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

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Abstract

Offering unemployed individuals a subsidy to become self-employed is a widespread strategy to help unemployed individuals to escape unemployment. Studies have illustrated its high effectiveness to improve labor market prospects of participants compared to other unemployed individuals. However, mainly due to data restrictions the evaluation of start-up subsidy programs from a business perspective, i.e., does the program lead to successful businesses, has received only little attention so far. Using a new dataset based on a large-scale telephone survey, we are now able to compare subsidized start-ups out of unemployment with "regular" business founders and contribute in this regard. The results indicate that nascent unemployed entrepreneurs face disadvantages in variables correlated with entrepreneurial ability and access to capital. Using propensity score matching methods to disentangle the influence of observable and unobservable characteristics on business performance, we find that 19 months after start-up subsidized businesses out of unemployment experience higher survival, but lagging behind "regular" business founders in terms of income and business growth. Moreover, we show that expected deadweight effects related to start-up subsidies occur but at a much lower scale than usually assumed.

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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 and still constitute a significant part of German ALMP. For instance, the Federal Employment Agency reports that 134,000 individuals were subsidized in 2011. The number of entries are therefore 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 of high relevance for policy makers to know if 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. First, from an ALMP perspective, i.e, does the program improve participant's labor market prospects? And second, from a business/economic growth perspective, i.e., does the program lead to successful businesses, additional jobs, etc.? A causal evaluation 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 and improve participants labor market outcomes (see Caliendo and Künn, 2011). A causal assessment of the second perspective would require a control group consisting of "regular" business founders, i.e., non-subsidized[1] start-ups out of non-unemployment. Due to data restrictions in this regard it has not been investigated so far if subsidized start-ups out of unemployment are as successful as "regular" businesses. This is the main contribution of the paper.

Therefore, we constructed a new explorative dataset that allows such an analysis. For the group of subsidized start-ups out of unemployment, we use a random sample of entries into the *start-up subsidy* ("Gründungszuschuss", SUS) in the first quarter of 2009. The start-up subsidy has been introduced in August 2006 and provides unemployed individuals financial assistance during the founding period (up to a maximum of 15 months). As "regular" business founders we consider non-subsidized business start-ups out of non-unemployment in the first quarter of 2009. 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. We finally collected information on both groups by means of computer-assisted telephone interviews. In contrast to data of former studies comparing founders out of unemployment with other start-ups, we are able to rely on a rich set of individual as well as business related information, and observe business development over time.

In theory, the justification for start-up subsidies for unemployed individuals bases on the existence of disadvantages faced by nascent unemployed entrepreneurs. Those 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. Start-up subsidies aim at removing these disadvantages by provid-

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

ing financial assistance during the critical founding period. The subsidy therefore aims at helping nascent entrepreneurs among the unemployed to overcome existing barriers due to their unemployment status.

However, there are also some critical aspects related with the subsidy. First, the subsidy might lead to so-called deadweight effects, i.e., nascent entrepreneurs intentionally register as unemployed in order to receive the subsidy for their business start-up. Second, the existence of the subsidy bears the risk that low ability individuals enter self-employment. Theoretical models of occupational choice predict that individuals become self-employed if their expected profits (which is a function of ability) are larger than expected wages (which are exogenously given). In such a model, the subsidy would allow individuals with lower abilities to become self-employed who would actually not become self-employed in the absence of the subsidy (as their expected profits would be lower than expected wages). This is likely to affect business performance of subsidized businesses negatively. Finally, the existence of the subsidy might induce moral hazard which would further reduce business growth. Subsidized individuals are likely to reduce effort as they —in contrast to non-subsidized businesses— do not have to take the cost, i.e., the risk of no or low income.

Based on the newly constructed dataset that allows a direct comparison of subsidized businesses out of unemployment with "regular" business founders, we now study the empirical relevance of the arguments above. Thereby, we ask 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? To give a brief preview, results indicate that deadweight effects seem to exist but at a much lower scale than usually assumed, and nascent unemployed entrepreneurs indeed face disadvantages in variables correlated with entrepreneurial ability and access to capital. In terms of business performance, subsidized start-ups out of unemployment face higher business survival rates 19 months after start-up, however, lagging behind "regular" business founders in terms of income, business growth and innovation.

The paper is organized as follows: Section 2 provides a theoretical consideration with respect to the justification of the subsidy and its impact on the selection into self-employment and business performance. Sections 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. Section 6 concludes.

2   Theoretical Consideration

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. Disadvantages might exist in different aspects. First of all, the unemployed are likely to face severe credit constraints that prevents them from starting a business. On the one side, unemployed individuals tend to have lower financial means (personally and within family) compared to the non-unemployed population which decreases the amount of personal equity available for business start-up. On the other hand, capi-

tal 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 which decreases the probability of receiving credits[2]. 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 due 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 costumers. The lack of employment experience also induces disadvantages in terms of business and social networks, i.e., contact to potential costumers, business partners or knowledge spillovers. For instance, employed individuals might take advantage of facilities provided by their current employer to prepare their business start-up, including knowledge transfers from colleagues, ongoing contact to costumers etc. Unemployed individuals do not have such advantages to prepare their business start-up. 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, decreases individuals self-confidence, making them less likely to consider self-employment as an alternative to dependent employment (Bönte and Jarosch, 2011, show that business start-up and personality are positively correlated). Finally, start-ups out of unemployment are more likely to being necessity start-ups. Due to missing employment alternatives unemployed individuals decide to become self-employed. This is usually done on short notice, so that they invest less time in preparing the start-up, e.g., elaborating the business idea or the marketing and financial strategy. In this context, Shane (2003) argues that necessity start-ups have less access to information about business opportunities so that they (due to time restrictions) also realize less valuable business ideas, introducing less innovation and hence earn smaller profits.

