

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

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Preliminary version

This version: June 17, 2013

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 large-scale telephone 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.

Keywords: Entrepreneurship, Start-Up Subsidies, Evaluation
Deadweight Effects
JEL: C14, L26, J68

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We thank participants at the 2013 IECER in Brescia, 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.

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 might be concerned about 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.

The main contribution of this paper is to introduce a new explorative dataset that allows comparing subsidized start-ups out of unemployment and regular business start-ups. 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 was introduced in August 2006 and provides unemployed individuals with financial assistance during the founding period (up to a maximum of 15 months). As regular business founders, we consider non-subsidized¹ 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. This group has been constructed based on registered start-ups at the chamber of industry and commerce, the chamber of crafts and information from a private address provider. 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 justification for start-up subsidies for unemployed individuals is based on the existence of disadvantages faced by nascent unemployed entrepreneurs. Such disadvantages might arise due to severe capital constraints among the unemployed, 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). Start-up subsidies

¹We 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.

aim at removing these disadvantages by providing financial assistance during the critical founding period, thus aiming to help nascent entrepreneurs among the unemployed to overcome barriers that exist due to their unemployment status.

However, there are also some critical aspects related with the subsidy. 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 that more low ability individuals enter self-employment, because, from an occupational choice perspective, the required returns from self-employment (at which an individual is willing to become self-employed) are lower than without the subsidy. This is likely to negatively affect the performance of subsidized businesses. Finally, the subsidy could induce a moral hazard problem, leading to reduced effort and thus further reducing business growth.

Based on the new data, we study the empirical relevance of these arguments and examine three particular questions: 1) What is the magnitude of deadweight effects? 2) Do initial differences between subsidized and regular start-ups exist? 3) How do 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 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 2 provides a theoretical consideration with respect to the subsidy's justification and impact on the selection into self-employment and business performance. Section 3 provides relevant institutional settings in Germany and summarizes related previous findings. Section 4 describes the construction of our dataset and Section 5 contains the empirical analysis. Finally, Section 6 concludes.

2 Theoretical 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. On the one hand, unemployed individuals 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. On the other hand, 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 credit². In addition, unemployed individuals might face disadvantages due to a depreciation of their start-up specific human and social capital during unemployment. This particularly includes the lack of experience of previous 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. Furthermore, 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. 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 previously explained, 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. As a result, unemployed individuals need to invest more resources (labor and capital) during the founding period itself in order to elaborate initially less valuable business ideas, create networks and acquire start-up specific human capital, etc. Accordingly, the subsidy is expected to compensate for these disadvantages. However, the existence of the subsidy might also induce some negative effects, i.e. deadweight effects, attracting low ability individuals and inducing moral hazard.

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

²Banks 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.

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.

Attraction of low ability individuals: Offering a subsidy bears the risk of opening the way to entrepreneurship for low ability individuals. Based on earlier studies by Knight (1921), Schumpeter (1939) and Kirzner (1973), modern economic theory relies on occupational choice models in order to explain the creation of entrepreneurship (see de Wit, 1993; Blanchflower and Oswald, 1998; Parker, 2009, amongst others). To illustrate the impact of a subsidy on the selection into self-employment, we adopt a very simple and static occupational choice model³, where wages w are exogenously given and profits π depend on the individual ability θ (see de Wit, 1993; Clark and Drinkwater, 2000, for instance). Individuals become self-employed if the expected profits are greater than wages, i.e. $w < \pi(\theta^*)$ where θ^* indicates the marginal amount of ability that ensures a certain profit higher than wages paid in dependent employment. If we introduce the subsidy SUS , the previous equation changes to $w < \pi(\theta_{SUS}^*) + SUS$ for unemployed individuals with subsidy receipt (SUS), while it remains unchanged for individuals without such a subsidy. Therefore, the subsidy has a positive impact on the expected income from self-employment ($\pi + SUS$) and, all else being equal, makes it attractive for low ability individuals (who would not have become self-employed in the absence of the subsidy) to become self-employed. This is because the subsidy reduces the amount of expected profits needed to prompt unemployed individuals to become self-employed, i.e. $\pi(\theta_{SUS}^*) < \pi(\theta^*)$ as $\pi(\theta^*) = \pi(\theta_{SUS}^*) + SUS$. As the expected profits depend on entrepreneurial abilities, this directly implies that $\theta^* > \theta_{SUS}^*$, i.e. on average, subsidized business founders are characterized by lower entrepreneurial abilities than non-subsidized business founders.⁴

Moral hazard: The subsidy payment might induce moral hazard. 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.⁵ 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.

