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The Bright but Right View? A New Type of Evidence on Entrepreneurial Optimism

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Abstract

Existing empirical evidence suggests that entrepreneurs are optimists, a finding researchers often interpret as evidence of a behavioral bias in entrepreneurial decision-making. We revisit this claim by analyzing an unusually large survey dataset (180,814 responses) that allows us to create a good measure of entrepreneurial optimism. Our measure is based on the individual's beliefs about *nationwide* economic conditions, unlike measures that prevail in the literature of an individual's beliefs about *her personal* future economic conditions. Beliefs about *nationwide* economic conditions form a good measure of optimism because they are completely uncorrelated with the individual's own life or work situation (which is not optimism) and therefore do not respond to an individual's objective situation, which may affect beliefs about *her personal* future economic conditions. Our data highlight the importance of measuring optimism correctly. About half of the survey respondents differ in their beliefs about nationwide and own conditions. In addition, our measure of optimism makes it possible to relate an individual's beliefs to actual outcomes. We can thereby test, in a novel way, whether entrepreneurial optimism is a behavioral bias or not. We show that entrepreneurs have more favorable beliefs about nationwide conditions and then that these entrepreneurs' beliefs are relatively good predictors of the future. We conclude from these two findings that entrepreneurs are less biased towards optimism than non-entrepreneurs are biased towards pessimism. Additional evidence pertaining to education, which arguably correlates positively with rational decision-making, supports this conclusion. We show that entrepreneurs are more educated and their beliefs about the future are more similar to educated peoples' beliefs. In summary, our paper documents that entrepreneurial optimism is an important real-world phenomenon, yet, it may not be a behavioral bias that gives rise to irrational decision-making.

JEL: C83, D84, E27, L26

Keywords: Entrepreneurship, forecast, optimism, survey data

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I. Introduction

It is often argued that entrepreneurs need to have an optimistic personality.¹ This optimism has been proposed as an important explanation to who chooses to become an entrepreneur, how entrepreneurs in general behave, and why so many people enter into entrepreneurship despite the high failure rate of newly started firms (Camerer and Lovallo, 1999; Hayward et al., 2006). In the casual definition, an optimist is a person who looks at life from the bright side. But a stricter and more formal definition, on which academic researcher typically rely, defines an optimist as a person who “revises up the probability of favorable events and revises down the probability of unfavorable events” (Hey, 1984).² With this definition, optimism is a behavioral bias that manifests irrationality, because a person’s revision errors differ systematically across types of events.

The idea that a behavioral bias of optimism could affect entrepreneurship has solid theoretical support. As compared to regular employees, entrepreneurs receive larger work rewards from the realization of a favorable event, but they also stand more to lose following the realization of an unfavorable event. One reason for this greater sensitivity is that entrepreneurs hold residual cash flow rights (i.e., shares and options) in their firms. Another reason is that entrepreneurs make large firm-specific investments of their human capital, the value of which depends on the firm’s performance. Entrepreneurs also receive non-pecuniary work benefits, which are forgone if the firm goes out of business (Hamilton, 2000; Moskowitz and Vissing-Jorgensen, 2002; Hurst and Pugsley, 2010). For all these reasons, entrepreneurship is an attractive form of occupation for people who, due to irrational optimism, revise up the probability of favorable events.³

Several empirical papers have tested the expectation that entrepreneurs are optimists (Cooper, Woo and Dunkelberg, 1988; Busenitz and Barney, 1997; Camerer and Lovallo, 1999; Arabsheibani et al., 2000; Fraser and Greene, 2006; Puri and Robinson, 2006; Koellinger, 2008; Crane and Crane, 2007; Trevelyan, 2008; Ucbasaran et al., 2010; Cassar, 2010). The main finding from existing work is that entrepreneurs hold beliefs about their own life or work situations that are significantly more favorable than the beliefs of non-entrepreneurs. This finding is often cited as supportive of the claim that entrepreneurs have an optimism bias and, thus, are irrational in their decision-making.

In this paper, we challenge this conclusion. Our basis is that most of the existing evidence on entrepreneurial optimism suffers from two methodological problems. We highlight and discuss each of these two problems, and then present novel empirical results that (at least partially) resolve them. Our main takeaway is that entrepreneurs are optimistic in the casual definition, but *not* necessarily optimistic

¹ See for example: <http://blog.bradleygauthier.com/optimism-the-single-most-important-factor-to-an-entrepreneurs-success/>

² The optimism bias is sometimes also referred to as over-confidence or hubris, although some studies make a distinction between these concepts (with overconfidence referring to the precision/accuracy of beliefs).

³ Similar reasoning predicts that entrepreneurs should have lower risk-aversion and greater locus of control.

in the formal definition that implies a behavioral bias. Rather, our evidence suggests that entrepreneurs are more rational than non-entrepreneurs in how they form their beliefs.

The first methodological problem that plagues much of existing research on entrepreneurial optimism is one of bad measurement. The common way to measure optimism is to ask a person's questions about how she believes her own situation is currently or will be in the future. For example, Arabsheibani et al. (2000) and Fraser and Greene (2006) define an optimist as someone who thinks her prospects for the coming year are better than present. Ucbasaran et al. (2010) defines an optimist as someone who thinks that her business has greater success chances than any other business like hers. Trevelyan (2008) measures optimism by aggregating responses to questions such as "I always look on the bright side of things" and "I [...]expect things to go my way". Using a different approach, Puri and Robinson (2006) use a person's subjective life expectancy to measure optimism.

The problem is that these types of measures confound a person's objective situation with her subjective beliefs about this situation. Only the latter captures optimism according to Hey's formal definition of this behavioral bias. However, the former is likely the first-order determinant for why people have different beliefs about their own future. To illustrate this concern, suppose a researcher found that people who recently had large lottery wins had more favorable beliefs about their future. It would obviously be wrong to conclude that these people had the behavioral bias optimism because their future would most likely be brighter. Because an econometric test cannot perfectly control for differences in the sample in objective life or work situations, it could be problematic to rely on such measures to identify an optimism bias.

The problem of bad measurement plagues any study that uses subjective beliefs about a person's own situation as a measure of optimism. However, it may be particularly problematic for studies of optimism in the context of entrepreneurship. The issue is that a simple theoretical model could predict precisely that entrepreneurs have a better objective situation than others. Consider a world where fully rational individuals are employed in existing firms. Suppose a random subset of these individuals receives an entrepreneurial opportunity that can only be exploited if they start a new firm. The individuals in this subset would then (1) choose to become entrepreneurs and (2) have better opportunities than individuals in the non-entrepreneurial subset. Hence, a test based on the individual's own situation (i.e., the bad measure of optimism) would incorrectly show that entrepreneurs have irrational optimism, even though the model assumed full rationality.

The second methodological problem in existing research is that entrepreneurs who appear optimistic in the data could be relatively accurate in their beliefs, i.e. not suffer from a behavioral bias in decision-making. It is possible, and even plausible, that instead non-entrepreneurs suffer from the bias of

pessimism.⁴ Research in psychology suggests that pessimism could help a person to help cope with uncertainty and anxiety (Norem and Cantor, 1986, 1989). But such behavioral bias may be costly for entrepreneurs because they must be able to make informed, intelligent decisions that improve the success chances of their businesses (Sternberg, 2004; Baum and Bird, 2009).