The start-up subsidy aims at removing such barriers for the unemployed by providing financial assistance for the coverage of the cost of living and social security during the founding period. As explained before, due to capital constraints, shortages in human capital, missing networks or time restrictions to explore business opportunities nascent entrepreneurs among the unemployed have in general less resources available — than regular business founders — to prepare the actual business start-up. As a result, unemployed individuals need to invest more resources (labor and capital) during the founding period itself, i.e., after start-up, to elaborate initially less valuable business ideas, create networks and acquire start-up specific human capital. The subsidy is expected to compensate disadvantages and equalize starting conditions.

However, the existence of the subsidy might also induce some negative effects, i.e., deadweight effects, attraction of low ability individuals and moral hazard. First, the existence of the subsidy might lead nascent entrepreneurs to intentionally register as unemployed

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[2]Banks tend to screen individuals with respect to their human capital in the sense that human capital is negatively correlated with credit default risk which makes individuals with higher human capital more capable with better access to credit.

in order to receive the subsidy. To identify so-called deadweight effects in the context of business start-ups two criteria have to be fulfilled: 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, mainly due to data restrictions, empirical evidence on the occurrence of deadweight effects is very limited.

Furthermore, the existence of the subsidy bears the risk that it opens low ability individuals the way to entrepreneurship. Based on older studies by Knight (1921), Schumpeter (1939) and Kirzner (1973), the 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 model[3], 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 for unemployed individuals, the previous equation changes to $w < \pi(\theta^*_{SUS}) + SUS$ for unemployed individuals with subsidy receipt (SUS) while it remains unchanged for non unemployed individuals without such a subsidy. The subsidy therefore has a positive impact on the expected income from self-employment ($\pi + SUS$) and, everything else equal, makes it for low ability individuals (who would have not become self-employed in the absence of the subsidy) attractive to become self-employed. This is because the subsidy reduces the amount of expected profits needed to make subsidized 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 implies directly that $\theta^* > \theta^*_{SUS}$, i.e., on average subsidized business founders are characterized by lower entrepreneurial abilities than non-subsidized business founders.[4]

Finally, 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 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 if at all only present in the short-term. In the long-run the subsidy expires and subsidized individuals would also experience an income loss or even business failure if they would reduce their effort.

Given the intention of the subsidy to offset initial disadvantages faced by nascent en-

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[3]For 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.

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

[5]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.

trepreneurs among the unemployed on the one hand side and the risk to attract low ability individuals and inducing moral hazard on the other side, the overall effect on business performance such as growth and survival is ambiguous. The subsidy payment is expected to extend survival in self-employment as it increases profits and therefore the utility of remaining self-employed. In addition, the subsidy provides individuals financial flexibility and therefore releases resources to catch up with "regular" business founders. It is therefore expected to lead to comparable business development in the long-run. However, expected lower abilities among the subsidized individuals predict the opposite. 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.

The aim of this paper is to contribute empirical evidence to the theoretical expectations. First, do deadweight effects occur? Second, do initial differences exist? And third, how do subsidized businesses perform compared to "regular" businesses?

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 the last decades. Until August 2006, unemployed individuals could choose between two different programs. Both programs basically differed in terms of the length and amount of the subsidy (see Caliendo and Künn, 2011, for a description). In August 2006 however, both programs have been replaced by one single start-up subsidy program ("Gründungszuschuss", SUS) which is under scrutiny in this study. In order to being eligible to 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 an independent institution. If all requirements were fulfilled, SUS was paid for a maximum duration of 15 months whereby the subsidy consisted 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 payment of 300 Euro to cover social security costs was paid. 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 granted, only the lump sum payment was paid for an additional period of six months.

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[6]In Germany, every individual who has been in employment subject to social security for at least one year 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 Wunsch, 2006).

To illustrate the magnitude of subsidized start-ups out of unemployment compared to all business start-ups in Germany, we show in Figure 2 the respective numbers for full-time business start-ups between 2006 and 2012.[7] While we have information about the exact number of entries into SUS available (based on the Statistic of the FEA), we have to rely on estimates for the number of all business founders based on population representative surveys. This is because Germany lacks a centralized administrative register for all business founders. The most frequently cited estimates are based on the *German Microcensus* and the *KfW Start-up Monitor*.[8] The difference between both estimates arises mainly 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 (individuals who are self employed in the current wave but not in the previous year). As we can see, start-ups out of unemployment depict a significant share of all full-time business start-ups. Depending on the data source, the share ranges between 40 to 60% on average.

