Title

Opportunity versus Necessity Entrepreneurship: Two Components of Business Creation

Authors

Fairlie, Robert W
Fossen, Frank M

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Defining Opportunity versus Necessity Entrepreneurship: Two Components of Business Creation

Robert W. Fairlie
University of California, Santa Cruz
NBER
(rfairlie@ucsc.edu)

Frank M. Fossen
University of Nevada, Reno
DIW Berlin
IZA
(ffossen@unr.edu)

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Abstract

A proposed explanation for why business creation is often found to increase in recessions is that there are two components to entrepreneurship – "opportunity" and "necessity" – one of which is counter-cyclical. Although there is general agreement on the conceptual distinction between these two factors driving entrepreneurship, there is no consensus in the literature on empirical definitions. We propose an operational definition of opportunity versus necessity entrepreneurship based on the entrepreneur's prior work status (i.e. based on previous unemployment) that is objective, and empirically feasible using many large, nationally representative datasets. We then validate the definitions with theory and empirical evidence. Using large, nationally representative datasets from the United States and Germany we find that 80-90 percent of entrepreneurs are opportunity entrepreneurs. Using our proposed definitions, we find that opportunity entrepreneurship is generally pro-cyclical and necessity entrepreneurship is strongly counter-cyclical both at the national levels and across local economic conditions. We also find that opportunity vs. necessity entrepreneurship is associated with the creation of more growth-oriented businesses. The operational definitions of opportunity and necessity entrepreneurship proposed here may provide a useful starting and comparison point for distinguishing between the two types of entrepreneurship in future research.

JEL Codes: L26, J64
Keywords: entrepreneurship, opportunity, necessity, self-employment, unemployment

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1. Introduction

Although the economic contraction from December 2007 to June 2009 is generally considered the worst since the Great Depression, business creation actually increased steadily during the Great Recession (Fairlie 2013). Business creation was also lower throughout the preceding period of unusually strong economic growth, commonly referred to as the "Roaring 90s." Similar patterns were found for the United Kingdom (Bell and Blanchflower 2011), and previous research on the general relationship between unemployment and entrepreneurship provides mixed results with many studies showing positive relationships, negative relationships, and zero relationships (Parker 2009).[1] One potential reason for the lack of finding an unambiguous relationship between economic conditions and entrepreneurship is that there are two underlying components to business creation: one that is pro-cyclical and one that is counter-cyclical. Indeed, one topic of research in entrepreneurship that has drawn a substantial amount of attention in recent years is identifying two different motivations for starting a business: “opportunity” entrepreneurship and “necessity” entrepreneurship. The basic distinction is that some entrepreneurs create businesses when they see a business opportunity whereas other entrepreneurs are forced into starting a business out of necessity because of the lack of other options in the labor market.[2]

There is no consensus in the empirical literature, however, on the operational definitions of “necessity” and “opportunity” entrepreneurship. Numerous recent papers note the distinction,

1 Using a cross-country panel of 22 OECD countries from 1972 to 2007 Koellinger and Thurik (2012) find that the entrepreneurial cycle is positively affected by the national unemployment cycle. Congregado et al. (2012), Parker et al (2012), and Fritsch et al. (2015) report evidence of overall counter-cyclical entrepreneurship rates in Spain, the U.K., and Germany, respectively.

2 The terms “pull” vs “push” entrepreneurship, “disadvantaged” entrepreneurship, and “innovative” entrepreneurship have also been used in the previous literature to express roughly similar ideas.

but ultimately use a wide range of empirical definitions.[3] Perhaps the most notable attempt at creating a working definition of opportunity vs. necessity entrepreneurship is provided by the Global Entrepreneurship Monitor (GEM). The distinction is based on the following question in the GEM survey: "Are you involved in this start-up to take advantage of a business opportunity or because you have no better choices for work?" This definition, however, is not readily available in large, nationally representative datasets, and is somewhat subjective potentially being influenced by the post-realized success of the business launch instead of pre-launch motivations. The lack of consensus and dizzying array of different definitions of opportunity and necessity entrepreneurship applied in the entrepreneurship literature is confusing and detrimental for comparing results across studies.

Thus, the primary goal of this paper is to propose definitions of opportunity and necessity entrepreneurship that can be used in future empirical research and perhaps provide some consensus over definitions. Another goal is to validate our definitions by exploring their consistency with the classic theoretical economic model of entrepreneurship, macroeconomic trends, variation in local economic conditions, and association with growth-oriented types of businesses.

Our operational definitions of opportunity and necessity entrepreneurship meet four key criteria. First, the distinction is consistent with the standard theoretical economic model of entrepreneurship. Second, the distinction is defined ex ante and not ex post. Third, the distinction is readily available in many large, nationally representative datasets already used to study

3 For recent examples of this voluminous literature, see for example Wennekers et al. (2005), Bergmann and Sternberg (2007), Ho and Wong (2007), Van Stel et al. (2007), Acs and Amorós (2008), Bjørnskov and Foss (2008), McMullen et al. (2008), Block and Koellinger (2009), Block and Sandner (2009), Caliendo and Kritikos (2009, 2010), Koellinger and Minniti (2009), Stephen et al. (2009), Block and Wagner (2010), Kautonen and Palmroos (2010), Stephan and Uhlaner (2010), Terjesen and Amorós (2010), Giacomin et al. (2011), Pinillos and Reyes (2011), Serida and Morales (2011), Dawson and Henley (2012), Nissan et al. (2012), Fossen and Buettner (2013), Van der Zwang et al. (2016), and Calderon et al. (2017).

entrepreneurship. Finally, the definitions are objectively defined and not open to interpretation by survey respondents.

To satisfy these four criteria for classifying entrepreneurs into opportunity versus necessity entrepreneurship, we propose using initial unemployment status. Individuals who are initially unemployed before starting businesses are defined as "necessity" entrepreneurs, and individuals who are wage/salary workers, enrolled in school or college, or are not actively seeking a job are defined as "opportunity" entrepreneurs. Although it is difficult to cleanly dichotomize the two types of entrepreneurship, the proposed distinction closely matches the theoretical concepts, is determined ex ante (i.e., before starting the business), and is objectively defined. Prior unemployment status is also often available in both panel and cross-sectional datasets.[4]

In addition to discussing the proposed operational definitions of opportunity and necessity entrepreneurship in detail, we demonstrate how these definitions are motivated by the classic theoretical economic model of entrepreneurship. We next measure necessity and opportunity entrepreneurship using large, nationally-representative and widely-used datasets for the United States and Germany, two countries for which an extensive amount of research on entrepreneurship has been conducted. Using these definitions, we find that roughly 80 percent of entrepreneurship is out of opportunity vs necessity in the United States, and roughly 90 percent in Germany. Using these datasets and the proposed definitions we then explore whether the definitions are consistent with the business cycle. We find that opportunity entrepreneurship generally moves pro-cyclically and necessity entrepreneurship clearly moves counter-cyclically. These patterns hold at the national and local labor market levels for both the United States and

4 Panel datasets will typically have month-to-month or year-to-year information on unemployment, wage/salary work and business ownership. Cross-sectional datasets sometimes provide information on the labor force state just prior to the current labor force state.

Germany. Finally, we present findings indicating that opportunity vs. necessity entrepreneurship is positively associated with the creation of more growth-oriented businesses. These findings suggest that the proposed working definitions of opportunity and necessity entrepreneurship capture the essence of the intended meanings of the terms in the previous literature. The proposed operational definition may be useful for future research on entrepreneurship.

2. Empirically Defining Necessity and Opportunity Entrepreneurship

To distinguish between opportunity versus necessity entrepreneurs, we use initial unemployment status prior to starting the business. Individuals who are initially registered as unemployed before starting businesses are defined as being necessity entrepreneurs, whereas individuals who are wage/salary workers, enrolled in school or college, or are not actively seeking a job before starting businesses are defined as being opportunity entrepreneurs. Individuals who register as unemployed are, by definition, looking for employment. In contrast, business creation occurring out of the other three prior labor market states is viewed as an "opportunity."[1]

This operationalization has advantages. First, the classification criterion is objective and unambiguous. Every entrepreneur can be classified if the employment status before starting the business is known. Second, the data requirements are relatively light, so the approach can be

1 A related approach used by Block and Sandner (2009) and Block and Wagner (2010) uses information on how the person who becomes an entrepreneur exited from the previous wage and salary job. Entrepreneurs are classified as necessity entrepreneurs if they were dismissed or the firm that employed them closed down. If they voluntarily quit their previous job, they are classified as opportunity entrepreneurs. A drawback of this approach is that many datasets do not provide this information, and even if they do, only those entrepreneurs who were observed as wage/salary employees before becoming an entrepreneur can be classified. In addition, the authors exclude those entrepreneurs from the sample whose former wage job was terminated because a limited time contract expired as well as those who lost their last wage/salary job more than two years ago because classification would be too ambiguous in these cases. The consequence of these restrictions is that less than one third of the self-employed can be classified into opportunity and necessity entrepreneurs using this approach based on German Socio-economic Panel data.

applied to a broad set of available databases. In contrast, an approach that requires asking for specific motives to become an entrepreneur, for example, rules out the use of many available databases. Although specific survey questions can be designed and new survey populations can be used, this will often be costly and requires compromises on sample size and representativeness.

Panel data with at least two time-series observations almost automatically fulfills the requirements for our classification approach. A new entrant into entrepreneurship, who is an entrepreneur in period *t*, but not in period *t*-1, is labeled as a necessity entrepreneur in period *t* if he or she was unemployed in *t*-1. Individuals who are not unemployed in period *t*-1, but become entrepreneurs in period *t* are defined as opportunity entrepreneurs.[2]

The classification approach using the employment status in two subsequent waves of panel data will be sufficiently accurate for most analyses if the period between two interviews is not too long (say, one year or less). The longer the period between two interviews, the higher the risk of multiple employment transitions between them, which are not captured using this method. For example, somebody may be a paid employee at the time of the interview in *t*-1, then become unemployed, and then become an entrepreneur before the interview in *t*. In this case, the information on temporary unemployment would be missed, and the entrepreneur would be classified as an opportunity entrepreneur instead of as a necessity entrepreneur. Some panel surveys elicit calendar style information for the time between two interviews. For example, in each of the annual interviews, the respondents may be asked for their employment states in each month between the last and the current interviews. This would prevent missing any intermediate

2 One potential problem is that the definition does not work for individuals who are already entrepreneurs in the first period of observation in the panel. Some panel surveys (e.g. the German Socio-economic Panel) elicit the retrospective employment history in the first interview with a new respondent, which allows recovering the employment status before starting the current business and classification even in these cases.

employment spells. Other panel surveys include questions such as “Have you ever been unemployed within the previous year” or “How many months did you receive unemployment benefits in the previous year”, this would also be sufficient for our classification purpose.

