ARTICLE

The outcome of coaching and training for self-employment. A statistical evaluation of outside assistance support programs for unemployed business founders in Germany

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Abstract This paper focuses on the question of whether improving the competence of new business founders through programs that offer external expertise enhances the duration of self-employment. In our analysis, we focus on three different programs that are provided along with a financial subsidy and that focus on founders who started a business while they were unemployed. We found that participation was strongly determined by regional patterns and time, and that individual characteristics were less important. These results reflect a particular regional specialization in promoting self-employment. A statistical matching approach was used to control for selectivity and was performed in a way that explicitly considered differences across regions and over time. The results show that the treatment effects tended to be low. However, we found evidence that external expertise increased passive learning.

Keywords Public policy · Statistical matching · Evaluation · Self-employment promotion

JEL classification J68 · J23

Die Erfolgswirkung von Gründercoaching und Gründertrainings. Eine Evaluation von Fördermaßnahmen bei Gründungen aus der Arbeitslosigkeit in Deutschland

Zusammenfassung Die vorliegende Arbeit geht der Frage nach, ob sich Förderprogramme, die helfen externen Sachverstand bei einer Gründung einzubinden, positiv auf die Verbleibsdauern in Selbständigkeiten auswirken. Hierzu werden drei unterschiedliche Programme betrachtet, die zusätzlich zu einer finanziellen Basissicherung Gründungsvorhaben aus der Arbeitslosigkeit fördern. Wir finden, dass die Selektion in die Förderprogramme stark durch regionale Merkmale determiniert wird und dass individuelle Charakteristika bei der Inanspruchnahme der Förderleistungen wenig relevant sind. Dieses verweist auf eine regionale Spezialisierung in der Ausrichtung der Förderung bei der Aufnahme einer selbständigen Tätigkeit durch die aktive Arbeitsmarktpolitik. Das angewandte Selektionskorrekturverfahren (statistisches Matching) berücksichtigt diese Besonderheiten, so dass neben individuellen Merkmalen explizit auch regionale und zeitliche Aspekte kontrolliert werden. Die Analysen zeigen, dass die Wirkung der zusätzlichen Förderung für die Verbleibsdauer in Selbständigkeit eher gering ausfallen und dass Selbständigkeitsperioden bei Inanspruchnahme externer Expertise schneller beendet werden als ohne. Dieses deutet darauf hin, dass externe Expertise bei Gründungen aus der Arbeitslosigkeit tendenziell passives Lernen fördert.

Schlüsselwörter Arbeitsmarktpolitik · Statistisches Matching · Evaluation · Förderung von Selbständigkeit

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1 Kurzfassung

In der vorliegenden Studie untersuchen wir die Teilnahmeeffekte zusätzlicher Fördermaßnahmen gemessen an der Stabilität der Selbständigkeit über einen Zeitraum von fünf Jahren. Wir evaluieren den Effekt, der von der Einbindung externer Expertise ausgehen dürfte. Dabei konzentrieren wir uns auf Personen, die mit Überbrückungsgeld gefördert wurden und hierzu parallel oder im Vorfeld eine weitere Förderung durch Gründertraining-, -coachings oder Freie Gründungsförderung (Maßnahmen der Freien Förderung nach § 10 SGB III mit zu erwartendem Schwerpunkt im Bereich Einbindung externer Expertise) erhalten. Damit untersuchen wir Fördermaßnahmen, die im Zusammenhang mit der aktiven Arbeitsmarktpolitik in Deutschland umgesetzt werden und einen nationalen Bezug aufweisen. Darüber hinaus können wir von weitestgehend homogenen Förderbedingungen ausgehen. Inhaltlich gehen wir mit der Evaluationsanalyse der Frage nach, ob das Einbinden externer Expertise eine positive Wirkung auf die Verbleibsdauer in Selbständigkeit hat.

Für unsere Analyse verwenden wir Daten der Integrierten Erwerbsbiografien (IEB). Dieser Datensatz enthält Informationen zu Perioden abhängiger sozialversicherungspflichtiger Beschäftigung und umfasst Teilnahmezeiten an Programmen der aktiven Arbeitsmarktpolitik, Lohnersatzleistungen und zu Meldungen zur Arbeitsuche. In unserer Analyse finden wir, dass die Wahrscheinlichkeit zur Programmteilnahme vorwiegend durch regionale Merkmale erklärt wird. Dieses Ergebnis weicht von bisherigen Erkenntnissen aus der Evaluationsforschung in Deutschland ab und verweist auf eine ausgeprägte regionale Spezialisierung im Bereich der Gründungsförderung durch die Bundesagentur für Arbeit. Wir berücksichtigen diese Besonderheit indem wir einen Matching-Algorithmus zur Selektionskorrektur verwenden, der auf Zeit-Regionen Stratas basiert.

Die Evaluationsergebnisse zeigen, dass die Effekte der zusätzlichen Förderung eher gering ausfallen und dass die Einbindung externer Expertise mit einer Verkürzung von Selbständigkeitsperioden verbunden ist. Zudem finden wir schwache Hinweise auf zeitlich abhängige Effekte (vgl. u.a. Rotger et al 2012). Insgesamt sind die gefunden Effekte aber von geringer statistischer Signifikanz. Die relativen Effektgrößen sind jedoch nicht zu vernachlässigen. So finden wir z.B. für die Teilnahme an Coaching-Programmen insgesamt 17 % weniger Austritte in eine abhängige Beschäftigung (verglichen zu Gründern die nur mit Überbrückungsgeld gefördert wurden). Signifikante Effekte bei Gründungstrainings konzentrieren sich auf erhöhte Austritte in Arbeitslosigkeit (7 %). Für Teilnahmen an der der freien Gründungsförderung finden wir 6,7 % mehr Austritte in Arbeitslosigkeit und 10 % weniger Austritte in eine abhängige Beschäftigung.

Unsere Ergebnisse zeigen auf, dass Gründertrainings, Gründercoachings sowie die Freie Gründungsförderung nicht die von der Politik erwartenden Effekte zur Stabilisierung von Selbständigkeitsperioden für Gründer aus der Arbeitslosigkeit hervorrufen. Mit diesem Aussage unterstützen wir die Ergebnisse von Karla und Valdvia (2011), die ebenfalls auf geringe und überwiegend insignifikante Fördereffekte ähnlicher Programme in Peru hinweisen (für ähnliche Ergebnisse siehe auch Shutt und Sutherland 2003 sowie Eckl et al. 2009). Dieses würde zusammenfassend bedeuten, dass eine zusätzliche Gründungsförderung, die auf das Einbinden externer Expertise konzentriert ist, keine kluge politische Entscheidung ist. Allerdings widerspräche diese Bewertung anderen Studien, die sehr deutlich machen, dass maßgeblich die Qualifikation des Gründers eine zentrale Erfolgskomponente darstellt (Chandler und Hanks 1998, Cressy 1996). Ebenso: basierend auf einer Studie zu ähnlichen Förderprogrammen wie wir sie untersucht haben, finden Michaelides und Benus (2012) positive Wirkungseffekte bei Gründern aus der Arbeitslosigkeit für die USA. Allerdings ist der Förderrahmen bei den untersuchten Programmen deutlich selektiver ausgerichtet. Letztendlich bleiben die Untersuchungsergebnisse zudem in mancherlei Hinsicht vorläufig, da die Datengrundlage der Analysen mit nicht unerheblichen Limitationen behaftet ist.

2 Introduction

From a practical perspective, policy and research have long focused on capital endowments as major constraints to entrepreneurship, small business development and self-employment (Almus 2004). Since the 1990s, it has been recognized that capital and qualifications interact and that deficits in expertise constitute further constraints to self-employment (e.g., Cressy 1996; Chandler and Hanks 1998; Shutt and Sutherland 2003). One political consequence was to begin initiatives to combine financial support and qualification in promoting entrepreneurship (e.g., Chrisman et al. 2005; Michaelides and Benus 2012). For European countries, the European Employment Strategy (EES) offered a master framework for implementing experimental settings in the late 1990s and the early 2000s to develop new promotional programs that focused on including external expertise to enhance the qualifications for starting a new business.

However, with respect to the inclusion of external expertise, evidence on the outcome of related programs for self-employment is mixed. For example, experience reported from the Small Business Development Center (SBDC) program in the U.S. indicates that the intensity and quantity of advisory services had a positive but inversely u-shaped effect on firm growth and sales development (Chrisman et al. 2005; Chrisman and McMullan 2004). Shutt and Sutherland

(2003) did not find a significant effect of local advisory support programs on the chances for survival of newly founded businesses in England. Similar findings were also reported for the FINCA-Peru program (Karlan and Valdivia 2011). Additionally, Eckl et al. (2009) did not find that advisory support improved firm growth when they focused on ESF (European Social Funds) co-funded start-ups in Germany. Similar evidence has also been reported for the English Business-Link-Network program (Mole et al. 2008). However, research has provided evidence for the complexity of the mechanisms of training and advisory support programs. For example, Parker and Belghitar (2006) discuss potential quality effects of corresponding programs, just as Wren and Storey (2002) indicate that assistance programs may be most effective for medium-sized business start-ups. Chrisman and Leslie (1989) focus on the potential variation of treatment effects depending on the start-up period in which the support program actually begins and discuss whether the program focuses on strategic or operating assistance. Rotger et al. (2012), in addition, report that the effect of outside advice diminishes over time.

In this study, we investigated the outcomes of three different support programs (*training* courses, support for using business *coaching* and a flexible promotion program) that promoted the implementation of external expertise to enhance self-employment. These programs complemented a financial promotion program (*bridging allowance*) and were part of the German active labor market policy framework in the early 2000s.[1] At the heart of our study, we focused on the effect of the additional support on the sustainability of self-employment.[2] In contrast to earlier research, we evaluated programs that allowed for the study of heterogeneity in terms of flexibility (standardized topics, problem-oriented counseling and flexible promotion) and in terms of the timing of using external expertise (before and after start-up). Furthermore, we focused on promotion programs that were part of a nationwide policy program. Research that allows for insight into greater nationwide policies on promoting self-employment is scarce.

Assessing the net outcome of using external expertise to improve self-employment sustainability faces at least two important challenges that require extra attention. First, clarification is needed on how external expertise may operate

in affecting particular outcome measures. This is not trivial because from a theoretical perspective, one must be aware that the inclusion of external expertise may be ambiguous with regard to its effects on the chances for survival. In fact, external expertise may improve productivity (Ericson and Pakes 1995), but it may also enhance passive learning (Jovanovic 1982). This may, in turn, also foster retiring from self-employment and can thus have effects opposite to those expected by politicians (see LeBrasseur et al. 2003; Castrogiovanni 1996). Note that the view of the potentially ambiguous outcomes of external expertise on self-employment sustainability differs from the view that was typically emphasized in earlier research (e.g., Rotger et al. 2012; Michaelides and Benus 2012). Second, selection effects are an important issue. Unobserved characteristics may govern the choice to take advantage of external expertise. With regard to our evaluation approach, we followed a broad strand of recent evaluation studies of labor market interventions, and we controlled for endogeneity and selectivity using a statistical matching approach (e.g., Hujer et al. 2004; Almus and Czarnitzki 2003; Baumgaertner and Caliendo 2008). In particular, to capture regionally embedded differences in the quality of the interventions and the treatment assignment, we extended the general framework by giving extra weight to regional characteristics in the matching approach.

The data we used were the Integrated Employment Biographies (IEB), which are compiled by the Institute for Employment Research of the German Federal Employment Agency. This data set consists of information from four distinct administrative registers and combines employment biographies and detailed information on participation in employment and training programs. We saw five advantages in using these data: (1) we were able to observe a five-year period to assess program outcomes; (2) the data rarely suffered from the types of participation or attrition bias that are usually found in survey data; (3) the data permitted valid identification during periods of self-employment of the types of nonfinancial support received and detailed information on the individual employment histories; (4) all of the individuals in our study received a *bridging allowance* to start their ventures, which ensured a relatively homogenous study population in terms of entrepreneurial intention and (5) the data allowed us to identify the regional context in which the intervention took place.

Section two describes the institutional and conceptual setting of German self-employment promotion as it is implemented in active labor market policy. Section three presents the dataset and describes the construction of the sample for analysis. Section four focuses on the analysis strategy. This includes a brief theoretical foundation of the research, descriptive information and a short discussion of the selection process plus the implementation of the statistical matching procedure. Section five presents and discusses

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[1] Focusing on Germany, we found that promoting self-employment among the unemployed (only those who received financial support) increased substantially over the last decade to almost 25 % of all new self-employment notifications (this varied between 20 % and slightly above 30 %, depending on which statistic was applied) in the early 2000s. In total, the *bridging allowance* was the most important program for promoting self-employment entries in Germany (see also Wießner 2001; Reize 2004; Caliendo and Kritikos 2010).