³For simplicity, we neglect further extensions, such as dynamic consideration, capital constraints or non-pecuniary utility of self-employment. See Parker (2009) for an overview or Blanchflower and Oswald (1998) for a detailed discussion of underlying assumptions and extensions.

⁴Note, if we would allow for a lower wage level for unemployed individuals due to lower reservation wages (as usually assumed in the literature), this would not change our results but rather reinforce the story, i.e., self-employment becomes even more attractive for subsidized unemployed individuals.

⁵This 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.

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 of whether disadvantages faced by unemployed nascent entrepreneurs and the risk of attracting low ability individuals due to the subsidy translate into observable initial differences between subsidized and regular start-ups. Third, we will consider the development of subsidized and regular businesses over time. In this regard, the theoretical considerations do not provide a clear indication. On the one hand, 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, and is thus expected to lead to comparable business development in the long run. However, on the other hand, expected lower abilities among the subsidized individuals predict the opposite, as 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.

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 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*⁶ 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. 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.

⁶In 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 and Hogenacker, 2012).

Once the second period was approved, only the lump sum payment was granted for an additional period of six months.

INSERT FIGURE 1 ABOUT HERE

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 1 the respective numbers for full-time business start-ups between 2006 and 2011.⁷ 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 on the *German Microcensus* and *KfW Start-up Monitor*.⁸ 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 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.

Largely due to data limitations, empirical studies analyzing differences between start-ups out of unemployment and non-unemployment are scarce. Indeed, to the best of our knowledge, only three studies exist for Germany at present. Hinz and Jungbauer-Gans (1999) made a first attempt to investigate differences between both groups by collecting data on business start-ups in the metropolitan area of Munich in 1995. The empirical analysis is based on 172 observations in total and finds no shortages in terms of human capital, but less job creation among subsidized founders compared to start-ups founded out of non-unemployment. However, due to the regional focus on Munich, the external validity of these results is very limited. In another study, Pfeiffer and Reize (2000) use the ZEW Firm Start-up Panel⁹ extending the analysis to 15 labor market districts in Germany. However, this dataset entails the disadvantages that very small firms are likely to be underrepresented and variables related to individual characteristics are very limited (in particular with respect to human capital). Therefore, their findings primarily focus on business characteristics. Comparing subsidized start-ups out of unemployment and other start-ups between 1993 and 1995, they find no differences in terms of job creation but slightly lower survival probabilities after one year for subsidized firms in East Germany (although not West Germany). In a more recent study, Niefert (2010) uses the KfW Start-up Monitor (see above) to investigate differences between previously unemployed and

⁷In 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.

⁸The 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 KfW Bankengruppe (2012) and Fritsch, Kritikos, and Rusakova (2012).

⁹See Fryges, Gottschalk, and Kohn (2010) for detailed information on the ZEW Firm Start-up Panel.

employed business founders with respect to individual and business characteristics at the time of start-up. While she finds no shortages in terms of educational attainment, start-ups out of unemployment seem to face credit constraints as indicated by less capital investments and fewer employees at start-up. However, the study does not provide insights in terms of business development over time, given that the dataset is a cross-sectional survey.

In addition to the German evidence, Andersson and Wadensjö (2007) provide evidence for Sweden and Désiage, Duhautois, and Redor (2012) for France. Andersson and Wadensjö (2007) use administrative data to compare the business outcomes of self-employed individuals conditional on their prior employment status, i.e. dependent employment, unemployment or inactivity. They find that start-ups out of employment perform best in terms of income and employment growth, and those among the start-ups out of unemployment, those who received a start-up subsidy perform better than those without the subsidy. Désiage, Duhautois, and Redor (2012) compare unemployed or inactive individuals who received a start-up subsidy in France in 1998 with non-subsidized start-ups. Combining administrative with survey data, they find that subsidized start-ups have higher survival rates after eight years. However, the study does not find evidence for higher economic performance with respect to number of employees and financial development among the subsidized firms.