Mainly due to data limitations, empirical studies analyzing differences between start-ups out of unemployment and non-unemployment are scarce. To the best of our knowledge, only three studies exist for Germany so far. Hinz and Jungbauer-Gans (1999) made a first attempt to investigate differences between both groups by collecting data on business start-ups in 1995 in the metropolitan area of Munich. 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. 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 Panel[9] and extent the analysis to 15 labor market districts in Germany. This dataset has the disadvantage though that very small firms are likely to being 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 business 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 (but not West Germany). In a more recent study, Niefert (2010) uses the KfW Start-up Monitor (see explanation in previous paragraph) to investigate differences between previously unemployed and employed business founders

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[7]In order to being eligible to SUS, founders have to set up their businesses in full-time. Therefore, we compare them to all business start-ups who were set up in full-time, too.

[8]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 a annual representative survey capturing 1% of the German population and currently contains about 700,000 individuals. For further information see KFW Bankengruppe (2012) and KFW Bankengruppe (2012); Fritsch, Kritikos, and Rusakova (2012).

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

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 employees at start-up. The study does not provide insights with respect to business development over time as 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 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 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 do usually not provide sufficient information to clearly identify both groups. Moreover, they are somehow restricted with respect to individual information about the founder (such as human capital or intergenerational transmission) and longitudinal information on business development. Therefore, we created a new dataset that allows for such a comparison based on large-scale representative samples of start-ups out of unemployment and non-unemployment. Beside cross-sectional information on individual and business-related characteristics, the data contain longitudinal information on business development. The collection of the data was done by a telephone survey where the difficulty was to find a data source that provides contact details for individuals who belong to our target population.

As depicted in Figure 3, we had to rely on different data sources in order to realize a sample of business start-ups out of unemployment and non-unemployment. While 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), the identification of non-subsidized start-ups out of non-unemployment is not straightforward. This is mainly due to the absence of a centralized register for all business founders in Germany. Instead

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 had to rely 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 who's main objective is the representation 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., freelance professionals[10], 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, represent the interests of businesses in the crafts sector and therefore record all crafts enterprises. Finally, we emphasize that although freelance professions and agriculture businesses are officially exempted from registering at CCI or CC, in practice they are usually covered as 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. Not every single chamber[11] was willing to participate and to deliver data. This would restrict the regional representativeness of our data so that we collected additional addresses from a private address provider. The PAP obtains their information based on own research and from the commercial register ("Handelsregister").[12] While we do not have detailed information about their own research strategy and sources to collect contact information of business start-ups, we mention that the commercial register has the disadvantage that large firms tend to being overrepresented. Therefore, we only use addresses by the PAP to complement addresses by CCI and CC for regional representativeness.

Finally, out of each data source, we extracted a random sample of business start-ups within the first quarter of 2009 and collected the required information on these businesses by means of computer-assisted telephone interviews. As depicted in Figure 3, in total we have 2,306 realized interviews with subsidized businesses out of unemployment available for the empirical analysis. With respect to non-subsidized businesses, we end up with 2,303.

As mentioned before, 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 actually like to run a

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[10]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).

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

[12]The commercial register contains firms who are actively involved in trading activities. 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 ability to pay liabilities.

comparison towards the underlying population which is, however, unknown in our case. Therefore, we provide a comparison to a representative sample of all business start-ups in Germany instead. This has the limitation that also subsidized start-ups out of unemployment are included.[13] Based on information from the German *Mircocensus*[14], 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 less individuals with a university degree in our sample, however, more master craftsman, i.e., 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 and other sectors.

<div align="center">Insert Table 1 about here</div>

For the empirical analysis, we have to restrict the sample of non-subsidized businesses further 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 in full-time as this is also required for the SUS recipients. Secondly, we dropped all business founders who have 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. These two restrictions reduce the size of the non-subsidized founders from 2,303 down to 1,529 observations (see Figure 3).[15]

5 Empirical Analysis

Based on this data set, the empirical analysis investigates differences between subsidized start-ups out of unemployment and non-subsidized start-ups out of non-unemployment and particularly addresses the following three questions. First, do deadweight effects occur? Second, do initial differences exist between subsidized start-ups out of unemployment and "regular" business founders. And third, how do subsidized businesses perform over time compared to "regular" businesses?

We restrict the empirical analysis to male individuals.[16] Male and female business founders significantly differ in several aspects. While men are represented along the entire

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[13]According to the reporting system of the German *Kreditanstalt für Wiederaufbau*, out of all business start-ups in Germany, 21,4% were started by unemployed individuals in 2009 (KfW Bankengruppe, 2010).

[14]The *Microcensus* of the German Federal Statistical Office is a population representative survey based on 1% sample of the German population. The survey is conducted on a yearly basis and provides information on individual and household characteristics (see Statistisches Bundesamt, 2011, for a detailed overview). Business founders are identified based on the self-reported employment-status, i.e., individuals who become self-employed between two subsequent interview waves (Fritsch, Kritikos, and Rusakova, 2012).

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

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

distribution of entrepreneurs, female entrepreneurs tend to being concentrated in particular sectors, and among low performance businesses, i.e., in terms of profits, survival, growth rates and income, mainly because women are seeking work-family balance instead of earning maximization (Klapper and Parker, 2011; Boden, 1999). This differences between male and female entrepreneurs is reflected by working hours. Self-employed women are significantly less likely to become full-time self-employed (Gurley-Calvez, Biehl, and Harper, 2009; Lechmann and Schnabel, 2012). As we focus on full-time start-ups only, we are concerned that we would analyze a selected sample of female entrepreneurs (not representative towards the 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 male subsidized business founders out of unemployment and 930 male "regular" business founders, i.e., non-subsidized start-ups out of non-unemployment.