Our classification approach is possible with not only panel data, but also with many cross-sectional databases if they include a retrospective question on previous unemployment. Some cross-sectional surveys not only ask for the current employment status, but also the previous one before the current employment spell. For example, surveys of business owners often ask whether the respondent was unemployed just prior to starting the business, which is sufficient for our classification. However, recall bias might be an important limitation, especially if the business was started many years ago. A second limitation is that only surviving businesses at the time of the interview are included in the analysis. This potentially implies survival bias, a common limitation to cross-sectional analyses. Other cross-sectional questionnaires such as the German Micro Census ask for the current employment status as well as the employment status 12 months (or some other fixed period) ago. This allows classification of all new entrants into entrepreneurship into necessity and opportunity entrepreneurs, while those who were already entrepreneurs 12 months ago cannot be classified. This is sufficient for analyses that focus on entry into entrepreneurship. For many research questions, the dynamics of entrepreneurship are of more interest than the stock of entrepreneurs, especially if the intention is causal inference. However, if the retrospective question refers to a longer time ago, the same limitations occur as discussed before, namely recall bias and the danger of missing intermediate, multiple transitions between employment states.

Not only survey data, but also administrative data often include information allowing our classification approach, as long as at least minimal information on the employment history is included or can be reconstructed.

Previous Definitions

To be sure, the idea of distinguishing between business creation out of unemployment and other labor force states is not new. Evans and Leighton (1989) was one of the first studies to document the high rate of self-employment coming out of unemployment. Farber (1999) also showed high rates of self-employment among displaced workers. Other studies have shown that prior unemployment is important for understanding the importance of liquidity constraints and risk attitude for entrepreneurship and measuring the effects of human capital on earnings and success of entrepreneurs (see, for a few examples, Fairlie and Krashinsky 2012; Caliendo et al. 2009; Fossen and Buettner 2013; Baptista et al. 2014).

As noted above, an early attempt at creating a working definition of opportunity vs. necessity entrepreneurship was provided by the Global Entrepreneurship Monitor (GEM).[1] GEM uses responses to the following question: "Are you involved in this start-up to take advantage of a business opportunity or because you have no better choices for work?" The GEM has been used extensively in the entrepreneurship literature for a wide range of topics; Bosma (2013) provides an overview of GEM-based academic publications.[2] Other surveys adopted the same question to distinguish between opportunity and necessity entrepreneurship from the GEM. For

1 See Reynolds et al. (2001, 2005) for a description and discussion of the survey.

2 For examples of studies using the GEM and its definition of opportunity versus necessity entrepreneurship see Wennekers et al. (2005), Bergmann and Sternberg (2007), Ho and Wong (2007), Van Stel et al. (2007), Acs and Amorós (2008), Bjørnskov and Foss (2008), McMullen et al. (2008), Koellinger and Minniti (2009), Stephen et al. (2009), Stephan and Uhlaner (2010), Terjesen and Amorós (2010), Pinillos and Reyes (2011), Serida and Morales (2011), and Nissan et al. (2012).

example, the definition has been used in an online survey in Germany (Block and Koellinger 2009), a survey of recently established Finnish micro enterprises (Kautonen and Palmroos 2010), and the Flash Eurobarometer Survey on Entrepreneurship (Van der Zwang et al. 2016).

However, we are concerned about this distinction between opportunity and necessity entrepreneurship for several reasons. The primary concern is that this information is available only in a handful of existing datasets. Second, the GEM-type survey question is subjective. How one person interprets this question could be different than how another person interprets the question. Another concern is that the same person could differ in how they interpret the question over time (i.e. as they get older or at different parts of the business cycle). Fourth, entrepreneurs may base their responses to this question on how successful their business launch is going and not on pre-launch goals (although this is less of a concern for nascent entrepreneurship than actual business creation).

Another approach is to ask entrepreneurs for various motivational factors for their decision to become an entrepreneur. For example, the 2010 wave of the German Socio-economic Panel (SOEP) asks those who newly became self-employed in the survey year how much they agree with eight statements, including “I have always wanted to be my own boss”, “I had an idea that I really wanted to implement”, “I did not want to be unemployed anymore”, and “I did not find employment (anymore).” Similar approaches to distinguish between opportunity and necessity entrepreneurs are used, for example, in a sample of entrepreneurs in Belgium (Giacomin et al. 2011), the UK Quarterly Labour Force Survey (Dawson and Henley 2012), a sample of female entrepreneurs in Mexico (Calderon et al. 2017), and an alternative survey for Germany (Caliendo and Kritikos 2009, 2010).

To be sure, there exists some overlap between the previous unemployment distinction and motivation questions, but it is far from perfect. Fossen and Buettner (2013) compare entrepreneurs who started their businesses out of unemployment with those who started out of employment with respect to the motivations they indicate in the 2010 wave of the SOEP. The authors find that for those who were initially employed, the wish to be their own boss is more important, while for those who were initially unemployed, escaping unemployment and being unable to find employment are more important reasons for becoming entrepreneurs. Interestingly, Caliendo and Kritikos (2009, 2010) find that many formerly unemployed entrepreneurs simultaneously indicate pull as well as push motives, making it difficult to categorize them into necessity or opportunity entrepreneurs.

Although we do not claim that our approach of using prior unemployment status provides a perfect dichotomy between opportunity and necessity entrepreneurship, we are concerned about using statements on the motives for entrepreneurship to define opportunity and necessity entrepreneurship. In particular, this approach does not meet three of the requirements that we specify above. Information on startup motivations is not available in most large, nationally representative datasets. This approach also might have potential inconsistency across individuals and time, and motivations are asked after start-up and answers might depend on the ex-post success of the business. Our definition does not suffer from these weaknesses, but certainly is not perfect as some unemployed individuals might find great opportunities for starting businesses and some wage/salary workers might face barriers leading to necessity entrepreneurship.

3. Consistency with the Theoretical Model

Although we propose a definition of opportunity vs. necessity entrepreneurship that can be measured empirically, is it consistent with implications of the standard theoretical economic model of entrepreneurship? Theoretical models of the choice to become self-employed in economics are generally based on a comparison of potential income from business ownership and wage and salary work. In the classic economic model by Evans and Jovanovic (1989) individuals can obtain the following income, Y^W, from the wage and salary sector:

(2.1) $Y^W = w + rA$,

where w is the wage earned (earnings) in the market, r is the interest rate, and A represents the consumer's assets. Income in the self-employment sector, Y^{SE}, is defined as:

(2.2) $Y^{SE} = \theta f(k)\varepsilon + r(A-k)$,

where θ is entrepreneurial ability, f(.) is a production function whose only input is capital, ε is a random component to the production process, and k is the amount of capital employed in the business. Individuals choose to become self-employed if the potential earnings from self-employment and investing remaining personal wealth after using it for startup capital is higher than the potential income from wage and salary work and investing personal wealth.

Two clarifications are needed in the model to facilitate the discussion of opportunity vs. necessity entrepreneurship. First, in (2.1) it is important to note that w is *total earnings* of which employment is a major component. Second, $\theta f(k)\varepsilon$ in (2.2) captures production measured in profits and not in the quantity produced. Thus, for example, ε might capture a random demand shock instead of, or in addition to, a random shock to production. Note that in both cases, all components of income are measured in dollars.

This simple theoretical model is useful for identifying the two components of business creation. Necessity entrepreneurship is generally thought of as business creation in the face of limited alternative opportunities. In this model, this would imply that Y^W is low or suffered an adverse shock. Given that there is downward wage rigidity in the labor market, the primary cause of low earnings in the wage and salary sector will more commonly be through unemployment and not a reduction in wages. In this way, we can associate unemployment with necessity entrepreneurship. Additionally, it is very difficult to directly measure a wage reduction or adverse shock to potential earnings. Prior unemployment is much easier to measure.

Opportunity entrepreneurship is generally thought of as business creation when there is an entrepreneurial opportunity. In this case, Y^{SE} is high or experienced a positive shock. In examining (2.2) there are several possible factors resulting in opportunity entrepreneurship. First, there could be a positive random shock to production (measured in profits). Consumer and firm demand for products and services provided by startups might increase resulting in higher ε. Another possibility is that an entrepreneur might discover a better production method resulting in a larger f(k) for any value of k. Third, entrepreneurial ability may be high or change. Some individuals might take advantage of higher or increased entrepreneurial ability. Finally, capital may become more available or cheaper resulting in expanded opportunities for business creation. All of these cases are forms of opportunity entrepreneurship. Given that there are so many possibilities for positive shocks it is useful to include entrepreneurship from various labor force states other than unemployment.

It is important to note, however, that this discussion holds everything constant, which is difficult to find in the real world. It is rare that one factor affecting either necessity or opportunity entrepreneurship will change in isolation. For example, factors that lead to high levels of

unemployment such as recessions also often lead to limited entrepreneurial opportunities. For example, one of the main effects of recessions is that they reduce consumer and firm demand for products and services provided by startups, thus decreasing potential entrepreneurial earnings, Y^{SE}. Recessions may also reduce total wealth, A, and access to financial capital more generally, which in turn would lower opportunities for entrepreneurship. On the other hand, the costs of production are lower in a recession, especially rent and labor, increasing Y^{SE}, which could be viewed as providing an opportunity for business creation. On the necessity side, an important factor having a positive effect on the entrepreneurial decision is that compensation in the wage/salary sector decreases in economic contractions. Thus, there are many factors leading to opportunity and necessity entrepreneurship, but in general we expect that the number of new opportunity entrepreneurs relative to new necessity entrepreneurs is higher in economic growth periods and lower in recessions.[1]

1 Opportunity entrepreneurship might be less strongly associated with the business cycle, because ideas for entrepreneurship might come stochastically, or at least relatively constantly, even if the resources and demand needed for implementation might not.

4. Empirical Validation of Definitions

In this section, we use data from three nationally-representative and widely used sources of data to illustrate patterns in opportunity and necessity entrepreneurship based on our empirical proposed definitions. Data from the United States and Germany are used because these countries are extremely well represented in the previous literature on entrepreneurship. After describing the datasets and exact definitions, we examine time series patterns and correlated outcomes with the goal of determining if our definitions of opportunity vs. necessity entrepreneurship line up with concepts.