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 based on large-scale representative samples of start-ups out of unemployment and non-unemployment. Besides cross-sectional information on individual and business-related characteristics, the data contains longitudinal information on business development. 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.

INSERT FIGURE 2 ABOUT HERE

As depicted in Figure 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 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 professions¹⁰, craft enterprises and agriculture businesses. 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 chamber¹¹ was willing to participate. The PAP obtains information based on its own research, as well as from the commercial register (“Handelsregister”).¹² 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. As depicted in Figure 2, we realized a total of 2,306 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. Therefore, we 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

¹⁰Subject 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).

¹¹In Germany, 80 *Chambers of Industry and Commerce* and 53 *Chambers of Crafts* exist in total.

¹²The 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.

are also included.¹³ Based on information from the German *Mircocensus* (see Section 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 1. 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, retail and services, while differences exist in terms of manufacturing, construction, crafts, services and other sectors.

INSERT TABLE 1 ABOUT HERE

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 2).¹⁴ 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”.

5 Empirical Analysis

Based on this dataset, the empirical analysis addresses the research questions derived in Section 2. We restrict the empirical analysis to male individuals.¹⁵ 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). Given that we only focus on full-time start-ups,

¹³According 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 (KfW Bankengruppe, 2010).

¹⁴Out 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.

¹⁵See Caliendo and Künn (2012) for evidence on subsidized start-ups out of unemployment by females.

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. Therefore, we exclude women and finally observe 1,478 (930) male subsidized (regular) business founders.

5.1 Deadweight effects

As illustrated in Section 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 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.¹⁶

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 2 shows that this is not 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, 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

¹⁶See, e.g. Bundesministerium für Arbeit und Soziales und Institut für Arbeitsmarkt und Berufsforschung (2011).

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 5.3.2.

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

As described in Section 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 low ability individuals entering self-employment, and thus inducing an adverse selection of entrepreneurs.

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 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 be 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.

INSERT TABLE 3 ABOUT HERE

5.2.1 Motivation to start a business

Results with respect to the motivation to start a business in the upper part of Table 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. Following Shane (2003), this can be considered a disadvantage as necessity start-ups usually have less access to information about business opportunities, and consequently (due to time restrictions) also realize less valuable business ideas.

5.2.2 The Role of 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, we consider both school achievement and professional education. Table 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).

Another important aspect of human capital for starting a business comprises the existing employment and industry-specific experience of the founders. For instance, individuals might have acquired industry-specific knowledge from previous dependent employment, including contacts to potential customers or potential business partners. Our dataset allows us to disentangle between employment experience in general and industry-specific experiences. With respect to the former, Table 3 shows results concerning the individual time spent in employment (and unemployment) relative to the overall time spent in the labor market, whereby we observe that subsidized business founders have on average less employment (and more unemployment) experience, thus indicating a disadvantage.

Regarding industry-specific experience, the individuals were asked to report if they already had specific experience in the sector in which they started their self-employment. We detect a similar pattern compared to the general employment experience, i.e. subsidized business founders indeed seem to face disadvantages. Table 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. Within the entrepreneurship literature, it has been shown that intra-family transmission has a significant influence on the individual decision to become self-employed and also on business performance over time (Tervo, 2006; Fairlie and Robb, 2007). Table 3 shows that subsidized start-ups seem to face disadvantages in this regard. 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.

5.2.3 Capital Investments and Constraints

Finally, we consider capital investments realized at business start-up and within the founding period. As derived in Section 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.

Based on descriptive statistics in Table 3, we clearly find supportive evidence that subsidized start-ups invest less capital. While the share of individuals who invested capital at start-up is comparably 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 3 show.