Importantly, an empirical test that relates beliefs to entrepreneurship cannot distinguish between entrepreneurial optimism and non-entrepreneurial pessimism. But this is an important distinction, because the assumption about entrepreneurial optimism matters for several policy questions related to how society could best promote entrepreneurship. For example, consider the policy question of how entry into entrepreneurship would respond to education/training of individuals' analytical thinking, a concept closely related to rationality. If it were true that entrepreneurs are irrationally optimistic, then this effort could decrease the number of entrants into entrepreneurship. If, by contrast, non-entrepreneurs were irrationally pessimistic, then this effort could increase entry. Another example is how entrepreneurs respond to signals about their firm's future outcomes. Their response may be more aggressive if they were irrationally optimistic than if they were rational in their decision-making. Entrepreneurial optimism may also matter for financial contracting: an irrationally optimistic entrepreneur may accept a contract that gives the investor strong downside protection (Landier and Thesmar, 2009; Bengtsson and Bernhardt, 2012)

It is a challenging task to empirically resolve the two above-discussed methodological problems. The researcher needs to access data on beliefs, to measure optimism, and outcomes, to test whether such beliefs are accurate or inaccurate (i.e., optimism bias). The challenge is that beliefs and outcomes must be measured on a situation unrelated to a person's own situation, because of the first methodological problem. But the data must also cover many such objective situations so the researcher can relate beliefs to outcomes with less statistical noise, to resolve the second methodological problem. Suppose a person correctly predicts a future situation to have a positive outcome. Based on this observation alone, it is impossible to infer whether the person has beliefs that are rationally unbiased or irrationally optimistic. One needs data on more situations to separate statistical noise from behavioral bias.

This paper resolves, at least partially, these two problems. We do so by analyzing an unusually large survey-based dataset from Swedish National Institute of Economic Research in Sweden, which includes 180,814 responses from 153 monthly surveys conducted between January 1996 and October 2009. In addition to its large size and scope, the dataset offers two unique advantages for research. Firstly, it includes survey questions that allow us to measure optimism in a way that is completely unrelated to a person's own situation, thus resolving the first methodological problem. Concretely, we measure optimism

⁴ The definition of "a pessimist is someone who "revises up the probability of unfavorable events and revises up the probability of unfavorable events" (Hey, 1984).

by a person's belief about how the economic situation in Sweden will be one year from the survey date.⁵ Although the Swedish population as a whole obviously influences this situation, no individual Swede is sufficiently important to influence it. By using this measure and controlling for survey fixed effects (i.e., year-month dummies), we eliminate the impact of the person's objective situation on the optimism measure. Secondly, because our data covers a large time span with many surveys, we can test how ex-ante beliefs relate to ex-post outcome in a sample of several observations. This allows us to identify whether entrepreneurs have the optimism bias or non-entrepreneurs have the pessimism bias. We can therefore resolve the second methodological problem.

Our approach has some shortcomings. Firstly, we study only one specific dimension of optimism – a person's beliefs about nationwide economic conditions. Although arguably important for entrepreneurship, this represents only one optimism dimension of many that would be interesting to study. For example, if such data were available to us, we would have liked to investigate a person's beliefs about his or her ability to work hard or come up with a new entrepreneurial idea. Secondly, our measure of optimism captures in essence a person's macro-economic forecasting ability. Our approach thereby confounds differences across people with respect to their information about macro-economic conditions and their optimistic interpretation of such information, respectively. It could be that we find entrepreneurs to be more optimistic than non-entrepreneurs because they have better information about national or international politics, general business news or monetary policies, perhaps as a result of stronger incentive to collect such information. But better information about nationwide conditions means that entrepreneurs presumably think more rationally and make economic decisions in more in a rational sense, which is precisely the point we make in this paper. Hence, our view is that our measure – although not perfect – captures well a dimension of optimism that is relevant for entrepreneurship.

Our main findings are as follows. We first show that our measure of optimism is markedly distinct from the measure based on questions about a person's own situation, which are also included in the surveys. We find that the correlation between beliefs about the Swedish economic situation one year ahead (i.e., our measure of optimism) and beliefs about a person's own economic situation one year ahead is only about 0.2. We tabulate these measures and show that a majority of the survey respondents (53%) state different beliefs for these two situations. From this analysis we conclude that it matters both conceptually and empirically that optimism is correctly measured.

We then use our measure of optimism to show that entrepreneurs hold more optimistic beliefs than non-entrepreneurs. The result is economically and statistically significant, and holds in a univariate comparison and in multivariate tests that include a battery of demographic controls and survey time

⁵ Optimism that applies to general phenomena is sometimes referred to as dispositional optimism, which contrasts situational optimism. For brevity, our paper does not discuss this distinction in detail.

dummies. It also holds robustly in tests based on subsamples formed on age, educational level, income, region, and household status. Thus, we confirm the finding from the prior literature on entrepreneurship and optimism, but we do so with a measure of optimism that does not suffer from the first methodological problem we have discussed.

We then run tests that resolve the second methodological problem—the concern that results on optimism are not necessarily evidence of irrationality and bias in decision-making. We do this by comparing a person’s beliefs about the Swedish economic situation a year ahead with the ex-post realized outcome. We use GDP growth as our proxy for Sweden’s economic situation. We define a person as being less biased if he or she has lower forecast error about the future Swedish economy. We find that entrepreneurs have lower forecast errors than non-entrepreneurs. The smaller errors mean that entrepreneurs’ beliefs are, in general, more accurate than the beliefs of non-entrepreneurs.⁶ Combined with our finding that entrepreneurs are relatively more optimistic, this result points to entrepreneurial optimism not being a strong irrational bias (at least compared to the irrational bias of non-entrepreneurial pessimism).

In summary, our findings confirm the viewpoint that entrepreneurs are optimistic using the casual definition, but not in the definition that imply a behavioral bias in decision-making. Hence, our conclusion is that the bright view of entrepreneurs appears closer to the right view. We present three additional results pertaining to education and optimism that confirm this conclusion. Firstly, entrepreneurs are more educated than non-entrepreneurs. Secondly, more educated people are more optimistic than less educated people, using our measure of optimism. Thirdly, more educated people make smaller forecast errors than less educated people. Combined, these results show that entrepreneurs hold beliefs that are similar to those educated people hold. Under the plausible assumption that education correlates positively with rationality, due to selection or treatment, this is additional evidence that entrepreneurial optimism is not a behavioral bias but rather rational decision-making.

As with any empirical study, our paper derives its findings in a dataset with limitations in its scope. Concretely, we study one country, Sweden, and one period in time, 1996-2009⁷. During this time frame, Sweden experienced a period of mostly positive GDP growth (see Figure 1 for a plot). This explains why optimistic entrepreneurs, who predicted such positive growth, are more accurate than pessimistic non-entrepreneurs. This also means that if we were to study a sample with predominantly negative GDP growth, we would likely have found that entrepreneurs are less accurate. However, it is important to note that most regions in the world during most periods experience positive GDP growth (see Figure 2). Hence,

⁶ An important caveat is that we cannot interpret our finding on forecast ability as evidence that entrepreneurs are rational in any absolute sense, only relatively more rational than non-entrepreneurs.

⁷ We note that our sample window includes two negative events: The dot-com crash of 2001, which affected Sweden due to its relatively large high-tech sector, and the recession of 2007–2008.

for most (but admittedly not all) hypothetical samples one could study, the conclusion would be that entrepreneurial optimism is more accurate than non-entrepreneurial pessimism.

Our paper contributes to the literature on optimism, which is vast and spans many academic areas.⁸ It is beyond the scope of our paper to review all related studies. We note that our findings relate to theoretical models on entrepreneurial optimism (Landier and Thesmar, 2009; Dushnitsky, 2010). Our paper shows that a model assumption that entrepreneurs are relatively optimistic is supported by the data, however, an assumption that they this optimism is a bias is not supported. A better model assumption is that non-entrepreneurs have a pessimism bias.

Our paper is also directly related to papers that test how entrepreneurial optimism changes with experience (Fraser and Greene, 2006; Ucbasaran et al., 2007, 2010). From a conceptual standpoint, the relationship between optimism and experience depends on whether optimism is a behavioral bias or not. If it is a bias, then it may be that more experience should diminish it. But if it is not a bias, then it may remain unchanged with experience. Our paper supports the latter view, consistent with the Ucbasaran (2010) who show that serial entrepreneurs (i.e., people with prior start-up experience) do not adjust their optimism following a failure.