Data

We use data from three nationally-representative and widely used sources of data – the matched U.S. Current Population Survey (CPS), the German Micro Census, and the German Socio-Economic Panel (SOEP). With more than 1 million observations per year, the matched CPS is one of the largest household survey panel datasets in the world.[1] The CPS is used to estimate the widely reported and analyzed national unemployment rate in the monthly "Jobs Report" produced by the U.S. Bureau of Labor Statistics. The German Micro Census is an official annual cross-sectional household survey provided by the German Federal Statistical Office. It consists of a 1% sample of the population in Germany, i.e. about 370,000 households per year. Most questions are subject to compulsory response, which ensures a low rate of non-response and that entrepreneurs are adequately represented. For additional analyses, we also use

1 The underlying datasets that are used to create the matched longitudinal data are the basic monthly files to the Current Population Survey (CPS). Households in the CPS are interviewed each month over a 4-month period. Eight months later they are re-interviewed in each month of a second 4-month period. Thus, individuals who are interviewed in January, February, March and April of one year are interviewed again in January, February, March and April of the following year. The rotation pattern of the CPS, thus allows for matching information on individuals monthly for 75 percent of all respondents to each survey because the fourth month in the rotation cannot be matched to a subsequent month. We focus on two-month matches across subsequent months. For more details on matching see Fairlie (2013).

the SOEP, an annual household panel survey, which is provided by the German Institute for Economic Research, and which is similar to the U.S. Panel Study of Income Dynamics (PSID). It offers a very rich set of socio-demographic variables, but with about 22,000 individuals in 12,000 households, it covers a smaller sample size in comparison to the Micro Census. To add regional data such as the local unemployment rate, we merge local characteristics of Germany's 96 Spatial Planning Regions to our panel data.[2]

Definition of Entrepreneurship in the CPS

Using the matched CPS data over time, we create a measure of business formation that captures all new business owners including those who own incorporated or unincorporated businesses, and those who are employers or non-employers. To estimate the business formation rate in the matched CPS data, we first identify all individuals who do not own a business as their main job in the initial survey month in the two-month pair. By matching CPS files, we then identify whether they own a business as their main job with 15 or more usual weekly hours worked in the subsequent survey month. The entrepreneurship rate is thus defined as the percentage of the population of non-business owners that start a business each month. To identify whether individuals are business owners in each month we use information on their main job defined as the one with the most hours worked. Thus, individuals who start side businesses will not be counted if they are working more hours on a wage and salary job. The 15 or more hours per week (or roughly 2 or more days per week) criterion is chosen to guarantee a reasonable work commitment to the new business venture.

2 We obtain the regional data from the INKAR database provided by Germany's Federal Institute for Research on Building, Urban Affairs and Spatial Development (http://www.inkar.de). Spatial Planning Regions in Germany are used for statistical reporting and do not have administrative functions on their own.

Definition of Entrepreneurship in the German Micro Census and SOEP

In the German Micro Census and SOEP, we define entrepreneurship analogously to our definition using the CPS (i.e., we define those as entrepreneurs who report that self-employment is their main job and working 15 or more hours a week). Again this definition includes employers and non-employers. In both German data bases, we can identify business formation. Although the German Micro Census is cross-sectional, it not only asks for the current employment state, but also includes a retrospective question on a respondent's employment state in the year prior to the survey. This allows us to identify necessity entrepreneurs, who were unemployed in *t*-1 and entrepreneurs in *t*, and new opportunity entrepreneurs, who were in another labor force state in t-1 and entrepreneurs in *t*. The main advantage of the Micro Census is its large sample size and representativeness, which makes it possible to analyze time trends with high precision.

The main advantages of the SOEP are the availability of a rich set of socio-demographic variables and its panel structure (see Wagner et al. 2007). When using the SOEP, we exploit the panel structure and identify necessity (opportunity) entrepreneurs as those who are observed in unemployment (all other labor market states, respectively) in year *t*-1 and entrepreneurs in year *t*. We thus do not need to rely on retrospective information for determining opportunity and necessity entrepreneurship.

National Trends in the United States

In this section, we show how our definitions of overall entrepreneurship, opportunity entrepreneurship and necessity entrepreneurship track the business cycle. The goal here is not to establish causation between economic conditions and entrepreneurship (which is a tall task), but

to instead explore whether our definitions are consistent with expectations about movements with economic conditions. Figure 1 displays the total number of new entrepreneurs vs. the national unemployment rate from 1996 to 2015 using the CPS.[1] The number of new entrepreneurs captures the adult (ages 20-64), non-business owner population that starts a business each *month*.[2] Thus, it is a flow measure and not a stock measure. We focus on the period starting in 1996 because it captures the start of the strong economic growth period of the 1990s reasonably well and because of data limitations in matching the CPS in immediately preceding years. The period from the beginning of 1996 to 2015 captures two downturns and three growth periods. The NBER officially dates the end of the strong economic growth period of the late 1990s as March 2001 and the subsequent contraction period as ending in November 2001. The next peak of the business cycle was December 2007 and the official end of the "Great Recession" was June 2009, although unemployment remained very high over the next few years.

The number of entrepreneurs shows a somewhat counter-cyclical pattern generally moving with the national unemployment rate. Both entrepreneurship and unemployment were high in 1996 then declined steadily in the strong economic growth period of the late 1990s. Both measures increased in the early 2000s corresponding with the recession. In the mid-2000s both measures declined at first but only the unemployment rate continued to decline until the start of the recession in 2007. The unemployment rate rose very rapidly over the next two years during the Great Recession. In the few years immediately following the Great Recession the number of entrepreneurs and unemployment rate fell, but as the unemployment rate continued to fall the number of entrepreneurs changed course and has been increasing since 2013.

1 The unemployment rate is from the U.S. Bureau of Labor Statistics (BLS).

2 Sampling weights provided in the CPS are used to scale up to population numbers.

Figure 2 displays the number of entrepreneurs and real GDP growth rates. Entrepreneurship displays a relatively weak counter-cyclical pattern when using real GDP growth rates to track economic conditions. One problem is that real GDP growth rates fluctuate making it difficult to see a more continuous measure of business cycle conditions. But, these results generally paint the same picture as those displayed in Figure 1 for the relationship between entrepreneurship and the national unemployment rate.

The finding that total entrepreneurship does not follow a strong cyclical trend is consistent with findings in previous studies and might be due to the opposing forces of opportunity and necessity entrepreneurship. To investigate we separately examine trends in opportunity and necessity entrepreneurship. Figures 3 and 4 display the number of opportunity and necessity entrepreneurs over the business cycle, respectively. The number of opportunity entrepreneurs shows somewhat of a cyclical pattern. The number of opportunity entrepreneurs rose in the late 1990s, in the mid-2000s, and in the past few years. It declined during the early 2000s and around the Great Recession. The number of necessity entrepreneurs shows a strong counter-cyclical trend moving strongly with the unemployment rate, which is what is expected based on the definition.

To combine and simplify these patterns, Figure 5 displays the opportunity share of new entrepreneurs (defined as the number of new opportunity entrepreneurs as a share of the total number of new entrepreneurs). Over the past two decades, the share of new business creation from opportunity entrepreneurship increased when economic conditions were improving and decreased when economic conditions were worsening. The largest share of opportunity entrepreneurship occurred at the height of the "Roaring 90s," and the smallest share was in 2009 at the end of the Great Recession. The share of opportunity business creation also decreased in

the recession of the early 2000s and increased in the following growth period in the mid-2000s. The opportunity share of new entrepreneurs is clearly pro-cyclical.[3]

Figures 1-4 display the number of entrepreneurs over the business cycle. The patterns do not change when we implicitly adjust for trends in population size by focusing on entrepreneurship rates (which capture the percentage of the adult, non-business owner population that starts a business each *month*). Figure 6 displays the entrepreneurship rate over the business cycle. As expected the patterns do not differ substantially from patterns for the number of entrepreneurs. Appendix Figures 1 and 2 display trends for similar rate measures for opportunity and necessity entrepreneurship. These also follow similar time series patterns. Opportunity entrepreneurship displays a weak pro-cyclical pattern and necessity entrepreneurship follows a strong counter-cyclical pattern.

Returning to trends in the number of entrepreneurs displayed in Figure 1, it is possible to explain changes over time. For example, from 2006 before the Great Recession to 2010 when the Great Recession ended the number of new entrepreneurs increased by 85,370 per month. Most of the increase in business creation from the start to end of the Great Recession came from necessity entrepreneurship. The number of new necessity entrepreneurs increased by 53,886 (63 percent). In contrast, the recent increase in the total number of new entrepreneurs of 103,990 from 2013 to 2015 was entirely driven by the increase in the number of opportunity entrepreneurs.

National Trends in Germany

3 We find a similar pattern of clear pro-cyclicality in the opportunity share when we exclude new entrepreneurs who were initially not in the labor force.

We next examine trends in Germany using the German Micro Census. Figure 7 plots the total number of new entrepreneurs and the unemployment rate, which is obtained from Germany's Federal Employment Agency (2017). Similar to the United States, the number of new entrepreneurs exhibits a weak counter-cyclical pattern moving mostly with the unemployment rate. Figure 8 shows the relationship between entrepreneurship and the real GDP growth rate, which is provided by German Federal Statistical Office (2016). No clear pattern emerges due to the erratic nature of GDP growth. In Figure 9, we look at new opportunity entrepreneurs separately. Similar to the total number of new entrepreneurs, the number of new opportunity entrepreneurs moves somewhat with the unemployment rate. A very clear relationship becomes apparent, however, between the number of new necessity entrepreneurs and the unemployment rate (Figure 10). As expected, and as seen in the United States, the two trends move together indicating that necessity entrepreneurship is counter-cyclical. Focusing on the percentage of opportunity vs. necessity entrepreneurship, we find that the opportunity share of new entrepreneurs is strongly cyclical (Figure 11). In 2003-2005, when unemployment is at its peak, the share of opportunity entrepreneurs out of all new entrepreneurs falls from 90% to 80% and rises back to 90% thereafter. Finally, when we plot new entrepreneurship rates instead of numbers, very similar patterns emerge (Figure 12 and Appendix Figures 3 and 4), which is in line with our earlier observation from the U.S. data.[1]

West and East Germany

We also examine differences between former West and East Germany that persist after reunification in 1990. In particular, the regional economy is much weaker in the east. While the

1 The results also remain similar when we exclude those initially not in the labor force from the sample.

total new entrepreneurship rate is almost the same in both parts of the country, distinguishing between opportunity and necessity entrepreneurship reveals important differences in the expected direction. The new necessity entrepreneurship rate in the east is double the rate in the west (0.20% versus 0.10% in our SOEP sample), whereas the opportunity entrepreneurship rate is lower in the east (0.62% versus 0.74%). Thus, exclusively considering the total new entrepreneurship rate hides substantial differences between the two types of entrepreneurship.

