

Entrepreneurs' Over-optimism During the Early Life Course of the Firm

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Abstract Recent research on cognitive biases in decision making suggests that over-optimism critically influences entrepreneurs' decisions to establish and sustain new firms. This paper looks at entrepreneurs' over-optimism during the early life course of the firm, in order to uncover the dynamics and persistence of over-optimism. We use a representative sample of start-ups in the Netherlands, which we divide into solo self-employed and employer firms. We find that while there is a persistence of over-optimism for the solo self-employed, namely initial over-optimists are more likely to be overoptimistic in subsequent periods; this is not the case for the employer firms.

1 Introduction

While some new firms prosper, most of them stagnate and die shortly after start-up. Several authors attribute this high share of failing start-ups to the over-optimistic expectations of their founders (De Meza and Southey 1996; Storey 2011; Dawson and Henley 2013). This is quite in contrast to the dominant line of reasoning in economics, which emphasizes “rational expectations”, i.e. that the predictions of economic actors about future values of economically relevant variables are not systematically wrong and that all errors are random. Much psychological evidence shows that subjects do not have rational expectations, but rather that they are unrealistically optimistic: ‘According to popular belief, people tend to think that they are invulnerable. They expect others to be victims of misfortune, not themselves’ (Weinstein 1980: 806). This hopeful outlook on life implies “a judgment error” which Weinstein called unrealistic optimism or optimistic bias. Interestingly, entrepreneurs are also regarded as economic actors specializing in judgmental decision making (Casson 1982). While overoptimism is positively associated with innovation, both at the micro and macro level (Dosi and Lovallo 1997), judgmental overconfidence is negatively linked to innovation (Herz et al. 2014).

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Overoptimism is a trend in the expectations, which are systematically estimated in a more optimistic manner with respect to the real potential of the projects (Pulford and Colman 1996). This personality trait of entrepreneurs has been highlighted in recent research due to the effect of their decision making on the performance of the company (Lowe and Ziedonis 2006; Hmieleski and Baron 2009; Landier and Thesmar 2009; Cassar 2010; Hogarth and Karelaia 2012; Hyytinen et al. 2014). On the one hand, it encourages the self-employed to follow their dreams and believe in their success, but, on the other hand, it also poses some problems for the sustainable growth and survival of new firms. The highly optimistic individuals tend to fail to recognize the true probabilities of future events. It enables them to discount with lower probabilities the lowest-profit probabilities, and to attribute unrealistically high probabilities to the high-profit events, luring them into risky situations with uncertain pay offs.

Does this trait of overoptimism change over time? Previous research shows that some entrepreneurs do learn to control their overoptimism and to account properly for the risk involved in their projects (Fraser and Greene 2006; Hmieleski and Baron 2009). According to Ucbasaran et al. (2010), having a failure serves to improve entrepreneurs' perception and attitude towards risk and is beneficial for their later performance as business-owners. However, this does not hold for all entrepreneurs. There are also examples of serial failures in the field, namely entrepreneurs who have consecutive failing businesses, who have a high level of over-optimism and do not learn from their experience (Ucbasaran et al. 2010).

So far the existing research is focused on the learning process after having had an entity, i.e. after entrepreneurial exit. It is interesting, however, if the entrepreneurs actually learn while they control their entity, namely if the learning actually happens when they see that their entity is underperforming (in comparison to their expectations) or are they overly optimistic and the learning process happens only after the (perhaps) more dramatic event of entrepreneurial exit? The aim of this paper is to analyze the relationship between initial optimism, as reported by the entrepreneurs, and the level of realism of their predictions of the future, measured as the discrepancy between their expectations for change in employment and realized employment growth. To do so, we will perform empirical tests on a large cohort of start-ups in the Netherlands. The insights from the analysis will contribute to a better understanding of optimism during the early life course of firms.

This paper contributes to the literature in two ways. The existing literature has taken a static view on over-optimism, by focusing on the differences in over-optimism between entrepreneurs and non-entrepreneurs, and as a determinant of exit. Our first contribution is to take a more dynamic view on over-optimism of entrepreneurs during the early life course of firms. Our second contribution is that we relate these over-optimism dynamics to other, non-varying characteristics of the firm and entrepreneur. In this paper, we consider whether entrepreneurial overoptimism is persistent over time (during the early life course of the firm) and

whether this overoptimism over time can partly be explained by individual and firm level characteristics. To do so, we trace the overoptimism of entrepreneurs during the first 6 years of the new firm's life course, and relate this to individual and firm characteristics. Our analysis considers optimism in three moments in time: during start-up (are business plan expectations met?), in the first 3 years after start-up and the subsequent 3 years (are growth expectations met, 3 years after forecast?). Despite the prevalence of research on overoptimism in a wide variety of investment decision-making situations (including entrepreneurial decisions), there has been little research on the persistence of this characteristic and its determinants over time.

