Boockmann, Bernhard; Nielen, Sebastian

Conference Paper

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Beiträge zur Jahrestagung des Vereins für Socialpolitik 2016: Demographischer Wandel - Session: Unemployment and School-to-Work Transition, No. F18-V1

Provided in Cooperation with:
Verein für Socialpolitik / German Economic Association

Mentoring disadvantaged youths during school-to-work transition: evidence from Germany

Bernhard Boockmann*

Sebastian Nielen+

February 29, 2016

Abstract: In the German school and vocational education systems, there is a wide range of support measures during school-to-work transition. We analyze a novel program providing mentoring to low-achieving school leavers as a bridge between different stages and different institutional systems in secondary and post-secondary education. Using high-quality survey and administrative data and propensity score matching, we find some positive effects on the probability of transiting into the dual vocational education system in the intermediate run. Higher program intensity leads to larger treatment effects. Contrary to the goals of the program, however, there is only weak evidence that it accelerates transitions into vocational training immediately after leaving school.

JEL-Codes: J24, I21, I28, C21

Key Words: school-to-work transition, mentoring, school drop-out, vocational training

Acknowledgements: We wish to thank the Institute for Employment Research (IAB), Nürnberg, and SOKO Institut, Bielefeld, for providing administrative and survey data. Nicole Meythaler and Hans Verbeek made important contributions to this research. We thank conference participants at the BIBB (Bonn) for helpful comments. This paper is based on the evaluation of the program "Berufseinstiegsbegleitung", commissioned by the German Ministry of Labor and Social Affairs (BMAS). This research does not necessarily reflect the opinions and views held by the BMAS.

* Institute for Applied Economic Research (Institut für Angewandte Wirtschaftsforschung, IAW), University of Tübingen and IZA, Bonn. Address for correspondence: IAW, Ob dem Himmelreich 1, D-72074 Tübingen, Germany, phone +49 7071 9896-20, e-mail: bernhard.boockmann@iaw.edu.

+ Institute for Applied Economic Research (Institut für Angewandte Wirtschaftsforschung, IAW), phone +49 7071 9896-19, e-mail: sebastian.nielen@iaw.edu.

1. Introduction

Many school leavers face substantial difficulties during the transition from to school to work. Youths from disadvantaged backgrounds and with reduced cognitive abilities are particularly affected by problems such as early school dropout, grade repetitions, delays in starting vocational training or further education and early dissolution of vocational training contracts. Failure during the school-to-work transition often has adverse long-run consequences, such as lack of qualifications, low pay and instable labor force attachment. Therefore, both preventive approaches in earlier stages of education as well as support during transition are important.

In Germany, vocational training in the dual system is the most common form of vocational education for youths who do not move on to tertiary education. It consists of both formal education in vocational training schools and practical work experience in training companies. Vocational training is not considered a "second-best" option but has traditionally been a standard way of entering the labour market (Biavaschi et al. 2012). Recent evidence shows, however, that direct transitions from secondary school to dual vocational training have become the exception rather than the rule (see, e.g., Fitzenberger and Lickleder 2015). In fact, the vocational training system is challenged at different ends of the ability distribution. Among youths with relatively high abilities, an increasing number proceed to more advanced educational tracks and further to academic education. Recently, the number of entrants into academic education has surpassed the number of entrants into the vocational training system (BIBB 2014a, 2014b). At the lower end of the ability distribution, integrating school leavers with poor school marks, reduced math and reading abilities, a lack of social skills or behavioral problems into vocational training courses is particularly difficult in a time of rising skill demands at the workplace (Fitzenberger and Lickleder 2015). Solutions such as public training schemes succeed in absorbing school-leavers, but do not safeguard their transition into the vocational system after completion of the measures (Beicht 2009).

We analyze the effects of a novel support program in Germany, the Career Entry Guidance program (CEG, in German Berufseinstiegsbegleitung). A wide range of policies and programs have been implemented in schools, in the vocational training system, in the public employment service, by companies and business associations and

by charities in Germany. These programs include training programs, support at school, subsidized public vocational training courses, mentoring, social work and many others. The novel features of the CEG are, first, that it offers individual mentoring rather than classroom training and, second, that it provides a bridge between different stages and different institutional systems in secondary and post-secondary education.