5.1 Deadweight effects

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 had no impact on business success. Due to data restrictions, previous studies had to rely on information with respect to the first criteria only (see Caliendo and Kritikos, 2010). We are now able to go one step further and consider the second dimension too.

Table 2 shows that we have two variables available that describes 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 founded a business even in the absence of the subsidy. Using a much more narrow definition, i.e., whether individuals intentionally registered as unemployed to receive the subsidy (statement 2), we see that only 22.8% are potentially affected. Before considering the second dimension, we want to recap that those shares have been often cited within the political discussion with respect to the occurrence of deadweight effects.

We have now data available that allow 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 no or only a minor relevance for individuals who would have become self-employed even 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, reduces the shares that are potentially affected by deadweight effects significantly. For instance, the share of 48.3% that is potentially affected by deadweight effects reduces to 21.3% as only those individual 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 reduce from 22.8% to only 8.6%.

Although respondents are surveyed 19 months after business start-up and hence an-

swers might be correlated with business success, we argue that the results provide essential new insights by showing that the share that is potentially affected by deadweight effects is much smaller than usually assumed. However, to finally 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 in order to exclude any impact of the subsidy on business success (beyond the founding period). As we have a control group consisting of non-subsidized business start-ups out of non-unemployment available, we provide such a comparison in Section 5.3.2.

5.2 Do Subsidized Start-ups Out of Unemployment Differ from Start-ups Out of Non-Unemployment?

As described in Section 2, start-ups out of unemployment are expected to face disadvantages in terms of capital constraints, shortages in start-up specific human capital, missing networks and restricted access to information about business opportunities compared to "regular" business founders. Unemployed individuals are therefore offered a subsidy in order to compensate for those initial disadvantages. However, the existence of the subsidy bears the risk that low ability individuals enter self-employment and therefore induce a negative selection of entrepreneurs.

To investigate the empirical relevance of the expected disadvantages and shortages for subsidized start-ups out of unemployment, we provide a descriptive comparison between subsidized start-ups out of unemployment with "regular" business founders at the time of start-up. Thereby, we consider individual and business related characteristics that reflect the aforementioned disadvantages in Table 3.

However, we 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. Such a comparison would reflect the true extent of disadvantages. However, it is very hard to identify nascent entrepreneurs and therefore we rely on business founders instead. Doing so, 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 nascent entrepreneur to business founder. On top, the existence of the subsidy generates deadweight effects, i.e., individuals who would have founded a business out of non-unemployment 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 (instead of nascent entrepreneurs) is likely to reflect a lower bound estimation of the true amount of disadvantages that unemployed individuals actually face.

Insert Table 3 about here

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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 out of unemployment. While no significant differences exist for the two pull motives, i.e., "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 are overrepresented among start-ups out unemployment. Following Shane (2003), this can be considered a disadvantage as necessity start-ups usually have less access to information about business opportunities so that they (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 disadvantages faced by the unemployed in this regard, we have measures of formal education, employment and industry-specific experiences, and intergenerational transmission available.

Starting with formal education, we consider school achievement as well as professional education. Table **??** shows no significant differences with respect to school degree for subsidized business founders out of unemployment. With respect to professional education we find significant differences compared to "regular" business founders but no clear pattern. Higher shares of previously unemployed business founders have a apprenticeship or university degree, while "regular" business founder are more likely to have a technical college or other degree. In total, 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 as 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 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 costumers or potential business partners. Our dataset allows us to disentangle between employment experience in general and industry-specific experiences. With respect to employment experience in general, Table 3 shows results with respect to the individual time spent in employment (and unemployment) relative to the overall time spent in the labor market. We see that subsidized business founders have on average less employment (and more unemployment) experience indicating a disadvantage.

With respect to industry-specific experience, the individuals were asked to report if they had already 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 acquired industry-specific experience primarily from de-

pendent 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 realized a business start-up before (learning process) and hence are likely to have valuable business networks, existing contacts to costumers etc. Subsidized start-ups out of unemployment 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 out of unemployment 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 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 to face a higher risk of being discriminated by capital markets which restricts the access to loans.

Based on descriptive statistics in Table 3, we clearly find supportive evidence that subsidized start-ups out of unemployment invest less capital. While the share of individuals who invested capital at start-up is comparable high at 82% in both groups, we find substantial differences in terms of the amount of capital for those who invested capital at start-up. "Regular" business founders invest significantly more capital at start-up, e.g., on average 21,740 Euro invested by business founders out of unemployment compared to 44,172 Euro out of non-unemployment. To rule out that differences in mean values are driven by statistical outliers, we provide in addition to mean values the median and maximum value of the distribution in Table 3. It can be seen that the median is consistently lower than mean values in both groups while the maximum values are almost equal. This contradicts the hypothesis that statistical outliers affect the result that "regular" business founders seem to found larger businesses by investing more money at start-up.