Before looking into the empirics, the next section will consider the existing literature on the topic. It will be used as a basis for developing the hypotheses about the factors influencing over-optimism. Afterwards, the data used in the empirical analysis will be described, as well as the methodology used to analyze it. The next section discusses the empirical results and the implications for the literature. The paper finishes with concluding remarks outlining the relevance of the research and proposing further steps.

2 Literature and Hypotheses

Good judgment is one of the most important factors for a successful business. Managers evaluate projects all the time and make investment decisions based on the expected pay offs. The main factors determining the quality of the judgment are: 1) the knowledge about the environment; and 2) the knowledge of the personal capabilities (or experience) (Hogarth and Karelaia 2012).

The evaluation of the environment is based mostly on previous experience in the sector. The longer a person has worked in a certain environment, the better is the quality of her decision making, since the experience accumulated reduces the 'noise' in the environment. The importance of the evaluation of the environment is noted by Hogarth and Karelaia (2012), who point out that even when individuals are realistic about their capabilities, if their evaluation of the working environment is 'noisy', they tend to make wrong decisions which can evolve into serious monetary losses.

The evaluation of the personal capabilities also comes from the past experience of the decision maker: relative optimism diminishes with experience, since entrepreneurs learn about their capabilities (Fraser and Greene 2006). The experience, however, may not be always pleasant. Ucbasaran et al. (2010) shows that failure has a positive effect on the quality of decision making: entrepreneurs report being less over-optimistic since they can picture themselves failing. This affects the probability-distribution they perceive: it increases the probability of a bad-event happening and corrects for their negligence of those events. Furthermore, such an outcome is seen as a 'clear signal' that something is wrong (Sitkin 1992). This

encourages the entrepreneurs to re-evaluate their behavior and provides them with more knowledge about themselves, as well as about the environment.

However, not all authors agree that entrepreneurs can learn. According to Weiner (1986) entrepreneurs strive to keep their self-esteem and after a failure they tend to search for external facts that could have contributed to it instead of analyzing their own role in the situation. This serves as a barrier for acquiring knowledge on the (lack of) skills of the entrepreneur.

Over-optimism is seen as the tendency of individuals to see future outcomes in a more positive light than what could actually occur (Cassar 2010). This is related to the level of their over-confidence,¹ or their tendency to overestimate their ability to do well (Larwood and Whittaker 1977). According to Hmieleski and Baron (2009) high levels of over-optimism result in no learning effects for the entrepreneurs, since they focus on information that confirms their beliefs. Information that is contradictory is disregarded. This results in a biased analysis of the accumulated experience. So we hypothesize:

H1: Initial over-optimism of entrepreneurs is positively related to subsequent over-optimism in the early life course of the firm.

Furthermore, Storey (2011) argues that entrepreneurs do not learn. He pictures entrepreneurs as players in casino which derive satisfaction from “being at the table” and therefore do not try to analyze their capabilities in order to improve their future performance. However, most research in psychology on the relationship between risk propensity and optimistic biases shows that there is no clear evidence of the relation between the two within the overall human population, which seems to suggest that the two variables are not necessarily related (Hillman and Todesco 1999; Cohn et al. 1995). We hypothesize that:

H2: Risk propensity of entrepreneurs is positively related to over-optimism.

Bernardo and Welch (2001) describe the nature of the over-optimistic entrepreneurs as individuals more likely to diverge from the common behavior and use privately held information for decision making, rather than following the herd. They argue that this behavior decreases substantially in the cases when the “public information becomes sufficiently overwhelming” (Bernardo and Welch 2001: 13), otherwise it persists throughout the life time of individuals. From this it follows that without a major shock in the environment, the entrepreneurs will persist in their over-optimism and therefore we hypothesize that:

H3: Initial over-optimism and consequent over-optimism of entrepreneurs are positively related to subsequent measures of over-optimism in the early life course of the firm.

¹Overconfidence relates to the ancient concept of hubris (going back to Greek tragedies), and the recent hubris theory of entrepreneurship (Hayward et al. 2006), which incorporate three separate psychological processes: overconfidence in knowledge, overconfidence in prediction, and overconfidence in personal abilities.

