Essays on the Transition from Unemployment to Employment with a Special Emphasis on Start-up Subsidies in Germany

Inaugural-Dissertation

zur Erlangung des akademischen Grades

eines Doktors der Wirtschafts- und Sozialwissenschaft (Dr. rer. pol.)

der Wirtschafts- und Sozialwissenschaftlichen Fakultät

der Universität Potsdam

vorgelegt von

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Published online at the
Institutional Repository of the University of Potsdam:
URN urn:nbn:de:kobv:517-opus4-87464
http://nbn-resolving.de/urn:nbn:de:kobv:517-opus4-87464

To my mother.

Acknowledgemens

This thesis was written during my time as a Resident Research Affiliate at the Institute for the Study of Labor (IZA) in Bonn. A main part of the thesis was part of the project "Evaluation des Gründungszuschusses", for which financial support of the Institute for Employment Research (IAB) in Nuremberg under the research grant No. 1143 is gratefully acknowledged. I also thank IZA for providing the financial means and infrastructure that allowed me to write this thesis in the first place

I would like to express my gratitude to my supervisor, Prof. Marco Caliendo for his guidance and useful critiques of this research work. I also thank Prof. Alexander S. Kritikos and Prof. Rainald Borck for their willingness to referee this dissertation.

I am also particularly thankful to my co-authors for the good cooperation during our research project.

A very special thank you to my family and friends for their continuous support. In particular I thank Irene and Michael. Without you this would not have been possible.

Contents

List of Abbreviations

AO	Tax Code ("Abgabeordnung"): Basic German tax legislation
APS	Adult Population Surveys
BA	Bridging Allowance ("Überbrückungsgeld")
BEEG	"Bundeselterngeld- und Elternzeitgesetz"
BRS	Business Register Statistics ("Gewerbeanzeigenstatistik")
CAPI	Computer-Assisted Personal Interviewing
CATI	Computer-Assisted Telephone Interviewing
CC	Chamber of Crafts ("Handwerkskammer")
CIC	Chamber of Industry and Commerce ("Industrie- und Handelskammer")
ERP	European Recovery Program
EStG	Income Tax Law ("Einkommensteuergesetz")
FEA	Federal Employment Agency ("Bundesagentur für Arbeit")
FOS	Federal Office of Statistics ("Statistisches Bundesamt")
GEM	Global Entrepreneurship Monitor
HGB	Commercial Law Book ("Handelsgesetzbuch")
IAB	Institute for Employment Research ("Institut für Arbeitsmarkt- und Berufsforschung")
IFB	Institute for Liberal Professions ("Institut für Freie Berufe")
IfM	Institute for Research on Small and Medium-sized Enterprises ("Institut für Mittelstandsforschung")
IfMSuS	IFM Start-up Statistics ("IfM Gründungs- und Liquidationsstatistik")
ILO	International Labor Organization
IZA	Institute for the Study of Labor ("Institut zur Zukunft der Arbeit")
KfW	Reconstruction Credit Institute ("Kreditanstalt für Wiederaufbau")
KfWGM	KfW Start-up Monitor ("KfW Gründungsmonitor")

MuP	Mannheim Foundation Panel ("Mannheimer Gründungspanel")
MZG	Legal Basis for the survey reporting system Microcensus ("Mikrozensusgesetz")
NRW	North Rhine-Westphalia
NSUS	New Start-up Subsidy ("Gründungszuschuss")
OECD	Organisation for Economic Cooperation and Development
OSUS	Old Start-up Subsidy ("Existenzgründungszuschuss")
PartGG	Partner Company Law ("Partnergesellschaftsgesetz")
PLB	Parental-Leave-Benefit ("Bundeselterngeld")
REM	Regional Entrepreneurship Monitor
RQC	Register of Qualified Craftsmen ("Handwerksrolle")
SCB/SC	Social Code Book ("Sozialgesetzbuch")
SME	Small and medium sized enterprise
STW	Short-time-work
TEA	Total-Early-stage Entrepreneurial Activity
TLO	Trade Licensing Office ("Gewerbeamt")
TR	Trade Register ("Handelsregister")
UB I	Unemployment Benefit I ("Arbeitslosgengeld I")
UB II	Unemployment benefit II ("Arbeitslosengeld II")
UstG	German turnover-tax law ("Umsatzsteuergesetz")
VC	Local subsidiaries of the credit rating agency Creditreform ("Vereine Creditreform")
WZ	German official classification of economic sectors ("Wirtschaftszweige")
ZEW	Centre for European Economic Research ("Zentrum für Europäische Wirtschaftsforschung")

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CHAPTER 1

Introduction

Unemployment poses one of the main societal challenges of our time. From a macroeconomic perspective unemployment results in an under-utilization of available production potential, and causes substantial costs for the social security system. On an individual basis long-term unemployment is inter alia linked to the loss of financial assets, depreciation of human capital, and mental illness, all of which further lessen the chances of unemployed individuals to regain access to the labor market (Paul and Moser, 2009; Biewen and Steffes, 2010; Frey and Stutzer, 2002). Therefore, the reduction of unemployment has been considered to be one of the main aims of government policies during the last 20 years. The main instruments for the government thereby constitute measures in the realm of active labor market policy (ALMP), which generally aim at increasing the chances of unemployed individuals for a permanent reintegration into the first labor market (Caliendo and Steiner, 2005; Bernhard, Hohmeyer, Jozwiak, Koch, Kruppe, Kruppe, and Wolff, 2008).

In Germany, persistently high unemployment rates during the 1990s in combination with a growing pressure on the social security system resulted in a distinct shift away from reactive (i.e., financial support focused labor market policies) towards activating policies, culminating in major labor market reforms at the beginning of the new millennium (Wunsch, 2006). While programs of ALMP had already been in use since the 1960's, the so-called *Hartz Reforms*, introduced incrementally between the years 2003 and 2005, marked the beginning of a new era of the German labor market policy. Not only did the *Hartz Reforms* intend to stimulate labor demand by deregulating the labor market, they also contained substantial conceptual modifications with respect to ALMP-programs. More

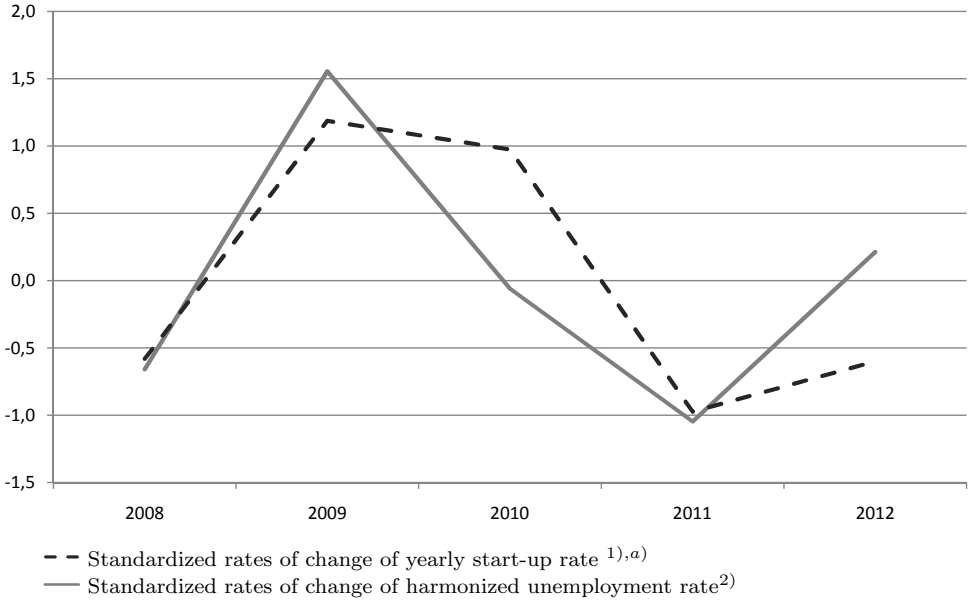
specifically, they aimed at (1) improving the effectiveness and efficiency of the programs, and (2) activating unemployment individuals by stimulating individual initiative ("Fördern und Fordern", Jacobi and Kluve, 2007). Along with the reforms, the government also explicitly incorporated the evaluation of ALMP as a central aim of labor market research. As a direct consequence of the implemented law, the Federal Employment Agency (FEA) started to grant access to its vast administrative data sources in order to facilitate impact research on its ALMP programs. Ever since then, the evaluation of the effectiveness and efficiency of ALMP has become a major field in labor market research in Germany.

Whereas the major part of ALMP-programs targets the promotion of take-up of dependent employment (e.g., by providing training measures, public job-creation schemes, or subsidized employment), a further important strand of programs aims to promote self-employment initiatives, taking into account that the entry into self-employment has proven to be an important way to end unemployment not only in Germany, but also in many other OECD countries (OECD/The European Commission, 2013). Unemployment is thereby often looked upon as a *push-factor* that causes not only unemployed individuals to consider self-employment as an alternative due to a shortage of alternative dependent employment opportunities. The strong positive correlation between unemployment and business start-ups is exemplified in Figure 1.1. Here, the standardized changes[1] in yearly harmonized unemployment rates, and changes in share of start-ups are plotted for the years 2007 to 2012. The figure shows that both trends exhibit a strong positive co-movement, providing suggestive evidence that individuals tend to consider self-employment more (less) often as alternative to dependent employment when labor market conditions worsen (improve).

Against this background, the first and main part of the thesis at hand contributes to the evaluation of start-up support schemes within ALMP, providing the first detailed empirical

[1]The observed values were standardized such that the respective time series exhibit a mean of zero and a variance of one.

Figure 1.1: Yearly Start-up activity and Unemployment



Source: [1)]KfW Start-up Monitor, [2)]Eurostat; own calculations.
Notes: [a)]Yearly start-up rate is calculated as share of business founders aged 18 to 65 years with respect to total population in the same age bracket.

assessment of the *New Start-up Subsidy* ("Gründungszuschuss") that was introduced in 2006.

Start-up Subsidies out of Unemployment Since their initial introduction in 1985, the promotion of start-ups out of unemployment has become one of the most important ALMP programs in Germany, and has allegedly influenced the overall start-up activity in the country (see, for example Kohn, Niefert, and Ullrich, 2010).[2] The so-called *Bridging Allowance* ("Überbrückungsgeld") that had already existed since 1986, was as part

[2]Unfortunately, the share of start-ups out of unemployment on the overall start-up activity is not possible to determine straightforwardly, and its quantity largely depends on the type of data source. This is due to the fact that there is no central start-up reporting system in Germany that provides information about the complete universe of start-ups in Germany. Moreover, absolute numbers of start-ups differ significantly depending on the respective start-up reporting system that is consulted (see also Chapter 3). For the year 2011, the state-owned bank KfW ("Kreditanstalt für Wiederaufbau") estimates the share of start-ups on the overall start-up activity to be around 23% based on survey data (Hagen, Metzger, and Ullrich, 2012).

of the *Hartz Reforms* complemented by two new start-up subsidy programs, namely the *(Old) Start-up Subsidy* ("Existenzgründungszuschuss", also known as "Ich-AG")[3], and a startup subsidy for unemployed welfare recipients ("Einstiegsgeld"). Between 2003 and 2006, these three instruments supported start-ups out of unemployment for more than one million individuals. The effectiveness of the programs were subject to extensive evaluations within the scope of a long-term research project that aimed at a comprehensive analysis of most measures and programs implemented or reformed during the *Hartz Reforms* (Bundesministerium für Arbeit und Soziales, 2005, 2006). Despite the overall positive evaluation results, the Old Start-up Subsidy and the Bridging Allowance were replaced in 2006 by the *New Start-up Subsidy* ("Gründungszuschuss", NSUS) that comprised elements of both of its predecessors, but incorporated a more restrictive design of start-up promotion of the FEA.[4] A further major labor market reform in 2011, modified some of the features of the New Start-up Subsidy.

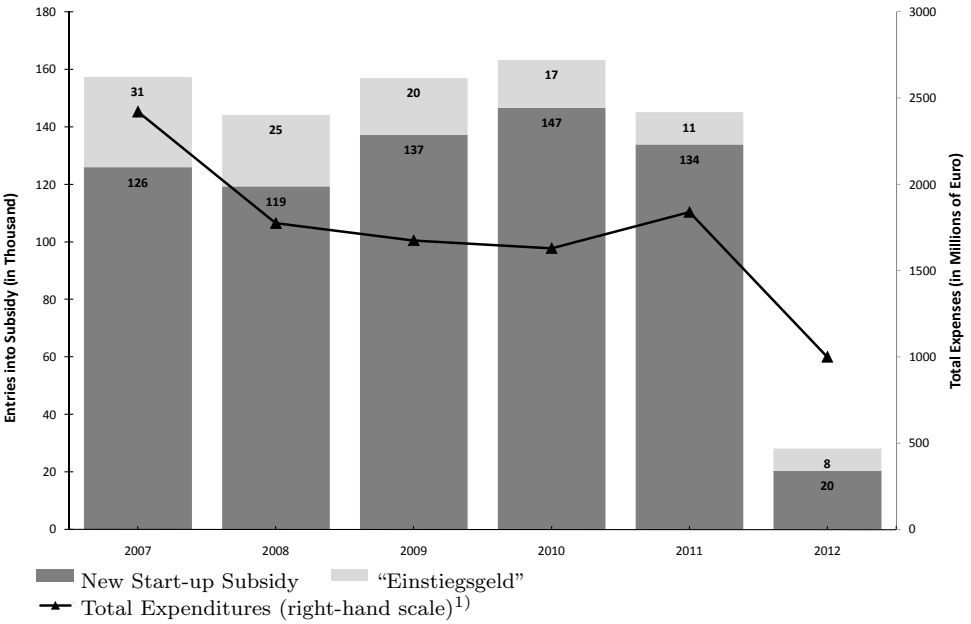
Figure 1.2 displays yearly entries into start-up subsidy schemes from 2007 to 2012, and related yearly total expenses of the FEA. The figure clearly shows that the quantitative most important program within the start-up promotion scheme of the FEA is the New Start-up Subsidy. The start-up program "Einstiegsgeld" averagely constituted a share of only 16% with respect to total yearly entries over the years 2007 to 2012. With respect to total entries, one observes that until the end of the year 2011, on average around 153,300 individuals had entered both subsidy schemes. Start-up promotion hence constituted one of the most important programs within the realm of ALMP of the FEA until this time.[5]

[3]In the ensuing chapters, this subsidy will be referred to as the *old start-up subsidy*, taking into account the introduction of a further subsidy scheme in 2006.

[4]Since 2005, the statutory framework of labor market activation programs distinguishes between unemployed subject to the Social Code Book (SC) III, and unemployed subject to the SC II. The New Start-up Subsidy is targeted at the former, whereas the "Einstiegsgeld" program is targeted at the latter. In the following we focus on the programs offered within the SC III framework.

[5]In 2011, for example the the New Start-up Subsidy (133,800 entries) was only topped by measures for further vocational training (158,300) and exceeded schemes for wage subsidies (85,900) (Caliendo and Hogenacker, 2012).

Figure 1.2: Total Expenses and Yearly Entries into Start-up Promotion Schemes of the FEA (2007-2012)



Source: Statistics and yearly budget plans of the FEA.
Note: The respective numbers include yearly entries into the New Start-up Subsidy and the "Einstiegsgeld"-program.
1)Only total expenses of the New Start-up Subsidy are displayed. Expenses of the "Einstiegsgeld"-program are part of the Federal Budget and not included here.

During it's peak in 2007, the FEA spent around 2.4 billion Euros for the New Start-up Subsidy, which accounted for 22% of total ALMP-expenses in the respective year. It can also be seen, however, that the latest reform of the New Start-up Subsidy in 2011 led to a very sharp decline in total entries in the year 2012. Nevertheless, despite the dramatic decline the promotion of start-ups still remains an important topic on the agenda of the German Government (Deutscher Bundestag, 2013).

The two self-contained chapters 2 and 4 (see also Table 1.1) of the thesis focus on the evaluation of the New Start-up Subsidy in its first version (from 2006 to the end of 2011). The chapters offer an advancement of the evaluation of start-up subsidies in Germany, and are based on a novel data set of administrative data from the FEA that was

enriched with information from a telephone survey. The research project was conducted in cooperation with the Institute for Employment Research (IAB) during the years 2009 and 2013. Based on a random draw of entries into the NSUS during the first quarter of 2009, the survey interviews were conducted by the end of 2010. To be able to compare participants of the NSUS with the ones from its predecessors in Chapter 2, the survey used a similar sampling scheme and a comparable questionnaire as the one used for the data collection for the evaluation studies of these former programs. For the analysis of Chapter 4 the same data collection was enriched with data of a random sample of non-subsidized entries in self-employment during the first quarter of 2009. Analogously to the data of subsidized founders, the same set of information was collected by means of a telephone survey. The data source for the non-subsidized founders was based on registered start-ups at the chamber of industry and commerce, the chamber of crafts, and information from a private address provider.

Chapter 2 provides a thorough descriptive analysis of the New Start-up Subsidy that consists of two parts. First, the participant structure of the program is compared with the one of the former programs, the Bridging Allowance, and Old Start-up Subsidy. Against the background of the positive evaluation results of the former programs, the launch of the New Start-up Subsidy (NSUS) that exhibited program features of both previous programs was subject to some criticism. In particular, it was believed that a merging of two programs into one would lower its effectiveness, and reduce its efficiency. These concerns are explicitly addressed. In a second step, the study conducts an in-depth characterization of the participants of the NSUS focussing on founding motives, the level of start-up capital and equity used as well as the sectoral distribution of the new business. Furthermore, the business survival, income situation of founders and job creation by the new businesses is analyzed during a period of 19 months after start-up. Finally, the analysis also addresses the occurrence of potential deadweight-effects.

Table 1.1: Overview of Thesis Chapters

Title	Co-Authors	Publication
Old Idea, New Program: The New Start-up Subsidy as a Successor of the former Bridging Allowance and the Old Start-up Subsidy (Chapter 2)	Marco Caliendo Steffen Künn Frank Wießner	"Alte Idee, neues Programm: Der Gründungszuschuss als Nachfolger von Überbrückungsgeld und Ich-AG", *Journal of Labour Market Research*, 2012, 45(2), 99-123[a)], http://dx.doi.org/10.1007/s12651-012-0104-z
Start-up Reporting Systems in Germany: An Overview (Chapter 3)	–	mimeo
Subsidized Start-Ups out of Unemployment: A Comparison to Regular Business Start-Ups (Chapter 4)	Marco Caliendo Steffen Künn Frank Wießner	*Small Business Economics*, 2015, 45(1), 165-190[a)], http://dx.doi.org/10.1007/s11187-015-9646-0
Job Search 2.0: Internet Search and Subsequent Labor Market Outcomes of Unemployed Individuals in Germany (Chapter 5)	Marco Caliendo	mimeo
The German labor market after the Great Recession: successful reforms and future challenges (Chapter 6)	Marco Caliendo	*IZA Journal of European Labor Studies* 2012, 1:3[a)], http://dx.doi.org/10.1186/2193-9012-1-3

Note: [a)]Refereed publication.

The main findings of Chapter 2 are that the New Start-up Subsidy supports a smaller range of unemployed individuals than the former two schemes. However, the analysis does not find indication for inefficiencies resulting from the fact that the benefit withdrawal rate was degressive, providing incentives for applicants to exhaust their Unemployment Benefit I entitlement before entering the program. The analysis also reveals that 75% to 84% of all subsidized founders are still self-employed 19 months after start-up, and are able to secure their livelihood with the earnings of their business. It is further found that deadweight-effects exist, but to a smaller extent than previously assumed.

The contribution of Chapter 4 is to introduce a new explorative data set that allows comparing subsidized start-ups out of unemployment with non-subsidized business start-ups that were founded by individuals who were not unemployed at the time of start-up. Because previous evaluation studies commonly used eligible non-participants amongst the

unemployed as control group to assess the labor market effects of the start-up subsidies, the corresponding results hence referred to the effectiveness of the ALMP measure, but could not address the question whether the subsidy leads to similarly successful and innovative businesses compared to non-subsidized businesses. An assessment of this economic/growth aspect is also important, since the subsidy might induce negative effects that may outweigh the positive effects from an ALMP perspective. Besides deadweight losses the subsidy might lead to entries into self-employment by individuals with a smaller entrepreneurial ability, because the expected returns might be lower than without the subsidy. Finally, the subsidy could also evoke a moral hazard problem in that founders out of unemployment exert less effort when starting a business since the subsidy takes away some of the income risk that usually goes along with founding a business.

The assessment of the economic/growth aspect requires a control group consisting of "regular" business start-ups, i.e., start-ups of individuals that were not unemployed and not subsidized by the FEA. To this date, such a control group had not been available due to data restrictions. Based on the introduction of a new data set, the empirical analysis considers the question of whether disadvantages faced by unemployed nascent entrepreneurs translate into observable initial differences between subsidized and regular start-ups. Subsequently, propensity score matching methods are used to balance observable characteristics between subsidized and non-subsidized founders, and to compare the business development between both groups over time.

The main results of Chapter 4 indicate that subsidized founders seem to have no shortages in terms of formal education, but exhibit less employment and industry-specific experience, and are less likely to benefit from intergenerational transmission of start-ups. Moreover, the study finds evidence that necessity start-ups are over-represented among subsidized business founders, which suggests disadvantages in terms of business preparation due to possible time restrictions right before start-up. Finally, the study also detects

more capital constraints among the unemployed, both in terms of the availability of personal equity and access to loans. With respect to potential differences between both groups in terms of business development over time, the results indicate that subsidized start-ups out of unemployment face higher business survival rates 19 months after start-up. However, they lag behind regular business founders in terms of income, business growth, and innovation.

The arduous data collection process for start-up activities of non-subsidized founders for Chapter 4 made apparent that Germany is missing a central reporting system for business formations. Additionally, the different start-up reporting systems that do exist exhibit substantial discrepancies in data processing procedures, and therefore also in absolute numbers concerning the overall start-up activity.

Start-up reporting systems in Germany Chapter 3 is therefore placed in front of Chapter 4 and has the aim to provide a comprehensive review of the most important German start-up reporting systems. The review also provides a short overview of institutional settings, concepts, and definitions related to start-up activity in Germany in order to gain a better understanding of the initial start-up process. The overview differs from previous ones in the entrepreneurial literature in that it also illustrates how to recover information on business formations within the liberal professions sector: Although start-ups in this sector play a significant role in Germany, there is no single administrative reporting system to date that provides a complete count of these.

The review shows that start-up reporting systems can be differentiated into two types. On the one hand, there are administrative reporting systems, using enterprises as sampling units of interest, and that are based on registration processes that are mainly required by law. On the other hand, there are survey based reporting systems that use individual founders as sampling units of interest. For research purposes, survey based reporting

systems exhibit the advantage that they cover a broader range of information on socio-demographic and socio-economic characteristics of the individual founders, and may also include more detailed information on firm-related characteristics. When comparing the reporting systems with respect to yearly absolute numbers, one observes that there are substantial differences in the yearly levels of new business formations. However, it appears that no "true" number of new business formations can be extracted from any of the reporting systems. It rather boils down to the fact that choosing a reporting system depends on the respective research interest and related concept of the analysis, i.e. whether the units of interest refer to enterprises, or individuals, for example.

Determinants for Job Search Behavior of Unemployed Individuals In contrast to start-up promotion, the rationale of coaching and training programs as part of ALMP is the assumption that certain unemployed individuals may exhibit deficits in terms of their human capital preventing them from finding sustainable dependent employment. While training or coaching programs aim to overcome these deficits, an efficient and adequate activation also needs to take account of existing endowment levels of human capital, as well as potential behavioral responses in light of an envisaged program participation. To understand the resources that individuals have at their disposal during job search, as well as their interaction with the ALMP programs, a large research literature has emerged, analyzing the effectiveness of the job search choices of the unemployed. While it is now well established in the theoretical and empirical research literature that the job search behavior of the unemployed is determined by personal characteristics, e.g., personality traits (Caliendo and Uhlendorff, 2011), and exogenous factors (Devine and Kiefer, 1991), the search effort is also dependent on the effectiveness of the search methods used. Previous research has shown that unemployed individuals use multiple types of information channels during job search. The most important types of information channels used are personal

networks, public employment agencies, and the internet. While the effectiveness of these channels has been investigated in previous research (Fougère, Pradel, and Roger, 2009; Holzer, 1988; van den Berg and van der Klaauw, 2006), several aspects still remain to be addressed.

During the last decade, the internet has been found to substantially reduce search frictions in various markets, including for example the apartment rental and real estate market (Kroft and Pope, 2012), and the retail market (Hart, Doherty, and Ellis-Chadwick, 2000). With regard to the labor market, however, empirical analyses have only found mixed empirical evidence for a friction reducing effect (Kuhn and Mansour, 2011). From a theoretical point of view, it is argued that the internet is increasing the efficiency with which workers are matched to jobs. This may either be due to a higher initial number of interview meetings between potential employees and workers, or due to more efficient online pre-screening of job candidates by the firm (Autor, 2001). Another potential benefit of internet use on the labor market is seen in the increase of job match quality. Because search costs are reduced and firms can consider more possible candidates more rapidly, reservation wages are expected to increase and therefore also the earnings of the recruited workers. However, the research literature also points to potential negative effects of the internet use during job search. In particular, the possibility of an adverse selection of job candidates is discussed, as many job applicants might apply for jobs they are not qualified for due to the fact that the costs of submitting an online application are much lower than those of submitting a 'paper' application (Autor, 2001; Fountain, 2005).

So far, the effects of internet-based search on reservation wages and the search effort have not been assessed. Moreover, it still remains an open question of whether finding a job through the internet does also lead to a better job quality compared to other job search channels. Chapter 5 contributes to the literature on determinants of job search behavior of the unemployed individuals by addressing these questions. For the analysis of

the effectiveness of internet search and the search behavior linear regression methods as well as propensity score matching methods are used.

The analysis is based on the *IZA Evaluation Dataset*, which consists of an inflow sample of around 17,400 unemployed individuals who entered unemployment in Germany between June 2007 and May 2008, and were for the first time interviewed shortly after unemployment entry (see Caliendo, Falk, Kaiser, Schneider, Uhlendorff, van den Berg, and Zimmermann, 2011, for details). These individuals were followed over time with the second (third) wave being conducted 12 months (three years) after the first wave. The sample is drawn from administrative records of the Federal Employment Agency (FEA), is restricted to individuals between 17 and 54 years of age, and includes detailed information on socio-demographic variables as well as search behavior during unemployment (i.e. search channels used, search effort, and reservation wage).

The empirical analysis of Chapter 5 finds a positive statistical association between using the internet for unemployed job search, the hourly reservation wages, and search effort. These results hold even after controlling for a rich set of observable characteristics, including *inter alia* validated measures of personality traits. With regard to whether the jobs found through the internet are of better quality in terms of subsequent hourly net income and job satisfaction, Chapter 5 finds mixed empirical evidence. Whereas a small wage premium for individuals who found their job through the internet is detected, the same group seems to be less satisfied with their subsequent job. Moreover, the effects are very heterogeneous with regard to sample stratification: Mostly men and individuals with a high professional education level seem to benefit in terms of subsequent hourly net income when successfully finding a job through the internet.

The German Labor Market after the Great Recession The third and final part of the thesis outlines why the German labor market reacted in a very mild fashion to the

Great Recession 2008/09, especially compared to other countries. Chapter 6 describes current economic trends of the labor market in light of general trends in the European Union, and reveals some of the main associated challenges. Thereafter, recent reforms of the main institutional settings of the labor market which influence labor supply are analyzed. Finally, based on the status quo of these institutional settings, the chapter gives a brief overview of strategies to adequately combat the challenges in terms of labor supply and to ensure economic growth in the future.

The main conclusion of Chapter 6 states that Germany still has to catch up in terms of labor supply for women and people aged 55 and older. Since the labor supply of both of these groups will become increasingly important in light of the massive demographic change Germany will experience over the next 50 years, improving their employability remains one of the main challenges. Since reforming the current status quo concerning the joint taxation of married couples within a household might not be on the political agenda any time soon, one of the main challenges can be considered the improvement as well as the supply of child-care facilities to ensure that income support systems like the Parental-Leave-Benefit (PLB) develop their full impact.

CHAPTER 2

Old Idea, New Program: The New Start-up Subsidy as a Successor of the former Bridging Allowance and the Old Start-up Subsidy

Abstract: The promotion of self-employment as part of active labor market policies is considered to be one of the most important unemployment support schemes in Germany. This paper analyzes the participant structure of a new self-employment support program introduced in 2006 ("Gründungszuschuss", *new start-up subsidy*, NSUS), and compares it to the one of two former programs that were replaced by the new program. Additionally, the paper sheds light on the business survival, the income situation, and the job creation activity of subsidized founders around 19 months after start-up. Our main findings are that the new program supports a smaller range of unemployed individuals compared to the former two support schemes. We also find that 75% to 84% of the subsidized founders are still self-employed 19 months after start-up, and that their household income can be considered to secure their livelihood. Finally, we are also able to contribute new insights regarding potential deadweight effects. We show that those effects exist, but to a smaller extent than previously assumed.[1]

[1]This paper is joined work with Marco Caliendo, Steffen Künn, and Frank Wießner, and is a translated version of the paper titled *"Alte Idee, neues Programm: Der Gründungszuschuss als Nachfolger von Überbrückungsgeld und Ich-AG"*, originally published in the *Journal for Labour Market Research* (Caliendo, Künn, Hogenacker, and Wießner, 2012). Financial support of the Institute for Employment Research (IAB) in Nuremberg under the research grant No. 1143 is gratefully acknowledged. DOI (German Version): `http://dx.doi.org/10.1007/s12651-012-0104-z`

2.1 Introduction

The promotion of self-employment as a way to end unemployment is an important instrument in the context of active labor market policies (ALMP) in Germany. Start-ups out of unemployment are an important part of the overall start-up activity in Germany. As part of a large ALMP reform[2], the *New Start-up Subsidy* ("Gründungszuschuss", NSUS) was introduced in August 2006 to replace the *Bridging Allowance* ("Überbrückungsgeld", BA) as well as the *Old Start-up Subsidy* ("Existenzgründungszuschuss (Ich-AG)", OSUS). Alongside an increase in transparency and clarity, the main objective of the reform was to reduce bureaucratic burden within the Federal Employment Agency (FEA), and to create a more efficient design of start-up support instruments for the unemployed.

The NSUS program is a monetary support scheme for recipients of unemployment benefit (UB I) who are aiming to become self-employed. The support scheme consists of two consecutive stages: During the first nine months, recipients are entitled to a monthly payment equivalent to the UB I level received immediately before entering the program, and an additional monthly lump sum payment of 300 Euro to cover social security costs. The second stage consists of an additional six month-period during which only the lump sum payment is paid. In contrast to the first stage, the payment during the second stage is optional and depends on the approval and discretion of the caseworker.

In light of the positive effects found in previous evaluations of the predecessors of NSUS, the introduction of the NSUS was accompanied by some criticism (Caliendo, Kritikos, and Wießner, 2006; Caliendo and Kritikos, 2010). Based on comparisons of the program characteristics of NSUS with those of BA and OSUS, Caliendo and Kritikos (2009a) developed different hypotheses regarding expected changes in efficiency, take-up and effectiveness of the NSUS compared to the old programs. While they concluded that no changes with

[2] "Gesetz zur Neuregelung der Grundsicherung" (see also Deutscher Bundestag, 2006)

respect to program effectiveness were to be expected, the introduction of the NSUS was assumed to reduce the range of unemployed individuals willing to become self-employed. In particular, individuals with low levels of UB I who are typically low qualified, and/or were part-time employed before becoming unemployed would not be able to obtain the same amount of financial support (see also Winkel, 2006). Furthermore, the authors suggested that due to the degressive UB I withdrawal rate, the NSUS would provide incentives for applicants to extend the period of UB I receipt to a maximum duration of 90 days before actually becoming self-employed. This disincentive could, in combination with the extended duration of the financial assistance of the new program, eventually lead to a decrease in monetary efficiency of the NSUS.

In this paper, the relevance of the outlined expectations are empirically analyzed. Based on a random sample of entries into the NSUS during the first quarter of 2009, administrative labor market records from the FEA are drawn and enriched by survey information from program participants. In addition, the data are merged with survey data obtained in the empirical evaluation of the previous programs.

Regarding the take-up of the program, our comparative analysis does not support the expectation of an exhaustion of the acquisition period of UB I, but does confirm the expectation that the new program does not cover the same range of unemployed individuals. The participant structure of the NSUS is somewhat similar to that of the BA, but some differences emerge. To explore the relevance of these difference for program effectiveness, we conduct an in-depth analysis of the start-up activity in the NSUS, and analyze how the participants differ from those of the previous programs (OSUS and BA) with respect to survival in self-employment, current and planned job creation activity, and income. In addition, we assess potential differences during the entrepreneurial seed-stage (i.e. start-up motivation, preparation for, and experience before start-up), and the start-up-stage (i.e. start-up capital, equity, and sectoral distribution).

In a second part of the analysis, we assess the potential deadweight effects associated with NSUS. The existence of deadweight effects in the promotion of self-employment within ALMP is based on two conditions: First, the decision to become self-employed is made independently from the subsidy. Second, the subsidy does not influence the success or failure of the start-up. Up to now, the second condition was difficult to identify due to data limitations, and was therefore mostly not part of the assessment of deadweight effects in previous evaluation studies (Caliendo, Steiner, and Baumgartner, 2005; Caliendo and Kritikos, 2010). The new data at hand allow for the first time an analysis of this second dimension, and hence add to the discussion of potential deadweight effects within the area of financial start-up support for unemployed individuals (Bundesministerium für Arbeit und Soziales and Institut für Arbeitsmarkt- und Berufsforschung, 2011; Heyer, Koch, Stephan, and Wolff, 2011).

The remainder of this chapter is organized as follows: In Section 2.2, we provide a short overview of the institutional framework and the development of start-up support for the unemployed in Germany. The subsequent section elaborates on previous work related to start-ups out of unemployment. Here, we also highlight the main empirical results of previous evaluation studies of the OSUS and BA programs, and outline expectations regarding the effects of integrating these programs into the NSUS program. Section 2.3 ends with an overview of international evidence on start-up support schemes. Section 2.4 describes the data sources collected to analyze NSUS, and conducts a comparative descriptive analysis of all three programs 2.4. In Section 2.5 we provide an in-depth analysis of the NSUS program. Section 2.6 concludes.

2.2 Start-up Support as part of ALMP: An Overview

In August 2006, the German government replaced two existing programs for start-up support, the Bridging Allowance (BA) and the Old Start-up Subsidy (OSUS), by one single

program, the New Start-up Subsidy (NSUS). This reform was intended to simplify the terms of support, and to unify the two central objectives of start-up support schemes in Germany, namely the financial protection of the individual's livelihood, and the coverage of social security costs during the start-up period (Caliendo and Kritikos, 2009a). Table 2.1 provides an overview of the most important support conditions of all three programs. The NSUS launched in 2006 consisted of two independent funding periods; whereas participants were only legally entitled to the first one. Similar to the previous BA program, the level of financial support received during the first funding period was made dependent on the level of UB I received. The payment of an additional lump sum payment was a feature taken from the OSUS program. The combination of an income-dependent component with a lump sum amount aimed to increase attractiveness of the program for unemployed with only low level of UB I receipt. These unemployed are commonly characterized by low levels of education, and/or previous part-time employment (mostly women). In the past, the OSUS program that consisted of a lump sum payment had predominantly attracted participants from this group of unemployed. The second support period had also been part of the OSUS program, but was now turned into a discretionary support payment. The requirement that recipients had to reapply for the second support period already led to substantial bureaucratic expenses and uncertainties in the official statistics during the existence of the OSUS (Caliendo, Steiner, and Baumgartner, 2005). It is likely that the new procedure results in similar frictions. As within the framework of the BA, and in contrast to the OSUS program, recipients of the NSUS are not legally required to contribute to the social security system and the statutory pension system. It was therefore to be seen whether the voluntary arrangements concerning medical and long-term care, pension scheme, and unemployment insurance increased the amount of individuals without respective social protection.

Table 2.1: Programs for the Promotion of Start-ups out of Unemployment

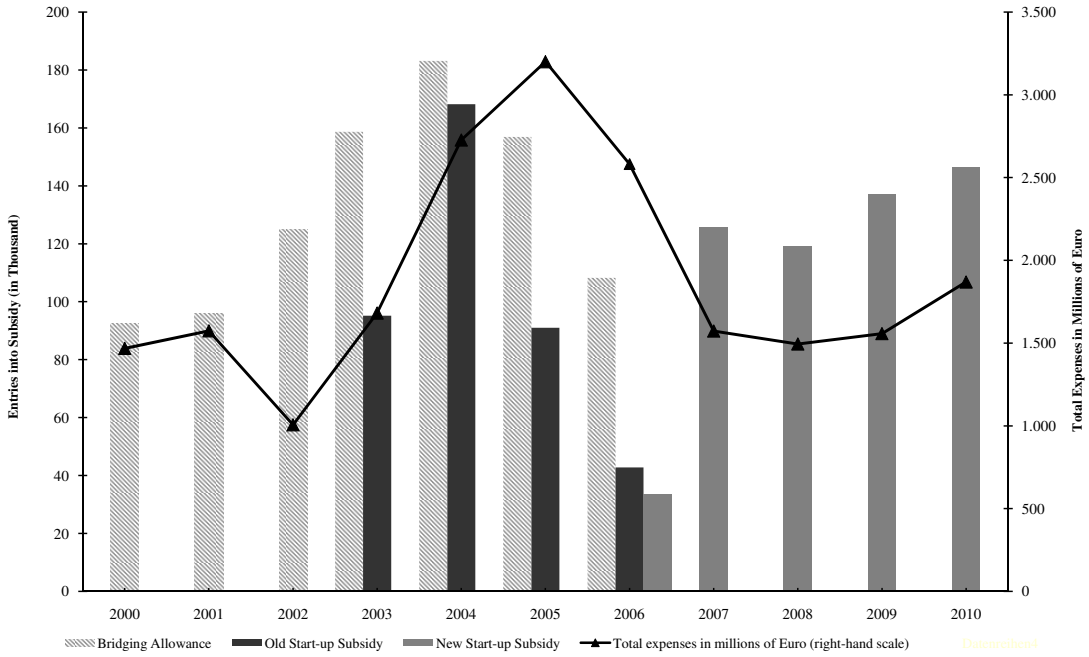
	Bridging Allowance	Old Start-up Subsidy	New Start-up Subsidy
Period	01/1986-07/2006	01/2003-06/2006	08/2006-12/2011
Legal Basis	Sec. 57 of Social Code Book (SCB) III	Sec. 421 (1) SCB III	Sec. 57 SCB III
Entry Conditions	– *Entitlement for* Unemployment Benefit I, or participation in other ALMP scheme – Certification of "sustainability" of business idea	– *Receipt of* UB I, or participation in other ALMP scheme – Certification of "sustainability" of business idea – Income generated from self-employment is not supposed to exceed 25,000 Euro per year – From 11/2004 until end: Approval of business plan by an external institution (e.g. chamber of commerce)	– *Entitlement for* Unemployment Benefit I, or participation in other ALMP scheme – Certification of "sustainability" of business idea – Remaining entitlement for UB I of at least 90 days at time of business foundation – Approval of business plan by an external institution (e.g. chamber of commerce)
Support	– Monthly reception of monetary amount equal to previously received UB I for six months – Additional lump sum payment of social security contribution in relation to UB I – Social insurance on one's own account	– Lump sum payment of 600 Euro per month during the first year, 360 Euro per month during the second year, and 240 Euro per month during the third year (recipient has to reapply each year for financial support) – During financial support compulsory insurance under the statutory pension scheme – After financial support social insurance on one's own account	– Monthly reception of monetary amount equal to UB I for nine months – Additional lump sum payment of 300 Euro per month to cover social security costs – Optional lump sump payment of 300 Euro for six more months after completion of first support period – Social insurance on one's own account
Other	– Legal entitlement to support – Remaining entitlement for UB I can be claimed for up to four years after their emergence	– Legal entitlement to support – Remaining entitlement for UB I can be claimed for up to four years after their emergence	– Legal entitlement to support for first period – FEA reserves right to assess aptitude of applicant with regard to self-employment – Possibility of voluntary participation in unemployment insurance – UB I entitlement is reduced by days spent in the program

Source: Caliendo and Kritikos (2009a) and Caliendo, Künn, Hogenacker, and Wießner (2012), own depiction.

It is important to note that the German parliament passed a further reform in November 2011, entailing major changes in the program setup of the NSUS: The first period of the NSUS was turned into a fully discretionary scheme, i.e., even individuals fulfilling all legal requirements for a reception of the start-up support could be denied support by the caseworker. Moreover, the required remaining entitlement period of UB I at time of business foundation was increased from 90 to 150 days. In addition, the duration of the

first stage payment (UB I plus lump sum payment of 300 Euro) was reduced from nine to six months, whereas the duration of the second stage (only lump sum payment) was increased from six to nine months, leaving the maximum period of support unchanged. This paper does not address the question to what extent these new adjustments change the effectiveness of the NSUS.

Figure 2.1: Yearly Entries and Expenditures of the Federal Employment Agency for Start-up Support, 2000-2010



Source: Statistics of the FEA. Figure taken from Caliendo, Künn, Hogenacker, and Wießner (2012).

Figure 2.1 displays the quantitative importance of start-up support schemes within ALMP in Germany during recent years. The large increase of entries into the support schemes after the introduction of the OSUS in 2003 was followed by a strong decrease after entries peaked in the year 2004. Entries were at their lowest level when the NSUS came into force in 2006. From 2008 onwards, we again observe a slight increase of yearly entries

into the program. In 2010, the number of yearly entries was still at 100,000 individuals, underscoring the popularity of start-up promotion schemes in Germany. The substantial decrease of expenditures of the FEA for start-up promotion within ALMP after 2006, indicates a significant budgetary effect of the integration of both the OSUS and the BA into a single new instrument. Expenditures on the former two had become one of the main outlays during the years in which the two old programs were both available (see Figure 2.1). Clearly, with the increase of entries into the NSUS after 2007, expenditures also increased again. In 2010, the FEA spent around 1.9 billion Euro for the NSUS, with expenditures of 20 billion Euro for ALMP in total (Bundesagentur für Arbeit, 2010). The average per-capita expenses of entries into the NSUS are approximately similar to the expenses of the BA (between 11,000 and 13,000 Euro during the last years); the OSUS expenses amounted to 14,400 Euro at the most. The individual amount can vary significantly around this average figure. The reform of 2011 is expected to further reduce the per-capita expenses of the NSUS. However, the proclaimed political target of saving five billion Euro until 2015 due to the reform appears unrealistic, unless yearly entries into the program decrease by more than 30% compared to current numbers.

2.3 Start-ups out of Unemployment: Empirical Evidence

2.3.1 Evaluation of the OSUS and the BA: A short Overview of Results, and Expectations with regard to the New Instrument

During the evaluation of the *Hartz-Reforms* between 2005 and 2006, the short- and medium-run effects of start-up promotion through both the OSUS and the BA were analyzed extensively with microeconometric methods (Caliendo et al., 2006). In addition, Caliendo, Künn, and Wießner (2010) analyzed the long-term effects in a follow-up study.

These analyses use panel data based on administrative data records of the FEA starting in 2005, that were enriched with detailed survey information. The survey was based on a representative sample of around 6,000 individuals who had become self-employed in the third quarter of 2003, covering both recipients of the OSUS or the BA. The first survey was conducted during January and February 2005. Additionally, a control group was part of the survey covering unemployed individuals who had not entered in either of the programs in the third quarter of 2003. Hence, the first observation period between (potential) start-up, and time of first survey consisted of 16 months. To analyze the medium- and long-run effects of both programs, two further survey waves were conducted in 2006 and 2008, which resulted in a total observation period of almost five years. The comprehensive study allowed detailed statements regarding the sustainability of the start-ups, and the net effects of both programs. According to Caliendo et al. (2010), the most important effects of the programs consisted of a high survival rate in self-employment after 56 months (between 57% and 63% for the OSUS, and between 56% and 70% for the BA), whereas participants of both programs were also significantly less prone to unemployed reentry than non-participants. Furthermore, program participants received a higher average income in comparison to similar non-participants. It hence appeared that both programs had reached the intended effects, significantly increasing the probability of a long-term integration of program participants in the labor market.

The two programs targeted different groups of individuals: Overall, the receivers of start-up assistance in the BA were better educated than participants in OSUS, invested more private equity, employed more workers, and were significantly less likely to be female. In particular, the share of female OSUS participants partly exceeded the share of unemployed women in total (Noll and Wießner, 2007; Caliendo and Kritikos, 2009a). Due to the similarity of NSUS and BA, and the abolishment of the OSUS program, it was expected that women and less educated unemployed would not be responding to the start-up incen-

tives after the reform. Furthermore, Caliendo and Kritikos (2009a) viewed the degressive benefit withdrawal rate of the NSUS rather critically. Rational applicants were expected to prolong their acquisition period of UB I up to the maximum possible range of 90 days before actually becoming self-employed.

2.3.2 Subsidized Start-ups out of Unemployment: An international Perspective

Several international studies provide evidence of the effectiveness of start-up support schemes for the unemployed.[3] Carling and Gustafson (1999) compare the relative effectiveness of wage subsidies and start-up subsidies in Sweden and conclude that subsidized founders have a lower probability to return to unemployment. Tokila (2009) show for Finland that start-up subsidies have a positive effect on the probability to remain in self-employment two years after start-up: 67% of subsidized founders and only 60% of the non-subsidized founders were still self-employed. O'Leary (1999) analyzes a program similar to NSUS in Hungary, and finds that 80% of all subsidized founders are still self-employed 21 months after start-up. Cueto and Mato (2006) evaluate survival in self-employment for subsidized individuals in Spain. The authors show that 24 (60) months after start-up 93% (76%) of all subsidized founders are still actively self-employed. It is noteworthy that the magnitude of these survival rates exceed the ones previously found for the two former German programs BA and OSUS. Perry (2006) and Kelly, Lewis, Mulvey, and Dalzell (2002) offer a positive summary of the effectiveness of start-up subsidies outside of Europe, namely New Zealand and Australia, respectively. While Perry (2006) considers the probability to re-enter unemployment, Kelly et al. (2002) consider the longevity of start-ups, finding that about half of the subsidized start-ups are still active 36 months after the end of the funding period. In summary, this evidence suggests that monetary support schemes for start-ups

[3]Here, we only outline monetary support schemes comparable to the NSUS, neglecting evidence on alternative approaches to start-up promotion, such as preparatory courses, coaching, or start-up loans (See for example Almeida and Galasso, 2010; Rodríguez-Planas, 2008; Shutt and Sutherland, 2003).

out of unemployment yield positive employment effects. However, the heterogeneity with respect to the survival probability in self-employment of subsidized founders is quite large, varying between 67% to 93% two years after start-up.

2.4 Comparative Analysis of the Support Schemes NSUS, OSUS, and BA

2.4.1 The New Data source for the NSUS

In addition to the data that had previously been used for the evaluations for the BA and OSUS programs (see also Section 2.3), a further data set was created for the empirical analysis of the NSUS program. For this purpose and similar to the previous data collections, administrative data of the FEA were enriched by telephone interviews. For the telephone survey, a random and representative sample of all NSUS recipients starting a business out of unemployment during the first quarter of 2009 was used. Based on this, 2,306 recipients of the NSUS were interviewed at the end of 2010, around 19 months after start-up (see Table 2.2).

Table 2.2: Realized Interviews

	New Start-up Subsidy					Previous Programs	
	West Germany		East Germany		Total	OSUS	BA
	Men	Women	Men	Women			
1^{st} Wave[a]	1,157	634	321	194	2,306	3,015	3,080
Agreed with Admin. Merge[b]	989	527	285	168	1,969	2,560	2,570
50% Module (only NSUS)	562	327	152	102	1,143		

Source: Caliendo, Künn, Hogenacker, and Wießner (2012), own depiction.
[a]Individuals were surveyed in January/February 2005 (OSUS/BA) and November/December 2010 (NSUS), respectively.
[b]These individuals gave permission to merge survey and administrative data.

The aim of the survey was to gain insight into start-up related characteristics and activities of the subsidized founders. Therefore, in addition to socio-demographic and

income information, founders were asked detailed questions about the preparation of their start-ups, the founding motives, as well as their expertise and experiences in the relevant area of business. In addition, information related to the implementation of the NSUS program and a subjective assessment of the program quality were surveyed. As labor market information since the start-up was not documented in the administrative records yet, the survey was also used to collect detailed longitudinal information about labor market outcomes since entry into the subsidy. Due to the large number of questions, the questionnaire was split into modules. The main module, covering most of the background and outcome information was given to all individuals. Only 50% of the respondents were also exposed to a module that covered questions regarding start-up preparation. The respective sample sizes are depicted in Table 2.2.

2.4.2 Empirical Approach and Research Questions

Based on the NSUS data collection outlined before, we now provide a descriptive comparative analysis between the NSUS and its predecessors, OSUS and BA. To this end, we collected survey data for all programs, as well as information from the administrative data parts, covering socio-demographics, education, and labor market histories. The respective entry periods covered by these data are the third quarter of 2003 for the OSUS and the BA, and first quarter of 2009 for the NSUS. As only about 15% of surveyed respondents did not give their permission to pool the administrative data with the data from the telephone survey (see Table 2.2), the samples covering the old programs OSUS and BA reduce to around 2,500 individuals each, and 1,970 NSUS-recipients. For reasons of comparability it was intended to harmonize the data selection process as well as the data collection across the three programs. A distinctive feature that needs to be kept in mind when interpreting the findings is that the funding periods of the BA (6 months), and the NSUS (15 months

at most) had already expired at point of the survey, whereas the funding period of the OSUS was still ongoing.

In line of the expected changes arising due to the introduction of the NSUS outlined in Sections 2.2 and 2.3, it is particular interesting to assess the questions whether the NSUS covered a comparable range of unemployed as the old programs, and whether recipients of the NSUS prolonged their acquisition period of the UB I up to the maximum possible range of 90 days before actually becoming self-employed due to the degressive benefit withdrawal rate.

Bernhard and Wolff (2011) had addressed the first issue in an analysis using aggregated data from the statistics of the FEA, showing that the range of unemployed reached by the NSUS is more closely related to the BA than to the OSUS in terms of gender, regional characteristics, age, and educational attainment. Due to the larger detail of our survey data, our analysis allows a more in-depth comparison of the participant structure. In particular, we are able to provide information on the risk disposition and founding motives of the respective recipients, and are also able to address the second question by using data on the unemployment spell (UB I entitlement, unemployment duration).

In addition to a comparison-of-means analysis we also conduct a multivariate analysis, assessing wether mean differences in observable characteristics still hold when controlling for differences in observable characteristics, and the fact that the set up of the unemployment eligibility-conditions between 2003 and 2009 changed due to the Hartz reforms. While in 2003 recipients of so-called unemployment assistance[4] were eligible for the start-up subsidies of the BA and the OSUS, unemployment assistance and social assistance were merged into Unemployment Benefit II in 2005, changing the jurisdiction of former unemployment assistance recipients and excluding them from the group of individuals entitled to BA and OSUS from 2005 onwards (Bernhard and Wolff, 2011). The NSUS was also solely designed

[4]For more information on the income protection system in Germany before the *Hartz-Reforms* see Caliendo and Hogenacker (2012).

for UB I recipients. At the same time, the decision to become self-employed is likely to be correlated with the overall economic conditions, implying that different business cycle conditions at time of start-up entry may result in different participant structures that are not due to differences in the program set up.[5] We hence complement our univariate comparison by estimating a Logit-model in which we control for observable characteristics, the duration of unemployment until entrance into subsidy, as well business cycle conditions to be able to analyze whether differences in the participant structure still hold in simple multivariate analysis.

2.4.3 Results

The first columns of Table 2.3 provide selected descriptives of participants in the programs BA, OSUS, and NSUS (columns (1)-(3)). In column (4), we merge the samples of the OSUS and the BA to draw conclusions about the "breadth" of the participants in the old and the new programs. Significant differences between the participants are detected by two-sample t-tests of mean-equality, whereas bold numbers indicate statistically significant mean differences. Finally, we depict the signs and significance levels of the coefficients from the corresponding multivariate Logit-models in columns (5)-(7).

A first look at the age structure of the recipients reveals that individuals participating in the NSUS are around 41 years old at time of entry (during the first quarter of 2009) into the program, and therefore on average two years older compared to the participants of the old programs at time of their entry during the third quarter of 2003. This positive age effect is statistically significant in each case, and supported by the multivariate analysis.

[5] A high unemployment rate and the reduced availability of employment alternatives play a crucial role in the decision to become self-employed out of unemployment. In general, labor market conditions were worse in the third quarter of 2003 compared to the first quarter of 2009. The average unemployment rate conditional on the civilian labor force was 10.3% within the third quarter of 2003, whereas the number of open vacancies amounted to 268,100. During the first quarter of 2009, the average unemployment rate was 8.5%, while 312,060 open vacancies were reported by the FEA within the same period (Source: Statistics of the FEA).

A closer look at the age distribution shows that less individuals under the age of 25 years are addressed by the NSUS, compared to the OSUS, however, no significant difference emerge here between the NSUS and the BA. In contrast, individuals above 50 years of age seem to make use of the NSUS more frequently compared to the participants of the old programs. This statistically significant positive effect still holds after controlling for observable characteristics. A central critique of the introduction of the NSUS was grounded in the expectation that the share of women participating in the program would be reduced significantly. From Table 2.3, we observe that the share of female participants of the NSUS lies with 35% well below the one within the OSUS (45%). However, this negative effect is not statistically significant anymore in the multivariate analysis. Compared to the BA program, a significantly higher share of women becomes self-employed with the financial promotion of the NSUS, and the effect remains when controlling for covariates. Overall, this points to no general, significant discrimination against women in the light of the reform in 2006. The fact that women choose less often to become self-employed than men is a frequently observed phenomenon (Wagner, 2007). Based on data of the *KfW Start-up Monitor*, Hagen, Kohn, and Ullrich (2011) estimate the share of women on the overall start-up activity in Germany to be 37% in 2010. Hence, the share of female participants within the NSUS only marginally lies below that of the estimated share concerning the overall start-up activity.