Given the finding that subsidized start-ups invest remarkably less capital at start-up, the question remains as to whether the unemployed face more severe capital constraints or if the subsidy induces less capital investment.¹⁷ To shed light on this question, we provide information regarding the source of the capital that has been invested at start-up. As described in the theory section, the unemployed are expected to have disadvantages in terms of personal equity and access to loans. While we do not have detailed information on personal equity, we know the share of the invested capital that has been financed by personal equity. We detect 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 regarding the argument that the unemployed are discriminated by capital markets and hence face restricted access to loans. Table 3 shows that only 20% of subsidized start-ups received a loan, which was the case for 29% of regular business founders. More interestingly, 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 accessibility of loans for the unem-

¹⁷Based on the occupational choice model, we know that individuals become self-employed if expected profits are higher than wages. Due to the subsidy, unemployed individuals already choose to become self-employed at lower levels of expected profits compared to regular business founders. If one assumes a positive correlation between capital investments and expected profits, it follows that subsidized businesses tend to invest less capital (Pfeiffer and Reize, 2000).

ployed. Although we cannot precisely determine the impact of existing capital constraints on capital investments at start-up, the descriptive evidence prompts the conclusion that capital constraints seem to exist for unemployed individuals.

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.

5.3 Business Development

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. From a theoretical perspective, the subsidy is expected to have two opposing effects on business survival and growth. On the one hand, the subsidy is expected to extend survival and provide individuals with financial flexibility that releases resources to catch up with regular business founders leading to comparable business development in the long run. However, on the other hand, it is anticipated that lower abilities among the subsidized individuals and the occurrence of moral hazard will negatively impact business development.

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 a 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. The idea is to compare the group of subsidized start-ups to a counterfactual situation consisting of regular business founders that are identical at the time of start-up. However, as shown in the previous section and Table A.1 in the Appendix, substantial differences exist between both groups, and an unconditional comparison would lead to biased results. Therefore, to estimate the impact of prior employment status and hence subsidy receipt on business performance, we will use decomposition methods that allow us to disentangle the influence of differences in terms of observable and unobservable characteristics.

We use 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 (see Caliendo and Kopeinig, 2008, for details on propensity score matching). 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.

This helps to answer the question of how subsidized founders would perform if they had the characteristics of regular business founders. In contrast to the evaluation literature, we do not claim causality and do not have to rely on the strong conditional independence assumption. The estimated effects are subsequently interpreted as conditional gaps that arise due to the difference in initial employment status (unemployed, not unemployed) and a residual term, i.e. which is unobservable (Frölich, 2007).¹⁸ In other words, the conditional gap might arise from the choice to start a business out of unemployment or non-unemployment, and due to unobserved differences induced by the subsidy such as ability and moral hazard. The data allows us to control for a large vector of observable characteristics including labor market history and important information about the start-up (see Table A.1), which are correlated with ability and personality and thus should significantly reduce the remaining influence of unobserved differences. Details on the implementation of the matching procedure as well as the balancing characteristics are depicted in Appendix B.

5.3.1 Main Results

To answer the question of how subsidized start-ups perform over time compared to regular business founders, Table 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 3).

First of all, we focus on results for the full sample (upper part in Table 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 6.4% (conditional). However, the remaining conditional gap of 6.4%-points is statistically significant and therefore still indicates higher survival for subsidized start-ups. This might be explained by subsidy receipt (as started out of unemployment) and unobserved differences. As we find higher survival for subsidized business founders, it seems that the direct effect of the subsidy payment during the founding period dominates potentially induced negative effects such as lower ability 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. This indicates that the subsidy receipt (and having started out of unemployment) apparently has no impact on post self-employment individual labor market status. With respect to working income, Table 4 shows significant higher net earnings for regular business founders, which is largely attributable to existing differences in

¹⁸See Caliendo and Lee (2013) and Krause, Rinne, and Schüller (2012) for similar applications using matching to perform decomposition.

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 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, Hogenacker, and Künn, 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. Similar to the discussion above, the differences between raw and conditional values indicate that differences in observable characteristics affecting outcome variables. After having controlled for observable differences, the remaining gaps indicate that subsidized business founders are lagging behind in terms of income and business growth. In contrast to business survival, this suggests that potentially induced negative effects such as lower ability or moral hazard dominate the subsidy effect.