Given the finding that subsidized start-ups out of unemployment invest remarkably less capital at start-up, the question remains if 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 disadvantages

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[17]Based on the occupational choice model, we know that individuals become self-employed if expected profit are higher than wages. Due to the subsidy, unemployed individuals already choose to become self-employment 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 out of unemployment tend to invest less capital (Pfeiffer and Reize, 2000).

in terms of personal equity and access to loans. We do not have detailed information on personal equity but 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 finally 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 out of unemployment received a loan while it is the case for 29% of "regular" business founders. More interestingly, 16% of all start-ups out of unemployment report that they received no loan but would have liked to get one. Among the "regular" business founders this applies to only 10%. Although we are not able 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 availability of loans to the unemployed.

Although we can not precisely determine the impact of existing capital constraints on capital investments at start-up, the descriptive evidence allows the conclusion that capital constraints for unemployed individuals seem to exist and restrict capital investments of unemployed business founders.

In summary, start-ups out of unemployment seem to have no shortages in terms of formal education, however, have less employment and industry-specific experience, and less spillovers from intergenerational transmission. Moreover, we find evidence that necessity start-ups are overrepresented among business founders out of unemployment suggesting disadvantages in term of business preparation due to time restrictions. Finally, we detect capital constraints among the unemployed in terms of both availability of personal equity and access to loans.

5.3   Business Development

Given the existence of disadvantages for start-ups out of unemployment compared to start-ups out of non-unemployment, we now address the question how subsidized businesses perform compared to "regular" businesses. Form a theoretical perspective, the subsidy is expected to have two opposing effects on business survival and growth. On the one side, the subsidy is expected to extend survival and provide individuals financial flexibility which releases resources to catch up with "regular" business founders leading to comparable business development in the long-run. On the other side however, expected lower abilities among the subsidized individuals and the occurrence of moral hazard will impact business development negatively.

The question 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. As we only observe each individual either as a previously unemployed or as "regular" business founder, we have to estimate the counter-

factual situation for subsidized business founders out of unemployment. To do so, we use the group of "regular" business founders. The idea is to compare the group of subsidized start-ups out of unemployment to a counterfactual situation consisting of "regular" business founders which 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 identify the impact of prior employment status and hence subsidy receipt on business performance, we will use decomposition methods which allows 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 out of unemployment 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 done in the evaluation literature (Rosenbaum and Rubin, 1983; Imbens and Wooldridge, 2009), we interpret the gap as a conditional gap, e.g., would "regular" business founders survive longer if they had the distribution of characteristics of subsidized unemployed business founders? This has the advantage that we do not –in contrast to the evaluation literature– claim causality and have to rely on the strong conditional independence assumption. Similar to the decomposition literature, the estimated effects are then 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 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.1) that are correlated with ability and personality. This should significantly reduce the remaining influence of unobserved differences. Details on the implementation of the matching procedure as well as balancing characteristics are depicted in Appendix B.

5.3.1 Main Results

To answer the question how subsidized start-ups out of unemployment 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, at this time subsidy receipt has been fully expired since four months at least (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 out of unemployment are still self-employed compared to 72.6% in case of "regular" business founders. This indicates higher survival among the subsidized businesses out of unemployment. The

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

question however is, to what extent this raw difference is driven by differences in observable characteristics. Column three shows the conditional share estimated by propensity score matching. It can be seen 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 out of unemployment. 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. Moreover, among those subsidized business founders who failed are less in dependent employment and more in unemployment compared to "regular" business founders. With respect to working income, Table 4 shows significant higher earnings for "regular" business founders which is to a large extent attributable to existing differences in observable characteristics. After having controlled for these differences, "regular" business have a monthly working income of 2,500 Euro on average which is not significantly different to monthly earnings of subsidized business founders out of unemployment.

Conditional on being still self-employed, Table 4 shows further business outcomes. We find significantly lower income and less business growth for subsidized business founders out of unemployment 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, although the income of subsidized founders is smaller compared to non-subsidized founders, it still exceeds monthly earnings of a full-time employee in Germany which corresponds to about 1,900 Euro per month in 2010 (Caliendo, Hogenacker, and Künn, 2012).

Moreover, only 36.1% of previously unemployed and 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. The remaining gaps after having controlled for observable differences 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 about business opportunities or missing pull motives (Shane, 2003; Caliendo and Kritikos, 2009). Table 4 confirms this expectation. After having controlled for observable characteristics, "regular" business founders are more likely to file a patent or an 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 out of unemployment face higher business survival, however, lagging 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 profits and therefore 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 if increased business survival is indeed attributable to the recently expired subsidy receipt, we would need a larger observation period.

The lower income and growth rates might be explained by three different issues: First, the subsidy allows low ability individual 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 non-subsidized businesses only the profitable businesses survive and grow larger than subsidized businesses where also non-profitable businesses are represented.

The question remains if the identified gaps are persistent or will disappear after a while. In the long-run, former subsidized firms have to survive and compete at 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 as they reported that they intentionally registered as unemployed to receive the subsidy and in addition, 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 had no impact on business success beyond the founding period. If this would be the case, we could conclude that 8.6% of the subsidized founders are certainly affected by deadweight effects.

INSERT TABLE 5 ABOUT HERE

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[19]The capital-intensive first part of the subsidy payment, i.e., unemployment benefit plus lump-sum payment of 300 Euro/month, has been expired since 10 months already, and the optional second part, consisting of the lump-sum payment of 300 Euro/month only, since 4 months.