With regard to the regional distribution, we find that in 2003 around 30% of the participants of the BA and the OSUS came from East Germany, compared to only 23% in 2009 in the NSUS. A potential reason for the decrease in promoted business formations out of unemployment in East Germany could be the improvement of labor market conditions, and the related decrease in "necessity start-ups". The unemployment rate in East Germany decreased by 22% (from 18.2% to 14.0%) between 2003 and 2009, whereas the reduction of the unemployment rate during the same period in West Germany only amounted to 15%

Table 2.3: Comparison of the particular subsidy schemes with regard to selected characteristics

	Descriptive Analysis[a]				Effects of Logit-Model[b]		
	NSUS	OSUS	BA	OSUS/BA[c]	NSUS vs. OSUS	NSUS vs. BA	NSUS vs. OSUS/BA
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Socio-demographic characteristics							
Age (in years, mean)	40.5	**38.4**	**38.8**	38.6	+***	+***	+***
Categories							
Less than 25 years	4.6	**7.7**	5.1	**6.3**	Ref.	Ref.	Ref.
25 - 34 years	26.1	**29.1**	28.1	**28.5**	+	-	+
35 - 44 years	34.8	35.8	**40.5**	**38.5**	+	+	+
45 - 49 years	13.9	12.5	13.4	12.9	+ **	+ **	+***
50 years and older	20.6	**14.9**	**12.9**	**13.9**	+ ***	+ ***	+***
Female	35.3	**44.6**	**25.2**	33.5	-	+**	+
East Germany	23.0	**31.3**	**30.1**	30.3	+***	+***	+***
Education and Labor Market History							
Highest school certificate							
No certificate	2.1	2.3	**1.1**	1.6	Ref.	Ref.	Ref.
Lower secondary school	19.4	**30.4**	**22.8**	**25.9**	-**	-	-**
Intermediate school	31.9	**37.4**	**34.6**	**35.7**	+	-	-
Advanced technical certificate	15.6	**8.9**	**13.7**	**11.8**	+	+	+
Higher education entrance certificate	30.9	**21.0**	**27.9**	**24.9**	+	+	+
Duration of Unemployment until entrance into subsidy							
Mean (in months)	2.8	**8.2**	**6.8**	**7.4**	-***	-***	-***
Median (in months)	1.9	5.9	5.3	5.6			
Categories							
Less than 3 months	64.4	**31.0**	**30.2**	**30.6**	Ref.	Ref.	Ref.
3-5 months	20.2	18.4	**22.8**	20.9	-***	-***	-***
6-11 months	13.9	**30.7**	**33.2**	**32.3**	-***	-***	-***
12 and more months	1.6	**20.0**	**13.8**	**16.2**	-***	-***	-***
Remaining entitlement period UB I (in months)	7.2	**4.5**	**6.8**	**5.8**	+	-***	-***
Average amount of UB I (Euro/month. in real terms. basis 2009)	953	**548**	**923**	**763**	+***	-***	+***
Start-up related characteristics							
Motives for start-up (selection)							
Wanted to be my own boss	68.5	**50.5**	**53.9**	**52.1**	+***	+***	+***
Had discovered a market niche	37.5	**32.2**	**31.6**	31.7	+***	+***	+***
Risk disposition (1: not at all; 10: very prepared to take risks; mean)[d]	6.1	**5.7**	**5.8**	**5.8**			
Share of equity (in %)[d]	72.4	**78.9**	**75.9**	**76.8**			
Sectoral Structure							
Other Services (facility manager, education etc.)	31.4	**42.0**	**35.8**	**38.6**	Ref.	Ref.	Ref.
Agriculture, forestry, fishing, animal breeding	0.9	**1.5**	0.6	0.9	+	+	+
Crafts, manufacturing, car repair, gardening	12.9	**9.7**	**10.2**	9.5	+***	+***	+***
Construction	8.9	8.9	**10.9**	10.0	+**	+***	+***
Trade (wholesale and retail)	14.8	**17.3**	15.5	16.2	+***	+**	+***
Traffic, news, logistics, courier services	3.6	4.6	3.0	3.5	+	+	+*
Credit, insurance	4.7	**3.4**	7.5	5.9	+***	-	+
IT, information processing	4.6	**5.0**	8.1	6.8	-*	-	-**
Other	18.2	**7.5**	**8.3**	**8.1**	+***	+***	+***
Number of Observations	1,969	2,560	2,570	4,473	4,448	4,468	6,324

Source: Caliendo, Künn, Hogenacker, and Wießner (2012), own depiction.
Note: Characteristics were measured at time of entry into respective subsidy scheme. Values in percent when not stated otherwise.
[a] Bold values in columns (2)-(4) depict statistical significance (p-value < 0.1) based on a t-test of mean comparison between NSUS and OSUS; NSUS and BA, as well as NSUS and the pooled sample of OSUS/BA.
[b] Columns(5)-(7) depict sign and statistical significance (*10%,**5%,***1%) of coefficients of a logit model with NSUS participation as the dependent variable. Additional covariates not included in the table: Real GDP (per capita), and open vacancies/amount of unemployed ratio. See Tables A.2.12, A.2.13, and A.2.14 in the Appendix for full regression results. The deviance in the total number of observations between the univariate and the respective multivariate comparison results from observations dropped due to missing values during the regression analysis.
[c] The deviance of the quantitative ratio of the OSUS to the BA in the pooled sample (49.9:50.1) from the true population ratio (42.5:50.1) was corrected by drawing a random sub-sample out of the OSUS sample with N=1,903.
[d] Due to a large number of missing values, this variable was excluded from the logit analysis.

(8.2% to 7.0%) during the same time period.[6] If we take this development into account and control for business cycle effects in the Logit-Model, the coefficient for East Germany

[6] Source: Statistics of the Federal Employment Agency.

turns out to be positive and statistically significant. This suggests that the reduction in the relative share of business founders in the NSUS program in East Germany can be mainly attributed to the economic development.

Additional significant differences between the programs emerge with respect to educational attainment and labor market histories of participants. In Table 2.3 we observe that the majority of individuals in all three programs obtained an intermediate school certificate. However, the share of individuals who obtained at most a lower secondary school certificate (19%) is significantly lower within the group of NSUS participants compared to those of the previous programs (30 and 23%, respectively). Whereas the OSUS also reached less qualified individuals, this is not the case anymore in the NSUS. When comparing the different programs with regard to the duration of unemployment, we clearly observe that the expectation of a potential prolongation of the acquisition period of UB I up to the maximum possible range turns out not to be true. Contrary to the expectations, recipients of the NSUS spent with 2.8 months significantly less time in unemployment before starting a business compared to the participants of the old programs OSUS (8.2 months) and BA (6.8 months). This negative effect also holds in the multivariate analysis. Moreover, 50% of all NSUS-participants start their self-employment after two months in unemployment. In addition, the remaining entitlement period of UB I lies with 7.2 months on average well above the period of three months that is required by law with regard to the NSUS (see Table 2.3). In view of this result, the extension of the entitlement period to six months within the framework of the upcoming reform at the end of 2011 does appear to be unproblematic.

Founding motives play an important role within entrepreneurial research. A business start-up out of unemployment is generally considered a "push"- motive, since it is often conducted in the absence of employment alternatives (Block and Wagner, 2010). However, Caliendo and Kritikos (2009b) also show that business founders out of unemployment are

not a homogeneous group with regard to their founding motives, but are also motivated by "pull"-factors. Table 2.3 shows that NSUS-recipients are significantly more often driven by the "pull"-motives, i.e., wanting "to be my own boss", and having "discovered a market niche" compared to the participants of the previous programs. This result suggests that "pull"-motives play a more important role within participants of the NSUS. While NSUS-participants subjectively rate themselves as more willing to take risks compared to BA- and OSUS-participants, the share of equity used to start the business is higher among the last two. With regard to the sectoral distribution, we observe that subsidized individuals predominantly start their business within the service sector in all three programs. However, NSUS-participants tend to found their business more frequently within the crafts and manufacturing sector.

2.4.4 Conclusion

As expected, the new program NSUS exhibits the same participant structure as the old program BA, and therefore does in total not reach the same range of unemployed individuals willing to become self-employed compared to its predecessors OSUS and BA. Compared to these programs, the NSUS attracted especially older (50 years and more), and better qualified individuals. The expectation that women would be significantly discriminated against through the reform in 2006 could not be confirmed with our data. Furthermore, in contrast to our expectations, potential recipients of the NSUS do not prolong their acquisition period of UB I up to the maximum possible range of 90 days before actually becoming self-employed. Moreover, they tend to be more motivated by "pull"-factors, are on average more willing to take risks, but used less equity compared to participants of the old programs. At last, recipients of the NSUS also found their business more often in the crafts and manufacturing sector.

2.5 In-depth Analysis of the NSUS

Up to now we briefly described the main structural features of NSUS-recipients relative to those participating in the previous programs OSUS and BA. In this section, we provide an in-depth analysis of the founding activities and founding success of individuals subsidized by the NSUS. Given that the NSUS is found to differ in its participant structure from its predecessors, we provide comparisons –where possible– to these older programs, particulary with regard to survival in self-employment, and the employee structure of the business. In our analysis of the founding activities we differentiate between three start-up stages: The seed-stage (Section 2.5.1),[7] the start-up-stage (Section 2.5.2), and the growth-stage (Section 2.5.3). Concerning the NSUS-specific characteristics, we mainly evaluate the importance of the subsidy during the start-up stage, and discuss the occurrence of possible

[7]We refer to the seed-stage as the period before the actual start-up of the business.

deadweight-effects (2.5.4). Finally, we also look at NSUS participants who had dropped out of self-employment at time of survey (Section 2.5.5).

2.5.1 Seed-Stage

Founding motives of the subsidized founders As outlined in Section 2.4.3, founding motives play an important role in entrepreneurial research. We therefore take a more detailed look at the founding motives of NSUS-recipients, further differentiating the analysis by region (East and West Germany) and gender. The upper part of Table 2.4 displays the level of agreement of the respondents to a set of statements of possible founding motives, differentiating between "pull"-factors (the first four items) and "push"-factors (the last three items).

Overall, we observe that the level of agreement to "pull"-motives is systematically higher than the agreement to "push" factors. In particular the level of agreement to the statement "wanted to be my own boss" was amongst the highest across both regions and both sexes. While both genders agreed rather strongly to the motive "wanted to implement an idea", "better compatibility between family and career", and "wanted to earn more money", the relative importance of family and career compatibility and implementing an idea was stronger for women than men. In turn, the "push"-motives "couldn't find dependent employment", "was discriminated at the former workplace", and "others advised me to found a business" only moderate levels of agreement are observed, but with higher agreement among women.

Preparation for start-up Besides the required remaining entitlement period of UB, an essential eligibility criteria for the NSUS program is the provision of a sustainable business plan. The evaluation and approval of the applicant's personal, professional, and material requirements was done by an external expert institution ("Fachkundige Stelle"),

that could take various forms. Table 2.4 provides in the upper half an overview of the type of expert institution used to evaluate the previously subsidized founders. 30% (38%) of the individuals receiving the NSUS in East (West) Germany handed in their business plan to a tax consultant. With exception of women in East Germany, who tend to mostly arrange an evaluation through a local Chamber of Industry and Commerce (CIC), tax consultants represent the largest group among the expert institutions. Bernhard and Wolff (2011) report that caseworkers of the Local Employment Agencies tend to expel tax consultants from the group of approving institutions, because they are suspected to issue erroneous evaluations.[8] Given the significant role of tax consultants according to the results presented here, a critical assessment should be undertaken with regard to the influence of the tax consultants on the quality of the respective business start-ups.

The types of documents that have to be sent to the external institution are explicitly listed on the application form that is handed over to the applicants by the caseworker of the local FEA units. According to the application form, a financing- and business plan are required for application. However, 15% of all respondents report not having set up a financing plan for their start-up. This suggests that either the applicants have not sufficiently dealt with the financial part of their business foundation, or that the evaluation by the external institution was insufficient itself. Table 2.4 also shows that between 5% to 10% of respondents report not to have made a business plan.[9] Self-assessment tests on their ability to become self-employed (for example online-tests on start-up specific web pages) are used only moderately by the respondents: only 24% of the NSUS-recipients indicate to have undergone self-assessments on whether they are personally and professionally qualified for self-employment.

[8] As potential reason for this, Bernhard and Wolff (2011) point out the conflict of interests in tax consultants approval activity, as founders also represent future customers to tax consultants.

[9] The term "business plan" does not explicitly appear in the application form, but is mentioned in additional documents that are handed out to the applicant (Bernhard and Wolff, 2011, p. 42).

Experience before start-up Table 2.4 also summarizes the level of previous experience that founders had made in the area of their business before the business start-up. The majority (64% to 73%) of the NSUS-recipients stated to have gained relevant experiences through previous dependent employment. Experiences from former self-employment, and/or from hobby undertakings are less prevalent, whereas regional-, and gender-specific differences can be identified. For example, women in East Germany state less often to have gained experience by way of former self-employment, compared to women in West Germany (12% vs 16%). At the same time, women in both regions state to have gained know-how through hobby undertakings (28% in each case). Only 11% to 14% of all formerly subsidized founders state not to have had any relevant experiences before starting a business.

2.5.2 Start-up-Stage

Start-up capital, equity, and sectoral distribution Regional- and gender-specific differences also emerge with respect to the amount of start-up capital. Overall, 18% to 22% of all formerly subsidized individuals do not invest any start-up capital during business formation, whereas women tend to start the business more often without any start-up capital than men (see Table 2.4). A regional-specific comparison reveals that the average investment in start-up capital among East German men is significantly lower than for West German men (13,700 Euro vs. 18,900 Euro). The differences in investments arise due to general lower levels of investments at all levels of the distribution: the share of male West German founders who invest at least 5,000 Euro (50,000 Euro) start-up capital is at around 60% (9%), compared to 48% (5%) in East Germany. For female founders no regional differences in average investment levels emerge (10,154 Euro in the West vs. 10,781 in the East). In both regions about 40% of women invest at least 5,000 Euro start-up capital. The share of own equity invested is rather similar across regions, whereas subsidized founders

in East Germany tend to invest more equity to cover their initial investments compared to those in West Germany.

Finally, Table 2.4 also presents regional-and gender-specific information on the different business sectors of the business start-ups. In both regions and in both gender groups the highest share of business formations takes place in the service-sector. However, whereas 40% of female start-up's are concentrated in this area, only about one quarter of male founders start their business in this area. Further significant gender differences emerge in male-dominated business sectors: the share of founders in the "crafts, manufacturing, car repair, gardening" sector is significantly higher among men at 15%, compared to women (ca. 8%). Similar gender-patterns emerge with regard to the "construction" sector.

Table 2.4: Selected Characteristics of NSUS-recipients with regard to the Seed- and Start-up Stage

	West Germany		East Germany	
	Men	Women	Men	Women
Founding Motives[a] (1=Doesn't apply at all; 7=Fully applies, Mean values)				
Wanted to be my own boss	4.7	4.6	4.7	4.5
Had an idea that I really wanted to implement	4.1	4.7	4.1	4.8
Wanted to earn more money	4.1	3.7	4.2	3.7
Expected a better compatibility of family and career by becoming self-employed	4.0	4.4	4.1	4.5
Couldn't find dependent employment	3.0	3.4	3.0	3.5
Was discriminated at the former workplace	2.7	2.8	2.4	2.7
Others had advised me to found a business	2.1	2.5	2.1	2.2
Business Plan/Idea was evaluated by[a]				
Tax consultant	39.1	37.2	30.2	27.8
Chamber of Industry and Commerce (CIC)	16.6	16.4	26.8	30.4
Chamber of Crafts (CC)	8.2	3.0	13.1	4.6
Start-up center	9.6	14.5	8.4	6.2
Business consultant	9.0	9.9	8.4	13.4
Preparation for Start-up[a,b]				
Created financing plan and/or identified possible financing sources	84.7	86.2	82.2	89.2
Created a business plan	91.3	94.8	89.5	93.1
Made use of intensive coaching and/or consulting services (for example CIC, CC, Start-up Centers, business/tax consultants)	64.2	70.3	66.5	74.5
Self-assessment of subject specific start-up qualification (for example online tests on start-up webpages)	24.2	23.9	19.7	28.4
Experience before Start-up within Field of Self-employed Activity[a,b]				
From dependent employment	71.4	64.4	72.6	70.6
From previous self-employment	20.2	16.1	16.5	11.9
From hobby undertakings	24.8	28.4	25.9	28.4
No experience before start-up	10.5	12.6	12.5	13.9
Amount of Capital and Equity used for Start-up				
No start-up capital	18.6	22.2	17.6	19.5
Amount of start-up capital (in Euro, Mean)	18,872	10,154	13,675	10,781
At least 5,000 Euro start-up capital	59.5	39.7	47.8	42.2
At least 50,000 Euro start-up capital	8.9	5.1	4.5	6.0
Share of equity	72.6	71.1	75.9	73.8
Business Sector[a]				
Other Services	26.4	43.9	24.1	38.1
Trade (wholesale and retail)	14.9	14.7	12.5	18.6
Crafts, manufacturing, car repair, gardening	15.2	7.9	15.3	6.7
Construction	9.9	1.9	16.6	3.6
Number of Observations	1,157	634	321	194

Source: Caliendo, Künn, Hogenacker, and Wießner (2012)
Note: Only NSUS-recipients, numbers in % where not indicated otherwise.
[a] Selected items.
[b] Question was only proposed to 50% of the respondents. Multiple entries were possible.

2.5.3 Growth-Stage

Survival in self-employment In this section we analyze the sustainability of start-ups within the NSUS program and compare it to that of the previous programs. Table 2.5 displays the main occupational status of NSUS-recipients at time of survey (i.e. 19 months after entry into self-employment), and the main occupational status of recipients of the previous programs (i.e. 16 months after entry into self-employment). While Table 2.5 only displays a conservative estimate of survival in self-employment, Figure 2.2 shows the survival in self-employment (in main and secondary activity) over time. It is important to note that the differences across programs cannot be interpreted causally, as we neither control for structural changes in the composition of individuals within the different programs, nor do we control for business cycle variables at the respective time of entries.[10] The analysis of causal effects will be part of future analyses.

Table 2.5 shows that the NSUS leads to a sustainable integration of recipients in self-employment. Between 75% to 84% of all subsidized founders are still self-employed as main activity 19 months after business start-up. Thus, and keeping the limited validity of the program comparison in mind, the NSUS exhibits in all gender-region subgroups a higher survival rate in self-employment compared to its predecessors (with the exception of female West German founders in the OSUS). Note, that at point of the survey interview, the funding period of the BA (6 months) and the NSUS (15 months) had already been expired, whereas the one of the OSUS was still ongoing. With regard to the general

[10]Up to the year 2005, recipients of the former unemployment assistance ("Arbeitslosenhilfe"), who were to a large part long-term unemployed, also had the possibility of receiving the BA and the OSUS. Since the probability of being pushed into self-employment increases with the duration of unemployment (Block and Wagner, 2010), the share of long-term unemployed among the recipients of the BA and the OSUS could have a significant negative impact on the survival rates within both programs (Kohn, Niefert, and Ullrich, 2010). In addition, the structural differences (for example with respect to socio-demographic characteristics) between the programs, and different cyclical effects between both observation periods could be responsible for the different survival rates.

Table 2.5: Main Occupational Status at Time of Survey (First Wave)

	West Germany		East Germany	
	Men	Women	Men	Women
New Start-up Subsidy (19 months after entry)[a]				
Self-employed	79.6	74.8	84.1	84.0
Unemployed or looking for work	4.9	6.5	2.8	5.7
Dependent employed (subject to social insurance contributions)	12.0	12.2	9.4	6.7
Bridging Allowance (16 months after entry)[b]				
Self-employed	71.5	66.2	74.2	68.5
Unemployed or looking for work	13.8	14.1	15.3	15.8
Dependent employed (subject to social insurance contributions)	11.6	13.7	8.2	7.9
Old Start-up Subsidy (16 months after entry)[b]				
Self-employed	74.7	78.6	80.6	79.0
Unemployed or looking for work	14.6	8.3	13.9	11.0
Dependent employed (subject to social insurance contributions)	7.3	5.4	3.1	4.1

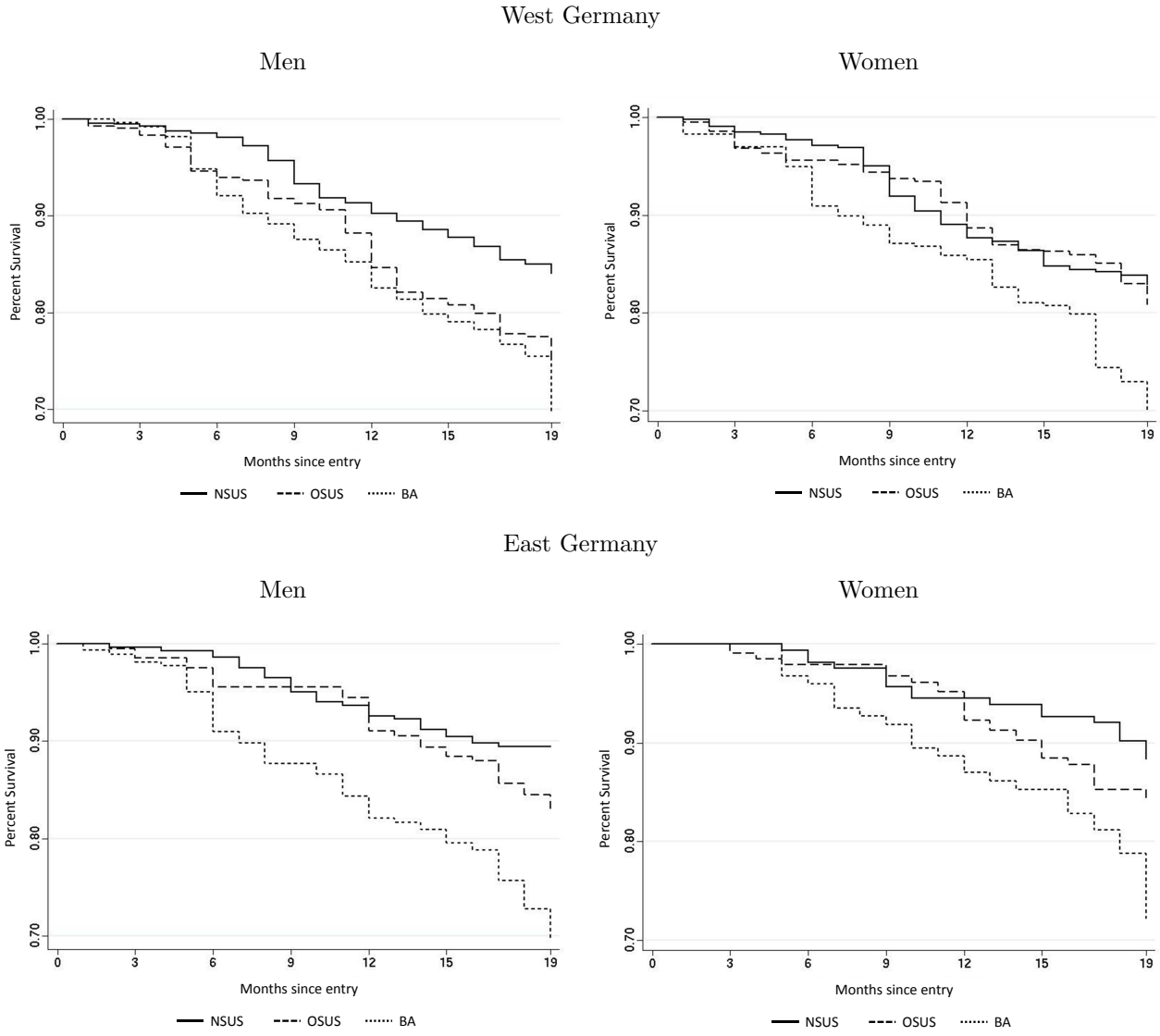
Source: Caliendo, Kritikos, and Wießner (2006), and Caliendo, Künn, Hogenacker, and Wießner (2012)
Note: Shares in %
[a] Surveyed November/December 2010
[b] Surveyed January/February 2005

integration on the labor market, we observe that the share of unemployed individuals is also lower within the NSUS-recipients compared to those from the previous programs.

The program-specific monthly survival rates in self-employment as main and secondary activity are displayed in Figure 2.2. Compared to Table 2.5, the deviating survival rates that are displayed in the graphs of Figure 2.2 at the end of the respective observation periods indicate that a part of the formerly subsidized founders does apparently not continue self-employment in main activity.[11] Figure 2.2 also shows that the difference between the survival curves is greatest between the NSUS and the BA, despite their similarity with respect to the institutional framework and the participant structure. This provides suggestive evidence that the six month funding period of the BA was not sufficiently long enough to support founders over the critical start-up stage. This view is also backed up by the fact that the survival curves of the BA display a significant drop after six months.

[11] Unfortunately, we are not able to distinguish between main and secondary activity in the retrospective longitudinal section of our data set. Hence, individuals who exit main activity self-employment towards secondary activity self-employment are not indicated as transitions in our duration data.

Figure 2.2: Survival in Self-employment (Main and Secondary Activity) Over Time



Source: Figure taken from Caliendo, Künn, Hogenacker, and Wießner (2012).

Income situation and household context Besides the integration in the first labor market, the objective of start-up promotion for unemployed is enabling recipients to earn a sustainable living income. Table 2.6 provides an overview of individual net incomes from self-employment for subsidized individuals who are still self-employed at time of survey.

To assess whether or not the NSUS enables recipients to obtain a living income, Table 2.6 displays information about the household context (i.e. the number of household members), the household net income, and the corresponding net equivalent incomes of the self-employed.[12] This income measure is compared with a general poverty threshold.[13]

With respect to the individual net income, similar region, and gender-specific patterns as in the BA and OSUS can be observed. Table 2.6 shows that compared to women, men obtain higher incomes from their self-employment activity and more frequently carry out their self-employment in full-time. This pattern holds for both West and East Germany. The reason that female founders in West Germany earn less compared to women in East Germany can be attributed to the fact that working hours among female founders in the East tend to be higher (Caliendo, Künn, and Wießner, 2009). This can also be observed among female NSUS-recipients. According to Table 2.6, 80% of female founders from East Germany carry out their self-employment in full-time, compared to only 67% in West Germany. Considering only the sub-group of female founders in full-time self-employment, we find the regional-specific gap in monthly net incomes to reverse: whereas women in full-time self-employment in the East earn on average 1,600 Euro net per month, female founders in the western part reach a monthly net income of around 1,700 Euro. For men, no working-hours differences across regions are observed (90% carry out self-employment in full-time). But again, West German men tend to earn significantly more than East German men (2,498 Euro vs 2,037 Euro). Table 2.6 also shows that the net income distribution is significantly spread out within the subgroups. 50% of male founders, for example, earn not more than 2,000 Euro net per month in full-time self-employment. As reference for the level of monthly net incomes of the self-employed, it is helpful to compare them to the average monthly net incomes of dependent employees. In 2010, an average male/female dependent

[12]The net equivalent income is calculated by assigning the head of the household a weight of 1, children under the age of 15 a weight of 0.3, and all other household members a weight of 0.5. Next, the total household income is divided by the added weights of all household members.

[13]The official poverty threshold currently lies at 60% of the median of the national net equivalent income.

Table 2.6: Income Situation and Household Context of the NSUS-recipients

	West Germany		East Germany	
	Men	Women	Men	Women
Income from self-employment				
Net income (mean)	2,498	1,408	2,037	1,427
Net income (median)	2,000	1,200	1,500	1,000
Share of individuals in full-time self-employment[a] (in %)	90.7	67.2	89.9	79.8
Net income (mean)	2,612	1,700	2,136	1,613
Net income (median)	2,000	1,500	1,500	1,000
Household context and household income				
Number of individuals living in household	2.7	2.5	2.5	2.5
Net household income (mean)	3,587	3,210	2,972	3,137
Net equivalent income[b] (mean)	2,105	1,994	1,815	1,944
Risk-of-poverty-rate[c] (in %)	12.5	12.4	14.8	14.1
Number of Observations	794	415	238	144

Source: Caliendo, Künn, Hogenacker, and Wießner (2012), own depiction.
Note: All numbers refer to former NSUS-recipients, who are still self-employed at time of survey and provide information on their income situation. Numbers are in Euro per month where not indicated otherwise.
[a] 35 and more hours per week.
[b] The net equivalent income was calculated according to the new OECD-scale: The head of the household was given a weight of 1, children under the age of 15 were weighted with 0.3, and all other household members were assigned a weight of 0.5. Next, the total household income was divided by the added weights of all household members.
[c] Share of still self-employed founders with an equivalent household net income below the general poverty threshold of 925 Euro per month in 2008 (see Grabka and Frick, 2010).

employee earned a gross monthly income of around 2,820/2,490 Euro (see Statistisches Bundesamt, 2010a, p. 124). Assuming an underlying payroll deduction of 29%,[14] the respective monthly net income amounts to 1,990/1,760 Euro. Although this comparison is somewhat limited, we thus find that the monthly net income out of self-employment for formerly subsidized NSUS-recipients does not deviate significantly from that of average dependent employees, and is higher on average. Looking at the household context, we see that on average 2.5 individuals live in a household throughout all subgroups displayed here. In contrast to the individual monthly net income, the equivalent income does not differentiate much across gender and region subgroups. It hence appears that women condition their working hour decision on the household context, which suggests that they do not depend only on their own net income from self-employment (Caliendo et al., 2009, Noll and Wiessner, 2011).

[14] The calculation is based on a three member household (one child), and a single earner in the German tax bracket III-1 (see Statistisches Bundesamt, 2010b).

Based on data of the German Socio-economic Panel (SOEP), Grabka and Frick (2010) report a poverty threshold of 925 Euro per month for the year 2008, and a related risk-of-poverty-rate of 14%. Table 2.6 shows that the average net equivalent incomes of the formerly subsidized founders considerably exceed the poverty threshold in all subgroups. Taking a closer look at the respective risk-of-poverty-rates reveals that around 12.5% and 14% of all formerly subsidized founders in West and East Germany earn a net equivalent income, which is less than 925 Euro per month. Based on these results, we can conclude that formerly subsidized founders that are still self-employed 19 months after start-up are not subject to a higher risk of being poor compared to the general population. Hence, the net income obtained by former NSUS-recipients can be considered as providing a sufficient livelihood.

Employment effects of subsidized start-ups We now consider the question whether the subsidized start-ups also generate additional employment. In comparison to other ALMP schemes, start-up promotion is commonly linked to the term "double dividend", indicating that subsidized founders end their own unemployment and may create positive employment effects by generating new jobs. Therefore, the question whether subsidized business founders become new employers is of great interest (Caliendo et al., 2010, Fritsch, 2007). Table 2.7 depicts the employee structure and the expected personal development of recipients who are still self-employed at time of survey. We find that most of the formerly subsidized founders are still active as sole proprietors at time of survey (i.e. at least 19 months after start-up). Male founders are found to be more likely to employ at least one worker: 26% of female founders in West Germany employ at least one worker, compared to 37% of male West Germans; in East Germany, 33% of the male founders and 30% of female founders state to have at least one employee. In comparison, the share of subsidized male (female) BA-recipients with at least one employee amounted to 29% (22%) on average around 16 months after start-up. OSUS-recipients had thereby been much more reluctant in the past in employing additional workers in their businesses. Around 16 months after start-up, only 8% of all subsidized founders within the OSUS scheme had employed at least one employee (Caliendo et al., 2010).

In terms of full-time-equivalents, Table 2.7 shows that the formerly subsidized self-employed create on average around 1.6 to 2.8 new full-time jobs. However, the survey also shows that most of the founders, who have not employed any worker at time of survey, also do not intend to create new jobs in the future.

Social security coverage Table 2.8 addresses the social security coverage of the subsidized founders, and shows that the vast majority of them have a health insurance. Throughout all subgroups, less than 1% are not medically insured. With respect to pension plans

Table 2.7: Employee Structure and Development within Businesses started by NSUS-recipients

	West Germany		East Germany	
	Men	Women	Men	Women
Employee Structure				
Founders with at least one employee	36.7	26.2	33.1	29.5
Average number of employees	4.1	3.9	4.0	2.7
Average number of employees according to different categories				
Dependent employees subject to social security contr.: Full-time	1.5	0.9	2.3	1.1
Dependent employees subject to social security contr.: Part-time	0.7	0.8	0.8	0.7
Apprentices	0.3	0.2	0.3	0.1
Freelancers, interns, auxiliaries, mini-/midi-jobber	1.6	2.0	0.6	0.8
Full-time equivalents[a]	2.3	1.8	2.8	1.6
Employee Development				
If no workers are employed right now, would you like in the future...				
.. to employ workers?				
Yes, absolutely	15.5	12.3	14.5	12.1
Yes, preferably	26.0	10.6	21.7	8.6
No, preferably	23.1	15.6	15.7	19.0
No, absolutely not	35.4	61.5	48.2	60.3
.. to employ apprentices?				
Yes, absolutely	4.7	2.8	3.6	6.9
Yes, preferably	13.0	5.1	7.2	1.7
No, preferably	15.2	7.9	14.5	6.9
No, absolutely not	67.0	84.3	74.7	84.5
Number of Observations	921	474	270	163

Source: Caliendo, Künn, Hogenacker, and Wießner (2012).
Note: All numbers refer to former NSUS-recipients, who are still self-employed at time of survey. Numbers are in % where not indicated otherwise.
[a] Full-time equivalents were calculated by weighting "Part-time dependent employees subject to social security" with 0.5, "Freelancers", "auxiliaries", and "mini-/midi-jobbers" with 0.25.

and the related apprehension that the voluntary character concerning the contribution to the statutory pension scheme would increase the share of individuals without pension plan, Table 2.8 shows that the share of formerly subsidized founders who state to not contribute to any pension scheme amounts lies between 13% and 16%. The further development of this share should be critically monitored in the future, in order to prevent possible shortcomings with respect to adequate old-age-pensions for self-employed individuals. The FEA offers self-employed individuals to voluntarily contribute to the unemployment insurance system. According to Table 2.8, only 50% to 59% of all former NSUS-recipients take this opportunity.

Regarding the additional benefit receipt during self-employment we observe that a small share of founders has to rely on additional transfers (top-up-benefits) in the form of Unemployment Benefit II after the funding period of NSUS, because their net income from self-employment is not sufficient enough to secure their livelihood. The share is highest for women in East Germany (6%), whereas the share in the remaining subgroups amounts to 2% and 3%, respectively. From an institutional perspective the need of additional benefits is not desirable, since one of the essential requirements to become eligible for the start-up subsidy is the proof of the sustainability of the business opportunity. This sustainability check is supposed to make sure that the recipient is able to secure his/her livelihood at least during the start-up stage. The further development of self-employed NSUS-recipients having to take up further transfers therefore needs to be observed thoroughly.

Table 2.8: Social Security Coverage of NSUS-recipients

	West Germany		East Germany	
	Men	Women	Men	Women
Social security coverage				
No health insurance coverage	0.4	0.2	0.7	0.0
No pension plan	15.6	15.6	13.0	14.7
Importance of transfer-system of the FEA				
Voluntary unemployment insurance	49.6	53.9	57.1	58.5
Reception of top-up benefit ("Aufstocker")				
During founding period	3.0	1.9	3.7	3.1
After founding period	1.5	1.6	2.8	6.3
Number of Observations	921	474	270	163

Source: Caliendo, Künn, Hogenacker, and Wießner (2012).
Note: All numbers refer to former NSUS-recipients, who are still self-employed at time of survey. Numbers are in % where not indicated otherwise.

2.5.4 Subsidy Related Characteristics

Receipt of the second funding period and importance of the subsidy As pointed out in Section 2.2, the current version of the NSUS consists of two independent funding periods for which individuals may legally claim only the first one. Table 2.9 shows that the majority of all formerly subsidized business founders are also granted the second funding period. However, regional- and gender-specific differences emerge. Whereas West German recipients are less likely to receive the second funding period than East German recipients, women are generally more likely to receive it than men. Hence, whereas men in West Germany are least likely to receive the additional funding (57%), women in East Germany are most likely (73%) to enter the second period.

Table 2.9: Subsidy Related Characteristics

	West Germany		East Germany	
	Men	Women	Men	Women
Ongoing funding through NSUS				
Second funding period was received	57.5	63.2	65.9	73.2
Selected reasons for why second funding period was not received				
Wasn't aware of existence of second funding period	17.0	13.4	11.9	11.5
Effort of re-applying for second period was too high	30.7	26.7	33.0	28.9
Rejection of second funding period by LEA	8.2	9.5	11.0	7.7
Wasn't self-employed anymore	9.4	13.8	9.2	15.4
Statements regarding the importance of the subsidy				
"Without the NSUS I would not have been able to weather the first six months of my self-employment"[a]				
Mean (absolute number)	4.9	5.7	5.1	5.5
Share of agreement (values 5 to 7)	61.4	76.3	65.7	73.7
"The NSUS secured the my livelihood and the one of my family during the start-up stage"[a]				
Mean (absolute number)	5.2	5.2	5.3	5.5
Share of agreement (values 5 to 7)	68.8	67.2	67.3	73.2
"Through the NSUS, I was able to finance entrepreneurial activities during the start-up stage"[a]				
Mean (absolute number)	4.7	5.1	4.8	5.6
Share of agreement (values 5 to 7)	60.5	68.5	63.6	79.3
Preferred subsidy alternatives compared to the current institutional framework				
Extended funding period with lower monthly amounts	22.6	28.7	22.7	23.7
Shorter funding period with higher monthly amounts	6.7	3.9	5.3	2.1
Current length of funding period was okay	70.0	64.8	71.7	71.7
Number of Observations	1,157	634	321	194

Source: Caliendo, Künn, Hogenacker, and Wießner (2012).
Note: All numbers refer to former NSUS-recipients. Numbers are in % where not indicated otherwise.
[a] Scaling: 1-Does not apply at all; 7-Does fully apply

Whether these differences in receipt of the second funding period emerged du to rejections from the LEA or due to non-application is also shown in Table 2.9. In particular, it is found that the lower funding probability for men is partially explained by their lower probability to apply to the second period funding. Whereas 48% of West and 45% of East German men note that they did not apply as they were not aware of its' existence or judged that the effort of reapplying was to high, only 40% of women state to have not applied due to these reasons. While only 8% to 9% state that they applied and were denied funding, the share is somewhat higher amongst East German men with 11% .

Table 2.9 also provides information about the perceived importance of the subsidy amongst participants. Overall, it can be seen that most founders assign a rather strong role to the NSUS: between two thirds and three quarters of all founders agree to the statements that the NSUS was of crucial importance for the survival of the first six months after start-up and that the NSUS had secured their livelihood and the one of their families during the start-up stage. Regarding the program features, about 70% of founders state that they are satisfied with the length of the funding period; about 22% stated that they would have preferred a longer funding period with lower level funding, between 2% and 7% would have preferred a shorter funding with a higher level of monthly support.

Deadweight-effects The questions on the perceived importance of the subsidy can be used to assess the existence and importance of deadweight effects. Deadweight-effects associated with financial subsidies are often discussed within entrepreneurial research, but their importance has never been investigated up to this point. Deadweight effects emerge if two conditions are fulfilled. First, the unemployed need to have been able to start the business also without the subsidy, or may even have voluntarily registered as unemployed with the intention to receive the subsidy. A second condition, that has been neglected by previous research, is that the subsidy must not have had a (positive) impact on the

chances of success of the start-up. Hence, to verify whether deadweight-effects exist, one has to show that (1) the decision to become self-employed was made independently of the subsidy, and (2) that the subsidy did not have any impact on success or failure of the subsidy (Caliendo and Kritikos, 2010). The second condition could not be evaluated so far due to data restrictions, and was therefore not taken into account. Our data allows a first assessment of the second condition, and thus makes an important contribution to the discussion of deadweight-effects within start-up promotion of the FEA.

With regard to whether the first condition holds two questions are available. First, one can use the level of agreement to the statement whether the recipients would have also become self-employed without the subsidy. Second, the participants were asked to indicate whether they voluntarily registered as unemployed in order to be able to receive the subsidy. Whether the second condition applies can be assessed by the answers to the question whether individuals feel that they would have survived the first six months even without the subsidy.

Table 2.10: Potential Deadweight Effects Related to the NSUS

	Second Condition "Without the NSUS I would not have been able to weather the first six months of my self-employment"[a]			Total
	Disagree	Maybe	Agree	
First Condition				
(1) "I would have started the business also without the subsidy"[a]				
Disagree	5.1	2.8	36.9	44.8
Maybe	1.4	0.7	6.1	8.2
Agree	19.0	4.0	24.0	47.0
(2) "Did you (voluntarily) register as unemployed to receive the NSUS?"				
No	18.3	5.3	54.9	78.5
Yes	7.1	2.1	12.3	21.5

Source: Caliendo, Künn, Hogenacker, and Wießner (2012).
Notes: All numbers refer to former NSUS-recipients, and are in %.
[a] The categories rely on an aggregation of a scale variable. The respondents were confronted with the statement and asked to range their answer on a scale from 1 (does not apply at all) to 7 (does fully apply). We categorized the values 1 to 3 to "Disagree", 4 to "Maybe", and 5 to 7 to "Agree".

From Table 2.10 it can be seen that 47% of all NSUS-recipients state they would have started the business also without the subsidy, and that 22% of recipients said that they voluntarily registered as unemployed in order to become eligible for the subsidy. Note, that the reliability of these statements may have been reduced by the retrospective nature of the question that was asked 19 months after start-up. In particular, the retrospective assessment of the importance of the subsidy is likely to be influenced by the founding experience, i.e., how founders weathered the critical start-up stage. Hence, we cannot rule out that having successfully started a business induces the founder to believe that he/she would have started the business irrespective of the subsidy. Indeed, the level of agreement to this question seems to be pretty high at first sight.

Note, that in the past, the share of individuals agreeing to these statement were used as indicator for deadweight-effects (Handelsblatt, 2011). However, following our more differentiated definition above, we need to additionally confirm that the subsidy did not simultaneously affect the success of the start-up. Table 2.10 contrasts the information about the importance of the subsidy for start-up survival within the first 6 months with these two questions assessing the role of the NSUS during start-up. While one would expect that respondents who indicate that the subsidy had no role during start-up also attribute little or no importance to the subsidy during the start-up stage, Table 2.10 shows that this not the case. Taking our more narrow definition, the group with potential deadweight-effects is reduced from the initial 47% to 19%, as only these recipients state that the subsidy was neither relevant during start-up nor during for business survival within the first six months after start-up. With regard second aspect of the first condition (i.e. unemployment registration to become eligible for the subsidy), a similar pattern can be observed. The subgroup of individuals that agree to both statements is 7%, relative to 22% beforehand. Although we cannot verify exactly to what extent deadweight-effects

exist, our results provide suggestive evidence that they play a less significant role than was presumed until now.

2.5.5 Business Terminations

As a final analysis, we take a look at businesses that had already been terminated again at time of survey. Table 2.11 shows that the lack of demand is the main reason for a termination of the business throughout all subgroups of former NSUS-recipients that were not self-employed anymore at time of survey. The change from self-employment into dependent employment was the decisive reason for 32% to 44% of all drop-outs, which shows that one should not always label the termination of a formerly subsidized business as an actual business failure. The result of self-employment being a gateway to dependent employment is consistent with results reported from previous studies. For example, Caliendo et al. (2009) report that recipients of the former BA often used their self-employment in order to establish contacts to interesting employers.

A clear picture emerges with respect to the type of business termination. Between 85% to 90% of all former NSUS-recipients who had left self-employment at time of the survey terminated their businesses on their own account, whereas just a small share went bankrupt, or filed insolvency proceedings. Nevertheless, debts remain frequently and arise, e.g., from lease agreements, or lost share capital (Caliendo et al., 2009, p. 5). During our observation period, mainly male founders terminated their business with debts (32% in the west, and 31% in the east). In contrast, women less frequently ran into debt when terminating their businesses (19% in the west vs. 25% in the east). Similarly, business terminations by male founders are more often subject to debts of 5,000 Euro than those of female founders, at least in West Germany.[15]

[15]Due to an insufficient number of observations and related data security restrictions, we could not report the corresponding shares for former NSUS-recipients in East Germany.

Table 2.11: Analysis of Business Terminations of Formerly Subsidized NSUS-Recipients

	West Germany		East Germany	
	Men	Women	Men	Women
Reasons for Business Termination[a]				
Lack of orders, not enough customers	61.7	49.6	44.4	50.0
Operating expenses were too high	37.7	26.8	33.3	50.0
Receivables were too high, too many payment defaults	22.9	19.5	25.0	45.0
Underestimated the costs of social security	21.7	29.3	25.0	45.0
Found attractive job position in dependent employment	32.0	37.4	44.4	30.0
Underestimated own professional and sectoral knowledge	11.4	9.8	5.6	10.0
Health issues (i.e. too much stress, burnout)	14.3	24.4	25.0	30.0
Type of Business Termination[a]				
Terminated activity with bankruptcy, filed insolvency proceedings	4.0	4.1	5.6	0.0
Terminated activity on one's own account	89.7	85.3	86.1	85.0
Passed on business (sale, endowment, inheritance)	4.6	8.1	2.8	5.0
Debts from former self-employment				
Share of business failures with debts	31.6	18.7	30.6	25.0
Share of businesses with debts of 5,000 Euro and above	63.6	39.1	–[b]	–[b]
Number of Observations	175	123	36	20

Source: Caliendo, Künn, Hogenacker, and Wießner (2012).
Note: All numbers refer to former NSUS-recipients that had terminated their self-employment at time of survey. Numbers are in % where not indicated otherwise.
[a] Selected items, multiple answers possible.
[b] Not reported due to insufficient number of observations.

2.6 Conclusion and Outlook

This paper analyzes the *New Start-up Subsidy* (NSUS) as instrument for start-up promotion in context of active labor market policies. To this end, we generate a new data set of subsidy recipients, enriching administrative data of the federal employment agency with detailed survey information. The focus of this analysis is twofold. First, we compare the NSUS to two previous programs *Bridging Allowance* (BA) and *Old Start-up Subsidy* (OSUS) that were replaced by the NSUS. As the NSUS was intended to integrate the two programs into one single instrument, we empirically compare the programs and investigate several hypotheses about program take-up of the NSUS based on the experience with the previous programs. Finally, we conduct an in-depth analysis of the NSUS, in which we evaluate the participant structure, various sustainability measures, and the empirical relevance of potential deadweight-effects.

In the comparative analysis we show that the NSUS is similar to the BA in terms of the participant structure and does not cover the same range of unemployed individuals willing to become self-employed as the two previous programs. Compared to the previous programs, founders in NSUS are on average older and better qualified. We do not find evidence for a systematic discrimination of female founders due to the new institutional framework of the subsidy. We also cannot confirm the hypothesis that nascent founders prolong their acquisition period of the UB I up to the maximum possible range of 90 days before actually becoming self-employed. Based on this result, the further enhancement of the minimum remaining entitlement period of UB I from three to six months that was part of a further reform in 2011 does not seem critical. Comparing founding motives and the characteristics of founders across programs, we further show that "pull"-factors play a more prominent role amongst NSUS-recipients compared to the older programs, that NSUS recipients tend to be more willing to take risks, and that they use less equity. Finally, we

also find that NSUS recipients are more likely to found their business within the crafts and manufacturing sector, and less in the services sector.

The in-depth assessment of the participant characteristics of NSUS reveals that the majority of the subsidized business founders has gained relevant working experience in the sector of their current self-employment prior to the start-up. Moreover, the majority of the NSUS-recipients hand in their business plan/idea to a tax consultant in order to verify their professional, and personal qualification for self-employment. Gender specific differences are observed with respect to investment decisions and business sector of the start-up. Women tend to invest less start-up capital, and are less represented in male dominated sectors (construction, crafts).

Concerning the sustainability of the program, we consider the growth-stage of the business and find that 75% to 84% of all formerly subsidized founders are still self-employed in main activity 19 months after start-up. Female founders who work in full-time self-employment on average earn a monthly net income of 1,670 Euro, whereas male founders earn on average 2,500 Euro. In comparison to the net income of similar individuals in dependent employment, formerly subsidized male founders who are still self-employed at time of survey earn considerably more, whereas the net income of self-employed women is somewhat lower than that of their dependently employed counterparts. The net equivalent incomes of the formerly subsidized founders lie well above the poverty threshold and can therefore be considered as high enough to provide a sufficient livelihood.

We assess potential deadweight-effects of start-up promotion within ALMP and find that 47% of the former recipients state that they would have founded their business even without the subsidy. At the same time, only 40% of these founders also state that they do not consider the subsidy crucial for the business-survival during the critical first six months after start-up. We argue that deadweight-effects only occur if the subsidy does neither affect the start-up decision nor the success of the business and thus conclude that the

share of individuals for whom deadweight effects may exist is at about 19%. Although we ultimately did not pinpoint the magnitude of the deadweight-effects, these results provide suggestive descriptive evidence that they play a less significant role as previously assumed based on their relevance in the start-up decision.

One crucial question that has not been answered yet is whether the NSUS is successful in mitigating possible disadvantages of unemployed business founders as compared to non-subsidized business founders that have not been unemployed before. Since this assessment requires a control group that consists of "regular" business founders, a thorough analysis of this question was not possible to this date. Since our data set also includes a new innovative control group of this kind, we will for the first time be able to shed new light on this research topic, and will also be able to provide more thorough statements with regard to potential deadweight-effects.

2.7 Appendix

2.7.1 Supplementary Tables

Table A.2.12: Logit Model – NSUS vs. OSUS

Dependent Variable: Participation in NSUS (1=yes)	(1)	(2)	(3)
Socio-demographic characteristics			
Age (in years)	0.0282***		
	(0.0049)		
Age Categories (*Ref.*: Less than 25 years)			
25 - 34 years		0.1506	0.1565
		(0.1821)	(0.1823)
35 - 44 years		0.2849	0.2627
		(0.1869)	(0.1871)
45 - 49 years		0.4890**	0.5017**
		(0.2094)	(0.2099)
50 years and older		0.8447***	0.8905***
		(0.2057)	(0.2060)
Female	-0.0497	-0.0465	-0.0374
	(0.0985)	(0.0985)	(0.0993)
East Germany	1.0437***	1.0344***	1.0364***
	(0.117)	(0.1172)	(0.1179)
Education and Labor Market History			
Highest school certificate (*Ref.*: No certificate)			
Lower secondary school	-0.6741**	-0.6864**	-0.6645**
	(0.3180)	(0.3189)	(0.3223)
Intermediate school	0.014	-0.0034	0.0133
	(0.3169)	(0.3178)	(0.3217)
Advanced technical certificate	0.4313	0.42	0.4111
	(0.3331)	(0.3339)	(0.3377)
Higher education entrance certificate	0.1938	0.1925	0.1959
	(0.3224)	(0.3234)	(0.3272)
Duration of unemployment until entrance into subsidy (in months)			-0.2449***
			(0.0137)
Categories (*Ref.*: Less than 3 months)			
3 - 5 months	-0.7131***	-0.7054***	
	(0.1087)	(0.1087)	
6 - 11 months	-1.6675***	-1.6562***	
	(0.1178)	(0.1177)	
12 and more months	-3.5073***	-3.5133***	
	(0.2583)	(0.2605)	
Remaining entitlement period of UB I (in months)	0.0137	0.0132	0.0008
	(0.0089)	(0.009)	(0.0092)
Average amount of UB I (Euro per month)	0.0018***	0.0018***	0.0019***
	(0.0001)	(0.0001)	(0.0001)
Start-up related characteristics			
Motives for start-up (selection)			
Wanted to be my own boss	0.8497***	0.8449***	0.8387***
	(0.0897)	(0.0897)	(0.0903)
Had discovered a market niche	0.4245***	0.4235***	0.4507***
	(0.1093)	(0.1093)	(0.1101)

Table to be continued.

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Dependent Variable: Participation in NSUS (1=yes)	(1)	(2)	(3)
Sectoral Stucture (*Ref.*: Other Services)			
Agriculture, forestry, fishing, animal breeding	0.0252	-0.0129	-0.0046
	(0.4288)	(0.4299)	(0.4332)
Crafts, manufacturing, car repair, gardening	0.7943***	0.7965***	0.7732***
	(0.1542)	(0.1541)	(0.1554)
Construction	0.3931**	0.3949**	0.3604**
	(0.1726)	(0.1726)	(0.1734)
Trade (wholesale and retail)	0.3465***	0.3539***	0.3507***
	(0.1301)	(0.1300)	(0.1311)
Traffic, news, logistics, courier services	0.102	0.1011	0.0749
	(0.2223)	(0.2219)	(0.2250)
Credit, insurance	0.6595***	0.6233***	0.5707***
	(0.2109)	(0.2116)	(0.2126)
IT, information processing	-0.4132*	-0.4319**	-0.4840**
	(0.2162)	(0.2155)	(0.2171)
Other	1.0450***	1.0364***	1.0016***
	(0.1412)	(0.1413)	(0.1429)
Real GDP (in Euro, per capita)	0.0000*	0.0000*	0.0000
	(0.0000)	(0.0000)	(0.0000)
Open vacancies/amount of unemployed ratio	0.1864***	0.1861***	0.1845***
	(0.0087)	(0.0087)	(0.0088)
Constant	-5.5191***	-4.8036***	-4.4493***
	(0.4117)	(0.4072)	(0.4105)
Log-Likelihood	-1,750	-1,750	-1,720
Pseudo R^2	0.4264	0.4257	0.4355
Number of Observations	4,448	4,448	4,448

Source: Own Calculations.
Note: Characteristics were measured at time of entry into respective subsidy scheme. Robust standard errors are depicted in parentheses.

Table A.2.13: Logit Model – NSUS vs. BA

Dependent Variable: Participation in NSUS (1=yes)	(1)	(2)	(3)
Socio-demographic characteristics			
Age (in years)	0.0562***		
	(0.0051)		
Age Categories (*Ref.*: Less than 25 years)			
25 - 34 years		-0.0051	-0.0264
		(0.1935)	(0.1933)
35 - 44 years		0.1324	0.1059
		(0.198)	(0.1979)
45 - 49 years		0.4975**	0.4805**
		(0.2181)	(0.2186)
50 years and older		1.6797***	1.7482***
		(0.2249)	(0.2257)
Female	0.2460**	0.2566***	0.2811***
	(0.0979)	(0.0984)	(0.0996)
East Germany	0.8733***	0.8531***	0.8505***
	(0.1104)	(0.1110)	(0.1118)
Education and Labor Market History			
Highest school certificate (*Ref.*: No certificate)			
Lower secondary school	-0.4654	-0.5283	-0.5457
	(0.3630)	(0.3655)	(0.3656)
Intermediate school	-0.0606	-0.1268	-0.1596
	(0.3611)	(0.3634)	(0.3636)
Advanced technical certificate	0.2647	0.1994	0.1852
	(0.3723)	(0.3747)	(0.3753)
Higher education entrance certificate	0.0641	0.05	0.0138
	(0.3652)	(0.3675)	(0.3678)
Duration of unemployment until entrance into subsidy (in months)			-0.3124***
			(0.0143)
Categories (*Ref.*: Less than 3 months)			
3 - 5 months	-1.0977***	-1.1204***	
	(0.1011)	(0.1017)	
6 - 11 months	-2.1791***	-2.2131***	
	(0.1156)	(0.1170)	
12 and more months	-3.8576***	-4.0829***	
	(0.2406)	(0.2496)	
Remaining entitlement period of UB I (in months)	-0.0721***	-0.0807***	-0.0944***
	(0.0086)	(0.0088)	(0.0090)
Average amount of UB I (Euro per month)	-0.0005***	-0.0004***	-0.0004***
	(0.0001)	(0.0001)	(0.0001)
Start-up related characteristics			
Motives for start-up (selection)			
Wanted to be my own boss	0.6770***	0.6870***	0.6838***
	(0.0854)	(0.0860)	(0.0870)
Had discovered a market niche	0.6842***	0.6759***	0.6977***
	(0.1097)	(0.1099)	(0.1116)

Table to be continued.

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Dependent Variable: Participation in NSUS (1=yes)	(1)	(2)	(3)
Sectoral Stucture (*Ref.*: Other Services)			
Agriculture, forestry, fishing, animal breeding	0.3867	0.2929	0.2646
	(0.4719)	(0.4723)	(0.4820)
Crafts, manufacturing, car repair, gardening	0.6242***	0.6306***	0.6088***
	(0.1458)	(0.1460)	(0.1472)
Construction	0.4339***	0.4409***	0.4450***
	(0.1586)	(0.1589)	(0.1607)
Trade (wholesale and retail)	0.3178**	0.3045**	0.3202**
	(0.1247)	(0.1256)	(0.1275)
Traffic, news, logistics, courier services	0.3675	0.3960*	0.3208
	(0.2280)	(0.2293)	(0.2313)
Credit, insurance	-0.0967	-0.2128	-0.2612
	(0.1757)	(0.1791)	(0.1794)
IT, information processing	-0.3094	-0.3543*	-0.3796**
	(0.1882)	(0.1898)	(0.1900)
Other	0.8839***	0.8501***	0.8205***
	(0.1325)	(0.1329)	(0.1351)
Real GDP (in Euro, per capita)	0.0000***	0.0000***	0.0000***
	(0.0000)	(0.0000)	(0.0000)
Open vacancies/amount of unemployed ratio	0.1909***	0.1908***	0.1889***
	(0.0084)	(0.0084)	(0.0085)
Constant	-3.9778***	-2.1863***	-1.7441***
	(0.4374)	(0.4412)	(0.4425)
Log-Likelihood	-1,960	-1,940	-1,900
Pseudo R^2	0.3606	0.3655	0.3795
Number of Observations	4,468	4,468	4,468

Source: Own Calculations.
Note: Characteristics were measured at time of entry into respective subsidy scheme. Robust standard errors are depicted in parentheses.