Regression Results Using National Unemployment Rates

We next examine the relationship between entrepreneurship and the business cycle in a regression framework. The regressions allow us to control for trends in demographic factors, regional population shifts, and long-term trends that might be correlated with business cycle dynamics. We first examine entrepreneurship in the United States using the matched CPS from 1996-2015.

Table 1 reports estimates from linear probability regressions for the probability of total new entrepreneurship, new opportunity entrepreneurship, and new necessity entrepreneurship.[1] The sample for all three models includes the adult, non-business owner population in the initial survey month of the two-month panel. Total entrepreneurship captures individuals starting a business in the second survey month. Specifications 1 and 2 report estimates for the regression of total new entrepreneurship on the national unemployment rate with and without controls, respectively. The entrepreneurship probability has a positive association with the national unemployment rate indicating a counter-cyclical pattern. Controlling for demographic, regional

1 Marginal effects for probit and logit models are similar and not reported.

and long-term factors does not change the estimate of the association between entrepreneurship and the unemployment rate.

We also estimate regressions for the probability of opportunity and necessity entrepreneurship. Specifications 3 and 4 report estimates for regressions for the probability of opportunity entrepreneurship, and Specifications 5 and 6 report estimates for regressions for the probability of necessity entrepreneurship. The probability of opportunity entrepreneurship is not strongly associated with the national unemployment rate. The point estimate is negative, as expected, but it is not statistically significant. The necessity entrepreneurship probability, however, is positively associated with the national unemployment rate.

The regression estimates confirm the trends displayed in the figures. Necessity entrepreneurship is counter-cyclical whereas opportunity entrepreneurship is weakly pro-cyclical. Also, demographic, regional and long-term trends are not responsible for the relationships with the business cycle.

The results from analogous regressions using the German SOEP appear in Table 2. Using annual panel data and the sample of adult non-entrepreneurs, the dependent variable is 1 if an individual reports entrepreneurship in the subsequent year. Those who are unemployed before the transition are classified as necessity entrepreneurs and all other new entrepreneurs are classified as opportunity entrepreneurs. The national unemployment rate is positively associated with the total new entrepreneurship rate. This is statistically significant only when including control variables. There is no significant association of the unemployment rate with opportunity entrepreneurship. In contrast, necessity entrepreneurship is positively and significantly related to the unemployment rate. Thus, in Germany similar to the United States, the counter-cyclical

movement of necessity entrepreneurship drives the counter-cyclicality of the total entrepreneurship rate.

In general this analysis of national trends over the business cycle is consistent with agreed-upon concepts of opportunity vs. necessity entrepreneurship. Our empirical definitions meet expectations regarding the strong counter-cyclicality of necessity entrepreneurship and weak pro-cyclicality of opportunity entrepreneurship.

Local Economic Conditions in the United States

We turn to examining the relationship between opportunity and necessity entrepreneurship and local economic conditions. In case of the United States, we focus on metropolitan areas which capture local labor markets. Figure 13 displays average new total, opportunity and necessity entrepreneurship rates across several ranges of local unemployment rates. Variation across local labor markets and over time are used to generate the relationships displayed in the figure. There is a positive relationship between total new entrepreneurship rates and local unemployment rates. The distinction between opportunity and necessity entrepreneurship shows that this is driven by the even stronger association of necessity entrepreneurship with local unemployment rates. Necessity entrepreneurship rates increase substantially and monotonically from the lowest local unemployment rates to the highest local unemployment rates. In contrast to the clear results for necessity entrepreneurship we do not find a clear relationship between opportunity entrepreneurship and local unemployment rates.

Figure 14 displays the opportunity share of entrepreneurship across local unemployment rates. The relationship between the opportunity share of entrepreneurship and local unemployment rates is strongly negative. Higher local unemployment rates are associated with

lower opportunity shares, consistent with the patterns found for opportunity and necessity entrepreneurship.

Regression Results Using Local Unemployment Rates in the United States

We also estimate regression models that replace the national unemployment rate with the MSA unemployment rate.[1] Table 3 reports estimates from linear probability regressions for the probability of total new entrepreneurship, new opportunity entrepreneurship, and new necessity entrepreneurship including the local unemployment rate. The regressions control for demographic trends and differences across metropolitan areas that might confound the estimated relationship between entrepreneurship and local unemployment rates. Regional and urbanicity trends and differences, and long-term macro trends are also controlled for in the regressions.

Total entrepreneurship has a positive association with local unemployment rates. Necessity entrepreneurship, as expected also has a positive association with local unemployment rates. On the other hand, we do not find evidence of a negative association with opportunity entrepreneurship. These results generally confirm the patterns displayed in the figures and are consistent with the findings using the national unemployment rate as the measure of business cycle conditions.

Results Using Local Unemployment Rates in Germany

Entrepreneurship patterns by local unemployment rates in Germany (based on Spatial Planning Regions) are similar to those in the United States. In particular, the new necessity entrepreneurship rate generally increases with the local unemployment rate (Figure 15) whereas

1 Observations from rural areas or not-identified MSAs are not included in the sample. These observations represent less than 25 percent of the total sample.

the opportunity share decreases (Figure 16). There is no clear trend in the total new entrepreneurship rate, however, which highlights again that this statistic alone disguises the important difference between the two types.

Table 4 shows linear probability regressions for Germany based on the SOEP. The main regressor of interest is the local unemployment rate. The association between total new entrepreneurship and the local unemployment rate is positive, indicating counter-cyclicality, similar to the United States. The association between opportunity entrepreneurship and the unemployment rate is negative, indicating pro-cyclicality. However, the point estimates for total and opportunity entrepreneurship are not statistically significant. In contrast, necessity entrepreneurship is positively associated with the unemployment rate and statistically significant. This result confirms the counter-cyclical pattern of necessity entrepreneurship.

5. Business Types Associated with Opportunity vs. Necessity Entrepreneurship

Do our definitions of opportunity and necessity entrepreneurship line up with the creation of more growth-oriented businesses? In other words, based on our definitions do opportunity entrepreneurs start businesses with more growth-oriented characteristics than do necessity entrepreneurs? We explore this question next. Table 5 reports estimates for several measures of the businesses created by new opportunity and necessity entrepreneurs based on the CPS. We find that new opportunity entrepreneurs are more likely to create incorporated businesses and are more likely to create employer businesses.[1] These two factors are especially associated with the seriousness of the business venture (e.g., Astebro and Tag, 2015).

1 Employer status of business owners is only available in the CPS starting in 2014.

Incorporation status might represent another method of distinguishing between opportunity and necessity entrepreneurship. We explore this possibility by plotting trends in the incorporation share of new entrepreneurs vs. the unemployment rate using the CPS (Figure 17). One pattern that is extremely clear is that incorporation status has been steadily increasing in the United States over the past two decades. The share of new entrepreneurs starting incorporated businesses increased from 28 percent in 1996 to 36 percent in 2015. The incorporation share increased steadily from 1996 to 2008. It decreased slightly in the Great Recession, but did not decrease during the recession in the early 2000s. The dominant trend in the incorporation share of new entrepreneurs is a long-term upward trend and not one that closely follows the business cycle. A perhaps more important concern, however, is that incorporation status can be thought of as an ex-post business outcome. It might depend on the early success of the business venture. An important criterion in distinguishing between opportunity and necessity entrepreneurship noted above is that it is pre-determined. But, incorporation status is defined simultaneously with the business creation decision.

Table 5 also reports the industry distributions for businesses created by new opportunity and necessity entrepreneurs. Opportunity entrepreneurs are more likely to start businesses than necessity entrepreneurs in agriculture, wholesale/retail trade, and education/health. Necessity entrepreneurs are more likely to start businesses in construction. These differences generally line up with opportunity entrepreneurs starting businesses in industries with higher barriers to entry. But, overall we find that both opportunity and necessity entrepreneurs are fairly spread across industries.

Using the SOEP, we find that opportunity entrepreneurship is related to indicators of growth-oriented businesses in Germany as well (Table 6). New opportunity entrepreneurs are

more likely to hire workers: Three quarters of new necessity entrepreneurs are solo-entrepreneurs, but only 53% of new opportunity entrepreneurs. New opportunity entrepreneurs also earn substantially more per month than necessity entrepreneurs. The difference is even larger with regard to business assets. New necessity entrepreneurs are more likely to work in the construction industry in Germany, like in the United States, although the difference between opportunity and necessity entrepreneurs is not as large in this respect in Germany. Unfortunately, neither the SOEP nor the Micro Census provide information on incorporation status.

6. Conclusions

In this paper, we create operational definitions of necessity and opportunity entrepreneurship that satisfy four criteria: i) consistent with theory, ii) objectively defined, iii) empirically measurable ex-ante, and iv) available in many large, nationally representative datasets. Using panel data or retrospective information we define individuals who are initially unemployed before starting businesses as "necessity" entrepreneurs, and define individuals who are not unemployed (i.e. wage/salary workers, enrolled in school or college, or are not actively seeking a job) before starting businesses as "opportunity" entrepreneurs. We show that our empirical definitions are consistent with the standard theoretical economic model of entrepreneurship.

Taking our proposed definition to the data, we find that roughly 80 percent of entrepreneurs in the United States are opportunity entrepreneurs, and 90 percent of entrepreneurs in Germany are opportunity entrepreneurs. We find that total entrepreneurship is somewhat counter-cyclical, but once we distinguish between opportunity and necessity entrepreneurship associations with the business cycle become clearer. Opportunity entrepreneurship is generally

pro-cyclical and necessity entrepreneurship is strongly counter-cyclical. Opportunity entrepreneurship is positively associated with local economic conditions and necessity entrepreneurship is negatively associated with local economic conditions. Opportunity entrepreneurship is also found to be associated with more growth-oriented businesses than necessity entrepreneurship. These findings provide validation that our definitions of opportunity and necessity entrepreneurship are capturing their intended concepts.

To be sure, it is impossible to create a perfectly clean dichotomy along the lines of opportunity and necessity entrepreneurship. Entrepreneurship or business ownership is more broadly determined by both supply and demand factors. An outward shift in demand for the goods and services typically produced by entrepreneurs or an outward shift in the availability of capital could lead to more opportunity entrepreneurship, whereas an inward shift in demand for wage and salary jobs could lead to more necessity entrepreneurship. Economic fluctuations, for example, are likely to affect all of these factors and not just one in isolation, thus making it difficult to cleanly dichotomize the underlying motivations for starting a business. Furthermore, not all businesses created from unemployment will be out of necessity as some unemployed workers might have good opportunities in the wage/salary sector, and similarly, not all businesses created from wage/salary work will be opportunity entrepreneurship as some wage/salary workers might be receiving low pay or facing reduced work hours. The underlying problem is that one cannot observe all of the internal and external factors influencing the decisions to start a business by the individual.