3 Data and Methodology

3.1 Sample

The data represents a random sample of all companies registered as start-ups at the Dutch Chamber of Commerce. The observations have been collected through a questionnaire designed by the research institute EIM Business and Policy Research. Initially 10,642 firms were contacted, out of which 1938 took part of the survey (see also Bosma et al. 2004; Stam and Wennberg 2009). These firms have been surveyed annually, which allows for a longitudinal analysis of their development. After 6 years, the number of observations declined to 612 due to unresponsiveness of the initial participants. The reasons for this could range from failure of the company, to change of location (which has been an obstacle for tracing them), to decline to participate further in the process. This substantial reduction of observations raises some concerns with respect to survivor bias.

3.2 Measuring Optimism

Since the pioneering articles by Scheier and Carver (1985) and Scheier et al. (1994), the optimism literature has developed quite extensively. Optimism is seen as generalized positive expectations about future events (Scheier and Carver 1985). Optimistic bias may vary from one setting to the next (Weinstein 1980), while dispositional optimism is a psychological trait that lies at the heart of an individual's outlook on life in general (Puri and Robinson 2007). In this paper we are focusing on optimistic bias in the setting of the early life course of the firm.

Measuring over-optimism entails comparison between predictions for the future and the realized performance at a later stage. The first opportunity for such a measurement is provided by the parameters of the business plan. Usually entrepreneurs develop a business plan when they start a new company. It reflects their vision of the company aims for the intermediate future. In our survey, the entrepreneurs are asked how the company is performing with respect to the initial business plan. The answers corresponding to the company performing worse and much worse represent the initial over-optimism of the entrepreneurs. In our data set this characterizes 66 people out of 612 (or approx. 11%). The others evaluate their company as performing the same as the plan or better, meaning that they were not overestimating the possible results of their entity.

An important question to ask here is whether the initial over-optimism is related to the subsequent firm performance, and in particular if it is associated with higher firm exit. In the first year of this cohort (including 1938 new ventures) 314 respondents had been found to be over-optimists, which corresponds to 16% of the total sample. This means that 248 initial over-optimists have exited the sample during the first 6 years. They constitute 19% of the (1938 - 612 = 1326) non-survivors,

meaning that over-optimism is positively related to subsequent firm exit (see also Dawson and Henley 2013). This implies that our analyses of subsequent over-optimism suffer from survivor bias (as expected), which could result in underestimation of the strength of the relation between initial and subsequent over-optimism, given that a relatively large share of the initial over-optimistic entrepreneurs did not manage to create a viable business.

Considering the survivors, at the same moment when they are asked to reflect on the development of their company with respect to their business plan, they are also asked to make predictions for the future, such as what is the expected change of profit in the next year (increase, decrease or no change), as well as what are the aims of their entity in the medium run. As such they could evaluate the importance of increase/decrease of personnel, improving their own skills, enjoying their work, extending their property, increasing the quality of their products etc. The discrepancy between these consequent predictions and the actual performance of the companies in 3 years' time indicates the level of optimism of the entrepreneurs in that point of time. A change of attitude, from being overly optimistic in their business plan predictions to being realistic in that second prediction, would be an indicator of a learning process. In that line of thought, we can compare the predictions about sales and employment. The other expectation categories are rather weak estimators of firm performance. However, the survey does not ask directly about the expected sales, but about the relative levels of profitability. The latter concept is not a good indicator of the development of most start-ups. They do not aim at high profit margins. Their focus is directed towards ensuring the viability of their business. In most cases, the new entity barely breaks even in the initial years of its existence. Thus, the expectations for profit are not an appropriate indicator for the future development of this type of companies. On the other hand, the amount of personnel is something highly correlated to the sales performance of the companies. The ones which perform better increase the number of employees in order to be able to cover their enlarged business needs. Therefore the aim of hiring new people is a good indicator of the expected future development of the company.² Comparing this prediction to the realized employment change in 3 years provides us with our second measure of optimism, from now onwards called Optimism2. It indicates over-optimism when the entrepreneur aims at increase of personnel, but this increase is not realized in 3 years' time. This measure is comparable to the measures used by other studies on over-optimism. For example, Landier and Thesmar (2009) compare a new venture's actual growth with its initial growth expectations.

The relation between the accuracy of the initial business plan prediction and the accuracy of the second prediction could indicate if there is a learning process happening while the entrepreneurs are working in their company.

²Other studies take these growth expectations as a key indicator of ambitious entrepreneurship (see Stam et al. 2012 for a review). In this study we take a more cautious view, by emphasizing the degree to which these expectations are realized.