Table A.2.14: Logit Model – NSUS vs. OSUS/BA[a]

Dependent Variable: Participation in NSUS (1=yes)	(1)	(2)	(3)
Socio-demographic characteristics			
Age (in years)	0.0428***		
	(0.0043)		
Age Categories (*Ref.*: Less than 25 years)			
25 - 34 years		0.116	0.1072
		(0.1637)	(0.1636)
35 - 44 years		0.2243	0.1972
		(0.1674)	(0.1672)
45 - 49 years		0.4967***	0.4851***
		(0.1842)	(0.1844)
50 years and older		1.3058***	1.3567***
		(0.1847)	(0.1847)
Female	0.1219	0.1354	0.1549*
	(0.0836)	(0.0838)	(0.0846)
East Germany	0.9235***	0.9077***	0.9084***
	(0.0968)	(0.0969)	(0.0974)
Education and Labor Market History			
Highest school certificate (*Ref.*: No certificate)			
Lower secondary school	-0.5625**	-0.5926**	-0.6077**
	(0.2854)	(0.2872)	(0.2895)
Intermediate school	-0.0237	-0.0576	-0.0827
	(0.2836)	(0.2853)	(0.2878)
Advanced technical certificate	0.3344	0.3135	0.2947
	(0.2940)	(0.2957)	(0.2983)
Higher education entrance certificate	0.1779	0.1806	0.1395
	(0.2872)	(0.2888)	(0.2913)
Duration of unemployment until entrance into subsidy (in months)			-0.2761***
			(0.0120)
Categories (*Ref.*: Less than 3 months)			
3 - 5 months	-0.9359***	-0.9391***	
	(0.0878)	(0.0880)	
6 - 11 months	-1.9204***	-1.9290***	
	(0.0994)	(0.1000)	
12 and more months	-3.5977***	-3.6963***	
	(0.2198)	(0.2232)	
Remaining entitlement period of UB I (in months)	-0.0383***	-0.0429***	-0.0543***
	(0.0069)	(0.0070)	(0.0072)
Average amount of UB I (Euro per month)	0.0003***	0.0003***	0.0004***
	(0.0001)	(0.0001)	(0.0001)
Start-up related characteristics			
Motives for start-up (selection)			
Wanted to be my own boss	0.7163***	0.7245***	0.7220***
	(0.0742)	(0.0746)	(0.0753)
Had discovered a market niche	0.5131***	0.5113***	0.5308***
	(0.0918)	(0.092)	(0.0929)

Table to be continued.

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Dependent Variable: Participation in NSUS (1=yes)	(1)	(2)	(3)
Sectoral Stucture (*Ref.*: Other Services)			
Agriculture, forestry, fishing, animal breeding	0.3512	0.2987	0.2644
	(0.3934)	(0.3937)	(0.4018)
Crafts, manufacturing, car repair, gardening	0.7758***	0.7774***	0.7487***
	(0.1270)	(0.1272)	(0.1284)
Construction	0.4893***	0.4935***	0.4710***
	(0.1414)	(0.1416)	(0.1423)
Trade (wholesale and retail)	0.3793***	0.3763***	0.3842***
	(0.1090)	(0.1093)	(0.1104)
Traffic, news, logistics, courier services	0.3570*	0.3475*	0.3171*
	(0.1911)	(0.1912)	(0.1923)
Credit, insurance	0.1047	0.038	-0.0025
	(0.1608)	(0.1622)	(0.1625)
IT, information processing	-0.3601**	-0.3870**	-0.4216**
	(0.1660)	(0.1662)	(0.1671)
Other	0.9261***	0.9071***	0.8699***
	(0.1130)	(0.1130)	(0.1142)
Real GDP (in Euro, per capita)	0.0000***	0.0000***	0.0000***
	(0.0000)	(0.0000)	(0.0000)
Open vacancies/amount of unemployed ratio	0.1744***	0.1742***	0.1726***
	(0.0067)	(0.0067)	(0.0068)
Constant	-4.9274***	-3.6988***	-3.2902***
	(0.3547)	(0.3548)	(0.3574)
Log-Likelihood	-2,590	-2,590	-2,540
Pseudo R^2	0.3369	0.3385	0.3507
Number of Observations	6,324	6,324	6,324

Source: Own Calculations.
Note: Characteristics were measured at time of entry into respective subsidy scheme. Robust standard errors are depicted in parentheses.
[a] The deviance of the quantitative ratio of the OSUS to the BA in the pooled sample from the population ratio was corrected with a weighting factor.

CHAPTER 3

Start-up Reporting Systems in Germany: An Overview

Abstract: Entrepreneurial activity is considered to be of crucial importance for the economic development of Germany, since it plays a key role in fostering innovation, job creation, and dynamism of the economy. One central indicator of entrepreneurial activity is the yearly number of new start-ups, which is, however, not an easy task to measure: There is no central reporting system in Germany providing reliable information about the complete universe of new business start-ups. In this paper, we will provide a short overview of institutional settings, concepts, and definitions related to start-up activity in Germany. Furthermore, we will review seven of the most important start-up reporting systems in Germany, highlight their methodological differences, and analyze their strength and weaknesses. We will also show how to recover information on start-up activity within the liberal professions sector, although there is no administrative reporting system to date that provides a complete count of start-ups within this sector.

3.1 Introduction

Entrepreneurial activity is considered to be of crucial importance for the economic development of a country, since it plays a key role in fostering innovation, job creation, and dynamism within the economy (OECD, 2005b).[1] Moreover, self-employment is also regarded as a key strategy in combating unemployment within the European Union (European Council, 2005). Therefore, many public promotion programs have been introduced in Germany in recent years with the overall aim to foster new business formation in the country. In 2006, for example, the German Government introduced the *New Start-up Subsidy* ("Gründungszuschuss"), which offers financial aid for unemployed individuals willing to become self-employed. The *KfW Group* ("Kreditanstalt für Wiederaufbau Bankengruppe"), a German state-owned bank, offers a wide range of financial assistance programs that are provided to business founders at time of start-up, and small firms that have been economically active for at least three years. Hence, the evaluation of regional and sectoral patterns as well as possible effects of start-ups on the labor market and the economic development of a country is of central interest for policy makers (see for example Deutscher Bundestag, 2013).

In this context, one of the most important indicators for entrepreneurial activity is considered to be the yearly development of the absolute number of new business formations. Yet, there is no central reporting system providing reliable information about the complete universe of new business formations in Germany to this date. Instead, the various start-up reporting systems available for Germany reveal substantial differences in data processing procedures, and therefore also in absolute numbers concerning the overall start-up activity. In the year 2009, for example, the *Center for European Economic Research* (ZEW, "Zentrum für Europäische Wirtschaftsforschung") reported 205,000 business formations based

[1] This view is certainly not shared by everyone conducting entrepreneurship research. For a different view on the role of entrepreneurship within the economy, see for example Shane (2008).

on information of the *Mannheim Foundation Panel* (ZEW, 2010). In contrast, Piorkowsky and Buddensiek (2011) reported 312,000 business formations for the same year based on data of the *German Micro-Census*, which is a representative sample of the German population. In turn, the *KfW Group* declared in its annual report of start-up activity in Germany, which is based on the *KfW Start-up Monitor*, that there were even 872,000 start-ups in 2009 (Kohn, Spengler, and Ullrich, 2010). These differing numbers show that the lack of a central reporting system for start-up activity constitutes one of the main bottlenecks for the empirical research on the topic in Germany. The researcher is confronted with different reporting systems that are based on different definitions of what a start-up is, and that also cover different economic sectors (Dahrenmöller, 1987). Moreover, these reporting systems also differ with respect to their data generating process: The first group consists of *administrative reporting systems* that are based on registration processes mainly required by law. In contrast, the second group comprises of *survey based reporting systems*. Unlike the administrative reporting systems, the data are either collected through random draws out of some varying target population of interest, or depict secondary statistics of population surveys.

Depending on the epistemological interest, this leads to a range of issues that should be taken into account when trying to recover and assess the available information on start up activity in Germany through the different reporting systems (Fritsch, Grotz, Brixy, Niese, and Otto, 2002; Fritsch, Kritikos, and Rusakova, 2012). The first two issues concern the *unit of interest*, and the *type of formation*, both of which represent distinctive features start-up reporting systems can be distinguished from each other. The unit of interest may be either derived from institutional settings (i.e. enterprises), or may have to be extracted from labor statistical features of a certain target population (i.e. self-employed individuals, business founders). In contrast, the type of formation basically concerns the interplay between a legal entity (i.e. a legal or natural person) that undertakes the formation, and the

type of structural existence of the new business (i.e. whether a completely new production unit is created, or an already existing business is simply taken over). The third issue concerns the question with regard to the *starting point of the business*, whose assessment may be based on pure legal definitions (i.e. the mandatory registration with institutions involved in the start-up process), can be guided by economic principles (i.e. whether a firm starts to be economically or commercially active), or may stem from pure self-assessment about the founding date from respondents within some survey. The fourth issue concerns the *extent of business activity*, i.e. the amount of working time that is devoted to the company by its founder, and becomes important when start-up activity is analyzed in the economic context of households and/or labor markets. Furthermore, additional specific issues may arise with respect to the coverage of economic sectors and the provision of further relevant information about the newly founded businesses by the respective reporting systems. Those that are based on administrative data processing procedures often over-, or under-report business formations, since they do not cover all sectors of the economy due to the institutional framework connected to the start-up process. In contrast, survey reporting systems may fail to sufficiently disaggregate the sectoral information below the Federal State level. Hence, the researcher will always be confronted with the question of how representative the data are, or how close they mimic the "true" start-up activity. In addition, the question to what extent the respective reporting system is providing further firm-level, or socio-demographic information becomes important if the research interest is more structural in nature.

The aim of this paper is to provide a review of seven important German start-up reporting systems. We will thereby describe the main features of the latter, and then provide a comparison oriented at the research issues posed above. In addition, we will also provide a short overview of institutional settings, concepts, and definitions related to start-up activity in Germany to gain a better understanding of the initial start-up process. Our

paper differs from previous work in that it also illustrates how to recover information on business formations within the liberal professions sector: Although start-ups in this sector play a significant role in Germany, there is no single administrative reporting system to date that provides a complete count of these. The remainder of the paper is organized as follows: In Section 3.2, we will first review possible definitions of the units of interest, different concepts of the extent of business activity, and will also provide information on possible types of new formations. All of these concepts are important in assessing the information provided by the reporting systems. In Section 3.3 we will than describe and compare the reporting systems. In addition, we will also cover the liberal professions sector in more detail in Section 3.4. Section 3.5 concludes.

3.2 Institutional Settings, Concepts, and Definitions related to Start-up Activity

Entrepreneurial research on start-up activity is interested in certain phenomena that either originate in the field of entrepreneurship literature, or are connected to constructs of official statistics. However, this often results in the fact that certain terms related to start-up activity are predominantly used in one field, but do not exist in the other, or are used interchangeably, although with different assessments of the same term. A basic understanding of the institutions involved in the start-up process, and different concepts and definitions related to start-up activity in Germany is crucial for the to adequate assessment of reporting systems. The aim of this section is therefore to provide necessary background information on main institutional settings, different units of interest, and formation types, as well as on different definitions with regard to the extent of business activity, and the starting point of a business.

3.2.1 Institutional Settings of Business Formation in Germany

Figure 3.1 presents a highly stylized depiction of the institutional business start-up process in Germany. All natural or legal persons[2] engaging in trade and business activities on their own account must, by law, register with a local *Trade Licensing Office* (TLO, "Gewerbeamt") responsible for the respective region of residence.[3] Exempted from this legal obligation are legal or natural persons who carry out an occupation within the primary sector[4] of the economy, or an occupation defined as a liberal profession (see section 3.4).[5] Although every natural/legal person is typically free to choose any type of trade in Germany ("Gewerbefreiheit"), different admission certificates have to be obtained before registering with the TLO in case the business activity is subject to approval ("erlaubnispflichtiges Gewerbe").

Whether or not a business is subject to approval depends on the type of occupation. For example, if the new business will be located in the skilled crafts sector and the craft itself is *subject to approval*, the natural/legal person first has to register the new business with one of the *local registers of qualified craftsmen* (RQC, "Handwerksrollen"), and has to be in possession of a master craftsman's certificate ("Meisterbrief"). Craft trades, which are *free of admission* don't have to be registered with a RQC. The same applies for craft trades, which are *craft like*.[6] If the founding person is registered with the RQC, a *crafts card* ("Handwerkskarte") is obtained that is necessary to register with the TLO.[7] The local

[2]According to German (private) law, a natural person is legally defined as an individual that is able to "carry rights and duties". In contrast, a legal person is an association of individuals with a legal form (for example an incorporated society) that carries rights and duties.

[3]The legal basis is provided by § (section) 6 of the *Conduct of Commercial and Industrial Activities* ("Gewerbeordnung").

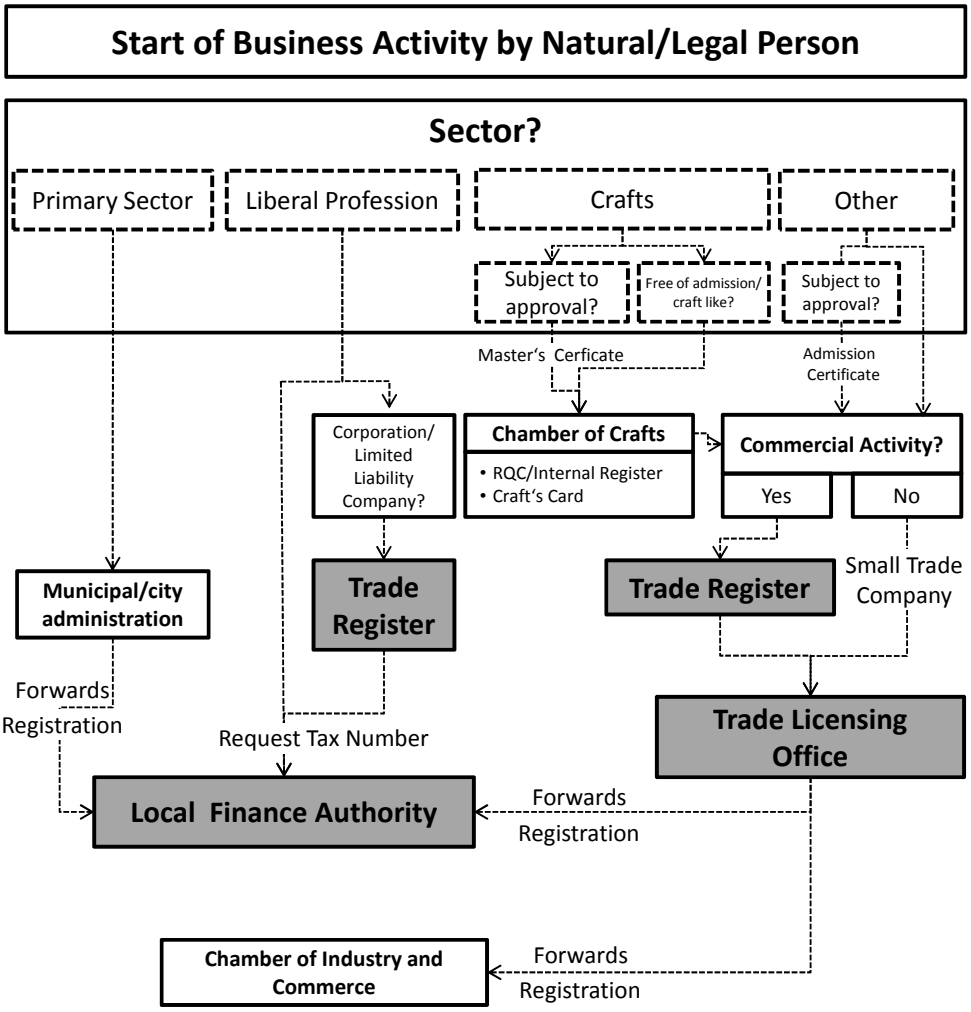
[4]Agriculture, forestry, fishing, gardening, wine-growing, and mining.

[5]However, as soon as the business activity in one of these sectors is executed in conjunction with a business activity for which registration is mandatory, the start-up has to be registered with the TLO.

[6]To which of the three categories the business belongs, is laid down in the *Conduct of Craft Trades* ("Handwerksordnung") and will not be covered in detail here.

[7]Other occupations that also first require an admission certificate in order to register with the TLO for example include gastronomy, cab trade, and personal security companies (for more information see sections 29-34 of the *Conduct of Commercial and Industrial Activities*).

Figure 3.1: Institutional Start-up Process in Germany



Notes: Own depiction, highly stylized.

RQCs are administered by local *Chambers of Crafts* (CC, "Handwerkskammer"), which are corporations under public law and constitute the respective lobby group for all businesses located in the skilled crafts sector in Germany.

If the day-to-day operation of the new start-up will require so-called commercial activities ("kaufmännischer Geschäftsbetrieb")[8], and the business does also neither operate within an occupational sector falling under the liberal profession definition[9], nor within the primary sector[10], registration with the *Trade Register* (TR, "Handelsregister") before registering with the TLO is also mandatory. The TR is an official register that provides legal information on the enlisted individuals and enterprises. It therefore functions as a control or legitimacy tool, since other firms or individuals can easily assess the information available in the TR.[11] In contrast, firms that do not fall under the legal requirement mentioned above don't have to register with the TR and can operate as small trade companies ("Kleingewerbe").[12]

Although not having to register with the TLO, natural/legal persons planning to carry out a business activity in the primary sector still have to report the start-up to the city/municipal administration of their district, which then forwards the registration to the local tax authority. In contrast, natural/legal persons planning to carry out a business activity within the liberal professions sector have to directly request a tax number with the local finance authority ("Finanzamt"). Is the natural/legal person involved in trade and business activities not falling under one of the two exempted sectors, the TLO will directly contact the local finance authority after the registration, from which the necessary

[8]See sec. 1 (2) of the German *Trade Law Book* ("Handelsgesetzbuch", HGB). There is no exact legal definition from what point of time on the operation of the respective business includes commercial activities. However, certain reference points for *non*-commercial practices inter alia include: No or just few employees, no establishments, just few business connections, and low turnovers (Industrie- und Handelskammer Bonn/Rhein-Sieg, 2004).

[9]Liberal profession businesses that choose the legal form of a corporation (AG, "Aktiengesellschaft"), or a limited liability company (GmbH, "Gesellschaft mit beschränkter Haftung") are not included in this exemption.

[10]See sec. 3 (1) of the German HGB.

[11]The mandatory information contains the name and place of the enterprise, its legal form, and the name(s) of its legal representative(s). If the company is a corporation, information on the common capital stock has also to be provided.

[12]If the turnover of a company does not exceed 17,500 Euro in its first calendar year of operation, and/or 50,000 Euro within the subsequent calendar year, it can also be exempted from the obligation to pay turnover tax (see sec. 19 of the German "Umsatzsteuergesetz" (UstG), and sec. 141 (4) of the German "Abgabeordnung" (AO).

documents to request a tax number are then sent to the founder. The local TLO also automatically contacts the regional *Chamber of Industry and Commerce* (CIC, "Industrie- und Handelskammer"). This is also a corporation under public law and basically represents the interests of industry and commerce in their respective districts. There are currently 80 local CICs in Germany, and membership in one of these chambers is compulsory, meaning that all individuals engaged in trade and business activities are obligated to be a member with the respective chamber responsible for their region.[13]

In this subsection we showed that the public institutions involved in registering a start-up activity mainly vary by type of sector, legal form, and type of commercial activity of the start-up. For example, starting a business in the liberal professions only involves the local finance authority as a public institution, unless the type of legal form is that of a corporation, or a limited liability company. For start-ups within the primary sector the local city/municipal adminstration and the local finance authority depict the public institutions involved in the start-up process. For the remaining sector types, at least two public institutions (i.e. the TLO and either the CIC, or the CC) are involved, whereas the trade register is only approached if the start-up's day to day operation will require commercial activities. It will become clear later on, that these settings are important to keep in mind when we review the administrative reporting systems.

3.2.2 Type of Formation and Unit of Interest

Two distinctive concepts are of central importance when dealing with start-up activity in Germany: The *type of formation*, and the *unit of interest*. With regard to the latter, the framework of the official statistics distinguishes between two main units that are also employed within the entrepreneurial literature, albeit not consistently used therein (Statis-

[13]The legal basis for the compulsory membership is laid down in sec. 2 of the *Act on the Preliminary Regulation of the Law Concerning Chambers of Commerce and Industry* ("Gesetz zur vorläufigen Regelung des Rechts der Industrie- und Handelskammern"), which was established in 1956.

tisches Bundesamt, 2012b; Duschek, Hansch, Piorkowsky, and Fleißig, 2003). *Enterprises* ("Unternehmen") thereby depict entities that are legally independent, sell and produce goods and services and have to do accounting due to tax law. In contrast, an *establishment* ("Betrieb") is defined as a single identifiable workplace in a particular location, such as a factory or office. Hence, an enterprise can comprise of one or more establishments. In the German entrepreneurship literature, the terms establishment and enterprise are sometimes used interchangeably, but also occasionally in the sense of a hierarchical order (Duschek et al., 2003). A third unit of interest simply comprises the individual who owns an enterprise, or establishment. Administrative reporting systems basically target enterprises and establishments as units of interest, whereas survey reporting systems focus on individual founders as units of interest.

With regard to the type of formation, the German entrepreneurship literature distinguishes between the generic terms *enterprise formation* ("Unternehmensgründung"), and *business formation* ("Existenzgründung"), which do not exist within the field of official statistics (Duschek et al., 2003). In their seminal work, Szyperski and Nathusius (1977) classified the type of formation into four different categories based on the type of legal entity (*independent* vs. *dependent*), and the structural existence (*distinct* vs. *derivative*) of the formation. Table 3.1 provides an overview of all four categories. Formations that depict the emergence of a completely new production unit are categorized as *distinct formations*. The second category with respect to the structural existence refers to formations stemming from the take-over, or reorganization of already existing production units (*derivative formations*). With regard to the type of legal entity, a formation that is undertaken by a natural person is defined as an *independent foundation*. In contrast, any formation by a legal person (for example a cooperation) is defined as *dependent formation*. As we can see from Table 3.1, the two categories with respect to type of legal entity can be combined with the categories referring to the structural existence. The entrepreneurial literature

Table 3.1: Types of Formation

Type of legal entity	**Type of Structural Existence**	
	Distinct [=New set-up of production unit]	**Derivative** [=Already existing production unit]
Independent [=Founder: natural person]	New set-up of legally independent enterprise as main office. [=*Business & enterprise formation*]	Succession, take-over, purchase of, or involvement in already existing enterprise. [=*Business formation*]
Dependent [=Founder: legal person]	New set-up of establishment. [=*Enterprise formation*]	Merger, acquisition of existing legally independent enterprise

Source: Own depiction based on Szyperski and Nathusius (1977), and Fritsch, Grotz, Brixy, Niese, and Otto (2002).

often takes up an individual perspective by focusing on natural persons that create a new means of existence by either establishing a completely new production unit, or through the take-over, succession, purchase, or involvement in an already existing enterprise. In case of the first formation possibility (*independent distinct formation*), an enterprise formation is simultaneously considered to also be a business formation. In contrast, the second formation possibility (*independent derivative formation*) is solely considered to be a business formation, since there is a no set-up of a completely new production unit. However, the entrepreneurial literature can also take on an institutional perspective that is focused around the enterprise. An enterprise formation is thereby equivalent to the set-up of a new production unit that can either be executed by a natural, or legal person, in which the latter combination is defined as a *dependent distinct formation*. The last category, which constitutes the merger, or acquisition of existing enterprises executed by legal persons (*dependent derivative formation*) is mostly neglected within the entrepreneurial literature on start-up activity.

3.2.3 Starting point

Entrepreneurial research on start-up activity is confronted with the fact that founding a business is a process that takes place over a certain period, and ends at some unspecified point in time. It starts with the decision of the founder to start a business, and formally

ends with the legal execution of its formation. In order to adequately acquire accountable facts about the starting point of the business, it is therefore necessary to rely on legal acts related to the business formation, or pure self-assessment of business founders. One starting point could be either seen in the *specific legal act* that is required for the formation of every business, or *common legal acts* that are related to some economic activity of the newly founded business on the market (Kistner and Südfeld, 1987). With respect to the former, the registration of the new business with the TLO, with the RQC, or with the TR are specific legal acts in Germany that can be seen as a first link to the starting point (see also section 3.2.1). Concerning the identification of common legal acts (i.e. the beginning of some economic activity), another link to the starting point can be seen in activities involving acts like the pre-registration of turnover taxes ("Umsatzsteuervoranmeldung") with the local finance authority[14], registration of employees of the newly founded business with the Federal Employment Agency, and the take-up of loans. Another potential starting point may relate to pure self-assessment by founders that are questioned in the context of population surveys. With regard to the accountable facts just described, we will mainly focus on reporting systems that involve specific legal acts, and self-assessment as reference points. This is because the reliance on common legal acts can lead to the fact that the related starting point may lie well beyond the actual date of start-up (see also section 3.3).

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3.2.4 Extent of Business Activity

Another concept concerns the categorization of the extent of business activity the owner of an enterprise devotes his available working time to. This concept might for example become important when start-up activity is analyzed in the individual context of households and/or

[14]By law, newly founded enterprises have to declare and transfer their turnover tax to the local finance authority on a monthly basis for the first two years of their existence. However, small trade companies are exempted from this legal obligation.

labor markets (Dangel, Fleißig, Piorkowsky, and Stamm, 2006). With regard to the extent of business activity, there is neither a set definition within the entrepreneurial literature, nor does legislation provide any explicit distinction. However, the entrepreneurial literature provides some references by mostly distinguishing between self-employment in *main activity* ("Haupterwerb", self-employment is main or sole gainful activity that is undertaken in full-time), *secondary activity* ("Nebenwerwerb", self-employment is a secondary gainful activity in addition to a first gainful activity), and *part-time* activity ("Zuerwerb", self-employment is first or sole gainful activity, but undertaken in part-time) (Duschek et al., 2013). German legislation has also implicitly defined that self-employment in main activity prevails if it exceeds possible additional gainful activities in their economic relevance and time exposure (see Deutscher Bundestag, 1988, p. 159), and/or the self-employed individual does employ more than one additional worker in his or her enterprise (GKV Spitzenverband, 2010). These circumstances have to be evaluated by statutory health insurance institutions on a case-by-case basis when the question is to be assessed whether or not an individual founder has to become a member of the statutory health insurance system[15]. Furthermore, the extent of business activity of self-employed individuals is also very important with respect to start-up subsidies. For example, one legal requirement for the receipt of the new start-up subsidy ("Gründungszuschuss") of the Federal Employment Agency is that the individual starts his or her own business as main activity.[16] It is assumed that a significant part of individuals start their business in secondary activity in Germany (Günterberg, Kohn, and Niefert, 2010). Furthermore, mostly women tend to start a business in part-time since conducting household related activities can still be considered a female domain in Germany (Dangel, Fleißig, Piorkowsky, and Stamm, 2006).

[15]According to sec. 5 (5) of the Fifth German SCB (SCB V) self-employed individuals who conduct their business operations as main activity can be exempted from the statutory health insurance.

[16]See sec. 93 (1) of the Third *Social Codebook* (SCB III).

3.3 Start-up Reporting Systems

In the ensuing section we will now analyze seven different reporting systems covering start-up activity in Germany. We will thereby distinguish between administrative and survey based reporting systems, and review them in different sections. In each case, we will start off with a description of the main features of the reporting system, and then provide a comparison, again separated by administrative and survey based reporting systems with respect to the research issues posed in the introduction. Finally, we will also provide a comparison of the absolute start-up numbers, and illustrate with an example how the sectoral coverage differs between reporting systems. The administrative reporting systems that will be covered in this paper are the *Business Register Statistics* ("Gewerbeanzeigenstatistik"), the *IfM Start-up Statistics* ("IfM Gründungs- und Liquidationsstatistik"), and the *Mannheim Foundation Panel* ("Mannheimer Unternehmenspanel"). With respect to survey based reporting systems, our paper will cover the *KfW Start-up Monitor* ("KfW Gründungsmonitor"), the *German Microcensus* ("Mikrozensus"), the *Global Entrepreneurship Monitor*, and the *KfW·ZEW Start-up panel* ("KFW·ZEW Gründungspanel"). The latter depicts a special form of reporting system, since it is based on an administrative data source, but is enriched with information of a telephone survey.

We excluded some reporting systems in our analysis due to various reasons. The *IAB Establishment Register* ("IAB Betriebsdatei", for more information on this data source see Brixy and Grotz, 2002; Fritsch and Brixy, 2002), covers only firms that employ at least one dependent employee. Since it is estimated that the majority of firms (estimates range from 60% to 63%, see Caliendo, Künn, Hogenacker, and Wießner, 2012; Hagen, Metzger, and Ullrich, 2012, for example) is started without any employees, using this reporting system would drastically discard information on enterpises in sole proprietorship in Germany. The *Turnover Tax-Statistics* ("Umsatzsteuerstatistik", see Gräb and Zwick (2002)) does

not cover firms whose turnover is less than 17,500 Euro in their first calendar year, which leads to a systematic exclusion of the start-up activity of small trade companies. The same fact applies to the *Enterprise Register* ("Unternehmensregister"), which also has the additional disadvantage of a significant time-lag with regard to available information due to data processing procedures (May-Strobl and Suprinovič, 2003; Sturm and Tümmler, 2006).

3.3.1 Business Register Statistics

The *Business Register Statistics* (BRS, "Gewerbeanzeigenstatistik") of the Federal Office of Statistics (FOS) is a reporting system based on information on all registrations and terminations in local TLOs. The regional statistical offices are thereby provided with all registration processes on a monthly basis by the TLOs, and prepare the data according to standard guidelines. Afterwards, the final data sets are sent to the FOS, which then constructs the complete data set. The sampling units of interest of the BRS are all natural or legal persons, that are required to report a take up, change, or termination of a trade and/or business activity. With respect to our analysis, only reports in combination with the take up of a business activity are considered. Since 2003, the take up of a business activity by a natural or legal person is differentiated by the BRS according to the following three main categories (see also Statistisches Bundesamt (2013a), and Figure 3.2):

1. ***Start-ups*** ("Neuerrichtungen"). This category subsumes

   - *New formations* ("Neugründungen") of *legally independent main offices* ("Hauptniederlassung")[17]. This circumstance arises if the respective pro-

[17]In this context, the terms "independence/dependence" refer to legal business operations, and not to the type of formation. For example, a business is legally independent with separate accounting and a general manager who is authorized to complete business deals and transactions independently. Note also that the terminology of the BRS deviates here from the wording of the more general definitions of the FOS with regard to the units of interest, which were covered in section 3.2.2. In a strict sense, the legally independent office might depict an enterprise, an establishment, or a workplace at the same time.

duction unit to be registered depicts the central point of all business operations. However, a natural person registering an establishment as legally independent office is required to have either registered with the Trade Register (TR), or own a crafts card, or employ at least one employee (Statistisches Bundesamt, 2013a). If none of these requirements is fulfilled, the natural person has to register a *small trade company* ("Kleingewerbe"). Since 2003, registration with the TLO is based on revised documents that make an explicit declaration possible of whether or not the business is started in *secondary activity* (Angele, 2004). However, this categorization is solely based on the self-assessment of the claimant.

- New formations of *legally independent district offices* ("Zweigniederlassung"), and *dependent district offices* ("unselbständige Zweigstelle"), where the latter are local facilities that for example serve as warehouses, but lack the decisive feature of legal independence.
- *Mergers* of multiple enterprises into one enterprise, or *split-ups* of one enterprise into multiple enterprises

2. ***Re-openings*** of enterprises, or establishments after relocation from another district.
3. Business ***take-overs***: This category contains
    - legal form changes of enterprises,
    - entries of new proprietors into the enterprises, as well as
    - successions, purchases, or tenancies of enterprises.

Based on the claimants' descriptions of the respective business activities, the BRS also provides a detailed segmentation of business sectors, which is based on the German *Classification of Economic Activities* (WZ, "Klassifikation Wirtschaftszweige"). The WZ is based

on the *NACE Rev. 1.1* framework of the European Community (Statistisches Bundesamt, 2003), and its newest version dates back to the year 2008 (WZ 2008).[18] Furthermore, the BRS also provides information about the legal form of the business, federal state, and number of employees (Leiner, 2002; Statistisches Bundesamt, 2012a). In addition, the BRS also reports age, sex, and citizenship of the claimant reporting to the TLO. The monthly data are available around 9 to 10 weeks after the initial month under report.

3.3.2 IfM Start-up Statistics

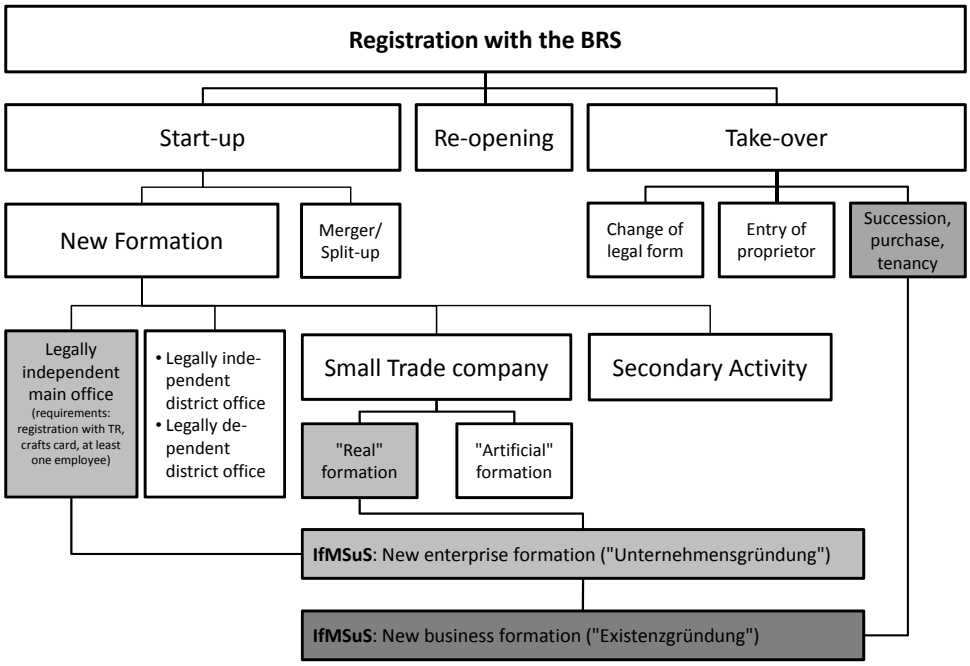
Closely connected to the BRS are the *Start-up Statistics* ("Gründungs- und Liquidationsstatistik") of the IfM ("Institut für Mittelstandsforschung") Bonn (IfMSuS).[19] The IfMSuS is based on the BRS, but has the main advantage of correcting the BRS by several entries, which are not rated as relevant for the coverage of business formations by the German entrepreneurship literature (Günterberg, 2011). In contrast to the BRS, the IfMSUS therefore basically excludes new formations of district offices. Although these production units may play a role with respect to the regional economic development, they are not considered to be relevant for the actual start-up activity by the IfM, since these types of business formations lack the decisive feature of independence with respect to the type of formation (Günterberg, 2011). This also applies for registrations based on re-openings and all take-overs except those based on succession, purchase, and tenancy of an enterprise. Furthermore, formations of businesses in secondary-activity are also excluded. As defined by the IfM, a formation of a business in secondary activity does not constitute the central point of the economic activity of the founding individual. This type of formation is there-

[18]The WZ is updated at irregular intervals. Older versions of the current WZ date back to the years 1993 (WZ 1993) and 2003 (WZ 2003) (Statistisches Bundesamt, 2002).

[19]The IfM (*Institute for Research on Small and Medium-sized Enterprises*) is a foundation of private law and was founded by the federal state of North Rhine-Westphalia (NRW) in 1957. It is financed by the *Federal Ministry of Economics and Technology*, and the local government of NRW. The IfM is equipped with an official mandate to conduct research on small and medium sized enterprises (SMEs) in Germany, with the aim to provide the public with information on the economic situation and development as well as possible problems of SMEs in the country.

fore considered to be an insignificant side issue with respect to the overall start-up activity. Lastly, the IfM divides all new business formations within the category "small trade companies" into "real" formations, and "artificial" formations. Since the latter are defined as registrations made without the actual intention to really start an economic activity on one own's account, they are excluded from the calculations.[20]

Figure 3.2: Business Formations according to the BRS and the IfMSuS



Source: Own depiction based on Günterberg (2011).

Whereas the first three exclusion restrictions can be clearly identified based on information from the BRS (see also Section 3.3.1), the IfM estimates that the share of "artificial" formations with respect to all small trade company foundations constitutes a share of

[20]For example, an artificial formation may include registrations that are usually only conducted for the purpose of gaining access to cheap-rate shopping facilities (i.e. wholesale trade), or trade fairs that are only reserved for expert audiences (Günterberg, 2011).

10% (Günterberg, 2011).[21] Moreover, the IfM explicitly distinguishes between the formation of a new enterprise ("Unternehmensgründung") and the formation of a new business ("Existenzgründung", see also Figure 3.2), which also includes new registrations due to succession, purchase, or tenancy of an enterprise.

3.3.3 The Mannheim Foundation Panel

The *Centre for European Economic Research* (ZEW, "Zentrum für europäische Wirtschaftsforschung") maintains two data sets covering start-up activity in Germany. The *Mannheim Foundation Panel* (MuP, "Mannheimer Unternehmenspanel")[22] was started in 1989 and is a joint project of the ZEW and the "Verband der Vereine Creditreform e.V." (henceforth Creditreform), which is the largest credit rating agency in Germany. Closely connected to the Mannheim Foundation Panel is the *KfW·ZEW Start-up Panel* (see section 3.3.8), which was started as a survey based reporting system in 2008, and is a joint project with the KfW Group. The validity and the quality of both data sets heavily depend on the collection process of Creditreform, whose motivation to collect and maintain a data base of firms arises from three main business segments of the association. These mainly consist of collecting information about creditworthiness of firms, the takeover of collecting orders, and the provision of firm addresses and other related data in return for payment (Almus, Engel, and Prantl, 2002). Today, Creditreform as the governing body is organized around a franchise-like concept with currently 134 legally independent subsidiaries (VC, "Vereine Creditreform"). These subsidiaries collect data on a regional basis by systematically

[21] Before the reform of the BRS in 2003, formations in secondary activity were not reported separately. Until 2003, the IfM therefore first estimated the "artificial" formations to be 15% of all other start-ups, and the share of start-ups in secondary activity to be 20% of all other start-ups adjusted by the subtraction of the "artificial" formations (Günterberg, 2011).

[22] The Mannheim Foundation Panel is not to be confused with the KfW·ZEW Start-up Panel (see also section 3.3.8). The official German name of the Mannheim Foundation Panel had been "ZEW Gründungspanel" until the beginning of 2009. After the introduction of the KfW·ZEW Start-up Panel, the formerly named "ZEW Gründungspanel" was changed to "Mannheimer Unternehmenspanel".

evaluating the Trade Register (TR)[23], insolvency applications issued out by local courts, as well as information based on daily newspapers, business reports, and published balance sheets of firms. In addition, the subsidiaries conduct own research after customer enquiries, and survey new firm information by sometimes also hiring experts for oral interviews (Engel and Fryges, 2002). The regional data is collected by the local subsidiaries based on a standardized system and is sent to a central data base on a daily basis. This data base is maintained and operated by Creditreform and constitutes the source for both data sets mentioned above. In this section, we will only focus on the MuP, and treat the KfW·ZEW Start-up Panel in a later section.

The target population of the MUP is composed out of the stock of firms enlisted in the data base of Creditreform, which provides the ZEW with a biannual update. Therefore, the sampling unit of interest of the MuP is the legally independent, economically active enterprise. That means that an enterprise is only listed in the database if it takes out loans, employs workers, and/or rents out business rooms (Fryges, Gottschalk, and Kohn, 2010). Concerning the starting point of business, Creditreform provides at most three founding dates[24] *plus* the date the enterprise has been officially registered in the TR. In the process of the data cleaning process at the ZEW, the oldest date is identified out of all four possible dates available and defined as the date of independent distinct formation.[25] The sectoral coverage of the start-up activity in the MuP is currently based on the system WZ 2008. Moreover, the MuP explicitly accounts for start-ups in innovative sectors by providing three additional subcategories covering start-ups in the Hightech-sector, the information and communications sector, and the scientific services sector (ZEW, 2014).

[23]See Section 3.2.1 for a closer description of the TR.

[24]A date is recorded at start-up (i.e. registration with the TLO, or financial authorities), or every time a legal succession took place.

[25]Because Creditreform collects detailed information (i.e. names of natural persons and legal entities, addresses, and amount of financial participation) about the shareholders of the company, independent distinct foundations can be selectively identified and distinguished from other type of foundations (i.e. independent derivative foundations) in the MuP (Almus, Engel, and Prantl, 2002).

Since the VC systematically collect data on all enterprises registered with the TR, the data base of Creditreform basically constitutes a complete count of all firms enlisted in the TR. The probability that enterpises not registered with the TR (i.e. small trade companies as well as companies in the liberal professions and primary sector) appear in the data base of Creditreform depends on whether and to what extent they demand credits, and on their business ties to other companies (Engel and Fryges, 2002). In order to calculate the actual absolute number of start-up activity for a specific year, the results in the MuP are extrapolated to account for time lags between the actual starting point of the business and its recording through Creditreform (Almus, Engel, and Prantl, 2002).

3.3.4 Comparison of Reporting Systems based on Administrative Data

We will now begin with a first comparison of the reporting systems analyzed up to this point of the paper. The analysis showed that these reporting systems differ in their respective data collection approach. As we will later show in section 3.3.10, this leads to considerable divergences with respect to the absolute numbers of new start-ups.

To begin with, Table 3.2 contrasts the reporting systems with regard to the issues posed in the introduction. Since both the BRS and the IfMSuS are based on the TLO, they are identical in that both their sampling units of interest are natural or legal persons, that are required to report a take up of a trade and/or business activity. Another identical feature of both reporting systems consists in the starting point of business, which in both cases is identified by the registration with the TLO. However, this categorization as well as the registration with the TLO in general only constitutes a declaration of intention.

Table 3.2: Overview of Reporting Systems based on Administrative Data

	Business Register Statistics	IfM Start-up Statistics	Mannheim Foundation Panel
Sampling unit of interest	Natural or legal persons, that are required to report a take up of a trade and/or business activity	Natural or legal persons, that are required to report a take up of a trade and/or business activity	Legally independent and economically active enterprises included in the data pool of Creditreform
Starting Point of Business	Registration with Trade Licensing Office	Registration with Trade Licensing Office	– Ideally registration with Trade Licensing Office, or own voluntary disclosure of enterprise when inquired by Creditreform – Possibly date of registration with the Trade Register available – Potentially not exactly identified if no registration with Trade Register
Type of business formation and sectoral coverage	– Distinct and derivative formations (independent and dependent) – Sector classification according to WZ 2008 – Under-reporting of primary, and liberal professions sector – Over-reporting due to "artificial" business formations and fictitious self-employment	– Distinct independent formations (legally dependent establishments, business formations in secondary activity, and "artificial" formations are excluded) – Sector classification according to WZ 2008 – Under-reporting of primary, and liberal professions sector	– Distinct and derivative formations (no identification of legally dependent establishments possible) – Sector classification according to WZ 2008 (since 2009), with three additional subcategories of innovative setors – Under-reporting of small businesses without registration with Trade Register, or without demand for external capital – Under-reporting of primary, and liberal professions sector
Extent of Business activity	Identification of business formations in secondary activity possible	Main activity (by assumption)	Main activity
Covariates related to business	Number of employees, Legal Form	Number of employees, Legal Form	Name and address of the enterprise, legal form, number of employees, Amount of revenue
Further socio-demographic information of founder	Age, sex, citizenship	Age, sex, citizenship	No
Data Accessibility	Aggregated data accessible through publications of the FOS, On-site access of microdata possible for universities and institutions conducting independent research	Aggregated data accessible through publications of the IfM, Microdata not accessible by external institutions	Aggregated data accessible through publications of the ZEW. Subject to charges, when required in more detailed form. On site-access of microdata possible by external institutions on a case by case basis
Ascertaining Institution	Statistisches Bundesamt Gruppe E 105 Handwerk, Insolvenzen, Gewerbeanzeigen, Überschuldung 65180 Wiesbaden www.destatis.de	Institut für Mittelstandsforschung Bonn Maximillianstrasse 20 53111 Bonn www.ifm-bonn.org	Zentrum für Europäische Wirtschaftsforschung GmbH (ZEW) L7,1 68161 Mannheim www.zew.de

The actual implementation or success of the start-up is not validated ex-post. Hence, start-ups in the BRS are likely to be over-reported due to small trade companies that are "artificial" formations, or whose founders operate in fictitious self-employment[26] (Leiner, 2002). As explained before, the IfMSuS takes this problematic feature into account by excluding certain registrations, and by substracting a 10%-share of "artificial" formations and formations based on fictitious self-employment from all newly founded small trade companies (Günterberg, 2011).[27] Hence, the BRS identifies both derivative and distinct independent/dependent formations, whereas the IfMSuS does not include dependent derivative and distinct formations. Both the BRS and the IfMSuS constitute a complete inventory count of all business formations that are obligated to register at local TLOs. Hence, both reporting systems offer a rich classification of economic sectors and allow for a precise regional disaggregation down to municipalities. However, both the BRS and IfMSUS under-report start-ups within the primary and the liberal professions sector, since these are not obligated to register with the TLO. Moreover, besides the number of employees, the legal form, age, citizenship, and sex of the founder, both data sets do not provide additional firm-level and socio-economic information. Concerning the working time, the BRS provides an indicator variable for whether or not the business is started in secondary activity since 2003 (Angele, 2004). In contrast, the IfMSuS explicitly excludes formations in secondary activity. With respect to the accessibility, the BRS provides aggregated data through periodical publications of the FOS. On-site access of microdata is granted to universities and institutions conducting independent research. The IfMSuS only provides aggregated data that are published on a periodical basis by the IfM. However, since the data adjustment process

[26] In general, fictitious self-employment ("Scheinselbständigkeit") occurs when the founder is in essence only acting on behalf of one client.

[27] There is no conclusive evidence on the accuracy of this estimate. For example, Fritsch et al. (2012) argue that the share of artificial foundations is higher than 10%.

of the IfM is precisely documented, it could be possible to process data sets of the BRS accordingly, once on-site access to the microdata of the BRS is gained.[28]

In contrast to both the BRS and the IfMSuS, the sampling units of interest in the MuP are all legally independent and economically active enterprises included in the data pool of Creditreform (see again Table 3.2). Ideally, the starting point of business can be identified through respective inquiries undertaken by the local subsidiaries of Creditreform (VC), or through the date the business registers with the TR. Due to the nature of the data collection process, Creditreform disproportionately often conducts research on big and economically active firms with many business connections. Moreover, information on firms in bad financial situations, or firms facing insolvency proceedings is also collected with a higher frequency. Therefore, the research procedure of Creditreform leads to an under-reporting of small trade companies, since they often have no or just few employees, have just a few business connections, and low turnovers. With regard to the type of business formations, the MuP does make identifications of both distinct and derivative formations possible. However, the MuP does not identify formations of dependent establishments (Fritsch, Grotz, Brixy, Niese, and Otto, 2002). Nevertheless, one main advantage of the MuP over the BRS and the IfMSuS is that it does allow for a reliable identification of genuine business formations due to the way of how the local VC conduct their research. Like the BRS and the IfMSuS, the MuP also uses a distinctive subdivision of sectors according to the WZ 2008, and in contrast to the BRS and IfMSuS, also explicitly provides three subcategories of innovative sectors. To what extent businesses in the liberal professions and primary sector are covered in the MuP in principle depends on their demand for loans, and their connections to other businesses, for example in the form of trade credits[29]. However,

[28]For more information see the website of the research data centre of the FOS: http://www.forschungsdatenzentrum.de/bestand/gewerbeanzeigen/index.asp.

[29]One kind of trade credits can for example comprise of a supplier credit. In this case, the acquiring party of some commodity is initially allowed to postpone the payment up to a certain time period in accordance with the supplier of the commodity.

it can be stated that the MuP also clearly under-reports these businesses. However, another possible advantage of the MuP over the BRS and the IfMSuS is that it basically provides the possibility of following businesses over time since the data base of Creditreform is updated on a biannual basis. However, the MuP cannot be considered a real panel, since not every information about each business is updated at the same point of time.

Concerning the extent of business activities, the data collection process of Creditreform entails that businesses in the MuP are run by at least one person as main activity. Businesses run as secondary activity, or in part-time are not included in the data base of Creditreform, since they are not considered to be economically active in the sense that they employ workers, rent out additional business rooms, or take out loans (Fryges, Gottschalk, and Kohn, 2010). With respect to additional firm-level covariates, the MuP comprises information on the name and address of the company, the legal form, the number of employees, turnover figures, and the sector to which the company belongs to according to the classification scheme WZ 2008. However, no further information with regard to socio-economic variables of the founder is provided. The ZEW publishes aggregated data of business start-ups based on the MuP on a regular basis. Researchers interested in start-up numbers in a more disaggregated form may obtain these for a certain fee at the ZEW (for more information see ZEW, 2014). In principle, the institution also grants on-site access to its microdata for external institutions on a case by case basis.

In the ensuing four subsections we will now turn to the description of the survey based reporting systems that we cover in our analysis. As described before, the survey based reporting systems differ from those based on administrative data: The units of observations are mainly individuals and the data are either collected through random draws out of some population of interest of individual business founders, or depict secondary statistics of population surveys.

3.3.5 The KfW Start-up Monitor

The *KfW Start-up Monitor* (KfWGM, "KfW Gründungsmonitor") of the *KfW Group* is a representative cross-section survey of the German population, which is conducted on an annual basis since the year 2000. The KfW is a German development bank that is owned by the government and was established in 1948 as part of the Marshall Plan. The KfW Group comprises among other subsidiaries the "KfW Mittelstandsbank", which provides a wide range of loans to business founders and other medium sized enterprises. The KfWGM takes on the individual perspective meaning that the sampling units of interest are individual founders (not enterprises), who either start-up or take over a business by themselves, or are directly involved in the start-up process. The target population about which the realized sample is supposed to provide information comprises the German workforce between 18 and 65 years. The survey is solely conducted through *Computer-Assisted Telephone Interviewing* (CATI), and the sampling design is based on a gross sample, that includes all available landline numbers in Germany[30], and out of which a random and regionally stratified initial sample is generated. In a first step, self-employed individuals are initially identified at the beginning of each interview by the question whether they founded a business in main or secondary activity in the trade or liberal professions sector within the last 36 months before time of survey. Thereby, the classification with respect to whether the business was started in main-, or secondary-activity is entirely left to the assessment of the respondent without explicit definitions on behalf of the interviewer (Hagen, Metzger, and Ullrich, 2012). All respondents who confirm this question then proceed with the rest of the interview.[31] In contrast to the 36-months concept, the KfWGM in a second step defines

[30]In recent years, this sampling technique has become more problematic since an increasing number of households does not have a landline number anymore. The share of 'mobile-only' households is estimated to be around 12% in Germany (Arbeitskreis Deutscher Markt- und Sozialforschungsinstitute e.V., 2012). The KfWGM adjusted its sampling design in 2010, and also appended mobile phone numbers to its landline number quota.

[31]Individuals who possibly have stopped being self-employed during the 36-month period are also proceeding.

business founders as individuals out of all self-employed, who indicate to have started a new business within the last 12 months. The new business can thereby constitute both a start-up (distinct independent formation), and a take-over of, or involvement in an existing enterprise (derivative independent formation). To make comparisons to individuals who are not self-employed possible, the survey also contains a subsample of these individuals that covers basic personal data. In total, the questionnaire used for the KfWGM currently subsumes around 70 questions covering inter alia information on process and type of business formation, whether or not additional workers were employed, financing of the prospective business start-up, and socio-economic as well as socio-demographic characteristics of the individual founder. Since 2008, around 50,000 survey interviews were realized in the KfWGM on an annual basis (Hagen, Metzger, and Ullrich, 2012).[32] In order to be able to make statements about individual business founders within the target population, the KfWGM uses weighting factors to adjust the distribution of the realized sample to the population of the German workforce between 18 and 65 years with respect to federal state, community size, professional education, sex, age, citizenship, and size of household.

3.3.6 The German Microcensus

The *German Microcensus* (MZ, "Mikrozensus") is the official representative 1% sample of the German Population. In contrast to the other survey based data sets described in this paper, the MZ is an official reporting system that has a legal foundation, and German residents chosen for this survey are obligated by law to provide information on most of the survey questions.[33] The survey has been conducted on an annual basis since 1957 (1991) in West (East) Germany, and covers information on labor force status, socio-economic, and socio-demographic characteristics. In 2012, around 688,900 individuals

[32]Before 2008, around 40,000 interviews were realized in each wave (Kohn and Spengler, 2009).

[33]The legal foundation for the MZ is laid down in the so-called "Mikrozensusgesetz" (MZG), which was last changed in 2004.

living in 340,000 households were surveyed (Statistisches Bundesamt, 2013b).[34] The MZ is a multi-purpose survey that was not explicitly designed to provide information about start-up activity in Germany. However, within the framework of a political program initiated by the government in 1999 to implement a gender mainstreaming concept, the Federal Office of Statistics was assigned to evaluate the labor market situation of self-employed women based on the MZ (Duschek, Hansch, Piorkowsky, and Fleißig, 2003). As a result, the MZ quickly moved into the focus of researchers analyzing the start-up activity in Germany, now covering living and working conditions of self-employed individuals in Germany over a 28 year period.[35]

The target population consists of all registered individuals living in Germany ("Wohnbevölkerung"). The survey is mainly conducted through *Computer-Assisted Personal Interviewing* (CAPI)[36], and its sampling design is based on a stratified sampling method with certain districts as stratums.[37] Moreover, the MZ is arranged as a rotating panel[38], making analyzes over time in general possible.[39]

The Labor Force Survey of the European Union is integrated in the MZ as a questionnaire module. Therefore, all individuals in the household who are 15 years and older also receive a wide range of questions related to their employment activity. Currently, the MZ identifies all those individuals to be self-employed through a question referring to the first

[34]Note that both figures might vary by each wave.

[35]See also Piorkowsky and Fleißig (2005, 2006, 2007)

[36]Interviewers conduct the questioning in-house with a laptop. In 2012 76.8% of the interviews were conducted via the CAPI method. However, respondents can also independently fill out the questionnaire at home. In rare cases (2%) the survey is also conducted through telephone interviews (Statistisches Bundesamt, 2013c).

[37]This means, that these districts all have a 1% probability of being sampled. All individuals in all registered households located in the sampled district are surveyed.

[38]The households (i.e. all individuals living in the household) of a sample district are surveyed for four consecutive years, whereas each year 25% of sample districts are exchanged by replacing individuals or households which moved away by newly relocated individuals or households.