We also add to prior studies on how cognitive traits matter for selection into entrepreneurship, and for how entrepreneurs behave. In addition to optimism, researchers have documented that two cognitive traits are especially strong for entrepreneurs: low risk aversion (Rees and Shah, 1986; Begley and Boyd, 1987; Stewart et al. 1999; Van Praag and Cramer 2001, Cramer et al. 2002, Caliendo et al. 2009; Roach and Sauermann, 2011), and greater locus of control (Brockhaus, 1980; Mueller and Thomas, 2001). Common for all these traits are that they allow a person to handle a project, such as starting a new business, that has a high uncertainty in payoffs. But there is an important distinction between the traits: only optimism could be a manifestation of irrationality, whereas risk aversion is a preference and locus of control an attitude.

Finally, the methodology on forecast errors we use in this paper is related to the literature on how people form their forecasts about macro-economic conditions. Mincer Zarnowitz (1969) propose a linear regression to analyze the so called absolute accuracy of forecasts compared to cardinal measures of outcomes⁹. We cannot explicitly implement this approach due to our ordinal data, but rather use a probit model to quantify the probability that being an entrepreneur entails in making smaller forecast errors ex-post.

⁸ Weinstein (1980) summarizes early papers on optimism. Good reviews of recent papers are found in Petersen (2000) for psychology, Scheier and Carver (2006) for health, and de Meza and Southey (1996) and Barberis and Thaler (2003) for finance/economics.

⁹ The linear regression in this setting is the basis of tests of the Weak and Strong Form of Rational Expectations, for example see Batchelor Dua (1991).

The remainder of the paper is structured as follows. Section II develops testable hypotheses based on a theoretical framework. Section III describes the data. Section IV presents our measure of optimism and discusses its conceptual advantages. Section V presents results of empirical tests. Section VI ends with a brief summary of the paper and a conclusion.

II. Theory

In this section we derive hypotheses about the optimism bias and entrepreneurship. Our goal is not to write down a formal theoretical model, but to present a stylized framework that can explain our intuition. We focus on two hypotheses that can readily be tested with our data.

To begin, we consider a group of individuals. Each individual chooses between engaging herself in an entrepreneurial project or doing nothing. The entrepreneurial project has two possible states of the world, success, S, and failure, F. The individual's ex-post utility is $Utility(S)$ if the project is successful and $Utility(F)$ if it fails, with $Utility(S) > Utility(F)$. Her utility from not undertaking the project is $Utility(N)$, which is randomly drawn from some statistical distribution. The individual makes her decision about the project based on expected utility theory. She will do the project only if her expected utility from the project is higher than $Utility(N)$.

Now consider that the individual could be one of two personality types: an optimist (O) and a pessimist (P). Each type faces the same project and draws $Utility(N)$ from the same distribution. The type affects how she assigns subjective probabilities to each state of the world of the project.

$$\begin{aligned} \text{Probability}(S | O) &> \text{Probability}(S | P) \\ \text{Probability}(F | O) &< \text{Probability}(F | P) \end{aligned}$$

Importantly, we do not make an assumption at this point how the perceived probabilities relate to the true probabilities of the project's success and failure, respectively. Hence, it is possible that an optimist could assign probabilities of success that are either biased upwards or accurate. Similarly, a pessimist could assign probabilities of failure probabilities that are either biased downwards or accurate. Obviously, both individuals cannot assign accurate probabilities to a state of the world. The optimist's ex-post utility of the project is:

$$\text{Probability}(S | O) * \text{Utility}(S) + \text{Probability}(F | O) * \text{Utility}(F)$$

The pessimist's ex-post utility of the project is:

$$\text{Probability}(S | P) * \text{Utility}(S) + \text{Probability}(F | P) * \text{Utility}(F)$$

The expected utility of the project is higher for the optimist than for the pessimist. As a result, there will be more optimists than pessimists for whom the random draw of $Utility(N)$ is below the expected utility. Hence, more optimists will choose the entrepreneurial project.

Hypothesis 1: An entrepreneur is more likely to be relatively optimistic than a non-entrepreneur.

Before we proceed, we make a couple of clarifying remarks about how to interpret hypothesis 1. Firstly, we derive it without making any assumptions about whether the optimist's or pessimist's probabilities are rationally unbiased. Secondly, we derive it in a framework that could describe either a situation of entry into the entrepreneurial project or a situation of exit out of it.

We next relate the probabilities each individual assigns to the actual probabilities. We here contrast two scenarios. Under scenario 1, optimists have an optimism bias in how they assign probabilities about the states of the world of the project. Pessimists have no such bias, so their probabilities are accurate.

$$\begin{aligned} \text{Probabilities}(S | O) &> \text{Probabilities}(S) = \text{Probabilities}(S | P) \\ \text{Probabilities}(F | O) &< \text{Probabilities}(F) = \text{Probabilities}(F | P) \end{aligned}$$

These probabilities mean that an optimist will make two types of mistakes. She too often predicts the project to be successful and too seldom that it fails. A pessimist makes no mistakes. Because people who choose the entrepreneurial project are more likely to be optimists (per hypothesis 1), they are wrong more often in their predictions as compared with people who don't choose the project.

Hypothesis 2a: If the bias is entrepreneurial optimism, then an entrepreneur is less often right in her beliefs than is a non-entrepreneur.

Under scenario 2, optimists assign accurate probabilities but pessimists have a pessimism bias.

$$\begin{aligned} \text{Probabilities}(S | O) &= \text{Probabilities}(S) > \text{Probabilities}(S | P) \\ \text{Probabilities}(S | O) &= \text{Probabilities}(S) < \text{Probabilities}(S | P) \end{aligned}$$

With this bias, a pessimist too seldom predicts the project to be successful and too often that it fails. An optimist makes no mistakes. People who choose the project are optimists so their probabilities would be more often a correct prediction of the future as compared with people who don't choose the project.

Hypothesis 2b: If the bias is non-entrepreneurial pessimism, then an entrepreneur is more often right in her beliefs than is a non-entrepreneur.

In our framework, hypothesis 2a and 2b are mutually exclusive. A test of which hypothesis is most supported by the data provide evidence on the question of whether entrepreneurial optimism is rational or a behavioral bias.

III. Data

Sample Construction

Our data come from monthly surveys conducted by the Swedish National Institute of Economic Research (NIER), a government agency responsible for analyzing and predicting macro-economic conditions. The data is a subset of a survey that probes Swedish households about their purchasing plans for the coming twelve months. The purpose of the survey is not to study optimism and entrepreneurship, but rather to create measures of current and future macroeconomic conditions. To ensure the validity of

such measures, NIER has as its stated objective that every survey must be representative of the Swedish population.

The survey is carried out monthly by phoning randomly chosen respondents. We analyze the surveys that were collected between January 1996 and September 2009. Before January 2002, Statistics Sweden, a government agency, was in charge of collecting the data. It phoned about 1,500 individuals from the population registry. The mean response rate during that time was 97%. The sampling procedure was changed in January 2002 when GfK, a professional survey firm, took over. It phoned a random selection of Swedish telephone numbers and persisted until responses had been obtained from 1,500 individuals. These random sampling methods, combined with the exceptionally high response rate, imply that our data is free from selection bias, a problem that plagues most other survey-based research studies. A drawback of our data is that they are completely anonymous, so we cannot link the entrepreneurs in our sample to information about their firms. Another drawback is that each survey samples new individuals, so we cannot track the same individuals over time. Our identification therefore comes from cross-sectional differences across individuals, but our data cover many such cross-sections (one per survey/month).