[20]We 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 can not assume for this group that they 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%.

Table 5 compares selected business outcomes of the suspicious subgroup of 8.6% of subsidized businesses that is likely to being 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. Subsidized businesses show higher survival rates 19 months after start-up but lagging behind "regular" businesses in terms of income, business growth and innovation. Although differences in income and innovation are not statistically significant (due to lower number of observation compared to Table 4), the results clearly indicate that the share that is affected by deadweight effects must be even smaller than 8.6% as the subsidy had at least some impact on business success for this subgroup.

6 Conclusion

This study investigates differences between subsidized start-ups out of unemployment and non-subsidized start-ups out of non-unemployment. Thereby, it addresses 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 question is only very limited. Therefore, we created a new data set based on a large-scale telephone survey that allows such a comparison. Beside cross-sectional information on individual and business-related characteristics, the data contain longitudinal information on business development.

The identification of deadweight effects related to start-up subsidies requires a two step procedure. First, it has to be shown that individuals would have become self-employed even in the absence of the subsidy. In this regard, we find that 48.3% of subsidized business founders in our sample report that they would have become self-employed even without the subsidy and 22.8% that they intentionally registered as unemployed to receive the subsidy. Both shares are generally suspicious, however, to finally prove that they are affected by deadweight effects, it has to be additionally shown that the subsidy had no impact on business success of these firms. In previous studies, this was not possible due to data restrictions so that the aforementioned shares have been often cited within the political discussion with respect to the occurrence of deadweight effects. However, our data allow to consider the second dimension, too. We find that the suspicious shares of 48.3% and 22.8% reduce remarkable 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 go one step further and provide a direct comparison of the suspicious share of 8.6% to "regular" business founders to validate whether the subsidy had no impact on business success beyond the founding period. We find significant differences so that we conclude that deadweight effects seem to exist but at a much lower scale than usually assumed.

With respect to the second research question, i.e., do initial differences exist between subsidized start-ups out of unemployment and "regular" business founders, we find that

start-ups out of unemployment seem to have no shortages in terms of formal education, however, have less employment and industry-specific experience, and less spillovers from intergenerational transmission. Moreover, we find evidence that necessity start-ups are overrepresented among business founders out of unemployment suggesting disadvantages in term of business preparation due to time restrictions. Finally, we detect capital constraints among the unemployed in terms of both 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. Therefore, we compare subsidized and non-subsidized businesses with respect to business survival, income and growth 19 months after business start-up. Using propensity score matching methods, we disentangle which part of the observed differences in business performance is due to differences in observable characteristics of business founders and which 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, lagging behind "regular" business founders in terms of income, business growth and innovation.

The differences in business performance might be explained by different issues. First, the subsidy payment has recently expired, so that it might still have an ongoing positive effect on business survival. Second, the presence of the subsidy allows low ability individuals to enter self-employment who would not have become self-employed in the absence of the subsidy. Third, the subsidy payment might have introduced moral hazard or hindered the market mechanism, i.e., the selection process of profitable and not profitable businesses (survival-of-the-fittest). Within the non-subsidized businesses only the profitable businesses survive and grow larger than subsidized businesses where also non-profitable businesses are represented.

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, but on the other side introduces a negative bias in terms of business performance. The latter should concern policy makers if the identified gaps would be persistent. However, in the long-run former subsidized firms have to survive and compete at the market without the subsidy and therefore might converge towards "regular" business founders.

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Tables and Figures

Figure 1: Entries in Start-up Subsidy and Corresponding Expenditures

Quarterly entries in Start-up Subsidy
Yearly expenditures
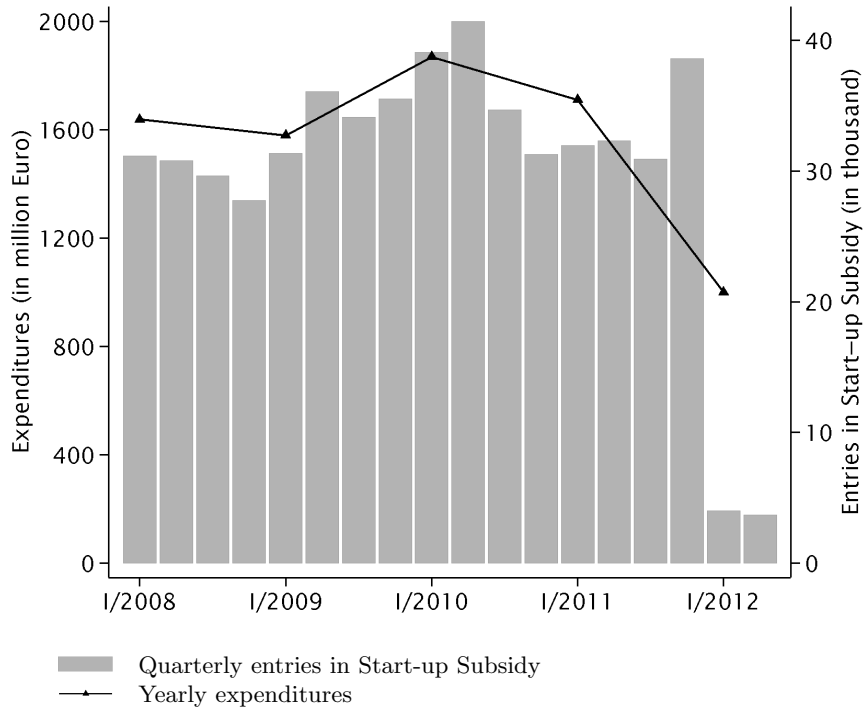
Source: Statistics of the Federal Employment Agency.