[2] For the use of alternative outcome measures, see McMullen et al. (2001).

the empirical results. Finally, section six summarizes the study, makes concluding policy-related remarks, and offers suggestions for future research.

3 Promotion of self-employment as part of active labor market policy

3.1 The basic framework of the promotion of self-employment since the late 1990s

The field of self-employment promotion in German active labor market policy was first addressed in 1986 in the form of a financial subsidy aimed at supporting the transition from unemployment to self-employment (known as *'Überbrückungsgeld': bridging allowance*). During the mid-1990s, self-employment was promoted through a more generous *bridging allowance*. In the late 1990s, the promotion of self-employment had been expanded in general. As for example, the implementation of Social Code Book III (SGB III) in 1998 led to a greater degree of managerial responsibility for local employment offices, as based on § 10 SGB III (discretionary measures of regional active labor market policy administered by local employment agencies; *'Freie Förderung'*). To a large extent, this greater degree of freedom was used to increase the promotion of self-employment at local levels. Second, in 1998, the active labor market policy of the Federal Employment Agency implemented a nationwide program as part of the national ESF funding.[3] Initially, this funding framework only focused on promoting general training programs, but it largely shifted toward promoting support for self-employment between 1998 and 2008.[4]

3.2 Characteristics of the programs that promoted self-employment[5]

During the early 2000s, the *bridging allowance* was the most important program in the field of self-employment promotion in Germany.[6] Access to this program was limited to the unemployed or to individuals who were threatened by unemployment and sought to avoid unemployment by becoming self-employed. Furthermore, this program was only open to those who were entitled to unemployment benefits and only in cases in which the new venture would enable the individual to leave unemployment. Support was only granted for applications with a positive assessment of the business concept (e.g., a local chamber of commerce). Finally, the *bridging allowance* offered a subsidy comparable with the sum of the unemployment benefits and covered social security contributions for the first six months of the new business activity.

Building on the ESF funding framework, *'training'* and *'coaching'* programs were implemented to ensure qualified outside assistance during the preparation and early stage business development of new businesses founded by the previously unemployed. In accordance with the implementing regulations, *training courses* were focused on seminars that lasted between 4 and 12 weeks and were supposed to cover topics such as bookkeeping, business plan development, finance, sales and legal issues to ensure sufficient business preparation. In contrast, the *coaching* program was designed to cover expenditures for business consultancy, such as might be related to tax issues, sales development, marketing or accounting support, to improve early stage business development. Initially, there was no detailed official regulation concerning the form and content of the *coaching*.[7] Both programs were legislated to cover all direct expenses (course fees or payments for the coach) as well as indirect costs for child care, accommodation, and travel (up to a maximum of 4,600 €).

Finally, the *discretionary measures* of the regional active labor market policy offered a more flexible promotion framework. Based on Social Code Book III, § 10 (*'Freie Förderung'*; hereafter *'discretionary measures'*), local employment agencies were allowed to administer locally specialized programs. This strategy partly deviated from the generally centralized German labor market policy. In general, the discretionary measures offered a framework that allowed employment agencies to concentrate on special industries or target groups and permitted them to address specific regional problems. However, over time, this source of funding has increasingly been used to promote self-employment. For example, local entrepreneurship centers and financial subsidies or training programs for nascent entrepreneurs were funded within the discretionary measures (so-called *'discretionary start-up support'* (*DSUS*)). Despite its heterogeneous setting, reports from the Federal Employment Agency indicate that *DSUS*—if used as addi-

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[3] Before 2000, the nationwide ESF funding was known as the AFG-Plus Program (for details, see Deeke, 2005).

[4] In 2003, a second financial support program was established that gave extra attention to the long-term unemployed. In 2006, both programs (the bridging allowance and the business start-up allowance) were combined to form a new type of self-employment promotion. For details, see Fleckenstein (2008); with respect to the promotion of self-employment, see also Caliendo and Kritikos (2009).

[5] Table 3 in the Appendix provides a more detailed overview of the promotion programs that were of interest for this study.

[6] See footnote 1.

[7] Note, that the *coaching* here is different from that of the SBDC, for which counselors must have a specific qualification and must participate in ongoing training (Chrisman et al. 2005). In the German context (ESF-BA-Program; 1998–2008), founders can freely choose a coach and are only expected to argue why that particular coach is qualified.

Fig. 1 Conceptual objectives related to policy interventions
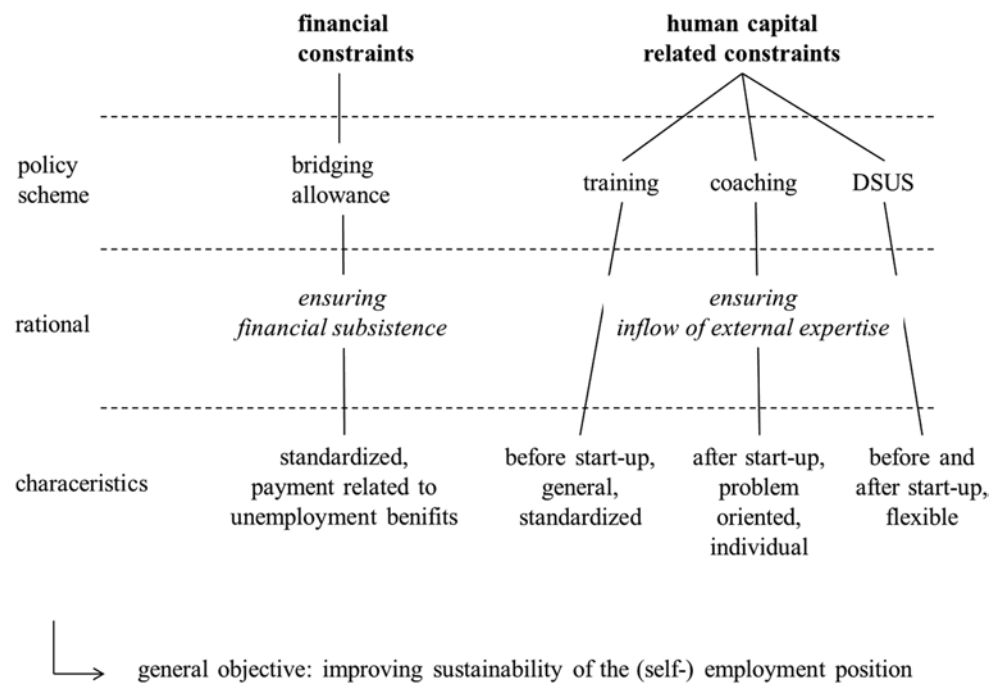
tional support—mainly comprised types of support that we would typically define as qualification-oriented.[8]

3.3 Conceptual objectives

Note that our study addresses the combination of different support programs that promoted self-employment activities while concentrating on the outcome of programs that allowed for the inclusion of external expertise. We used the *bridging allowance* funding as a basic program to identify entries in self-employment. It is vital to note that this program ensures subsistence for everyday life during the first months of business activity. With respect to the total arrangement of self-employment promotion, this implies that the overall risk of financial distress during a new business's start-up period is already relaxed. In contrast, the other programs can be characterized as different approaches that promoted the inclusion of external expertise for a new self-employment activity. Figure 1 summarizes the range of promotion activities in our research context and emphasizes the conceptual rationales of the related programs.

The major issue with the *training* program is that it focuses on skill enhancement before the start-up begins to ensure sustainable and assessable business planning and market preparation. Hence, a substantial aim of *training*

is to improve the ability of the business founder to assess the new business option and to evaluate ongoing business development. Furthermore, *training* courses also intend to improve specific knowledge on topics related to business activities such as technical skills in accounting, finance and marketing. For this, the implementing regulation outlines rather homogenous requirements for the form and content related to the *training* seminars. In contrast, the use of the *coaching* program focuses on the period after start-up and allows for an inflow of external knowledge during the early stage business development. The major aim of this program is to allow for individual and context-specific support to overcome technical problems and to compensate specific technical and personal deficits. Furthermore, skill enhancement may also be relevant in this context since learning is allowed to be problem- and context-specific. Therefore, *coaching* not only improves the business development of the newly founded business but also fosters the individual's ability to assess and manage the economic potential of the business concept in general. *Coaching* in this sense should be understood as a highly flexible tool that allows for the inclusion of external expertise in the post entry period.[9]

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[8] From a legal perspective, it is unlikely that granting two financial support programs to one start-up would match the Federal Employment Agency's internal alignments in handling public money. Statements from the Agency reported that *DSUS* was used to obtain access necessary licenses (e.g., instructor licenses) or specific documents required for the business ventures. See Table 3.

[9] Oberschachtsiek (2007) provides extra information on the overall quality of this promotion program. It was reported that most of the *coaching* was focused on accounting (67 %), sales development (47 %) and development of the business concept (45 %) and primarily consisted of an on-demand counselling (62 %) ranging between 10 and 24 hours of assistance. The report also showed that in most cases, *coaching* was performed by professional consultants (60 %) or by professionals from a local start-up-center (20 %). It was also demonstrated that most *coaching* was focused on compensating for knowledge gaps

Note that this implies a rather wide definition of coaching (e.g., Chrisman and McMullan 2004). Finally, *discretionary start-up support* can be characterized as having the highest degree of freedom in terms of the timing of the intervention, related topics and concerning the way this support is used. Nevertheless, it is plausible to assume that *DSUS* mainly focuses on incorporating external expertise for a new business venture (see above). Hence, *DSUS* may provide a mixture of the characteristics related to what is covered by the *training* and the *coaching* programs.

4 Data and sampling

The data used for the analysis were a sample from the Integrated Employment Biographies (IEB). These data were compiled from four administrative sources that originated from the registers of the Federal Employment Service.[10] The data comprise employment and benefit histories till 1990 and official registrations for job search, periods of unemployment, and participation in active labor market programs till 2000. By combining these sources, the IEB provides a detailed historical perspective of periods of employment and unemployment.

The information provides the exact start and end dates of each period. Source-specific information adds data on individual schooling, type of employment, job characteristics, income and detailed information on qualifications. In addition, we added data from the Establishment History Panel (Betriebs-Historik-Panel—BHP; see Spengler 2008)) to include the characteristics of corresponding employment episodes and regional labor market information.[11] In the latter case, we added data from the official statistics of the Federal Employment Agency (for a detailed overview of the attributes, see Table 4 in the Appendix).

To control the context of the additional support programs, we restricted the analysis to individuals who received a *bridging allowance* starting not before the year 2000. This restriction ensured a valid identification of self-employment periods. Start-ups after the first quarter of 2003 (hereafter, 2003(I)) were excluded because they could have been affected by institutional changes that were introduced in 2003 (see Caliendo and Kritikos 2009).[12] Dropouts and

episodes for which it was difficult to identify valid start or end dates were also removed from the analysis.[13] To focus on valid additional support, including external expertise, we also restricted the analysis to cases of support that occurred within a certain time before and after receipt of the *bridging allowance*.[14]

The treatment was defined as participating in an additional self-employment support program. More precisely, the following three treatments were distinguished: (1) participating in short-term self-employment *training*, (2) being assigned to a *coaching* program, and (3) receiving *discretionary start-up support*. Unfortunately, there was no further information related to the quality of these interventions in the data source. Multiple treatments, such as combining *training* and *coaching* or *discretionary start-up support* for self-employment, were not studied. For the comparison group, we used individuals who received a *bridging allowance* but no additional support. This group included all individuals who did not receive extra support (external expertise support programs) during the time period under observation and those who did not receive valid additional support.[15]

The outcome measure of our evaluation concentrated on capturing the general objective of the active labor market policy. Here, we focused on the stability of an individual's period of self-employment.[16] However, it should be noted that the data did not provide a direct measure of this variable. Therefore, we used an inverse definition in which instability was approximated by any record that was not related to self-employment promotion after entry into self-employment. These records included any observation of unemployment benefits, employment, job-search promotion or non-self-employment promotion after the individual began receiv-

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(51%), was concentrated on technical problems (34%) or was used to compensate for uncertainness related to the start-up in general (37%).

[10] These data cover nearly 80% of all employed individuals (only excluding self-employed individuals and civil servants).

[11] Local information focuses on labor market districts, as suggested in Arntz and Wilke (2009).

[12] Note that the Hartz reform (see Fleckenstein 2008) officially began on 01.01.2003. However, the legal act was passed in December 2002, and it usually typically two or three months to implement such reforms on the executable level. Nevertheless, robustness checks did not reveal

substantial differences when we focused on a more restrictive time frame that only included new business activities until the end of 2002.