Table 1 Distribution of initial optimism and consequent optimism

Optimism2	Initial optimism business plan		
	0	1	Total
0	405	41	446
	91%	9%	100%
	74%	62%	73%
1	141	25	166
	85%	15%	100%
	26%	38%	27%
Total	546	66	612
	89%	11%	100%
	100%	100%	100%

The column variable in Table 1 represents the initial optimism measured as a comparison between the business plan and the performance of the company: 1 indicates over-optimistic behavior and 0 otherwise. The variable Optimism2 is built analogically: 1 represents over-optimism with respect to the expected increase in employees, while 0 all other cases. Based on this, we can see that there are 405 realists that kept on being realists in their second evaluation.³ Meanwhile, 141 (26%) of the realists became over-optimists while working in the company. The reasons could be initial luck, which increased their confidence and blurred their judgment. On the other hand from the initial over-optimists 25 are showing no learning behavior and kept their over-optimism. While 41 of the same group exhibit learning behavior, namely they improved their judgment. This means that in the population of initial over-optimists, 62% show learning behavior during the first years of their company. This could be attributed to the better insights from the work due to the accumulated experience, as we hypothesized. However, in order to be able to claim so, we should trace the persistence of this feature for at least two periods. While the second measure of over-optimism shows signs of divergence of behavior, this could as well be something different than learning (or non-learning). The noise could come from the abundance of factors that affect the initial years of development of the entity and therefore (may) affect the accuracy of judgment of the entrepreneur. However, those diminish in time and the perception of the entrepreneur becomes the main source of discrepancy between prediction and realization. Therefore, a consequent measure of judgment accuracy which provides with an overview of the trait on a longer time period could serve as an indicator of learning (or non-learning persistency). Such a measure could be retrieved from the data. The same process that enabled us to derive the second measure of optimism is available for developing a consequent measure: at the moment of judgment of accuracy of the second prediction (namely 3 years after the first questionnaire) the entrepreneurs are interviewed one more time and make predictions about the future.

³However, this could also be attributed to the fact that the individuals were lucky rather than having an accurate judgment (see Barney 1986).

At this moment they can see how accurate their judgment was and based on that knowledge, predict what will be the development of the entity in the next 3 years. Based on these expectations and the realized performance 3 years later, we were able to build Optimism3. The variable has the value of 1 when the entrepreneur expected to increase the number of employees and this did not happen, namely he was overoptimistic; and the value of 0 otherwise. It shows that there are 125 (or 20%) over-optimists at this third measurement point, versus 166 (27%) at the second measurement point and 66 (11%) at the initial point, namely the business plan. Would that mean that we have a learning curve?

To be able to claim so, we need to see how the accuracy of the predictions evolved in time. We can divide the sample into two groups: entrepreneurs who were over-optimistic in their business plan, and a group that does not possess this trait according to our measurement. Considering the initial over-optimists (outlined in Table 2), we can see that 62% of that group improved the accuracy of their judgment in the second measurement point. However, this improved performance was sustained only by 48% (or 32 people out of the 66 initial over-optimists) at the third measurement point. We call them ‘learners’ since the improvement of their judgment is persistent in time. The initial period may be prone to noise and the entrepreneurs may be claimed to be lucky in their accurate prediction. However, the persistence of this trait for more than one period cannot be classified as pure luck.

Considering the development of the other group, namely the entrepreneurs who were the non-over-optimists in their business plan (outlined in Table 3), we can see that there is a large group who were non-optimistic during the whole period, namely 57% (348 people out of the whole sample). This persistence of non-optimists results from the survivor bias present in the sample, according to which a large proportion of the over-optimists did not manage to establish a viable business. However, it is interesting to note that there is also a large group did suffer from a persistent deterioration of expectations, namely 9% (47) of the initial realists became persistently over-optimistic during the second and third measurement.