We impose several sample restrictions. Firstly, we exclude individuals who are older than 64 years old, which is the standard retirement age in Sweden. A comparison of entrepreneurs to non-entrepreneurs beyond this age level would be misleading because retirement is an endogenous choice. Secondly, we exclude unemployed individuals. These two restrictions imply that we compare optimism between entrepreneurs and those who are employed, thereby ruling out effects related to an individual's willingness or ability to work. By selecting out unemployed individuals, we cannot study how optimism affect labor market participation in general, however, this is deliberately not the scope of our study. Thirdly, we also exclude all responses from the 2002 surveys, because they included no question about self-employment. Fourthly, we exclude 20,656 observations where the respondent did not answer all the key variables we use in our analysis. With these restrictions, we analyze 180,814 responses from 153 surveys. To the best of our knowledge, this sample size is one of the largest used in the literature on entrepreneurial optimism.

Description of Key Variables

Table 1 summarizes the sample and provides statistics on the variables that we form base on the survey questions. Our focal variable is "Entrepreneur". About 16% of respondents with a professional occupation are self-employed, who we classify as entrepreneurs. This broad definition of entrepreneur captures both self-employed individuals who run innovative, fast-growing startups, but also other types of self-employed individuals (e.g., carpenters, accountants). It would be interesting to separate these two groups, however, the data do not make this possible. An advantage of our classification of entrepreneur is that our results apply to a larger subset of self-employed in the Swedish population.

The survey respondents were also asked a number of questions about demography and socio-economic status: gender, level of education, household status, age, income and education. We use these to form control variables and to form subsamples for our robustness tests. About 52% of the sample is females. If the respondent has only completed the mandatory primary education, which is equivalent to nine years of schooling in Sweden, the respondent is put into the first category (19% of the sample). Respondents with an educational level equivalent to high school or gymnasium are put into the second category (45% of the sample). The third category comprises respondents who have received further education, equivalent to attaining graduate school (37% of the sample). In Panel F, we differentiate between entrepreneurs and non-entrepreneurs to emphasize that entrepreneurs are relatively better educated than non-entrepreneurs. The share of entrepreneurs who have obtained a higher education is about 63% (=10.0%/16.6%) whereas it is only 32% (=26.9%/84.0%) for non-entrepreneurs.

The survey further divides respondents into one of five household categories. The first category comprises single households without any children (23% of the sample). The second category comprises single households with children (5% of the sample). The third category comprises a household in which the respondent has a steady partner (32% of the sample). The fourth category comprises a household in which the respondent has a steady partner, including children (28% of the sample). The fifth category comprises respondents with other living arrangements (13% of the sample). Respondents are also partitioned into one of four categories based on their stated age: 18 to 29 years of age comprise 20% of the sample; 30 to 49 years of age comprise 49% of the sample; 50 to 64 years of age comprise 30% of the sample. The classification of a respondent's age into these categories was done in the survey. Finally, respondents are also asked to state income of the household, which is classified into four categories at the time of sampling. The ordinal variable represents levels of annual income for households earning less than or equal to 180,000 SEK (13% of the sample), households earning more than 180,000 SEK but less than or equal to 285,000 SEK (22% of the sample), households earning more than 285,000 SEK but less than or equal to 440,000 SEK (30% of the sample), and finally households earning more than 440,000 SEK (34% of the sample).¹⁰

IV. Measures of Optimism

Definition of Our Measures

The survey asks about each respondent's perceptions and expectations of different dimensions of Sweden's macro-economic situation, including the economic conditions, unemployment and inflation. We use the questions on economic conditions to measure optimism. In the first question, the respondent is

¹⁰ These cutoff levels apply to surveys after December 2001. Before this survey month, the three cut off levels used for annual income classification into ordinal scales were 160,000 SEK, 265,000 SEK and 420,000 SEK. The designers of the survey implemented this (crude) adjustment to account for inflation.

asked to state what her expectation is of the economic situation of Sweden in 12 months from now. The respondent is asked to state whether she thinks it will improve from today (which we label “better”), stay about the same (“same”), or deteriorate (“worse”)¹¹. We use this question to create a measure denoted “Optimism about Future”. The second question asks the respondent to state what her perception is of the current financial situation of Sweden compared to 12 months ago. The respondent is then asked to state whether she thinks it has improved (“better”), stayed about the same (“same”), or deteriorated (“worse”). We use the second question to construct a measure denoted “Optimism about Present.”

Table 2 summarizes and analyzes our two measures of optimism. Panel A shows that for “Optimism about Future”, 29.4% of respondents think Sweden’s economic conditions will become better, 45.0% the same, and 25.5% worse one year ahead. For “Optimism about Present”, 31% of respondents think Sweden’s economic conditions are better, 57% the same, and 11% worse than one year ago. Thus, a much larger fraction of the sample has optimistic beliefs about the present than about the future.

Advantages of Our Measure of Optimism

In the Introduction, we explained why variables based on a person’s beliefs about her own situation are bad measures of optimism. The concern is that such beliefs confound a person’s objective situation, which is not optimism, and a subjective assessment of this situation, which is optimism. We now present some stylized evidence from our data that highlight that this concern is a major problem. Concretely, we show that many people have different beliefs about their own situation and Sweden’s situation.

Panel B of Table 2 compares the responses to two survey questions: (1) a respondent’s expectation of Sweden’s economic situation in 12 months (i.e., “Optimism about Future”), and (2) the same respondent’s expectation of her own economic situation in 12 months. The percentages refer to the fraction of all survey responses. The column “Identical” lists the fraction of the total sample that has identical responses, and the column “Different” lists the fraction that has different responses. We find that only 47.1% of the respondents have the same responses to both questions. We also compute the correlation between the responses, and find it to be very low, 0.2. Panel C of Table 2 compares the responses to two survey questions: (1) a respondent’s perception of Sweden’s current economic situation (i.e., “Optimism about Present”), and (2) the same respondent’s perception of her own current economic situation. The percentages refer to the fraction of all survey responses. The column “Identical” lists the fraction of the total sample that has identical responses, and the column “Different” lists the fraction that has different responses. Only 44.1% of the respondents have the same responses to both questions. The correlation between responses is only 0.25.

¹¹ The answers “much better”, and “better” are reclassified as “better”; the answers “much worse” and “worse” are reclassified as “worse”.

The result that most survey respondents make different assessments of their own situation and the Swedish economy, respectively, is not surprising. We obtain it because many people can have a good personal situation even if the country as a whole has a bad situation, and vice versa. Hence, we document that individual differences in people's objective situations matter a lot in practice. This finding validates our conceptual argument that it is problematic to use person's beliefs about her own situation as a measure of the behavioral bias optimism. In our empirical analysis we therefore use our two measures of optimism, which are based on a person's beliefs about Sweden's economic conditions. Although the Swedish population as a whole can affect Sweden's economic conditions, each individual person cannot.

One possible critique against our measures of optimism is they both capture a general form of optimism. It may be that an entrepreneur has a rational belief about Sweden's economic situation, but nevertheless has a biased belief of the business prospects of her company.¹² That is, a person's behavioral bias may be more pronounced for issues "close to her". This implies that our statistical tests may be difficult to interpret, but it depends on the direction of the results we obtain. Concretely, if our statistical tests were not to find any evidence on entrepreneurial optimism on the macro level, then we cannot reject that entrepreneurs are optimists on the micro level about their own business prospects. However, if our tests were to find such evidence then we could conclude that entrepreneurs are optimistic at both the macro level and micro level. As we describe in detail in the next section, we do find such evidence.

The measure further avoids another source of endogeneity because it allows for an ex-ante measure of optimism, which is more reliable as an indicator of the respondents behavioral bias than an ex-post measure of optimism compared to the actual outcome of the state of the economy. A respondent who scores high on the "Optimism about Present" measure may do so because of recently observed data (such as newspaper articles) that has influenced the respondent's perception and experience of the state of the economy. However, with respect to the measure "Optimism about Future", being an ex-ante measure, this particular source of measurement error is avoided. It is not possible for a single individual to influence the state of the economy, nor is it possible for a future state of the economy to influence present expectations on the performance of the economy.

Disadvantages of our Measure of Optimism

Our measure also has some limitations. Optimism is obviously a multi-dimensional psychological concept, encompassing a range of possible beliefs. For example, a person who is optimistic about nationwide conditions may not be optimistic about conditions in his or her immediate surroundings (e.g.