With these caveats in mind, the dichotomy between opportunity and necessity entrepreneurship defined here could be valuable for future research on the determinants and outcomes of entrepreneurship. For example, research focusing on the determinants of more

growth-oriented entrepreneurship (and not necessity entrepreneurship) might want to exclude the previously unemployed in some specifications. On the other hand, an analysis of the reliance on business ownership as a route out of poverty might want to focus on necessity entrepreneurship. Although researchers need to be careful about the potential for removing ultimately successful "necessity" entrepreneurs or removing downtrodden "opportunity" entrepreneurs this approach could tighten up estimates and provide clearer results.

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Figure 1
Number of New Entrepreneurs and Unemployment Rates (1996-2015)

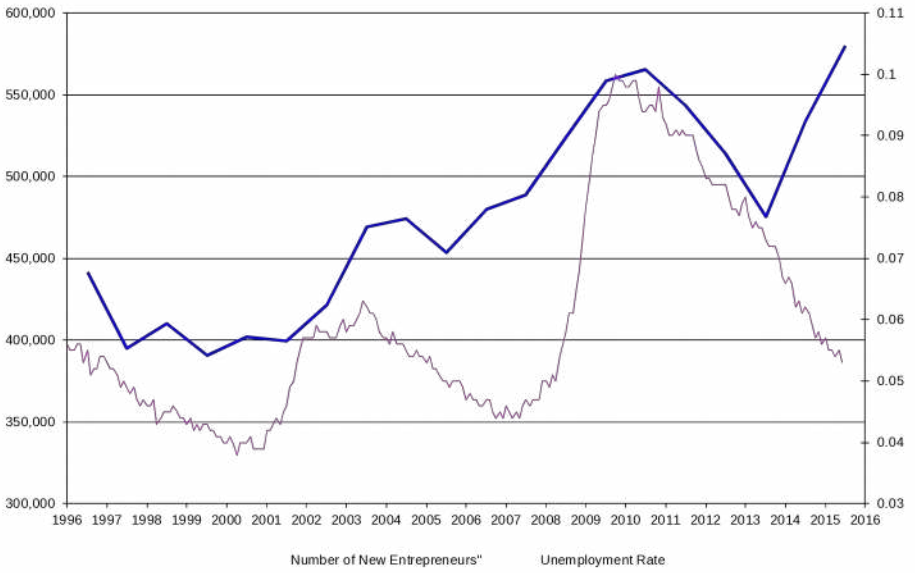


Figure 2
Number of New Entrepreneurs and Real GDP Growth Rates (1996-2015)

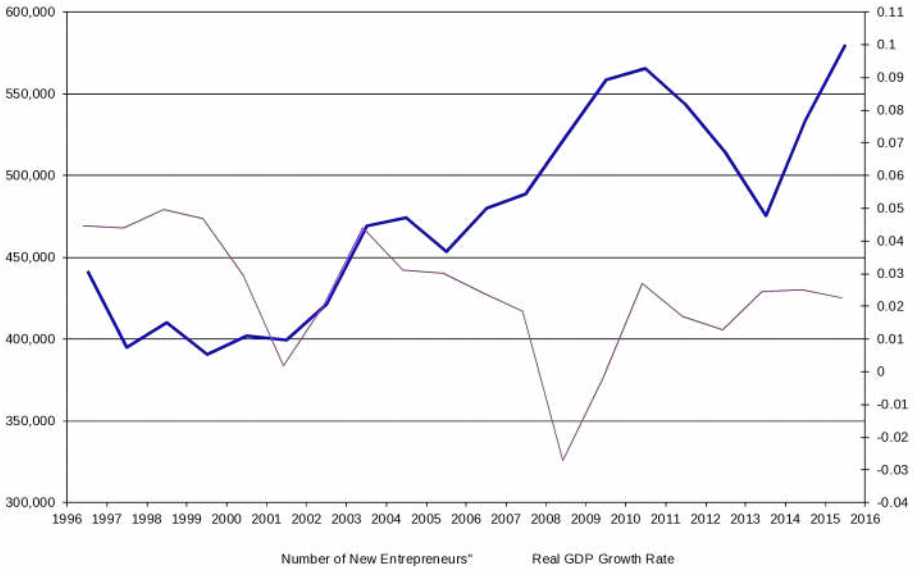


Figure 3
Number of New Opportunity Entrepreneurs and Unemployment Rates (1996-2015)

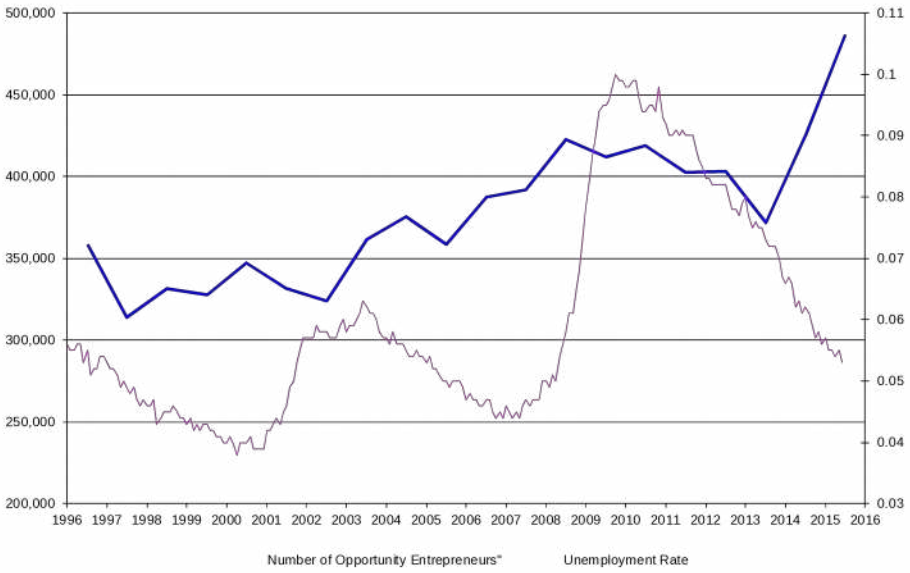


Figure 4
Number of New Necessity Entrepreneurs and Unemployment Rates (1996-2015)

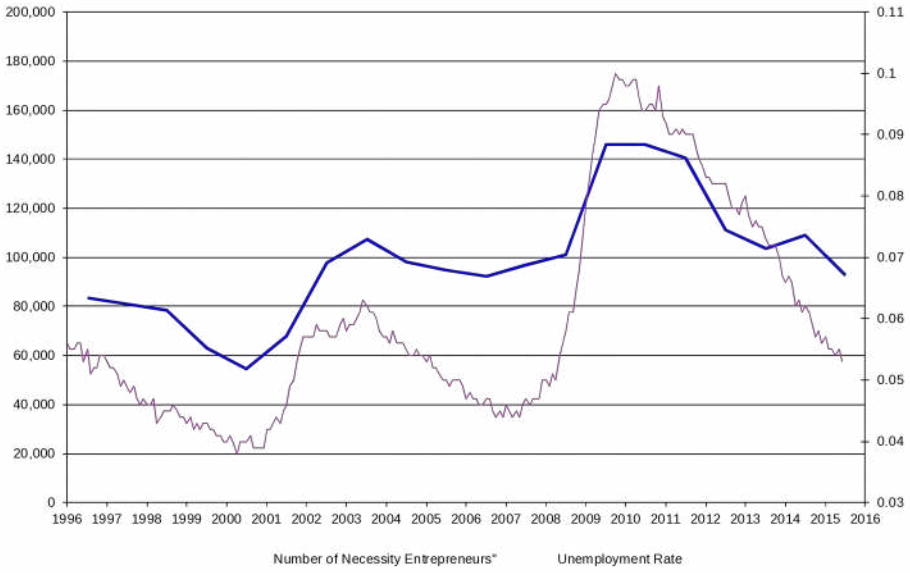


Figure 5
Opportunity Share of New Entrepreneurs and Unemployment Rate (1996-2015)

Figure 6
New Entrepreneurship Rate and Unemployment Rates (1996-2015)

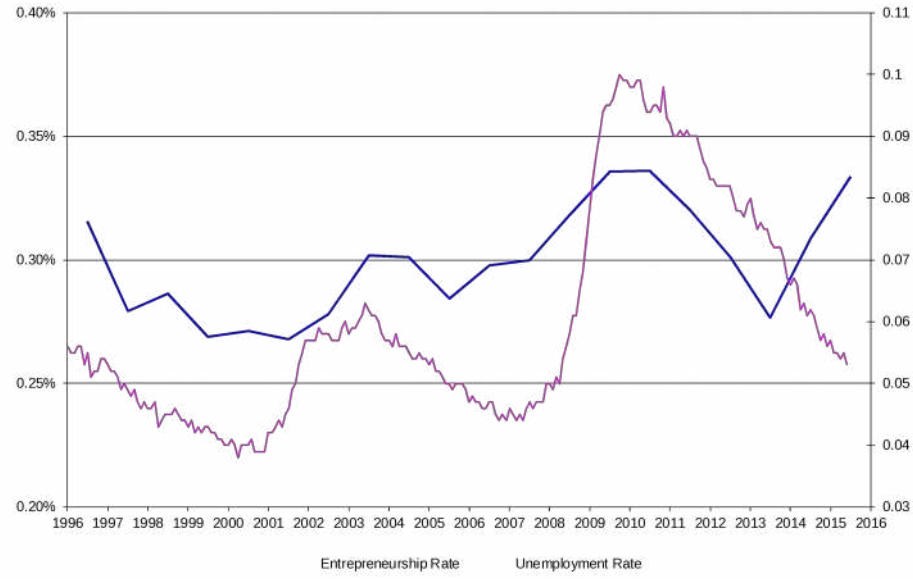


Figure 7
Number of New Entrepreneurs and Unemployment Rates in Germany (1996-2015)