[39]It has to be noted that merging different waves of the MZ cannot be undertaken straightforwardly due to the anonymisation method applied in the dataset. However, the Federal Office of Statistics has constructed two panel-datasets out of the cross-section files for the years 1991-1999 and 2001-2004, for which data access is in general possible.

or sole gainful activity that is currently undertaken by the respondent according to the standard definition by the *International Labor Organization* (ILO). Subject to this definition, an individual who organizationally or economically runs a commercial or agricultural enterprise, establishment, or workplace as owner, co-proprietor, or tenant is defined to be self-employed.[40] Furthermore, self-employed merchants and individuals holding a job coming under any liberal profession occupation are also defined as self-employed. The MZ takes on the individual perspective with self-employed individuals as the respective sampling unit of interest, and, with respect to the type of business formation, focuses on independent business formations (i.e. business formations by natural persons). However, the questionnaire design of the survey does currently not allow a selective differentiation between independent distinct and derivative foundations. With respect to the starting point of the business (i.e the inherent definition of a founder), two retrospective questions are currently available for its identification (Duschek, Hansch, Piorkowsky, and Fleißig, 2003): Since 1992, a retrospective question surveys the starting point (month and year) concerning the take-up of the current first or sole gainful activity indicated by the respondent.[41] However, due to high data protection standards, day and month of the starting point are not provided in the data, which are accessible by external institutions. The only variable that relates to the starting point is indicating the quarterly period within the year in which the interview was conducted.

The second retrospective question relates to the employment situation 12 months before the current time of survey. By means of this question, the starting point of business could implicitly be located in the time period between the time of survey and the respective 12 months before. Hence, business founders could be identified as self-employed individuals who indicated their self-employment in the respective wave, but were, according to the

[40]Note that this definition does not rule out the fact that executives of statutory cooperations are also subsumed under the self-employment category.

[41]Until 1996, the answer to this question was optional. From 1996 onwards, respondents are obligated by law to provide information to this question.

retrospective question, either not gainfully employed at all, or dependent employed 12 months before the time of the survey. However, one main drawback arises when using the second question to identify business founders: Since interim changes in the employment status in-between the 12 month time period are not recorded, the actual starting point cannot be isolated further (Duschek, Hansch, Piorkowsky, and Fleißig, 2003).

With respect to the extent of business activity, the MZ only allows the explicit identification of business start-ups in main activity, and start-ups in part-time.[42] This is due to the fact that the starting point of a secondary gainful activity in addition to a first gainful activity is not surveyed in the MZ (Duschek, Hansch, Piorkowsky, and Fleißig, 2003). The MZ covers a wide range of socio-demographic (for example sex, marital status, age), and socio-economic variables (for example highest education level, personal net income, household income), as well as further variables related to the household (number, and age of children, occupational status of the partner etc.). With respect to further covariates that are related to the business, the MZ surveys information about the number of employees, the federal state the business is located in, as well as the economic sector.

3.3.7 The Global Entrepreneurship Monitor (GEM) and the Regional Entrepreneurship Monitor of Germany

The *Global Entrepreneurship Monitor* (GEM) is an international research consortium that currently covers start-up activity in 69 countries, and aims at making it internationally comparable (Xavier, Kelley, Kew, Herrington, and Vorderwülbecke, 2012). The GEM conducts annual cross-section adult population surveys (APS) on a country basis, and has three main objectives: The first objective is to measure differences in the level of the country specific start-up activity. The second objective is directed towards the analysis of reasons of changing extents of start-up activity in the participating countries. The last aim consists in

[42]The differentiation between main-, and part-time activity can be undertaken since the MZ also surveys the temporal extent of the first gainful activity (full-time or part-time).

evaluating strength and weaknesses of start-up related conditions (i.e. financing, start-up promotion, entrepreneurial education) in each participating country (Xavier et al., 2012). Germany has been part of the GEM every year since 1999. The research team responsible for conducting the survey in Germany uses a landline-based survey design with an added sample of mobile-phone numbers targeting all individuals between 18 and 64 years living in Germany as the total population.[43] Furthermore, a postal, or electronic inquiry of local start-up experts on the local economic conditions for start-ups complements the APS. The realized sample of the 2012 *Regional Entrepreneurship Monitor* (REM)[44] for Germany includes 4,300 interviews, whereas 60 respondents of different regions in Germany were consulted for the expert interviews (Sternberg, Vorderwülbecke, and Brixy, 2013). The methodology of the GEM takes on the individual perspective, thereby setting up its founder definition around the very broad term "entrepreneurship". In this context, the latter is defined by the GEM as "Any attempt at new business or new venture creation, such as self-employment, a new business organization, or the expansion of an existing business, by an individual, a team of individuals, or an established business." (Xavier et al., 2012, p.20). This guideline translates into the identification of three types of explicit founder definitions:

- The first type consists of *nascent entrepreneurs* and comprises all respondents who indicate to (1) be involved in setting up a new business alone or with a business partner, (2) having undertaken any sort of action in favor of a business formation (for example, the organization of a start-up team, or the preparation of a business plan), or (3) aim at acquiring ownership, or co-partnership in a business.

[43]The survey designs might vary by country. However, the questionnaires are standardized, such that exactly the same questions are posed to the respondents in the population surveys and the expert interviews.

[44]The surveys conducted in each country by local research teams are called Regional Entrepreneurship Monitors.

- The second type of founders is subsumed under the term *young entrepreneurs* and is composed of all respondents who indicate to be owner-manager, or co-partner of an already existing enterprise, and claim to *not* have received salaries, profits, or any other type of non-pecuniary benefits for longer than 42 months.

- The third type of founders comprises all entrepreneurs who indicate to be owner-manager, or co-partner of an enterprise, and claim to have received salaries, profits, or any other type of non-pecuniary benefits for longer than three and a half years.

Out of the first two definitions, the GEM constructs the *Total-Early-stage Entrepreneurial Activity* (TEA) share, which is the central measure for start-up activity and is used to measure differences in the level of the country specific start-up activity. As can be seen from the above definitions, there is no differentiation with regard to the extent of business activity. Moreover, there is also no explicit definition with regard to the starting point of business, and the type of business formation. The questionnaire of the GEM (and the REM, respectively) of the APS inter alia covers information on the type of business, market environment, self-assessment of the respondent concerning his/her own ability to start and maintain a business, a judgment of the respondent concerning the chances of success, founding motives, and basic socio-demographic, as well as socio-economic variables. The GEM applies different weights to each country APS data set in order to harmonize the data (Xavier et al., 2012).

3.3.8 The KfW·ZEW Start-up Panel

The *KfW·ZEW Start-up Panel* (SuP) was established in the year 2008 as a firm-level panel data set with the aim of following young firms over a six year period, and hence to enable in-depth analyzes about their development (Fryges, Gottschalk, and Kohn, 2010). Although the SuP is also based on the data base of Creditreform, which also constitutes the target population, it is essentially a survey reporting system, in which the sampling unit

of interest is the economically active enterprise. Out of the data base of Creditreform, a random stratified sample of firms is drawn each year. The stratification criteria include year of foundation, economic sector, and whether or not the company received financial support from the KfW. The first criterion limits the gross sample to firms no older than three years since their start-up, in order to be able to collect crucial firm specific characteristics at, or shortly after the time of start-up. The second criterion stratifies the sample according to 10 different economic sectors[45], whereas newly-founded high-technology firms are over-sampled to account for a sufficient high number of high-technology start-ups.[46] The last criterion is grounded in the aim of the KfW to retrieve information about its debtors, in order to improve it's support programs.

In 2008, the initial sample size consisted of around 25,500 firms, which were started between 2005 and 2007 (Fryges, Gottschalk, and Kohn, 2010). Out of this initial sample, 5,500 firms were surveyed in the same year. Since then, the survey was conducted on an annual basis with realized samples of 6,000 firms each year on average (Fryges, Gottschalk, Metzger, Mohr, Murmann, and Ullrich, 2012).[47] The survey interviews are conducted via CATI, with an interviewee who is engaged in the management of the firm, and is also financially involved. The survey thereby screens out firms that are either not legally independent, or who were not started within the respective time period. Two different questionnaires are used to differentiate between firms that take part in the survey for the first time, and firms which already participated in previous waves. The SuP inter

[45]The sector classification explicitly takes into account business formations within high-tech sectors (i.e. high-tech start-ups within the manufacturing industry, the services sector, and the IT-sector), and non-high tech start-ups (i.e. non high-tech start-ups within the manufacturing industry, the services sector, the construction sector, and trades sector).

[46]The share of start-ups in the high-technology sector in Germany each year is estimated to be rather small: In 2009, it amounted to 7% within all start-ups of economically active firms (Heger, Höwer, Müller, and Licht, 2011). Therefore three yearly foundation cohorts are included in the respective gross samples of the SuP to sufficiently cover those firms in the survey.

[47]The realized sample of the current wave (2012) includes 6,400 firms. Each year, a new gross sample of new firms not older than three years is drawn, and added to the firms that already participated at least once.

alia covers information on personal characteristics of the founders, employee structure, founding motivation, types and sources of business financing, and related difficulties. Since enterprises operating in the high-technology sector are over-represented, the realized sample is not representative for the total population of economically active enterprises. Hence, a weighting factor for each enterprise in the sample is calculated, based on the start-up numbers of the MuP (Fryges et al., 2012).

3.3.9 Comparison of the Survey based Reporting Systems

We will now again compare the survey reporting systems described in the previous sections. The comparison, which is also summarized in Table 3.3, takes the explicit definition of founders as determined by the respective reporting system, and its survey design as two additional features into account. With respect to the sampling unit of interest, the KfWGM aims at individual business founders, which are thereby explicitly defined as individuals who started their business within the last 12 months at time of survey in main, or secondary activity. The founding definition includes the start-up of, take-over of, or involvement in a business in the commercial or liberal professions sector. Overall, the KfWGM therefore maintains a broad definition of business founders that includes independent derivative and distinct foundations. However, the starting point of the business is based on the own perception of the founder, and not on an explicit registration date. Hence, the identification of the exact date of the business formation is not possible in the KfWGM.

With respect to the extent of business activity, the differentiation between main-, or secondary activity is based on self-assessment of the respondent with no explicit definition of the KfWGM. Concerning the survey design, the KfWGM is an annual cross section survey aiming at the German workforce aged between 18 and 65 years as target population. It also covers a wide range of business related variables, by inter alia providing information about business financing, number of employees, as well as socio-demographic variables.

One main feature of the KFWGM is that it also collects information on self-employed individuals who had already terminated their business again at time of survey. This allows, for example, for analyzes of the determinants of business failures and success. An additional and interesting aspect of the KfWGM consists in the fact that it surveys the labor market status right before the business formation. It is therefore possible to examine business formations out of unemployment, which still contribute to a large extent to the overall start-up activity in Germany (Metzger and Ullrich, 2012).

Unlike the KfWGM, the MZ is a multi-purpose population survey that was not explicitly designed to provide information about start-up activity in Germany. Hence, the sampling unit is the individual person, and there is no explicit definition of a business founder as well as no further information with regard to the type of business formation. Nevertheless, the MZ contains necessary information needed to identify new business founders as a subgroup of the stock of self-employed. It can therefore be used in principle as a reporting system for start-up activity. The survey design of the MZ differs from the one of the KfWGM in that it is a 1% sample of all residents of the German population. In terms of the identification of the starting point of business, both the KfWGM and the MZ rely on the self-assessment of the respondents and their assignment of the start-up to a specific time period. The strengths of both the KfWGM and the MZ lie in the combination of individual-, household-, family-, and further socio-economic characteristics that allow a detailed analysis of the social context of the founder. However, only limited information is provided by the MZ concerning firm-specific covariates, which in turn are provided by the KfWGM.

The GEM is a population based survey with the explicit aim of measuring differences in the level of country specific start-up activities. The sampling unit of interest are individuals within the total population aged 18 to 64 years in Germany. The research consortium GEM uses a very broad definition of entrepreneurship that translates to three types of business

founders: nascent, young, and established entrepreneurs. Although the survey does not offer explicit definitions with respect to type of business formation, the starting point of business, and the extent of business activity, the REM has several unique characteristics that are worth mentioning here. First, the harmonized data makes it possible to directly compare start-up activities of different countries via the Total-Entrepreneurial-Activity (TEA). Second, in addition to basic socio-demographic and socio-economic characteristics, the GEM also surveys start-up motivation and entrepreneurial attitudes of founders.[48] Furthermore, detailed expert interviews complement the population survey, which allows the researcher to directly compare the general entrepreneurial attitude, and the economic environment for start-ups between countries.

In contrast to the KfWGM, the MZ, and the GEM, the SuP explicitly targets economically active enterprises as sampling units of interest. It does therefore not take on the individual perspective. Instead, its research interest lies in making inference about economically active, and independent companies. Therefore, it does also not include take-overs of already existing enterprises, since it explicitly focuses on the take-up of new economic activities. Due to this narrow and economic definition of business formation, the SuP does also not include business formations in secondary, or part-time activity, as well as small trade start-ups. Compared to all other survey based reporting systems described in this paper, the SuP is explicitly designed as a panel study, which enables the researcher to follow firms over time. Since it also collects detailed firm information (see Table 3.3) and has an emphasis on start-ups in the high-technology sector, the potential of the SuP lies in the research field of start-up characteristics of young and innovative firms.

[48]For example, the GEM identifies start-up out of opportunity (i.e. those start-ups founded because of the exploitation of a market idea) and necessity (i.e. those start-ups founded because no alternative employment option was available). Moreover, respondents are also asked to self-assess whether they think they have the knowledge and skills to start a business, and whether fear would prevent them from starting a business.

With respect to data accessibility besides downloadable publications of aggregated data, the ascertaining institutions of the reporting systems KfWGM, MZ, and SuP offer on-site access, or scientific-use-files of their micro-data sets for research institutions on a case-by-case basis. The research centre of the FOS furthermore offers a scientific use-file of the MZ for off-site access, which is a 70% subsample of the 1%-sample of the MZ (for more information see Table 3.3). The GEM offers free data access to its micro-data files.

Table 3.3: Overview of Survey Based Reporting Systems

	KfW Start-up Monitor	KfW·ZEW Start-up Panel	German Microcenus	GEM (REM)
Sampling Unit of Interest	Individuals	Economically active enterprises	Individuals, households, and apartments	Individuals
Definition of Founder	Start-up of, take-over of, or involvement in business in the commercial or liberal professions sector	Economic definition of firm formation: Active participation in business life (i.e. taking out loans, employing workers, or renting out business rooms)	No explicit definition. Identification through employment status (Self-employed with or without employees) and starting point of business (see below) possible	Differentiation between: – Nascent entrepreneurs – Young Entrepreneurs – Established Entrepreneurs
Starting Point of Business	Starting point as perceived by the founder (reference time period: 12 months before time of survey)	Starting point as defined by Creditreform (i.e. starting point of business formation is defined as date in which business starts regular economic activities)	Starting point of first and sole gainful activity as perceived by the individual (only yearly quarter of business start identifiable)	No explicit definition, only very broad time period (business has paid salaries, profits, or any other type of non-pecuniary benefits to the owners for no longer than 42 months) of start-up phase
Survey Design	– Target population: German workfore between 18 and 65 years – Annual cross section survey since 2000 – Initial sample generation: Landline and Mobile Number ("Dual-Frame") System – Interview Method: Computer Aided Telephone Interviewing (CATI) – Realized Sample: N≈50,000 (each year)	– Target population: All firms enlisted in the database of Creditreform – Conducted annually since 2008 – Initial sample generation: Stratified sampling method (with year of firm formation, economic sector, and borrowing with KfW as stratums) – Interview Method: Computer Aided Personal Interviewing (CAPI) – Arranged as panel study – Realized Sample: N≈6,406 (2012)	– Target population: 1% Sample of all residents in Germany, Subsample of workforce for individuals 15 years and older – Conducted annually since 1957 (1991) in West (East) Germany – Initial sample generation: stratified sampling method with certain districts as stratums (each with 1% sampling probability) – Interview Method: Mostly Computer Aided Personal Interviewing (CAPI) – Arranged as rotating panel – Realized Sample: N≈688,900 (2012)	– Target population: Individuals between 18 and 64 years living in Germany – Initial sample generation: Landline-based phone number system, with an added sample of mobile-phone numbers – Interview Method: Computer Aided Telephone Interviewing (CATI) – Realized Sample: N≈4,300 (2012) – Cross-section survey – Additional qualitative interviews with entrepreneurship experts
Type of Business Formation	Independent distinctive and derivative formations	Independent distinctive and derivative foundations	Not explicitly defined	Not explicitly defined
Extent of Business Activity	Main-, or secondary activity	Main activity (in addition, firm has to be economically active)	Main activity, and part-time activity (secondary activity only covered in stock data)	Not explicitly defined
Sectoral Coverage	Aggregated differentiation in manufacturing, construction, other non-service occupations, trade, transport/communication, financial services, and other services (economic and personal), further disaggregation of sectors possible	High-tech sectors (i.e. high-tech start-ups within the manufacturing industry, the services sector, and the IT-sector), and non-high tech start-ups (i.e. non high-tech start-ups within the manufacturing industry, the services sector, the construction sector, and trades sector). Categorized according to WZ 2008	Differentiation according to WZ 2003 and WZ 2008	No sectoral indicator
Covariates related to business	Business financing (differentiation between external and internal financing), number of employees at time of start-up, occupational group, novelty of product, region	Legal form, number of employees, amount of revenue, age, current financial situation, Research and Development (R&D) expenditures	Number of employees	Number of employees
Further information related to founder	Sex, age, citizenship, professional qualification, individual start-up motivation	Sex, age, professional qualification, founding experience	Sex, age, citizenship, professional qualification, household income (categorized)	Sex, age (categorized), household income (categorized), entrepreneurial attitudes (intention, fear of failure, perceived capabilities, perceived opportunities)
Data accessibility	On-site data access of external researchers only possible within the framework of cooperation projects with the KfW for more information see: www.kfw.de/KfW-Konzern/KfW-Research/Economic-Research/Forschungskooperationen [last accessed: February 16, 2016]	Data access for external researchers of public-financed research institutions (non-commercial research) via on-site access, or scientific-use-files (accessible in the third year after the survey) possible for more information see: www.gruendungspanel.de/kfwzew-gruendungspanel/scientific-use-files.html	Access for external, public-financed research institutions (non-commercial research) via scientific-use-files possible for more information see: www.forschungsdatenzentrum.de/bestand/mikrozensus/index.asp	Full data files downloadable for more information see: www.gemconsortium.org/Data
Ascertaining institution	KfW Bankengruppe Research Palmengartenstraße 5-9 60325 Frankfurt am Main www.kfw.de	Zentrum für Europäische Wirtschaftsforschung GmbH (ZEW) L7,1 68161 Mannheim www.zew.de	Forschungsdatenzentrum des Statistischen Bundesamtes Gustav-Stresemann-Ring 11 65189 Wiesbaden	Leibniz Universität Hannover Institut für Wirtschafts- und Kulturgeographie Schneiderweg 50 30167 Hannover www.wigeo.uni-hannover.de

3.3.10 Difference in Absolute Numbers and Sectoral Distribution

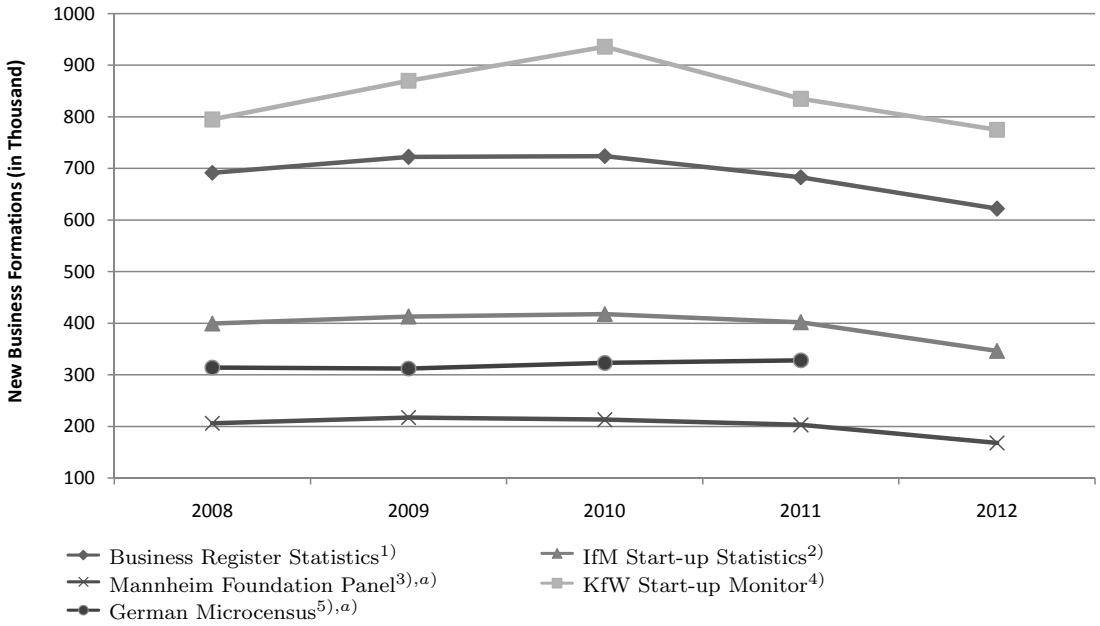
Let us now in a last step of our comparison exemplify the differences between the reporting systems with regard to the absolute numbers of new business formations for the period from 2008 to 2012, as they are reported by the respective studies using the respective reporting systems on start-up activity in Germany. With respect to the administrative reporting systems, we will thereby focus on the BRS, IfMSuS, and the MuP. The SuP does not (and doesn't have the aim to) provide information about absolute numbers of new formations in Germany, since it explicitly targets new enterprises in innovative sectors. With respect to the survey based reporting systems, we include the MZ and the KfWGM in our comparison. Studies based on these two systems provide extrapolated absolute numbers of new business formations in Germany.[49] Studies based on the GEM do not report absolute numbers, but focus on the share of young entrepreneurs within the group of all individuals between 18 and 64 years living in Germany. Based on published BRS-data, and the scientific-use-file of the MZ, we will also provide a comparison for the sectoral distribution of new business formations, based for the year 2010 in the second part of this section.[50]

Figure 3.3 displays the yearly absolute numbers of business formations between 2008 and 2012 according to studies based on the administrative reporting systems BRS, IfMSuS, and MuP, and the survey reporting systems MZ and KfWGM. The lowest level of yearly numbers of new formations is reported by the ZEW based on the MuP, according to which around 201,400 new businesses were founded on average between 2008 and 2012 (ZEW, 2009, 2010, 2011, 2012, 2013). In contrast, Piorkowsky, Buddensiek, and Herter-Eschweiler (2013) report, based on the full 1%-sample of the MZ, on average 319,250 new

[49] This also accounts for the MuP, which is based on an administrative system, but extrapolates to account for time lags between the actual starting point of the business and its recording through Creditreform (Almus, Engel, and Prantl, 2002)

[50] Due to data restrictions concerning the MZ, we use 2010 as reference year for the sectoral distribution.

Figure 3.3: New Business Formations in Germany 2008-2012–Absolute Numbers



Source: [1)]Statistisches Bundesamt (2013a), Numbers include start-ups (except re-openings) without take-overs; [2)]Statistics of the IfM Bonn, business formations; [3)]Zentrum für Europäische Wirtschaftsforschung (ZEW, 2009, 2010, 2011, 2012, 2013) ; [4)]Hagen, Metzger, and Ullrich (2012); Metzger and Ullrich (2012), numbers include new business formations in main and secondary activity; [5)]Piorkowsky, Buddensiek, and Herter-Eschweiler (2013), numbers include all formations in main, and part-time activity by individuals.
Notes: Aggregated data; [a)]Absolute Numbers for 2012 are not yet published.

business formations between 2008 and 2011.[51] Out of these, around 29% were founded in part-time every year. The difference between the absolute numbers of the MuP and the MZ might firstly be explained by the different units of interest between both reporting systems. Whereas the MuP focuses on economically active enterprises, and is therefore likely to under-report small trade companies, the units of interest of the MZ are individual founders. Moreover, businesses run as secondary activity, or in part-time are not included in the MuP, which does also underreport business formations within the primary and liberal professions sector. In contrast, the MZ provides information about the whole universe of the working force, and does therefore also include individual founders within these two sectors, small trade companies, and new business formations in part-time. However, formations in

[51] As of now, no numbers are published yet for the year 2012.

secondary activity are also not covered in the MZ, since only the year of the new business formation with regard to the first gainful activity is surveyed.

If one develops the coverage argument further, one should also expect lower absolute numbers of new business formations for studies based on the BRS and the IfMSuS, since both reporting systems also under-report formations in the liberal professions and primary sector. However, as we will show now this is not the case. The FOS reports, based on data of the BRS, that 688,520 new business formations (start-ups) have been undertaken on average between 2008 and 2012 (Statistisches Bundesamt, 2013a). As we can observe, these numbers are higher than those displayed by the IfMSuS, which reports around 395,500 new business formations on average between the same time period. As explained before, the IfM deducts various entry positions within the BRS, and also accounts for "artificial" formations. To illustrate this further, Table 3.4 exemplifies the categorization of all new registrations with the TLO for the year 2012 by the BRS and the IfMSuS. Out of the total

Table 3.4: Categories of New Business Formations 2012 – BRS vs. IfMSuS

	BRS	IfMSuS
Total Registrations	757,371	
Start-ups		
New Formations	**618,780**	
Legally independent district office	9,012	
Legally dependent district office	33,203	
Legally independent main office	576,565	
Main activity		**92,017**
Secondary Activity		241,197
Small Trade Company		243,351
"Artificial Formations"		24,335
"Real Formations"		**219,016**
Merger/Split-up	**3,103**	
Re-openings	81,178	
Take-overs	54,310	
Change of legal form	12,052	
Entry of proprietor	6,879	
Succession, purchase, tenancy	35,379	**35,379**
Total Business Formations	621,883	346,412

Source: IfM Start-up Statistics.

757,371 new registrations with the TLO in 2012, 618,780 (82%) are depicted by the BRS

as new formations with the vast part being legally independent main offices (576,565). The IfM disaggregates the last category further into formations in main activity (92,017), secondary activity (241,197), and small trade companies (243,351), from which a 10%-share (24,335) of "artificial" formations is then substracted. This finally results in 219,016 "real" formations of small trade companies for the year 2012. Both the number of formations in main activity, and the number of "real" small trade company formations are then added in a last step to all take-overs that resulted from the succession, purchase, or tenancy of an enterprise by a founder (35,379). In total, this results in 346,412 new business formations for the year 2012 as reported by the IfM. In contrast to the IfMSuS, mergers and split-ups of enterprises are also added to the yearly number of start-ups. Hence, this results in a difference of around 275,470 between the numbers of the BRS, and the numbers of the IfMSuS. Going back to Figure 3.3, we finally observe that the highest level of absolute numbers is reported by Hagen, Metzger, and Ullrich (2012) based on the KfWGM, which depicts an average of 842,200 new business formations between the period of 2008 and 2012.[52]

The question with regard to why the studies and therefore the reporting systems shown here all report significantly different absolute numbers of new business formations cannot be finally resolved. However, at least a few indications for these differences shall be mentioned here. The KfWGM obviously employs one of the broadest definitions of the term "new business formation" and also explicitly includes the primary and the liberal professions sector (see section 3.3.5). This might to a large part account for the difference between

[52]Based on information provided by the GEM, one can also try to infer absolute numbers of new business formations in Germany. The share of young entrepreneurs within the group of all individuals between 18 and 64 years living in Germany amounted, according to the 2011 data based on the GEM, to 2.4% (this share was not published in the 2011 report, but can be retrieved from the website of the GEM: www.gemconsortium.org/key-indicators). However, if one translates this share in absolute numbers by looking at the latest population census of 2011, which provides a total number of roughly 50 million individuals between 18 and 64 years of age living in Germany in the year 2011 (Statistisches Bundesamt, 2013c, Table 5.3), this would amount to a total of around 1,2 million business formations according to the definition of the GEM. Hence, the information provided by the REM Germany does not seem to provide a reliable foundation to retrieve absolute numbers of new business formations in Germany.

absolute numbers from the KfWGM, and those from the BRS and the IfMSuS. However, the absolute numbers based on the MZ also include the primary and liberal professions sector, but are lower than those from the BRS and the IfMSuS. One reason for this might be grounded in the fact that within the MZ the current labor market status is used to determine the point of business formation. Hence, individuals that start a new business, but stopped being self-employed shortly after are not counted as new founders. Furthermore, the MZ also neglects new business formations in secondary activity. This, in turn raises the question of whether there is still a significant over-reporting problem inherent in the BRS and the IfMSuS with regard to reported formations that are based on "artificial" formations (Fritsch et al., 2012).

In a last step, let us know take a look at the sectoral distribution of new business formations in the year 2010 as reported by the FOS based on numbers by the BRS. The latter allows a disaggregation into 18 sector categories based on the WZ 2008 classification. We oppose this sectoral distribution of the BRS to the one of the MZ, which also allows a sectoral classification according to WZ 2008. We calculated the sectoral distribution based on the scientific-use-file of the year 2010. As we can see from Table 3.5, "Wholesale, and Retail" (22%), "Other economic services" (13%), and "Construction" (12%) are the main sectors in which new business formations took part in the year 2010 according to the BRS. However, a different pattern seems to evolve when looking at the corresponding sectoral distribution calculated based on the MZ. Top among the sectors of new business formations in the MZ are "Liberal professions, research, and technical services" with a share of roughly 20%, followed by "Wholesale, and Retail" (15%), and "Public Administration" (13%). Hence, the sectoral distribution shown in Table 3.5 provides empirical evidence that the BRS consistently under-estimates liberal professions, which in turn, however, significantly contribute to new business formations according to the MZ. New business formations in the primary sector, which are not subject to registration with the TLO unless any business

Table 3.5: Business Sectors of New Business Formations 2010 – BRS vs. MZ

	BRS	MZ[a)]
Business Sectors[b)]		
Agriculture and Fishing	0.7	1.4
Mining	0.0	0.0
Manufacturing	3.3	4.7
Electricity, Gas, Thermal supply	6.4	0.9
Water Supply, Recycling	0.2	0.3
Construction	12.0	7.5
Wholesale, and Retail	22.0	15.4
Transport, Storage	3.1	3.5
Hotels, Restaurants	5.6	6.7
Information and Communication	3.9	5.6
Financial Intermediation	3.5	4.0
Real Estate	1.9	1.1
Liberal professions, research, and technical services	9.8	19.7
Other economic services	12.9	6.9
Public Administration	9.6	7.8
Education	1.5	5.7
Health and Social Work	1.3	4.0
Arts, Entertainment, and Vacation	2.1	4.8
Number of Observations	723,871	1,172

Source: Federal Office of Statistics and own calculations.
Notes: Shares are in percent.
[a)] Note that numbers of the MZ were calculated using the 2010 scientific use-file of the MZ and therefore on a 70% subsample of the complete MZ dataset.
[b)] Classification according to WZ 2008 (Statistisches Bundesamt, 2008).

activity therein contains some sort of trade/business activity, only account for roughly 1% of all new formations in the BRS. Indeed, new business formations in the primary sector do also seem to play a negligible role according to the MZ (1.4%).

3.4 Liberal Professions

In this section, we will provide an additional overview of the liberal professions sector. Unlike the primary sector, the liberal professions ("Freie Berufe")[53] apparently constitute a significant share of all new business formations in the German economy. This suggestive evidence is backed up by calculations by the *Institute for Liberal Professions* ("Institut für

[53] The German expression "Freiberufler" (i.e. an individual carrying out an occupation falling under the definition of a liberal profession) is often falsely translated to English with the term *freelancer*. However, this term only relates to a self-employed person that is hired to work for a company on a particular assignment. A freelancer, however, is not necessarily a person that carries out a liberal profession.

Freie Berufe", IFB) in Nuremberg, according to which 27% of all self-employed individuals were working within an occupation defined as liberal profession in the year 2011. The increase of self-employed individuals in the liberal professions sector between 2001 and 2011 was many times greater than the the overall increase of self-employed individuals in Germany during the same period. Whereas the amount of self-employed in the liberal professions sector grew by 62% between 2001 and 2011, the overall amount of self-employed individuals only grew by 19%. Moreover, liberal professions are estimated to contribute around 10% to the German Gross Domestic Product (GDP) in 2009, and to employ around three million dependent workers (Brehm, Eggert, and Oberlander, 2012).

One of the main approaches to the status-quo definition of a liberal profession is based on German jurisdiction with respect to income tax law. Although section 18 of the German *Income Tax Act* ("Einkommensteuergesetz", EStG) doesn't provide an explicit definition, it lists three different occupational groups that can be assigned to the liberal professions sector. The first group consists of a number of occupations that are explicitly listed within sec. 18 of the EStG ("Katalogberufe") and depicted in Table 3.6: Among these occupations are (1) medical professions, (2) consulting professions in the area of law, tax, and economics, (3) scientific and technical professions, and (4) informational and cultural professions. Second, the jurisdiction during previous years has led to a number of additional occupations that are considered as similar to the occupations explicitly listed ("ähnliche Berufe"). And lastly, there are a number of occupations, for which the fiscal assignment to the liberal professions sector might go beyond the pure requirement of the similarity concept just described. This assignment can thereby be undertaken on a case-by-case basis, and accounts for the development of new job descriptions and new fields of work during the past years (Institut für Freie Berufe, 2006). This third occupational group basically includes research, artistic, authorial, educating, and parenting activities ("Tätigkeitsberufe"). Furthermore, an explicit definition of a liberal profession is, since 1998, laid down in sec. 1

Table 3.6: Explicit Definitions of Liberal Professions in the EStG and the PartGG

Medical professions	Doctors, dentists, veterinarians, natural health professionals, Physiotherapists, delivery nurses^{+}, massage therapists^{+}, qualified psychologists^{+}
Consulting professions in the area of law, tax, and economics	Lawyers (members of bar associations^{+}, respectively), patent agents, notaries, auditors, tax accountants, consulting economists, accountant officers
Scientific and technical professions	Land surveyors, engineers, trade chemists, architects, pilots^{+}, authorized experts^{+}
Informational and cultural professions	(Foto-)journalists, interpreters, translators (and similar professions^{+}), scientists^{+}, artists^{+}, authors^{+}, teachers^{+}, child care workers^{+}

Source: Sec. 18 (1) EStG, $^{+}$Sec. 1 (2) PartGG.

(1) of the German *Partner Company Law* ("Partnergesellschaftsgesetz", PartGG), which governs the corporate forms that can be undertaken by members of the liberal professions sector. According to this definition, liberal professions are occupations that require "special vocational education or creativity", and "involve the personal, autonomous, as well as professionally independent provision of upper-level services on behalf of the customers and the community". The PartGG also expands the group of liberal professions explicitly listed in the EStG by a number of further occupations (see again Table 3.6).

Although there are aggregated statistics available with respect to the stock of self-employed individuals in the liberal professions sector (see, for example, Brehm et al., 2012) there has – to the best of our knowledge – so far been only one attempt to map the start-up activity therein. In 2010, the IfM conducted a pilot study in corporation with the IFB to survey information on new mandatory registrations from newly founded businesses at fiscal authorities in the federal state of North-Rhine Westfalia (Kranzusch and Suprinovič, 2011). The study was then expanded to almost all federal states[54] and made an assessment of the start-up activity within the liberal professions sector possible for a three year period (2008 to 2010) (Kranzusch, Suprinovič, and Haunschild, 2011). According to

[54]The only federal state not included in the analysis was Saxony.

their results, around 128,800 individuals on average founded a business each year within the liberal professions sector during this period. This constitutes a share of roughly 20% compared to the overall start-up activity.[55] One further important discovery of the study is that the start-up activity within the liberal professions sector also significantly varies by region. The share of individuals who started their business within the liberal professions sector is, compared to the overall start-up activity, highest in the federal city states Berlin and Hamburg (30 to 40%). In comparison, the respective share lies between 25 and less than 30% in North-Rhine Westfalia, which is the the most heavily populated federal state in Germany. At the lower end of the distribution (less than 15%) stand Lower Saxony, Baden-Wuerttemberg, and Rhineland-Palatinate (Kranzusch, Suprinovič, and Haunschild, 2011).

The attempt of both the IfM and the IFB can be considered a promising start to develop a method that will make it possible to create reliable information about the start-up activity within the liberal professions sector in Germany. Hence, it will be of crucial importance whether the data collection process can be institutionalized in the future, in order to maintain a data source providing information about start-up activity for the liberal professions sector.

3.5 Conclusion

The present paper first provided a short overview of institutional settings, concepts, and definitions related to start-up activity in Germany, and then reviewed seven important start-up reporting systems. We first established that these can be differentiated into two types. The first one consists of *administrative reporting systems*, which comprise enterprises as sampling units of interest, and are based on registration processes that are mainly

[55] These results are therefore in accordance with our share obtained from the scientific-use-file of the MZ for the year 2010. However, the absolute numbers clearly deviate from those of the MZ.

required by law. In contrast, the second type comprises of *survey based reporting systems*, that mainly take on the individual perspective with individual founders as sampling units of interest. Compared to administrative reporting systems, survey based reporting systems basically have the advantage that their conceptual framework is mainly driven by research interests. This basically results in a broader range of information on socio-demographic and socio-economic characteristics of the individual founders, and may also include more detailed information on firm-related characteristics (i.e. number of employees, financing, product novelty, start-up reasons).

Yet, survey based reporting systems have to rely on self-assessment with respect to the starting point of the business. With regard to the latter, administrative reporting systems offer a more strict definition of the starting point since their information is based on mandatory registration procedures connected to the start-up process. Concerning the extent of business activity, the paper also showed that a solid and universal differentiation of working time into certain categories has not become prevalent in reporting systems, so far. Due to related institutional settings, the administrative reporting systems furthermore face under-reporting issues, since they either do not cover all occupational sectors of the economy (BRS/IfMSuS), or only focus on certain types of business formations (MuP). When comparing the reporting systems with respect to yearly absolute numbers, one observes that there are substantial differences in the yearly levels of new business formations. However, it appears that no "real" number of new business formations can be extracted from any of the reporting systems. It rather boils down to the fact that choosing a reporting system depends on the respective research interest and related concept of the analysis, i.e. whether the units of interest refer to enterprises, or individuals, for example.

We also laid a special emphasis on the liberal professions sector, and on how information on business formations within the latter could be recovered: Although there is still no administrative reporting system in Germany providing a complete count of start-ups

in the liberal professions sector, we showed that the attempt of both the "Institut für Mittelstandsforschung" (IfM), and the "Institut für freie Berufe" (IFB) can be considered a promising start to develop a method that will make it possible to create reliable information about absolute numbers with respect to the start-up activity within the liberal professions sector in Germany.

CHAPTER 4

Subsidized Start-Ups out of Unemployment: A Comparison to Regular Business Start-Ups

Abstract: Offering unemployed individuals a subsidy to become self-employed is a widespread active labor market policy strategy. Previous studies have illustrated its high effectiveness to help participants escaping unemployment and improving their labor market prospects compared to other unemployed individuals. However, the examination of start-up subsidies from a business perspective has only received little attention to date. Using a new dataset based on a survey allows us to compare subsidized start-ups out of unemployment with regular business founders, with respect to not only personal characteristics but also business outcomes. The results indicate that previously unemployed entrepreneurs face disadvantages in variables correlated with entrepreneurial ability and access to capital. 19 months after start-up, the subsidized businesses experience higher survival, but lag behind regular business founders in terms of income, business growth and innovation. Moreover, we show that expected deadweight losses related to start-up subsidies occur on a (much) lower scale than usually assumed.[1]

[1]This paper is joined work with Marco Caliendo, Steffen Künn, and Frank Wießner. We thank participants at the 2013 IECER in Brescia, the 2013 ESPE conference in Aarhus, the 2013 IZA Summer School and seminars at University of Potsdam and University of Jena for helpful discussions and comments. Financial support of the Institute for Employment Research (IAB) in Nuremberg under the research grant No. 1143 is gratefully acknowledged. We further thank the Chambers of Industry and Commerce, and Chambers of Crafts for their active support in constructing the data. DOI: http://dx.doi.org/10.1007/s11187-015-9646-0

4.1 Introduction

Within the framework of active labor market policy (ALMP) in Germany, unemployed individuals are offered a monetary subsidy when starting their own business to exit unemployment. Start-up subsidies for unemployed individuals have a long tradition in Germany, constituting a significant part of German ALMP in the last decade. For instance, the Federal Employment Agency reports that 134,000 individuals were subsidized in 2011. Therefore, the number of entries is quite comparable to other large ALMP programs, such as wage subsidies (187,000 entries in the same year) or vocational training. Given the size of the program, it is highly relevant for policy makers to ascertain whether this is a successful strategy. As start-up subsidy programs are special ALMP programs due to the integration of participants in self-employment, policy makers are interested in their effectiveness from two perspectives: 1) from an ALMP perspective, it is interesting to know whether the program improves participants' labor market prospects; and 2) from a business/economic growth perspective, we want to know whether the subsidy leads to successful businesses, additional jobs and potentially innovation. An examination of both perspectives requires two different control groups. Based on comparisons of program participants with other unemployed individuals, previous studies have shown that start-up subsidies are effective from an ALMP perspective, improving participants' labor market outcomes (see Caliendo and Künn, 2011). An assessment of the second perspective requires a control group consisting of "regular", i.e. non-subsidized business start-ups.

Such an assessment is absolutely needed given that the existence of the subsidy might induce negative aspects that might offset/outweigh the positive evaluation from an ALMP perspective. First, it might involve deadweight losses, i.e. a situation where the same outcome would have been achieved even without the subsidy. Second, the existence of the subsidy bears the risk of adverse selection where individuals with less entrepreneurial ability

enter self-employment because the required returns from self-employment (at which an individual is willing to become self-employed) are lower than without the subsidy. Finally, the subsidy could induce a moral hazard problem, leading to reduced effort and thus further reducing business growth.

Data limitations make empirical studies analyzing the effectiveness of subsidy programs for the unemployed from a business perspective scarce. For Germany, existing studies deliver no clear answer on whether subsidized businesses are comparable to regular businesses in terms of business performance (Hinz and Jungbauer-Gans, 1999; Pfeiffer and Reize, 2000). Furthermore, Niefert (2010) finds no shortages in terms of educational attainment but credit constraints for start-ups out of unemployment. However, the validity of the results is restricted due to data limitations, i.e., regional representativeness, the limited scope of available characteristics and cross-sectional information preventing an in-depth analysis of business development. From an international perspective, Andersson and Wadensjö (2007) compare business outcomes of self-employed individuals conditional on their prior employment status in Sweden. They find that start-ups out of employment perform best in terms of income and employment growth. Among those start-ups out of unemployment, the ones who received a start-up subsidy perform better than those without the subsidy. Désiage, Duhautois, and Redor (2012) compare previously unemployed or inactive business founders who did or did not receive a start-up subsidy in France. While subsidized start-ups have higher survival rates, they do not find evidence for higher economic performance with respect to number of employees and financial development among the subsidized firms. Hombert, Schoar, Sraer, and Thesmar (2013) find similar results when analyzing a reform in France that removed existing financial disincentives associated with starting a business out of unemployment. They find that businesses started out of unemployment after the reform were on average smaller but have similar growth paths than start-ups before the reform.

The main contribution of this paper is to introduce a new explorative dataset that allows an in-depth comparison between subsidized start-ups out of unemployment and regular business start-ups in Germany. For the group of subsidized start-ups out of unemployment, we use a random sample of entries into the *start-up subsidy* ("Gründungszuschuss", SUS) from the first quarter of 2009. The start-up subsidy provides unemployed individuals with financial assistance during the founding period (up to a maximum of 15 months). As regular business founders, we consider non-subsidized[2] business start-ups from the first quarter of 2009. Since almost no unemployed person started a business without the subsidy during this time period, this group contains start-ups out of non-unemployment. Most importantly for our analysis, the same set of information was collected for both groups by means of extensive computer-assisted telephone interviews. Therefore, in contrast to previous studies, we are able to rely on a rich set of individual and business related information, as well as observing business development over time. The observation period ends 19 months after start-up allowing us a short-term analysis only.

Based on the new data, we examine three particular questions: First, we want to know the magnitude of deadweight effects. Second, unemployed individuals are expected to face disadvantages compared to regular start-ups in terms of more severe capital constraints, shortages in start-up specific human capital and networks, imperfect information and higher shares of necessity start-ups (mainly motivated by the pressure to cease unemployment). The new data allows us to examine whether such initial differences exist. Finally, we ask how businesses founded by subsidized unemployed individuals perform compared to regular business start-ups. To provide a brief preview of our results: 1) Deadweight effects seem to exist, albeit at a much lower scale than usually assumed; 2) nascent unemployed entrepreneurs indeed face disadvantages in variables correlated with

[2]We use the term "non-subsidized" in the sense that individuals did not receive the start-up subsidy under scrutiny. However, this does not exclude receipt of other support, such as subsidized loans, counseling, etc.

entrepreneurial ability and access to capital; and 3) in terms of business performance, subsidized start-ups show higher survival rates 19 months after start-up, but lag behind regular business founders in terms of income, business growth and innovation.

The remainder of this paper is organized as follows: Section 4.2 provides some economic considerations with respect to the subsidy's justification and impact on the selection into self-employment and business performance. Sections 4.3 provides relevant institutional settings in Germany. Section 4.4 describes the construction of our dataset and Section 4.5 contains the empirical analysis. Finally, Section 4.6 concludes.

4.2 Economic Considerations

Disadvantages faced by unemployed nascent entrepreneurs: The existence of start-up subsidies for the unemployed relies on the assumption that nascent entrepreneurs among the unemployed face disadvantages compared to regular business founders. Such disadvantages might relate to different aspects. First of all, the unemployed are likely to face severe credit constraints.[3] They tend to have lower financial means (personally and within family) compared to the non-unemployed population, which thus reduces the amount of personal equity available for business start-up. Moreover, capital markets are particularly likely to discriminate against unemployed individuals, which restricts access to loans (see Meager, 1996; Perry, 2006). For instance, unemployed individuals are more likely to have bad debt records, less wealth and less human capital, thus reducing their probability of receiving credit.[4] Second, unemployed individuals might face disadvantages due to a depreciation of their start-up specific human and social capital during unemployment (Pfeiffer and Reize, 2000). This particularly includes the lack of experience of previous

[3]General evidence on how credit constraints restrict the start-up rate can be found in Evans and Jovanovic (1989), Holtz-Eakin, Joulfaian, and Rosen (1994) and Schäfer, Talavera, and Weir (2010).

[4]Banks tend to screen individuals with respect to their human capital in the sense that it is negatively correlated with credit default risk, which renders individuals with higher human capital more capable and thus better access to credit.

business foundation and industry-specific experience owing to less (self-)employment experience in the past. Beside the direct effect on the ability to start a business, it might further induce negative stigma effects in the sense that their businesses are discriminated by customers. Moreover, the lack of employment experience also induces disadvantages in terms of business and social networks, i.e. contact to potential customers, business partners or knowledge spillovers from colleagues (Niefert, 2010). Third, due to imperfect information unemployed individuals primarily focus on dependent employment and tend to ignore self-employment (Storey, 2003, refers to it as "lack-of-awareness"). The experience of labor market failure due to job loss reduces individuals self-confidence, making them less likely to consider self-employment as an alternative to dependent employment (Bönte and Jarosch, 2011, show that personality influences the decision to become self-employed). Finally, start-ups out of unemployment are more likely necessity start-ups, namely unemployed individuals decide to become self-employed owing to missing employment alternatives. This is usually undertaken at short notice, with less time invested in preparing the start-up, e.g. elaborating the business idea or marketing and financial strategy (Niefert, 2010). In this context, Shane (2003) argues that unemployed individuals have less access to information concerning business opportunities and lower opportunity costs, and consequently they also realize less valuable business ideas, introduce less innovation and hence earn smaller profits.

The role of the subsidy: The start-up subsidy aims at removing such barriers for the unemployed by providing financial assistance towards covering the cost of living and social security during the founding period. As explained above, owing to capital constraints, shortages in human capital, missing networks or time restrictions to explore business opportunities, nascent unemployed entrepreneurs are expected to have fewer resources available—than regular business founders—to prepare the business start-up. The subsidy

is expected to compensate for these disadvantages. Moreover, in a recent study Bianchi and Bobba (2013) show that insurance (instead of credit) constraints are mostly binding for nascent entrepreneurs, i.e., the (financial) risk of failure hinders nascent entrepreneurs. In this sense, the subsidy can be considered as an insurance against the risk of low or no income during the start-up period stimulating nascent entrepreneurs among the unemployed to start a business. This might be particularly important for the unemployed due to low wealth. However, the existence of the subsidy might also induce some negative effects which are discussed below.

Deadweight effects: In the context of policy evaluation, deadweight effects occur if the outcome under the treated situation would be exactly the same as without the treatment. Transferring this concept to start-up subsidies, it would require two criteria being fulfilled in order to identify deadweight effects: First, the subsidized individuals would have also become self-employed in the absence of the subsidy; and second, business success is uncorrelated with the subsidy (Caliendo and Kritikos, 2010). The identification of the second dimension is not straightforward and hence empirical evidence on the occurrence of deadweight effects is very limited, mainly due to data restrictions.

Adverse selection: Offering a subsidy bears the risk of opening the way to entrepreneurship for low ability individuals. In general, two different views exist in the literature on how individuals select into entrepreneurship when reducing existing barriers (see Hombert, Schoar, Sraer, and Thesmar, 2013): The experimentation view states that individuals do not have information about their entrepreneurial ability ex ante but learn their type by starting a business (Jovanovic, 1982). Therefore, barriers to entrepreneurship prevent the most constrained individuals from entrepreneurship who have similar or even better abilities as unconstrained individuals. On the contrary, the self-selection view states that individuals have full knowledge about their ability and self-select into entrepreneurship

if expected returns exceed costs. Reducing the costs (e.g. due to a subsidy) allows less qualified individuals to enter (see also de Meza, 2002). While Hombert, Schoar, Sraer, and Thesmar (2013) find supportive evidence for the experimentation view, Nanda (2008) and Hvide and Møen (2007) show that reducing liquidity constraints drives adverse selection which supports the self-selection view.

Moral hazard: The subsidy payment might induce moral hazard (which might occur in addition to adverse selection as discussed before) inhibiting the survival-of-the-fittest mechanism.[5] The economic concept of moral hazard predicts that individuals adjust their behavior if they do not have to take the full risk of their actions. Adopting this concept to the case of start-up subsidies, individuals might reduce their effort during subsidy receipt as they—in contrast to non-subsidized businesses—do not have to take the cost, i.e. the risk of no or low income.[6] However, as the subsidy is only paid temporarily, moral hazard is only present in the short-term, if at all. In the long run, the subsidy expires and subsidized individuals would also experience an income loss or even business failure if they reduce their effort.

Resulting research questions: Based upon the above considerations, we derived three main aspects to consider in the empirical analysis. First, we will investigate the occurrence of deadweight effects. Second, we are interested in a comparison of subsidized and regular business founders at the time of start-up, exploring the question whether disadvantages faced by unemployed nascent entrepreneurs and the risk of adverse selection due to the subsidy translate into observable initial differences between subsidized and regular start-

[5]The survival-of-the-fittest mechanism states that due to competition and market selection, relatively high performing start-ups survive while low performing firms drop out the market (see Fritsch, 2008).

[6]This relies on the existence of asymmetric information, i.e. individuals who apply for the subsidy have more information than the institution that pays the subsidy. Once the subsidy is approved, the institution has no influence on the effort of the applicant. See Paulson, Townsend, and Karaivanov (2006) as an example for how moral hazard induces financial constraints on start-ups.

ups. Third, we will consider the development of subsidized and regular businesses over time. In this regard, the economic considerations do not provide a clear indication. On the one hand, given that the experimentation view applies and the subsidy removed a financial barrier for constrained but similarly or more able individuals, we would expect similar or even better performance among the subsidized start-ups. Furthermore, the subsidy payment is expected to extend survival in self-employment, given that it increases profits and consequently the induced utility of remaining self-employed. In addition, the subsidy provides individuals with financial flexibility and releases resources to catch up with regular business founders. On the other hand, if the self-selection view dominates and adverse selection occurs, we would expect the opposite, given that individuals with lower entrepreneurial ability are expected to run smaller and probably low-profit businesses (de Wit, 1993; Pfeiffer and Reize, 2000). In addition to the entrepreneurship-specific literature, the occurrence of moral hazard might further slow down business development in the short run.

4.3 Start-up Subsidies for Unemployed Individuals in Germany

The provision of start-up subsidies for unemployed individuals has been subject to several reforms during recent decades. Until August 2006, unemployed individuals wanting to start a business (including business takeovers or business inheritance) could choose between two different programs, which essentially differed in terms of subsidy's length and amount (see Caliendo and Künn, 2011, for a description). However, in August 2006, both programs were replaced by one single start-up subsidy program ("Gründungszuschuss", SUS), which is under scrutiny in this study. In order to be eligible for the subsidy, unemployed individuals

had to have a minimum entitlement to *unemployment benefit I*[7] of at least 90 days at the time of program start. Moreover, individuals applying for the SUS had to provide a business and financing plan to the Employment Agency, which had to be evaluated by a competent external institution. If all requirements were fulfilled, SUS was paid for a maximum duration of 15 months, with the subsidy comprising of two parts: During the first nine months after business start-up, an amount equivalent to the individual's last unemployment benefit and a lump sum of 300 Euro to cover social security costs was paid monthly.[8] After nine months, individuals could apply for an optional second period by sufficiently proving that their business is economically active. While the first period of SUS could be legally claimed by all individuals who fulfilled all legal requirements, the second period was entirely subject to the assessment of the respective case worker. Once the second period was approved, only the lump sum payment was granted for an additional period of six months. We find that 59.3% of the business founders in our sample received the subsidy for 15 months.

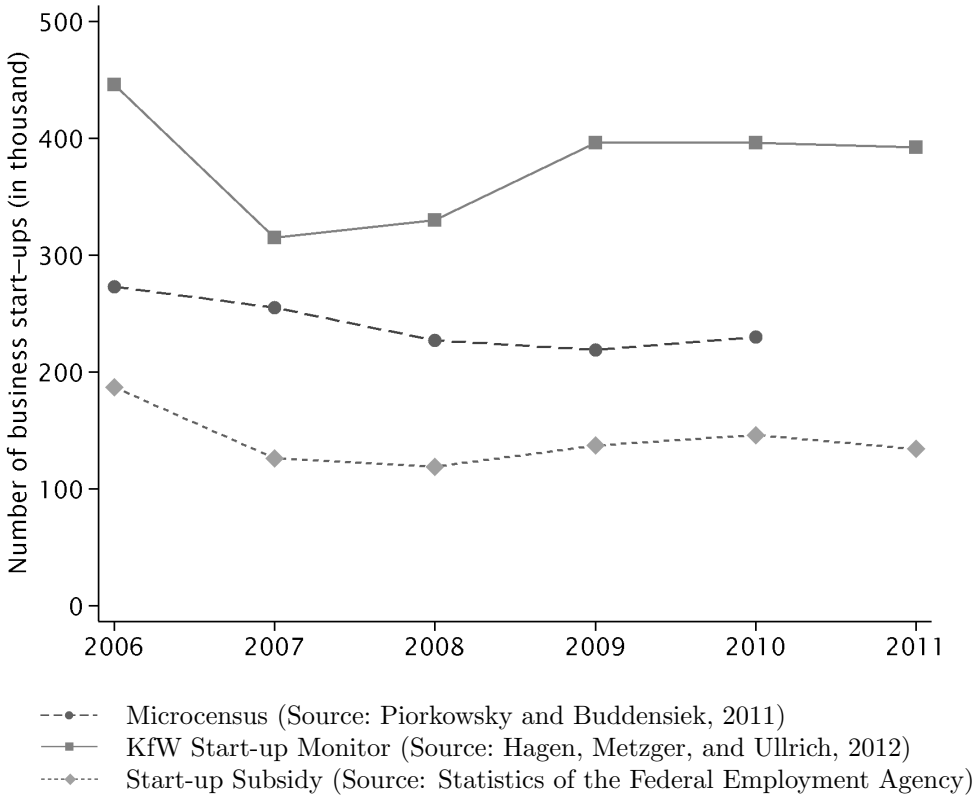
In order to illustrate the magnitude of subsidized start-ups out of unemployment compared to all business start-ups in Germany, we show in Figure 4.1 the respective numbers for full-time business start-ups between 2006 and 2011.[9] While information is available concerning the exact number of entries into SUS (based on the Statistic of the Federal Employment Agency), we have to rely on estimates for the number of all business founders based on population representative surveys, because Germany lacks a centralized administrative register for all business founders. The most frequently cited estimates are based

[7] In Germany, every individual who has been in employment subject to social security for at least one out of the last three years is eligible for unemployment benefit I. The amount of the benefit consists of 60% (67% with children) of the last net wage and is basically paid for a period of 12 months, with the exception of older individuals (see Caliendo, Künn, Hogenacker, and Wießner, 2012).