[13] For the same reasons, people with more than three records of *bridging allowances* between 1999 and 2005 were excluded from the sample. Thus, we excluded episodes of *bridging allowances* that lasted for fewer than 60 days or more than 740 days. In cases in which there were two or three records of *bridging allowances*, we used the first observation as the reference. The reasons for this exclusion relate to the fact that it was not feasible to identify a valid start-up in these cases. For example, when people received a *bridging allowance* for a very short period of time, we had to assume that these people did not have a true intention of starting a venture.

[14] For a detailed description, see Fig. 4 in the Appendix. Detailed information is available from the author.

[15] Alternatively, we could have omitted these observations. However, such a restriction could have biased the investigation because invalid treatments may have related to re-starters and led to an underrepresentation of unsuccessful cases.

[16] For a discussion of alternative outcome measure, see McMullen et al. (2001). Here, we follow, for example, Reize (2004), Oberschachtsiek (2012) and Rotger et al. (2012), who also focused on the termination of a newly founded business or self-employment position.

ing the *bridging allowance*.[17] These observations were used to measure employment stability as associated with self-employment activity. In addition, we concentrated on the duration of self-employment and allowed for different types of exits from self-employment (i.e., departing for unemployment or employment), which allowed us to further capture aspects of the economic reasons for exiting self-employment. However, it is important to note that because of data limitations, we did not observe any non-labor-market-related positions (e.g., retirees) and that the observation of promotion activities may have depended on the fact that individuals had to be entitled to receive unemployment benefits. Both of these facts may have caused the underestimation of the true rate of exiting self-employment.[18]

The first outcome measure (Y^1) was defined as the likelihood of exiting self-employment during the first 36 months after accepting the *bridging allowance* ($T \leq 36$). The second measure (Y^2) provided information on the time-dependent survival probability. The second measure was the inverse of the probability of exiting self-employment during or before a time interval ($t; t'$) assuming that the individual had entered that time interval. Both measures were calculated for k types of exits (all types of exits, exits into unemployment, and exits into employment):

$$Y^1 : \Pr(T^k \leq 36) \tag{a}$$

$$Y^2 : 1 - \Pr(t \leq T^k < t' \mid T^k \geq t) \tag{b}$$

5 Analysis

5.1 Theoretical evaluation framework

To assess the theoretical outcome of expertise related to supporting programs, we assumed that the programs directly or indirectly affected the founder's capability to evaluate and improve business prosperity. Imagine the following theoretical foundation: Any business idea embraces a specific distribution of potential outcomes (e.g., reward, income, utility)[19] while the exact position on this potential outcome

distribution is unknown to the individual unless the person begins to exploit the business idea. If the expected position on this distribution exceeds a certain threshold (the opportunity costs), the individual becomes self-employed (Gimeno et al. 1997). As new information comes in (along with business activity), the founder becomes more capable of assessing the true position of the potential outcome distribution. We characterize this as passive learning (Jovanovic 1982). Hence, increased information may have two effects: (1) the founder realizes that the initial assessment overrated the true business potential; or (2) the initial assessment of the business potential was correct or even underrated. In the first scenario, we expected that the founder would quit his or her new business. In the second scenario, we expected that the business would continue. Note that in this context, an active intervention (e.g., lowering production costs because of counseling) can be interpreted as improving information that helps uncover the true market potential of the business idea. We may call this active learning (Ericson and Pakes 1995).

For example, because *training* is conducted before a business is launched, better and faster assessments are possible for two reasons. First, start-up *training* enhances convergence toward the true option value of the business. This should lower the risk of initial overestimation and improve the chance for additional active improvements after the start-up. Second, *training* may allow for better assessments to show that the true option value is lower than was initially expected, which would increase the risk of exiting self-employment. In contrast, *coaching* is only focused on transferring expertise in the post-entry period. Nevertheless, the rationale related to *coaching* remains the same as the one related to *training* because it improves the realization of the true outcome potential of the business idea (active and passive learning). Similarly, we should expect a similar mechanism for the *DSUS*. However, we should be aware of a higher degree of freedom, which may allow a more accurate mix of active and passive assessments (learning). Nevertheless, the net outcome related to the additional supporting programs on including external expertise remains an empirical question.

5.2 The evaluation strategy

To evaluate the promotion outcome, we used a comparison framework in which the populations of individuals with and without policy interventions were used to identify counterfactual observations to estimate average treatment effects (Rosenbaum and Rubin 1983)[20] Compared with other methods, the advantage of matching is that the set of necessary

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[17] Note that we did not account for job search registrations alone. The difficulty related to job search registrations is that—because of legal issues—these searches only demonstrate that an employment position at risk of being quit or terminated.

[18] However, the overall effect should have been low: 1st, most individuals do not start a business when they are close to retirement age, and 2nd, claims can be interrupted over a period of up at least two years. Additionally, new business founders who start from a position of unemployment may benefit from opting for a voluntary unemployment insurance contribution.

[19] The idea behind this consideration is that each idea allows different ways of exploitation given the financial endowment, existing human capital stock and economic environment.

[20] For a deeper discussion, see Heckman et al. (1997) or Blundell and Costa Dias (2009).

restrictions is highly limited (e.g., it does not need the exogeneity of conditioning variables and exclusion restrictions or the separability of outcome and choice equations). In particular, matching techniques do not require a parametric specification of the outcome function or the selection process. However, they emphasize the existence of a common support that makes it possible to study heterogeneous treatment effects. Because of matching, the bias reduction fundamentally depends on the availability of rich information that allows for including attributes that simultaneously determine the treatment assignment and the potential outcome of the comparisons (the conditional independence assumption; CIA).

Furthermore, the identification of net effects fundamentally relies on the absence of general equilibrium effects (the stable unit treatment value assumption, SUTVA; see Holland 1986). Participants had to be stochastically independent across all observations, and the outcome had to be independent of the mechanism by which participants received the treatment. In more practical terms, SUTVA implies that an individual's potential outcome and his or her likelihood of receiving a treatment should not interfere with those of others. These conditions may be violated in a regional evaluation context. To clarify, consider an intervention that is small at the national level but may be highly relevant to a particular region. In such a case, we would need a better understanding of the regional level for the selection process. If regional characteristics are important, the validity of SUTVA will require a more local perspective, which must result in implementing a matching approach that considers the regional support context.

5.3 Distribution of participation

Observations entered the risk pool in 2000 and were right-censored to December 2005. We found that inflows into the *bridging allowance* increased from over 85,000 in 2000 to 140,671 in 2003. In total, and considering the sample restrictions presented above, 418,856 cases of *bridging allowance* were included in this study. *Discretionary start-up support* (*DSUS*) showed the largest number of participants ($N=30{,}481$), followed by cases of *coaching* ($N=13{,}737$). The number of participants in *training* courses remained relatively small ($N=2{,}131$).

Following the discussion above and the outline of self-employment promotion in Sect. 2, we first took a closer look at the regional variation in the relative relevance of the individual programs. Figure 2 illustrates the ratio between the number of participants in an additional support program (*training*, *coaching* or *DSUS*) and the total number of participants who received the *bridging allowance* for each of the 176 local labor market districts (note: the x-axis is based on the official identifiers of the local districts).
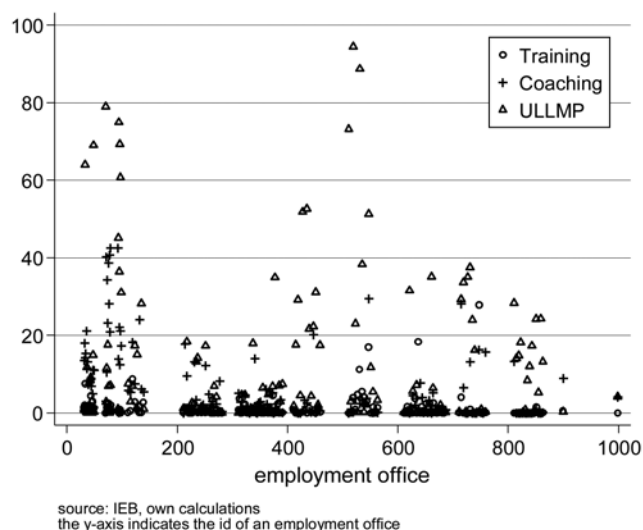

Fig. 2 The relative importance of different self-employment promotion programs across regions

As observed in Fig. 2, most labor market districts had low ratios of additional support policies, which indicate the limited importance of external expertise as an instrument for promoting self-employment. However, in some regions, these extra support activities were close to or exceeded 40 % (e.g., *DSUS* and *coaching*). In contrast, *training* for self-employment remained relatively unimportant in most labor market districts (close to zero). Clearly, there were strong local differences in the costs of managing programs or in the expected gains that could have driven this regional heterogeneity.

This finding is important for the evaluation because it indicates the high relevance of a local policy implementation (Hirschenauer 2001). This observation also supports the hypothesis that there is a particular regional specialization in the strategy of self-employment promotion. Furthermore, this finding directly emphasizes the concern regarding general equilibrium effects (in regions with exposed promotion activities) and the problem of limited joint support (in regions with minimal additional activities). To overcome this potential source of bias, we excluded regions that had more than 40 % of additional promotion in one of the studied promotion programs.[21] As a result, 17 local labor market districts were excluded from the study. This corresponded to a loss of nearly 29,700 observations (12,500 from the *bridging allowance*; 3,400 *coaching* observations; 12,200 from *DSUS*). Furthermore, for matching, we excluded all regions that did not support the statistical matching approach.[22]

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[21] We also implemented a lower threshold for studying whether the threshold level affected our findings (e.g., using a 20 % threshold level did not have a substantial effect on our findings). For the general distribution of shares of additional support, see Fig. 1.

[22] The initial and final sample sizes are reported in Table 6–8 in the Appendix.

Table 1 Factors affecting treatment selection. (Source: IEB, own calculations)

Block of variables	Training		Coaching		DSUS	
	BIC	LR	BIC	LR	BIC	LR
Model 1 (only b1)	40,459.61	1782.47***	171,601.50	7163.75***	200,113.40	1260.58***
Model 2 (adding b2 to b1)	33,738.78	8204.86***	129,326.40	44134.18***	152,136.90	50014.96***
Model 3 (adding b3 to model 2)	33,057.17	950.84***	128,866.70	926.89***	150,720.80	1685.34***

The blocks of attributes are introduced sequentially in nested models

The blocks of attributes contain: b1 (7 dummy variables for the # half-year of entry); b2 (regional information, 108 to 159 variables, including regional conditions and dummy variables for each local labor market district); b3 (individual information, 94–99 variables, including gender, age, qualification level, employment background and occupational background based on a two digit classification)

Low values of the BIC indicate a superior statistical model: $BIC = -2 * \ln L + k * \ln(n)$

The change in the terms of the BIC is sensitive to the order in which the models are introduced—however, several checks reveal no different findings from those reported above

Statistical signifcance: * $p<0.05$; ** $p<0.01$; *** $p<0.001$

5.4 The selection process, potential outcomes, and the validity of the CIA

5.4.1 Treatment selection

Prior to the evaluation, we examined the selection process to gain further insight into the treatment assignment. Note that the selection processes associated with the interventions was complex in nature. First, interventions were implemented within highly regionalized policy frameworks. This induced a much higher supply-side effect on the selection process than is typically found in active labor market policy. Based on the local labor market structures and local policy strategies, there may have been varying motives to focus on self-employment as a promising way to improve local employment (e.g., offering more or less support). As such, particular regional policy strategies had to be considered in the matching frameworks. Second, selection only took place if the individual had evaluated the *training, coaching* or *DSUS* to be of advantage to the founder.

To simplify the selection process, imagine that the selection into an additional support program is a result of the negotiation between the local employment office case manager and the applicant. Considered from the agency perspective, regional differences in the negotiation may result from different local policy strategies, different cost and benefit structures, and the perceived success of the intervention. In contrast, the single case manager may be less important. Generally, case managers are not trained to evaluate the *extra promotion* needs of business founders. Instead, they mainly follow general routines and strategies that are developed at the agency level. Therefore, the supply-side selection will be driven largely by specific local labor market conditions. Note that time may be a crucial factor in this context because it captures variations in learning about efficient policies and allows the agency to establish quality benchmarks.

With regard to the selection process at the individual level (the demand-side), we expected that negotiation would be mainly driven by the individual's cost-benefit functions. The quality of the business concept that may govern the need to improve business preparation is an important factor in this context. However, because the business concept itself was not observable, we assumed that the driving force that determined the quality of the business concept as well as the overall cost-benefit ratio in assessing the expected returns on additional support were related to individual expertise. As a result, the negotiation position of a founder's selecting *training*, *coaching* or *DSUS* could be formulated as a function of the founder's experience, formal qualifications, and employment biography. With this framework, we directly linked the founder's ability to develop a certain quality level of the business concept and his or her competence to assess the quality of the business and to outline the potential return on the external expertise. Furthermore, this statement implies that better-qualified business founders may interact more efficiently with external experts, ask better and more precise questions, and be more likely to capitalize on previous knowledge to improve their businesses.