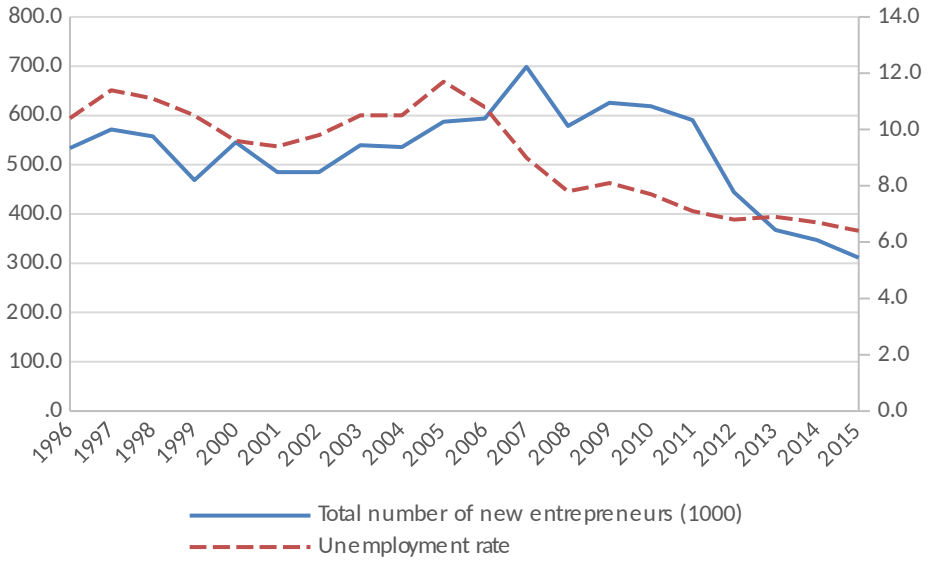


Figure 8
Number of New Entrepreneurs and Real GDP Growth Rates in Germany (1996-2015)

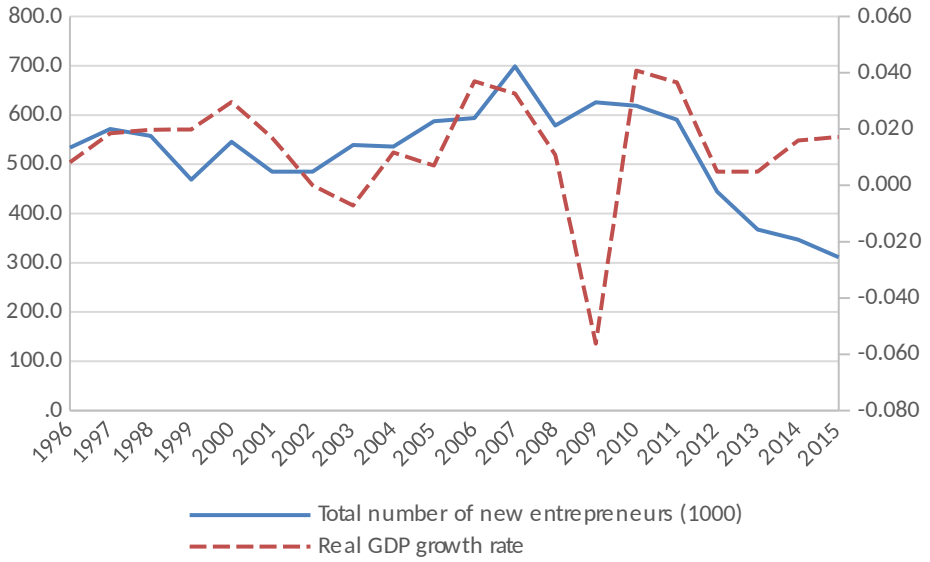


Figure 9
Number of New Opportunity Entrepreneurs and Unemployment Rates in Germany (1996-2015)

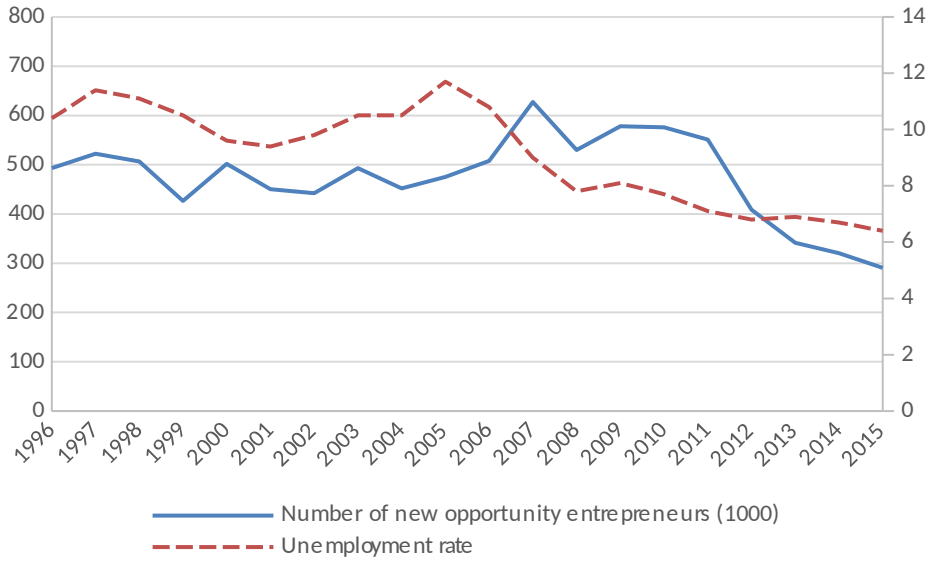


Figure 10
Number of New Necessity Entrepreneurs and Unemployment Rates in Germany (1996-2015)

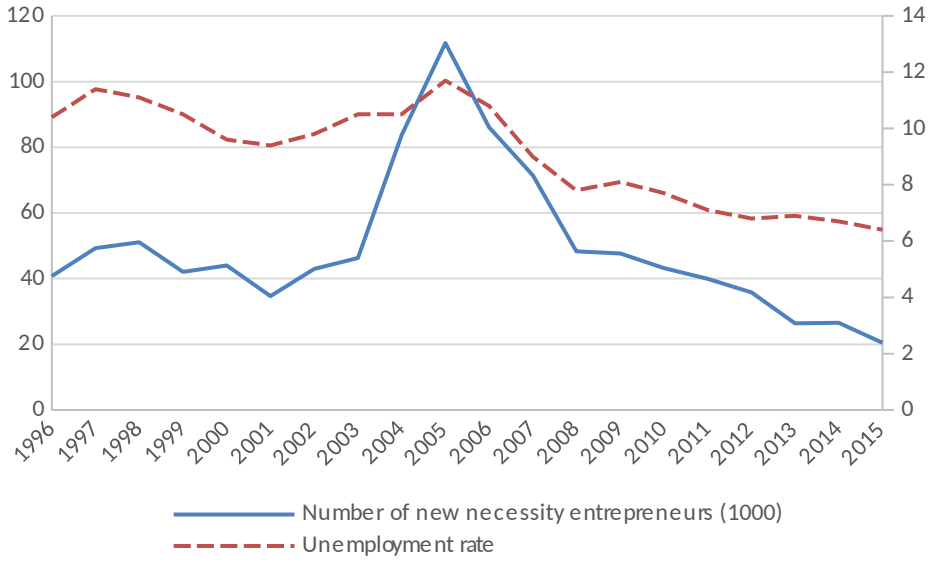


Figure 11
Opportunity Share of New Entrepreneurs and Unemployment Rates in Germany (1996-2015)

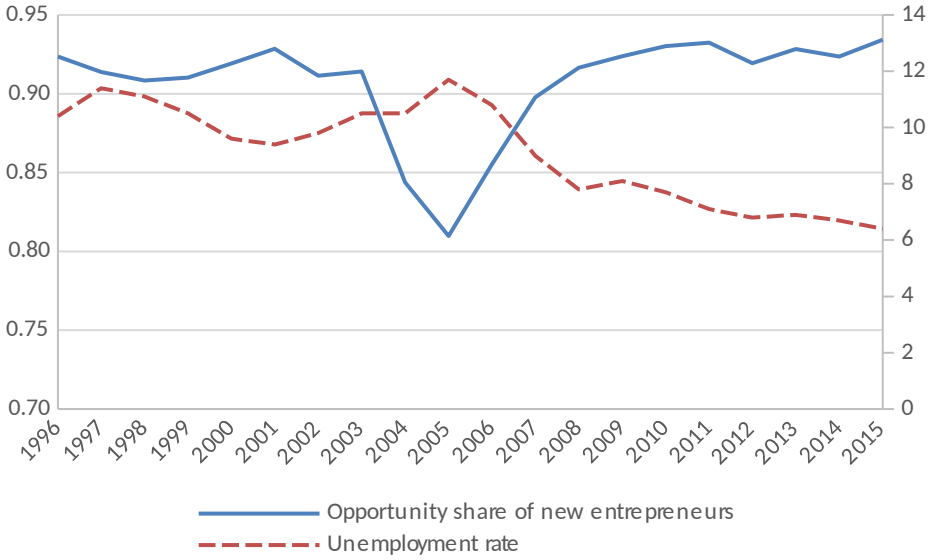


Figure 12
New Entrepreneurship Rate and Unemployment Rates in Germany (1996-2015)

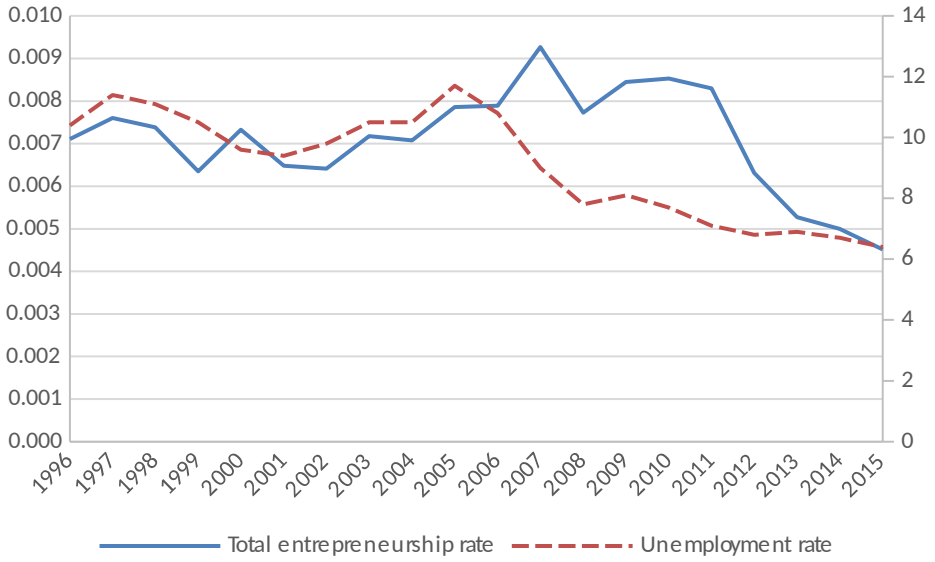


Figure 13: New Entrepreneurship Rates by Local Unemployment Rates
Current Population Survey (1996-2016)