[8] Without program participation, the individuals would loose their unemployment benefit entitlement given that they start their own business and hence work full-time.

[9] In order to be eligible to SUS, founders have to set up their businesses full-time. Therefore, we compare them to all business start-ups that were also set up full-time.

Figure 4.1: Start-up Activity in Germany 2006-2011



Notes: Only full-time business start-ups.

on the *German Microcensus* and *KfW Start-up Monitor*.[10] The difference between both estimates mainly arises due to the identification of business start-ups: While the KfW start-up monitor identifies business founders based on a direct question (asking whether the respondent has started a business within the last 12 months), the Microcensus identifies business founders based on a change in employment status (i.e. individuals who are self-employed in the current wave but not in the previous year). As we can see, start-ups

[10]The KfW Start-up Monitor is an annual cross-section population survey, which currently contains 50,000 individuals between 18 and 65 years. The Microcensus is an annual representative survey capturing 1% of the German population and currently contains around 700,000 individuals. For further information, see Hagen, Metzger, and Ullrich (2012) and Fritsch, Kritikos, and Rusakova (2012).

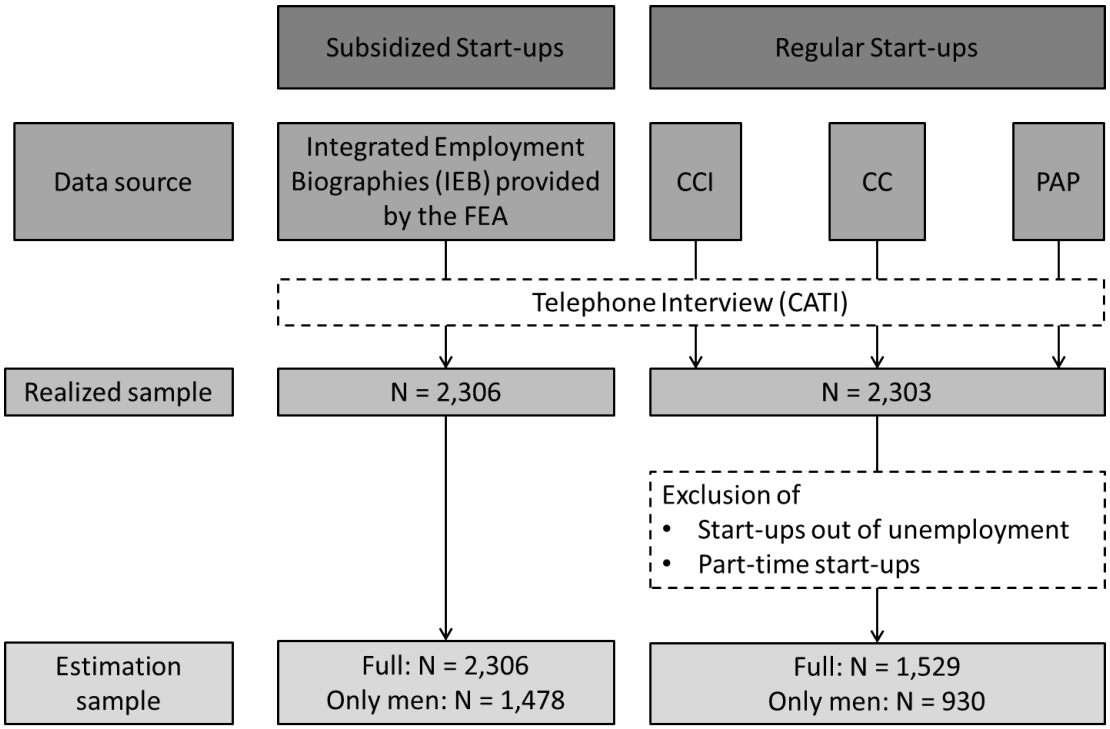
out of unemployment account for a significant share of all full-time business start-ups, ranging between 40% to 60% on average, depending on the data source.

4.4 Construction of the Data

The aim of this study is to provide a comprehensive comparison between subsidized start-ups out of unemployment and non-subsidized start-ups out of non-unemployment. As illustrated by the literature review above, existing datasets usually do not provide sufficient information to clearly identify both groups. Moreover, they are somewhat restricted with respect to individual information about the founder (such as human capital or intergenerational transmission) and longitudinal information on business development. Therefore, we create a new dataset that allows for such a comparison. Besides cross-sectional information on individual and business-related characteristics, the data contains information on business development over time. The data collection was achieved through a telephone survey, where the difficulty lay in finding a data source providing contact details for individuals who belong to our target population.

As depicted in Figure 4.2, we used different data sources in order to realize a sample of subsidized and non-subsidized business start-ups. Subsidized start-ups out of unemployment are registered at the Federal Employment Agency and hence can be identified in the administrative data (*Integrated Employment Biographies*) provided by the Institute for Employment Research (IAB). However, the identification of non-subsidized start-ups is not straightforward, mainly due to the absence of a centralized register for all business founders in Germany. By contrast, a very decentralized industry-specific registration system exists, in the sense that business founders have to register with different institutions depending on their profession and location. Therefore, we relied on three different data sources to obtain contact information for non-subsidized start-ups: (1) the *Chambers of*

Figure 4.2: Data Construction



Industry and Commerce ("Industrie- und Handelskammern", CCI), (2) the *Chambers of Crafts* ("Handwerkskammern", CC) and (3) a private address provider. As the underlying population is unknown, capturing these three data-bases can be considered a first attempt to construct such a sample of non-subsidized business start-ups.

Let us briefly discuss the three data sources. The *Chambers of Industry and Commerce* are public institutions with the main objective of representing of the interests of trading and manufacturing businesses. Subject to law, all businesses have to register with the CCI, with the exemption of particular professions, i.e. liberal professions[11], craft enterprises and agriculture businesses. Given that subsidy receipt is not restricted to certain

[11]Subject to German law, liberal professions are defined as professions that require "higher vocational education or creativity", such as medical occupations (e.g. physicians, dentists), consultants (e.g. lawyers, tax accountants), technical or scientific occupations (e.g. engineers, architects) and the cultural sector (e.g. writer, musicians).

sectors, we also want to create a sample of non-subsidized business start-ups represented along the entire sectoral distribution. This is important because otherwise we would compare subsidized business founders (without restrictions on sectors) with a restricted sample of non-subsidized founders. Therefore, to complement the data basis with information on neglected professions, we also incorporate information from the *Chambers of Crafts*. Similar to CCI, CC are public institutions that represent the interests of businesses in the crafts sector, and thus record all crafts enterprises. Finally, we emphasize that despite liberal professions and agriculture businesses being officially exempted from registering at CCI or CC, in practice they are usually covered given that they trade, produce or provide crafts services. The information from CCI and CC is finally complemented by addresses provided by a private address provider (PAP) to ensure regional representativeness of the sample as not every single chamber[12] was willing to participate. The PAP obtains information based on its own research, as well as from the commercial register ("Handelsregister").[13] Since firms included in the commercial register are overrepresented in the PAP data, this complements well the addresses by CCI and CC for regional and occupational representativeness.

Finally, we extracted a random sample of business start-ups within the first quarter of 2009 from each data source, and collected the required information on these businesses by means of computer-assisted telephone interviews.[14] The survey was collected about 19 months after business start-up. We provide detailed information on the implementation of the survey in Appendix 4.8.1. As depicted in Figure 4.2, we realized a total of 2,306

[12]In Germany, 80 *Chambers of Industry and Commerce* and 53 *Chambers of Crafts* exist in total.

[13]The commercial register contains firms who are actively involved in trading activities (so that large firms tend to be overrepresented). Its main objective is to provide security to business partners in the sense that they can rely on recorded firm-specific characteristics such as name, legal form, location, executive directors and the ability to pay liabilities.

[14]We note that having access to only one particular quarter of entrants might restrict the external validity of the results if the composition of business founders would change significantly over time. However, comparing the distribution of certain characteristics (e.g. age, education, migration, unemployment duration) across different quarters of entries into the subsidy program (based on the statistic of the Federal Employment Agency) does not show significant differences.

interviews with subsidized businesses out of unemployment available for the empirical analysis, as well as 2,303 with non-subsidized businesses.

As previously mentioned, the construction of the dataset depicts a first attempt to construct such a sample of non-subsidized start-ups. In order to assess the representativeness of the finally realized sample of non-subsidized start-ups, we would like to compare it with the underlying population; however, this is unknown in our case which prohibits a representativity analysis. Therefore, the best we can do is to provide a comparison to a representative sample of all business start-ups in Germany instead, although this entails the limitation that subsidized start-ups out of unemployment are also included.[15] Based on information from the German *Mircocensus* (see Section 4.3 for details on the *Microcensus* and how start-ups are identified), we provide such a comparison between our realized sample of non-subsidized businesses and all business founders in Germany in 2009 in Table 4.1 (and separated by gender in Table A.4.6). It can be seen that we have relatively more men, older individuals and natives in our realized sample of non-subsidized businesses. Moreover, the share of business founders located in East Germany is lower in our sample. With respect to professional education, we find equal shares of skilled workers; however, within tertiary education, we find fewer individuals with a university degree and more master craftsmen (holding a technical college degree). Finally, we compare the sectoral distribution and find similar shares in agriculture, construction, crafts and information technology, financial and insurance service while some significant differences exist in terms of remaining sectors. However, the comparison does not reveal whether the realized sample of non-subsidized start-ups is representative towards the population of non-subsidized start-ups (as mentioned above) but rather should help the reader to assess the constructed sample.

[15] According to the reporting system of the German *Kreditanstalt für Wiederaufbau*, of all business start-ups in Germany, 21.4% self-reported having started out of unemployment in 2009 (Kohn, Spengler, and Ullrich, 2010).

Table 4.1: Comparison of the Realized Sample of Non-Subsidized Business Founders with a Representative Sample of All Business Founders Based on the German Microcensus

	Realized sample of non-subsidized business founders	All business founders based on the German Microcensus
Men	63.4	57.0***
East Germany	10.5	21.4***
Not German	5.3	13.8***
Age distribution		
< 25	4.5	8.7***
25 - < 35	21.0	30.0***
35 - < 45	29.4	32.6*
45 - < 56	29.3	21.5***
≥ 56	15.9	7.2***
Professional Education		
Unskilled workers	5.4	16.0***
Skilled workers (apprenticeship)	47.6	48.1
Technical college education (master craftsman)	20.3	9.7***
University education	22.6	26.0**
Others	4.1	0.1***
Sector Business was founded in		
Agriculture, forestry, fishing	1.8	1.2
Manufacturing, crafts	21.8	6.7***
Construction	7.4	8.7
Retail	18.1	13.6***
Logistics and transport services	2.0	3.2*
Financial and insurance services	2.9	4.0
Information technology	4.9	4.8
Other services	26.5	50.2***
Other sectors	14.7	7.7***
Number of observations	2,303	1,053

Notes: All numbers are percentages. The information from the German Microcensus is based on own calculations using the scientific-use-file of the 2009 survey, including all individuals who reported that they became self-employed in 2009 (N=1,053). Based on a t-test with unequal variances, statistical significance at the 1/5/10%-level is denoted by ***/**/*.

For the empirical analysis, it is necessary to further restrict the sample of non-subsidized businesses in order to align it towards the subsidized start-ups out of unemployment. First of all, we only keep non-subsidized business founders who started their business full-time, given that this is also required for the SUS recipients. Secondly, we dropped all business founders who had been unemployed immediately before start-up, as we want to

compare subsidized start-ups out of unemployment to non-subsidized start-ups out of non-unemployment. Accordingly, these two restrictions reduce the size of the non-subsidized founders from 2,303 down to 1,529 observations (see Figure 4.2).[16] Finally, we highlight that we will denote the group of subsidized start-ups out of unemployment as "subsidized start-ups" throughout the remainder of the paper, and our comparison group consisting of non-subsidized start-ups out of non-unemployment as "regular start-ups".

4.5 Empirical Analysis

Based on this dataset, the empirical analysis addresses the research questions derived in Section 4.2. We restrict the empirical analysis to male individuals.[17] Male and female business founders significantly differ in several aspects. While men are represented along the entire distribution of entrepreneurs, female entrepreneurs tend to be concentrated in particular sectors, and among low performance businesses, i.e. in terms of profits, survival, growth rates and income, mainly because women tend to seek work-family balance rather than earning maximization (Klapper and Parker, 2011; Boden, 1999). These differences between male and female entrepreneurs are also reflected in working hours, with women significantly less likely to become full-time self-employed (Gurley-Calvez, Biehl, and Harper, 2009; Lechmann and Schnabel, 2012).[18] Given that we only focus on full-time start-ups (as this is one of the eligibility criteria for subsidy receipt), we are concerned that we would analyze a selected sample of female entrepreneurs (not representative of the entire population of female entrepreneurs), which would limit the external validity of the results for women in this analysis. For men this is not an issue since the vast majority runs

[16] Out of the initial sample of 2,303 individuals, 132 business founders were excluded from the data because they started out of unemployment. Out of the remaining sample of 2,171 observations, a further 642 founders who started their self-employment part-time were excluded.

[17] See Caliendo and Künn (2012) for evidence on subsidized start-ups out of unemployment by females.

[18] The German Federal Statistical Office reports for 2009 that 55% of female entrepreneurs work 40 hours/week or more while this amounts to 86% for male founders.

their business in full-time. Therefore, we exclude women and finally observe 1,478 (930) male subsidized (regular) business founders.

4.5.1 Deadweight effects

As illustrated in Section 4.2, the identification of deadweight effects related to start-up subsidies requires that two criteria have to be fulfilled: First, the subsidized individual would have become self-employed even in the absence of the subsidy; and second, the subsidy must have had no impact on business success. Due to data restrictions, previous studies have had to rely on information only concerning the first criteria only (e.g. Lenihan, 2004; Caliendo and Kritikos, 2010; Tokila, Haapanen, and Ritsilä, 2008). We are now able to go one step further and also consider the second dimension.

Table 4.2 shows that two variables describe the first dimension, i.e. whether individuals would have become self-employed even without the subsidy. Using the broader definition represented by statement 1, we can see that 48.3% of the subsidized business founders are potentially affected by deadweight effects, as they report that they would have even founded a business in the absence of the subsidy. Using a much narrower definition, i.e. whether individuals intentionally registered as unemployed to receive the subsidy (statement 2), we observe that only 22.8% are potentially affected. Before considering the second dimension, we want to recap that those shares have been often cited within former studies and the political discussion with respect to the occurrence of deadweight effects.[19]

We have now data available that allows the consideration of the second dimension, i.e. the importance of the subsidy for business survival during the first six months. We would actually expect that the subsidy had little or no relevance for individuals who would have even become self-employed without the subsidy (48.3%) or intentionally registered as unemployed to receive the subsidy (22.8%). However, Table 4.2 shows that this is not

[19]See, e.g. Bundesministerium für Arbeit und Soziales and Institut für Arbeitsmarkt- und Berufsforschung (2011).

Table 4.2: Descriptive Evidence on the Occurrence of Deadweight Effects Related to the Start-up Subsidy

	Second dimension of deadweight effects Statement: The subsidy was highly relevant for business survival during the founding period (first six months).[a)]			Total
	Disagree	Perhaps	Agree	
First dimension of deadweight effects				
Statement 1: I would you have started a business even without the subsidy?[a)]				
Disagree	5.5	3.2	33.7	42.4
Perhaps	2.0	1.0	6.5	9.4
Agree	21.3	4.7	22.3	48.3
Statement 2: Did you intentionally register as unemployed to receive the subsidy?				
No	20.2	6.3	50.8	77.2
Yes	8.6	2.5	11.7	22.8
Number of Observations				1,471

Notes: Values are measured 19 months after start-up. Only subsidized founders. Shares in %.
[a)] The categories rely on an aggregation of a scale variable. The respondents were faced with the statement and asked to give their answer on a scale from 1 (fully disagree) to 7 (fully agree). We categorized the values 1 to 3 to "Disagree", 4 to "Perhaps", and 5 to 7 to "Agree".

the case. Taking the second dimension into account significantly reduces the shares that are potentially affected by deadweight effects. For instance, the share of 48.3% that is potentially affected by deadweight effects reduces to 21.3%, with only those individuals having reported that the subsidy had no impact on business survival. For the remaining share, the subsidy had at least some impact on business success and hence has to be excluded from the share that is potentially affected by deadweight effects. Using the narrow definition of the first dimension, the potentially affected share is reduced from 22.8% to only 8.6%.

Despite respondents being surveyed 19 months after the business start-up and hence answers might be correlated with business success[20], we argue that the results provide essential new insights by showing that the share potentially affected by deadweight effects is much smaller than usually assumed. However, in order to ultimately conclude that this is the true amount of deadweight effects, we would need to compare business outcomes of the suspicious subgroups (21.3% and 8.6%) to non-subsidized business start-ups to exclude any impact of the subsidy on business success (beyond the founding period). As we have a control group available consisting of non-subsidized business start-ups out of non-unemployment, we provide such a comparison in Section 4.5.3.

[20]We do not expect that misreporting is a big issue here because each respondent was informed (by a letter and at the beginning of each interview) that their answers will be treated absolutely anonymous and that public institutions such as the Employment Agency will never have access to the data.

4.5.2 Do Subsidized Start-ups Differ from Regular Start-ups?

As described in Section 4.2, start-ups out of unemployment are expected to face disadvantages compared to regular business founders in terms of capital constraints, shortages in start-up specific human capital, missing networks and restricted access to information about business opportunities. Therefore, unemployed individuals are offered a subsidy in order to compensate for such initial disadvantages. However, the existence of the subsidy bears the risk of adverse selection.

To investigate the empirical relevance of the expected disadvantages and shortages for subsidized start-ups, we provide a descriptive comparison between subsidized start-ups with regular business founders at the time of start-up. Thereby, we consider individual and business related characteristics in Table 4.3 that reflect the aforementioned disadvantages.

However, it is necessary to highlight a limitation of this analysis. In order to identify the existence of disadvantages faced by unemployed individuals, one would actually need to compare nascent entrepreneurs among the unemployed with nascent entrepreneurs among the non-unemployed, which would reflect the true extent of disadvantages. However, given that it is very hard to identify nascent entrepreneurs, we rely on business founders instead. Consequently, this limits the validity of the results, as out of all nascent entrepreneurs finally realized businesses start-ups by unemployed and non-unemployed individuals are likely to being more homogenous. For instance, individuals with very severe financial constraints (which are most likely overrepresented among the unemployed) are relatively less likely to make their way from a nascent entrepreneur to business founder. Additionally, the subsidy induces individuals who would have founded a business out of non-unemployment to register as unemployed in order to receive the subsidy and therefore now belong to the group of start-ups out of unemployment. This will further enforce the homogeneity of business founders out of unemployment and non-unemployment. Therefore, comparing

business founders (rather than nascent entrepreneurs) is likely to reflect a lower bound estimation of the true level of disadvantages that unemployed individuals actually face.

Motivation: Results in Table 4.3 suggest that "push motives" are overrepresented among subsidized business founders. While no significant differences exist for the two "pull motives" ("I wanted to be my own boss" and "I wanted to earn more money"), we find significant higher shares of unemployed business founders reporting the two "push motives" ("Advice from external institution (Employment Agency etc)" and "No employment alternative"). This suggests that necessity rather than opportunity reflects the dominant motivation among start-ups out of unemployment.

Human Capital and Networks: Human capital and existing networks play an important role for setting up and running a business (Parker, 2009). In order to reveal the disadvantages faced by the unemployed in this regard, we have measures available concerning formal education, employment and industry-specific experiences, and intergenerational transmission.

Starting with formal education, Table 4.3 shows no significant differences with respect to school degrees for subsidized business founders. In terms of professional education, we find significant differences compared to regular business founders, but no clear pattern. Higher shares of previously unemployed business founders have an apprenticeship or university degree, while regular business founders are more likely to have graduated from a technical college or have another degree. Overall, we do not find clear evidence that subsidized business founders face disadvantages in terms of formal education. However, against the background of previous findings, our results are not very surprising given that general education has been shown to have only a moderate influence on the start-up decision (van Praag, van Sluis, and Vijverberg, 2008; Ucbasaran, Westhead, and Wright, 2008).

Table 4.3: Individual and Business Related Characteristics of Subsidized and Regular Start-ups at the Time of Start-up

	Subsidized founders	Regular founders
Motivation to start a business		
Wanted to be my own boss	70.1	68.2
I wanted to earn more money	58.7	57.5
Advice by external institution (e.g. Employment Agency)	18.9	11.7***
No employment alternative	36.8	17.6***
School achievement		
None or lower secondary school	21.0	21.6
Middle secondary school	31.3	31.6
Upper secondary school	47.8	46.8
Professional education		
Unskilled workers	4.8	6.2
Skilled Workers (apprenticeship)	45.9	36.1***
Technical college education (master craftsman)	17.1	24.9***
University education	30.9	27.6*
Others	1.4	5.1***
Employment experience before start-up (as a share of working time)[b)]		
Lifetime Employment	73.0	76.0***
Lifetime Unemployment	4.6	2.0***
Industry-specific experience before start-up		
Due to dependent employment	71.7	61.3***
Due to previous self-employment	19.4	24.6***
Due to secondary employment	21.1	17.0***
Due to hobby	25.0	27.3
Due to honorary office	6.1	7.2
None	11.0	12.4
Intergenerational transmission		
Parents are/were self-employed	32.9	46.6***
Takeover of parents' business	2.8	14.4***
Capital invested at start-up (in %)	81.6	82.0
Average amount invested (in Euro)	21,739.5	44,172.3***
[Median]	[8,000.0]	[15,000.0]
[Max]	[600,000.0]	[650,000.0]
Share of equity (in %)	73.3	74.3
Raising of credit since start-up (in %)		
Yes, loan received	20.0	28.9***
No, but wanted to borrow	16.0	10.7***
No loan needed	64.0	60.4*
Receipt of other subsidies/programs (in %)		
Promotional loan[c)]	28.0	33.5
Business coaching	15.5	6.5***
Number of Observations	1,478	930

Notes: Subsidized founders: Out of unemployment. Regular founders: Non-subsidized business founders out of non-unemployment. All numbers are percentages and measured at start-up. Based on a t-test, statistical significance at the 1/5/10 %-level is denoted by ***/**/*.

[a)] Measured at the time of the interview, i.e., 20 months after start-up.

[b)] Shares are calculated by dividing the cumulative time spent in employment/unemployment in the past by the total time spent in the labor market (as approximated by age in years minus 15).

[c)] Only individuals who received a loan.

Another important aspect of human capital concerns employment and industry-specific experience of the founders, which can also be an indicator for the size and quality of existing networks (e.g. through contacts to potential customers or potential business partners). Table 4.3 shows that subsidized business founders have on average less employment (and more unemployment) experience, thus indicating a disadvantage. Regarding industry-specific experience, we detect a similar pattern. Table 4.3 shows that subsidized business founders primarily acquired industry-specific experience from dependent employment while regular business founders are significant more likely to have industry-specific experience from previous self-employment. This depicts a significant advantage for regular business founders as they had realized a business start-up before and hence are likely to have valuable business networks, existing contacts to customers, etc., whereas subsidized start-ups generally do not have this experience.

Finally, we investigate differences in terms of intergenerational transmission, i.e., self-employed parents transmit start-up specific abilities, existing businesses and networks to their children, which has been shown to have a significant influence on business performance over time (Tervo, 2006; Fairlie and Robb, 2007). Table 4.3 shows that regular business founders are significantly more likely to have self-employed parents (and to experience intra-family business takeover) and hence are benefiting potentially more from intergenerational transmission of start-up specific abilities, networks and businesses.

Capital Investments and Constraints: Finally, we consider capital investments realized at business start-up and within the founding period. As derived in Section 4.2, business founders out of unemployment are expected to have lower financial means and face a higher risk of being discriminated by capital markets, which restricts their access to loans. We clearly find supportive evidence that subsidized start-ups invest less capital in Table 4.3. While the share of individuals who invested capital at start-up is compara-

bly high in both groups, at 82%, we find substantial differences in the invested amount. Regular business founders invest significantly more (44,170 Euro) capital at start-up than subsidized ones (21,740 Euro). This effect is not driven by statistical outliers, as the median and maximum values in Table 4.3 show.

However, the question remains whether this gap is due to differences in available personal equity or access to loans. While we do not have detailed information on overall personal equity, we observe the share of the invested capital that has been financed by personal equity. Here, we find no significant differences between both groups, i.e. business founders finance on average 70% of the start-up capital by personal equity. Therefore, constraints in terms of personal equity might eventually lead to less capital investment. Moreover, we find supportive evidence that the unemployed also face more restricted access to loans. Table 4.3 shows that only 20% of subsidized start-ups received a loan, which was the case for 29% of regular business founders. However, the pure take-up rate does not necessarily indicate credit constraints as subsidized individuals might simply have less demand for loans due to the subsidy. The credit constraint argument becomes more evident in the following statistic: 16% of all subsidized start-ups report that they received no loan but would have liked to, while this only applies to 10% among the regular business founders. Although we are unable to identify whether those individuals actually tried to apply for a loan in the end, we interpret this pattern as suggestive evidence for existing credit constraints in terms of the accessability of loans for the unemployed. Finally, we provide evidence on the take-up of other types of support. Table 4.3 shows no differences in terms of receiving a subsidized loan but a higher share of subsidized founders received a business coaching.

In summary, subsidized start-ups seem to have no shortages in terms of formal education; however, they have less employment and industry-specific experience, and fewer spillovers from intergenerational transmission. Moreover, we find evidence that necessity

start-ups are overrepresented among business founders out of unemployment, suggesting disadvantages in terms of business preparation, owing to time restrictions. Finally, we detect capital constraints among the unemployed in terms of both the availability of personal equity and access to loans.

4.5.3 Business Development

Econometric Strategy

Given the existence of disadvantages for subsidized start-ups compared to regular start-ups, we now address the question of how subsidized businesses perform compared to regular businesses. Based on economic considerations, the subsidy is expected to have two opposing effects on business survival and growth (see Section 4.2). The question that we address is what would have happened if the subsidized unemployed person had started a business out of non-unemployment without the subsidy. To answer this question, we actually want to compare the development of a business started by an unemployed individual (with subsidy receipt) with a business started out of non-unemployment by the same individual. However, given that we only observe each individual either as previously unemployed or as regular business founder, we have to estimate the counterfactual situation for subsidized business founders. To do so, we use the group of regular business founders.

However, an unconditional comparison of outcome variables (Y) between subsidized (D=1) and regular (D=0) founders, i.e., $\tau^{raw} = E(Y \mid D = 1) - E(Y \mid D = 0)$, is not very informative given that substantial differences in terms of observable characteristics exist (as shown in the previous section in Table 4.3 and Table A.4.7 in the Appendix). In addition to the differences in observable characteristics, both groups might further differ in terms of unobserved characteristics. Therefore, we will use a decomposition method to disentangle the influence of both parts. Instead of using traditional decomposition methods such as the Blinder-Oaxaca decomposition (which is based on linear regression models), we follow Frölich (2007) and use propensity score matching (PSM) as it relaxes the underlying parametric assumptions.[21]

[21] See Caliendo and Lee (2013) and Krause, Rinne, and Schüller (2012) for similar applications using matching to perform decomposition.

Based on PSM (see Caliendo and Kopeinig, 2008, for details on the implementation of PSM), we align the group of regular business founders towards the group of subsidized start-ups in terms of observable characteristics. However, instead of interpreting the estimated gap in outcome variables as the causal average treatment effect on the treated (ATT), as conducted in the evaluation literature (Rosenbaum and Rubin, 1983; Imbens and Wooldridge, 2009), we interpret the gap as a conditional gap:

$$\tau^{cond} = E(Y|D=1) - E_{P(X)}[E(Y|P(X), D=0)|D=1], \tag{4.1}$$

where the first term can be directly estimated from the group of subsidized founders. The second term is the adjusted mean from the matched group of regular founders using propensity score P(X) matching.

The calculation of the counterfactual outcome (second term in Equation 4.1) helps to answer the question of how regular business founders would perform if they had the same distribution of observable characteristics as subsidized business founders. The remaining gap to the outcome of the subsidized founders (τ^{cond}) is subsequently interpreted as a conditional gap that remains unexplained by observable characteristics. The rich data allow us to control for a large vector of observable characteristics including labor market history and important information about the start-up (see Table A.4.7), which are correlated with personality and thus should significantly reduce the remaining influence of unobserved differences. Based on economic considerations, τ^{cond} might be explained by the receipt of the subsidy, disadvantages arising from the unemployment status of the subsidized founders and adverse selection or moral hazard as induced by the subsidy. Finally, to avoid any misinterpretation, we emphasize that τ^{cond} (in contrast to the evaluation literature where matching is usually applied) has no causal interpretation here, as it simply reflects a conditional gap after having controlled for observable characteristics. Details on the imple-

mentation of the matching procedure including a list of all observable characteristics as well as the balancing characteristics are shown in Appendix 4.7.2.

Main Results

To answer the question of how subsidized start-ups perform over time compared to regular business founders, Table 4.4 shows results with respect to survival in self-employment, income and business growth, as measured by the employee structure 19 months after business start-up. Note that subsidy receipt has been fully expired for at least four months at this time (see Section 4.3).

First of all, we focus on results for the full sample (upper part in Table 4.4). It can be seen that 19 months after start-up, 80.7% of subsidized business founders remain self-employed compared to 72.6% in the case of regular business founders, indicating higher survival among the subsidized businesses. However, the question is to what extent this raw difference is driven by differences in observable characteristics. Column (3) shows the conditional share estimated by propensity score matching. It can be observed that controlling for observable characteristics reduces the outcome gap from initially 8.1% (raw) to 6.3% (conditional). However, the remaining conditional gap of 6.3%-points is statistically significant and therefore still indicates higher survival for subsidized start-ups. This might be explained by subsidy receipt. It seems that the direct effect of the subsidy payment during the founding period dominates initial disadvantages arising from unemployment and by the subsidy potentially induced negative effects such as adverse selection or moral hazard. Regarding those who failed to remain self-employed, we do not find any significant differences between both groups in terms of integration in dependent employment or unemployment after having controlled for observable differences. With respect to working income, Table 4.4 shows significant higher net earnings for regular business founders, which is largely attributable to existing differences in observable characteristics. After having controlled for

these differences, regular businesses have a net monthly working income of 2,500 Euro on average which is not significantly different to the monthly earnings of subsidized business founders.

Conditional on still being self-employed, Table 4.4 shows further business outcomes, highlighting significantly lower net income and less business growth for subsidized compared to regular business founders. For instance, 19 months after start-up, previously unemployed and subsidized business owners earn on average 2,389 Euro per month from their self-employed activity, which is, conditional on observable characteristics, 684 Euro less than regular business founders earn. However, despite the net income of subsidized founders being smaller compared to regular founders, it still exceeds monthly net earnings of a comparable full-time employee in Germany, which corresponded to about 1,900 Euro per month in 2010 (Caliendo, Künn, Hogenacker, and Wießner, 2012). Moreover, only 36.1% of previously subsidized business owners employ on average three full-time equivalent workers, compared to 56.5% employing on average six full-time equivalent workers among the regular business founders; whereby the conditional differences are also statistically significant.

Table 4.4: Business Development 19 Months After Start-up

	Subsidized founders (1)	Regular founders raw (2)	Regular founders conditional (3)
Full sample			
Main labor market status (in %)			
Self-employed	80.7	72.6***	74.4**
Dependent employed	11.5	10.6	14.7
Unemployed	4.8	1.6***	4.2
Number of Observations	1,449	930	
Income measures (in Euro, net)[a)]			
Monthly working income	2,146.0	2,636.6***	2,374.4
Number of Observations	1,301	785	
Conditional analysis: Self-employed individuals only			
Income measures (in Euro, net)[a)]			
Monthly working income	2,388.8	3,243.9***	3,073.0**
Hourly working income	11.5	16.4***	15.1**
Working time (in hours/week)	51.3	51.1	51.5
Monthly equivalent household income[b)]	2,050.4	2,792.3***	2,382.1*
Number of Observations	967	517	
Employee structure			
At least one employee (in %)	36.1	62.8***	56.5***
Number of full-time equivalents[c)]	3.1	7.0***	6.2***
Number of Observations	1,156	675	
Innovation implemented by businesses (in %)[d)]			
Filed patent application	2.0	5.0**	2.6
Filed application to legally protect corporate identity	6.8	12.8***	16.0**
Number of Observations	547	401	

Note: Subsidized founders: Out of unemployment. Regular founders: Non-subsidized business founders out of non-unemployment. The first column shows the outcome variables as realized by the subsidized businesses 19 months after start-up. Column two and three show the raw and conditional values for regular business founders respectively. Conditional values are calculated based on propensity score matching. Statistical significance at the 1/5/10 %-level is denoted by ***/**/* and in case of the conditional values are based on bootstrapping with 200 replications. Deviant absolute values of number of observations compared to Table A.4.8 due to implemented common support conditions and missing observations in outcome variables.

[a)] We excluded eight individuals who reported a monthly income larger than 30,000 Euro.

[b)] The equivalent income is calculated by adjusting the household income by the number of household members. The household income is divided by the weighted number of household members. Following the actual OECD equivalence scale, the household head achieves a weight of one, all children below the age of 15 are weighted with 0.3 and everybody else with 0.5 (see Whiteford and Adema, 2007).

[c)] Number of full-time equivalent employees is a weighted sum of different employment types, whereby full-time worker receive the weight 1, part-time worker and apprentices a weight of 0.5, and other employees a weight of 0.25. We excluded four observations with inconsistent information and one statistical outlier from the analysis.

[d)] Only half of the sample (randomly drawn) received this question.

Finally, we shed light on the empirical relevance of the argument that start-ups out of unemployment implement less innovation due to restricted access to information concerning business opportunities or missing pull motives (Shane, 2003; Caliendo and Kritikos, 2009b). Indeed, Table 4.4 confirms this expectation: After having controlled for observable characteristics, regular business founders are more likely to file a patent (not statistically significant though) or application to protect corporate identity (which is also statistically significant). This reflects the higher degree of innovation implemented by these firms during the first 19 months after start-up.

In summary, Table 4.4 suggests that subsidized start-ups face higher business survival, but lag behind regular business founders in terms of income, business growth and innovation. The extended survival might be explained by the subsidy payment as it increases income and consequently the utility of remaining self-employed. Although a direct effect due to ongoing subsidy receipt can be excluded, it might be the case that the measurement 19 months after start-up is still influenced by recent subsidy expiration.[22] The lower income and growth rates might be explained by different issues: First, subsidized founders might face disadvantages arising from their initial unemployment status (in addition to observed aspects), e.g., discrimination at capital markets or smaller networks. Second, the subsidy could induce adverse selection in self-employment resulting in lower business performance. In contrast to Hombert, Schoar, Sraer, and Thesmar (2013), our results support the self-selection view where less qualified individuals self-select into entrepreneurship due to reduced costs of entry which is in line with findings by Nanda (2008) and Hvide and Møen (2007). Third, the presence of the subsidy might have reduced business growth due to moral hazard by inhibiting the selection process of profitable and non-profitable businesses (survival-of-the-fittest). Within the regular businesses only the profitable businesses sur-

[22]The capital-intensive first part of the subsidy payment, i.e. unemployment benefit plus lump-sum payment of 300 Euro/month, has already expired for 10 months, and the optional second part, consisting of the lump-sum payment of 300 Euro/month only, for four months.

vive and grow larger than subsidized businesses where also non-profitable or low-profitable businesses are represented.

The question remains whether the identified gaps are persistent or will disappear after a while. In the long run, former subsidized firms have to survive and compete in the market without the subsidy and therefore might converge towards regular business founders. This is left for future research.

The Role of Deadweight Effects

Based on descriptive evidence, we identify in Section 4.5.1 a share of 8.6% that is potentially affected by deadweight effects, having reported that they intentionally registered as unemployed to receive the subsidy and also that the subsidy had no impact on business survival during the first six months. For this group, we can reliably assume that they would have started a business out of non-unemployment in the absence of the subsidy and hence would belong to the group of regular business founders.[23] Therefore, comparing business outcomes of this suspicious subgroup with those of regular business founders allows us to validate whether the subsidy indeed had no impact on business success beyond the founding period. If this was the case, we could conclude that 8.6% of the subsidized founders are certainly affected by deadweight effects.

Table 4.5 compares selected business outcomes of the suspicious subgroup of 8.6% of subsidized businesses that are likely to be affected by deadweight effects with those of regular business founders. We only present conditional values, i.e. after having controlled for differences in observable characteristics. As we can see, the same pattern as in Table 4.4 arises, with subsidized businesses showing higher survival rates 19 months after start-up, but lag behind regular businesses in terms of income, business growth and innovation.

Although the identification of deadweight effects relies on survey information measured 19 months after start-up (see Section 4.5.1) and differences in income and innovation are not statistically significant (due to the lower number of observations compared to Table 4.4), the results indicate that the share affected by deadweight effects must be even smaller than 8.6% as the subsidy still had some impact on business success for this subgroup.

[23] We neglect results for the subgroup of 21.3% that is potentially affected by deadweight effects using the broad definition (see Section 4.5.1 and Table 4.2) as we cannot assume that this group would have started out of non-unemployment (and hence belong to regular business founders). Here, the adequate control group would consist of non-subsidized start-ups out of unemployment, which is difficult to create as almost no unemployed person starts a business without the subsidy in Germany. However, point estimates using our available control group indicate a similar pattern as for the share of 8.6%. Results are available online and upon request from the authors.

Table 4.5: Detailed Consideration of Business Development to Determine the Role of Deadweight Effects

	Suspicious subgroup of subsidized founders	Regular founders Conditional value
Full sample		
Share in self-employment (in %)	92.6	79.8***
Number of Observations	122	930
Conditional analysis: Self-employed individuals only		
Income measures (in Euro, net)[a)]		
Monthly working income	3,415.9	4,620.6*
Hourly working income	16.0	22.4
Number of Observations	103	517
Employee structure		
At least one employee (in %)	46.9	72.3***
Number of full-time equivalents[b)]	3.2	6.8***
Number of Observations	113	667
Innovation implemented by businesses (in %)[c)]		
Filed patent application	1.8	3.2
Filed application to legally protect corporate identity	7.0	16.6*
Number of Observations	57	398

Note: Values are measured 19 months after start-up. The first column shows the outcome variables as realized by the subsidized businesses out of unemployment 19 months after start-up. Column two shows the conditional values for regular business founders. Conditional values are calculated based on propensity score matching. Statistical significance at the 1/5/10 %-level is denoted by ***/**/* and are based on bootstrapping with 200 replications.

[a)] We excluded eight individuals who reported a monthly income larger than 30,000 Euro.

[b)] Number of full-time equivalent employees is a weighted sum of different employment types, whereby full-time worker receive the weight 1, part-time worker and apprentices a weight of 0.5, and other employees a weight of 0.25. We excluded four observations with inconsistent information and one statistical outlier from the analysis.

[c)] Only half of the sample (randomly drawn) received this question.

4.6 Conclusion

This study investigates differences between subsidized start-ups out of unemployment and non-subsidized start-ups out of non-unemployment, thereby addressing three particular questions: First, do deadweight effects occur? Second, do initial differences exist between subsidized start-ups out of unemployment and other business start-ups? And third, how do businesses founded by subsidized unemployed individuals perform compared to "regular" business founders? Due to data restrictions, the empirical evidence on these questions has been very limited to date. This study uses a new data set based on a telephone survey making such a comparison possible. In addition to cross-sectional information on individual and business-related characteristics, the data also contains information on business development over time.

The new data allows for the first time a deeper analysis of deadweight effects because it contains both detailed information on the importance of the subsidy for business start-up and in addition its potential influence on business outcomes. In particular the consideration of the latter issue was missing in previous studies due to data restrictions. Although the identification of deadweight effects relies on survey information measured 19 months after start-up, our analysis confirms the existence of deadweight effects (as found by previous studies), but at a (much) lower scale than usually assumed. With respect to initial differences between subsidized and regular start-ups, we find that founders of subsidized start-ups seem to have no shortages in terms of formal education. However, they have less employment and industry-specific experience, and fewer spillovers from intergenerational transmission. Moreover, we find evidence that necessity start-ups are overrepresented among subsidized business founders, suggesting disadvantages in terms of business preparation due to time restrictions. Finally, we detect capital constraints among the unemployed in terms of both the availability of personal equity and access to loans.

Given the detected differences at business start-up, we further investigate its influence on business performance over time. Using propensity score matching as a decomposition method, we disentangle which part of the observed differences in business performance is due to differences in observable characteristics of business founders and which is due to the subsidy and related unobserved heterogeneity such as adverse selection or moral hazard. Results indicate that subsidized start-ups out of unemployment face higher business survival rates 19 months after start-up, however, lag behind regular business founders in terms of income, business growth and innovation. The differences in business performance might be explained by different issues. First, given that the subsidy payment has recently expired, it might still have an ongoing positive effect on business survival. Second, subsidized founders might face disadvantages arising from their initial unemployment status (in addition to observed aspects), e.g., discrimination at capital markets or smaller networks. Third, adverse selection due to the subsidy could negatively impact business development. In contrast to Hombert, Schoar, Sraer, and Thesmar (2013), our results seem to support the self-selection view where less qualified individuals self-select into entrepreneurship due to reduced costs of entry which is in line with findings by Nanda (2008) and Hvide and Møen (2007). Fourth, the subsidy payment induces moral hazard hindering the market mechanism, i.e. the selection process of profitable and not profitable businesses (survival-of-the-fittest). Future research needs to investigate whether the identified gaps remain in the longer run, or if subsidized and regular businesses converge once the subsidy receipt is far behind.

Although the observation period is limited to 19 months after start-up, the findings in this paper suggest that the subsidy indeed helps unemployed individuals to set up a business and survive the critical founding period; however, it also seems to induce a negative bias in terms of business performance. Therefore, the findings complement the overall picture with respect to the effectiveness of the subsidy program. The subsidy

helps unemployed individuals to sustainably escape unemployment (effective as an ALMP program), however, it does not spur business growth and innovation (less successful from a business perspective). Although we cannot make final causal statements based on short-term results, the latter finding should concern policy makers if subsidized businesses are proven to persistently lag behind.

4.7 Appendix

4.7.1 Supplementary Tables

Table A.4.6: Comparison of the Realized Sample of Non-Subsidized Business Founders with a Representative Sample of All Business Founders Based on the German Microcensus – Separated by Gender

	Realized sample of non-subsidized business founders		All business founders based on the German Microcensus	
	Men	Women	Men	Women
East Germany	11.2	9.3	20.5***	22.5***
Not German	4.9	5.9	15.5***	11.5***
Started self-employment as first activity and in full-time	63.7	71.1	81.5***	53.4***
Age distribution				
< 25	4.9	3.9	8.5***	9.1***
25 - < 35	22.5	18.3	30.8***	28.9***
35 - < 45	28.1	31.6	31.8*	33.6
45 - < 56	26.2	34.5	21.0**	22.1***
≥ 56	18.3	11.7	7.8***	6.4***
Professional Education				
Unskilled workers	4.9	6.3	17.7***	13.9***
Skilled workers (apprenticeship)	40.9	59.3	47.7***	48.8***
Technical college education (master craftsman)	25.3	11.5	9.8***	9.5
University education	24.9	18.5	24.7	27.8***
Others	3.9	4.4	1.7***	0.0***
Sector Business was founded in				
Agriculture, forestry, fishing, animal breeding	2.4	0.7	1.5	0.9
Crafts, manufacturing, car repair, gardening	23.2	19.1	9.0***	3.3***
Construction	10.3	2.4	14.8***	0.7**
Retail	15.4	22.8	12.3*	15.2***
Transport, information, logistics, courier service	2.4	1.4	4.2**	2.0
Financial service, insurance industry	3.4	2.0	5.0*	2.7
IT, data processing	7.0	1.3	7.0	1.8
Other services	21.6	35.1	42.8***	60.0***
Other sectors	14.4	15.2	3.3***	13.5
Number of observations	1,460	843	600	453

Notes: All numbers are percentages. The information from the German Microcensus is based on own calculations using the scientific-use-file of the 2009 survey, and includes all male individuals who reported to have become self-employed in 2009. Based on a t-test with unequal variances, statistical significance compared with non-subsidized founders is denoted by ***/**/* at the 1/5/10%-level.

Table A.4.7: Selected Descriptive Statistics

	Subsidized founders	Regular founders	p-value
Number of observations	1,478	930	
Personal characteristics			
East Germany	21.7	10.9	0.000
Age distribution			
< 25	3.1	6.0	0.001
25 - < 35	24.3	20.5	0.033
35 - < 45	32.5	26.9	0.004
45 - < 56	28.1	24.2	0.036
≥ 56	12.0	22.4	0.000
Children under six years in household	20.6	15.4	0.001
Children between six and 14 years in household	23.0	21.4	0.357
Married	57.2	61.1	0.058
Not German	6.7	4.9	0.079
Human capital			
School achievement			
None or lower secondary school	21.0	21.6	0.709
Middle secondary school	31.3	31.6	0.855
Upper secondary school	47.8	46.8	0.635
Professional education			
Skilled workers (apprenticeship)	45.9	36.1	0.000
Technical college education (master craftsman)	17.1	24.9	0.000
University education	30.9	27.6	0.086
Unskilled workers/others	6.2	11.3	0.000
Intergenerational transmission			
Parents are/were self-employed	32.9	46.6	0.000
Business takeover from parents	2.8	14.4	0.000
Parents born abroad	20.4	15.9	0.006
School achievement of father			
None or lower secondary school	55.5	58.4	0.171
Middle secondary school	18.2	17.4	0.627
Upper secondary school	24.8	23.8	0.553
Father unknown	1.4	0.4	0.020
Father of respondent employed at age 15	0.873	0.875	0.897
Labor market history			
Monthly net income from last dependent employment right before start-up			
Dependently employed and income not specified	3.8	7.2	0.000
0-1,000 Euro	9.4	4.8	0.000
$>$ 1,000 - 1,500 Euro	25.3	14.3	0.000
$>$ 1,500 - 2,500 Euro	32.1	21.8	0.000
$>$ 2,500 Euro	21.4	15.9	0.001
In apprenticeship or marginal employment	4.4	14.4	0.000
In other status	3.6	21.5	0.000
Duration of dependent employment right before start-up			
$<$ 1 year	6.7	2.9	0.000
5 or more years	54.8	49.8	0.016

Table to be continued.

Table A.4.7 continued from previous page.

	Subsidized founders	Regular founders	p-value
Unemployment experience before start-up (as share of working time, stand. by age-15)			
Not specified	1.8	0.6	0.015
0	5.3	53.5	0.000
> 0 - ≤ 2	33.3	23.5	0.000
> 2 - ≤ 5	30.3	12.0	0.000
> 5 - ≤ 15	25.0	8.0	0.000
> 15	4.3	2.3	0.009
Employment experience before start-up (as share of working time, stand. by age-15)			
Not specified	0.9	1.0	0.960
≤ 50	16.4	14.6	0.233
> 50 - ≤ 70	21.4	16.5	0.003
> 70 - ≤ 90	37.9	34.7	0.118
> 90 - ≤ 99	17.3	21.9	0.005
>99	6.0	11.3	0.000
Regional information			
Federal state (selected states)			
Baden-Wuerttemberg	12.4	15.3	0.049
Bavaria	16.8	24.4	0.000
Saxony	5.5	4.7	0.381
Local macroeconomic conditions			
Vacancies related to stock of unemployed	15.0	15.4	0.215
Unemployment rate	8.6	7.5	0.000
Real GDP per capita in 2008 (in thousand Euro)	35.7	32.5	0.000
Business related characteristics			
Sectoral distribution of business foundation			
Agriculture, forestry, fishing	0.9	2.3	0.005
Manufacturing, Crafts	15.2	22.2	0.000
Construction	11.2	9.9	0.325
Retail	14.0	16.0	0.175
Transport, logistics	4.9	2.5	0.003
Financial service, insurance industry	5.8	3.9	0.034
IT	6.4	7.8	0.183
Other services	22.6	20.8	0.286
Other sectors	19.1	14.7	0.006
Industry-specific experience before start-up			
Due to dependent employment	71.7	61.3	0.000
Due to former self-employment	19.4	24.6	0.002
Due to secondary employment	21.1	17.0	0.013
Due to hobby	25.0	27.3	0.214
Due to honorary office	6.1	7.2	0.281
None	11.0	12.4	0.293
Capital invested at start-up			
None	17.9	17.3	0.699
$<$ 1,000 Euro	4.4	8.7	0.000
1,000 - $<$ 5,000 Euro	19.8	12.4	0.000
5,000 - $<$ 1,000 Euro	16.1	8.5	0.000
10,000 - $<$ 50,000 Euro	31.7	32.9	0.549
$\geq$ 50,000 Euro	7.8	16.1	0.000
Share of equity	45.9	47.2	0.545

Note: Subsidized founders: Out of unemployment. Regular founders: Non-subsidized business founders out of non-unemployment. All numbers are percentages (unless stated otherwise) and measured at start-up. P-value is based on a t-test on equal means.

4.7.2 Details on the Implementation of the Matching Procedure

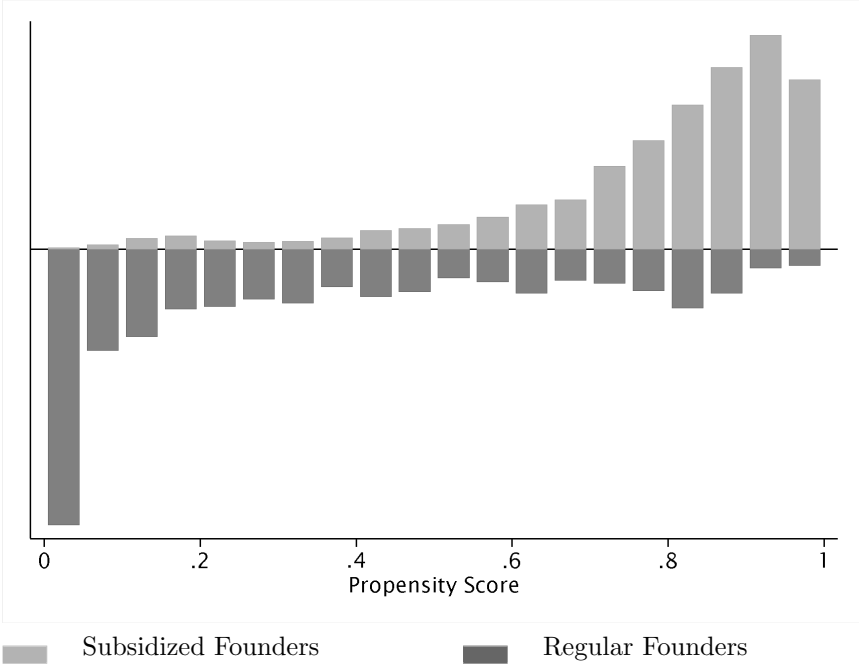
This section contains details on the implementation of the propensity score matching in order to align the group of regular business founders towards the group of subsidized start-ups in terms of observable characteristics. First of all, we estimate the propensity score $P(D = 1|X)$ to start a business out of unemployment and therefore receive the subsidy using probit-models. Table A.4.8 shows the results of the probit-estimation. We observe that particularly age, professional education, industry-specific experiences, labor market history, intergenerational transmission, regional characteristics and capital investment decisions at start-up significantly influence the probability of starting a business out of unemployment with subsidy receipt. In addition, Figure A.4.3 shows the distribution of the estimated propensity scores. Although the estimated propensity scores of subsidized business founders overlap the region of estimated scores for regular business founders to a large extent, there is only limited overlap in the tails of the distribution. To ensure that we only compare subsidized business founders to regular business founders with similar values of the propensity score, we exclude 29 subsidized business founders that have propensity score values above (below) the maximum (minimum) value of the regular business founders.

To finally align the group of regular business founders towards the group of subsidized start-ups, we apply a kernel matching. In fact, we apply an *Epanechnikov Kernel* with a bandwidth of 0.06. This offers the advantage of increasing efficiency by using the full set of regular business founders to construct the individual counterfactual outcome of previously unemployed business founders. Moreover, Kernel matching allows us to use bootstrapping in order to calculate standard errors and draw statistical inference. In this study, we use 200 replications to calculate standard errors (as suggested by Efron and R. J, 1993). Table A.5.12 shows different measures to assess the quality of the applied matching procedure, i.e. whether the matching successfully balances the distribution of observable characteristics between both groups.[24] Based on a simple t-test, it can be seen that the number of variables with significant differences in sample means between the subsidized and regular founders significantly declines after matching. As results from the t-test allow for an assessment in terms of bias reduction in the marginal distribution of observable characteristics, we additionally provide the mean standardized bias (MSB) as suggested by Rosenbaum and Rubin (1985). We observe that the MSB is 16% before matching, whereas our matching procedure significantly reduces the respective MSB down to 4%. This is below

[24]See Caliendo and Kopeinig (2008) for a detailed discussion on the assessment of the matching quality and for an explanation of applied measures.

the suggested threshold of 3-5% by Caliendo and Kopeinig (2008) and therefore indicates a successful matching. In a final step, we also re-estimate the propensity score using the matched sample and compare it to the initial propensity score estimation. Given that the matching is able to balance the samples of subsidized and regular founders, we would expect a sizeable reduction in the Pseudo-R^2 between both regressions (Sianesi, 2004). Indeed, this is confirmed by Table A.5.12, showing very low Pseudo-R^2 for the matched sample estimation. Finally, we conclude that the applied matching procedure significantly reduces differences in observable characteristics between subsidized and regular business founders.

Figure A.4.3: Propensity Score Distributions — Subsidized Business Founders vs. Regular Business Founders



Note: Depicted are distributions of estimated propensity scores for subsidized business founders out of unemployment and regular business founders (i.e. non-subsidized business founders out of non-unemployment) based on probit estimations as shown in Table A.4.8.

Table A.4.8: Propensity Score Estimation — Subsidized Business Founders vs. Regular Business Founders

Dependent variable: Subsidized founders (1) vs. Regular Founders (0)	
Personal characteristics	
East Germany	0.238
	(0.174)
Age distribution (Ref.: < 25)	
25 - < 35	-.233
	(0.192)
35 - < 45	-.186
	(0.201)
45 - < 56	-.169
	(0.208)
≥ 56	-.557**
	(0.221)
Children under six years in household	0.105
	(0.094)
Children between six and 14 years in household	0.002
	(0.087)
Married	-.022
	(0.08)
Not German	-.078
	(0.152)
Human capital	
School achievement (Ref.: None or lower secondary school)	
Middle secondary school	-.072
	(0.097)
Upper secondary school	0.038
	(0.113)
Professional education (Ref.: Unskilled workers/others)	
Skilled workers (apprenticeship)	0.435***
	(0.13)
Technical college education (master craftsman)	0.26*
	(0.145)
University education	0.492***
	(0.143)
Intergenerational transmission	
Parents born abroad	0.064
	(0.095)
Parents were/are self-employed	-.182**
	(0.072)
Highest Schooling Certificate of father (Ref.: No cert, Lower Secondary School)	
Middle Secondary School	0.053
	(0.092)
Tertiary Education Certificate	0.105
	(0.089)
Father unknown	0.899**
	(0.392)

Table continued.