Besides the optimism levels of the entrepreneurs and their allocation of efforts, we also have information about their personal characteristics such as gender and age; their human capital (represented by their highest education level and if they

Table 2 Persistence of consequent optimism given being overoptimistic in the business plan

Optimism3	Optimism2		
	0	1	Total
0	32	13	45
	71%	29%	100%
	78%	52%	68%
1	9	12	21
	43%	57%	100%
	22%	48%	32%
Total	41	25	66
	62%	38%	100%
	100%	100%	100%

Table 3 Persistence of consequent optimism given being non-overoptimistic in the business plan

Optimism3	Optimism2		
	0	1	Total
0	348	94	442
	79%	21%	100%
	86%	67%	81%
1	57	47	104
	55%	45%	100%
	14%	33%	19%
Total	405	141	546
	74%	26%	100%
	100%	100%	100%

Table 4 Summary statistics

Variable	Obs	Mean	Std. dev.	Min	Max
OptimismBP (d)	612	0.108	0.310	0	1
Optimism2 (d)	612	0.271	0.445	0	1
Optimism3 (d)	612	0.204	0.403	0	1
Gender (d)	612	0.724	0.447	0	1
Age	612	1.792	0.768	1	3
Education (d)	612	0.286	0.452	0	1
Industry experience	612	1.982	0.914	1	5
Start-up capital	612	2.495	1.569	1	7
Unemployment (d)	612	0.114	0.319	0	1
Part time (d)	612	0.554	0.497	0	1
Self-employed (d)	612	0.838	0.369	0	1
Sector	612	69.516	18.922	20	99
Risk	612	3.755	0.773	1	5

(d) for discrete change of dummy variable from 0 to 1

have prior experience in the industry); the initial company characteristics (captured by the starting capital, the number of people in the first year and the sector of operations); and their risk propensity. The summary statistics for all variables is outlined in Table 4. Further information about the variables and a correlation table can be found in Appendix. The correlation exploration shows no high correlations between variables, making it possible to use all of them simultaneously in a regression model.

3.3 Model and Methodology

To determine the statistical significance of the initial level of judgment accuracy on the consequent one, we will use the following equation:

$$\begin{aligned} \text{Optimism}N_i = & \beta_0 + \beta_1 \text{Optimism}(N-1)_i + \beta_2 \text{OptimismBP}_i \\ & + \gamma \text{Control variables}_i + \varepsilon_i \end{aligned} \quad (1)$$

Where:

$\text{Optimism}N_i$ and $\text{Optimism}(N-1)_i$ capture the accuracy of the prediction of expected increase in employment in period N (and period N-1 respectively) of individual i . The value of the variable is equal to 1 if the entrepreneur is predicting increase in employment, but this has not been realized in the next 3 years. In that case there is a sign of being overly optimistic. In all other cases the variable has a value of 0.

OptimismBP_i measures the initial level of over-optimism of individual i captured by the business plan. It is equal to 1 when the entrepreneur believes the company is performing worse than outlined in the plan. In all other cases the variable has a value of 0.

$\text{Control variables}_i$ capture the demographics (gender and age), human capital (education and experience in the same industry), initial company characteristics (starting capital and sector of operation), initial commitment (unemployment before start and part-time involvement in the entity), and risk propensity of individual i .

ε is the stochastic error term, which is assumed to have a normal distribution and to be independent from all other covariates.

We estimate Eq. (1) as a probit model, which enables us to capture properly the dual nature of the optimistic variable. Since we cannot read directly the magnitude of the coefficients from our estimation, we perform a post-estimation of marginal effects (or elasticities). Each marginal effect is calculated at the means of the other independent variables.

The equation has been estimated separately for the solo self-employed individuals and the entities with more than one person employed in them (i.e. employer firms). We evaluate the belonging to either of the two groups based on the start-up year. This separation is important due to the differences between the two forms of entrepreneurial activity.

4 Results and Discussion

4.1 Solo Self-Employed

The first four models look at the sample of solo self-employed individuals (see table 5). The initial model estimates the relationship between initial optimism measured by the business plan and the consequent level of optimism. It shows a statistically significant influence of the initial level on the consequent level, namely an initially overoptimistic person has 14.5% higher probability of being overly optimistic in the consequent measurement of this trend, if she is compared to a