¹² Psychology researchers sometimes distinguish between dispositional optimism, which is general in its nature, and situational optimism, which is specific to a situation. A classic example of dispositional optimism is the viewpoint that a glass is half full and not half empty. Our optimism measures are hard to classify as either of these types.

region, city). Other interesting optimism dimension includes a person's beliefs about his or her ability to work hard or come up with a new business idea. Our survey dataset does not include questions about such additional optimism dimensions, so we cannot study them. It is here important to emphasize, however, that any optimism dimension that is about the personal realm (e.g., optimism about ability to work hard) would suffer from the methodological problem that it confounds a person's actual situation and belief based on that situation.

A possible critique is that we measure optimism by a person's ability to forecast macro-economic conditions, which is not a standard definition of optimism. People may differ in this ability not due to behavioral optimism but rather to due to how much information they have or choose to collect about a country's economic situation. But we don't view this critique as a problem because this is precisely the point we are trying to make: entrepreneurs are more accurate in their assessments, likely both due better information and less biased interpretation of such information. Because we cannot observe what information the individuals in our sample have, we cannot empirically separate between these two explanations. This problem is common for almost all studies of entrepreneurial optimism.

V. Empirical Result

Entrepreneurial Optimism

We next turn to our empirical results. In Tables 3a and 4a we report the result of tests of hypothesis 1, which states that entrepreneurs are more optimistic than non-entrepreneurs. Importantly, these test do not distinguish between the casual definition of optimism and the formal definition of optimism (i.e., "bias-optimism"). The regressand is "Optimism about Present" in Table 3a and "Optimism about Future" in Table 4a. The regressand enters as an ordinal variable in three levels (better, same, worse) whereas the regressors enter as dummies, including the entrepreneur variable. The ordered probit models are estimated using maximum likelihood. Survey fixed effects are controlled for in all regressions, by the inclusion of year-month dummies.

Table 3a column 1 establishes that entrepreneurs are more optimistic about the present than non-entrepreneurs as shown by the positive coefficient of the "Entrepreneur" regressor. The estimate is significant at the 1% significance level and it remains robust as controls are cumulatively added for gender (column 2), education (column 3) and finally age, income and household status (column 4). Appendix Table 3b shows that the finding is robust across subsamples. In this robustness test, the regressand is the same as in Table 3a, "Optimism about the Present", but the samples are restricted to subpopulations of males (column 1) or females (column 2), respondents with a primary school education (column 3), secondary school education (column 4) or further school education (column 5), and finally respondents in the age spans 18–29 (column 6), 30–49 (column 7), or 50–64 (column 8). As for controls, in case a sample

is conditional on a particular socio-economic characteristic the socio-economic variables that complement the conditional variable will enter the regression as controls. That is, in a regression on a subsample of male respondents, controls for, say, education will be included, and conversely in a regression on a subsample of respondents with a primary school education controls for gender will be included. The estimate for the entrepreneur effect is significant at the 1% significance level for all subsamples.

Table 4a presents almost identical tests as Table 3a, except that the regressand is switched for “Optimism about Future”. The optimistic nature of entrepreneurs still shows from the sign and significance of the entrepreneur regressor, although the effect is somewhat smaller in size. Appendix Table 2 presents results of the robustness specification with “Optimism about Future” measure as the regressand. The specifications of the models follow the previous enumeration in Table 3a.

Overall, our results are strong evidence in support of hypothesis 1: Entrepreneurs are more optimistic, at least in the casual definition of optimism. Importantly, this test cannot distinguish separate between hypotheses 2a (entrepreneurs have optimism bias) and 2b (non-entrepreneurs have pessimism bias).

Robustness on Entrepreneurial Optimism

We also perform robustness tests by measuring optimism using two new variables: “Optimism about Unemployment” in Appendix Table 4c and “Optimism about CPI”¹³ in Appendix Table 4d, respectively. The variable “Optimism about Unemployment” is constructed from a survey question that asks each respondent to state his or her beliefs about whether Sweden’s unemployment will be lower, the same, or higher in 12 months. The variable “Optimism about CPI” is constructed from a survey question that ask each respondent state his or her beliefs about whether Sweden’s rate of inflation will be lower, the same, or higher in 12 months. For this variable we use reverse coding so a higher number corresponds to the belief that inflation will go down. We assume that most individuals view economic conditions to be good when inflation is low. Importantly, both of our two robustness measures resolve the first methodological problem pertaining to how to correctly measure optimism. They do so by capturing the respondent’s beliefs about nationwide conditions, which are uncorrelated by the respondent’s personal economic situations.

We repeat our empirical tests of the determinants of optimism, and find the coefficient on “Entrepreneur” to remain positive in specification 1, which excludes any controls, and specification 2, which includes only a female dummy control. When we include additional controls (specifications 3 and 4) we find mixed and overall insignificant results. The coefficient on the Entrepreneur regressor is significantly negative in specification 3 of Appendix Table 4c, however, this significance is removed in specification 4 where we control for income. We conclude that the robustness results give some, albeit

¹³ CPI stands for Consumer Price Index.

weak, support to hypothesis 1. There are two reasons why the results are overall weaker for the robustness variables than for our main measures of optimism. The first is that some entrepreneurs may view high unemployment and high CPI as something positive, because such conditions could make it easier/cheaper to hire new workers and thereby grow entrepreneurial firms. If such viewpoints were to exist, then our robustness variables would not measure optimism correctly. A second reason is that the robustness variables likely have more statistical noise as compared to our main measures of optimism. A survey respondent can probably comment on Sweden's general future economic conditions more accurately than on Sweden's unemployment or CPI, respectively.

Forecast Errors – Is Entrepreneurial Optimism a Bias?

We next try to distinguish between hypothesis 2a and hypothesis 2b. That is, we run a test that compares the size of the relative optimistic behavioral bias of entrepreneurs compared to non-entrepreneurs. Our approach is to study the forecast errors of the respondents' beliefs about the future, where the size of the errors proxy the size of the bias. We construct a binary measure of the error, called "Forecast Error State of the Economy", and we regress the measure on the same set of variables as in Tables 3a and 4a. The measure "Forecast Error State of the Economy" is constructed in two steps. First, we take the difference between the respondent's forecast of the economic situation of Sweden in 12 months and the outcome of the actual state of the economy in 12 months. The outcome of the economy 12 months out is classified in three levels where "better" equals an increase in GDP and "worse" a decrease in GDP, respectively, over the 12 month time span. Second, if there is a difference between the forecast and the outcome, the measure "Forecast Error State of the Economy" assumes a value of one, whereas a value of zero represents no discrepancy between the two. For instance, if a respondent answers that in 12 months the economy will be worse off, whereas it in fact turns out to be better or unchanged 12 months later, the measure "Forecast Error State of the Economy" will assume a value of one indicating an error.

As shown by the "Entrepreneur" regressor in Table 5a, entrepreneurs make smaller forecast errors than non-entrepreneurs. The effect is negative and significant at the 1% level, and it remains robust across specifications as we cumulatively add controls for gender (column 2), education (column 3) and finally age, income and household status (column 4). The probit model is estimated using maximum likelihood. Survey fixed effects (i.e., year-month dummies) are controlled for in all regressions. The negative coefficient shows that entrepreneurs are able to predict the direction of the economy with smaller errors than non-entrepreneurs. We interpret this result as a sign that entrepreneurs exhibit less of a bias in their beliefs. Hence, our results support hypothesis 2b.

Figure 1 illustrates the underlying reason for why entrepreneurs are more accurate – Sweden had more quarters of positive GDP growth during our period 1996-2009 than negative ones. This is, however,

not unique to our sample. As figure 2 illustrates, most regions in the world during most time periods had predominately positive GDP growth. Hence, optimistic entrepreneurs would most likely be more accurate than pessimistic non-entrepreneurs for most hypothetical samples.