Table A.4.8 continued.

Dependent variable: Subsidized founders (1) vs. Regular Founders (0)	
Business take-over from parents	-.777***
	(0.15)
Father of respondent employed at age 15	0.235**
	(0.099)
Labor market history	
Monthly net income from last dependent employment right before start-up (Ref.: Dependently employed and income not specified)	
0-1,000 Euro	0.677***
	(0.191)
> 1,000 - 1,500 Euro	0.545***
	(0.16)
> 1,500 - 25,00 Euro	0.54***
	(0.153)
> 2,500 Euro	0.557***
	(0.16)
In Apprenticeship or Marginal Employment	-.611***
	(0.2)
In other Status	-.663***
	(0.19)
Duration of dependent employment right before start-up	
< 1 year	-.162
	(0.161)
5 or more years	-.210**
	(0.092)
Unemployment experience before start-up as share of working time[a)] (Ref.: 0)	
Not Specified	2.006***
	(0.33)
> 0 - ≤ 2	1.462***
	(0.093)
> 2 - ≤ 5	1.772***
	(0.103)
> 5 - ≤ 15	1.897***
	(0.116)
> 15	1.607***
	(0.19)
Employment experience before start-up as share of working time[a)] (Ref.: ≤ 50)	
Not Specified	-.360
	(0.359)
> 50 - ≤ 70	-.135
	(0.123)
> 70 - ≤ 90	-.128
	(0.12)
> 90 - ≤ 99	-.122
	(0.143)
>99	-.295*
	(0.166)

Table continued.

Table A.4.8 continued.

Dependent variable: Subsidized founders (1) vs. Regular Founders (0)	
Regional information	
Federal state (selected states)	
Baden-Wuerttemberg	-.164
	(0.125)
Bavaria	-.210*
	(0.108)
Saxony	-.345**
	(0.174)
Local macroeconomic conditions	
Relation of open vacancies to amount of unemployed	0.013**
	(0.006)
Average Unemployment Rate	0.022
	(0.021)
Real GDP per capita in 2008 (in 1,000 Euro)	0.01***
	(0.003)
Business related characteristics	
Sectoral distribution of business foundation (Ref.: Other sectors)	
Agriculture,forestry,fishing, animal breeding	-.450
	(0.326)
Crafts, manufacturing, car repair, gardening	-.305***
	(0.117)
Construction	-.395***
	(0.13)
Retail	-.282**
	(0.119)
Transport, information, logistics, courier service	0.135
	(0.199)
Financial service, insurance industry	-.027
	(0.167)
IT, Data processing	-.167
	(0.155)
Other services	-.279**
	(0.109)
Industry-specific experience before start-up (Ref.: Not specified)	
Due to dependent employment	0.14
	(0.091)
Due former Self-employment	-.149*
	(0.086)
Due to secondary Employment	0.126
	(0.089)
Due to Hobby	-.128
	(0.082)
Due to honorary office	-.097
	(0.139)
None	-.036
	(0.134)

Table continued.

Table A.4.8 continued.

Dependent variable: Subsidized founders (1) vs. Regular Founders (0)	
Capital invested at start-up (Ref.: None)	
$<$ 1,000 Euro	-.402**
	(0.158)
1,000 - $<$ 5,000 Euro	0.195
	(0.121)
5,000 - $<$ 10,000 Euro	0.283**
	(0.127)
10,000 - $<$ 50,000 Euro	0.065
	(0.103)
$\geq$ 50,000 Euro	-.235*
	(0.128)
Capital at Start consisted entirely of own Equity	-.071
	(0.076)
Constant	-1.814***
	(0.387)
Number of observations	2,408
Pseudo R^2	0.384
Log-likelihood	-989.202
Hit-Rate (share of correct predictions in %)	81.8

Notes: Subsidized founders: Out of unemployment. Regular founders: Non-subsidized business founders out of non-unemployment. Standard errors in parentheses; statistical significance at the 1/5/10 %-level is denoted by ***/**/*.
[a)] Standardized by (Age-15)

Table A.4.9: Matching Quality — Subsidized Business Founders vs. Regular Business Founders

	Before Matching	After Matching
t-test of equal means[a]		
1%-level	40	4
5%-level	48	17
10%-level	51	21
Mean standardized bias	15.76	4.12
Number of Variables with standardized bias of certain amount		
$< 1\%$	3	9
1% until $< 3\%$	7	26
3% until $< 5\%$	6	12
5% until $< 10\%$	14	24
$\geq 10\%$	44	3
Pseudo R^2	0.39	0.03

Notes: Depicted are different statistics to assess the quality of the matching process, i.e., whether the distribution of observable characteristics between subsidized business founders out of unemployment and regular business founders (i.e. non-subsidized business founders out of non-unemployment) is sufficiently balanced. In total, 74 variables are considered. Deviant values in terms of Pseudo R^2 compared to Table A.4.8 are due to implemented common support conditions, i.e., due to excluded observations.

[a)] Depicted is the number of variables which differ significantly between treated and controls. The decision is based on a simple t-test of equal means.

4.8 Supplementary Referee Appendix

This Supplementary Appendix provides additional information to the referee and is not intended to be published but will be made available online.

Content:

Section 4.8.1 contains additional information to Section 4.4 in the paper. It provides details on the implementation of the survey.

Section 4.8.2 contains additional tables presenting results of sensitivity checks and additional information to the referees.

4.8.1 Details on the Implementation of the Survey

The interviews were collected by a professional survey institute *infas*[25] using pre-tested computer-assisted telephone interviews (CATI). The interview language was German.

Questionnaire: The questionnaire can be divided into a cross-sectional and longitudinal part. The information collected in the cross-section is related to the time of the interview, i.e. about 19 months after start-up. The cross-section contains questions with respect to individual characteristics (including labor market experience), the start-up period, business-related characteristics, household information and intergenerational mobility. The longitudinal section collects monthly information on labor market activities. Thereby, the respondents were asked to update their labor market biography retrospectively starting at business start-up (in the first quarter of 2009) until the interview. This allows to reconstruct the labor market biography of the respondents for the observation window of the survey. In addition to the content-related questions, the questionnaire contains several screening questions which aim is to identify the respondent and to make sure that he/she belongs to the target population.

Preparatory tasks: To check the overall acceptance of the study by the respondents, examine the consistency of the questionnaire (integrity of questions and response items) and check the duration of the interview, the survey institute conducted a pre-test during the period October 7-10, 2010. Therefore, the survey institute contacted randomly selected subsidized and regular business founders, conducting 34 interviews in total. Based on these interviews, the questionnaire was revised. Before the main survey finally started, all individuals selected for an interview received a letter prior to being contacted. The main purpose of the letter was to increase the acceptance of the study and therefore participation rates by informing the individuals about the content and background of the survey, data security legislation and highlighting that participation is indeed voluntarily yet highly important for the representativeness of the survey. In this letter (and also at the beginning of each interview), we highlighted that their answers will be treated absolutely anonymous and that public institution such as the Employment Agency will have never access to the data.

[25] infas Institute for Applied Social Sciences is a private and independent market and social research institution in Bonn, Germany.

Field stage: The interviews were collected in the period from November 18, 2010 to March 26, 2011. The survey institute only appointed interviewers who were already experienced in conducting surveys collecting longitudinal information. In addition, all interviewers received survey-specific training, where they learned about the design and background of this study. The average duration of the interviews amounts to 43 minutes.

Response rates The survey institute was requested to conduct 2,300 interviews for each group. Starting from a gross sample of 5,975 (26,984) subsidized (regular) business founders as shown in Table A.4.10, 3,840 (19,938) individuals were contacted. Thereby, the gross sample for the subsidized business founders was randomly extracted from the administrative data of the Federal Employment Agency. As explained in Section 5.3, the construction of the gross sample for the case of regular start-ups was not straightforward given the absence of a centralized register for all business founders in Germany. Therefore, we had to rely on three different data sources (CCI, CC, PAP) in order to obtain contact information. Given that we had no experiences with the quality of such data sources, we decided to draw a larger sample of contact information to make sure that we have enough addresses available in order to realize the required number of observations. Therefore, the gross sample of regular business founders is almost five times as big as the gross sample of subsidized start-ups.

Table A.4.10 shows that out of all individuals contacted, 2,306 (2,303) interviews were realized with subsidized (regular) founders, which corresponds to a participation rate of 30.1% (11.6%). The other contacted individuals could not be interviewed due to several reasons. First, 383 (6,133) could not be reached at all, mainly due to invalid telephone numbers or addresses. Although the survey institute took great care of investigating missing or wrong telephone numbers, the failure rate for regular founders is still three times higher than for subsidized start-ups. This confirms our expectation that the quality of the contact information from the administrative data for the subsidized founders is much better than those for the regular founders. However, when a respondent could be reached, than we find similar refusal rates. It can be seen that 25.6% (27.0%) of the subsidized (regular) founders refused to give an interview. Insufficient language skills only play a minor role for interview refusal.

As explained above, we conducted a very detailed screening at the beginning of each interview in order to ensure that we only interviewed individuals who unambiguously belong to the specified target population (business start-ups with and without subsidy receipt in

the first quarter of 2009). The screening was particularly important for the group of regular business founders because the available information provided by the three data sources (CCI, CC, PAP) only allowed for a raw identification of the target population. One major aim of the screening was to ensure that the right person was interviewed, i.e., the business owner or executive director. Table A.4.10 shows that only 10% of the subsidized founders were excluded based on the screening procedure while this amounts to 30.8% for regular business start-ups.

Table A.4.10: Response Rates

		Subsidized Start-ups	Regular Start-ups
Gross sample		5,975	26,984
	%	100	100
Not contacted		2,135	7,046
	%	35.7	26.1
Contacted		3,840	19,938
	%	100	100
Not reachable[a)]		383	6,133
	%	10.0	30.8
Refusals		983	5,374
	%	25.6	27.0
Insufficient language skills		69	178
	%	1.8	0.9
Screening drop-outs[b)]		99	5,950
	%	2.6	29.8
Realized interviews (compare Figure 3.3)		2,306	2,303
	%	60.1	11.6

a) Due to wrong telephone number/address, sickness, disability or death of the respondent.
b) At the beginning of each interview, the respondents had to answer several screening questions to make sure that we interview the right person and that he/she belongs to the target population.

4.8.2 Sensitivity Analysis and Additional Information

Table A.4.11: Detailed Consideration of Business Development to Determine the Role of Deadweight Effects for the Subgroup of 21.3% that is Potentially Affected by Deadweight Weight Effects Using the Broad Definition (see Section 4.5.1 in the paper)

	Suspicious subgroup of subsidized founders (1)	Regular founders Conditional value (2)
Full sample		
Share in self-employment (in %)	91.4	76.4***
Number of Observations	301	930
Conditional analysis: Self-employed individuals only		
Income measures (in Euro, net)[a)]		
Monthly working income	3,190.2	3,735.5
Hourly working income	15.4	18.5
Number of Observations	245	517
Employee structure		
At least one employee (in %)	44.7	63.3***
Number of full-time equivalents[b)]	3.3	6.8***
Number of Observations	275	667
Innovation implemented by businesses (in %)[c)]		
Filed patent application	2.2	7.9
Filed application to legally protect corporate identity	6.5	17.9**
Number of Observations	138	398

Note: Values are measured 19 months after start-up. The first column shows the outcome variables as realized by the subsidized businesses out of unemployment 19 months after start-up. Column two shows the conditional values for regular business founders. Conditional values are calculated based on propensity score matching. Statistical significance at the 1/5/10 %-level is denoted by ***/**/* and are based on bootstrapping with 200 replications.

[a)] We excluded eight individuals who reported a monthly income larger than 30,000 Euro.

[b)] Number of full-time equivalent employees is a weighted sum of different employment types, whereby full-time worker receive the weight 1, part-time worker and apprentices a weight of 0.5, and other employees a weight of 0.25. We excluded four observations with inconsistent information and one statistical outlier from the analysis.

[c)] Only half of the sample (randomly drawn) received this question.

Table A.4.12: Business Development 19 Months After Start-up — Excluding Business Founders with Industry-specific Experience from Previous Self-employment

	Subsidized founders (1)	Regular founders conditional (2)
Full sample		
Share in self-employment (in %)	80.8	73.8**
Number of Observations	1,143	701
Conditional analysis: Self-employed individuals only		
Income measures (in Euro, net)[a)]		
Monthly working income	2,458.3	3,412.8**
Hourly working income	11.9	17.1**
Number of Observations	776	369
Employee structure		
At least one employee (in %)	36.4	60.1***
Number of full-time equivalents[b)]	3.0	7.2***
Number of Observations	923	479
Innovation implemented by businesses (in %)[c)]		
Filed patent application	1.9	0.4**
Filed application to legally protect corporate identity	6.5	13.0
Number of Observations	433	273

Note: Subsidized founders: Out of unemployment. Regular founders: Non-subsidized business founders out of non-unemployment. The first column shows the outcome variables as realized by the subsidized businesses out of unemployment 19 months after start-up. Column two shows the conditional values for regular business founders. Conditional values are calculated based on propensity score matching. Statistical significance at the 1/5/10 %-level is denoted by ***/**/* and are based on bootstrapping with 200 replications.

[a)] We excluded eight individuals who reported a monthly income larger than 30,000 Euro.

[b)] Number of full-time equivalent employees is a weighted sum of different employment types, whereby full-time worker receive the weight 1, part-time worker and apprentices a weight of 0.5, and other employees a weight of 0.25. We excluded four observations with inconsistent information and one statistical outlier from the analysis.

[c)] Only half of the sample (randomly drawn) received this question.

Table A.4.13: Business Development 19 Months After Start-up — Excluding Individuals with Business Takeover from Parents

	Subsidized founders (1)	Regular founders conditional (2)
Full sample		
Share in self-employment (in %)	80.1	74.2*
Number of Observations	1,409	796
Conditional analysis: Self-employed individuals only		
Income measures (in Euro, net)[a)]		
Monthly working income	2,366.4	3,062.0**
Hourly working income	11.5	15.1**
Number of Observations	931	421
Employee structure		
At least one employee (in %)	35.1	55.5***
Number of full-time equivalents[b)]	3.1	6.2***
Number of Observations	1,094	547
Innovation implemented by businesses (in %)[c)]		
Filed patent application	2.1	2.6
Filed application to legally protect corporate identity	7.0	16.1**
Number of Observations	529	323

Note: Subsidized founders: Out of unemployment. Regular founders: Non-subsidized business founders out of non-unemployment. The first column shows the outcome variables as realized by the subsidized businesses out of unemployment 19 months after start-up. Column two shows the conditional values for regular business founders. Conditional values are calculated based on propensity score matching. Statistical significance at the 1/5/10 %-level is denoted by ***/**/* and are based on bootstrapping with 200 replications.

[a)] We excluded eight individuals who reported a monthly income larger than 30,000 Euro.

[b)] Number of full-time equivalent employees is a weighted sum of different employment types, whereby full-time worker receive the weight 1, part-time worker and apprentices a weight of 0.5, and other employees a weight of 0.25. We excluded four observations with inconsistent information and one statistical outlier from the analysis.

[c)] Only half of the sample (randomly drawn) received this question.

Table A.4.14: Business Development 19 Months After Start-up — Necessity Start-ups Only

	Subsidized founders (1)	Regular founders conditional (2)
Full sample		
Share in self-employment (in %)	73.2	69.4
Number of Observations	347	136
Conditional analysis: Self-employed individuals only		
Income measures (in Euro, net)[a)]		
Monthly working income	2,060.6	1,972.5
Hourly working income	10.7	10.7
Number of Observations	165	69
Employee structure		
At least one employee (in %)	29.0	32.1
Number of full-time equivalents[b)]	5.2	1.7
Number of Observations	252	89
Innovation implemented by businesses (in %)[c)]		
Filed patent application	1.8	3.6
Filed application to legally protect corporate identity	6.1	11.1
Number of Observations	114	50

Note: Necessity Start-up: Individuals who reported that they started a business because of missing employment alternatives or based on the advice of the employment agency. Subsidized founders: Out of unemployment. Regular founders: Non-subsidized business founders out of non-unemployment. The first column shows the outcome variables as realized by the subsidized businesses out of unemployment 19 months after start-up. Column two shows the conditional values for regular business founders. Conditional values are calculated based on propensity score matching. Statistical significance at the 1/5/10 %-level is denoted by ***/**/* and are based on bootstrapping with 200 replications.

[a)] We excluded eight individuals who reported a monthly income larger than 30,000 Euro.

[b)] Number of full-time equivalent employees is a weighted sum of different employment types, whereby full-time worker receive the weight 1, part-time worker and apprentices a weight of 0.5, and other employees a weight of 0.25. We excluded four observations with inconsistent information and one statistical outlier from the analysis.

[c)] Only half of the sample (randomly drawn) received this question.

Table A.4.15: Business Development 19 Months After Start-up — Using an Alternative Specification (Including one Additional Dummy Indicating Necessity Start-ups) for the Estimation of the Propensity Score

	Subsidized founders (1)	Regular founders conditional (2)
Full sample		
Share in self-employment (in %)	80.7	73.9**
Number of Observations	1,464	930
Conditional analysis: Self-employed individuals only		
Income measures (in Euro, net)[a)]		
Monthly working income	2,390.8	3,053.8**
Hourly working income	11.6	15.1**
Number of Observations	970	517
Employee structure		
At least one employee (in %)	36.4	57.4***
Number of full-time equivalents[b)]	3.0	5.8***
Number of Observations	1,135	675
Innovation implemented by businesses (in %)[c)]		
Filed patent application	2.0	2.6
Filed application to legally protect corporate identity	6.7	15.9**
Number of Observations	554	401

Note: Necessity Start-up: Individuals who reported that they started a business because of missing employment alternatives or based on the advice of the employment agency. Subsidized founders: Out of unemployment. Regular founders: Non-subsidized business founders out of non-unemployment. The first column shows the outcome variables as realized by the subsidized businesses out of unemployment 19 months after start-up. Column two shows the conditional values for regular business founders. Conditional values are calculated based on propensity score matching. Statistical significance at the 1/5/10 %-level is denoted by ***/**/* and are based on bootstrapping with 200 replications.

[a)] We excluded eight individuals who reported a monthly income larger than 30,000 Euro.

[b)] Number of full-time equivalent employees is a weighted sum of different employment types, whereby full-time worker receive the weight 1, part-time worker and apprentices a weight of 0.5, and other employees a weight of 0.25. We excluded four observations with inconsistent information and one statistical outlier from the analysis.

[c)] Only half of the sample (randomly drawn) received this question.

Table A.4.16: Business Development 19 Months After Start-up — Using an Alternative Specification (Including Two Additional Dummies for the Receipt of a Subsidized Loan or Business Coaching) for the Estimation of the Propensity Score

	Subsidized founders (1)	Regular founders conditional (2)
Full sample		
Share in self-employment (in %)	80.6	74.6**
Number of Observations	1,441	929
Conditional analysis: Self-employed individuals only		
Income measures (in Euro, net)[a)]		
Monthly working income	2,416.3	3,050.4*
Hourly working income	11.6	14.9**
Number of Observations	975	517
Employee structure		
At least one employee (in %)	36.4	57.3***
Number of full-time equivalents[b)]	3.0	6.2***
Number of Observations	1,135	675
Innovation implemented by businesses (in %)[c)]		
Filed patent application	2.0	2.4
Filed application to legally protect corporate identity	6.7	14.8**
Number of Observations	555	400

Note: Subsidized founders: Out of unemployment. Regular founders: Non-subsidized business founders out of non-unemployment. The first column shows the outcome variables as realized by the subsidized businesses out of unemployment 19 months after start-up. Column two shows the conditional values for regular business founders. Conditional values are calculated based on propensity score matching. Statistical significance at the 1/5/10 %-level is denoted by ***/**/* and are based on bootstrapping with 200 replications.

[a)] We excluded eight individuals who reported a monthly income larger than 30,000 Euro.

[b)] Number of full-time equivalent employees is a weighted sum of different employment types, whereby full-time worker receive the weight 1, part-time worker and apprentices a weight of 0.5, and other employees a weight of 0.25. We excluded four observations with inconsistent information and one statistical outlier from the analysis.

[c)] Only half of the sample (randomly drawn) received this question.

Table A.4.17: Descriptive Evidence on the Occurrence of Deadweight Effects Related to the Start-up Subsidy

	Second dimension of deadweight effects Statement: The subsidy was highly relevant for business survival during the founding period (first six months).[a)]			Total
	Disagree	Perhaps	Agree	
First dimension of deadweight effects				
Statement 1: I would you have started a business even without the subsidy?				
1 = Fully disagree	2.5	1.4	19.9	23.8
2	1.4	0.9	6.6	8.8
3	1.6	0.9	7.1	9.6
4	2.0	1.0	6.5	9.5
5	2.8	0.7	6.5	10.0
6	2.7	1.2	4.1	8.1
7 = Fully agree	15.7	2.8	11.7	30.2
Statement 2: Did you intentionally register as unemployed to receive the subsidy?				
No	20.2	6.3	50.8	77.2
Yes	8.6	2.5	11.7	22.8
Number of Observations				1,471

Notes: Only subsidized founders. Shares in %.

[a)] The categories rely on a aggregation of a scale variable. The respondents were faced with the statement and asked to give their answer on a scale from 1 (fully disagree) to 7 (fully agree). We categorized the values 1 to 3 to "Disagree", 4 to "Perhaps", and 5 to 7 to "Agree".

CHAPTER 5

Job Search 2.0: Internet Search and Subsequent Labor Market Outcomes of Unemployed Individuals in Germany

Abstract: We contribute to the literature about the effects of the internet on the labor market by considering a number of job search outcomes that have not yet been analyzed in previous studies. We find a positive statistical link between using the internet to search for jobs during unemployment and the outcomes hourly reservation wages and search effort. These results hold even after controlling for a rich set of observable characteristics that also include validated measures of personality. With regard to whether jobs found through the internet are in general of better quality in terms of subsequent hourly net income and job satisfaction, our results indicate that only highly qualified individuals benefit from finding a job through the internet in terms of a higher subsequent hourly net income. We therefore provide supporting evidence that the vast information available in the internet about new jobs might at first lead to an increased selectivity and a higher job search effort during job search, but might prevent a large part of employers and employees from exploiting the full benefits of the internet with respect to matching quality.[1]

[1]This paper is joint work with Marco Caliendo, and uses the IZA Evaluation Dataset provided by the Institute for the Study of Labor (IZA). The IZA Evaluation Dataset Survey consists of survey information on individuals who entered unemployment between June 2007 and May 2008 in Germany. Financial Support by the Deutsche Post Foundation is gratefully acknowledged.

5.1 Introduction

Using the internet to search for jobs has become increasingly popular in Germany. Online job search engines recorded around 23 million visits in the third quarter of 2009 in Germany, which constitutes a 28% increase compared to the same quarter of the previous year (BITKOM, 2009). At the same time, the internet has also become a major tool for firms with regard to vacancy posting, how applications are processed, and how potential job candidates are screened (Dietz et al., 2013; Weitzel et al., 2012). This empirical evidence, which also holds for other countries, has motivated a range of studies on the effects of the internet on the labor market. However, the resulting empirical evidence is still inconclusive to date. Whereas Kuhn and Skuterud (2004), Stevenson (2009), Fountain (2005), and Kroft and Pope (2012) do not find beneficial effects of the internet on the labor market, a positive relationship is established by Beard, Ford, and Saba (2010), Kuhn and Mansour (2011), and Atasoy (2013).

Using the internet for job search allows the unemployed job seeker to acquire more information about companies and characteristics of open positions in a shorter time, and at a much lower cost compared to other channels. Beyond the actual job opening, the job seeker can also look at the website of a potential employer for additional relevant information not included in the job opening, or browse through anonymous online forums where she can obtain information about potential (dis-)advantages of an engagement with a potential employer.[2] All this can be done at virtual no cost, thus decreasing search frictions job searchers face on the labor market (Stigler, 1962). But not only is the internet lowering the cost of information acquisition. Applying for jobs also becomes much cheaper, as sending out résumés can often be done at any time without ever leaving one's own

[2]For example, webpages like *www.kununu.de*, or *www.glassdoor.com* allow employees to anonymously rate their company according to certain criteria. Moreover, individuals can also compose experience reports about working conditions, or post offered salaries, and questions during job interviews.

desk (Stevenson, 2009). Therefore, it is reasonable to assume that the search intensity and therefore the arrival rate of job offers also increases since more jobs can be considered more rapidly by the job seeker. In a simple job search model framework, an increasing job offer arrival rate induced by a higher job search effort is predicted to lead to higher reservation wages and therefore ultimately to higher accepted wages (McCall, 1970; Mortensen, 1986).

However, workers first have to signal their productivity to the employer, which in turn might face an excess of applications, or receives applications from workers that are not, or only partially qualified for the job position (Autor, 2001; Fountain, 2005). Therefore, the internet might intensify the challenge for employers to evaluate the abundant information about potential job candidates. Hence, it remains an open question whether finding a job through the internet does also lead to a better job quality compared to other job search channels.

Using a unique data set of newly unemployed individuals in Germany, we contribute to the previous literature by considering the effect of job search via the internet on the reservation wage and a direct measure of search intensity as job search outcomes that have not yet been empirically analyzed in previous studies. While our data allow us to control for a significant number of potential confounders, we are unable to rely on exogenous variation to identify the causal effect of internet job search on the outcomes mentioned above. While our analysis does not try to give a definite answer to the causal relation, we are confident that by uncovering the relationship between internet job search and job search behavior, we are able to encourage further investigation on this topic. We additionally analyze whether individuals who successfully find a job through the internet earn more with respect to their subsequent hourly net income, and whether they are more satisfied with their new job compared to similar workers who find their job through another channel. To this end, we apply a propensity score matching approach.

We find a positive correlation between using the internet to search for jobs during unemployment and hourly reservation wages, as well as internet job search and search effort. These results hold even after controlling for a rich set of observable characteristics that also include validated measures of personality. However, we find mixed empirical evidence with regard to whether or not jobs found through the internet are in general of better quality in terms of subsequent hourly net income and job satisfaction. Our results indicate that only highly qualified individuals significantly benefit from finding a job through the internet, at least in terms of subsequent hourly net income.

The remainder of this paper is organized as follows: The next section gives a short overview of the related literature. Section 5.3 describes the data we use for our analysis and provides first descriptive evidence. Section 5.4 documents our empirical results. Finally, section 5.5 concludes.

5.2 Related Literature

Several studies explore the impact of the internet on the labor market, both in an equilibrium and partial equilibrium framework. Given that the use of internet job boards in the U.S. had already grown spectacularly at the turn of the millennium, Autor (2001) discusses possible scenarios of the effect of the internet on the labor market: First, Autor argues that the internet is increasing the efficiency with which workers are matched to jobs. This could be due to the fact that more initial job interviews can be set up between potential employees and workers, or due to more efficient online pre-screening of job candidates by the firm. Second, another potential consequence of the internet is that it increases job match quality: Because search costs are reduced and firms can consider more possible candidates more rapidly, reservation wages rise and so do earnings of the recruited workers. However, Autor also considers potential negative effects of the internet effect on the labor

market. In particular, he considers the possibility of an adverse selection of job candidates, as job applicants might apply for jobs they are not qualified for, because submitting an application to an employer is less costly when done online.

Kuhn and Skuterud (2004) examine the diffusion of internet job search among unemployed individuals, and estimate its effect on unemployment durations using data from the Current Population Survey (CPS) of 1998 and 2000. The authors find that, after controlling for observable characteristics, using the internet to search for jobs on average *increases* the unemployment duration. They suggest that this counterintuitive effect might either result from a negative selection on unobservables of job searchers looking for work online, or may be due to the ineffectiveness of internet job search per se. Fountain (2005) also uses the CPS for the same period, and evaluates the effect of the internet on the short-term probability of finding a job. She finds that searching the internet leads to a small positive effect on the probability of being reemployed in 1998, but this positive effect disappears for job searchers in 2000. Based on these results, she concludes that the initial advantage of the internet was not due to more efficient search, but due to the small fraction of job searchers using the internet in the early years. Fountain offers two potential reasons for this: First, the small share of individuals using the internet to search for jobs had better and more access to job information and hence a comparative advantage over those who did not use the internet for job search. Second, she hypothesizes that using the internet was a positive signal to employers in terms of the perceived productivity and resourcefulness of the job applicants since using the internet in 1998 was an exception rather than the rule. When many more workers had integrated the internet into their job search strategy in mid-2000, both advantages had disappeared.

Beard, Ford, and Saba (2010) investigate the hypothesis that the internet job search increases aggregate employment rates by keeping unemployed individuals from exiting the labor market due to, e.g., discouragement. Their econometric analysis suggests that using

the internet reduces the probability of becoming inactive due to discouragement by more than 50% when using a broadband connection at home. Using the 2005-2008 period of the National Longitudinal Survey of Youth (NLSY97), Kuhn and Mansour (2011) assess whether searching the internet for jobs reduces unemployment durations. Compared to Kuhn and Skuterud (2004), the authors find that the findings of a counterproductive effect of the internet is reversed: Searching the internet is associated with a 25% reduction in unemployment durations compared to individuals not using the internet. Kuhn and Mansour *inter alia* suggest that this change in effectiveness is due the improved usability of search sites, and the increasing popularity of industry- and occupation based niche sites. However, when examining the job quality of the newly found jobs with respect to wage changes between the last and the current job, the authors do not find any significant effects of internet search.

Kroft and Pope (2012) assess the effect of the introduction of online job search services on local labor market outcomes, exploiting regional variation in the expansion of the website "Craigslist" in the U.S. between 2005 and 2007 to analyze whether the internet had an impact on the apartment and housing rental market, and on local unemployment rates. While they find that "Craigslist" increased the matching efficiency on the housing and rental labor market, they do not detect an effect of the internet on the overall level of unemployment. They attribute this result to the fact that, unlike in the apartment market, local online job postings may not greatly improve the quality of information for job search relative to local print media, and that "Craigslist" may not have been as popular for job search compared to the other services. Atasoy (2013) shows based on county level data of the U.S. that gaining access to broadband services between 1999 and 2007 was associated with a 1.8 percentage point increase in employment rates. The effect was especially pronounced in rural areas. Stevenson (2009) examines how the internet has altered the search behavior of unemployed individuals. She finds that the growing nationwide inter-

net penetration between 1992 and 2002 resulted in an increase in the variety of job search methods used and the extent of job search behavior. However, no direct empirical evidence is provided regarding the question whether searching the internet for jobs is more effective relative to other search methods.

Finally, Brenčič (2014) examines the usage of online job boards and résumé banks, and finds that both employers and job searchers tend to visit websites that host a larger number of postings more often. However, once on the site, only a small fraction of job advertisements is actually reviewed by either group. The author concludes that both firms and workers are confronted with a high cost of information processing by reviewing the vast amount of information available online, and are therefore not able to exploit the full benefits of the internet with regard to the labor market.

5.3 Data and Descriptive Statistics

For our analysis we use a unique survey data set covering a sample of around 17,400 individuals who entered unemployment in Germany between June 2007 and May 2008. The inflow sample was drawn from the administrative records of the Federal Employment Agency (FEA) and constitutes a representative sample of monthly unemployment entries eligible for Unemployment Benefit I and between 17 and 54 years of age. Based on a first survey interview shortly after unemployment entry, the initially unemployed were followed over time; a second and third interview were conducted 12 and 36 months after unemployment entry, respectively (see Caliendo, Falk, Kaiser, Schneider, Uhlendorff, van den Berg, and Zimmermann, 2011, for details). The survey data include – alongside socio-demographic variables – detailed information on search behavior, i.e. search channels used, search effort, and reservation wage. Since individuals were followed over time, the data also comprise longitudinal information on the timing of employment spells subsequent to unemployment

entry, covering also employment characteristics, such as reemployment wages, job satisfaction, firm size, sector of work and whether the employer was in the public or the private sector. During the first interview, individuals were asked detailed questions about their job search strategy. Based on this we derive as our main variable of interest the use of the internet as job search search channel. The corresponding survey question was designed as a multiple choice question in which individuals were asked to mark the channels they use to obtain information about available jobs. The overall listing named ten different search channels, including "traditional" channels like newspaper advertisements, public employment agency, and private contacts, as well as "Research on the Internet" (see Table A.5.17 in the Appendix for the exact wording of the job search questions).

5.3.1 Unemployment Sample

For the first part of our analysis we restrict our sample to individuals who are still unemployed at time of the first survey, are actively looking for work, provide information on their last employment as well as their current reservation wage, and who also participated in the second survey interview one year after unemployment entry. After imposing these restrictions, 4,906 individuals are left in our "unemployment" sample (henceforth UE-Sample).[3] Table 5.1 depicts selected sample descriptives of the UE-sample, which we divide in total observations (column (1)), as well as sub-samples of internet (column (2)), and non-internet searchers (column (3)). The average individual in our sample is 37 years old and was unemployed for around two months at point of the first interview. Comparing the age distribution by use of the internet for job search we find that individuals searching the internet are more likely to be between 15 and 34 years old, whereas non-internet searchers are more likely to belong to the oldest age category (45-55 years). Individuals searching the internet are also more likely to be located in West Germany (70% vs. 60%),

[3]See Tables A.5.15 and A.5.16 in the Appendix for detailed information on the sample construction

Table 5.1: Selected Descriptives UE-Sample

	Total	Internet Search Yes	Internet Search No	sign.
	(1)	(2)	(3)	(4)
Duration of Unemployment until time of first survey (in days)	66.1	66.3	64.6	***
Socio-demographics				
Age (in years)	36.8	36.5	39.2	***
Age Bracket				
15-24 years	18.1	18.6	14.9	**
25-34 years	25.2	26.2	18.7	***
35-44 years	29.1	29.0	29.9	
45-55 years	27.6	26.3	36.6	***
West Germany	68.4	69.7	59.4	***
Home Internet Access	78.9	83.8	46.0	***
E-Mail Access	76.8	81.7	43.1	
Highest Schooling Degree				
Lower Secondary School Certificate	27.0	25.3	38.8	***
Middle Secondary School Certificate	41.9	41.9	42.3	
Upper Secondary School Certificate	28.7	30.7	15.0	***
No School Certificate	2.3	2.1	3.8	***
Highest Level of Professional Education				
No/other Degree	12.3	11.9	15.0	**
Apprenticeship	56.1	54.8	65.2	***
Vocational Academy	9.6	9.6	9.4	
Technical College, Masters Certificate	11.1	11.9	5.8	***
University Degree	10.9	11.8	4.6	***
Job Search Channels Used				
Internet Research	87.2	100.0	0.0	
Newspaper	84.4	86.8	67.7	***
Personal Placement of Ad	13.2	14.0	8.1	***
Job Information System (SIS)	61.1	65.1	33.4	***
Friends/Relatives/Private Contacts	84.8	85.7	78.1	***
Employment Office	70.1	72.8	51.6	***
Private Agency (with Voucher)[a)]	8.9	9.3	6.4	***
Private Agency (without Voucher)	16.3	17.5	7.7	***
Blind Applications at Companies	66.2	68.3	51.9	
Else	19.3	19.6	17.6	
Number of Observations	4,906	4,280	626	

Source: IZA Evaluation Dataset S, own calculations.
Note: Statistical significance of mean difference between Internet and Non-Internet searchers at the 1/5/10%-level is indicated by ***/**/* (two-tailed t-test)
[a)] As part of Active Labor Market Policy, unemployed individuals who are eligible for Unemployment Benefit I may receive vouchers from the Federal Employment Agency covering the costs for consulting a private placement agency of their choice.

which might point towards a digital divide between East and West Germany.[4] We find that 79% of individuals in our sample report to have internet access at home. Interestingly, not having access to the internet at home does not mean that the internet is not part of the job search strategy and vice versa. Of all individuals looking for jobs online, around 16% do not have access to the internet at home at time of survey. At the same time, around 46% of all individuals searching for jobs off-line have internet access at home. Regarding educational attainment, we observe that individuals looking for work online are on average better educated than those not using the internet. For example, around 31% of the internet searchers obtained an upper secondary school certificate compared to only 15% among the group of non-internet searchers. The same pattern applies with respect to the level of professional education. Whereas around 12% of individuals looking for work online have completed a Technical College/Masters Certificate or a University degree, respectively, this applies to only 6% (5%) of non-internet searchers. All of these mean differences are statistically significant from zero.

Looking at the distribution of search channel use, Table 5.1 shows that the share of unemployed looking for jobs online is very high at 87% in the total sample. This share constitutes the highest one among all other search channels, surpassing popular "traditional" methods like looking for jobs via "newspaper advertisements" (84%) and via "friends/relatives/private contacts" (85%). Regarding the overall intensity of job search, Table 5.1 further reveals that unemployed using the internet for job search are more likely to use *any* of the remaining "traditional" search methods compared to individuals not searching online. While this is likely to be related to co-varying differences in labor market characteristics, as the ones pointed out above, this positive relation may also capture the complementary role of the internet for other search channels, i.e., the internet may

[4] After reunification, there was an enormous lack of telephone lines with acceptable quality in many parts of East Germany. The enormous demand for phone lines led to a headlong implementation of incompatible technology in many parts of East Germany, which today hinders the launch of broadband internet there (Bauernschuster, Falck, and Wößmann, 2011).

facilitate job search also through off-line methods. Unfortunately, the data do not contain information on *how* the internet was used for job search, and therefore also do not give any indication on the relevance of the internet for using the other job search methods. Hence, we are not able to further analyze if the internet also facilitates search among other channels with our data at hand.

Hourly Reservation Wage and Search Effort The information on hourly reservation wages was collected in several steps: First, the respondent was asked what she expects as a monthly income from her prospective employment. In a second step, the respondent had to indicate how many hours a week she would expect to work for the monthly expected income defined in the previous question. Finally, the individual was asked if she would be willing to work for *less* than the expected wage, and if so, indicate the minimal monthly wage required. Based on this monthly reservation wage, the corresponding hourly reservation wage is calculated, by dividing the monthly reservation wage by 4.33 times the weekly working hours. Table 5.2 provides a picture of the unconditional reservation wage differentials between individuals searching through the internet and individuals not using the internet as a search channel. We find that internet searchers report an average hourly reservation wage of 7.9 Euro that is 9% higher than that of individuals not using the internet as a search channel. The difference is highly significant.

As measures for the overall search intensity, we use the number of own applications that had been sent out by the individual until the time of survey. The exact wording of the question is "How often did you apply for jobs during this time (i.e. since the start of your unemployment), which were not offered by the employment agency?". Hence, this measure reflects search effort that was undertaken on the individual's own account. Looking at the unconditional mean difference of search intensity in Table 5.2, we find that individuals looking for work online send out almost twice as many own applications compared to

off-line searchers. Again, the mean difference is highly significant. Although the overall distribution of search intensity is slightly skewed, this considerable mean difference is not driven by outliers as the median search intensity of the group of internet searchers is also twice as high compared to individuals not using the internet.

Table 5.2: Hourly Reservation Wage and Search Effort

		Internet Search		
	Total	Yes	No	sign.
	(1)	(2)	(3)	(4)
Hourly Reservation Wage (in Euro)	7.79	7.89	7.22	***
Std. Dev.	(3.15)	(3.18)	(2.89)	
Median	[7.14]	[7.30]	[6.77]	
Total Number of own Job Applications sent out	14.16	15.10	7.79	***
Std. Dev.	(15.18)	(15.56)	(10.30)	
Median	[10.00]	[10.00]	[5.00]	
Number of Observations	4,906	4,280	626	

Source: IZA Evaluation Dataset S, own calculations.
Note: Statistical significance of mean difference between Internet and Non-Internet searchers at the 1/5/10%-level is indicated by ***/**/* (two-tailed t-test)

5.3.2 Reemployment Sample

For the analysis of internet research as a successful job search method on subsequent net income and job satisfaction, we construct an additional "reemployment" sample (henceforth RE-sample) consisting of initially unemployed individuals, who became re-employed in dependent employment at least once after the date of the first survey. Our main interest thereby lies in identifying the *first* subsequent employment spell after the date of the first interview.[5] We focus on regular employment, i.e., employment relationships that were not subsidized by the FEA, resulting in 3,061 observations.[6] Due to missing observations in relevant covariates, the number of observations used in the empirical analysis further reduces to 2,850. Linked to the respective first employment spell after unemployment, we are able to observe information on the monthly net income, working hours, and a range of job satisfaction measures. To identify whether employment was found through internet search, we rely on a question asking for the successful search channel through which the respective employment was found (see again Table A.5.17 in the Appendix). Column (1) of Table 5.3 depicts the distribution of the successful search channels of the respective first subsequent employment spells in the total sample of all re-employed individuals. It provides suggestive evidence that the internet is among the most productive search channels: 16% of all re-employed individuals indicate to have found their new subsequent dependent employment through research on the internet, making it the second most important channel after "Friends/Relatives/Private Contacts" (29%). If we split the sample between individuals who stated to have searched online for jobs during their unemployment spell, and those individuals who did not use the internet (Columns (2) and (3)), we find that

[5]The respective spell is identified by an retrospective assessment of the individual's employment history between the first, second, and third wave (for more information see Caliendo et al., 2010).

[6]In total, we observe a re-employment spell for 72% of the initial UE-sample. Out of these, 9% obtained a job in dependent employment that was subsidized by the FEA. These individuals were discarded along with an additional 147 observations that had to be dropped due to information inconsistencies.

Table 5.3: Successful Search Channels and Internet Search[a)]

	Total	Internet Search: Yes	Internet Search: No	sign.
	(1)	(2)	(3)	(4)
Friends/Relatives/Private Contacts	28.5	26.6	42.8	***
Internet Research	16.6	18.2	4.5	***
Newspaper	15.6	15.9	14.1	
Blind Application at companies	11.4	11.4	11.3	
Employment Office	9.8	9.8	9.9	
Private Agency	3.1	3.2	2.2	
Other Methods[b)]	14.9	14.9	15.1	
Number of Observations	3,061	2,706	355	

Source: IZA Evaluation Dataset S, own calculations.
Note: Statistical significance of mean difference between Internet and Non-Internet searchers at the 1/5/10%-level is indicated by ***/**/* (two-tailed t-test)
[a)] Only includes individuals who entered regular dependent employment at least once between the first and the second survey interview. Depicted is the self-reported successful search channel of first dependent employment spell.
[b)] "Job Information System", "Personal Placement of Ad", and "Other" were subsumed under this category.

individuals who have not searched the internet during their unemployment spell have a very high probability to find a job through "Friends/Relatives/Private Contacts" (43%), while the shares of the remaining job search methods are rather similar between both subgroups. This suggests that individuals not searching the internet are more able to rely on productive social networks during their job search. At the same time, around 5% of these individuals state to have found their first subsequent employment through the internet. This either points to a dynamic adjustment of the search strategy over time (i.e. the inclusion of the internet into the search strategy after the first survey wave), or possible recall errors when asked for the search channels used at time of the first survey.

Table 5.4 provides descriptive evidence with respect to the labor market outcomes considered in our analysis, and the question whether they vary by successful internet search. Note, that we exclude observations in the first and 99^{th} percentile of the distribution of the net hourly reemployment income of the subsequent employment spell. Table 5.4 shows

that individuals who found their job through the internet earn on average around 10% more compared to those individuals who found their job through another channel (8.7 vs. 7.9 Euro). The mean difference is highly significant. With respect to measures of job

Table 5.4: Job Outcomes by Successful Internet Search Channel[a)]

	Internet was successful Search Channel		
	Yes	No	sign.
Average Hourly Subsequent Income (in Euro, net)[1)]	8.65	7.87	***
Std. Dev.	(3.34)	(2.82)	
Median	[7.80]	[7.40]	
Satisfaction with Subsequent Employment[2)]			
In general	6.94	7.23	**
Std. Dev.	(2.62)	(2.42)	
With wage	5.84	6.05	
Std. Dev.	(2.71)	(2.59)	
With working hours	6.91	7.24	**
Std. Dev.	(2.66)	(2.48)	
With working conditions	7.14	7.31	
Std. Dev.	(2.50)	(2.41)	
Average Number of Days spent in UE until First Dep. Empl. Spell	193.29	199.51	
Std. Dev.	(219.66)	(228.19)	
Median	[117.00]	[116.00]	
Categories (in %)			
$<$ 30 days	23.1	24.8	
30 - $<$ 120 days	26.1	25.7	
120 - $<$ 240 days	27.0	24.9	
$\geq$ 240 days	23.8	24.7	
Number of Observations	467	2,383	

Source: IZA Evaluation Data Set S, Own Calculations.
Note: [a)] Only includes individuals who entered regular dependent employment at least once between the first and the second survey interview.
[1)] Without 1^{st} and 99^{th} Percentile
[2)] Values range between 0(=absolutely not satisfied), and 10(=Absolutely satisfied)

satisfaction we draw on a set of questions used to capture the respondent's contentment with different aspects related to the dependent employment. To this end, the individuals had to indicate their level of satisfaction on a scale ranging from zero (=absolutey not satisfied) to ten (=absolutely satisfied) with regard to the overall job, the level of wages,

the working hours, as well as the working conditions. Interestingly, Table 5.3 shows that individuals who did not find their employment through the internet seem to be more satisfied with their new job in general. However, the observed differences are rather small (only around one tenth of a standard deviation of the average satisfaction level in each case), and only statistically different from zero with respect to the general job satisfaction and satisfaction with working hours.

In Table 5.3 we also provide descriptive evidence with regard to the length of the observed unemployment spells until the first subsequent employment. Based on this we do not find support for the hypothesis that jobs found through the internet are found earlier in the unemployment spell. Although individuals who found their job through the internet spend one week less in unemployment on average, this difference is not statistically significant. Moreover, median durations of both groups are almost identical.

5.4 Empirical Analysis

5.4.1 Reservation Wage and Search Effort during Unemployment

We start our empirical analysis by taking a closer look at conditional differences in hourly reservation wages and search effort between individuals using the internet to search for jobs and offline searchers (see Table 5.5). First, however, we have to point out a number of possible limitations due to the nature of our data. From Section 5.3, we already learned that during the survey interview the individual is confronted with a question allowing for multiple entries with regard to the search channels used. The exact wording of the question implies that the individual should indicate *all* methods that had been used at some point in time during the unemployment spell without having to specify exactly in which way and how frequently these methods were used. Unfortunately, we do not have information on how many job offers actually were generated through the respective job search methods, and are therefore not able to make any final statements about what effect the use of internet during unemployment really transmits.

Moreover, individuals choose their search methods according to expected costs and benefits, which vary across observations (Holzer, 1988), and also over time (Gregg and Wadsworth, 1996; Thomas, 1997). The most promising response to this endogeneity problem would be to randomly assign unemployed individuals to a group of people using the internet as search channel and to a control group not using the internet to search for jobs. Clearly, this research design is not feasible in practice and therefore we have to rely on our observational data at hand. In the absence of valid exclusion restrictions, we can only uncover associations in the data without being able to make causal statements.

As shown in the previous section, internet and non-internet searchers significantly differ by a number of observational characteristics that might simultaneously influence the probability of choosing the internet as a search channel and the reservation wage. Hence, we present estimates of linear regression models in order to evaluate whether the observed reservation wage differential still holds when we control for a rich set of observable characteristics. Thereby, the hourly reservation wage enters in logarithmic form as our dependent variable. Besides age, sex, region, and educational attainment, we also include a proxy of health status (i.e. whether the individual is disabled), and a dummy for migrational background as covariates. As a proxy for the opportunity cost during search, we also add a dummy indicating whether or not the individual received unemployment benefit I at time of survey. Furthermore, we also account for working time demand by including two dummies that cover the working time preference (full-/part-time) of the unemployed individual. In order to capture possible non-stationarities of the reservation wages, we also add a variable indicating the length of the unemployment spell until the time of the first interview. In addition, we also include the existence of children under 18, and the marital status of the individual as two proxies for the household situation. We also capture possible macroeconomic differences by including the unemployment rate at time of survey and two dummies capturing regional labor market conditions. Another important aspect reflects the use of additional search channels in addition to the internet. Since we found suggestive evidence for individual heterogeneity with regard to the job search behavior over the range of all available remaining search methods, we also include these in our linear regression.

Finally, our data also allow us to capture possible unobserved factors that might be simultaneously correlated with internet search and the reservation wage through a set of five validated measures of personality characteristics: Locus of control, extraversion, conscientiousness, neuroticism, and openness to experience (see section 5.6.2 in the Appendix for a detailed description of the personality traits we use in our analysis). The influence of per-

sonality traits on job search behavior is for example documented in Caliendo, Cobb-Clark, and Uhlendorff (2012), who show that people with a high internal locus of control (i.e. people that are convinced that success in life largely depends on their own actions) exert a higher search effort and have a higher reservation wage. Looking at column (2) of Table 5.5 we find that after controlling for socio-demographics, labor market history, heterogeneity in job search strategy, and macroeconomic conditions, the gap between internet searchers and non-internet searchers with respect to the hourly reservation wage decreases to around 4%, but still stays highly significant at 1%-level. Adding our additional set of personality variables to the regression of column (2) doesn't change the conditional difference very much, which is still highly significant.

We now repeat the above exercise for the search effort of the unemployed individual, and test again, how the unconditional difference in our observed measure changes when we include our control variables in two steps: Looking again at column (2), Table 5.5 shows that, with respect to "Number of Own Applications sent out", the initial gap of 7.3 applications decreases to 2.5 applications that have on average been sent out more by internet searchers. However, this conditional difference is still substantial and highly significantly different from zero. Moreover, this gap does not change when we additionally control for heterogeneity with regard to personality measures between internet and non-internet searchers.[7]

Our results therefore provide empirical evidence that internet search during unemployment is associated with a higher hourly reservation wage and a higher search effort in terms of own applications sent out by the individual. This positive association holds in both cases, even after we control for a wide range of possible confounding variables that also include measures of personality. We think that our results at least point towards

[7]Due to the count data nature of our search effort variable, poisson regression methods would actually be more feasible in this case. In order to ease the interpretation of our coefficients, we nevertheless choose the OLS approach here. Regressions accounting for the count data nature, however, led to similar results.

Table 5.5: Hourly Reservation Wage and Search Effort

	Internet Search vs. No Internet Search		
	Difference		
	uncond.[a)]	cond.[b)]	
	(1)	(2)	(3)
Hourly Reservation Wage (in Euro)	0.091***	0.039***	0.037***
	(0.016)	(0.014)	(0.014)
R^2	0.007	0.428	0.434
Number of Observations	4,906	4,906	4,906
Number of Own Applications Sent Out	7.307***	2.546***	2.483***
	(0.477)	(0.526)	(0.526)
R^2	0.026	0.196	0.199
Number of Observations	4,857[+]	4,857[+]	4,857[+]
Covariates			
Socio-demographics	–	✓	✓
Labor Market History	–	✓	✓
Job Search Behavior	–	✓	✓
Macroeconomic Conditions	–	✓	✓
Personality Traits	–		✓

Source: IZA Evaluation Dataset S, own calculations.
Note: Considered are all individuals in the UE-Sample who actively searched for dependent employment at time of survey of the first wave, and provided information on the reservation wage. [+]The difference in the number of observations results from missing information with regard to the dependent variable "number of own applications sent out".
[a)]Column (1) displays unconditional mean differences between individuals who searched the internet in addition to other search methods, and individuals who did not use the internet. The differences are derived from regressing the respective dependent outcome variables on a dummy indicating internet search during unemployment and a constant using OLS. Note that the variable "hourly reservation wage" enters in logarithmic form.
[b)]Column (2) shows conditional mean differences derived by adding additional control variables to (1). Robust standard errors are depicted in parentheses. Column (3) depicts conditional mean differences with personality variables as additional controls. Statistical significance at the 1/5/10 %-level is indicated by ***/**/*.
See Tables A.5.8, and A.5.9 for full regression results.

the fact that internet search seems to ease the cost of application processing for the job searcher. At the same time, the vast information about potential job positions seems to make job searchers more selective in terms of a higher hourly reservation wage.

5.4.2 Successful Internet Search and Subsequent Employment Outcomes

Empirical Strategy

Now, we will try to assess the question whether individuals who successfully searched through the internet find jobs that are of better (or lesser) quality with respect to the average hourly net income and job satisfaction than they would otherwise be if the same individuals successfully had searched through another channel.

In bringing this question to our data we have to take into account that individuals who found subsequent employment are not randomly selected out of all unemployed individuals searching for a job. If unobserved characteristics of individuals in our UE-sample that influence the selection into employment are correlated with unmeasured factors in our selected RE-sample, estimates of conventional variables entering as controls in our outcome regression will be biased.[8] Moreover, individuals may choose the channel through which they accept their subsequent job based on unobserved expected or perceived rewards with respect to labor market outcomes (Roy, 1951). Hence, the self-selection into a specific successful search channel based on unobserved comparative advantage considerations that are not independent of the expected outcome may again lead to selectivity biases when considering differentials in labor market outcomes and their attribution to different successful job search channels. Coping with both of these biases in observational data would

[8]To see if there is in fact a problem in our data, we tested whether we find suggestive evidence for a correlation of error terms between both the selection equation into reemployment, and a labor market outcome equation. To this end, we included the calculated inverse mills ratio from a first stage probit regression model –with a binary dependent variable indicating whether or not an individual was observed to be reemployed at least once–in an augmented OLS regression with the subsequent hourly net income as the dependent variable. Following Melino (1982), a test of potential correlation of the error terms is simply a test of whether the coefficient ($\hat{\lambda}$) on the included inverse mills ratio is statistically different from zero in the outcome equation. Our estimated coefficient of the inverse mills ratio was -0.084 with a corresponding standard error of 0.229. Hence, we were not able to reject the null hypothesis that there is no correlation between both error terms.

normally require fully parametric selection models that involve strong theory, and crucially depend on meaningful and valid exclusion restrictions. Again, the absence of such identifying instruments precludes such an approach with our data.

Nevertheless, being able to rely on a rich set of observed covariates, we in turn adopt a simple propensity score matching (PSM) approach[9] and impose an ignorability ("unconfoundedness") assumption, which postulates that potential labor market outcomes are uncorrelated with the choice of the successful internet search channel, conditional on observed confounders.[10] Whereas the main advantage of the PSM approach is that we do not have to rely on functional form assumptions, and that it allows us to control for observable characteristics in a more flexible way, the ignorability assumption is clearly very strong and has to be justified. In our setting, the factors driving both the likelihood to become reemployed through the internet channel and potential labor market outcomes are likely to depend on individual, institutional, and employer specific characteristics. Alongside socio-demographic indicators, the past labor market history, the elapsed unemployment duration, the adopted job search strategy during the unemployment spell, and structural labor market conditions are therefore important confounders that need to be captured or proxied in our analysis.

Table A.5.10 in the Appendix provides a detailed overview of the variables used as control variables in our analysis. With regard to demographic characteristics we inter alia control for information on age, gender, educational attainment, household characteristics, and indicators about available communication means. Concerning the past labor market history, our main control variables consist in preunemployment wage (a proxy for individual productivity), and the main activity before entering unemployment (a proxy for the

[9]We abstain from a detailed treatment of the theoretical basis of the estimation procedure. Standard references for the matching approach withn the econometric literature include Heckman, Ichimura, Smith, and Todd (1997); Rosenbaum and Rubin (1985); Rubin (1979).