In sum, we expected that the quality of *external expertise*—and therefore the selection process—would strongly depend on a mixture of regional policy strategy and individual qualifications. Qualitative interviews support this perspective of an interrelated selection (Oberschachtsiek 2007). However, exact information on each individual selection process was missing. For general evidence on the role of individual and regional factors in the selection process, see Table 1, which reports the related statistics separately for each support program. These results are based on logit models and cover different sets of attributes. Because

we were only interested in general information on the selection process, Table 1 only focuses on model fit statistics.[23] The reported statistics (Bayesian information criteria [BIC] and the likelihood ratio [LR]) provide information about the entropy of the statistical modeling that can be used to describe the general pattern of the selection process (Burnham and Anderson 2004). For further details on the selection process see also Table 5 in the appendix.

As observed in Table 1, the greatest model improvement was gained by introducing regional characteristics (especially by introducing an indicator for the local labor market district). This finding directly supports the hypothesis that the local agent's cost or utility function (policy strategy) is of high importance in the overall selection process. We found that using external expertise support programs had a higher ratio in eastern Germany (less pronounced for the *DSUS*) and that time and the local composition of the external expertise support programs strongly affected the selection process. In contrast, individual characteristics were of little informational value in explaining program participation. Nevertheless, we found that the probability of receiving support for additional external expertise was higher for males and that it increased with the age (inversely U-shaped) qualification level.

5.4.2 The validity of the CIA

Concerning the validity of the statistical matching approach, it was critical that we pay sufficient attention to information on both (individual and regional) selection levels, which correlated with the potential outcome. Particular concerns in our context may have been the role of the business concept in treatment selection, the role of the quality of the intervention and the effect of the local context on the treatment assignment (regional policy).

First, it is important to note that our study focused on self-employment creation that originated from an unemployment position. Note that this group is rather homogeneous in terms of capital endowment, business motivation and growth intentions. For example, Hinz and Jungbauer-Gans (1999) and Oberschachtsiek (2012) reported that previously unemployed founders typically began businesses that needed less financial capital endowment and relied relatively more on a founder's human capital structure. Associated with this overall difference, we believed that it was acceptable to assume that the complexity of businesses founded to induce primary self-employment was lower than it was for those that were founded in general context of entrepreneurship (e.g., lower growth intentions). In addition, it seemed plausible to us that among the unemployed,

the variation in business complexity would be rather low. As a result, missing information on business quality should—on average—have been less problematic in the population of the previously unemployed.

Second, we posited that the quality of the business concept and potential outcome would be strongly interrelated with the founder's qualifications. Previous research indicates that experience, schooling, gender, and motivation are highly correlated with the quality of the business idea and the assessment of business prosperity as well as with the duration of self-employment.[24] As a result, the need to select into *training* and *coaching* strongly depends on the founder's qualifications because it determines the need to improve the business concept and potential outcome. Therefore, having information on the individual's previous job experience, schooling, and professional training—as we had in our data—is highly important.

Third, we expected that the quality of the interventions would strongly depend on regional policy strategy. On average, the local agency may control quality by managing the total participation rate. A high participation rate may signal market demand, which may cause a downshift in marginal quality. In addition, local economic conditions have a direct effect on the willingness to set up new ventures because economic conditions are correlated with the level of competition and overall demand (e.g., Falck 2007). As a result, the local level is highly important in supporting the conditional independence assumption. In this study, we controlled for the regional implementation of promotion programs by modifying the matching algorithm.

Finally, an additional important factor supporting the argument that sufficient information was included in our data is that the major issue of selection was already absorbed by the decision to apply for the *bridging allowance* (i.e., the motivation to start a business was already captured) and because specific data restrictions applied (see above). Because both groups—the treated and potential comparisons—entered self-employment in reality, most of the unobserved factors that govern an individual's intention to start a venture should have been equally distributed in our study population. Therefore, we saw no fundamental aspect that would lead us to think this motivation would be different between the treated and untreated populations.

Overall, our opinion is that we were able to control for sufficient information to balance treated and untreated individuals. In particular, we relied on the assumption that motivation was controlled for by concentrating on *bridging*

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[23] Note that the findings of this investigation were robust to different sequences related to the inclusion of the blocks of attributes.

[24] For an overview, see Santarelli and Vivarelli (2007); for business founders who came from a position of unemployment in Germany, see Wießner (2001), Reize (2004), Caliendo and Kuenn (2011) and Oberschachtsiek (2012); for a focus on the opportunity cost argumentation of the exit event, see Gimeno et al., (1997); for the role of previous knowledge on business opportunity recognition, see Shane (2000).

allowance as the basic selector. Furthermore, for the quality of the business, we assumed that the founder's human capital was a good approximation, and we were confident that the policy strategies delineated by the treatment assignments were sufficiently approximated by local labor market information and local active labor market policy. Nevertheless, in our setting, we were not able to control for the use of similar programs that were provided by other authorities (e.g., local chambers of commerce). Therefore, we had to assume that in general, additional support for the inclusion of external expertise (focusing on business founders who exited unemployment) was mainly offered by the Federal Employment Agency. Furthermore, we also believe that for a substantial bias related to this deficit, it would have been necessary for a greater share of founders who had exited unemployment to have received support from other authorities. We state that this was unlikely the case.[25]

5.5 Implementation of the matching procedure

In our evaluation, we concentrated on the average treatment effect on the treated (*ATT*) as the most interesting parameter. This estimator is defined as the difference between the mean outcome of the treated $Y_i^{D=1}$ and the estimated counterfactual outcome $\hat{Y}_j^{D=1}$, which provides information about the net outcome of a treatment for those who were treated:

$$ATT = \sum_i \left[Y_i^{D=1} - \hat{Y}_j^{D=1} \right] \text{ given that } \hat{Y}_j^{D=1} = \sum_j W_{i,j} Y_j^{D=0} \quad (1)$$

i characterizes the treated and *j* the untreated individuals. In our analysis, individuals who only received the *bridging allowance* were defined as untreated, and individuals who had received additional support to include external expertise were defined as treated. As the right-hand side of Formula (1) shows, the estimated counterfactual outcome for those who received additional support (*training, coaching* or *DSUS*) was taken from the mean outcome of the *bridging allowance* population with no support ($\hat{Y}_j^{D=1}$). We calculated this counterfactual outcome as the weighted mean outcome of the non-treated, in which the individual weights $W_{i,j}$ referred to the distance between comparisons *j* and *i*. To ensure the equal importance of the treated and

untreated observations, weights were restricted to the following conditions:

$$\sum_j W_{i,j} = 1, W_{i,j} \in \left[0,1 \right] \quad (2)$$

The distance between the treated and the untreated was used to define the comparability of the comparisons. For technical reasons, we used the Mahalanobis distance, which allowed us to set a distance measure and was used as a measure of equality.[26] To stress the importance of specific characteristics, we used a more complex procedure to define the distance measure and apply it to the matching approach. For example, to permit a more detailed representation of the selection process, we carried out a direct matching procedure for the type of region and calendar time and then calculated three propensity scores (see the full matching approach on the next page) that were entered into the distance measurement.

Finally, the weighting program *W* was implemented using a kernel function *K* (Epanechnikov kernel) based on the bandwidth *h* and distance function *u*, where *u* was defined based on the distance between the balancing scores (*B(x)*)—that is, the dissimilarity between the treated and untreated observations—and bandwidth *h*:[27]

$$W_{i,j} = \frac{K_{i,j}}{\sum_j K_{i,j}} \text{ with } K_{i,j} = \frac{3}{4}(1 - u^2) \, 1_{\{|u| \leq 1\}} \text{ and} \quad (3)$$
$$u = (B_i(x) - B_j(x)) / h$$

Our Mahalanobis distance kernel matching proceeded as follows:[28]

1. Identify *j* and *i*.
2. Skip regions with no support (zero participants between 2000 and 2003).
3. Estimate three propensity scores *Ps(x): Pr(D = 1|X^i)*, *Pr(D = 1|X^{rc})* and *Pr(D = 1|Xrd)*;[29] where *Pr(D = 1|X = x) = 1/ (1 + e$^{X'}$β)*.
4. Stratify the matching procedure into matching clusters (by annual quarter and type of region[30]).

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[25] Note that local authorities may exist that sporadically offer support that is similar to what we studied. However, we think that these types of support are rather low for at least two reasons: a) During our studied time period, only the ESF offered structural funding that supported the promotion of external expertise for regular self-employment activities in Germany. b) Support for this assumption is given by Oberschachtsiek (2007): for example, only 42 out of 276 (= 15.2%) interviewed founders who did not receive *coaching* (that was supported by the Federal Employment Agency) answered that they had received additional support provided by others authorities. Only 12% of these 42 had used *coaching*, whereas 81% reported having attended a training seminar. Finally, we also provide robustness checks on this issue (see below).

[26] See Cochran and Rubin (1973) and Rubin (1980) for the properties of *M(x)* in matching approaches.

[27] A number of techniques have been discussed to assess the optimal choice of bandwidth, but they were not feasible in the context described here.

[28] The matching algorithm used mainly corresponds to that used in Lechner (1999) and Almus (2004). Note that we used the psmatch2 (version 3.1.5) command provided by Leuven and Sianesi (2003) for the software package STATA 10.1.

[29] *i* denotes individual characteristics, *rc* indicates regional and control variables, *rd* marks the set of regional dummy variables.

[30] For region type, we used the 'five-group' classification suggested by Blien and Hirschenauer (2005). Among other things, this classifica-

5. Calculate the Mahalanobis distance based on $Ps^{i,\,rc,\,rd}(x)$ and the selected X as the $B(x)$.
6. Set a multiplier $m \in |0,1|$.
7. Run a pre-matching process to identify h based on the distance distribution of the nearest neighbors in each matching cluster: a) Select a treated observation i. b) Use the nearest neighbor in terms of Mahalanobis distance given that j lies within the cluster cl, except for the distances between the comparisons. c) Extract the 75th percentile of all distance values within cluster cl. d) Use the 90th percentile across all 'cl p75-distance values' as the bandwidth h.
8. Run the clustered matching algorithm based on h taken from (7), which is multiplied by m.

    → if the balancing property is not sufficient, re-run from (7) based on additional attributes that are added to the calculation of the Mahalanobis distance.

    → if balancing is not sufficient based on the addition of attributes, rerun from (6) with a smaller multiplier.

Note that we calculated the standard errors (SE) of the estimator in (4) following Lechner (2001):

$$SE(ATT) = \frac{1}{N_i}Var(Y_i^{D=1}) + \frac{\sum_{n=1}^{N_j} W_n^2}{(N_i^2)}Var(Y_j^{D=0}) \quad (4)$$

In the calculation based on Formula (4), we implicitly assumed that individuals (treated and matched untreated) were independent, thereby emphasizing the issue of regional clustering (the non-independence of observations within a regional entity), as reported in Section 4. We also calculated two measures that provided information about the potential misspecification of the standard error. The first measure was a design-effect indicator (denoted by 'se^r/se, I') that focused on the ratio of the two standard errors taken from the non-weighted and unrestricted sample of the treatment effect estimation and based on a simple logit model with (se^r) and without robust standard errors (se). High values indicated a strong correlation between observations and, therefore, a high risk of misspecification of the common variance estimation. The second measure followed the same logic and was calculated as a ratio (denoted by 'se^r/se, II'). However, the ratio focused on the weighted and restricted population (matched sample). Nevertheless, using such indicators is not common in the context of evaluation, and they can only be considered rough indications of the potential effect of regional clustering.

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tion controls for a region's economic development, its agglomeration structure, its local unemployment rate, and any seasonal labor market fluctuation.

6 Results

6.1 Results for the main groups

Table 2 reports statistics related to the treatment effect.[31] In particular, we focused on the average treatment effect on the treated (ATT) measured in accordance with Formula (a) (Y^1: exits within the first three years) and the subsequent inference statistics. Note that for the interpretation of the ATT (Y^1), a positive sign is associated with a higher failure rate of the treated compared with those who only received the *bridging allowance*, thus indicating a negative effect of the treatment on the likelihood of remaining self-employed. As column five shows, the ATTs (Y^1) were relatively low and, in most cases, remained statistically non-significant. In empirical terms, this finding indicates that (on average) the additional support did not contribute to increasing the duration of self-employment. However, our findings indicate that it is important to disentangle the different reasons for exiting self-employment because the treatment effects significantly differed for exits into employment positions vs. exits into unemployment.