Table 5 Regression models 1–4: self-employed

Variables	Optimism2 (d)				Optimism3 (d)			
	Model 1		Model 2		Model 3		Model 4	
	Raw	mfX	Raw	mfX	Raw	mfX	Raw	mfX
Optimism2 (d)					0.804*** (0.140)	0.234*** (0.0448)	0.775*** (0.145)	0.219*** (0.0456)
OptimismBP (d)	0.411** (0.184)	0.145** (0.069)	0.413** (0.191)	0.143** (0.0710)	0.397** (0.197)	0.113* (0.0630)	0.407** (0.203)	0.114* (0.0637)
Gender (d)			0.114 (0.144)	0.0353 (0.0439)			0.00673 (0.160)	0.00162 (0.0385)
Age			-0.196** (0.0843)	-0.0619** (0.0265)			-0.0335 (0.0930)	-0.00807 (0.0224)
Education (d)			0.0282 (0.141)	0.00894 (0.0447)			0.120 (0.156)	0.0297 (0.0394)
Experience industry			-0.0168 (0.0681)	-0.00532 (0.0215)			-0.0683 (0.0763)	-0.0164 (0.0184)
Start-up capital			0.0723 (0.0496)	0.0228 (0.0156)			0.0661 (0.0544)	0.0159 (0.0131)
Unemployment (d)			-0.157 (0.189)	-0.0475 (0.0546)			0.462** (0.190)	0.130** (0.0604)
Part time (d)			-0.268** (0.135)	-0.0864* (0.0443)			-0.0939 (0.149)	-0.0229 (0.0367)
Sector			-0.00425 (0.00335)	-0.00134 (0.00106)			0.00139 (0.0038)	0.000335 (0.00092)
Risk			0.120 (0.0813)	0.0380 (0.0256)			0.146 (0.0898)	0.0350 (0.0216)

(continued)

Table 5 (continued)

Variables	Optimism2 (d)				Optimism3 (d)			
	Model 1		Model 2		Model 3		Model 4	
	Raw	mfx	Raw	mfx	Raw	mfx	Raw	mfx
Constant	-0.693*** (0.0639)		-0.548 (0.495)		-1.225*** (0.0870)		-1.879*** (0.561)	
Observations	513	513	513	513	513	513	513	513
Pseudo R ²	0.0083	0.0083	0.0521	0.0521	0.0807	0.0807	0.1096	0.1096

(d) for discrete change of dummy variable from 0 to 1
 Standard errors in parentheses
 ***p < 0.01, **p < 0.05, *p < 0.1

person who has a better initial judgment. This confirms hypothesis 1 and shows that the initially over-optimistic person has a lower probability to learn from her misjudgment. To test hypothesis 3, namely if there is persistency in the over-optimism trait, model 3 extends model 1 by including all three measures of over-optimism in one model. It shows that the trait is persistent in time and the probability of an individual being overoptimistic in the third time period is twice more probable if the individual had shown that trait in the second measure versus if he had it in the first measure. This time-discrepancy shows the higher importance of the closest periods for the current judgment. Furthermore, these results show that individuals, who start as being over-optimistic, have a lower propensity to learn and are prone to carry this trait forward in time. Therefore, this provides evidence for hypothesis 3.

Model 2 and 4 extend the first two models by including controls for the demographics of the entrepreneur (gender and age), his human capital (education and previous experience in the industry), company effects (start-up capital and sector), commitment reasons (unemployment and part-time), and risk-taking propensity. Both models show a persistent impact of initial over-optimism on the consequent measurements of over-optimism. Furthermore, the trend revealed by model 3, namely the higher importance of the optimism trait in closer time periods, is also present in model 4: initial over-optimists have 11.4% higher probability of being over-optimistic at our third measure of the trait, while over-optimists in the second measure have a twice as big probability, 21.9%.

Model 2 also shows a statistically significant negative effect of working part time on the levels of over-optimism, while controlling for the previous levels of optimism. An entrepreneur working part time has 8.6% less probability of being over-optimistic during the initial period of the entity, than one working full time. However, model 4 shows that this impact is not present on the consequent level of optimism, which measures the trait in the time span after the first 3 years of the entity. However, model 4 reveals that if the individual was unemployed before the start of the entity, she is 13% more prone to be overly optimistic in our last measure of the trait.

Considering all the indicators, it is important not to forget the risk propensity of the entrepreneur. Her judgments, and the extent to which she is optimistic, are likely to be correlated to his risk preferences. Therefore both model 2 and model 4 consider this personality trait of the entrepreneur. The variable categorizes the risk propensity of the entrepreneur into five different levels, from low to high. The effect of this, however, is not statistically significant for the probability of the solo self-employed entrepreneur being overly optimistic in the second measure of the trait (Optimism2). There is also no indication of statistically significant impact of the risk propensity on our last measure of optimism (Optimism3). Therefore, overall there is no evidence for hypothesis 2.