[10]In the treatment effects literature, this assumption is also often referred to as the "Conditional Independence Assumption" (CIA).

the extent of past labor market attachment). We also consider individual heterogeneity with regard to the job search strategy adopted during unemployment to be relevant for employment prospects and the likelihood of being eventually matched through the internet channel. We therefore control for the job search channels used during the unemployment spell, the individual's mobility disposition, and the type of occupation searched for (full-time/part-time). Variation in structural labor market conditions might also play a role since it might directly affect the selection into different search channels, and also influence potential labor market outcomes. We assess these potential confounders by including an indicator for labor market tightness, the local unemployment rate at regional level, and an indicator that differentiates the regional labor markets into three different categories. In addition, we also exploit several direct indicators of employer heterogeneity as control variables. From the empirical literature it is well established that wages vary according to firm size and sector (Idson and Oi, 1999; Adamchik and Bedi, 2000). At the same time, recent descriptive evidence points towards the fact that the search strategy of firms also varies at least with regard to the number of employees (Dietz, Röttger, and Szameitat, 2011; Dietz, Kubis, Leber, Müller, and Stegmaier, 2013). Therefore, we also include information about the size of the employer, sectoral information, and and indicator about the type of the employer as control variables.

Finally, we again use the validated set of personality variables and the elapsed unemployment duration to capture potential unobservables with regard to the likelihood of being employed and also potential labor market outcomes (for example motivation, subjective beliefs about reemployability and the depreciation of human capital).

Estimation Procedure and Results

We proceed by estimating a probit model with a one/zero dummy indicating whether or not an individual found the subsequent employment through the internet channel as the

dependent variable.[11] Table A.5.11 in the Appendix depicts the final probit model that was used to extract the corresponding propensity scores for our matching analysis. In addition, Figure A.5.1 in the Appendix also provides a graphical representation of the distributions of the estimated propensity scores for both groups. Although there is some indication that we only find individuals who successfully found their subsequent employment through the internet in the upper bound of the distribution, there is considerable overlap over most part of the support region. We estimate the differences in our labor market outcomes between both groups by applying a kernel matching algorithm.[12] The matching quality (i.e. the resulting balancing of our covariates) of our procedure is assessed in summary form in Table A.5.12.[13] We observe that kernel matching significantly reduces the observed mean standardized bias (from 10.5% to 1.8%).[14] Therefore, our matching procedure seems to be successful in sufficiently balancing the covariates in our model.

Table 5.6 presents the estimated differences in hourly subsequent net income and four measures of job satisfacton between individuals who found their subsequent job through the internet channel, and individuals who found work through another search method. With respect to the hourly net income from subsequent employment, we observe a positive difference of 0.33 Euro that is, however, only significant at 10%-level. Taking into account the respective levels of the hourly net income of both matched subsamples, the difference

[11] We experimented with different sets of variables with regard to the control variables mentioned in the previous section. We finally decided upon the best specification to be used for our matching analysis by also taking into account the Hit-Rate (i.e. the correct prediction rates within the sample), and the Pseudo-R^2 as an indication how well our regressors explain the probability of finding subsequent employment through the internet channel.

[12] Again we tested different algorithms and cross-validated each time how well the distributions were balanced. We achieved the best balance by applying Kernel matching with an *Epanechnikov* kernel and a bandwidth of 0.06. This algorithm also has the advantage that it increases efficiency and lets us apply bootstrapping for inference.

[13] Columns (3)-(6) in Table A.5.10 provide balancing statistics for all variables before and after matching.

[14] In our case, the *unmatched* mean standardized bias is defined as the difference of sample means of both the sub-samples of individuals who found their subsequent employment through the internet and those who found through another channel as a percentage of the square root of the sum of the respective sub-sample variances. Accordingly, the *matched* mean standardized bias is the difference of the sample means in the matched sample, i.e. those observations falling under the common support (Rosenbaum and Rubin, 1985).

accounts to a 4% wage premium for individuals who found their job through the internet (8.65 vs. 8.32 Euro). Hence the 10%-difference from our univariate comparison decreases significantly, but stays significant even after controlling for a wide range of confounding variables. With respect to our job satisfaction measures, however, individuals who successfully searched through the internet seem to be less satisfied with their job position in general and with regard to working hours. We don't find any significant differences in the remaining job satisfaction measures (working conditions and salary).

Table 5.6: Differences in Labor Market Outcomes

Successful Internet Channel vs. Other Channel	
Number of Observations[1)]	
Individuals with Successful Internet Channel	465
Individuals with Other Channel	2,333
Outcome Variable: Hourly re-employment net income	
Difference in Euro[2)]	0.33* (0.17)
Outcome Variable: Job satisfaction	
Difference in absolute values	
In general	-0.23* (0.13)
With salary	-0.15 (0.14)
With working hours	-0.24* (0.13)
With working conditions	-0.15 (0.12)

Source: IZA Evaluation Data Set S, own calculations.
Notes: Depicted are conditional average differences in the outcome variables "Hourly re-employment net income" and "job satisfaction" between individuals who found their subsequent employment through research on the internet and individuals who found their subsequent employment through other channels. Standard errors are depicted in parentheses and based on 300 bootstrap replications. Statistical significance at the 1/5/10 %-level is indicated by ***/**/*.
[1)]Differing numbers with respect to Table 5.4 due to imposition of common support condition.
[2)]Without 1^{st} and 99^{th} percentile

Looking at Table A.5.10 in the Appendix, we see that there are considerable mean differences with regard to certain age brackets and educational attainment between individuals who found a job through the internet and those who found their subsequent employment through another channel. Moreover, by looking at Table A.5.13 in the Appendix, we observe that individuals who are younger than 34 years, and individuals who obtained a high professional qualification (technical college, masters certificate, and uni-

versity degree) have a higher-than-average probability of successfully finding a job through the internet. Based on these descriptive statistics and comparative advantage considerations, one would in general expect a positive selection with regard to the economic return to successfully finding a job through the internet. That is, individuals who are most likely to find a job through the internet are also the ones who benefit most in terms of subsequent income and job satisfaction. In a next step, we therefore allow for heterogeneity in the effects of the internet as a successful channel on our labor market outcomes. To this end, we conduct the whole estimation procedure separately for different subgroups of our sample with regard to age, professional education, and gender. In a first step we divide our sample in individuals who are 34 years and younger, and individuals who are older than 34 years. With regard to educational attainment, we split the sample into individuals with high (technical college, masters certificate, or university degree), and low (no/other degree, apprenticeship, vocational academy) education.

The corresponding results are presented in Table A.5.14. Looking first at the results stratified by age, we observe no statistical significant differences in both subgroups with regard to the subsequent hourly net income between individuals who found their jobs through the internet and individuals who did not. However, we detect that finding a job through the internet leads to a lower job satisfaction with regard to working hours and working conditions among the subgroup of individuals who are older than 34 years. With respect to educational attainment, we find a highly significant and positive difference with respect to hourly net income for the subgroup of individuals with high professional education, whereas we do not find a significant difference for the subgroup of individuals with low levels of professional education. However, these individuals seem to be less satisfied with general characteristics of their subsequent job.

5.5 Conclusion

Using a unique data set of unemployed individuals in Germany, the first aim of this paper was to contribute to the literature of the effects of internet search on the labor market by considering search outcomes that have not been analyzed by previous studies, namely the reservation wage and the number of own applications that were sent out by the individual. We find a positive statistical link between using the internet to search for jobs during unemployment, hourly reservation wages, and search intensity. These results hold even after controlling for a rich set of observable characteristics that also include validated measures of personality traits. With regard to whether or not jobs found through the internet are of better quality in terms of subsequent hourly net income and job satisfaction, we do not find conclusive empirical evidence. Whereas we detect a small wage premium for individuals who found their job through the internet, the same group seems to be less satisfied with their subsequent job. Moreover, our effects are very heterogeneous with regard to sample stratification: Mostly men and individuals with a high professional education level seem to benefit in terms of subsequent hourly net income when successfully finding a job through the internet. Women and low educated individuals in contrast seem to be less satisfied with their job when they found them through the internet.

What might explain these patterns? The vast information available in the internet about new jobs might at first lead to an increased selectivity (i.e. a higher reservation wage), and also a higher job search effort during job search of the unemployed due to the lower cost of application processing (Autor, 2001). However, as searching the internet to look for jobs has become a common phenomenon among unemployed individuals, searching the internet for jobs and applying online does not exhibit a comparative advantage, or a positive signal to potential employers anymore (Fountain, 2005). In contrast, we find suggestive evidence, that individuals who do not search through the internet are substantially

more likely to find their job through social networks, a search channel that is commonly assumed to exhibit a high matching quality (Mortensen and Vishwanath, 1995). Furthermore, since applying for a job is often only "one-click away", firms looking for potential job candidates might face an excess of applications, possibly also from individuals who are only a poor match for the posted job positions. Hence, the vast amount of information on thousands of jobs in online job boards may eventually prevent both employers and job searchers from taking full advantage of benefits from online search with respect to retrieving relevant information about each other (Brenčič, 2014). However, the evidence that only highly qualified individuals seem to benefit significantly from finding a job through the internet points towards the fact, that the internet might lead to a better matching quality with regard to highly specialized jobs, which might also explain the emergence and increasing popularity of industry- and occupation based niche sites (Kuhn and Mansour, 2011).

Although our results provide supporting evidence for a number of hypotheses established in previous research, we have to keep in mind that the sample of individuals analyzed in our paper is not representative for the general working population in Germany. Hence, we are not able to make inferences outside this specific sample, and it remains an open question whether an analysis also considering individuals searching on the job would lead to similar results.

5.6 Appendix

5.6.1 Additional Tables and Figures

Table A.5.7: Descriptives UE-Sample

	Total (1)	Internet Search Yes (2)	Internet Search No (3)	sign. (4)
Socio-demographics				
Female	51.5	52.4	45.4	***
Age (in years)	36.8	36.5	39.2	***
Age Bracket				
15-24 years	18.1	18.6	14.9	**
25-34 years	25.2	26.2	18.7	***
35-44 years	29.1	29.0	29.9	
45-55 years	27.6	26.3	36.6	***
Married	42.0	41.8	43.8	
Migration Background	18.0	18.2	16.6	
West Germany	68.4	69.7	59.4	***
Children under 18 years in Household	35.5	35.6	34.7	
Highest Schooling Degree				
Lower Secondary School Certificate	27.0	25.3	38.8	***
Middle Secondary School Certificate	41.9	41.9	42.3	
Upper Secondary School Certificate	28.7	30.7	15.0	***
No School Certificate	2.3	2.1	3.8	***
Highest Level of Professional Education				
No/other Degree	12.3	11.9	15.0	**
Apprenticeship	56.1	54.8	65.2	***
Vocational Academy	9.6	9.6	9.4	
Technical College, Masters Certificate	11.1	11.9	5.8	***
University Degree	10.9	11.8	4.6	***
Handicapped	2.9	2.8	2.6	**
Available Means of Communication				
Home Internet access	78.9	83.8	46.0	***
E-Mail	76.8	81.7	43.1	***
Received Unemployment Benefit I at Time of Survey	49.7	50.7	42.3	***
Labor Market History and Search Behavior				
Duration of Unemployment until Time of Survey (in days)	66.1	66.3	64.6	***
Main activity before entry in unemployment				
Worked	73.2	72.6	77.2	**
School	12.4	13.2	6.2	***
Other activity	14.3	14.1	16.0	
Contact Frequency to former Colleagues before UE				
Frequent	20.7	19.6	28.0	***
Occasional Contact	29.4	29.9	26.3	*
Infrequent Contact	28.2	28.6	25.6	
No Contact	19.7	19.9	18.3	
Did not Have any Colleagues	2.0	2.0	1.8	
Last Net hourly income from (Self-)Employment				
Did not work prior to unemployment	16.8	17.2	14.2	*
Worked prior to unemployment, but missing information	2.1	2.2	1.3	
0-6 Euro	24.5	23.7	30.2	***
>6-8 Euro	24.5	24.1	27.3	*
>8-13 Euro	25.8	26.3	22.8	*
> 13 Euro	6.3	6.6	4.2	**
Disposition to move for new job	25.2	27.3	11.2	
Type of Employment Searched For				
Full-time	67.0	66.9	67.6	*
Part-time	15.6	15.2	18.2	**
Both Types	17.4	17.9	14.2	***

Table to be continued.

Table continued from previous page.

	Total	Internet Search: Yes	Internet Search: No	sign.
	(1)	(2)	(3)	(4)
Last Net hourly income from (Self-)Employment				
Did not work prior to unemployment	16.8	17.2	14.2	*
Worked prior to unemployment, but missing information	2.1	2.2	1.3	
0-6 Euro	24.5	23.7	30.2	***
>6-8 Euro	24.5	24.1	27.3	*
>8-13 Euro	25.8	26.3	22.8	*
> 13 Euro	6.3	6.6	4.2	**
Disposition to move for new job	25.2	27.3	11.2	
Type of Employment Searched For				
Full-time	67.0	66.9	67.6	*
Part-time	15.6	15.2	18.2	**
Both Types	17.4	17.9	14.2	***
Search Channels Used				
Internet Research	87.2	100.0	0.0	
Newspaper	84.4	86.8	67.7	***
Placement of Ad	13.2	14.0	8.1	***
Job Information System	61.1	65.1	33.4	***
Friends/Relatives/Private Contacts	84.8	85.7	78.1	***
Employment Office	70.1	72.8	51.6	***
Private Agency (with Voucher)[a)]	8.9	9.3	6.4	***
Private Agency (without Voucher)	16.3	17.5	7.7	***
Blind Application	66.2	68.3	51.9	
Else	19.3	19.6	17.6	***
Macroeconomic Conditions				
Unemployment Rate at time of UE entry	9.2	9.1	9.8	
Classification of Labor Market Region[b)]				
Favorable conditions	32.8	33.2	30.0	***
Above average or moderately high unemployment	33.3	34.1	28.1	***
Very high unemployment, severe labor market problems	33.9	32.7	41.9	***
Personality Variables[c)]				
Conscientiousness	6.2	6.3	6.2	**
Openness	5.0	5.0	4.9	***
Extraversion	5.2	5.2	5.0	***
Neuroticism	3.8	3.7	3.9	***
Locus of Control	5.0	5.0	4.9	***
Number of Observations	4,906	4,280	626	

Source: IZA Evaluation Dataset S, own calculations.
Note: Statistical significance of mean difference between Internet and Non-Internet searchers at the 1/5/10 %-level is indicated by ***/**/* (two-tailed t-test)

[a)] As part of Active Labor Market Policy in Germany, it is possible for unemployed individuals who are eligible for Unemployment Benefit I to receive vouchers from the Federal Employment Agency covering the costs for consulting a private (placement) agency whilst looking for jobs.

[b)] The classification of German labor market regions was conducted according to a typecast of the the Institute for Employment Research (IAB). For further reference see Dauth, Hirschenauer, and Rüb (2008).

[c)] The values of all personality variables range from 1 (=low manifestation) to 7 (=high manifestation)

Table A.5.8: Log Hourly Reservation Wage – OLS Regressions

Dependent Variable: Log Hourly Reservation Wage	(1)	(2)	(3)
Search by Internet	0.091***	0.039***	0.037***
	(0.016)	(0.014)	(0.014)
Socio-demographics			
Female		-.086***	-.083***
		(0.009)	(0.009)
Age Bracket *[Ref. = 15-24 years]*			
25-34 years		0.103***	0.101***
		(0.013)	(0.013)
35-44 years		0.154***	0.153***
		(0.014)	(0.014)
45-55 years		0.149***	0.153***
		(0.014)	(0.014)
Married		-.002	-.0009
		(0.009)	(0.009)
Migration Background		0.017*	0.022**
		(0.01)	(0.01)
West Germany		0.097***	0.094***
		(0.017)	(0.017)
Children under 18 years in Household		0.029***	0.028***
		(0.01)	(0.01)
Highest Schooling Degree *[Ref. = No Certificate]*			
Lower Secondary School Certificate		0.054**	0.05**
		(0.024)	(0.024)
Middle Secondary School Certificate		0.082***	0.074***
		(0.024)	(0.024)
Upper Secondary School Certificate		0.141***	0.13***
		(0.026)	(0.026)
Highest Level of Professional Education *[Ref. = No/other Degree]*			
Apprenticeship		0.05***	0.05***
		(0.014)	(0.014)
Vocational Academy		0.079***	0.078***
		(0.018)	(0.018)
Technical College; Masters Certificate		0.163***	0.162***
		(0.018)	(0.018)
University Degree		0.211***	0.214***
		(0.021)	(0.021)
Handicapped		0.006	0.003
		(0.008)	(0.008)
Available Means of Communication			
Home Internet access		0.015	0.022
		(0.017)	(0.017)
E-Mail		0.009	-.001
		(0.017)	(0.017)
Received UB-I at time of interview		-.002	-.002
		(0.008)	(0.008)
Labor Market History and Search Behavior			
Duration of Unemployment (in days)		-.0007**	-.0006*
		(0.0003)	(0.0003)
Main activity before entry in unemployment *[Ref. = Other Activity]*			
Worked		0.031**	0.03**
		(0.013)	(0.013)
School		-.035	-.035
		(0.029)	(0.03)
Frequent Contact to former Colleagues before Unemployment		-.001	-.009
		(0.01)	(0.01)
Occasional Contact to former Colleagues before Unemployment		0.012	0.009
		(0.009)	(0.009)

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Dependent Variable: Hourly Reservation Wage	(1)	(2)	(3)
Last Net hourly income from (Self-)Employment *[Ref.=Did not work prior to unemployment]*			
Worked prior to unemployment; but missing information		0.029 (0.042)	0.027 (0.042)
0-6 Euro		-.158*** (0.028)	-.154*** (0.029)
>6-8 Euro		-.050* (0.028)	-.045 (0.028)
>8-13 Euro		0.11*** (0.028)	0.112*** (0.028)
> 13 Euro		0.363*** (0.035)	0.36*** (0.035)
Disposition to move for new job		0.037*** (0.01)	0.033*** (0.01)
Type of employment searched for *[Ref. = Both Types]*			
Full-time		0.043*** (0.012)	0.04*** (0.012)
Part-time		0.032** (0.016)	0.032** (0.016)
Search Channels Used			
Newspaper		-.020* (0.012)	-.018 (0.011)
Placement of Ad		0.027*** (0.01)	0.024** (0.01)
Job Information System		-.015* (0.009)	-.016* (0.009)
Friends/Relatives/Private Contacts		-.023** (0.011)	-.025** (0.011)
Employment Office		-.023** (0.009)	-.023** (0.009)
Private Agency with Voucher		0.01 (0.013)	0.01 (0.013)
Private Agency without Voucher		0.012 (0.011)	0.01 (0.011)
Blind Application		-.021** (0.009)	-.024*** (0.009)
Else		0.021** (0.01)	0.018* (0.01)
Macroeconomic Conditions			
Unemployment Rate at time of UE entry		-.006** (0.003)	-.006** (0.003)
Classification of Labor Market Region *[Ref.=Favorable Conditions]*			
Above average or moderately high unemployment		-.005 (0.012)	-.006 (0.012)
Very high unemployment; severe labor market problems		0.008 (0.023)	0.008 (0.023)
Personality Variables			
Conscientiousness			0.001 (0.005)
Openness			0.014*** (0.004)
Extraversion			0.005 (0.004)
Neuroticism			-.013*** (0.004)
Locus of Control			0.01* (0.005)
Const.	1.909***	1.705***	1.621***
R^2	0.007	0.428	0.434
Number of Observations	4,906	4,906	4,906

Source: IZA Evaluation Data Set S, own calculations.
Notes: Significance at the 1/5/10 %-level is denoted by ***/**/*.

Table A.5.9: Number of own Applications sent out–OLS Regressions

Dependent Variable: Number of own Applications sent out	(1)	(2)	(3)
Search by Internet	7.307***	2.546***	2.483***
	(0.477)	(0.526)	(0.526)
Socio-demographics			
Female		0.765*	0.699
		(0.461)	(0.466)
Age Bracket *[Ref. = 15-24 years]*			
25-34		-1.870**	-1.925***
		(0.733)	(0.728)
35-44 years		-2.544***	-2.546***
		(0.77)	(0.764)
45-55 years		-2.902***	-2.791***
		(0.813)	(0.809)
Married		-.147	-.158
		(0.513)	(0.512)
Migration Background		0.09	0.17
		(0.553)	(0.555)
West Germany		-.745	-.796
		(0.842)	(0.84)
Children under 18 years in Household		0.002	-.055
		(0.489)	(0.488)
Highest Schooling Degree *[Ref. = No Certificate]*			
Lower Secondary School Certificate		0.976	0.923
		(1.630)	(1.625)
Middle Secondary School Certificate		0.416	0.249
		(1.629)	(1.625)
Upper Secondary School Certificate		1.300	1.132
		(1.664)	(1.658)
Highest Level of Professional Education *[Ref. = No/other Degree]*			
Apprenticeship		-.035	-.055
		(0.683)	(0.685)
Vocational Academy		-.169	-.141
		(0.877)	(0.877)
Technical College; Masters Certificate		0.982	0.953
		(0.92)	(0.919)
University Degree		-1.171	-1.080
		(0.922)	(0.92)
Handicapped		-.221	-.310
		(0.438)	(0.439)
Available Means of Communication			
Home Internet access		1.338*	1.497*
		(0.813)	(0.815)
E-Mail		-.399	-.645
		(0.786)	(0.79)
Received UB-I at time of interview		0.589	0.565
		(0.401)	(0.401)
Labor Market History and Search Behavior			
Duration of Unemployment (in days)		0.054***	0.056***
		(0.015)	(0.015)
Main activity before entry in unemployment *[Ref. = Other Activity]*			
Worked		0.798	0.77
		(0.655)	(0.655)
School		-2.434*	-2.387*
		(1.266)	(1.268)
Frequent Contact to former Colleagues before Unemployment		0.542	0.324
		(0.586)	(0.59)
Occasional Contact to former Colleagues before Unemployment		-.115	-.260
		(0.456)	(0.455)

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Dependent Variable: Number of own applications sent out	(1)	(2)	(3)
Last Net hourly income from (Self-)Employment *[Ref.=Did not work prior to unemployment]*			
Worked prior to unemployment; but missing information		0.675	0.626
		(2.021)	(2.011)
0-6 Euro		-2.237*	-2.168*
		(1.269)	(1.274)
>6-8 Euro		-2.663**	-2.573**
		(1.263)	(1.267)
>8-13 Euro		-1.847	-1.814
		(1.252)	(1.254)
> 13 Euro		-2.013	-2.072
		(1.422)	(1.423)
Disposition to move for new job		4.954***	4.884***
		(0.589)	(0.59)
Type of employment searched for *[Ref. = Both Types]*			
Full-time		0.43	0.291
		(0.561)	(0.561)
Part-time		-2.631***	-2.636***
		(0.636)	(0.638)
Search Channels Used			
Newspaper		3.211***	3.256***
		(0.487)	(0.488)
Placement of Ad		4.864***	4.779***
		(0.737)	(0.737)
Job Information System		1.420***	1.398***
		(0.425)	(0.425)
Friends/Relatives/Private Contacts		1.956***	1.858***
		(0.475)	(0.478)
Employment Office		0.583	0.586
		(0.438)	(0.439)
Private Agency with Voucher		3.003***	2.961***
		(0.888)	(0.882)
Private Agency without Voucher		5.336***	5.286***
		(0.673)	(0.669)
Blind Application		6.249***	6.121***
		(0.379)	(0.383)
Else		1.878***	1.778***
		(0.531)	(0.532)
Macroeconomic conditions			
Unemployment Rate at time of UE entry		-.022	-.012
		(0.139)	(0.14)
Classification of Labor Market Region *[Ref.=Favorable Conditions]*			
Above average or moderately high unemployment		0.704	0.681
		(0.622)	(0.623)
Very high unemployment; severe labor market problems		-.066	-.145
		(1.121)	(1.123)
Personality Variables			
Conscientiousness			0.346
			(0.249)
Openness			0.039
			(0.177)
Extraversion			0.465**
			(0.202)
Neuroticism			-.294
			(0.18)
Locus of Control			0.151
			(0.276)
Const.	7.790***	-2.209	-5.852*
	(0.412)	(2.885)	(3.447)
R^2	0.026	0.196	0.199
Number of Observations	4,857	4,857	4,857

Source: IZA Evaluation Data Set S, own calculations.
Note: Robust standard errors are depicted in parentheses. Significance at the 1/5/10 %-level is denoted by ***/**/*.

Table A.5.10: Covariate Distributions by Successful Search Channel (RE-Sample)

	Proportions			Balancing Stats				
				Before Matching			After Matching	
Variables	Internet (1)	Other (2)	(3)	P-value (4)	S-Bias (5)	(6)	P-value	SBias
Sociodemographics								
Female	0.454	0.507		0.036	-10.678		0.663	-2.856
West Germany	0.701	0.686		0.517	3.309		0.766	-1.931
Age Bracket in Years								
15-24	0.206	0.180		0.180	6.692		0.668	2.857
25-34	0.363	0.261		0.000	22.317		0.694	2.683
35-44	0.271	0.307		0.119	-8.022		0.675	-2.717
45-55	0.159	0.252		0.000	-23.127		0.642	-2.820
Married	0.323	0.402		0.001	-16.669		0.945	-0.445
Migration Background	0.198	0.170		0.145	7.258		0.902	0.831
Children under 18 years in Household	0.267	0.354		0.000	-18.961		0.927	-0.577
Highest Schooling Degree								
No Certificate	0.026	0.018		0.235	5.650		0.759	-2.259
Lower Secondary School Certificate	0.200	0.264		0.004	-15.205		0.632	2.951
Middle Secondary School Certificate	0.363	0.438		0.003	-15.349		0.691	-2.575
Upper Secondary School Certificate	0.411	0.280		0.000	27.766		0.915	0.734
Highest Level of Professional Education								
No/other Degree	0.097	0.101		0.774	-1.467		0.985	-0.123
Apprenticeship	0.465	0.585		0.000	-24.305		0.954	0.383
Vocational Academy	0.090	0.095		0.745	-1.665		0.998	-0.015
Technical College; Masters Certificate	0.151	0.108		0.008	12.828		0.856	-1.281
University Degree	0.198	0.111		0.000	24.187		0.915	0.780
Available Means of Communication								
Home Internet access	0.899	0.789		0.000	30.706		0.692	2.220
E-Mail	0.886	0.764		0.000	32.561		0.784	1.542
Contact Frequency to Former Colleagues								
Frequent	0.572	0.556		0.512	3.333		0.760	-1.999
Occasional Contact	0.176	0.183		0.750	-1.629		0.571	3.632
Infrequent Contact	0.252	0.262		0.645	-2.352		0.888	-0.921
Handicapped	2.916	2.904		0.552	3.090		0.966	-0.270
Received UB-I at time of interview	0.445	0.520		0.003	-14.909		0.798	-1.674
Labor Market History and Search Behavior								
Duration of Unemployment until First Interview (in days)	66.265	66.043		0.737	1.690		0.994	-0.054
Last Net hourly income from (Self-)Employment								
Did not work prior to unemployment	0.209	0.151		0.002	14.946		0.681	2.837
Worked prior to unemployment; but missing information	0.017	0.017		0.993	0.045		0.936	-0.535
0-6 Euro	0.206	0.234		0.203	-6.554		0.706	2.399
>6-8 Euro	0.213	0.266		0.016	-12.500		0.814	-1.488
>8-13 Euro	0.269	0.277		0.722	-1.813		0.756	-2.037
> 13 Euro	0.086	0.055		0.010	12.189		0.801	-1.839
Disposition to move for new job (1=Yes)	0.409	0.252		0.000	33.635		0.863	1.198
Reason for termination of last employment								
Left Job	0.120	0.082		0.007	12.806		0.715	2.555
Lost Job	0.391	0.449		0.023	-11.638		0.634	-3.105
Temporary Job	0.234	0.236		0.950	-0.316		0.982	0.151
Other	0.116	0.122		0.735	-1.730		0.968	-0.259
Main activity before entry in unemployment								
Worked	0.725	0.763		0.076	-8.863		0.866	-1.131
School	0.183	0.121		0.000	17.307		0.548	4.193
Other Activity	0.092	0.114		0.168	-7.215		0.619	-3.175

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Variables	Proportions			Balancing Stats				
				Before Matching			After Matching	
	Internet (1)	Other (2)	(3)	P-value (4)	S-Bias (5)	(6)	P-value	SBias
Type of Employment Searched For								
Full-Time	0.774	0.701		0.001	16.632		0.775	1.797
Part-time	0.060	0.125		0.000	-22.526		0.573	-3.157
Both types	0.166	0.174		0.677	-2.132		0.960	0.325
Search Channels Used During Unemployment								
Newspaper	0.806	0.845		0.038	-10.241		0.539	-4.141
Personal Placement of Ad	0.129	0.139		0.557	-3.013		0.491	-4.561
Job Information System (SIS)	0.641	0.630		0.660	2.236		0.526	-4.127
Friends/Relatives/Private Contacts	0.809	0.866		0.001	-15.540		0.459	-5.093
Public Employment Agency	0.699	0.708		0.705	-1.914		0.782	-1.814
Internet Research	0.968	0.886		0.000	31.783		0.884	0.665
Private Agency (with Voucher)	0.127	0.092		0.020	11.277		0.696	2.698
Private Agency (without Voucher)	0.234	0.172		0.001	15.577		0.844	1.361
Blind Applications at Companies	0.643	0.682		0.105	-8.145		0.647	-3.035
Else	0.191	0.203		0.563	-2.957		0.721	-2.342
Duration of UE until subsequent Empl. Spell (in months)								
< 2	0.232	0.246		0.528	-3.228		0.798	1.654
2-<4	0.260	0.255		0.830	1.085		0.754	2.049
4 - < 8	0.269	0.251		0.425	4.019		1.000	0.004
≥ 8	0.239	0.247		0.694	-2.007		0.571	-3.739
Characteristics of Subsequent Employment								
Employer Size								
1-10 Employees	0.144	0.273		0.000	-32.130		0.633	-2.787
11-500 Employees	0.557	0.550		0.780	1.418		0.995	0.039
501 and more Employees	0.170	0.092		0.000	23.321		0.969	0.289
Type of Employer								
Public Sector	0.161	0.160		0.940	0.384		0.968	0.265
Temporary Agency	0.191	0.136		0.002	14.915		0.943	0.503
Private Company	0.641	0.693		0.027	-11.094		0.969	-0.260
Sector of Employer								
Agriculture, Fishing	0.011	0.033		0.009	-15.249		0.260	-6.225
Manufacturing, Industry	0.241	0.266		0.257	-5.819		0.867	1.081
Services, Trade, Banking/Insurance	0.692	0.652		0.089	8.725		0.729	-2.223
Macroeconomic Conditions								
Unemployment Rate at Time of Survey (UE Rate)	9.223	9.127		0.602	2.646		0.694	2.559
Vacancies to Unemployed Ratio (V/U Ratio)	0.125	0.122		0.401	4.320		0.921	0.653
Classification of Labor Market Region								
Favorable Conditions	0.312	0.345		0.173	-6.983		0.881	-0.976
Above average or moderately high Unemployment	0.374	0.324		0.034	10.619		0.842	-1.331
Very high Unemployment, severe Labor Market Problems	0.314	0.332		0.456	-3.802		0.719	2.335
Personality Variables								
Conscientiousness	6.226	6.257		0.459	-3.753		0.792	-1.698
Openness	5.016	5.000		0.790	1.349		0.828	-1.399
Extraversion	5.133	5.163		0.590	-2.649		0.646	-3.010
Neuroticism	3.580	3.723		0.019	-11.832		0.998	-0.014
Locus of Control	5.061	5.020		0.288	5.384		0.959	0.336
Number of Observations	465	2,333						

Source: IZA Evaluation Data Set S, own calculations.
Notes: Only Individuals who were employed at least once in dependent employment.

Table A.5.11: Propensity Score Estimation[a)]

Dependent Variable: Found Job Through Internet Research (1=yes)	(1)
Socio-demographics	
Female	0.006
	(0.068)
West Germany	0.147
	(0.134)
Age Bracket in Years *[Ref. = 15-24]*	
25-34	0.015
	(0.091)
35-44	-.110
	(0.102)
45-55	-.321***
	(0.111)
Married	-.003
	(0.072)
Migration Background	0.077
	(0.078)
Children under 18 years in Household	-.136*
	(0.073)
Highest Schooling Degree *[Ref. = No Certificate]*	
Lower Secondary School Certificate	-.442**
	(0.209)
Middle Secondary School Certificate	-.380*
	(0.208)
Upper Secondary School Certificate	-.362*
	(0.214)
Highest Level of Professional Education *[Ref. = No/other Degree]*	
Apprenticeship	-.053
	(0.101)
Vocational Academy	0.116
	(0.132)
Technical College; Masters Certificate	0.137
	(0.129)
University Degree	0.201
	(0.133)
Available Means of Communication	
Home Internet access	0.214
	(0.137)
E-Mail	0.188
	(0.129)
Contact Frequency to Former Colleagues *[Ref. = Frequent]*	
Occasional	-.093
	(0.081)
Infrequent	0.014
	(0.071)
Received UB-I at time of interview	-.159***
	(0.058)
Labor Market History and Search Behavior	
Last Net hourly income from (Self-)Employment *[Ref.=Did not work prior to unemployment]*	
Worked prior to unemployment; but missing information	-.196
	(0.322)
0-6 Euro	-.195
	(0.235)
>6-8 Euro	-.171
	(0.236)
>8-13 Euro	-.119
	(0.234)
> 13 Euro	0.04
	(0.251)

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Dependent Variable: Found Job Through Internet Research (1=yes)	(1)
Reason for termination of last employment *[Ref. = Missing]*	
Left Job	0.247
	(0.157)
Lost Job	0.095
	(0.144)
Temporary Job	0.015
	(0.142)
Other	0.151
	(0.155)
Main activity before entry in unemployment *[Ref. = Other Activity]*	
Worked	0.105
	(0.119)
School	-.029
	(0.186)
Disposition to move for new job	0.241***
	(0.069)
Type of Employment Searched For Search for *[Ref. = Both Types]*	
Full-time	0.095
	(0.081)
Part-time	-.084
	(0.127)
Search Channels Used during Unemployment	
Newspaper	-.155*
	(0.081)
Placement Ad	-.033
	(0.084)
Job Information System	0.063
	(0.063)
Friends/Relatives/Private Contacts	-.192**
	(0.079)
Employment Office	0.003
	(0.065)
Search by Internet	0.577***
	(0.132)
Private Agency with Voucher	0.244**
	(0.095)
Private Agency without Voucher	0.095
	(0.075)
Blind Application	-.059
	(0.064)
Else	-.038
	(0.072)
Duration of Unemployment until First Interview (in days)	-.001
	(0.002)
Duration of UE until subsequent Empl. Spell (in months) *[Ref. = < 2]*	
2-< 4	0.102
	(0.081)
4-< 8	0.127
	(0.082)
≥ 8	0.119
	(0.084)
Characteristics of Subsequent Employment	
Company Size *[Ref. in each case = Other]*	
1-10 Employees	-.464***
	(0.117)
11-500 Employees	-.157
	(0.101)
501 or more Employees	0.049
	(0.123)

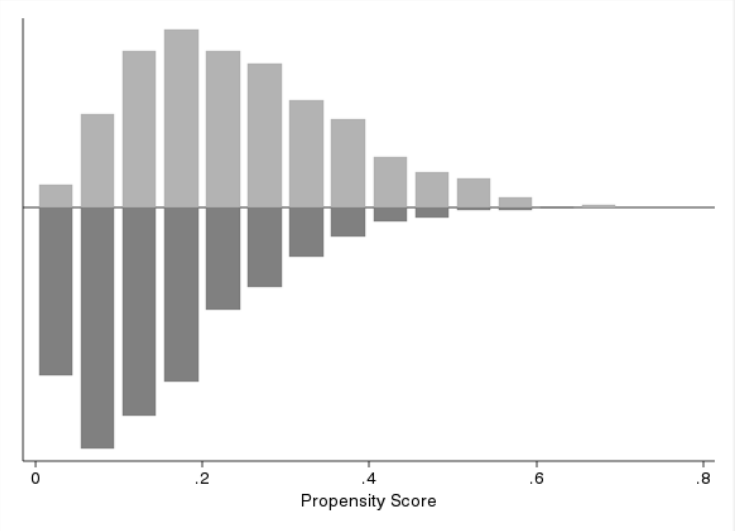
Table to be continued

Table continued from previous page

Dependent Variable: Found Job Through Internet Research (1=yes)	(1)
Type of Employer *[Ref. in each case = Other]*	
Public Sector Institution	0.081 (0.312)
Temporary Agency	0.358 (0.31)
Private Company	0.23 (0.305)
Sector of Employer *[Ref.=Agriculture; Fishing]*	
Manufacturing; Industry	0.007 (0.124)
Services; Trade; Banking/Insurance	0.134 (0.114)
Classification of Labor Market Region *[Ref.=Favorable Conditions]*	
Above average or moderately high Unemployment*UE Rate	0.021* (0.012)
Very high unemployment; severe labor market problems*UE Rate	0.021 (0.013)
Above average or moderately high Unemployment*V/U Ratio	-.043 (0.734)
Very high unemployment; severe labor market problems*V/U Ratio	-2.115 (1.793)
Personality Variables	
Conscientiousness	0.018 (0.041)
Openness	-.012 (0.027)
Extraversion	-.006 (0.031)
Neuroticism	-.022 (0.027)
Locus of Control	-.041 (0.042)
Const.	-1.303** (0.594)
Log-likelihood	-1,235.834
Pseudo R^2	0.103
Number of Observations	3,061

Source: IZA Evaluation Data Set S, own calculations.
Notes: Significance at the 1/5/10 %-level is denoted by ***/**/*, robust standard errors in parentheses.
[a)] Depicted is specification that was ultimately used for matching.

Figure A.5.1: Propensity Score Distributions (best specification)



Source: IZA Evaluation Data set S. Own Calculations.

Note: Depicted are the distributions of the estimated propensity scores from a probit model with "Found Job Through Internet Research" as the dependent variable (see Table A.5.11)

Table A.5.12: Covariate Balancing in unmatched and matched Sample (best specification)

	Unmatched	Matched
Number of covariates with significant mean difference at[a)]		
1%-level	27	0
5%-level	35	0
10%-level	37	0
Mean standardized bias (in %)	10.500	1.823
Number of covariates with mean standardized bias of		
$< 1\%$	3	26
1% until $< 3\%$	17	37
3% until $< 5\%$	9	11
5% until $< 10\%$	12	2
$\geq 10\%$	35	0
Pseudo R^{2}[b)]	0.108	0.007
Number of covariates in total	76	

Source: IZA Evaluation Data Set S. Own Calculations.
Note: [a)] Depicted are the number of variables that significantly differ between individuals who found subsequent employment through the internet, and individuals who found their subsequent employment through another channel, based on a t-test of equal means.
[b)] From probit estimation of the conditional probability to find subsequent employment through the internet channel.

Table A.5.13: Successful Search Channels by different subgroups [a)]

		Age		Gender		Professional Education	
	Total (1)	≤ 34 yrs (2)	>34 yrs (3)	Male (4)	Female (5)	Low (6)	High (7)
Friends/Relatives/Private Contacts	28.5	27.5	29.3	30.8	26.2	29.3	25.7
Internet Research	16.6	20.5	13.4	17.8	15.4	14.2	24.6
Newspaper	15.6	12.9	17.9	13.3	18.0	15.6	15.7
Blind Application at companies	11.4	12.5	10.5	10.4	12.4	12.1	9.1
Employment Office	9.8	9.4	10.1	9.7	9.9	10.5	7.4
Other Methods[b)]	14.9	17.2	19.1	18.0	18.1	18.2	20.9
Number of Observations	3,061	1,394	1,667	1,531	1,530	2,349	712

Source: IZA Evaluation Dataset S, own calculations.
Note: Statistical significance of mean difference between Internet and Non-Internet searchers at the 1/5/10 %-level is indicated by ***/**/* (two-tailed t-test)
[a)] Only individuals who were at least employed once after first interview. Depicted is the respective self-reported successful search channel of first dependent employment spell after unemployment.
[b)] "Job Information System", "Personal Placement of Ad", and "Other" were subsumed under this category.

Table A.5.14: Differences in Labor Market Outcomes: Effect Heterogeneity

Successful Internet Channel vs. Other Channel		
	Age	
	$\leq$ 34 years	$>$ 34 years
Number of Observations		
Successful Internet Channel	259	200
Other Channel	939	1,243
Outcome Variable: Hourly re-employment Net Income		
Difference in Euro[1)]	0.17 (0.22)	0.45 (0.29)
Outcome Variable: Job Satisfaction		
Difference in absolute values		
In general	-0.19 (0.20)	-0.35 (0.21)
With Salary	0.05 (0.19)	-0.39 (0.20)
With working hours	-0.02 (0.18)	-0.49*** (0.21)
With working conditions	0.02 (0.17)	-0.39*** (0.19)
Matching Quality[a)]		
Pseudo R^2	0.015	0.019
Mean Standardized Bias	2.671	2.792
	Education	
	Low	High
Number of Observations		
Successful Internet Channel	330	169
Other Channel	1,939	500
Outcome Variable: Hourly re-employment Net Income		
Difference in Euro[1)]	0.08 (0.19)	0.43*** (0.10)
Outcome Variable: Job Satisfaction		
Difference in absolute values		
In general	-0.30*** (0.15)	-0.09 (0.26)
With Salary	-0.19 (0.18)	0.03 (0.25)
With working hours	-0.31 (0.18)	-0.01 (0.25)
With working conditions	-0.22 (0.17)	0.09 (0.25)
Matching Quality[a)]		
Pseudo R^2	0.009	0.022
Mean Standardized Bias	2.314	3.563

Source: IZA Evaluation Data Set S, own calculations.
Notes: Depicted are conditional average differences in the outcome variables "Hourly re-employment Net Income" and "Job Satisfaction" between individuals who found their subsequent employment through research on the internet and individuals who found their subsequent employment through other channels. Standard errors are depicted in parentheses and based on 300 bootstrap replications.
[1)] Without 1^{st} and 99^{th} percentile
[a)] Depicted are the balance statistics after kernel matching for the respective best propensity score specification

Table A.5.15: Sample Construction UE-Sample

Sample Size IZA Evaluation Data Set S	**N = 17,396**
Not unemployed at time of survey	- N = 5,320
Not actively looking for dependent employment	- N = 2,086
Not surveyed in wave 2	- N = 5,235
No reservation wage specified	- N = 172
	N = 5,063
Missing data in covariates used for estimation (mostly Locus of Control)	- N = 157
Estimation UE-Sample	**N = 4,906**

Table A.5.16: Sample Construction RE-Sample

Valid Observations UE-Sample	**N = 4,906**
Individuals at least employed once in dependent employment	- N = 1,363
Respective dependent employment is not subsidized	- N = 334
Employment spell started before 1^{st} wave	- N = 147
RE-Sample	**N = 3,062**
Missing data for estimation	- N = 212
Valid Observations Estimation RE-Sample	**N = 2,850**

Table A.5.17: Survey Questions

Job Search channels

What have you done [..] in order to find an [..] employment?
INT: Read out options. Multiple entries are possible.
Have you searched ...

1:	through job advertisements in the newspaper
2:	by personally advertising as a job seeker
3:	through a job information system
4:	through contact with acquaintances, relatives, other private contacts
5:	through an agent from the employment agency
6:	through Internet research
7:	through a private agent with agency voucher
8:	through a private agent without agency voucher
9:	through blind application at companies
10:	other
11:	nothing of its kind
97:	refused
98:	do not know

Job finding

And how did you ultimately find this job?
INT: Name only one.

1:	through a job advertisement in the newspaper
2:	advertised myself as a job seeker
3:	through a job information system
4:	through acquaintances, relatives, other private contacts
5:	through an agent from the employment agency
6:	through Internet research
7:	through a private agent with agency voucher
8:	through a private agent without agency voucher
9:	blind application at companies
10:	other reasons
11:	nothing of the kind
97:	refused
98:	do not know

Source: IZA Evaluation Data Set S.

5.6.2 Personality Variables

The measures of personality used as additional control variables in our analysis are mainly based on two concepts:

Big5-approach The Big5-approach constitutes a psychological concept to capture personality, assuming that differences between individuals in the latter can be reduced down to five pivotal dimensions: *Agreeableness*, *Neuroticism*, *Extraversion*, *Openness to experience*, and *Conscientiousness*. In our data set, only the last four dimensions are available. These were measured according to a validated item battery, where respondents were confronted with 10 statements that each reflected one of the four dimensions. For each statement, the individuals had to classify themselves within a 7-point Likert Scale ranging from 1 ("Does not apply at all") to 7 ("Applies Fully"). The resulting measure of each dimension was then constructed using the sum of the corresponding classified statements. For individuals scoring high on *Neuroticism*, it is assumed that those experience fear and tension more frequently, and are rather cautious. In contrast, respondents scoring high on *Extraversion* are active, talkative, and optimistic. The dimension *Openness to Experience* is associated with an interest in new experiences and impressions. Individuals scoring high on this dimension are independent in their judgement and often have an unorthodox behavior. Lastly, individuals with high values on *Conscientiousness* work thoroughly, are reliable, and think carefully.

Internal Locus of Control The second concept is called *Internal Locus of Control* and reflects an expectation to what extent individuals expect that they can control events that affect them. Individuals with an internal locus of control are convinced that success in life largely depends on their own actions, whereas individuals with an external locus of control rather believe that their live is determined by external forces. The measure used in our analysis is based on 10 questions referring to both dimensions it is constructed to lie between the interval 1 (=high external locus of control) and 7 (= high internal locus of control)

CHAPTER 6

The German labor market after the Great Recession: successful reforms and future challenges

Abstract: The reaction of the German labor market to the Great Recession 2008/09 was relatively mild – especially compared to other countries. The reason lies not only in the specific type of the recession – which was favorable for the German economy structure – but also in a series of labor market reforms initiated between 2002 and 2005 altering, inter alia, labor supply incentives. However, irrespective of the mild response to the Great Recession, there are a number of substantial future challenges the German labor market will soon have to face. Female labor supply still lies well below that of other countries and a massive demographic change over the next 50 years will have substantial effects on labor supply as well as the pension system. In addition, due to a skill-biased technological change over the next decades, firms will face problems of finding employees with adequate skills. The aim of this paper is threefold. First, we outline why the German labor market reacted in such a mild fashion, describe current economic trends of the labor market in light of general trends in the European Union, and reveal some of the main associated challenges. Thereafter, the paper analyzes recent reforms of the main institutional settings of the labor market which influence labor supply. Finally, based on the status quo of these institutional settings, the paper gives a brief overview of strategies to combat adequately the challenges in terms of labor supply and to ensure economic growth in the future.[1]

[1]This paper is joined work with Marco Caliendo, and was published in the *IZA Journal of European Labor Studies* 2012, 1:3. A previous version of this paper circulated as "Income Support Systems, Labor Market Policies and Labor Supply: The German Experience". The authors thank Martin Kahanec, Alexander Kritikos, one anonymous referee, and participants at the "EU High-Level Conference on Labour Market Inclusion" in Stockholm for helpful comments. DOI: `http://dx.doi.org/10.1186/2193-9012-1-3`

6.1 Introduction

The reaction of the German labor market to the Great Recession 2008/09 was – especially compared to other countries – relatively mild. This "German Miracle" occurred due to various reasons. On the one hand, Germany had to – unlike countries such as Ireland and the United States, which both faced a slump in domestic demand combined with a real estate crisis – deal with a world demand shock that mostly affected economically strong firms (Rinne and Zimmermann, 2011; Schneider and Gräf, 2010). On the other hand, various flexibility instruments at the firm level, combined with discretionary adjustments of the institutional framework by policy makers (i.e. enhancement of the short-time work schemes), enabled firms to adjust their workforce along the internal rather than the external margin (Burda and Hunt, 2011).

In addition, far reaching labor market reforms between 2002 and 2005, initiated to fight the high and persistent unemployment that had evolved since the end of the seventies, had significantly altered the core elements of the labor market, including active and passive labor market policies, the organizational structure of labor offices as well as the pension system. The speed and depth of the reforms were quite remarkable when it is considered that the German welfare state had been typically depicted as the prime example of a "frozen welfare state", highly resistant to change (see Esping-Andersen, 1990; Manow and Seils, 2000; Kemmerling and Bruttel, 2005; Konle-Seidl, Eichhorst, and Grienberger-Zingerle, 2010, among others). In summary, the actions taken during the reforms led to higher working incentives and better matching between labor demand and supply in the period before the Great Recession, and were therefore considered as one of the main reasons for the mild reaction (Gartner and Klinger, 2010). The reforms also had the general goal of increasing the labor force participation of those with young families.

However, irrespective of the mild response to the Great Recession, there are a number of substantial future challenges the German labor market will soon have to face. Since Germany will – like many other Western European countries – further experience a massive

demographic change over the next 50 years, the development of labor supply of women and older people will become increasingly important in determining the extent to which the working population will decrease (OECD, 2005a). Although the employment rates of both groups have in recent years increased, challenges still remain. The current tax and transfer system has so far favored the sole male bread-winner model and therefore causes the absolute working-time hours of economically active women to lie well below that of other Western European countries. Together with the trend of a persistent low fertility rate, the sustainable economic growth of Germany is in jeopardy in the near future due to a decrease of employment potential (OECD, 2012). Moreover – although the employment rate of older people lies well above the EU-27 average and has also significantly increased since 2002 – the actual average retirement age continues to lie well below the statutory retirement age. This means there is some maneuverability for potential improvement. However, since older people are often discriminated against in favor of younger people, which often results from a misperception of their working potential, there is not only a need for further social benefit reforms, but also for enhancing prospects of lifelong learning (Eichhorst, 2011). Labor demand of firms is expected to decrease less than labor supply over the next decades (Sachverständigenrat zur Begutachtung der gesamtwirtschaftlichen Entwicklung, 2011), and due to a persistent skill-biased technological change – inducing a decrease of low-skilled jobs in the industry and a considerable growth in occupations requiring higher skills (Spitz-Oener, 2006; OECD, 2011c) – firms will find it harder to find employees with adequate skills. Employment opportunities for individuals with low education levels will significantly decrease (European Centre for the Development of Vocational Training, 2010), emphasizing the need for facilitating access to higher education for a larger share of the population. The aim of this paper is threefold. First, it analyzes past reforms of main institutional settings of the labor market which have influenced labor supply in Section 6.2. We outline the political and economic situation before 2002 and provide a brief description of the first set of labor market reforms in Section 6.2.1. This is followed by a discussion of the most relevant income support systems: unemployment benefits and social assistance (see Section 6.2.2); pensions and early retirement (see Section 6.2.4); and active

labor market policies, since the most recent reforms put an emphasis on increasing labor supply incentives as well (see Section 6.2.3). Wherever possible, we summarize the effects of these reforms in a comprehensive way. Furthermore, the paper outlines why the German labor market reacted in such a mild fashion during the "Great Recession" (Section 6.3.1), describes current economic trends of the labor market in light of general trends in the European Union, and reveals some of the main challenges associated with these trends in Section 6.3.2. The challenges for the education system and lifelong learning are discussed in Section 6.4.1, before an examination of the role of the current tax system in Section 6.4.2 and a recent initiative to increase labor supply of young families in Section 6.4.3 are introduced. Based on the status quo of these institutional settings, the paper also provides an overview of strategies to combat the above-mentioned challenges in terms of labor supply and to ensure economic growth in the future.

6.2 Institutional Settings and Labor Market Reforms in the last Decade

6.2.1 The Economic Situation before 2002 and the First Set of Labor Market Reforms

Many European countries had to face high unemployment rates in the 1990s, but Germany had especially proven to be unable to benefit from favorable conditions in the global economy by that time. At only 1.8%, GDP growth between 1991 and 2003 was only half of the UK growth rate, leading to decreasing employment and increasing unemployment (Jacobi and Kluve, 2007). Germany's slow response to the worsening labor market situation can only be explained by a long period of reform blockage and postponement in labor market policy adjustments (Reformstau, see Eichhorst and Marx, 2009). Reunification in 1990 certainly played a major role, where ALMP (and passive income support systems, like early retirement) were used to take "surplus labor" out of the labor market. A clear indication

of this is that the number of participants in job-creation schemes and training programs in 1992 exceeded the number of unemployed in East Germany. Since deficits in the unemployment insurance schemes and the budget of the Federal Employment Agency (FEA) were either covered by the federal government or by higher contributions of employers and employees, this resulted in rising non-wage labor costs which in turn hampered employment creation (Konle-Seidl et al., 2010). The left-wing coalition in power since 1998 was torn between stabilizing the traditional "German social policy" approach and introducing the concept of an "activating state" in UK "New Labour"-style.

The first step made effective from January 1, 2002, was the so-called Job-AQTIV amendment, which changed the focus of German labor market policy from a reactive to an activating one (Wunsch, 2006). The main elements of this amendment were the introduction of qualitative profiling of job-seekers upon unemployment registration with the Local Employment Agency (LEA) and the establishment of a compulsory written agreement between the LEA and the job-seeker (Eingliederungsvereinbarung) in order to determine the duties and efforts of both contracting parties during the job-search process. In addition strategies were put in place to reach replacement targets. The amendment postulated a more appropriate and flexible use of ALMPs and simplified other ones (Wunsch, 2006). Comprehensive evaluations of ALMPs were explicitly enshrined in the law by the Job-AQTIV amendment (§ 282, Social Code (SC) III) for the first time.

When the FEA was accused of massive fraud in reporting successful job placements in the beginning of 2002, the government took advantage of this scandal and appointed an independent expert commission, which worked out the blueprint for the reform package known as the *Hartz Reforms*.[2] This reform package consisted of four laws (Hartz I-IV), which were implemented incrementally between January 1, 2003, and January 1, 2005, and introduced some rather radical changes in German labor market policy. Hartz I introduced the concept of personnel service agencies (Personal-Service-Agenturen), which were

[2]The *Hartz Reforms* were named after the chairman Peter Hartz, who headed the commission. The official names of the Hartz I-IV laws were *Erstes*, *Zweites*, *Drittes* and *Viertes Gesetz für moderne Dienstleistungen am Arbeitsmarkt* (Bundesministerium für Wirtschaft und Arbeit, 2003).

attached to LEAs and were supposed to employ unemployed individuals, hire them out to companies and organizations, and train them when not hired out. Hartz I also tightened the conditions for the acceptability of jobs and introduced training vouchers unemployed individuals could use to get training from approved providers. The second amendment, Hartz II, introduced new regulations for minor jobs (Mini- and Midi-Jobs) and a second start-up subsidy (Ich-AG) for unemployed individuals starting in self-employment (in addition to an already existing start-up subsidy scheme). Hartz III addressed the organizational structure of public employment services, and altered existing programs, as well as introducing new ones, within the area of ALMP (for more details, see Section 6.2.3).

6.2.2 Unemployment Benefits, Social Assistance and Hartz IV

The *Hartz IV* amendment had the most dramatic change, since it replaced the former unemployment assistance and social assistance by a single means-tested replacement scheme for needy unemployed job-seekers and their household. Prior to the reforms, Germany had a system of income protection which was based on three pillars: 1) unemployment benefits, 2) unemployment assistance and 3) social assistance. The following brief description of these three elements will help for comparison with the new system (see Konle-Seidl et al., 2010, for a detailed description). Unemployment benefits (UB, Arbeitslosengeld) provided earnings-related income replacement for a limited duration of 6 to 32 months if the unemployed individual had been in employment covered by social insurance for at least 12 months. The legal basis for UB was the SC III. The replacement rate of UB was dependent on family status, while the duration was dependent on age and previous employment duration. Unemployed individuals with at least one child were entitled to 67% of net remuneration and 60% otherwise. UB claims were based on an employment record and provided benefits proportional to prior earnings within the reference period. Individual means or needs were not taken into account. The maximum duration of UB varied between 6 to 32 months. Workers who had been employed less than 12 months within the last seven years before entering unemployment were not entitled for UB, whereas 12 months of employ-

ment meant a claim period of six months. This period rose proportionally to the number of months in employment. However, several discontinuities with respect to age existed (see Table 1). For someone under 45, the maximum entitlement period was 12 months (given a minimum employment period of at least 24 months), whereas people above 45 (and under 47) could claim up to 18 months. Further discontinuities were built in at age 47 (up to 22 months), 52 (up to 26 months) and 57 (up to 32 months). The benefits were funded by matching employer and employee contributions and administered by the FEA, which was traditionally also in charge of implementing ALMPs.