Robustness on Forecast Errors

We next show that this result remains in robustness tests based on a respondent's forecast ability on unemployment and CPI, respectively. Appendix Table 5b presents estimated models similar to the ones in Table 5a, but in which the regressand has been exchanged for the measure "Forecast Error State of Unemployment". The measure is constructed in accordance with the same logic as for the measure "Forecast Error State of Economy". That is, the regressand assumes the value one if the respondent fails to correctly predict the direction of the unemployment, defined as the increase or decrease of unemployment twelve months out, and zero otherwise. The probit model is estimated using maximum likelihood. Survey fixed effects are controlled for in all regressions. The coefficient on "Entrepreneur" is negative in columns 1–4 but only significant in columns 1 and 2. This loss of significance occurs because we control for education variables in columns 3 and 4, which is positively correlated with entrepreneurship.

Appendix Table 5c present results for the robustness variable "Absolute Forecast Error CPI". The results remain qualitatively similar: Entrepreneurs make smaller forecast errors. In this test, we replace the regressand for our measure "Absolute Forecast Error CPI" that indicates the respondent's forecast error with respect to the evolution of CPI inflation. The regressand is now defined as the absolute forecast error between respondent's stated expected inflation and the outcome of CPI inflation 12 months out. The models are estimated with ordinary least squares and survey fixed effects are controlled for in all regressions. Once again, the entrepreneur regressor is negative, indicating that entrepreneurs make less of a forecast error than non-entrepreneurs. We again find weaker statistical significance in columns 3 and 4 where we control for education, which is positively correlated with entrepreneurship.

Overall, the results support the main finding that entrepreneurs have better forecast ability than non-entrepreneurs. We interpret this as support of hypothesis 2b.

Additional Evidence on Optimism and Education

We conclude by observing interesting patterns pertaining to education and optimism. Tables 3a–5a report the coefficient on our education dummies "Education Secondary" and "Education Higher". Studying the estimated coefficients on these dummies, we find three findings results that support our conclusion that entrepreneurs have less optimism bias than non-entrepreneurs have pessimism bias.

Firstly, we find that entrepreneurs are more educated than non-entrepreneurs, as shown in Table 1, Panel F. This may be a reflection of the fact that many self-employed labor tasks require the entrepreneur

to possess skills that are typical of a higher level production economy. For instance, in order to file income tax returns, the entrepreneur must be able to navigate the Swedish tax code, a task that is plausibly easier to perform with a higher level of education. Secondly, more educated people are more optimistic than less educated people, using our measures of optimism. This trait is reflected in all our measures, as shown by the positive coefficients on the regressors “Education Secondary” and “Education Higher” in Table 3a and 4a, with robustness in Appendix Tables 3b and 4b. Thirdly, we find in Table 5a that more educated people make smaller forecast errors than less educated people. In particular, the coefficients on “Education Secondary” and “Education Higher” are both negative. This finding is also robust as shown in Appendix Tables 5b and 5c.

Combined, these results show that entrepreneurs behave in similar ways as educated people. Under the plausible assumption that education correlates positively with rationality, due to selection or treatment, this is additional evidence that entrepreneurial optimism is not a behavioral bias but rather rational decision-making. This suggests that optimism may not be a bias but rather that the bias is pessimism, which is the beliefs held by less-educated people. Put differently, entrepreneurs have a bright but right view of the future. The results pertaining to education, combined with the assumption that education correlates with rational behavior, leads us to conclude that the entrepreneurs’ special personality with regards to optimism may not be a behavioral bias.

VI. Conclusion

The goal of this paper has to make a novel contribution by resolving two methodological problems on how to measure optimism. First, we establish a measure of optimism using an individual’s stated beliefs about *nationwide* economic conditions, which exhibits a low correlation to a measure about an individual’s beliefs about *personal* economic conditions. As we discuss in the introduction, versions of the latter measure prevails in a literature that does not distinguish between an individual’s objective situation (which is not optimism) and the individual’s beliefs about the objective situation (which is optimism). By using our measure of optimism, we avoid any impact an individual’s objective situation may have on the measure of optimism.

The second problem is that those people who hold favorable views about a situation may actually be correct, i.e., not suffer from a bias in their decision-making. It could instead be that those with unfavorable views are irrationally pessimistic. In the casual definitions of optimism and pessimism, the distinction between “bias-optimism” and “rational-optimism” is not critical. We can casually label a person with a rosy view of the future an optimist, and another person with a bleak view a pessimist. But in the formal definitions (Hey, 1984), which are used extensively in academic research, “bias-optimism” is a well-defined concept: An optimist is only someone who assigns too high (low) probabilities to (un)favorable

events. Hence, it is the accuracy of the probability assignment rather than the magnitude of probabilities that define an optimist with a “bias-optimism”. If favorable events were likely to occur in the future, then a person who assigns high probability to these events would be correct and not suffer from an optimism bias. Rather, it would be the person who assigns low probabilities that suffers from a bias – pessimism. Put differently, the bright view may be the right view.

The above argument highlights the importance of comparing optimism across individuals in a sample using a methodology that holds the probability of future events constant within the sample. We do so by using individuals’ beliefs about nationwide conditions as our measure of optimism. We run regressions with survey month fixed effect, and thereby isolate variation in beliefs across individuals that are solely due to time-varying differences in beliefs. Using this arguably good measure of optimism we find that entrepreneurs are more optimistic than non-entrepreneurs. However, our further tests show that entrepreneurial optimism is less of a behavioral bias compared with the non-entrepreneurial pessimism. In short, our results suggest that entrepreneurs view the future as bright—but they are actually right. Our evidence thereby challenges the prevailing argument that entrepreneurs are irrational in how they form their beliefs about the future. Rather, it is non-entrepreneurs who are more irrational, because their beliefs are overly pessimistic.

One explanation to this finding is that entrepreneurs gain from being relatively rational in their decision-making, which is often complex and involves high stakes. Unlike regular wage-earning employees, entrepreneurs stand much more to gain from good decisions and more to lose from bad ones. It is therefore not surprising that entrepreneurs are more rational in the sense that they make better forecasts about future nationwide conditions. Our supportive evidence pertaining to education supports this interpretation. Entrepreneurs are more educated and their beliefs about the future are more similar to educated peoples’ beliefs. One limitation of our study is that it covers one country and one time period, 1996–2009. We leave for future research to conduct similar studies for other countries and time periods. We note however that two empirical patterns suggest that our findings generalize: (1) most studies find that entrepreneurs make more favorable assessments of the future, and (2) most regions in the world had a bright future in the sense that GDP growth was positive.

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Figure 1 – Sweden’s Quarterly GDP Growth 1996–2009 (source: Swedish National Institute of Economic Research).

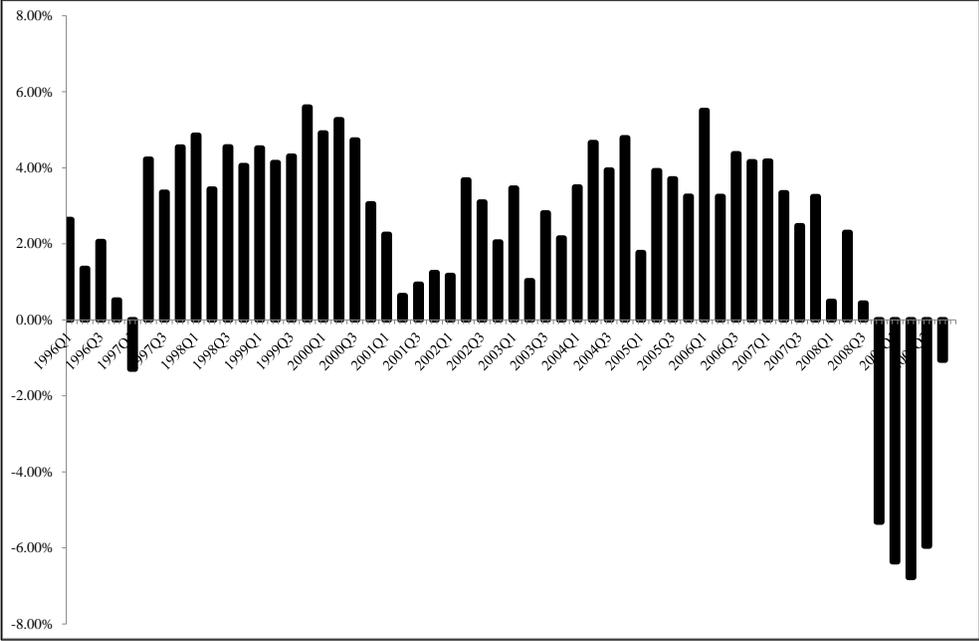


Figure 2 – Annual GDP Growth 1983–2012, by World Regions (source: World Bank)