For instance, in the case of *training* for self-employment, statistically significant effects could be identified only for exits into unemployment, which indicates that this form of support is associated with an increase in exiting self-employment if one focuses on exits into unemployment. In contrast, *coaching* significantly reduced exits into dependent employment (level of statistical significance: 95%), meaning that business founders who received *coaching* were less likely to enter dependent employment when they exited self-employment. Furthermore, focusing on the *DSUS,* we found that exits into employment were less likely, whereas exits into unemployment increased.

With respect to regional clustering, the indicator for the design effect ('se^r/se, I') showed a potentially high correlation in observations within regions. However, focusing on the 'se^r/se, the II' ratio suggests that the matching procedure solved the problem to some extent. Furthermore, despite some statistically significant treatment effects, Table 2 shows that the magnitude of the identified treatment effects remained rather small. For example, a statistically significant difference of 0.021 in exit rates between the treated and matched untreated (see *DSUS*; exits into unemployment) means that including external expertise increased exit probabilities by no more than 2.1 percentage points over a period of three years. This result seems less likely to be of

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[31] Note that we also used alternative matching approaches (different weighing programs)—see Table 6—that partly produced a better balance between treated and untreated. However, the general findings did not change. To avoid unnecessary complexity, we focused our discussion on the findings based on the matching procedure reported above (Mahalanobis distance kernel matching).

Table 2 Treatment effects (Mahalanobis-Distance-Kernel-Matching). (Source: IEB, own calculations)

Treatment/ type of exit	On support[a]		Matched[a]		ATT[b]	Inference			Balance (MSB)[c]		F-test[d]		Exit[e]
	Nj	Ni	Nj	Ni		se	se^r/se, I	se^r/se, II	Before	After	Before	After	
Training													
All types	1,555	118,236	1,555	32,968	0.006	0.015	1.799	0.818	24.866	2.380	0.000	0.631	0.486
Unempl.	1,555	118,236	1,555	32,968	0.023[f]	0.014	1.364	1.031	24.866	2.380	0.000	0.631	0.328
Employment	1,555	118,236	1,555	32,968	−0.013	0.009	1.163	1.020	24.866	2.380	0.000	0.631	0.103
Coaching													
All types	7,204	177,573	7,204	27,529	0.002	0.008	2.237	1.623	28.573	0.970	0.000	0.823	0.462
Unempl.	7,204	177,573	7,204	27,529	0.007	0.007	2.166	1.179	28.573	0.970	0.000	0.823	0.331
Employment	7,204	177,573	7,204	27,529	−0.013[g]	0.005	1.392	1.060	28.573	0.970	0.000	0.823	0.076
Discr. start-up support (DSUS)													
All types	8,942	206,189	8,942	22,033	0.010	0.007	3.633	1.042	24.773	0.885	0.000	0.523	0.487
Unempl.	8,942	206,189	8,942	22,033	0.021[g]	0.007	2.329	0.888	24.773	0.885	0.000	0.523	0.312
Employment	8,942	206,189	8,942	22,033	−0.011[g]	0.005	1.942	1.358	24.773	0.885	0.000	0.523	0.112

[a] j and i are indicators for the population (i = treated population; j = untreated persons)

[b] ATT stands for the average treatment effect on the treated; the ATT is calculated on the basis of Formula (4): $\Pr(T^k \leq 36)$

[c] The balancing property is calculated as the averaged mean standardized bias based on individual and regional variables as well as on the three propensity scores

[d] The test used is an F-test of the joint insignificance of all regressors before and after matching

[e] Reports the probability to observe quitting self-employment within a period of 36 months related to the employment status for the matched population

[f] Indicates statistical significance at the 90 % level

[g] Indicates statistical significance at the 95 % level

economic importance. However, compared with the baseline exit rate (see the 'EXIT-column'), this shift indicated an increase of 6.7 %, which should at least be considered serious as seen from a relative perspective. Similar results were found for *coaching* (−1.3 % points but −17 % compared with the baseline exit probability) and *DSUS* (−1.1 % points but −10 % compared with baseline) when we focused on exits into an employment position. Similarly, *trainings* increased exits into unemployment by nearly −7 % compared with the baseline exit rate.

However, when assessing this finding, we must be aware that there could have been different reasons for the low treatment effects, namely, time-variant effects, heterogeneous treatment effects, and methodical misspecifications. Considering these patterns suggests that existing effects may otherwise be averaged out. We focus on these issues below.

6.2 Time-variant treatment effects

To reveal time-dependent differences in survival (Rotger et al. 2012), Fig. 3 displays the treatment effect as the difference in the non-parametric survival functions between the treated and (weighted) untreated comparison groups. This finding provides information on the net outcome of promoting external expertise in terms of better survival chances over time. Note that the ATT at this point focused on Y^2 (time-dependent survival rate; see Formula (b)), and thus, a negative value reflected a lower survival chance (higher likelihood of exiting) in the treated population compared

with those with no treatment. Again, the results are reported for different types of exits (all types, only exits into unemployment, and only exits into employment). Considering right-censoring, the survival functions were calculated as the proportion of observations (self-employed at time t) in relation to the pool of individuals who were still at risk. Confidence intervals (dashed lines) of 95 % were calculated using Greenwood's (1926) approximation of standard errors (without controlling for clustering).

As Fig. 3 shows, time-dependent effects existed for all types of additional support. However, the extent to which variation occurred over time differed across the type of support and for the type of exit considered. For example—putting statistical significance aside—with regard to *training*, the findings revealed that the use of external expertise was associated in comparative terms with lower survival chances when we focused on all types of exits during the first 24 months. However, after 24 months, we observed that the survival difference between the treated and matched non-treated groups was almost zero. Additionally, there were relatively constant differences in survival for exits into unemployment and those into dependent employment. In general, there was little evidence that any benefit resulting from additional support increased with time when focusing on exits in general or exits into unemployment in particular (the opposite applies for exits into employment). Nevertheless, it is worth noting that those who experienced 'trained' periods of self-employment, in particular, had lower business survival rates immediately after the end of the *bridging*
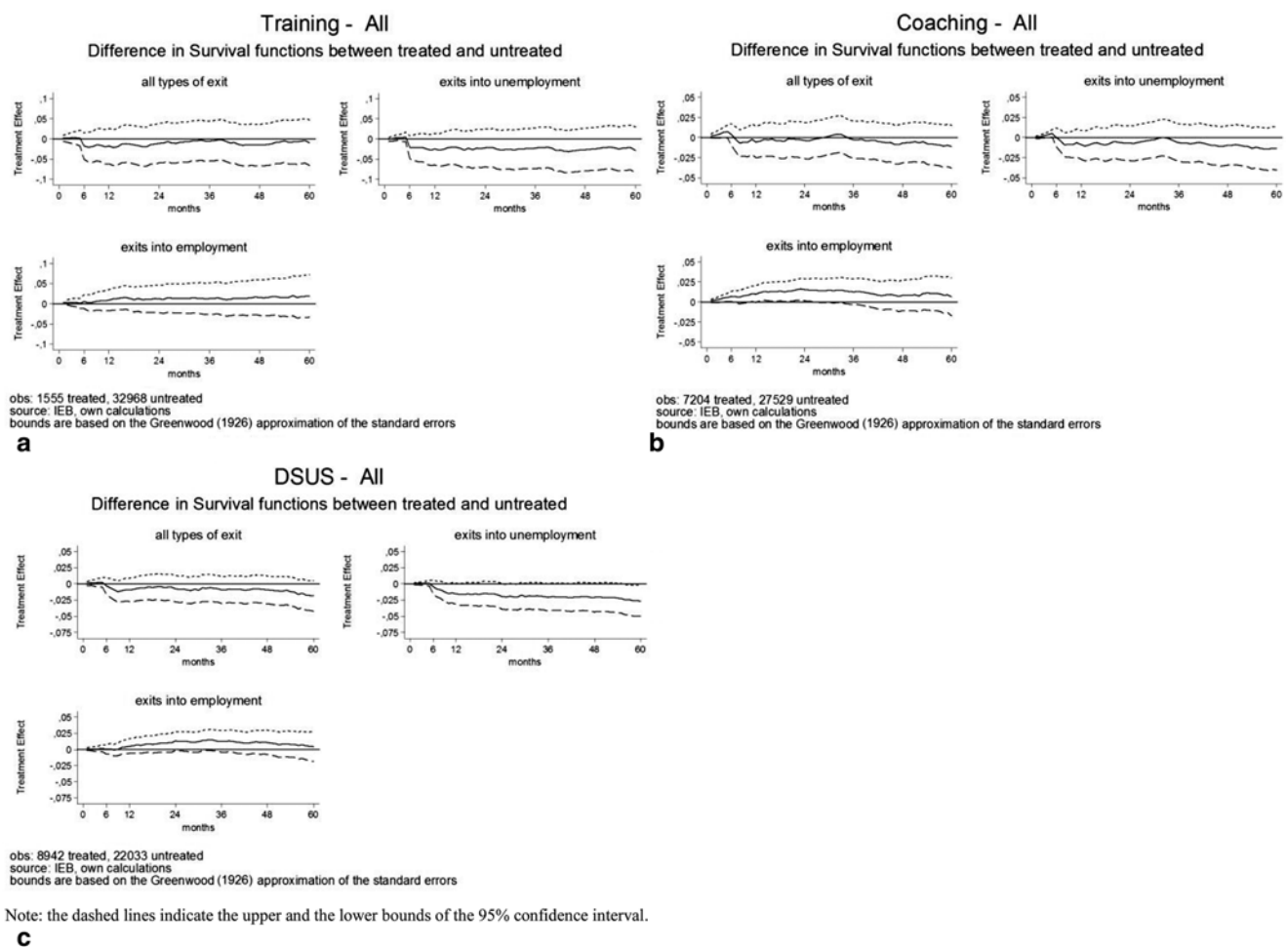
Fig. 3 Time-dependent treatment effects.

allowance and that entrants with *coaching* tended to have higher survival rates at this point in time. In particular, we found a lower survival rate in the '*trained*' population, which indicates strong post-entry selection. A similar pattern was also found for the *coaching* population. However, this finding was less pronounced, which may indicate that the additional support increased the perception of self-employment as being an inferior option to employment.

6.3 Heterogeneous treatment effects

For plausible reasons, the effects caused by the treatment may have differed for specific subpopulations. As research on self-employment shows, outcome differences are likely to emerge between genders because they are associated with differences in risk attributes, investment behaviors, income, and growth intentions (Williams 2000; Georgellis and Wall 2005; Wagner 2007). Following this idea, we controlled for gender differences and differences between eastern as well as western Germany and stratified the population based on

a generalized propensity score (five groups according to the 20th percentile). However, the findings did not differ substantially from the results for the whole population (see Tables 6, 7 and 8 in the Appendix). In most cases, we were unable to identify significant effects, except for the *DSUS,* for which we found the highest treatment effect for the subgroup with low treatment dispositions and increased exits into unemployment for those who had received additional support (ATT=0.065; se=0.027).

6.4 Common support and matching quality

To assess the quality of the matching procedures, we examined the joint distributions of the propensity scores for the treated and non-treated groups. According to the graphical assessment in Fig. 5 (in the Appendix), the included matched comparisons were sufficiently balanced. Furthermore, in accordance with Rosenbaum and Rubin (1983 and 1985), we used the mean standardized bias (MSB) as an indicator for the overall balance of the matched compari-

sons.[32] As reported in Table 2, the average MSB decreased strongly after the matching procedure. This is a fairly good indication of a sufficiently good balance. In fact, this was a better balance than that found in other related studies (e.g., Baumgaertner and Caliendo 2008). Finally, the F-test statistic revealed the joint insignificance of the covariates in a logistic regression in the matched sample.[33] Similarly, *t*-tests provided support for rejecting the mean differences between the matched treated and non-treated on the observed attributes.

6.5 Additional findings and robustness checks

The most critical objection in this evaluation might refer to the point that individuals with unpromising business projects may expect greater returns form using additional support programs and are therefore more likely to take advantage of these promotions. Because this might go unobserved, matching may fail to estimate unbiased treatment effects. However, various checks were conducted to assess the robustness of the estimates. First, we performed different matching procedures, including single nearest neighbors, caliper matching, and propensity kernel matching, to check methodical issues. On the whole, the results of the procedures supported the reported findings. We also tested the potential effect of unobserved heterogeneity by explicitly excluding information and calculating post-estimation Rosenbaum bounds.[34] In particular, neither of the sensitivity tests supported the hypothesis that unobserved heterogeneity had affected the reported estimates. In addition, we re-ran the estimates and included only regions with high ratios of external expertise support programs to consider potential interference from 'negative creaming' (assuming that negative selection would be relatively higher in regions with only a small number of participants). Finally, we replicated

estimations while focusing on regions with low levels of comparable self-employment promotion activities that were covered by state-specific ESF-funding to test for the effects of potential substitutes and to address the potential conflict with the SUTVA (see above).[35] Overall, none of the robustness checks revealed substantial differences from the findings reported above.