Figure 2: Start-up Activity in Germany 2006-2011

- - •- - Microcensus (Source: Piorkowsky and Buddensiek, 2011)
——■—— KfW Start-up Monitor (Source: Kreditanstalt für Wiederaufbau, 2012)
·····◆····· Start-up Subsidy (Source: Statistics of the Federal Employment Agency)
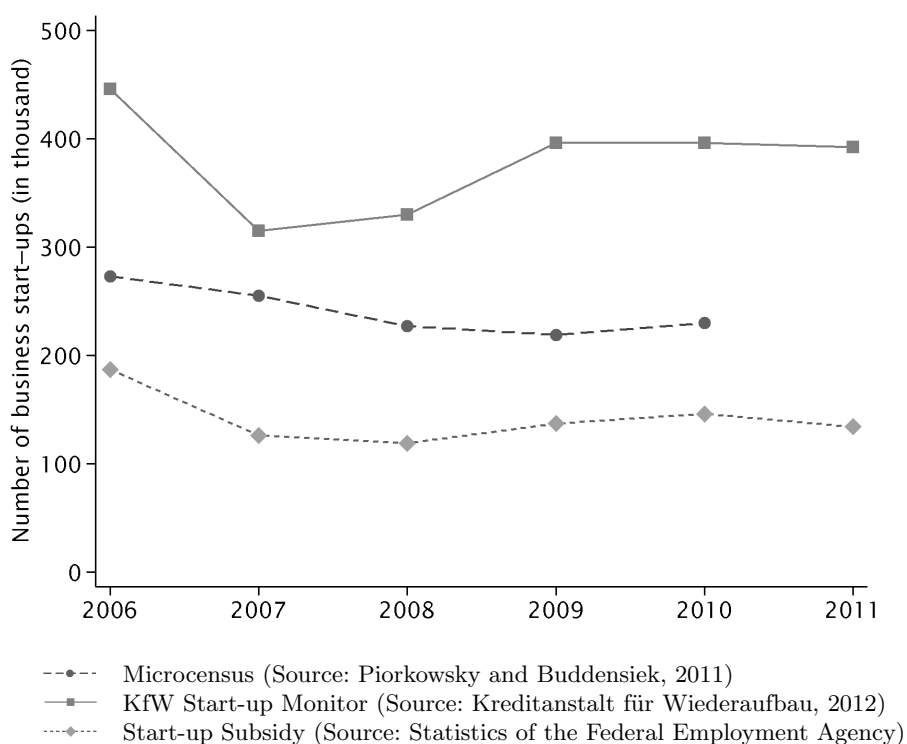
Notes: Only full-time business start-ups.

Figure 3: Data Construction
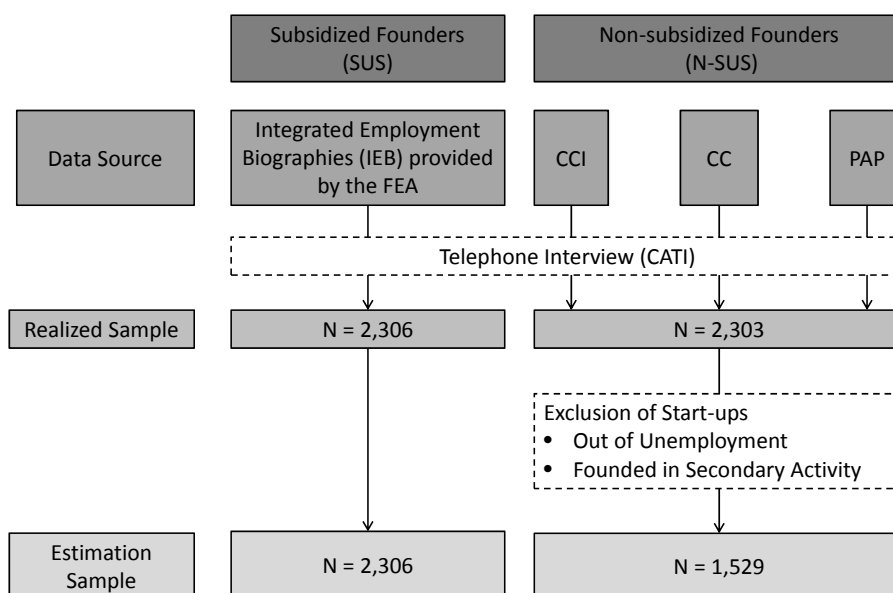
Table 1: Comparison of the Realized Sample of Non-Subsidized Business Founders with a Representative Sample of All Business Founders Based on the German Microcensus

	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	5.9
Professional education		
Unskilled workers	5.4	9.9
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	6.3
Sectoral distribution of business foundation		
Agriculture, forestry, fishing	1.8	2.2
Manufacturing, construction, crafts	28.5	15.5
Retail	18.6	13.2
Services (logistic, financial industry, IT etc)	38.1	41.6
Others	11.9	28.5