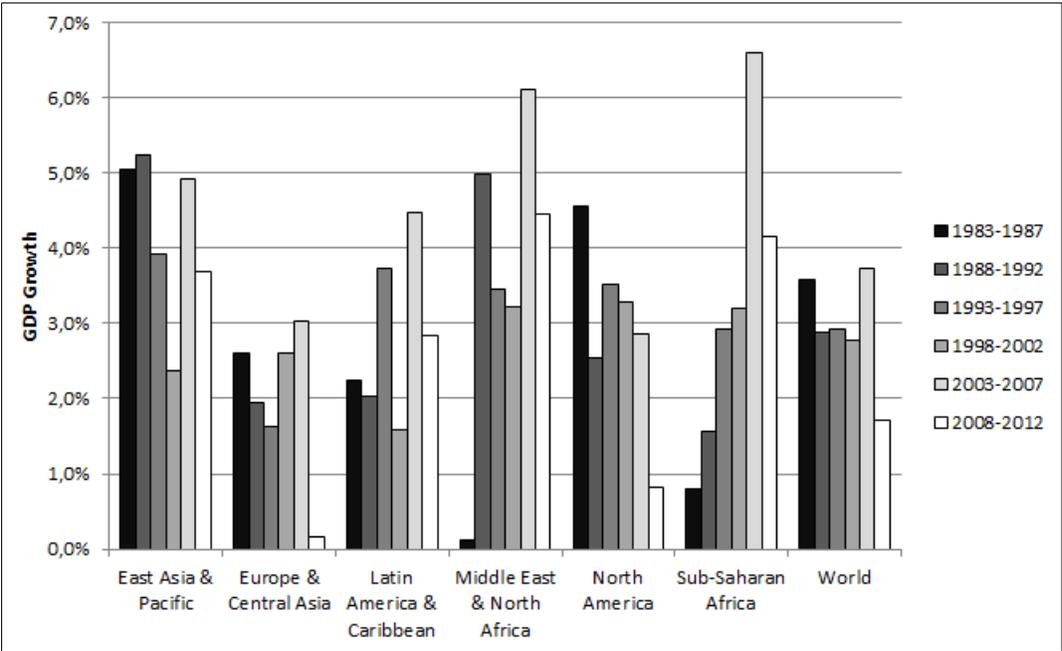


Table 1 - Overview of Sample

Descriptive data of the sample, which includes 180,814 observations. Panel A tabulates the distribution of observations for each year; Panel B, the distribution of entrepreneurs of the whole sample; Panel C, the distribution of males and females. Panel D tabulates the distribution of respondents divided into three age categories: age 18-29, age 30-49, age 50-64. Panel E tabulates the distribution of respondents divided into five categories representing the type of household: respondents living on their own without children; on their own with children; with a partner but without children; with a partner and with children; or in some other arrangement. Panel F tabulates the distribution of respondents divided into three education levels for entrepreneurs and non-entrepreneurs: the first is primary education; the second is secondary education (equivalent to high school or gymnasium); the third comprises higher education beyond secondary education. Panel G tabulates the distribution of respondents according to income levels: income below 180,000 SEK/annum; income above 180,001 SEK/annum but below 285,000 SEK/annum; income above 285,001 SEK/annum but below 440,000 SEK/annum; income above 440,001 SEK/annum.

Panel A: Survey Year

1996	9,06%	2003	7,57%
1997	9,32%	2004	7,40%
1998	8,89%	2005	7,53%
1999	8,66%	2006	7,53%
2000	7,37%	2007	7,13%
2001	7,34%	2008	7,02%
-		2009*	5,17%

* 2009 includes observations for january 2009 up until october 2009

Panel B: Employment Type

Entrepreneur	15,9%
Non-Entrepreneur	84,1%

Panel C: Gender

Male	48,4%
Female	51,6%

Panel D: Age

Age 18-29	19,9%
Age 30-49	49,3%
Age 50-64	30,8%

Panel E: Household Type

Single without child(ren)	22,9%
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Single with child(ren)	5,0%
Married/living together without child(ren)	31,7%
Married/living together with child(ren)	27,8%
Other type of household	12,7%

Panel F: Education

	Entrepreneur	Non-Entrepreneur
Education Primary	1,6%	16,8%
Education Secondary	4,4%	40,4%
Higher Education	10,0%	26,9%
Total	16,0%	84,0%

Panel G: Income

≤ 180,000 SEK	13,1%
180 001-285 000 SEK	22,4%
285 001-440 000 SEK	30,2%
440 001+ SEK	34,3%

Table 2 - Summary of Measures on Optimism

Summary of measures on optimism. Panel A tabulates the distribution of Optimism about Future and Optimism about Present over the whole sample. Panel B compares the responses to two survey questions: (1) a respondent's expectation of Sweden's economic situation in 12 months (i.e., "Optimism about Future"), and (2) the same respondent's expectation of her own economic situation in 12 months. Panel C compares the responses to two survey questions: (1) a respondent's perception of Sweden's current economic situation (i.e., "Optimism about Present"), and (2) the same respondent's perception of her own economic situation over the passed 12 months.

Panel A

Descriptive statistics for variables of current and future optimism

	<u>Better</u>	<u>Same</u>	<u>Worse</u>
Optimism about Future	29.41%	45.04%	25.55%
Optimism about Present	31.05%	57.62%	11.33%

Panel B

The correlation between "Optimism about Future" and Optimism about Household t+12 is 0.20

	<u>Optimism about Household t+12</u>	
<u>Optimism about Future</u>	<u>Identical</u>	<u>Different</u>
Better	12,9%	16,6%
Same	29,0%	16,1%
Worse	5,3%	20,2%
Total	47,1%	52,9%

Panel C

The correlation between "Optimism about Today" and Optimism about Household t-12 is 0.25

	<u>Optimism about Household t-12</u>	
<u>Optimism about Today</u>	<u>Identical</u>	<u>Different</u>
Better	9,6%	16,1%
Same	26,9%	16,2%
Worse	7,7%	23,5%
Total	44,1%	55,9%

Table 3a - Optimism about Present and Entrepreneurship

*Ordered probit regressions. The dependent variable is Optimism about Present. The Entrepreneur dummy variable is 1 if individual is self-employed, and is 0 otherwise. The Female dummy variable and Education dummy variables are described in table 1, including controls for age, income and household. All regressions include year-month fixed effects. Residuals are clustered by month. Significance marked with * at 10%, ** at 5%, and *** at 1%.*

Specification	1	2	3	4
Dependent Variable	Optimism about Present			
Entrepreneur	0.177*** [0.015]	0.134*** [0.014]	0.057*** [0.012]	0.079*** [0.012]
Female		-0.283*** [0.014]	-0.291*** [0.014]	-0.278*** [0.014]
Education Secondary			0.094*** [0.009]	0.059*** [0.009]
Education Higher			0.206*** [0.014]	0.175*** [0.015]
Number of Observation	180814	180814	180814	180814
Estimation Method	Ordered Probit	Ordered Probit	Ordered Probit	Ordered Probit
Year-Month Fixed Effects	Yes	Yes	Yes	Yes
Age Fixed Effects	No	No	No	Yes
Household Fixed Effects	No	No	No	Yes
Income Fixed Effects	No	No	No	Yes