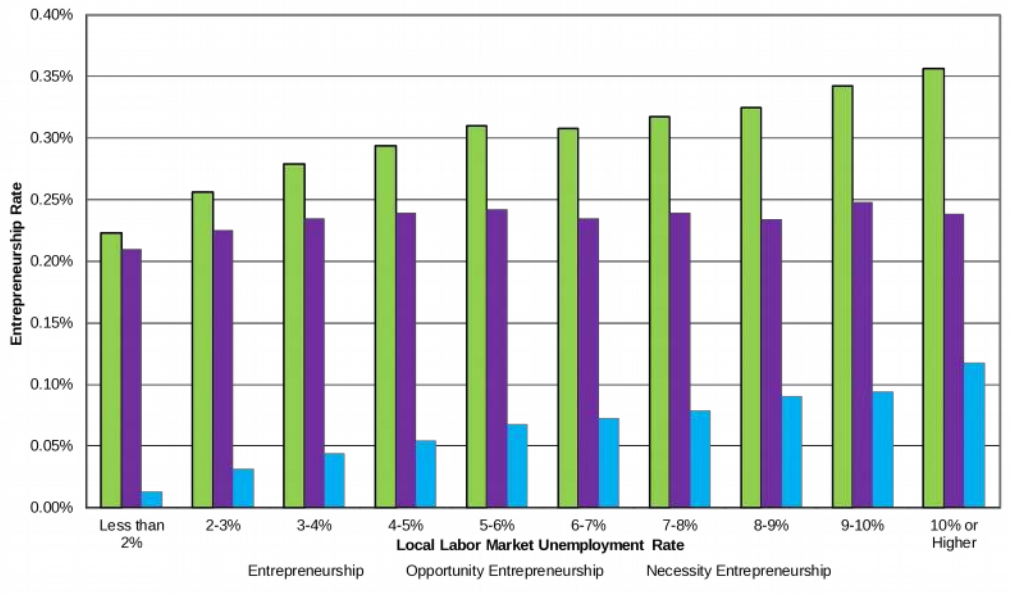


Figure 14: Opportunity Share of New Entrepreneurs by Local Unemployment Rates
Current Population Survey (1996-2016)

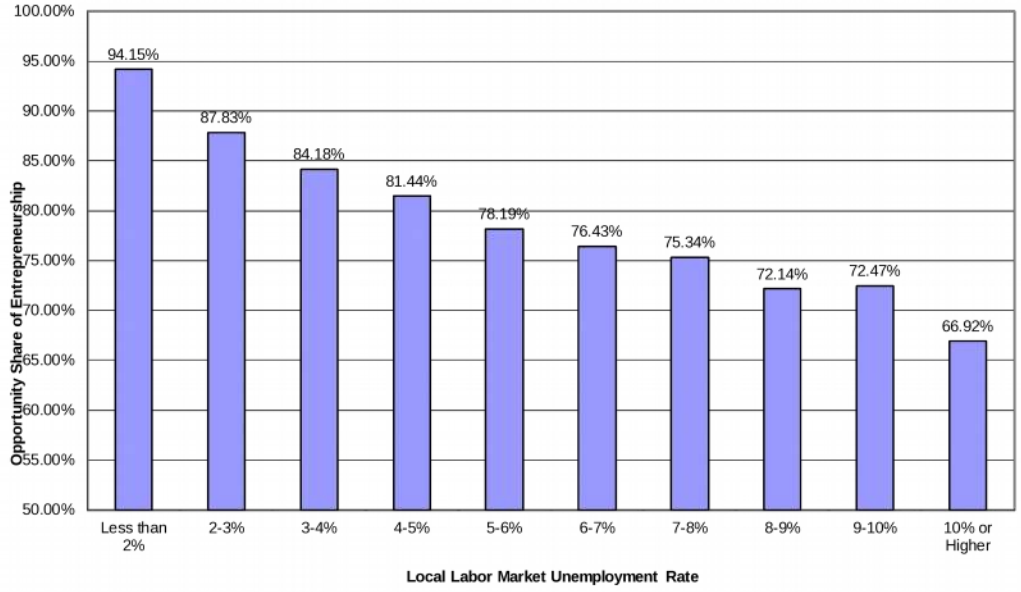


Figure 15
New Entrepreneurship Rates by Local Unemployment Rates
German Socio-economic Panel (1996-2015)

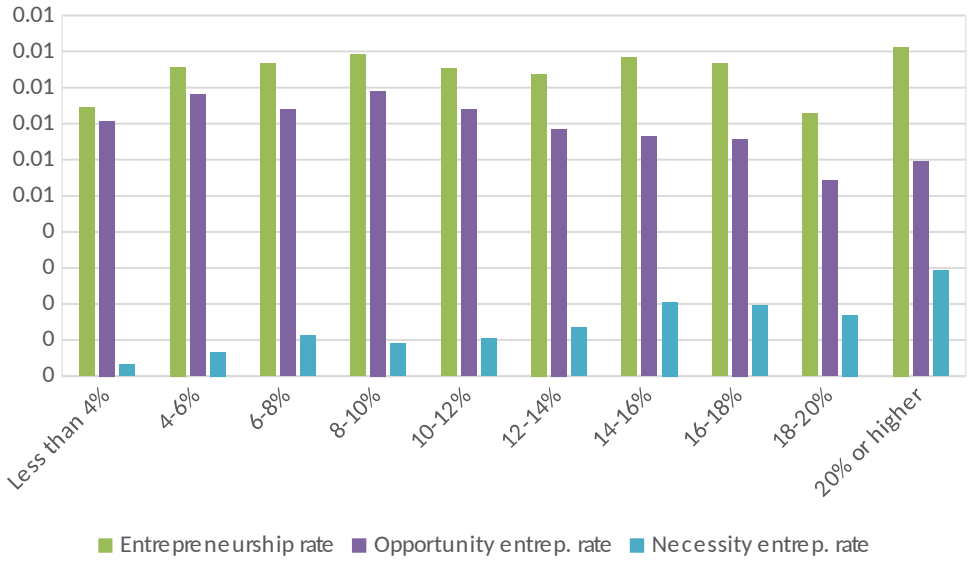


Figure 16
Opportunity Share of New Entrepreneurs by Local Unemployment Rates
German Socio-economic Panel (1996-2015)

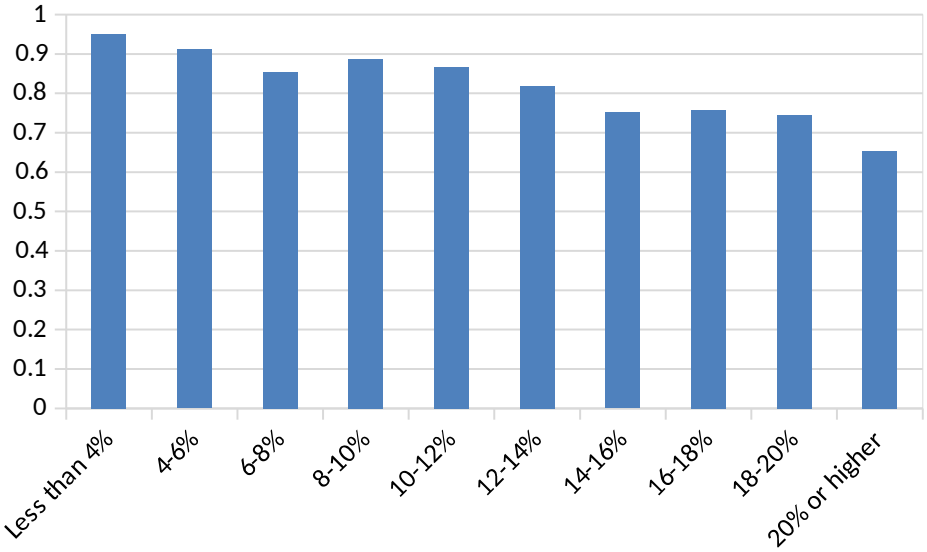


Figure 17
Incorporated Share of New Entrepreneurs and Unemployment Rate (1996-2015)

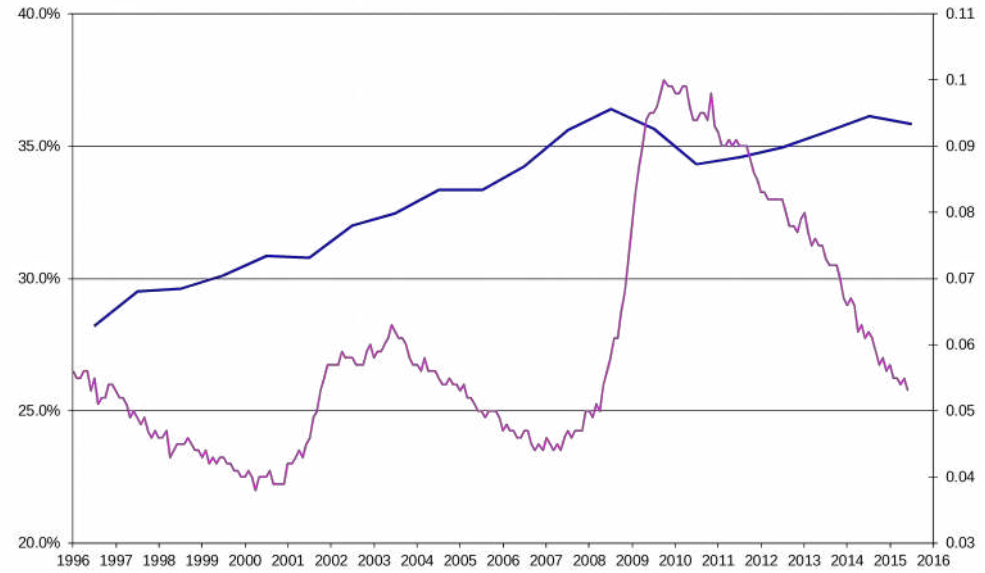


Table 1
Regressions for Probability of Entrepreneurship Type
Current Population Survey (1996-2016)

Explanatory Variable	Total Entrep (1)	Total Entrep (2)	Opportunity Entrep (3)	Opportunity Entrep (4)	Necessity Entrep (5)	Necessity Entrep (6)
National unemployment rate	0.00574	0.00586	-0.00133	-0.00121	0.00707	0.00707
	(0.00176)	(0.00175)	(0.00151)	(0.00150)	(0.00069)	(0.00069)
Demographic controls		X		X		X
Regional controls		X		X		X
Urbanicity controls		X		X		X
Quadratic time trend		X		X		X
Mean of dep. var.	0.00300	0.00300	0.00238	0.00238	0.00062	0.00062
Sample size	11,470,272	11,470,272	11,470,272	11,470,272	11,470,272	11,470,272

Notes: (1) The sample consists of individuals (ages 20-64) who do not own a business in the initial survey month of the two-month panel. (2) Demographic controls include gender, race, ethnicity, immigrant, age, age squared, education levels, and marital status dummies. (3) Standard errors are clustered at the monthly level.