INSERT TABLE 4 ABOUT HERE

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, 2009). Indeed, Table 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 suggests that subsidized start-ups face higher business survival, but lag behind regular business founders in terms of income, business growth and innovation. This finding might be explained by several reasons: The subsidy payment seems to extend survival in self-employment 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.¹⁹ In order to finally conclude whether increased business survival is indeed attributable to the recently expired subsidy receipt, we would need a longer observation period.

¹⁹The 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.

The lower income and growth rates might be explained by three different issues: First, the subsidy allows low ability individuals to enter self-employment resulting in lower business performance. Second, the presence of the subsidy might have reduced business growth due to moral hazard. Third, the selection process of profitable and not profitable businesses (survival-of-the-fittest) is hindered by the subsidy payment. Within the regular businesses only the profitable businesses survive 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.

5.3.2 The Role of Deadweight Effects

Based on descriptive evidence, we identify in Section 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.²⁰ 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.

INSERT TABLE 5 ABOUT HERE

Table 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 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 differences in income and innovation are not statistically significant (due to the lower number of observations compared to Table 4), the results clearly 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.

²⁰We neglect results for the subgroup of 21.3% that is potentially affected by deadweight effects using the broad definition (see Section 5.1 and Table 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%.

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 large-scale telephone survey that allows such a comparison. In addition to cross-sectional information on individual and business-related characteristics, the data also contains longitudinal information on business development.

The identification of deadweight effects associated with start-up subsidies requires two criteria to be fulfilled. First, that the subsidized individuals would have also become self-employed in the absence of the subsidy and second, that business success is uncorrelated with the subsidy. With respect to the first issue, 48.3% of subsidized business founders reported that they would have even become self-employed without the subsidy, and 22.8% that they even intentionally registered as unemployed to receive the subsidy. While these shares are high, they do not directly correspond to deadweight effects, given that the second dimension is missing. Due to data restrictions it has not been possible to consider the second dimension in previous studies, and thus those shares have been often cited within the political discussion with respect to the occurrence of deadweight effects. However, the new dataset also allows us to observe the second dimension. We find that the initial shares of 48.3% and 22.8% significantly reduce down to 21.3% and 8.6% respectively, as only those also reported that the subsidy had no impact on business survival during the first six months. In addition to the descriptive evidence, we provide a direct comparison of the suspicious share of 8.6% to regular business founders in order to validate whether the subsidy indeed had no impact on business success beyond the founding period. We find significant differences and thus conclude that deadweight effects seem to exist, albeit at a (much) lower scale than usually assumed.

With respect to the second research question, i.e. whether initial differences between subsidized and regular start-ups exist, 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 methods, 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 ability 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, the existence of the subsidy allows low ability individuals to enter self-employment, which negatively impacts business development. Third, the subsidy payment induces moral hazard or hinders the market mechanism, i.e. the selection process of profitable and not profitable businesses (survival-of-the-fittest). Future research is encourage 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, 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 induces 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). This latter aspect should concern policy makers if subsidized businesses are proven to persistently lag behind.

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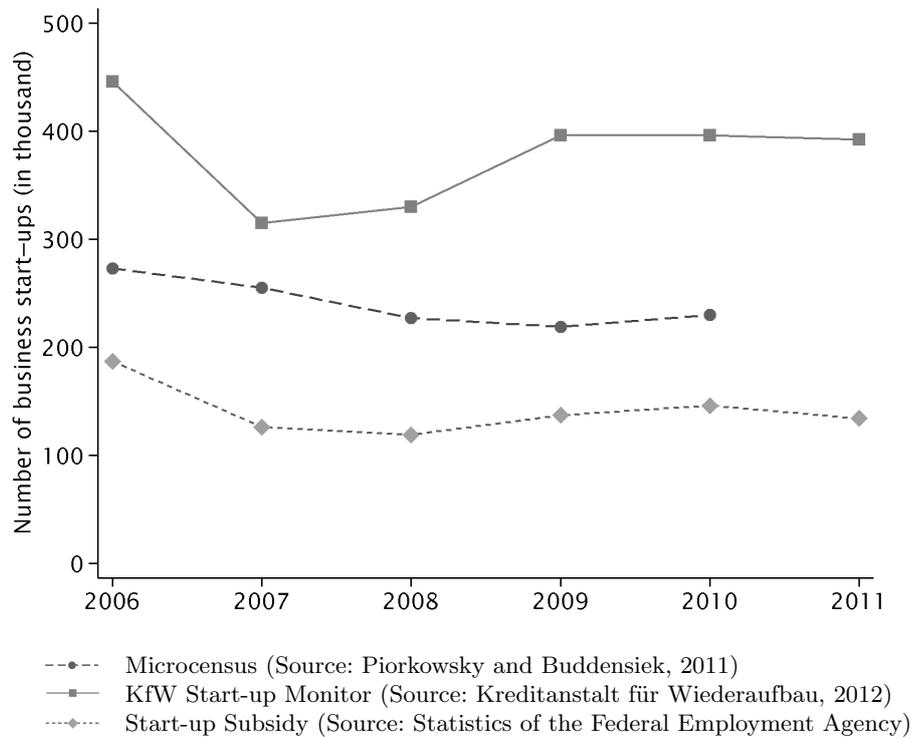
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Tables and Figures