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 (only men)

	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

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 Start-ups out of Unemployment and Non-Subsidized Start-ups out of Non-Unemployment at the Time of Start-up (only Men)

	SUS	N-SUS
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: 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 ***/**/*. SUS: Subsidized business founders out of unemployment. N-SUS: Non-subsidized business founders out of non-unemployment.
[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 (only Men)

	Subsidized founders out of unemployment (1)	Non-subsidized founders out of non-unemployment raw (2)	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
Income measures (in Euro, net)[a]			
Monthly working income	2,146.0	2,636.6***	2,374.4
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	11.7	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: The first column shows the outcome variables as realized by the subsidized businesses out of unemployment 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 (only Men)

	Suspicious subgroup of subsidized founders out of unemployment (1)	Non-subsidized founders out of non-unemployment Conditional value (2)
Full sample		
Share in self-employment (in %)	92.6	79.8***
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
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.

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A Supplementary Tables and Figures

Table A.1: Selected Descriptive Statistics (only Men)

	SUS	N-SUS	p-value
Number of observation	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
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 continued.

Table A.1 continued.

	SUS	N-SUS	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
≥ 50,000 Euro	7.8	16.1	0.000
Share of equity	45.9	47.2	0.545

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

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 start-ups out of unemployment in terms of observable characteristics. First of all, we estimate the propensity score to start a business out of unemployment 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 to start a business out of unemployment with subsidy receipt. In addition, Figure B.1 shows the distribution of the estimated propensity scores and it can be seen that the estimated propensity scores of subsidized business founder out of unemployment overlap the region of estimated scores for "regular" business founders.

To finally align the group of "regular" business founders towards the group of start-ups out of unemployment, we apply a kernel matching, in fact , we apply an *Epanechnikov Kernel* with a bandwidth of 0.06. This has the advantage that it increases 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., does the matching successfully balance 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 treated and control group significantly drops after matching. As results from the t-test do 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 last step, we also re-estimate the propensity score using the matched sample and compare it to the initial propensity score estimation. Given the matching is able to balance treated and non-treated sample, we would expect a sizeable reduction in the Pseudo-R^2 between both regressions (Sianesi, 2004). This is confirmed by Table B.3 as it shows 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 business founders out of unemployment and non-unemployment.

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[21]See 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 Out of Unemployment vs. Non-subsidized Business Founders Out of Non-unemployment (only Men)

| Dependent variable: Starting out of unemployment	
Personal characteristics	
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
Human capital	
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***
Intergenerational transmission	
Parents born abroad	0.064
Parents were/are self-employed	−.182**
Business take-over from parents	−.777***
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**
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***
> 1,000 - 1,500 Euro	0.545***
> 1,500 - 25,00 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: Starting out of unemployment

Regional information
Federal state
   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^{***}

Business related characteristics
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
   $\geq 50,000$ 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: Statistical significance at the 1/5/10 %-level is denoted by ***/**/*.
[a)] Standardized by (Age-15)

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Figure B.1: Propensity Score Distributions — Subsidized Business Founders Out of Unemployment vs. Non-subsidized Business Founders Out of Non-unemployment
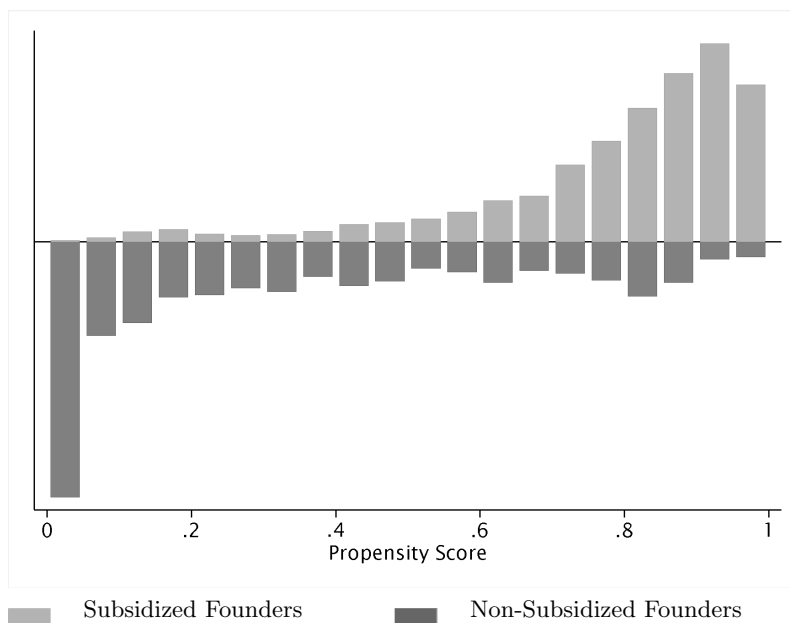
Note: Depicted are distributions of estimated propensity scores for subsidized business founders out of unemployment and non-subsidized business founders out of non-unemployment based on probit estimations as shown in Table B.2.

Table B.3: Matching Quality — Subsidized Business Founders Out of Unemployment vs. Non-subsidized Business Founders Out of Non-unemployment

	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 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 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.