Table 2
Regressions for Probability of Entrepreneurship Type
German Socio-economic Panel (1996-2013)

	Total Entrep. (1)	Total Entrep. (2)	Opportunity Entrep. (3)	Opportunity Entrep. (4)	Necessity Entrep. (5)	Necessity Entrep. (6)
National unemployment rate	0.0286	0.0810	0.0105	0.0516	0.0181	0.0294
	(0.0182)	(0.0368)	(0.0159)	(0.0324)	(0.0058)	(0.0112)
Demog. Controls		X		X		X
Regional controls		X		X		X
Urbanicity controls		X		X		X
Quadrat. time trend		X		X		X
Mean of dep. var.	0.0098	0.0098	0.0083	0.0083	0.0015	0.0015
Sample size	203,853	203,853	203,853	203,853	203,853	203,853

Notes: The sample consists of individuals (ages 20-64) who do not own a business in the year of observation. The dependent variable in the first two columns is one if the individual owns a business in the subsequent year and zero otherwise (new entrepreneur). In columns (3) and (4), only those among the new entrepreneurs are counted as new opportunity entrepreneur who are not unemployed in the initial year, and in (5) and (6), those who are unemployed in the initial year are coded as new necessity entrepreneurs. Demographic controls include gender, direct and indirect migration background, age, age squared, educational degrees, and a marital status dummy. Urbanicity is accounted for by including the population density in the Spatial Planning Region. The standard errors in parenthesis are clustered at the level of observation years. We obtain similar results when we run regressions on data aggregated by year (without control variables due to a lack of degrees of freedom), as recommended by Angrist and Pischke (2009) when the number of clusters is small.

Table 3
Regressions for Probability of Entrepreneurship Type for Local Unemployment Rates
Current Population Survey (1996-2016)

Explanatory Variable	Total Entrep (1)	Total Entrep (2)	Opportunity Entrep (3)	Opportunity Entrep (4)	Necessity Entrep (5)	Necessity Entrep (6)
Local unemployment rate	0.00852	0.00682	0.00014	-0.00105	0.00838	0.00788
	(0.00141)	(0.00100)	(0.00103)	(0.00075)	(0.00062)	(0.00053)
Demographic controls		X		X		X
Regional controls		X		X		X
Urbanicity controls		X		X		X
Quadratic time trend		X		X		X
Mean of dep. var.	0.00295	0.00300	0.00233	0.00233	0.00062	0.00062
Sample size	8,772,816	8,772,816	8,772,816	8,772,816	8,772,816	8,772,816

Notes: (1) The sample consists of individuals (ages 20-64) who do not own a business in the initial survey month of the two-month panel. (2) Demographic controls include gender, race, ethnicity, immigrant, age, age squared, education levels, and marital status dummies. (3) Standard errors are clustered at the MSA level.

Table 4
Regressions for Probability of Entrepreneurship Type for Local Unemployment Rates
German Socio-economic Panel (1996-2013)

	Total Entrep. (1)	Total Entrep. (2)	Opportunity Entrep. (3)	Opportunity Entrep. (4)	Necessity Entrep. (5)	Necessity Entrep. (6)
Local unemploy-	0.0022	0.0011	-0.0120	-0.0141	0.0142	0.0153
ment rate	(0.0099)	(0.0150)	(0.0088)	(0.0121)	(0.0022)	(0.0049)
Demog. controls		X		X		X
Regional controls		X		X		X
Urbanicity controls		X		X		X
Quadrat. time trend		X		X		X
Mean of dep. var.	0.0098	0.0098	0.0083	0.0083	0.0015	0.0015
Sample size	185,300	185,300	185,300	185,300	185,300	185,300

Notes: The sample consists of individuals (ages 20-64) who do not own a business in the year of observation. The dependent variable in the first two columns is one if the individual owns a business in the subsequent year and zero otherwise (new entrepreneur). In columns (3) and (4), only those among the new entrepreneurs are counted as new opportunity entrepreneur who are not unemployed in the initial year, and in (5) and (6), those who are unemployed in the initial year are coded as new necessity entrepreneurs. The local unemployment rate is the unemployment rate in the Spatial Planning Region (SPR) where the individual lives. Demographic controls include gender, direct and indirect migration background, age, age squared, educational degrees, and a marital status dummy. Urbanicity is accounted for by including the population density in the SPR. The standard errors in parenthesis are clustered at the SPR level.

Table 5
Mean Characteristics of New Entrepreneurs in their First Month
Current Population Survey (1996-2015)

	New Opportunity Entrepreneurs	New Necessity Entrepreneurs
Incorporated	19.1%	10.5%
Employer	14.9%	4.6%
Agriculture	7.4%	2.9%
Construction	17.3%	33.0%
Manufacturing	3.4%	2.1%
Wholesale/Retail Trade	11.8%	7.9%
Trans/Utilities	3.9%	4.0%
Information	1.9%	3.2%
Financial Activities	6.5%	4.2%
Professional/Business	20.0%	21.1%
Education/Health	13.8%	8.6%
Leisure/Hospitality	6.7%	5.6%
Other Services	7.4%	7.5%
Sample size	29,183	7,055

Notes: (1) The sample consists of individuals (ages 20-64) who are new entrepreneurs in in the second survey month of the two-month panel. (2) Employer status is only available starting in 2014.

Table 6
Mean Characteristics of New Entrepreneurs in their First Year
German Socio-economic Panel (1996-2013)

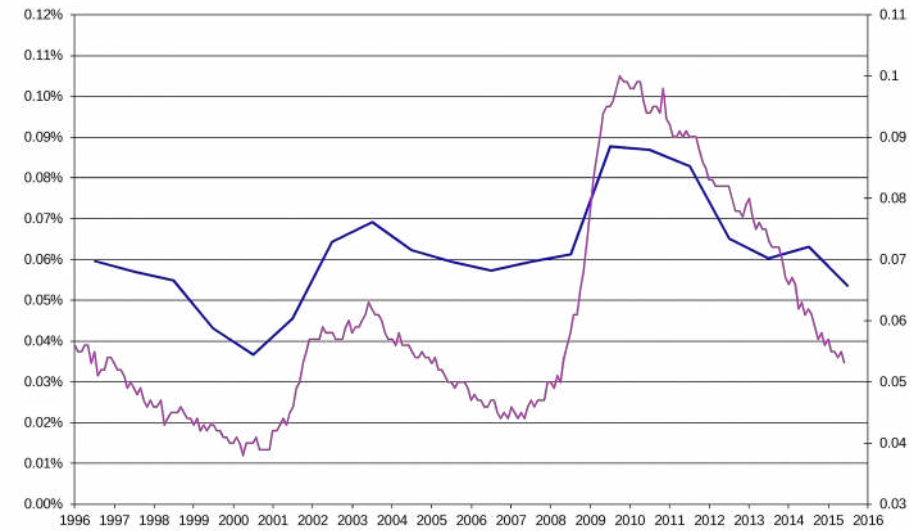
	New Opportunity Entrepreneurs	New Necessity Entrepreneurs
Solo entrepreneur	0.5322	0.7516
1-9 employees	0.2684	0.1742
10 or more employees	0.0603	0.0097
Full-time	0.6655	0.7645
Monthly gross labor income in euro	2536	1521
Business assets in euro	49927	6974
Industry		
Agriculture	0.0307	0.0290
Mining and quarrying	0.0006	0.0000
Energy and water	0.0029	0.0000
Manufacturing	0.0377	0.0355
Construction	0.0725	0.1000
Trade	0.1565	0.1484
Hotels and restaurants	0.0406	0.0419
Transport and communication	0.0423	0.0226
Financial services	0.0574	0.0548
Real estate	0.0023	0.0000
Business services	0.1733	0.2032
Public and personal services	0.2128	0.1645
Missing information on industry	0.1171	0.1581

Notes: Based on 1725 observations of new opportunity entrepreneurs and 310 observations of new necessity entrepreneurs in their first year of business (ages 20-64). Gross labor income is based on 1367 (249) observations for new opportunity (necessity) entrepreneurs and business assets on 259 (39) observations. Assets are only observed in 2002, 2007 and 2012.

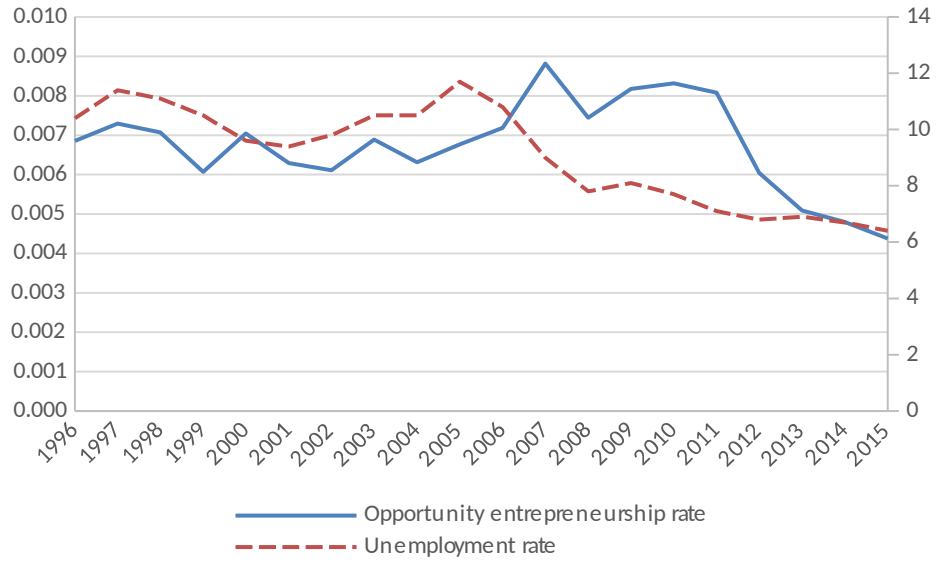
Appendix

Appendix Figure 1
New Opportunity Entrepreneurship Rate and Unemployment Rates (1996-2015)

Appendix Figure 2
New Necessity Entrepreneurship Rate and Unemployment Rates (1996-2015)



Appendix Figure 3
New Opportunity Entrepreneurship Rate and Unemployment Rates in Germany (1996-2015)



Appendix Figure 4
New Necessity Entrepreneurship Rate and Unemployment Rates in Germany (1996-2015)