4.2 Employer Firms

In the next four models, namely model 5 to model 8 (see table 6), we consider the optimism levels of the entrepreneurs who have a firm with more than one full-time

Table 6 Regression models 5–8: employer firms

Variables	Optimism2 (d)						Optimism3 (d)						
	Model 5		Model 6		Model 7		Model 8		Model 7		Model 8		
	Raw	mfx	Raw	mfx	Raw	mfx	Raw	mfx	Raw	mfx	Raw	mfx	
Optimism2 (d)								0.0418 (0.277)	0.0151 (0.100)			-0.0179 (0.321)	-0.00638 (0.114)
OptimismBP (d)	0 (0.399)		-0.214 (0.459)		-0.0719 (0.146)		0.0311 (0.400)		0.0112 (0.145)			0.0132 (0.414)	0.00470 (0.148)
Gender (d)			-0.0917 (0.394)		-0.0326 (0.142)							-0.305 (0.391)	-0.113 (0.149)
Age			0.420** (0.194)		0.147** (0.0683)							0.162 (0.199)	0.0579 (0.0709)
Education (d)			0.281 (0.341)		0.102 (0.126)							0.00554 (0.333)	0.00198 (0.119)
Experience industry			0.224 (0.184)		0.0785 (0.0647)							0.169 (0.167)	0.0602 (0.0596)
Start-up capital			-0.298*** (0.0907)		-0.105*** (0.0315)							0.0668 (0.0909)	0.0238 (0.0324)
Unemployment (d)			0.0358 (0.913)		0.0127 (0.326)							-	-
Part time (d)			-0.380 (0.403)		-0.125 (0.121)							0.0416 (0.407)	0.0149 (0.147)

working employee (including themselves). The models are estimated analogically to the one related to the solo self-employed entrepreneurs. While the first two consider the traits related to our second measure of optimism (Optimism2), the last two consider the factors associated with our third measure of optimism (Optimism3). None of the models show any impact of previous levels of over-optimism on consequent levels of the trait. Therefore, we can reject hypothesis 1 and 3 for the owners of multiperson companies. This is in contrast with the results for the solo self-employed entrepreneurs, where we found that the previous levels of over-optimism are related to later levels of the trait, as well as we found that the time span is of great importance for the intensity of the relationship. Furthermore, the models show no statistically significant relationship between risk propensity of the entrepreneur and his optimism levels, which results in rejection of hypothesis 2.

However, when we look at the second measure of optimism, two other covariates emerge as important: the start-up capital of the entity and the age of the entrepreneur (see model 6). Entrepreneurs with higher levels of start-up capital seem to be less over-optimistic. Older entrepreneurs strike as more over-optimistic. Never the less, those two characteristics do not persist as important for our last measure of optimism (Optimism3). Therefore, we can deduct that they are important during the initial years of the firm, but not later on. Lastly, the relationship that we found between unemployment before starting the entity and consequent levels of optimism; and between part-time work and later over-optimism for the solo self-employed entrepreneurs are not present for the entrepreneurs heading a firm with more than one full time working individual.

Over all, we can see that employers and solo self-employed entrepreneurs exhibit different traits. Table 7 reviews the empirical evidence for our hypotheses. We find strong persistence in over-optimism during the early life course of the firm, even after controlling for a large set of other variables, for the solo self-employed entrepreneur. However, this is not the case for the entrepreneurs involved in multiperson firms. Furthermore, we did not find any relation between risk preferences and the optimism levels of the two types of entrepreneurs.

Table 7 Hypotheses and empirical evidence

Hypothesis	Evidence	
	Self-employed	Employer firms
H1: Initial over-optimism of entrepreneurs is positively related to subsequent over-optimism in the early life course of the firm	+	0
H2: Risk preference of entrepreneurs is positively related to over-optimism	0	0
H3: Initial over-optimism and consequent over-optimism of entrepreneurs are positively related to latter measures of over-optimism in the early life course of the firm	+	0

5 Conclusion

The aim of this paper was to analyze the relationship between initial optimism and the level of realism of their predictions of the future, measured as the discrepancy between their expectations for change in employment and realized employment growth.

Over-optimism is said to be more prevalent amongst self-employed than amongst employees, and is likely to have a negative effect on the survival of newborn firms. But is this over-optimism homogeneous amongst the population of firm founders, and is it persistent during the early life course of the firm? Over-optimism is persistent once present, by diminishing the learning capabilities of the individual and providing her with an idea of more positive future outcomes than probable.

We have taken a more dynamic view on over-optimism of entrepreneurs than previous studies, by analyzing overoptimism during the early life course of firms. Our study reveals that initial over-optimism of entrepreneurs is positively related to subsequent over-optimism in the early life course of the firm, and that initial over-optimism and consequent over-optimism of entrepreneurs are positively related to latter measures of over-optimism in the early life course of the firm. However these findings only hold for solo self-employed, not for founders of employer firms. Over-optimism doesn't seem to be related to previous levels of overoptimism for founders of the employer firms. The over-optimism of founders of employer firms is reduced by those with relatively high start-up capital.