Figure 1: Start-up Activity in Germany 2006-2011



Notes: Only full-time business start-ups.

Figure 2: Data Construction

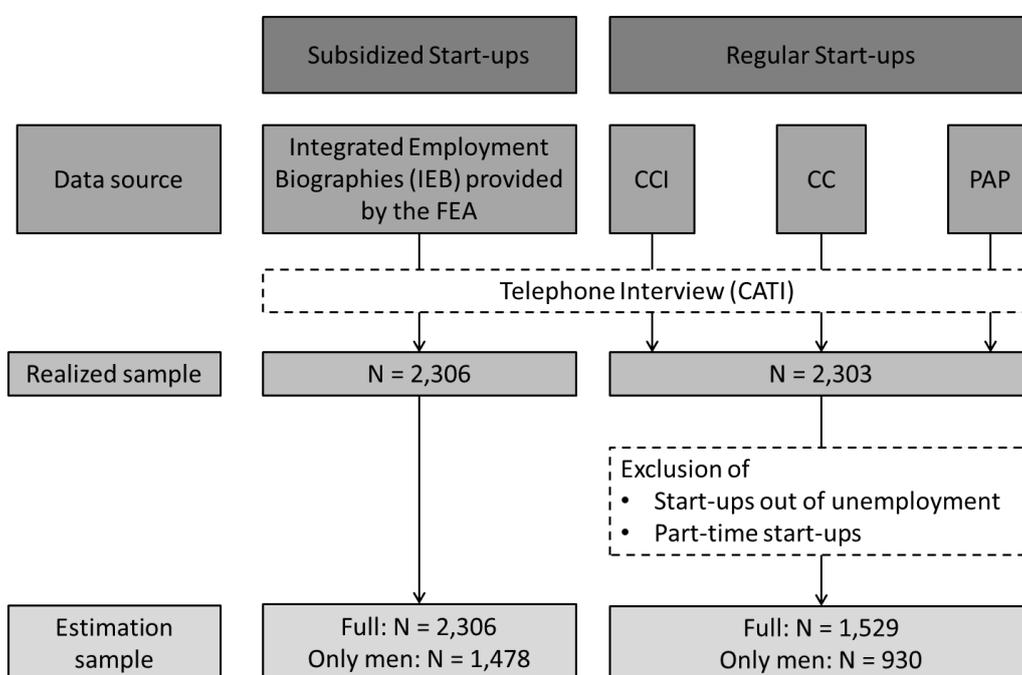


Table 1: Comparison of the Realized Sample of Non-Subsidized Business Founders with a Representative Sample of All Business Founders Based on the German Microcensus

	Realized sample of non-subsidized business founders	All business founders based on the German Microcensus
Number of observation	2,303	1,053
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	0.2
Sectoral distribution of business foundation		
Agriculture, forestry, fishing	1.8	1.3
Manufacturing, construction, crafts	29.0	14.4
Retail	18.1	13.6
Services (logistic, financial industry, IT etc)	36.4	26.2
Others	14.7	44.5

Notes: All numbers are percentages. The information from the German Microcensus is based on own calculations using the 2009 survey, including all individuals who reported that they became self-employed in 2009 (N=1,053).