Table 6.1: Maximum duration of unemployment benefit-Before and after the Hartz reforms

Length of benefit entitlement (in months)	Age (in years)	Months worked in last 7 years	Length of benefit entitlement (in months)	Age (in years)	Months worked in last 5/7 years
Prior to the Hartz Reforms			February 1, 2006-February 28, 2008		
6	-	12	6	-	12
8	-	16	8	-	16
10	-	20	10	-	20
12	-	24	12	-	24
14	45	28	15	55	30
16	45	32	18	58	36
18	45	36	Since March 1, 2008		
20	47	40	6	-	12
22	47	44	8	-	16
24	52	48	10	-	20
26	52	52	12	-	24
28	57	56	15	50	30
30	57	60	18	55	36
32	57	64	24	58	48

Source: SC III (Â§117 et seq.).

After the UB entitlement period had expired, unemployed individuals were, in principle, eligible for unlimited and means-tested unemployment assistance (UA, Arbeitslosenhilfe). These benefits were still earnings-related (57%/53% replacement rate with/without children) and provided income support for unemployed people who had some prior employment experience but had become long-term unemployed. In contrast to UB, UA was granted for an unlimited period (as long as individuals were available for the labor market) and funded by the Federal budget, that is, by general taxation. This scheme was also implemented by

the FEA. In principle, recipients of UA had access to similar active labor market schemes as UB recipients. This distinction becomes important when we discuss the reformed system.

Finally, social assistance (SA, *Sozialhilfe*), provided basic income protection on a means-tested and flat-rate basis for all German inhabitants. This assistance was independent of employment experience but conditional on not having other resources of earned income, social benefits or family transfers. Therefore, SA was a safety net for unemployed individuals with either no employment experience or unemployment benefit/assistance claims that did not match the guaranteed minimum income. Konle-Seidl et al. (2010) note that means-testing was harsher in the SA scheme (compared to the UA scheme) and every job was considered acceptable. SA was funded by the municipalities that were also responsible for reintegrating recipients into the labor market through specific active measures. A fairly rudimentary labor market policy scheme was available – called "Help to Work" – and operated by the municipalities, with a considerable scope of discretion. There was no entitlement to integration measures by the FEA (Konle-Seidl et al., 2010) and even if capable of work, many of those in need were not registered as unemployed with the FEA (Bernhard et al., 2008).

At the beginning of 2005 and with the fourth amendment of the Hartz Reforms, SC II came into force with some major changes in the system. Most importantly, the former unemployment assistance and social assistance were replaced by a single means-tested replacement scheme – unemployment benefit II (UB-II, *Arbeitslosengeld II*) – for needy unemployed job-seekers and their household. This scheme is tax-financed and covers needy job-seekers who are capable of working but not entitled to unemployment benefits – now called unemployment benefits I (UB-I, *Arbeitslosengeld I*) – or after UB-I has expired. The amount of UB-II does not depend on former income and needy job-seekers and their household are predominately registered as unemployed and may receive employment services (different from those for UB-I recipients). For UB-I recipients, the most drastic change concerned the duration of benefit entitlement (see Table 6.1). The maximum duration was cut down to 12 months for people aged below 58 years. For people aged above this threshold the maximum duration was elevated to 24 months, but only if they had worked

for at least 48 months in the last five years before becoming unemployed. Initially, the reductions were even more severe before they were relaxed again due to political unrest. Between February 1, 2006, and February 28, 2008, only two discontinuities were in place: for people aged at least 55, the maximum duration was set to 15 months (with 30 months of employment before) and 18 months (with at least 36 months of employment).

The Hartz Reforms radically changed the German system of wage-related welfare. In contrast to the old scheme, the new UB-II system now had a dual aim. Although designed to prevent poverty, it does not secure previous living standards. Thus, for those having received social assistance before, the new legislation actually allows them to receive marginally more money and access to job employment services (Konle-Seidl et al., 2010). For former recipients of UA, the level of transfer payment decreased. Apart from its social policy objective, the aim of the reform was to lower unemployment but also to ease the burden of taxation and non-wage labor costs by reducing benefit dependency. The major lever to achieve this goal was the shortening of individual unemployment spells through accelerated job placement and more coherent activation of the beneficiaries of unemployment insurance benefits and unemployment or social assistance. Less generous benefits for long-term unemployed, stricter job suitability criteria and more effective job placement and active labor market schemes were the instruments to achieve this goal.

Only a few empirical studies have evaluated the macroeconomic effects of the Hartz Reforms in detail. Fahr and Sunde (2009) as well as Klinger and Rothe (2010) use a stock-flow matching approach based on administrative data from the FEA to determine the speed of unemployment outflows after the first three Hartz Reforms. Their results indicate that the first two reform waves did indeed have a significant positive impact on the process of job creation. Both studies, however, emphasize that their results might be prone to measurement error, since the FEA changed definitions and statistics during the reform process, often making clear-cut identification strategies impossible. Furthermore, the studies also make no statements concerning the quality and the duration of new jobs. To sum up, the Hartz Reforms between 2002 and 2005 considerably changed the institutional settings of the labor market in Germany. However, not only had the passive labor market

policy (i.e. social assistance and unemployment benefits) been changed considerably. There was also a significant reframing of the ALMP during the Hartz Reforms, which we describe in the following section.

6.2.3 Active Labor Market Policy

Germany has a long tradition in the provision of ALMPs, and their expenses range among the highest in the budget of the FEA (for comprehensive overviews, see, among others Caliendo and Steiner, 2005; Wunsch, 2006; Bernhard, Hohmeyer, Jozwiak, Koch, Kruppe, Kruppe, and Wolff, 2008; Eichhorst and Zimmermann, 2007). ALMP programs generally aim at increasing the employability of the unemployed to support their integration into the labor market. In contrast to many other policy schemes, ALMPs have always been subject to a consistent and dynamic transition in the light of structural and societal adjustment processes of the labor market (Heyer, Koch, Stephan, and Wolff, 2011). There are three main categories of ALMPs: subsidized employment, labor market training, and public job-creation schemes. Whereas the first includes schemes targeted at the long-term integration of unemployed individuals into the first labor market through temporary subsidies (i.e. wage and start-up subsidies), the second aims at enhancing the chances for re-employment through various measures of short-term and further vocational training. The third is targeted especially at the long-term unemployed with minor prospects of a swift integration into the first labor market (i.e. 1-Euro-Jobs).

During the Hartz Reforms, a crucial shift had been made towards ALMPs that require a more pro-active behavior of unemployed individuals. Jacobi and Kluve (2007) describe the Hartz Reforms as a tripartite reform strategy aimed at: (1) improving labor market services and policy measures in terms of effectiveness and efficiency; (2) activating the unemployed based on the principle of "rights and duties" (*Fördern und Fordern*); and finally (3) stimulating labor demand by deregulating the labor market. More specifically, since the Hartz Reforms, unemployed individuals have had to carry out all necessary duties set out in an integration agreement (*Eingliederungsvereinbarung*) to become re-integrated

into the labor market (Konle-Seidl et al., 2010). These agreements result from the profiling process of the unemployed, listing the services that will be provided to the job-seeker as well as the job-seeker's obligation towards the employment agency, for example in terms of job-search activities and participation in labor market programs. The Hartz Reforms also introduced sanction elements in order to effectively monitor the unemployed's search activities and personal efforts to return into the regular labor market. Sanctions in form of temporary benefit reductions could be used, if the unemployed individual does not comply with the integration agreement or does not accept a suitable offer to work. Furthermore, an improved targeting of active measures and a better allocation of resources were additional aims. This was mainly done by profiling "customers" into four types and addressing their needs accordingly. Finally, it was also agreed upon to conduct rigorously scientific evaluations of all the measures (see Jacobi and Kluve, 2007, for more details).

Table 6.2: Entries into selected labor market programs between 2006 and 2011

	2006	2007	2008	2009	2010	2011
Entries into Program						
Wage Subsidies (*Eingliederungszuschüsse*)						
SC II	106,300	135,800	143,400	127,300	85,900	115,100
SC III	120,200	123,600	139,700	149,900	66,000	85,900
Further Vocational Training (*Berufl. Weiterbildung*)						
SC II	110,300	167,200	225,500	244,600	141,500	166,500
SC III	154,500	211,300	260,000	400,400	211,100	158,300
Public Job Creation I (*Arbeitsbeschaffungsmaßnahmen*)						
SC II	62,400	53,000	64,000	6,100	51	56
SC III	16,700	16,200	6,500	5,000	1,600	1,200
Public Job Creation II (*1-Euro-Jobs*)	741,900	798,700	823,200	812,300	421,000	475,200
Short-term training (*Trainingsmaßnahmen*)						
SC II	444,100	546,000	627,700	256,700	1,100	–
SC III	533,600	519,800	586,900	229,500	161	–
Contracting-out placement services (*Beauftragung Dritter*)						
SC II	140,400	119,400	189,800	105,700	–	–
SC III	142,600	120,700	254,000	108,200	–	–
Start-up Subsidy (*Ich-AG*)	42,800	–	–	–	–	–
Bridging Allowance (*Ãœberbrückungsgeld*)	108,300	–	–	–	–	–
New-Start Up Subsidy (*Gründungszuschuss*)	33,600	126,000	119,300	137,100	146,500	133,800

Source: Yearly Labor Market Reports of the Federal Employment Agency 2006-2011.

As part of the reform realignments in 2003, integration subsidies were redesigned and new forms of wage subsidies, start-up subsidies as well as jobs with reduced social security contributions were introduced. Emphasis was shifted away from public job-creation

schemes, which have been proven to be ineffective (see Caliendo, Hujer, and Thomsen, 2008). Since then, ALMP in Germany has undergone a further two major reforms, which came into effect in the beginning of 2009 and 2012. Both required considerable changes in the legal framework, which again involved the introduction of new schemes as well as the abolishment and redevelopment of old ones. Table 6.2 contains the number of entries in selected programs for 2006 to 2011, distinguished by individuals falling under SC III and needy job-seekers under SC II.

The most important programs covered by Social Code III are currently targeted wage subsidies, start-up subsidies and further vocational training. During the 2009 reform, the activation measures, short-term training and private placement services (contracting out) were subsumed under a general paragraph, making separate regulations for both schemes obsolete (Steinke, Koch, Kupka, Osiander, Dony, Güttler, Hesse, and Knapp, 2012). Therefore, the yearly entry statistics of the FEA no longer distinguishes between the two schemes. However, they are still considered to be important instruments in both legal frameworks (Heyer, Koch, Stephan, and Wolff, 2011). By far, the most important program covered by SC II in terms of yearly entries is public job-creation schemes (1-Euro-Jobs, see Hohmeyer and Wolff, 2007).

All programs and organizational changes have been (and are currently still) evaluated as part of the legal obligation contained in the Hartz Reforms. Since there are hardly any social experiments on German ALMPs, the comparison usually relies on statistical techniques to create an appropriate control group.[3] This has led to a broad collection on evaluation results on the effects of 1-Euro-Jobs (Hohmeyer, 2009), benefit sanctions (Schneider, 2008), start-up subsidies (Baumgartner and Caliendo, 2008; Caliendo, 2009; Caliendo and Kritikos, 2009a; Caliendo and Künn, 2011), and start-up subsidies for needy unemployed (Wolff and Nivorozhkin, 2008), private placement services/contracting out (Bernhard and Wolff, 2008), targeted wage subsidies (Bernhard, Gartner, and Gartner, 2008; Bernhard, Brussig, Gartner, and Stephan, 2008), and further vocational training (Rinne, Schneider, and Uhlendorff, 2011; Bernhard and Kruppe, 2012). Whereas start-up

[3]For an overview see, among others, Caliendo and Hujer (2006) or Imbens and Wooldridge (2009).

Table 6.3: Overview of Reporting Systems based on Administrative Data

Study	Instrument/Program	Inflows and Observation Period	Main results
Bernhard, Gartner, and Gartner (2008)	Targeted wage subsidies paid to employers for a limited period	– Feb-Apr 2005 – 20 months	Large and significant positive effects of nearly 40 percentage points
Bernhard and Kruppe (2012)	Further vocational training	– Feb-Apr 2005 – 30 months	Share of unemployment benefit II recipients decreases; employment rate in the intermediate term increases by up to 13 percentage points
Bernhard, Hohmeyer, Jozwiak, Koch, Kruppe, Kruppe, and Wolff (2008)	Contracting out placement services for UB-II recipients	– Feb-Apr 2005 – 25 months	– Locking-in effects in first months after start – Employment rates are raised by about 2 percentage-points for East German participants and West German male participants
Caliendo and Künn (2011)	– Bridging Allowance (formerly §57 SC III) – Start-Up Subsidy (formerly §421 SC III)	– Jul-Sep 2003 – 56 months	High employment and modest income effects for participants; considerable additional job creation for bridging allowance (small job creation for start-up subsidy)
Hohmeyer (2009)	– Work opportunities/*1-Euro-Jobs* – Paid in addition to UB-II	– Feb-Apr 2005 – 28 months	Small positive employment effects 28 months after program start for women in East and West Germany as well as men in West Germany
Rinne, Schneider, and Uhlendorff (2011)	Different program types of further vocational training	– Year 2002 – 28 months	All program types have on average a significant positive impact on employment prospects 24 months after program entry
Schneider (2008)	Benefit sanctions for UB II recipients not complying with requirements supposed to fasten reintegration in labor market	– Jan 2005 – 28 months	No significant effect on reservation wage of UB II recipients

Note: All studies use propensity score matching methods based on administrative data.

subsidies, and targeted wage subsidies have been found to be quite positive, the effects for 1-Euro-Jobs are rather negative (see Table 6.3). The effects of further vocational training

programs are quite heterogeneous depending on the empirical method, observation period, and data source used (Rinne et al., 2011). Nevertheless, these results can provide sound guidance for policy makers in further developing the institutional framework to adjust to structural changes of the labor market (Heyer, Koch, Stephan, and Wolff, 2011).

However, one main problem of impact evaluation in the dynamic field of ALMP are considerable time lags between program implementation and first evaluation results, which is mainly due to data and budget constraints, but also inevitable for ex-post analyses interested in medium- and long-term effects. Therefore, evaluation studies often refer to programs that have already been restructured. Moreover, there is still a considerable need for further research. Many schemes can only be insufficiently evaluated by standard statistical techniques. This mostly concerns activation measures such as vocational training for young individuals with a short labor market history (see, e.g., Caliendo et al., 2011).

6.2.4 The Pension System and Early Retirement

Germany has one of the most generous public pay-as-you-go (PAYGO) pension insurance systems in the world, providing pensions to all private- and public-sector dependent employees, with the exception of civil-servants and the self-employed. It leads to high effective replacement rates and low effective retirement ages. In 2011, the average retirement age in Germany was roughly 61 for both men and women and therefore still lay well below the current statutory retirement age of 67. Institutional settings in Germany have long provided various incentives for older people to exit the labor market before the statutory retirement age, some of which we describe here (for a more detailed overview, see Eichhorst, 2011). On the other hand, there are also demand factors contributing to early retirement that interact with these institutional settings. Firms might want to replace older workers for younger ones due to various reasons. Finally, early retirement might be the only option for older workers, since they face limited or unattractive employment opportunities. In this section, we explore certain aspects of early retirement, with a focus on institutional

settings and provide a brief overview of the main characteristics of the German pension system.

The core of the public pension system in Germany provides old-age pensions for workers aged 60 and older, disability pensions for workers under 60 and survivor benefits for spouses and children. It is often characterized as a three pillar scheme: the first pillar – the public retirement insurance (PRI, *Gesetzliche Rentenversicherung*) – contains the elements mentioned above. It is laid down in SC VI and covers about 85% of the German workforce including public-sector workers that are not civil servants. The second pillar includes the occupational and the subsidized pension scheme, whereas the third pillar contains elements of private pension plans, such as portfolios, real assets and private pensions that are not subsidized.

Early retirement schemes had rapidly grown due to a social policy shift at the beginning of the 1970s, which aimed at taking surplus labor out of the labor market and to replace old by young workers. This was done mostly because of industrial restructuring and to fight unemployment in times of weak economic growth. This policy shift initially led to a significant decline in the average retirement age until the 1980s, with a slight rebound afterwards (Arnds and Bonin, 2002). After reunification, German labor market policy reinforced early retirement schemes again to avoid a substantial increase of unemployment within the new Länder. Only after a massive increase of social security contributions and non-wage labor costs as well as in the light of ramifications of the demographic change did the government fundamentally alter retirement policies through a series of reforms starting in the early 1990s. The last major amendment to the pension system took place in 2007. The statutory retirement age of 65 will be gradually and incrementally raised to 67. Starting from 2012, and with the birth cohort of 1947, the age limit will be increased by one month per year and birth cohort. This means that the birth cohort of 1958 will have to work up to the age of 66. The mandatory retirement age of 67 will be reached for all birth cohorts born from 1964 onwards by 2029 (Bonin, 2009).

The German pension system today still allows for certain transitions into early retirement, although in a much more restrictive way. In general, individuals may retire volun-

tarily at any time between 63 and the full statutory retirement age, which is currently the age of 67. As compensation for the longer duration of pension payments, however, the pension reform in 1989 reduced the pension by 0.3% for each month of commencement of the pension before the age of 65 (Bonin, 2009). Since the pension reduction is imposed throughout the whole period of pension receipt, the aggregate pension loss can still be quite substantial, given the conditional life expectancy of above 15 years at retirement age (Berkel and Börsch-Supan, 2003). Since 1957, the German pension system has allowed for transitions from unemployment into early retirement under varying conditions (*Altersrente wegen Arbeitslosigkeit*, SC VI §237). Today, this pathway to early retirement is no longer possible for individuals born after January 1, 1952. Old-age part-time (*Altersteilzeit*) constitutes a different possibility to reduce labor supply. Individuals who have reached the age of 55 and have been subject to social security contributions for at least three out of the previous five years, have the possibility to halve their remaining working time until they reach the statutory retirement age. This can be done by (1) either reducing the volume of the previous working time by half right away for the whole period ("part-time model"); or (2) by continuing working full-time for the first half of the period and being released from work in the second half ("block model", see Wanger, 2009, for an extensive description of the old-age part-time employment act, *Altersteilzeitgesetz*). Whether the individual takes the first or second option is subject to regulations within collective bargaining agreements between employers and employees. In both cases, the employee receives 70% of her former net wage while the employer contributes to the pension system on the basis of 90% of the employee's full-time employment compensation (Arnds and Bonin, 2002).

In 2010, 16.3% of all newly retired individuals had previously been in old-age part-time. On average, men entered into one of the old-age part-time schemes at 57.6 (women at 57.0). Today, individuals in old-age part-time who were born before January 1, 1952 may still obtain reduced old-age pensions at 60 if they had arranged a part-time agreement with their employer before January 1, 2004.

To conclude, the early retirement policy of the 1970s has been reversed considerably in light of the demographic change and a sustainable financing of the social security system

through a major policy shift, which started in the 1990s. The public turned away from the perception that early retirement was a necessary means to keep unemployment low and to force integration of young people into the labor market (Eichhorst, 2011). In combination with fundamental labor market reforms, the labor market participation of older people has significantly increased since 2002.

6.3 Current Labor Market Trends after the Great Recession in Germany

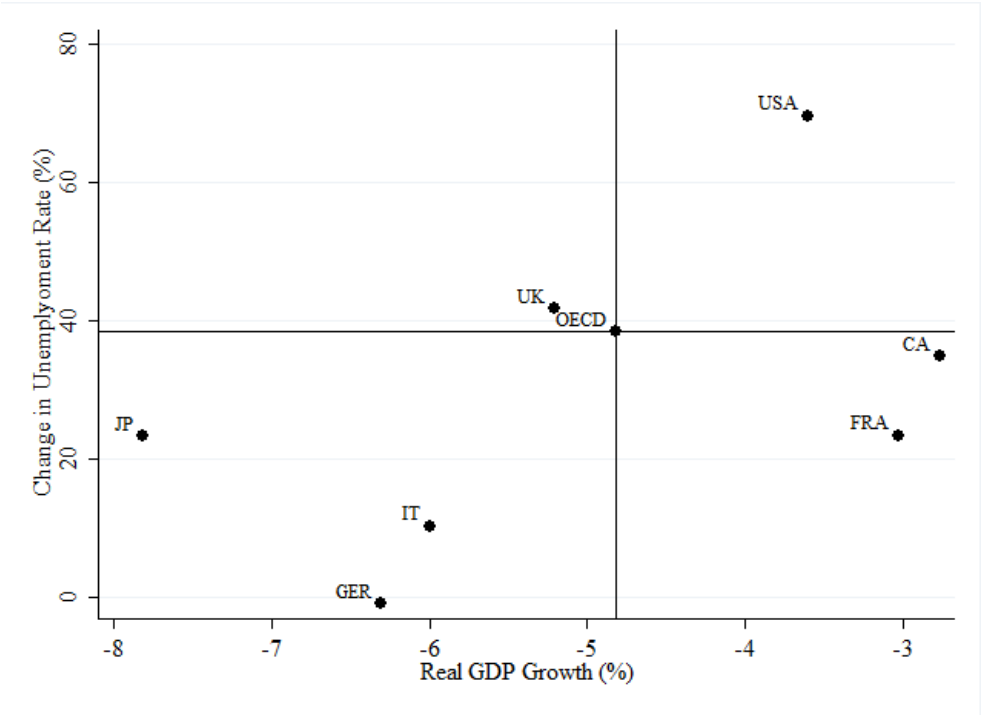
The previous sections have shown that the Hartz Reforms considerably changed the institutional settings of the labor market in Germany. Moreover, we have outlined that considerable efforts had further been undertaken in other areas of income support systems, which are important for labor supply in Germany. However, these numerous accomplishments should not conceal that Germany will face a number of substantial future challenges, which we will start to elaborate on in the next sections. Before we do so, we will first describe why the German labor market reacted in such a mild fashion to the Great Recession in 2008/2009.

6.3.1 The Mild Response during the Great Recession 2008/2009

The reaction of the German labor market to the Great Recession 2008/2009 has been very different from that of former recessions. Although the German economy had on average been hit stronger by the slump in gross domestic product (GDP) than many other countries in the Organisation of Economic Co-operation and Development (OECD), the increase in unemployment in the second quarter of 2009 was far lower than the OECD average (see Figure 6.1). This is largely due to the fact that, in contrast to Ireland and the United States for example, firms in Germany adjusted their working hours during this crisis almost solely along the intensive margin by reducing hours per worker (Burda and Hunt, 2011). This unusual reaction compared to previous recessions was often depicted

in the media as miraculous. However, it can be put into perspective by looking at three interdependent aspects – the previous labor market reforms, other flexibility instruments and the type of the recession – which we briefly do now.

Figure 6.1: Change in harmonized unemployment rates vs. change in real GDP growth in Germany, G7 countries, and OECD-total: First half-year 2008 compared to first half-year 2009[1].



Source: OECD Statistics Database.

[1]GER-Germany, IT- Italy, JP-Japan, OECD-OECD-total, UK-United Kingdom, CA-Canada, FRA-France.

As already described in the previous section, Germany had introduced profound reforms of the labor market, which fundamentally changed its institutional settings. With regard to the mild response, two direct consequences of these reforms stand out: First, the reduction of unemployment assistance and the aggravation of rules for suitable employment overall increased the matching efficiency on the labor market, which in turn also resulted in a decrease of long-term unemployment for the first time since the 1960s. Second, the fact that more unemployed individuals were willing to take up less-paid jobs as an outcome of

the labor market reforms resulted in smaller wage pressure during collective negotiations. Combined with a decrease in collective trade agreements, this led to an average reduction of 2% of unit labor costs in Germany between 2000 and 2007, compared to an average increase of 22% amongst all other OECD countries in the same period (OECD, 2012). These two structural adjustments towards a new equilibrium left the labor market in a robust condition at the eve of the Great Recession. Furthermore, the overall decrease in unit labor costs made it possible for firms to build up financial reserves during the economic upswing between 2006 and 2008, leaving them in a healthy financial state when the economic crisis began (Schneider and Gräf, 2010).

The second aspect has to do with other additional institutional factors which allowed a higher flexibility in Germany. In 2009, the overall working time of dependent employees was reduced by 41.3 hours (3.1%) on average compared to the previous year (Fuchs, Hummel, Klinger, Spitznagel, Wanger, and Zika, 2010). Basically, three instruments of working-time flexibility at the firm level (working-time accounts, working overtime and the reduction of weekly working hours) and one instrument at the state level (short-time work) involving subsidies from the FEA made this adjustment in working hours possible (Dietz, Röttger, and Szameitat, 2011). The first instrument at the firm level consisted of working-time accounts, which made it possible for firms to adjust the number of hours worked depending on the business cycle. During economic upswings, employees had accumulated working hours in their accounts through unpaid overtime, which they then used up with free time during the economic downturn. As a second instrument, paid working overtime was reduced by almost 20% in the first quarter of 2009 (Dietz et al., 2011). The last instrument at the firm level, reduction of weekly working hours, had recently been made more flexible due to new collective agreements, most of which were made in the manufacturing sector. The greatest reduction of average weekly full-time working hours was in the first quarter of 2009, with an average decrease of roughly one hour compared to the previous year (Dietz et al., 2011). Finally, short-time work (STW) was expanded dramatically during the Great Recession. In May 2009, around 1.5 million workers were drawing benefits from the STW

scheme compared to 50,000 in September 2008, the month of the Lehmann insolvency (Statistik der Bundesagentur für Arbeit, 2012).

The main idea behind STW is to offer an alternative to firms to lower labor costs without having to lay off workers. At the moment there are three kinds of STW, out of which the so-called "STW for economic reasons" (§96, SCB III) has mainly been applied during the economic crisis. A firm is eligible for this type of STW if it is able to claim that it suffers a temporary and inevitable loss or stoppage of working hours due to an aggravation of business conditions because of economic reasons. This stoppage must result in a loss of wages of more than 10% of the monthly gross earnings of at least one third of the firm's employees. Furthermore, the firm must have already applied all other possible flexibility options (i.e. reduction of overtime hours and the use of working-time accounts). Then for each worker, the FEA then pays the firm up to 67% of the individual net wage gap resulting from the loss of working hours for up to 24 months (Crimmann and Wießner, 2009). Taking the average number of subsidized working hours into account, STW supposedly saved around 360,000 jobs (Möller, 2010). In summary, the greatest contribution to the overall reduction of the annual working hours in 2009 compared to 2008 was 13% and resulted from STW. The reduction of weekly working hours contributed to the overall reduction with a share of roughly 10%, whereas the reduction of paid overtime was almost 8%. Finally, working-time accounts were responsible for 7% of the overall reduction of the yearly working hours (Fuchs et al., 2010).

The third aspect refers to the type of transmission mechanism through which the crisis was hitting Germany. Whereas Ireland, Spain and the United States had to deal with burdens resulting from structural adjustments due to the real estate crisis and turmoil within the financial sector, Germany had not experienced a housing bubble and was instead facing a fierce output decline due to a shortfall of world trade. This output decline primarily hit the export oriented manufacturing sector in Germany, which had experienced a strong upswing in the three previous years leading up to the crisis in 2008 with an output growth rate being twice as high compared to the aggregate economy (Möller, 2010). Another established empirical fact is that firms engaging in international trade are more productive

and innovative than non-exporting firms and, in the case of Germany, are mostly located in the manufacturing sector (Wagner, 2011). Hence, the Great Recession hit the strongest firms coming from an upswing with profit shares between 42% and 45% in the three years leading up to the crisis (Eurostat, 2012). Because of the foregone upswing, workers in the manufacturing sector had also accumulated a significant surplus of working hours on their working time accounts, which could then be used up during the crisis. It should also be stressed that flexibility instruments only work well if they are used to dampen a demand shock that has been induced externally and only lasts for a short period of time. This is why it worked in Germany better than in other European countries with similar schemes (Arpaia, Curci, Meyermans, Peschner, and Pierini, 2012).

Taken together, these three aspects allowed firms to hoard labor deliberately, hoping to be prepared for the next economic boom where they would need an often highly specialized labor force.

6.3.2 Labor Supply and Demographic Change: Future Challenges Ahead

Although the mild response to the Great Recession 2008/2009 has shown that the German labor market has recently exhibited quite some resistance against external economic shocks, it should not be concealed that there are some substantial future challenges the German labor market will soon have to face. This becomes especially obvious in the light of the ongoing demographic change which Germany will experience over the next 50 years. As many other Western European countries, Germany experienced a steep increase in the average life expectancy of women and men aged 65 during the second half of the twentieth century, combined with a significantly decreased birth rate since the 1960s. Forecasts of the Federal Statistical Office project that the old-age dependency ratio will increase steeply until 2030 due to the baby boom generation retiring between 2015 and 2030. This demographic change will fundamentally challenge the labor market because it will lead to a decline in the economically active population. According to the baseline scenario, the working population is expected to decrease by more than 30% until 2060 (Statistis-

ches Bundesamt, 2009). Under this scenario, labor supply in Germany will significantly diminish for the first time since World War II (Sachverständigenrat zur Begutachtung der gesamtwirtschaftlichen Entwicklung, 2011). Hence, the question on how to maintain economic growth and sustainable financing of the public pension and health system despite the decrease has become very important. In this context, the development of labor supply of women and older people will therefore play a crucial role in determining the extent to which the working population decreases (OECD, 2005a). The labor force participation of individuals aged 55 to 64 has admittedly risen significantly: In 2011, the employment rate of this age group was around 60%, compared to 38% in 2001 (see Table 6.4), which was mainly caused by a rising female labor force participation (Garloff, Pohl, and Schanne, 2012). Nevertheless, there are still incentives for older people to either retire before the statutory retirement age or to not seek employment because of limited or unattractive employment opportunities. Therefore, the main challenge concerning the future labor supply of older people is further increasing their working life, which could be achieved by either raising the retirement age or increasing the employability of older workers (OECD, 2012).

Table 6.4: Employment, unemployment and inactivity rates for 2011, by different age groups (in %)

	Germany			**EU 27**		
	Total	Men	Women	Total	Men	Women
15-65 years						
Employment Rate	72.5	77.3	67.7	64.3	70.1	58.5
Unemployment rate	6.0	6.3	5.7	9.7	9.7	9.8
Inactivity rate[1]	22.8	17.5	28.2	28.8	22.4	35.1
55-64 years						
Employment Rate[2]	59.9 (37.9)	67 (46.5)	53 (29.4)	47.4 (37.7)	55.2 (47.7)	40.2 (28.2)
Unemployment rate	6.5	6.6	6.4	6.8	7.3	6.1
Inactivity rate	36.0	28.3	43.3	49.1	40.5	57.2

Source: EU-Labour Force Survey (LFS) 2011.
[1]According to the definition of the International Labor Organisation (ILO), an individual is classified as inactive if he or she is not part of the labor force (i.e. not working at all and not available or looking for work either).
[2]Numbers in parentheses are for 2001.

Concerning the labor supply of women, it can be seen from Table 6.5 that the overall share of employed women of working-age in Germany (68%) is 9 percentage points higher than the EU-27 average (59%). However, the share of female individuals working part-time

is also considerable higher (48% vs. 31%). Taking into account that around 15% of these women actually work part-time involuntarily, the low participation rate of women working full-time reflects negative incentives for an increase in working hours. These negative incentives arise, on the one hand, from the current tax and social welfare legislation in Germany, which still favors the sole male bread-winner model. On the other hand, child-care facilities allowing parents to work full-time only exist for 8% of the children under three in Germany.

Table 6.5: Share of employed individuals (aged 25 to 64) working part-time and reasons for working part-time in 2011 (in %)

	Germany			**EU 27**		
	Total	Men	Women	Total	Men	Women
15-65 years						
Part-time[1]	26.3	8.1	47.4	17.7	6.6	30.9
Reasons for working part-time						
Undergoing Education or Training	4.6	15.1	2.8	3.1	7.1	2.1
Looking after Children or incapacitated adults	24.7	4	28.3	26.4	5.3	31.6
Other Family or personal reasons	26.4	7.6	29.5	17.4	10	19.2
Involuntary part-time employment[2]	17.1	32.5	14.5	25.8	39.7	22.4

Source: LFS 2011.
[1]According to the ILO, a part-time worker is "an employed person whose normal hours of work are less than those of comparable full-time workers" (Eurostat, 2008).
[2]As percentage of the total part-time employment.

For the overall labor market trend, another crucial component is the development of labor demand. Although projections of future labor demand are very difficult and prone to errors, it is generally expected that labor demand decreases less than labor supply (Sachverständigenrat zur Begutachtung der gesamtwirtschaftlichen Entwicklung, 2011). If the persistent reduction of structural unemployment in Germany continues until 2020, many firms are expected to face the problem of skill mismatching (Fuchs and Zika, 2010). Due to a persistent skill-biased technological change and increasing globalization, there will be a decrease of low-skilled jobs in the industry and a considerable growth in occupations requiring higher skills (Spitz-Oener, 2006; OECD, 2011c). Since this trend is expected to continue over the next ten years, employment opportunities for individuals with low education levels will significantly decrease (European Centre for the Development of Vocational Training, 2010). The significance of educational attainment for the labor market status

can be seen from Table 6.6, which displays unemployment rates for the economically active population by education level for 2011.

Table 6.6: Employment, unemployment, and inactivity rates of individuals aged 25-64 years by different education levels (in %)

	Germany			EU 27		
	Total	Men	Women	Total	Men	Women
High education (ISCED[1] level 5-6)	27.6	30.2	24.9	26.8	25.8	27.8
Employed	87.9	91.0	84	83.7	87.4	80.4
Unemployed	2.4	2.3	2.7	5.0	4.7	5.4
Inactive	9.9	6.9	13.7	11.8	8.3	15.1
Low Education (ISCED level 0-2)	13.7	11.4	16.1	26.6	25.8	27.3
Employed	56.6	66.8	49.2	53.5	64.5	43.3
Unemployed	13.9	15.7	12.1	14.8	14.7	14.9
Inactive	34.4	20.8	43.9	37.2	24.5	49.2

Source: LFS 2011.
[1]The International Standard Classification of Education (ISCED) of the OECD divides the levels of education in six categories: Pre-primary (level 1), primary (2), lower (3) and upper (4) secondary education, tertiary (5) education, and advanced research programs (6) leading to the award of an advanced research qualification.

Whereas the average unemployment rate in the EU-27 for the economically active population (25-64) is roughly 15% for individuals with low education (ISCED level 0-2), it is much lower (5%) for high-skilled individuals (ISCED[4] level 5-6). This relationship is even stronger for Germany: The unemployment rate for individuals aged 25 to 64 with low education is 14% and therefore seven times larger compared to highly educated individuals (2%). Hence, low-educated people in Germany face a much higher risk of joblessness than in other European countries. In 2009, 26% of the German population aged 25 to 34 had attained a tertiary education level. This share is below the OECD average (37%) and had only slightly increased since 2002 (OECD, 2011b). Although Germany has on average a high participation rate in education of individuals aged 15 to 24, it still has to catch up concerning the educational outcomes of pupils – when compared to other economically strong countries. According to the Programme for International Student Assessment (PISA) 2009 study, the reading and mathematical skills of 15-year-olds in

[4]The International Standard Classification of Education (ISCED) of the OECD divides the levels of education in six categories: Pre-primary (level 1), primary (2), lower (3) and upper (4) secondary education, tertiary (5) education, and advanced research programs (6) leading to the award of an advanced research qualification (OECD, 2011b).

Germany were significantly higher than the OECD average but well below the highest scores (OECD, 2010). Therefore, the elevation of the general educational level is still considered to be a necessary requirement to sufficiently overcome the sectoral and societal changes of the German economy (Sachverständigenrat zur Begutachtung der gesamtwirtschaftlichen Entwicklung, 2009).

6.4 Future Challenges for Labor Supply Policies

The previous sections have shown, that further reforms in various dimensions are necessary in light of the ongoing demographic and technological change. Since educational attainment concerning labor supply has become increasingly important, we explore some issues related to challenges the education system faces in Section 6.4.1. Section 6.4.2 describes why income splitting is still a source for reduced labor supply of women. The parental leave benefit (PLB, Elterngeld) as another instrument to tackle the problem of low full-time female labor supply is investigated in Section 6.4.3.

6.4.1 Towards a New Skill Strategy: Challenges of the Education System

Nowadays, there are basically two main challenges linked to the education system, both of which were described in Section 6.3.2. The demographic change means that the labor supply of older people is closely linked to their employability, and hence, improving strategies for lifelong learning. Second, due to the technological change, educational attainment has become increasingly important, which basically amounts to raising the overall education level and facilitating the access to tertiary education.

Financing on the job training for older people is less attractive for firms due to a shorter working life of these people. The share of 50 to 64-year old employees participating in on the job-training has declined by 2 percentage points since 2007 and is currently at 33% (Autorengruppe Bildungsberichterstattung, 2012). This is still fairly low compared to countries such as Sweden (OECD, 2012). Moreover, there are still considerable misconcep-

tions of the productivity of older employees. The assumption that working productivity decreases at an older age is wide spread. It is argued that cognitive and physical skills decrease at a steeper rate than working experience increases, leading to an overall decreasing working productivity (SVR, 2011). This leads to age discrimination of older workers (OECD, 2011d). Hence, there is a reduced hiring probability of older workers in Germany (Heywood, Jirjahn, and Tsertsvardze, 2010). However, more recent studies provide evidence that working productivity does not decrease for older people (Malmberg, Lindh, and Halvarsson, 2008; Göbel and Zwick, 2009). A recent study by Börsch-Supan and Weiss (2011) shows that the overall productivity of older people even increases slightly. But even if firms were encouraged to employ older workers—which, for example, was initiated in recent years by introducing wage subsidies targeted at older workers who would be in danger of being laid off because of the seniority principle–training measures could still be improved since older workers apparently do not often receive the "right" training (Zwick, 2011). In recent years, a number of collective agreements have explicitly incorporated the promotion of employability of older people, and a number of programs initiated by the Federal Government and several unions have been adopted to raise public awareness for the working potential and the discrimination of older people. These agreements are in harmony with the introduction of an amendment in 2006 (*Allgemeines Gleichbehandlungsgesetz*), which explicitly forbids discrimination because of gender, origin or age.

Besides raising the employability of older people, there is also a considerable need for raising the education level in general. As described in Section 6.3.2, population ageing and technological change will also increase the need for highly qualified individuals. Therefore, improving the access to tertiary education in Germany in combination with elevating the medium education level are considered to be of crucial importance (Sachverständigenrat zur Begutachtung der gesamtwirtschaftlichen Entwicklung, 2011; OECD, 2011c). Empirical studies stress that investments in education are most fruitful if made during early childhood (see Cunha and Heckman, 2007). There is also empirical evidence pointing towards the fact that appropriate pre-primary education has a positive effect on subsequent labor market outcomes, especially for children from families in which the parents have only

a low education (OECD, 2011c). Therefore, it is often claimed that public expenditures should be concentrated on early stages of life in order to assure an efficient allocation of these expenditures (Sachverständigenrat zur Begutachtung der gesamtwirtschaftlichen Entwicklung, 2009). However, the current distribution of public expenditures on education is not in accordance with these insights. In 2009, the highest share was spent for general education (ISCED 1-4, 35%) and tertiary education (ISCED 5-6, 18%).

Only 9% of the budget was spent on pre-primary education (Autorengruppe Bildungsberichterstattung, 2012). Hence, more efforts are still needed to expand pre-primary education and to place more emphasis on early childhood development. Experts propose the expansion of nursery schools for children aged 3 to 5, which is leading towards the concept of a mandatory pre-school year before entering the primary education level (Sachverständigenrat zur Begutachtung der gesamtwirtschaftlichen Entwicklung, 2009). Furthermore, the specific early tracking in Germany into different school types at the onset of secondary education level is often criticized because empirical studies show that early tracking increases inequality, especially for children with a migration background (Hanushek and Wössmann, 2006). Early school tracking more or less determines the chances for an entrance qualification to the upper level secondary education, which is still the only regular path to university, and the tertiary education in Germany. As a result, policy implications aim at a complete withdraw from early school tracking or to at least a postponement of the decision to a later point in time (OECD, 2012).

In light of an increasing number of young adults qualified for higher education, but a stagnating share of individuals actually taking up a tertiary education, the German government has already undertaken a number of measures to facilitate access to tertiary education. Apart from granting more autonomy to universities, the government also provides financial means to the different Länder, which in turn agreed to assure additional university places until 2020.

6.4.2 Income Splitting as a Source for Reduced Labor Supply

As described in Section 6.2.2, the number of hours worked by female employees in Germany is comparatively low by international standards. This is mainly due to a high share of female secondary-earners working only part-time for very few hours (OECD, 2012). It is often argued that the current system of income taxation creates fiscal disincentives for secondary earners because Germany allows for "income splitting" between married partners with regards to income taxation (*Ehegattensplitting*, §32a (5) *Einkommensteuergesetz*). Since 1958, married couples living in the same household may choose between individual and joint taxation. When choosing the latter, the taxable income of both spouses is cumulated and the sum is then split in half. The income tax is calculated by applying the tax function to the result and doubled in a third step to determine the tax liability of the couple. As a result, the amount of the income tax of a married couple may be lower than the tax the same couple would have to pay if both spouses were taxed individually according to the principle of separate taxation (Schlick, 2005). This results in a "splitting effect" and is seen by critics as a strong disincentive for non-working spouses to take up work in the first place or for secondary earners to start working full-time. In a progressive transfer system like the German one, the tax advantage within the system of income splitting is highest when earnings are distributed unevenly between both spouses. Hence, when taking up work or increasing hours worked, secondary earners are confronted with a high marginal tax rate (Gustafsson, 1992).[5] This is seen as a main reason for the relatively low labor force participation rate of married women in Germany.

Therefore, altering the current system of joint taxation has been repeatedly proposed by experts to increase labor supply of women (OECD, 2011a, 2012). Steiner and Wrohlich (2004) use a microsimulation model to estimate potential labor supply effects of a shift from joint taxation to individual taxation. The authors find that the female participation rate would increase by around 4.85 percentage points and the total number of hours worked

[5] As soon as the wife starts contributing to the family income, the "splitting effect" becomes smaller. The more she contributes, the smaller is the gain from joint taxation compared to a non-married couple. The marginal tax rate on second-earners is therefore higher than for singles.

by women would rise by 11%. However, many public finance experts maintain the contrary by considering that there is no marriage gain from joint taxation at all. They rather argue that joint taxation is a logical consequence of the progressive tax system in Germany given the normative rule that taxation should be neutral with respect to the distribution of incomes within the household (Schlick, 2005). Moreover, taxing on a purely individual basis may come into conflict with the constitutional law in Germany.[6]

In another paper, Dearing, Hofer, Lietz, Winter-Ebmer, and Wrohlich (2007) compare Austria and Germany in terms of work incentives created by the tax and transfer system and child-care institutions. Both countries are quite similar in many institutional aspects but differ in their detailed characteristics concerning the tax system: while in Germany married spouses are taxed jointly and are eligible for full income splitting, Austria has a system of individual taxation. Moreover, Austria has a much more generous parental leave benefit (PLB, Elterngeld) system. Hence, it is interesting to note that labor force participation rates of mothers in Austria and Germany are similar. However, full-time employment rates are much higher among Austrian mothers. In order to establish to what extent these differences can be attributed to differences in the tax-transfer system, the authors estimate structural labor supply models for both countries and then interchange two important institutional characteristics: the definition of the tax unit within the personal income tax and the PLB scheme. The results show that differences in mothers' employment patterns can be partly explained by the different tax systems: individual taxation in Austria leads to lower marginal tax rates for secondary earners and increases labor supply incentives. The authors argue that labor force participation of German mothers would rise considerably if Germany were to introduce Austria's income tax and PLB characteristics.

However, it seems to be very unlikely that the current status quo concerning the joint taxation of married couples within a household will be changed any time soon, since this would also imply major changes in other parts of the social transfer system as a nec-

[6]In 1957, the German constitutional court (BVerfGE, *Bundesverfassungsgericht*) ruled that married couples should not be disadvantaged relative to non-married couples and that an equal share of the total household earnings belongs to each person in a marriage (BVerfGE 6, 55).

essary condition in order to comply with constitutional norms (Sachverständigenrat zur Begutachtung der gesamtwirtschaftlichen Entwicklung, 2007). Nevertheless, there are a number of proposals considering alternative forms of joint taxation, ranging from a model of quasi-individual taxation where the personal exemption concerning the income tax is transferred from the non-working to the working spouse (OECD, 2012) and to different systems of family taxation (for an overview, see Sachverständigenrat zur Begutachtung der gesamtwirtschaftlichen Entwicklung, 2007). These systems cannot be covered in detail here. We instead focus on another income support system that has been established in recent years with the aim to foster female labor supply.

6.4.3 Parental Leave Benefit

In addition to the low full-time labor force participation of women, Germany has also one of the lowest fertility rates in Western European countries, and there is little hope of expecting a substantial increase over the current rate of 1.4 any time soon (Spiess and Wrohlich, 2008). Although these trends had already been observed, the German public has only just begun discussing these issues. The underlying reasons for this unfortunate mix–low fertility and low participation–can be seen as a result of a combination of various institutional arrangements preventing mothers from working full-time, for example an absence of child-care facilities, and rather strong and persistent preferences of (West-)German parents to care for young children at home (Bonin, 2009). In addition, one should note that the labor force participation of mothers depends crucially on the child's age. Whereas only 11.5% of mothers whose youngest child is in its first year of age are in gainful employment, the share escalates to around 40% when the youngest child is between one and two years old. The highest employment share (78%) is exhibited by mothers with the youngest child being between 12 and 15 (Bundesministerium für Familie, Senioren, Frauen und Jugend, 2009).

In light of the demographic change and the need to secure future skill needs, it became obvious that facilitating the return to work for young mothers had gained in importance (Deutsches Institut für Wirtschaftsforschung, 2012). The German government therefore passed a reform of the PLB system (PLB, *Elterngeld*) in line with the Scandinavian model,

which came into effect in the beginning of 2007 and replaced the means-tested preceding benefit (*Erziehungsgeld*).[7] The PLB is provided for up to 14 months to parents of children born on January 1, 2007 or later. The benefit replaces 67% of the average taxable income earned in the 12 months prior to the birth of the child for the parent staying at home.[8] The parent is eligible for benefit if he or she does not work full-time, which is defined as 30 hours per week. Besides the aim of increasing labor market participation of mothers with young children and fostering involvement in child-care of fathers, the reform also implicitly intended to increase fertility rates (Tamm, 2009).

In 2009, the PLB was evaluated by the Federal Ministry for Families concerning the short-term effects of the introduction of the benefit on employment behavior of parents with a new-born child (Bundesministerium für Familie, Senioren, Frauen und Jugend, 2009). The study was based on a mail survey of a sample of parents (N=1,595) whose child was born in April 2007 and who had applied for and received PLB. The study finds that the majority of young mothers resumed employment after having received PLB. Around 13% of women took up part-time work again after six months, and 12 months after giving birth one third of all young mothers (31%) were already re-employed. After 18 months the share was up to 39%, reaching 42% after 24 months. However, two thirds of the women state that the infrastructure of childcare services is insufficient in their region. Along with the request of better infirm child-care possibilities, these results indicate that the PLB only develops its full impact in combination with better early child-care services and more flexible models of working hours for women. To this date, only a few empirical studies have explicitly analyzed the impact of the PLB on the fertility rate mainly finding no statistically significant effects (Thyrian, Fendrich, Lange, Haas, Zygmunt, and Hoffmann, 2010; Hoßmann, Kröhnert, and Klingholz, 2009).

[7] *Bundeselterngeld- und Elternzeitgesetz* (BEEG).

[8] The monthly benefit ranges from 300 euros for low-income parents up to a maximum rate of 1,800 euros.

6.5 Conclusions

The relatively mild reaction of the German labor market to the Great Recession 2008/09 was often called the "German Miracle". However, various reasons are able to explain this unusual response. First, the economic crisis mostly hit financially strong firms coming from a long upswing leading towards to the crisis. These firms were able to hoard labor deliberately due to a number of working-time flexibility instruments at the firm as well as the state level. Second, in the years prior to the Great Recession, Germany had introduced profound reforms of the labor market, which fundamentally changed its institutional settings as well as income support systems and overall led to higher working incentives and better matching between labor demand and supply. There was also a considerable reframing of ALMPs in the course of the labor market reforms, which led to a broad collection on evaluation results providing sound guidance for policy makers in further developing the institutional framework to adjust to structural changes on the labor market. Overall, it is fair to say that Germany has been on the right track with the main reforms of the labor market for the last 10 years.

Despite the mild response to the Great Recession, however, the paper has shown that there are a number of substantial future challenges the German labor market will soon have to face. Although the employment rate of women has recently grown considerably, the current tax and transfer system still favors the sole male bread-winner model and therefore causes the absolute working-time hours of economically active women to lie well below that of other Western European countries. The same pattern concerning employment rates applies to people aged 55 and older. Despite growing numbers, the actual average retirement age continues to lie well below the statutory retirement age. Since the labor supply of both groups is becoming increasingly important in determining the extent to which the working population will decrease due to the massive demographic change Germany will experience over the next 50 years, improving their employability remains one of the main challenges. Fundamentally reforming the current status quo concerning the joint taxation of married couples within a household might not be on the political agenda any time soon.

Therefore, the main challenge rests upon improving the supply of child-care facilities to ensure that income support systems like PLB develop their full impact. Concerning the labor supply of older people, recent reforms of the pensions system, especially the reform in 2007 increasing the statutory retirement age to 67 from 2012 onwards, have provided the institutional framework to further increase the labor market participation of older workers.

However, further potential lies within the area of lifelong learning and hence in increasing the employability of older people. Although much has been done in this area in recent years, including a number of collective agreements explicitly incorporating strategies to increase the employability of older people, training measures could still be improved to ensure that older people receive the training the really need. The ongoing technological and demographic change combined with globalization is expected to lead to a skill mismatch since low-skilled jobs in the industry will decrease and occupations requiring higher skills will increase. This will put special emphasis on the importance of educational attainment on labor market status. Especially within the area of access to tertiary education, the German government, in collaboration with the Länder has already taken up measures to meet the challenges of promoting higher skills. However, the prevalent system of early school tracking into different school types is still vulnerable to family background and increases inequality of opportunity, which led to proposals suggesting to completely withdraw from the system, or to at least postpone the decision to a later point in time.

In conclusion, the German labor market has shown remarkable resilience to the weakened economic conditions. However, meeting the challenges laid out in this paper is crucial for establishing a solid basis for continuing economic growth, in light of societal and structural changes in the country. In order to achieve this, a coordinated effort in many institutional areas, including not only income support and pensions systems, ALMPs, but also education, tax incentives and child-care, will be needed. The paper has summarized some of the current challenges and examined potential solutions.

CHAPTER 7

Concluding Remarks and Outlook

The first and major part of this thesis focused on the evaluation of the New Start-up Subsidy (NSUS), which is offered to unemployed individuals in Germany willing to become self-employed. As outlined in Chapter 1, the main motivation for this evaluation arose from the fact that the promotion of start-ups out of unemployment had become one of the most important measures within the realm of active labor market policy in Germany since its start in 1985. The introduction of the NSUS as a new start-up support program within the framework of Active Labor Market Policies (ALMP) in 2006 posed a number of interesting new research questions, especially with regard to a comparison to the former start-up support programs *Bridging Allowance* (BA) and *Old Start-up Subsidy* (OSUS) that were replaced by the NSUS. These questions were analyzed in Chapter 2, which inter alia also contributed new insights to the discussion about potential deadweight effects associated with start-up subsidies. The analysis was based on a new innovative survey of administrative data of the German Federal Employment Agency that were enriched by telephone interviews of recipients of the NSUS, who started a business out of unemployment during the first quarter of 2009.

The main findings were that the new program supports a smaller range of unemployed individuals compared to the former two support schemes, and that deadweight effects exist, but to a smaller extent than previously assumed.

However, one crucial question that was not answered in Chapter 2 was, whether the NSUS also leads to successful businesses from an economic perspective, i.e., additional jobs and potential innovation when compared to "regular" start-ups. Such an assessment is crucial since there are a range of economic concerns linked to start-up subsidies. Besides deadweight-losses, the subsidy could also induce individuals with insufficient entrepreneurial abilities to start a business since the expected returns from self-employment

are smaller when founding a business out of unemployment. Moreover, the subsidy could also lead to a moral hazard problem, since it takes away some of the income risks that are usually associated with founding a business. Both of these scenarios could lead to smaller economic growth and less innovative businesses as compared to "regular" start-ups.

To this end, Chapter 4 first analyzed differences between subsidized start-ups out of unemployment and non-subsidized start-ups out of non-unemployment, and mainly provided – besides the empirical evidence for potential deadweight effects – empirical evidence for two additional research questions, namely whether initial differences exist between subsidized start-ups out of unemployment and other business start-ups, and how the businesses founded by subsidized unemployed individuals perform compared to "regular" business founders.

Taken together, the thesis showed in these Chapters that supporting start-ups out of unemployment is still an effective and therefore successful measure of ALMP in Germany. However, despite these positive results and despite the fact that deadweight effects seem to be much smaller than previously assumed, the German Government significantly altered the institutional framework of the NSUS by the end of 2011. These changes resulted in a significant decline in financial support levels, and a much more restricted access to the subsidy. The Government mainly justified these steep cuts with the statement that the majority of subsidized founders would have become self-employed even without the subsidy. The main policy implication associated with the research results of this thesis should therefore be to promote a more sustainable development of start-up support in Germany. More specifically, the strategy should be more bipartisan as well as long-term oriented, and should be less directed towards ad-hoc decisions due to budgetary matters.

However, Chapter 4 also showed that, although business founders out of unemployment have no shortages with respect to human capital, they seem to fall short with regard to business growth, and innovation compared to business founders that were not unemployed when starting their business. Therefore, policy makers should also be concerned with the question of how the financial support of unemployed individuals willing to become self-employed could be better complemented by individually crafted non-financial support

schemes such as cross-cutting preparatory courses, or coaching measures. This could go as far as systematically establishing entrepreneurial education already in schools of primary and secondary education levels to establish a broader "entrepreneurial thinking" in the society.

Since the results of those Chapters in this thesis are based on an observation period of only 19 months more further research is needed to gain more insights on how business founders out of unemployment that have been subsidized by the NSUS perform in the long-run.

One potential measure to keep track of the long-term development of start-up activity more thoroughly could also consist in the creation of a more consolidated data source that monitors the complete universe of newly founded businesses in Germany. As was shown in Chapter 3 of this thesis, the various start-up reporting systems available for Germany still reveal substantial differences in data processing procedures, and therefore also in absolute numbers concerning the overall start-up activity. Hence, efforts towards creating a central reporting system of start-up subsidies should in the future be on the political agenda in Germany.

Chapter 5 of this thesis assessed the effectiveness of the internet as a job search method. Although it was shown that the internet job search during unemployment apparently increases reservation wages and search effort of unemployed individuals, only mixed evidence is found with respect to potential improvements of job quality that go along the the successful use of the internet as a job search channel. Moreover, the study was limited to job searchers out of unemployment, and could not answer the question whether searching for jobs via the internet would exhibit the same effects when job searchers are employed. However, the findings still provide important insights into the potential scope for improvement of job search efficiency by extending the use of the internet. For example, it has often been documented that the effectiveness of the FEA search channel is lower than that of other search channels. In light of the findings, a substantial increase in the effectiveness of job search methods could be achieved, if the caseworkers of the FEA were to extend their vacancies to the most common online job search engines, especially for highly specialized

jobs. Furthermore, while we also find that about 80% of all unemployed individuals use the internet, it is likely that some individuals use the internet more successful than others, so that an explicit online coaching should be integrated into the standard toolbox of coaching measures.

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