7 Summary and conclusions

In this study, we examined the treatment effects of additional start-up support in terms of individual self-employment stability over a period of five years. We evaluated the outcome of including external expertise by studying the nationwide promotion of programs that complement a financial support program. The programs we studied are part of the nationwide active labor market policy in Germany. From a conceptual perspective, we studied three different programs that promote the inclusion of external expertise in the venture process and that complement a basic financial support program. Here, we question whether the individual self-employment position is more sustainable when external expertise is involved.

In our analysis, we used data from the Integrated Employment Biographies (IEB), which is an integrated German database that makes it possible to examine all cases of participation in employment and training programs that are offered by the Federal Employment Agency. The data allowed us to control for detailed information about employment history and qualification levels as well as socio-demographic information. In addition, rich regional data on local labor market conditions and on local labor market policies could be controlled for in the evaluation context, which made the statistical matching approach a valid evaluation technique. The information collected at the individual level allowed us to capture qualifications and biographical information, which we related to the quality of the business project. Furthermore, the population itself and our data restrictions allowed us to focus on relatively homogeneously treated and untreated individuals, which improved our matching the Conditional Indepence Assumption (CIA). An important issue in this context is that the treated and control participants received *bridging allow-*

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[32] The MSB is defined as the difference in the sample mean of each covariate in the treated and control subsamples as a percentage of the square root of the average of sample variances in both groups. We controlled for the following set of attributes: gender, age, higher education (upper secondary, college or university degree), small business background, being a master craftsman, being in western or eastern Germany, date of entry, all three propensity scores, and occupation based on a one-digit classification. Furthermore, all regional attributes were included: local unemployment rate, local firm hazard, variation index of local unemployment, and the regional share of additional support.

[33] The 'after test' (see Table 2) was performed to test the null hypothesis that the entropy of the treatment selection model would equal zero when it was restricted to the weighted matched population.

[34] The Rosenbaum bounds provide information on the potential change in an estimator if a hypothetical factor is included that covers unobserved heterogeneity (see Rosenbaum 2002 or Becker and Caliendo 2008 for details). In the sensitivity analysis, we used the STATA module 'mhbounds.ado', as suggested by Becker and Caliendo (2008). We focused the sensitivity test only on the nearest neighbor matching without replacement.

[35] During our study period, the ESF offered additional self-employment promotion for the inclusion of external expertise at the federal state level as well. This second promotion strategy was not focused on previously unemployed business founders and ran parallel to the ESF-BA program that we focused on. We used data from the ESF monitoring of 2002 to identify federal states with low figures for participation in ESF-funded *coaching*, self-employment training, and counseling. Because of data restrictions, robustness checks were only performed for western Germany.

ances, which ensured the homogeneity of their intentions to start businesses.

With respect to treatment selection, we found that the likelihood of participating in an additional support program was mainly the result of differences in local active labor market policy strategies across Germany. Note that this finding extends earlier research that emphasized the dominant role of individual factors in activities related to creating a venture (e.g., Santarelli and Vivarelli 2007). However, it provides support for the finding of low individual heterogeneity among the treated and the controls. In particular, the results show that few regions had large shares of additional support and that in most regions, using the external expertise promotion for self-employment was less attractive for previously unemployed business founders. This finding indicates a particular regional specialization in the promotion of self-employment that has not been addressed in previous evaluation studies. Nevertheless, this finding gives extra support to implement a weighting program in the matching procedure that includes specific regional context information.

The evaluation showed that support for including external expertise for self-employment tended to increase exits over a period of three years. We also found support for the time-dependent effects of the promotion (e.g., Rotger et al. 2012). However, statistical significance was limited for all programs and outcome measures. For example, *coaching* only showed relevance for (fewer) exits into dependent employment (17%), and significant effects for *training* were limited to (increased) exits into unemployment (7%). Statistically significant treatment effects concentrated on *DSUS,* following which exits into unemployment increased by 6.7% and exits into dependent employment decreased by 10%.

Our findings indicate that on average, *training* and *coaching* did not correspond to the intentions of the relevant policies. If individual 'learning' were improved because of the additional support, we would have expected the sustainability of the self-employment period to be higher or for exits into wage-earning positions to be accelerated. However, we found significantly lower exit rates into employment positions related to *training* and *DSUS* and significantly higher exit rates into unemployment related to *DSUS*. These findings are interesting for at least two reasons. First, they indicate that the promotion with the largest degrees of freedom was associated with a number of non-ignorable treatment effects. And, second, because the treatments were related to increased exits into unemployment (*DSUS*) and reduced exits into wage work (*training* and *DSUS*), 'passive learning' (Jovanovic 1982) may have been dominant in our study context. The only interpretation we see for this effect is that external expertise may have tended to improve the ability to critically assess the business's future economic prospects (e.g., to avoid running into debt). This would provide support for our theoretical framework and for our determination that it is highly

important to disentangle active and passive business assessments related to the inclusion of external expertise.

Compared with earlier research, our findings related to insignificant treatment effects support the results reported by Karlan and Valdvia (2011), who evaluated a support program in Peru in an experimental setting (see also Shutt and Sutherland 2003 or Eckl et al. 2009 for similar evidence in other countries). This would imply that providing extra support that includes external expertise is not a good idea. However, this general statement would be in conflict with the findings of Chandler and Hanks (1998) and of Cressy (1996), who reported that human capital is even more important for self-employment than is financial capital. Similarly, Michaelides and Benus (2012) reported positive outcomes for previously unemployed business founders in the U.S. Nevertheless, our research is the first study that concentrates on a nationwide promotion setting. A major difference in this context may have been that the governing of sufficient quality standards—such as those of the GATE program or those in the SBDC context—was not appropriately met in our study population. In addition, additional differences may exist because the policy context that our research related to consisted of few access barriers.

Finally, it should be noted that our findings should be treated as preliminary because our evaluation must address a number of data limitations. First, one should be aware that relevant regional characteristics as well as individual attributes may have existed that we were not able to control for. For example, in the regional context, we only focused on labor market characteristics. Hence, the level of market competition was not observed. Instead, we assumed that all relevant information was fully approximated by controlling for labor market issues. Furthermore, at the individual level, our findings were based on the assumption that the untreated business founders did not use similar promotion programs, which we were not able to observe. We only used rough approximations to control for this issue. Furthermore, it should be noted that we were not able to study the quality of the interventions or the quality of the business projects. Again, in both cases, we assumed that the quality was correlated with our observed attributes. Second, our findings were only based on a simple outcome measure that focused on the sustainability of self-employment. Although we were able to disentangle different post-exit positions, it should be noted that our definition only allowed for identifying post-entry positions that were observable in the data. Nevertheless, we think that the study of alternative outcome measures is necessary to uncover the mechanisms related to the inclusion of outside assistance.

Appendix

Table 3 Self-employment promotion schemes of active labor market policy

	Bridging allowance	Discretionary start-up support	Self-employment training	Self-employment coaching
Target group	Individuals who are entitled to unemployment benefit and who wish to start a new business	Individuals who wish to or who have started a business from a position of unemployment	Individuals who plan to become self-employed	Individuals who have started a business
Focus	Transition costs; financial support	Regional policy	Preparation and skills	External expertise, improved learning
Benefits	Coverage of living expenses during the first six months plus extra payment for social security contributions payments are limited to the level of (potential) unemployment benefit	Flexible (experimental) types of support during the transition period, start-up period or the early period of self-employment e.g, allowances for living expenses, technical equipment	4 to 12 weeks of training Coverage of training fees, travelling expenses and expenditures on child care Free selection of the course (usually professional training centers)	Coverage of coaching costs, travelling expenses and expenditures on child care Free selection of the coach to address individual topics (usually tax advisors or business consultants) Support can be used for a periodic support, on demand or for support at a stretch
Requirements	Self-employment activity ends or avoids unemployment	Does not conflict with the general directions of active labor market policy	Entitled to receive regular support under the Social Code Book III—e.g. planned to apply for bridging allowance	Receiving support under Social Code Book III—usually bridging allowance
	63 years of age an younger	Only if other schemes (including national or regional business development programs) are not possible	Preparing a start-up	Limited topics since 03/2003 (marketing, business development, psychological help)
	Positive assessment of the business concept Evidence of new business activity or the start-up (difficulties in cases of a business buyout)	Limited to a total expenditure of no more than 10% of the regional integration budget		Subsidies are limited to a one-year period after start-up Individual specific/ problem, oriented topics
Validity period	Started in 1986; reformed in August 1994; changes made in 1997, 1998 and 2001; termination in 2006	Started in 1998	Started in 1998; restarted in 2000, several changes; terminated in 03/2003 Total payment up to 9.000 € (until 03/2003), and 4,600 € between 02/2000 and 3/2003	Started in 1998; restarted in 2000, several changes; terminated in 2006

Own compilation

Fig. 4 Definition of valid additional support

own illustration

Table 4 Definition of the variables

Gender (male)

   Sex equals one if the individual is male. Source: Employment History

Age

   Age of the business founder at the beginning of the self-employment episode. Source: Employment History

Schooling (>= high school)

   Schooling equals upper secondary school leaving certificate (Germany: 'Abitur' or 'Fachabitur') or higher. Source: Job Search Register

Academic degree

   The founder holds an academic degree or diploma (university or college). Source: Job Search Register

Master craftsman/foreman

   The founder worked as a master craftsman or foreman (occupational status) in his or her last employment episode before starting the business. Employment episodes with a daily income lower than 5 euros or lasting less than 60 days (valid employment episode) are excluded. Source: Employment History

Management

   The founder worked in a management position in the last employment episode before starting the business. Source: Job Search Register

Commercial background

   The founder is experienced and (formally) trained in a commercial occupation. Source: Job Search Register (apprenticeship information); Employment History (using the two-digit classification of a selected set of occupations; experience)

Short unemployment

   The unemployment duration before setting up the business is less than 3.5 months (difference between last employment and beginning of the supported episode of self-employment; missing values are imputed). Source: Employment History

Number job changes

   Number of distinct occupations classified using the two-digit classification during the last two years before starting the business. Source: Employment History

Marginal part-time employment

   Founder worked in a marginal part-time job during the last valid employment episode before setting up the business. Source: Employment History

Wage premium

   Identifies whether a founder earned 1.66 times more than the expected monthly wage in the last valid employment episode. The expected income is a regressed function of the income and a selected set of covariates (e.g. age, schooling, job changes, gender, occupational status, size of the establishment) conditional on the type of occupation and part- or full-time status. Source: Employment History

Size of establishment/small business

   Size of the establishment: statistical mode of the number of employees in the establishments during the last five years before setting up the business. Only the employment records that last for more than 3 months with an income greater than zero are included. Source: Establishment History Panel. Small Business: The founder has usually worked (modus of the last five years) in establishments with less than 20 employees. Source: Establishment History Panel

Unemployment rate (UER)

   Monthly unemployment rate of the local labor market district. This information is merged with the micro data after splitting the dataset into three-month periods. Berlin is treated as one region (unweighted average). Source: Employment Statistics

Unemployment index

   Time-varying covariate that covers a normalized unemployment rate relative to the starting point (index =UER*100/UER). Source: Employment Statistics

Variation index

   Captures the variation of the monthly unemployment rate for each local labor market district. The index relates to the square root of the squared mean error of a time series estimation. Source: Employment Statistics

Share (%) of vanishing establishments (local firm hazard)

   Identifies the share of establishments that are found in t-1 but do not exist in t in the local labor market district. Source: Establishment History Panel

Cohort

   Represents the year in which the founder set up the business. Source: Participants-in-Measures History File

Profession/occupation

   Distinguishes seven clusters of occupations based on a two-digit job classification related to the last valid employment episode. Source: Employment History

Exit

   Equals one if there is an episode that is not-self-employment after starting the business (beginning of the support). Source: all sources of the IEB. The identification distinguishes between (a) employment (dependent employment with notification to the social security system), (b) unemployment (with or without unemployment benefits) or participation in an employment or training measure, and (c) other (e.g. marginal part-time employment). Before identifying these spells, the data set was reorganized to merge different types of spells

Duration of self-employment

   The duration of self-employment is the difference between the start date of the support (start-up of the business) and the date of the first episode that was not-self-employment after starting the business. Censoring refers to 31 Dec. 2005

Table 5 Treatment selection (estimated effects). (Source: IEB, own calculations)