Table 2: Descriptive Evidence on the Occurrence of Deadweight Effects Related to the Start-up Subsidy

Second dimension of deadweight effects				Total
Statement: The subsidy was highly relevant for business survival during the founding period (first six months). ^{a)}				
	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

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”.

Table 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		
Parent are/were self-employed	32.9	46.6***
Business takeover	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*

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)} Standardized by (Age-15)

Table 4: Business Development 19 Months After Start-up

	Subsidized founders (1)	Regular founders raw (2)	conditional (3)
<i>Full sample</i>			
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
Income measures (in Euro, net) ^{a)}			
Monthly working income	2,146.0	2,636.6***	2,374.4
<i>Conditional analysis: Self-employed individuals only</i>			
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*
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***
Innovation implemented by businesses (in %)			
Filed patent application	2.0	5.0**	2.6
Filed application to legally protect corporate identity	6.8	12.8***	16.0**

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.

^{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.

Table 5: Detailed Consideration of Business Development to Determine the Role of Dead-weight Effects

	Suspicious subgroup of subsidized founders (1)	Regular founders Conditional value (2)
<i>Full sample</i>		
Share in self-employment (in %)	92.6	79.8***
<i>Conditional analysis: Self-employed individuals only</i>		
Income measures (in Euro, net) ^{a)}		
Monthly working income	3,415.9	4,620.6*
Hourly working income	16.0	22.4
Employee structure		
At least one employee (in %)	46.9	72.3***
Number of full-time equivalents ^{b)}	3.2	6.8***
Innovation implemented by businesses (in %)		
Filed patent application	1.8	3.2
Filed application to legally protect corporate identity	7.0	16.6*

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.

A Supplementary Tables and Figures

Table A.1: Selected Descriptive Statistics

	Subsidized founders	Regular founders	p-value
Number of observation	1,478	930	
<i>Personal characteristics</i>			
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
<i>Human capital</i>			
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
<i>Intergenerational transmission</i>			
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
<i>Labor market history</i>			
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 continued.

Table A.1 continued.

	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
<i>Regional information</i>			
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
<i>Business related characteristics</i>			
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 - < 10,000 Euro	16.1	8.5	0.000
10,000 - < 50,000 Euro	31.7	32.9	0.549
≥ 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.

B 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 to start a business out of unemployment and therefore receive the subsidy using probit-models. Table B.2 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 B.1 shows the distribution of the estimated propensity scores, highlighting that the estimated propensity scores of subsidized business founders overlap the region of estimated scores for 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. Table B.3 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.²¹ 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 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-R² between both regressions (Sianesi, 2004). Indeed, this is confirmed by Table B.3, showing very low Pseudo-R² 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.

²¹See Caliendo and Kopeinig (2008) for a detailed discussion on the assessment of the matching quality and for an explanation of applied measures.

Table B.2: Propensity Score Estimation — Subsidized Business Founders vs. Regular Business Founders

Dependent variable: Subsidized founders (1) vs. Regular Founders (0)	
<i>Personal characteristics</i>	
East Germany	0.238
Age distribution (Ref.: < 25)	
25 - < 35	-.233
35 - < 45	-.186
45 - < 56	-.169
≥ 56	-.557**
Children under six years in household	0.105
Children between six and 14 years in household	0.002
Married	-.022
Not German	-.078
<i>Human capital</i>	
School achievement (Ref.: None or lower secondary school)	
Middle secondary school	-.072
Upper secondary school	0.038
Professional education (Ref.: Unskilled workers/others)	
Skilled workers (apprenticeship)	0.435***
Technical college education (master craftsman)	0.26*
University education	0.492***
<i>Intergenerational transmission</i>	
Parents were/are self-employed	-.182**
Business take-over from parents	-.777***
Parents born abroad	0.064
School achievement of father (Ref.: None or lower secondary school)	
Middle secondary school	0.053
Upper secondary School	0.105
Father unknown	0.899**
Father of respondent employed at age 15	0.235**
<i>Labor market history</i>	
Monthly net income from last dependent employment right before start-up (Ref.: Dependently employed and income not specified)	
0-1,000 Euro	0.677***
> 1,000 - 1,500 Euro	0.545***
> 1,500 - 2,500 Euro	0.54***
> 2,500 Euro	0.557***
In apprenticeship or marginal employment	-.611***
In other status	-.663***
Duration of dependent employment right before start-up	
< 1 year	-.162
5 or more years	-.210**
Unemployment experience before start-up as share of working time ^{a)} (Ref.: 0)	
Not specified	2.006***
> 0 - ≤ 2	1.462***
> 2 - ≤ 5	1.772***
> 5 - ≤ 15	1.897***
> 15	1.607***
Employment experience before start-up as share of working time ^{a)} (Ref.: ≤ 50)	
Not specified	-.360
> 50 - ≤ 70	-.135
> 70 - ≤ 90	-.128
> 90 - ≤ 99	-.122
>99	-.295*