This study shows that overoptimism tends to be affected by the commitment of the entrepreneur to the new entity, with hybrid entrepreneurship showing a positive effect on improving the accuracy of decision making in the short term by keeping the individual more realistic with respect to the probable outcomes. However it does not affect the later accuracy. Previous research allocates the hybrid type of entry to individuals who feel the need to test the environment and their skills before they commit themselves fully (Folta et al. 2010). This seems to be a good technique for controlling the accuracy of expectations. However, this does not mean that more accurate decision making would lead to more profitable outcomes.

These findings can be related to a more outside view of hybrid entrepreneurs in contrast to full-time solo self-employed, lowering their biases in expectation (cf. Cassar 2010), both initially and over time. Founders of employer firms reveal to be more overoptimistic initially, but there seems to be no persistence of overoptimism for them, as it is for solo self-employed. Having high levels of start-up capital even seems to decrease over-optimism during the early life course, possibly also explained by a stronger outside view and enforced by external financiers.

Appendix

Description of variables

Variable name	Definition
OptimismBP	Captures the initial level of optimism measured by the fulfillment of the business plan. 1 indicates over-optimism; 0 otherwise
Optimism2	Represents the levels of optimism at the time of the first questionnaire. It is measured by the consequent fulfillment of the expected change of employees. 1 indicates over-optimism; 0 otherwise
Optimism3	Represents the levels of optimism at the time of the second questionnaire. It is measured by the consequent fulfillment of the expected change of employees. 1 indicates over-optimism; 0 otherwise
Gender	Dummy variable: 1 = male; 0 = female
Age	Categorical variable dividing the population into three groups, namely below 35, between 35 and 44, and older than 45
Education	Captures the higher level of education. Dummy variable: 1 = university degree; 0 = lower level of education
Industry experience	Captures if the entrepreneur has experience in the same industry as the one his/her company is currently operating in. The variable categorizes the experience into five levels, ranging from very little experience to high experience.
Start-up capital	Categorical variable separating the starting capital into seven different classes.
Self-employed	Captures if the individual is self-employed in the year 1994 or the firm has employees. 1 indicates self-employed, 0 otherwise.
Sector	Two digit industry classification
Unemployed	Dummy variable: has the value of 1 if the entrepreneur was unemployed right before engaging in his current position
Part time	Captures if the entrepreneur is working full time as such, or has another commitment. The variable has a dummy character, with 1 denoting working part time.
Risk propensity	Represented by a categorical variable, which captures the relative amount of risk taking of the entrepreneur. 1 indicates a very weak inclination to risk taking; and 5 very strong.

Correlation table for all variables

Variable	Obs	OptimismBP (d)	Optimism2 (d)	Optimism3 (d)	Gender (d)	Age	Education (d)	Industry experience	Start-up capital	Unemployment (d)	Part time (d)	Self-employed (d)	Sector
OptimismBP (d)	612	1											
Optimism2 (d)	612	0.0841	1										
Optimism3 (d)	612	0.0983	0.2288	1									
Gender (d)	612	0.0027	0.0562	0.0228	1								
Age	612	-0.0021	-0.0649	-0.0320	0.0663	1							
Education (d)	612	0.0947	0.0043	0.0382	0.0269	0.1475	1						
Industry experience	612	0.0587	-0.0121	-0.0344	-0.1202	0.0087	0.0797	1					
Start-up capital	612	0.0179	0.0464	0.1373	0.1740	0.0243	-0.0199	-0.1512	1				
Unemployment (d)	612	-0.0091	-0.0345	0.0599	-0.0077	0.0503	0.0339	0.0127	-0.0676	1			
Part time (d)	612	-0.0589	-0.1327	-0.1243	-0.2087	0.1000	0.0223	0.1694	-0.4441	-0.0080	1		
Self-employed (d)	612	-0.0189	-0.0614	-0.1297	-0.0927	0.0662	0.0423	0.0788	-0.4697	0.1160	0.3199	1	
Sector	612	0.0540	-0.0651	0.0095	-0.2207	-0.0101	0.1805	0.0471	-0.1677	-0.0261	0.1808	0.0923	1
Risk	612	-0.0056	0.0556	0.1083	0.0642	-0.0995	0.0042	-0.0850	0.0880	0.0077	-0.1230	-0.0302	-0.0515

(d) for a dummy variable with values 0 and 1

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