	Coaching		Training		Discretionary start-up support	
	b	se	b	se	b	se
Individual characteristics						
Male	−0.288***	(0.05)	−0.337***	(0.05)	−0.139**	(0.07)
Age	0.061***	(0.01)	0.066***	(0.02)	0.084***	(0.01)
Age squared	−0.001***	(0.00)	−0.001***	(0.00)	−0.001***	(0.00)
Schooling (>= upper secondary school)	0.122***	(0.04)	0.251***	(0.07)	0.163***	(0.04)
Academic degree	−0.001	(0.04)	0.036	(0.06)	0.036	(0.03)
Master craftsman/foreman	0.050	(0.05)	0.213*	(0.12)	0.051	(0.06)
Management	−0.066*	(0.04)	−0.136	(0.12)	−0.038	(0.03)
Short unemployment	−0.256***	(0.04)	−1.169***	(0.21)	−0.457***	(0.04)
Small business	−0.023	(0.02)	−0.031	(0.03)	0.007	(0.02)
Occupation (one-digit classification; 10 types)	Included in the model but omitted in this table					
Local conditions						
Unemployment (ue) rate	0.011	(0.02)	−0.000	(0.02)	−0.018	(0.02)
Ue variation	−1.351***	(0.06)	1.440***	(0.21)	1.006***	(0.05)
Firm hazard	−0.069*	(0.04)	−0.018	(0.03)	−0.061***	(0.02)
Share of training	0.065***	(0.00)	0.182***	(0.00)	−0.019***	(0.00)
Share of coaching	0.113***	(0.00)	0.025***	(0.00)	0.043***	(0.00)
Share of DSUS	0.028***	(0.00)	0.065***	(0.00)	0.159***	(0.00)
Eastern Germany	2.192***	(0.21)	1.110***	(0.32)	1.516***	(0.24)
Time (quarter since 1/2000 = reference group)						
2nd	0.718***	(0.10)	2.088***	(0.38)	0.613***	(0.13)
3rd	0.916***	(0.16)	2.316***	(0.41)	0.856***	(0.17)
4th	0.867***	(0.30)	2.261***	(0.43)	0.975***	(0.20)
5th	1.180***	(0.30)	2.179***	(0.43)	0.958***	(0.17)
6th	1.490***	(0.32)	2.218***	(0.41)	0.846***	(0.20)
7th	2.052***	(0.30)	1.689***	(0.39)	0.847***	(0.22)
8th	2.642***	(0.29)	−0.725	(0.46)	0.917***	(0.27)
Local labor market district (153 dummies)	Included in the model but omitted in this table					
constant	−6.889***	(0.35)	−9.637***	(0.42)	−8.570***	(0.29)
N	337407.000		257281.000		365785.000	
Ll	−63343.482		−15649.085		−74211.991	
bic	127017.920		31622.076		148757.036	

Table reports estimated coefficients (b) and standard errors (se; in parentheses) based on logit model estimations

Statistical signifcance: * *p*<0.05; ** *p*<0.01; *** *p*<0.001

To focus only on valid additional support the study uses time corridors as displayed in Fig. 4. Following this figure *training*, *coaching* and *discretionary start-up support* are included only if they lie within a certain time corridor in relation to the start date of the *bridging allowance*. For simplicity the figure displays the number of the episode (I to IV) and the type of period (b = before the start of *bridging allowance*; a = after the start) as well as the time corridor to define the cut-off-point for including or excluding observations. For the training population this includes observations where the end date of the training lies within a corridor of one year before the start date of the *bridging allowance* (entry date) and end dates that are no later than 3 weeks after the entry date (*training courses* must have started before the entry date). Hence only episodes I and II are included (see the left part of the figure). For *coaching* we set a time window between −21

days and +365 days related to the start of the *coaching* and *coaching* must begin no later than one year after the *bridging allowance*. Therefore, only episode III is included (see right part of the graph). For *discretionary start-up support* the time corridor is +/- one year which means that episodes I, II and III are included (see right part of the figure).

Listing A.1: Description of the matching algorithm

Labor market districts (regions) that have no participants in the support schemes evaluated do not enter the study, because the joint support in these regions is zero (step 2). To include statistical information about the assignment process, linear predictions of logit estimates are used. To emphasize the distinct levels of selection three separate

Table 6 Treatment effects for '*training*' (sub groups and robustness checks)

Treatment/ type of exit	On support[a] Nj	Ni	Matched[a] Nj	Ni	ATT[b]	Inference se	se^r/se I	se^r/se II	Balance (MSB)[c] Before	After	Test[d] Before	After	Exit[e]
Single nearest neighbor													
All types	1,983	136,376	1,983	1,816	0.023	0.017	1.799	1.094	27.318	1.610	0.000	0.049	0.495
Unempl.	1,983	136,376	1,983	1,816	0.020	0.016	1.364	1.113	27.318	1.610	0.000	0.049	0.321
Empl.	1,983	136,376	1,983	1,816	0.010	0.011	1.163	0.943	27.318	1.610	0.000	0.049	0.119
Caliper matching													
All types	1,516	136,376	1,516	1,487	0.031	0.018	1.799	1.072	27.318	2.558	0.000	0.060	0.504
Unempl.	1,516	136,376	1,516	1,487	0.030	0.017	1.364	1.047	27.318	2.558	0.000	0.060	0.334
Empl.	1,516	136,376	1,516	1,487	0.009	0.012	1.163	0.962	27.318	2.558	0.000	0.060	0.116
Kernel PS-matching													
All types	1,983	136,376	1,983	1,816	0.023	0.017	1.799	1.094	27.318	1.610	0.000	0.049	0.495
Unempl.	1,983	136,376	1,983	1,816	0.020	0.016	1.364	1.113	27.318	1.610	0.000	0.049	0.321
Empl.	1,983	136,376	1,983	1,816	0.010	0.011	1.163	0.943	27.318	1.610	0.000	0.049	0.119
All, but excluding information													
All types	1,558	118,236	1,558	22,234	−0.001	0.016	1.725	0.842	26.087	1.984	0.000	0.851	0.475
Unempl.	1,558	118,236	1,558	22,234	0.021	0.015	1.423	1.041	26.087	1.984	0.000	0.851	0.323
Empl.	1,558	118,236	1,558	22,234	−0.013	0.010	1.172	0.842	26.087	1.984	0.000	0.851	0.102
Western Germany													
All types	1,321	88,003	1,321	2,5967	0.027	0.017	1.670	1.011	28.828	2.266	0.000	0.961	0.498
Unempl.	1,321	88,003	1,321	25,967	0.030	0.015	1.405	0.996	28.828	2.266	0.000	0.961	0.315
Empl.	1,321	88,003	1,321	25,967	0.001	0.011	1.099	0.820	28.828	2.266	0.000	0.961	0.119
Western Germany excluding regions with high ESF state funding													
All types	212	30,457	212	6,287	0.019	0.040	0.972	0.921	24.129	1.753	0.000	1.000	0.523
Unempl.	212	30,457	212	6,287	0.073	0.038	0.941	1.150	24.129	1.753	0.000	1.000	0.391
Empl.	212	30,457	212	6,287	−0.042	0.022	1.151	0.888	24.129	1.753	0.000	1.000	0.075
Eastern Germany													
All types	286	37,040	286	1,190	0.013	0.036	1.239	0.758	22.253	2.667	0.000	0.997	0.447
Unempl.	286	37,040	286	1,190	0.000	0.035	1.022	1.053	22.253	2.667	0.000	0.997	0.349
Empl.	286	37,040	286	1,190	0.024	0.019	1.232	1.032	22.253	2.667	0.000	0.997	0.073
Male population													
All types	1,126	83,300	1,126	33,874	−0.003	0.017	1.555	0.739	24.827	1.783	0.000	0.994	0.471
Unempl.	1,126	83,300	1,126	33,874	0.015	0.016	1.047	1.077	24.827	1.783	0.000	0.994	0.337
Empl.	1,126	83,300	1,126	33,874	−0.010	0.010	1.165	0.629	24.827	1.783	0.000	0.994	0.097
Female population													
All types	579	28,320	579	15,001	0.008	0.024	1.353	0.846	27.863	2.825	0.000	0.996	0.531
Unempl.	579	28,320	579	15,001	0.027	0.022	1.249	1.468	27.863	2.825	0.000	0.996	0.302
Empl.	579	28,320	579	15,001	0.001	0.017	0.845	1.024	27.863	2.825	0.000	0.996	0.139
Low treatment disposition													
All types	121	49,488	121	1,256	0.054	0.054	1.799	0.776	14.720	2.470	0.000	1.000	0.487
Unempl.	121	49,488	121	1,256	0.050	0.051	1.364	0.948	14.720	2.470	0.000	1.000	0.363
Empl.	121	49,488	121	1,256	−0.002	0.030	1.163	0.946	14.720	2.470	0.000	1.000	0.082
High treatment disposition													
All types	776	26,238	776	3,462	0.009	0.023	1.799	0.845	23.486	2.123	0.000	0.997	0.481
Unempl.	776	26,238	776	3,462	0.000	0.021	1.364	0.823	23.486	2.123	0.000	0.997	0.283
Empl.	776	26,238	776	3,462	0.014	0.016	1.163	0.899	23.486	2.123	0.000	0.997	0.126

Table reports selected statistics of the evaluation for subgroups and selected robustness checks; source: IEB, own calculations

[a] j and i are indicators for the population (i=treated population; j=untreated persons)

[b] ATT stands for the average treatment effect on the treated; the ATT is calculated on the basis of formula (4): $Pr(T^k \leq 36)$

[c] The balancing property is calculated as the averaged mean standardized bias based on individual and regional variables as well as the three propensity scores

[d] The test used is an F-test of the joint insignificance of all the regressors before and after matching (prob values)

[e] Reports the probability to observe quitting self-employment within a period of 36 months related to the employment status for the matched population

Table 7 Treatment effects for '*coaching*' (sub groups and robustness checks)

Treatment/ type of exit	On support[a]		Matched[a]		ATT[b]	Inference			Balance (MSB)[c]		Test[d]		Exit[e]
	Nj	Ni	Nj	Ni		se	se[r]/se I	se[r]/se II	Before	After	Before	After	
Single nearest neighbor													
All types	10,107	180,283	10,107	8,611	−0.012	0.008	2.237	1.603	28.604	1.107	0.000	0.003	0.473
Unempl.	10,107	180,283	10,107	8,611	−0.004	0.007	2.166	1.435	28.604	1.107	0.000	0.003	0.329
Empl.	10,107	180,283	10,107	8,611	−0.016	0.005	1.392	1.371	28.604	1.107	0.000	0.003	0.0838
Caliper matching													
All types	9,393	180,283	9,393	8,347	−0.006	0.008	2.237	1.389	28.604	0.998	0.000	0.010	0.477
Unempl.	9,393	180,283	9,393	8,347	−0.003	0.007	2.166	1.426	28.604	0.998	0.000	0.010	0.331
Empl.	9,393	180,283	9,393	8,347	−0.012	0.005	1.392	1.225	28.604	0.998	0.000	0.010	0.086
Kernel PS-matching													
All types	10,107	180,283	10,107	8,611	−0.012	0.008	2.237	1.603	28.604	1.107	0.000	0.003	0.473
Unempl.	10,107	180,283	10,107	8,611	−0.004	0.007	2.166	1.435	28.604	1.107	0.000	0.003	0.329
Empl.	10,107	180,283	10,107	8,611	−0.016	0.005	1.392	1.371	28.604	1.107	0.000	0.003	0.084
All, but excluding information													
All types	6,906	177,573	6,906	23,810	0.002	0.008	2.608	1.411	29.724	0.916	0.000	0.919	0.460
Unempl.	6,906	177,573	6,906	23,810	0.011	0.008	2.334	1.071	29.724	0.916	0.000	0.919	0.322
Empl.	6,906	177,573	6,906	23,810	−0.017	0.005	1.454	1.164	29.724	0.916	0.000	0.919	0.074
Western Germany													
All types	2,935	129,836	2,935	18,630	0.014	0.011	1.519	1.022	28.336	0.702	0.000	1.000	0.501
Unempl.	2,935	129,836	2,935	18,630	0.005	0.010	1.335	1.101	28.336	0.702	0.000	1.000	0.301
Empl.	2,935	129,836	2,935	18,630	−0.007	0.007	1.710	1.007	28.336	0.702	0.000	1.000	0.107
Western Germany excluding regions with high ESF state funding													
All types	1,615	34,537	1,615	13,288	0.019	0.015	1.336	0.613	23.574	1.289	0.000	0.999	0.536
Unempl.	1,615	34,537	1,615	13,288	0.016	0.014	1.065	0.872	23.574	1.289	0.000	0.999	30.22
Empl.	1,615	34,537	1,615	13,288	−0.007	0.009	1.369	1.481	23.574	1.289	0.000	0.999	0.108
Eastern Germany													
All types	4,269	47,737	4,269	9,497	−0.008	0.011	1.931	0.846	17.989	0.754	0.000	0.957	0.426
Unempl.	4,269	47,737	4,269	9,497	0.006	0.010	1.955	0.833	17.989	0.754	0.000	0.957	0.338
Empl.	4,269	47,737	4,269	9,497	−0.017	0.005	1.088	0.831	17.989	0.754	0.000	0.957	0.0855
Male population													
All types	5,405	124,239	5,405	28,342	−0.002	0.009	2.541	1.684	30.354	1.114	0.000	0.901	0.441
Unempl.	5,405	124,239	5,405	28,342	0.002	0.008	2.120	1.377	30.354	1.114	0.000	0.901	0.333
Empl.	5,405	124,239	5,405	28,342	−0.010	0.005	1.268	1.247	30.354	1.114	0.000	0.901	0.070
Female population													
All types	2,667	43,564	2,667	12,747	0.006	0.012	1.437	1.244	23.458	1.304	0.000	0.965	0.522
Unempl.	2,667	43,564	2,667	12,747	0.018	0.012	1.777	1.365	23.458	1.304	0.000	0.965	0.338
Empl.	2,667	43,564	2,667	12,747	−0.022	0.008	1.217	0.894	23.458	1.304	0.000	0.965	0.090
Low treatment disposition													
All types	340	74,383	340	1,583	−0.017	0.034	2.237	0.867	15.003	4.011	0.000	0.809	0.497
Unempl.	340	74,383	340	1,583	0.002	0.032	2.166	0.965	15.003	4.011	0.000	0.809	0.332
Empl.	340	74,383	340	1,583	−0.047	0.021	1.392	0.794	15.003	4.011	0.000	0.809	0.082
High treatment disposition													
All types	3,133	31,542	3,133	4,836	−0.002	0.013	2.237	0.766	12.474	1.243	0.000	0.795	0.422
Unempl.	3,133	31,542	3,133	4,836	0.003	0.012	2.166	0.888	12.474	1.243	0.000	0.795	0.321
Empl.	3,133	31,542	3,133	4,836	−0.009	0.007	1.392	1.314	12.474	1.243	0.000	0.795	0.064