Table continued.

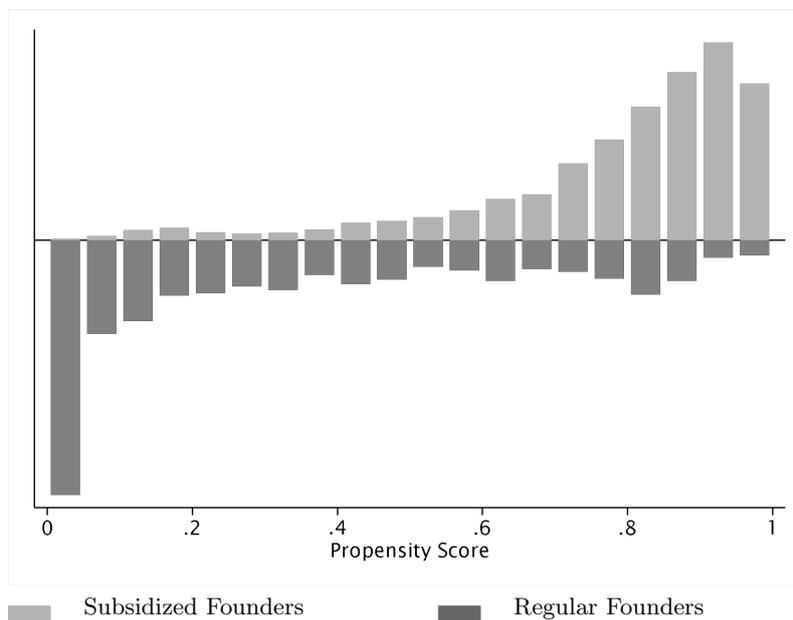
Table B.2 continued.

Dependent variable: Subsidized founders (1) vs. Regular Founders (0)	
<i>Regional information</i>	
Federal state (selected states)	
Baden-Wuerttemberg	-.164
Bavaria	-.210*
Saxony	-.345**
Local macroeconomic conditions	
Vacancies related to stock of unemployed	0.013**
Unemployment rate	0.022
Real GDP per capita in 2008 (in thousand Euro)	0.01***
<i>Business related characteristics</i>	
Sectoral distribution of business foundation (Ref.: Other sectors)	
Agriculture, forestry, fishing	-.450
Manufacturing, crafts	-.305***
Construction	-.395***
Retail	-.282**
Transport, logistics	0.135
Financial service, insurance industry	-.027
IT	-.167
Other services	-.279**
Industry-specific experience before start-up (Ref.: Not specified)	
Due to dependent employment	0.14
Due former self-employment	-.149*
Due to secondary Employment	0.126
Due to hobby	-.128
Due to honorary office	-.097
None	-.036
Capital invested at start-up (Ref.: None)	
< 1,000 Euro	-.402**
1,000 - < 5,000 Euro	0.195
5,000 - < 10,000 Euro	0.283**
10,000 - < 50,000 Euro	0.065
≥ 50,000 Euro	-.235*
Share of equity	-.071
Constant	-1.814***
Number of observation	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. Statistical significance at the 1/5/10 %-level is denoted by ***/**/*.

^{a)} Standardized by (Age-15)

Figure B.1: 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 B.2.

Table B.3: 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
≥ 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 R² compared to Table B.2 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.