Table 4a - Optimism about Future and Entrepreneurship

*Ordered probit regressions. The dependent variable is Optimism about Future (higher value means belief about better economic conditions). The Entrepreneur dummy variable is 1 if individual is self-employed, and is 0 otherwise. The Female dummy variable and Education dummy variables are described in table 1, including controls for age, income and household. All regressions include year-month fixed effects. Residuals are clustered by month. Significance marked with * at 10%, ** at 5%, and *** at 1%.*

Specification	1	2	3	4
Dependent Variable	Optimism about Future			
Entrepreneur	0.088*** [0.012]	0.056*** [0.011]	0.057*** [0.012]	0.047*** [0.009]
Female		-0.209*** [0.013]	-0.291*** [0.014]	-0.204*** [0.013]
Education Secondary			0.094*** [0.009]	0.019** [0.008]
Education Higher			0.206*** [0.014]	0.093*** [0.011]
Number of Observation	182473	182473	180814	182473
Estimation Method	Ordered Probit	Ordered Probit	Ordered Probit	Ordered Probit
Year-Month Fixed Effects	Yes	Yes	Yes	Yes
Age Fixed Effects	No	No	No	Yes
Household Fixed Effects	No	No	No	Yes
Income Fixed Effects	No	No	No	Yes

Table 5a - Forecast Errors and Entrepreneurship

*Probit regressions. The dependent variable is 1 if the respondent makes an error in forecasting the directional change of the economy at time $t+12$, and is 0 otherwise. The Entrepreneur variable is 1 if individual is self-employed, and is 0 otherwise. The Female dummy variable and Education dummy variables are described in table 1, including controls for age, income and household. All regressions include year-month fixed effects. Residuals are clustered by month. Significance marked with * at 10%, ** at 5%, and *** at 1%.*

Specification	1	2	3	4
Dependent Variable	Forecast Error State of the Economy			
Entrepreneur	-0.163*** [0.012]	-0.121*** [0.011]	-0.064*** [0.010]	-0.081*** [0.010]
Female		0.277*** [0.015]	0.282*** [0.015]	0.271*** [0.015]
Education Secondary			-0.076*** [0.009]	-0.058*** [0.009]
Education Higher			-0.147*** [0.012]	-0.133*** [0.012]
Number of Observation	189156	189156	189156	189156
Estimation Method	Probit	Probit	Probit	Probit
Year-Month Fixed Effects	Yes	Yes	Yes	Yes
Age Fixed Effects	No	No	No	Yes
Household Fixed Effects	No	No	No	Yes
Income Fixed Effects	No	No	No	Yes

Appendix Table 4c - Optimism about Unemployment and Entrepreneurship

Ordered probit regressions. The dependent variable is Optimism about Unemployment (higher value means belief about lower unemployment). The Entrepreneur dummy variable is 1 if individual is self-employed, and is 0 otherwise. The Female dummy variable and Education dummy variables are described in table 1, including controls for age, income and household. All regressions include year-month fixed effects. Residuals are clustered by month. Significance marked with * at 10%, ** at 5%, and *** at 1%.

Specification	1	2	3	4
Dependent Variable	Optimism about Unemployment			
Entrepreneur	0.047*** [0.014]	0.028** [0.013]	-0.023** [0.010]	0.009 [0.010]
Female		-0.125*** [0.013]	-0.140*** [0.013]	-0.124*** [0.013]
Education Secondary			0.068*** [0.009]	0.040*** [0.009]
Education Higher			0.176*** [0.014]	0.159*** [0.014]
Number of Observation	186897	186897	186897	186897
Estimation Method	Ordered Probit	Ordered Probit	Ordered Probit	Ordered Probit
Year-Month Fixed Effects	Yes	Yes	Yes	Yes
Age Fixed Effects	No	No	No	Yes
Household Fixed Effects	No	No	No	Yes
Income Fixed Effects	No	No	No	Yes

Appendix Table 4d - Optimism about CPI and Entrepreneurship

Ordinary Least Squares regressions. The dependent variable is Optimism about CPI (higher value means belief about lower CPI=Inflation). The Entrepreneur variable is 1 if individual is self-employed, and is 0 otherwise. The Female dummy variable and Education dummy variables are described in table 1, including controls for age, income and household. All regressions include year-month fixed effects. Residuals are clustered by month. Significance marked with * at 10%, ** at 5%, and *** at 1%.

Specification	1	2	3	4
Dependent Variable	Optimism about CPI			
Entrepreneur	-0.363*** [0.035]	-0.301*** [0.032]	-0.036 [0.027]	-0.036 [0.027]
Female		0.417*** [0.040]	0.432*** [0.040]	0.411*** [0.040]
Education Secondary			-0.064* [0.037]	-0.042 [0.038]
Education Higher			-0.499*** [0.051]	-0.458*** [0.050]
Number of Observation	182473	182473	180814	182473
Estimation Method	OLS	OLS	OLS	OLS
Year-Month Fixed Effects	Yes	Yes	Yes	Yes
Age Fixed Effects	No	No	No	Yes
Household Fixed Effects	No	No	No	Yes
Income Fixed Effects	No	No	No	Yes

Appendix Table 5b - Forecast Errors Unemployment

*Probit regressions. The dependent variable is 1 if the respondent makes an error in forecasting the directional change of unemployment at time $t+12$, and is 0 otherwise. The Entrepreneur variable is 1 if individual is self-employed, and is 0 otherwise. The Female dummy variable and Education dummy variables are described in table 1, including controls for age, income and household. All regressions include year-month fixed effects. Residuals are clustered by month. Significance marked with * at 10%, ** at 5%, and *** at 1%.*

Specification	1	2	3	4
Dependent Variable	Forecast Error State of Unemployment			
Entrepreneur	-0.060*** [0.014]	-0.041*** [0.013]	-0.017 [0.012]	-0.003 [0.011]
Female		0.120*** [0.015]	0.118*** [0.016]	0.117*** [0.015]
Education Secondary			-0.003 [0.013]	-0.019 [0.012]
Education Higher			-0.050** [0.020]	-0.067*** [0.019]
Number of Observation	189156	189156	189156	189156
Estimation Method	Ordered Probit	Ordered Probit	Ordered Probit	Ordered Probit
Year-Month Fixed Effects	Yes	Yes	Yes	Yes
Age Fixed Effects	No	No	No	Yes
Household Fixed Effects	No	No	No	Yes
Income Fixed Effects	No	No	No	Yes

Appendix Table 5c - Forecast Errors CPI

*OLS regressions. The dependent variable is the absolute forecast error when the respondent's cardinal expectation of inflation is subtracted from the CPI. The Entrepreneur variable is 1 if individual is self-employed, and is 0 otherwise. The Female dummy variable and Education dummy variables are described in table 1, including controls for age, income and household. All regressions include year-month fixed effects. Residuals are clustered by month. Significance marked with * at 10%, ** at 5%, and *** at 1%.*

Specification	1	2	3	4
Dependent Variable	Absolute Forecast Error CPI			
Entrepreneur	-3.014*** [0.315]	-2.613*** [0.279]	-1.494*** [0.217]	-1.590*** [0.232]
Female		2.599*** [0.268]	2.678*** [0.275]	2.562*** [0.261]
Education Secondary			-1.106*** [0.180]	-1.156*** [0.186]
Education Higher			-2.714*** [0.235]	-2.782*** [0.242]
Number of Observation	172986	172986	172986	172986
Estimation Method	OLS	OLS	OLS	OLS
Year-Month Fixed Effects	Yes	Yes	Yes	Yes
Age Fixed Effects	No	No	No	Yes
Household Fixed Effects	No	No	No	Yes
Income Fixed Effects	No	No	No	Yes