Table reports selected statistics of the evaluation for subgroups and selected robustness checks; source: IEB, own calculations

[a]j and i are indicators for the population (i=treated population; j=untreated persons)

[b]ATT stands for the average treatment effect on the treated; the ATT is calculated on the basis of formula (4): $\Pr(T^k \leq 36)$

[c]The balancing property is calculated as the averaged mean standardized bias based on individual and regional variables as well as the three propensity scores

[d]The test used is an F-test of the joint insignificance of all the regressors before and after matching (prob values)

[e]Reports the probability to observe quitting self-employment within a period of 36 months related to the employment status for the matched population

Table 8 Treatment effects for '*discretionary start-up support*' (sub groups and robustness checks)

Treatment/ type of exit	On support[a]		Matched[a]		ATT[b]	Inference			Balance (MSB)[c]		Test[d]		Exit[e]
	Nj	Ni	Nj	Ni		se	se[r]/se I	se[r]/se II	Before	After	Before	After	
Single nearest neighbor													
All types	17,790	209,040	17,790	14,578	0.001	0.006	3.633	1.175	24.747	0.657	0.000	0.574	0.515
Unempl.	17,790	209,040	17,790	14,578	0.013	0.005	2.329	1.325	24.747	0.657	0.000	0.574	0.319
Empl.	17,790	209,040	17,790	14,578	−0.016	0.004	1.942	1.210	24.747	0.657	0.000	0.574	0.129
Caliper matching													
All types	17,442	209,040	17,442	14,432	0.002	0.006	3.633	1.189	24.747	0.623	0.000	0.506	0.512
Unempl.	17,442	209,040	17,442	14,432	0.013	0.005	2.329	1.284	24.747	0.623	0.000	0.506	0.318
Empl.	17,442	209,040	17,442	14,432	−0.014	0.004	1.942	1.078	24.747	0.623	0.000	0.506	0.125
Kernel PS-matching													
All types	17,790	209,040	17,790	14,578	0.001	0.006	3.633	1.175	24.747	0.657	0.000	0.574	0.515
Unempl.	17,790	209,040	17,790	14,578	0.013	0.005	2.329	1.325	24.747	0.657	0.000	0.574	0.319
Empl.	17,790	209,040	17,790	14,578	−0.016	0.004	1.942	1.210	24.747	0.657	0.000	0.574	0.125
All, but excluding information													
All types	7,688	206,189	7,688	14,064	0.007	0.008	3.118	0.937	25.954	0.575	0.000	0.996	0.470
Unempl.	7,688	206,189	7,688	14,064	0.019	0.007	2.108	0.891	25.954	0.575	0.000	0.996	0.300
Empl.	7,688	206,189	7,688	14,064	−0.015	0.005	1.756	1.094	25.954	0.575	0.000	0.996	0.106
Western Germany													
All types	6,019	164,956	6,019	11,792	0.008	0.009	4.101	1.405	27.978	1.114	0.000	0.899	0.478
Unempl.	6,019	164,956	6,019	11,792	0.019	0.008	2.300	0.900	27.978	1.114	0.000	0.899	0.285
Empl.	6,019	164,956	6,019	11,792	−0.017	0.006	2.127	1.183	27.978	1.114	0.000	0.899	0.122
Western Germany excluding regions with high ESF state funding													
All types	1,673	35,618	1,673	6,544	0.023	0.016	2.304	0.652	41.720	1.234	0.000	0.956	0.565
Unempl.	1,673	35,618	1,673	6,544	0.023	0.015	1.653	1.462	41.720	1.234	0.000	0.956	0.345
Empl.	1,673	35,618	1,673	6,544	0.002	0.011	1.006	0.821	41.720	1.234	0.000	0.956	0.130
Eastern Germany													
All types	2,614	41,233	2,614	6,403	0.002	0.014	1.958	1.343	26.728	1.024	0.000	0.971	0.404
Unempl.	2,614	41,233	2,614	6,403	0.011	0.013	1.712	1.130	26.728	1.024	0.000	0.971	0.318
Empl.	2,614	41,233	2,614	6,403	−0.015	0.007	0.994	0.906	26.728	1.024	0.000	0.971	0.054
Male population													
All types	7,496	147,369	7,496	23,522	0.008	0.008	3.217	0.988	25.531	1.113	0.000	0.302	0.478
Unempl.	7,496	147,369	7,496	23,522	0.022	0.007	2.114	0.972	25.531	1.113	0.000	0.302	0.325
Empl.	7,496	147,369	7,496	23,522	−0.015	0.005	1.685	1.370	25.531	1.113	0.000	0.302	0.107
Female population													
All types	4,492	52,832	4,492	14,652	0.013	0.010	2.157	0.989	23.808	1.359	0.000	0.553	0.532
Unempl.	4,492	52,832	4,492	14,652	0.023	0.009	1.634	0.902	23.808	1.359	0.000	0.553	0.283
Empl.	4,492	52,832	4,492	14,652	−0.004	0.007	1.350	0.949	23.808	1.359	0.000	0.553	0.137
Low treatment disposition													
All types	428	88,513	428	2,378	0.039	0.030	3.633	0.884	10.112	1.963	0.000	1.000	0.425
Unempl.	428	88,513	428	2,378	0.065	0.027	2.329	0.937	10.112	1.963	0.000	1.000	0.297
Empl.	428	88,513	428	2,378	−0.025	0.017	1.942	1.081	10.112	1.963	0.000	1.000	0.082
High treatment disposition													
All types	6,044	34,157	6,044	10,038	0.004	0.009	3.633	1.236	6.840	0.579	0.000	1.000	0.502
Unempl.	6,044	34,157	6,044	10,038	0.025	0.008	2.329	1.195	6.840	0.579	0.000	1.000	0.306
Empl.	6,044	34,157	6,044	10,038	−0.017	0.006	1.942	1.377	6.840	0.579	0.000	1.000	0.124

Table reports selected statistics of the evaluation for subgroups and selected robustness checks; source: IEB, own calculations

[a] j and i are indicators for the population (i = treated population; j = untreated persons)

[b] ATT stands for the average treatment effect on the treated; the ATT is calculated on the basis of formula (4): $\Pr(T^k \leq 36)$

[c] The balancing property is calculated as the averaged mean standardized bias based on individual and regional variables as well as the three propensity scores

[d] The test used is an F-test of the joint insignificance of all the regressors before and after matching

[e] Reports the probability to observe quitting self-employment within a period of 36 months related to the employment status for the matched population
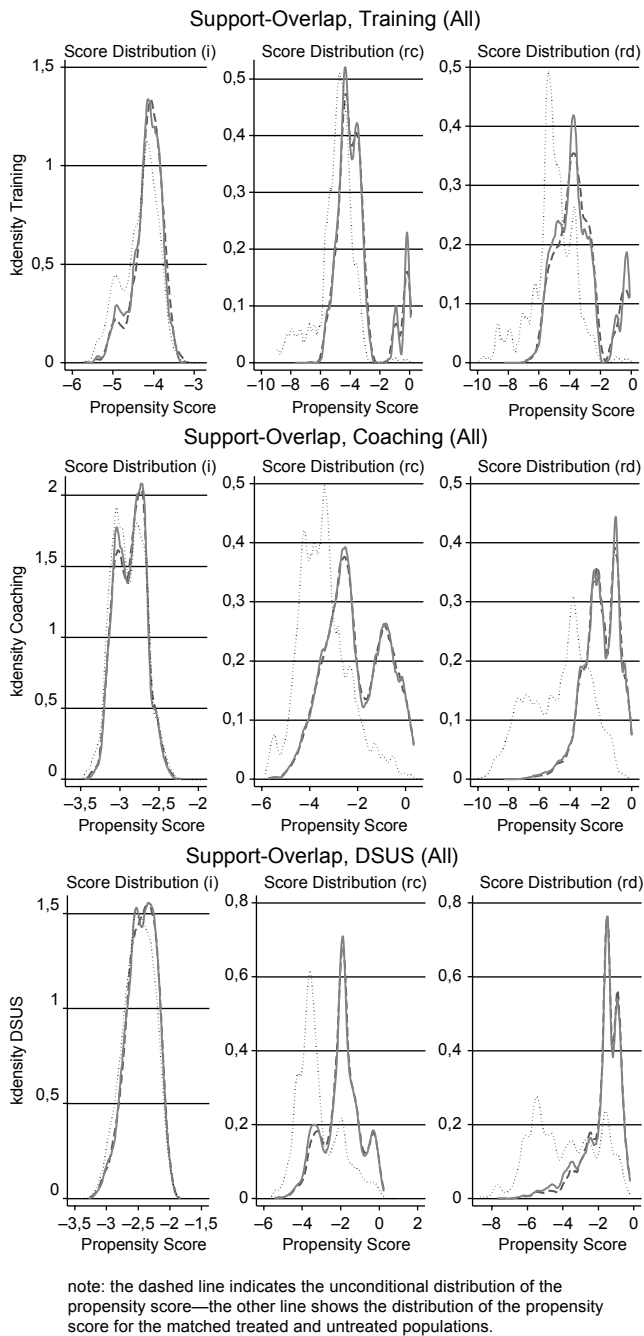
Support-Overlap, Training (All)

Support-Overlap, Coaching (All)

Support-Overlap, DSUS (All)

note: the dashed line indicates the unconditional distribution of the propensity score—the other line shows the distribution of the propensity score for the matched treated and untreated populations.

Fig. 5 Support-Overlap. (Source: IEB, own calculations)

scores are applied. The first one includes only individual characteristics, the second is based on regional attributes and time intervals, the third is based on dummy variables of the labor market district and time (step 3).

Before calculating M(x), the sample of i and j is stratified according to regional clusters and time intervals (step 4). Region (type of region) and time (13 annual quarters) define distinct matching clusters to ensure that comparisons are only taken from observations with the most similar external economic market conditions and to take into account the

dominating pattern of the treatment assignment. The exact date of entry, the scores and the interaction between the scores are added to the list of attributes that enter the calculation of the Mahalanobis distance (step 5). The inclusion of further variables depends on step 8.

A pre-within sample matching procedure is then performed to identify a bandwidth parameter (step 7). This step ensures that h is drawn directly from the clustered sample. Nearest neighbor matching guarantees that only the closest j are used. Based on the realized $n^{i,j}$ distances the 75th percentile is taken as the cluster k specific bandwidth (h^k). This avoids potential high distance matches within a cluster. Next, the 90th percentile of all h^k is used as the overall bandwidth parameter h. This procedure is implemented to weight matches in clusters in which only high distance matches exist.

The final matching procedure is performed based on h and proceeds in step 8. The multiplier defined in step 6 ensures a flexible adjustment of the bandwidth parameter and is only rescaled if the inclusion of additional variables (or interaction terms) does not improve the balance between i and j after matching.

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