The target group of the CEG is low-achieving school leavers at secondary schools. Since 2009, the CEG has been piloted in 1,000 schools leading to a basic school leaving certificate. We follow participants for a period of five years. We do not observe long-run outcomes such as salaries in the first employment but focus on short-run and intermediate-run results during school-to-work transition.

We find positive and significant treatment effects regarding transition from school to dual vocational training in the intermediate run. Our results also show that the program failed to improve the immediate transition into vocational training directly after finishing school. Furthermore our results point to the relevance of program intensity. In particular, we find that a high contact intensity between the pupils and their mentors lead to larger treatment effects. The same is true for a minimum number of specific measures realized within the program.

The remainder of the paper is structured as follows. In the following section, we discuss lessons and research results from existing studies. The third section describes the CEG, its implementation and its context in the German system of vocational training. Combined survey and administrative data are used to evaluate the program; these data sources and descriptive evidence are introduced in section 4. Methods and estimation results are discussed in sections 5 and 6. In section 7, estimated effects are differentiated according to program intensity, and section 8 concludes.

2. Previous empirical findings

Due to the different systems of vocational education, policy interventions to support young people in the school-to-work transition process differ considerably between countries. Nevertheless, some basic distinctions between types of programs can be made. First, some approaches such as mentoring provide individual support while others consist of classroom training and other group measures. Second, a distinction can be made according to the stage within the transition process: during school, during

transition, and after transition. Clearly, interventions may extend over more than one stage.

The effectiveness of programs directed at young people is surveyed e.g. by Kautz et al. (2014) and Kluve (2014). Regarding mentoring, the US program "big brothers—big sisters" was already founded in 1904; meanwhile, it has been introduced in many other countries (Grossman and Tierney 1998). More recently, the "School-to-Work" programs introduced with the 1994 "Federal School-to-Work Opportunities Act" provided mentoring in companies (Neumark and Joyce 2001). An example from Europe is the British program "Connexions", which was directed at 13 to 18-year-olds and was meant to reduce the proportion of early school leavers. A "personal advisor" allocated to participants counselled participants and built networks with other supporting actors. The program led to a significant increase in education participation of disadvantaged young people (Biggart 2005). A survey on the effectiveness of mentoring in recent programs is provided by Rodríguez-Planas (2014). She concludes that mentoring programs tend to be better at improving youth's noncognitive and social skills than their academic performance (Rodríguez-Planas 2014). This conclusion is mainly based on results for the Quantum Opportunity Program (QOP), which allowed for a long-term follow-up of participants (Rodríguez-Planas 2012).

Among school-based interventions other than mentoring, experience form programs to prevent school drop-out suggests that interventions should consists of multiple components (Dynarski et al. 2008). Evaluation results from comprehensive programs such as the Canadian "Pathways" program support this conclusion (Oreopoulos et al. 2009). Financial incentives are a particularly important and effective part of these programs (Dearden et al. 2009, Oreopoulos et al. 2009). Other school-based interventions are career guidance and career orientation programs. Saniter and Siedler (2014) examine the effectiveness of job information centers (JICs) in Germany for young people who are still attending school. According to their results, individuals who went to school in administrative districts with a JIC have higher educational attainments and a smoother transfer to the labor market than students who did not have access to these facilities.

During the school-to-work transition, active labor market programs are provided to improve access to vocational training and employment to school leavers. These can

be quite comprehensive and include components such as job-search assistance, counseling, training, and placement services. An example is the "Job Corps" program, which was introduced in the US in 1964 and since 1998 runs under the "Workforce Investment Act". This program succeeded in increasing the proportion of youths who obtained a General Educational Development (GED) certificate (equivalent to a high school diploma) and, in the longer run, increased participants' earnings significantly (Schochet et al. 2008). Similar programs from other countries have been examined. For instance, Kugler et al. (2015) study a Columbian programme of vocational training. They find a complementarity between vocational training and formal education: participants were more likely than non-participants to return to school after the programme.

After the transition into the vocational training system, policies are in place aimed at stabilizing vocational training and preventing drop-out. For Germany Mohrenweiser and Pfeiffer (2014) as well as Fries et al. (2013) find that coaching apprentices with a disadvantaged background or paying subsidies to companies for training apprentices does little to stabilize vocational training contracts.

Summarizing the available evidence, Kautz et al. (2014) conclude that there is "a much greater benefit from programs that target non-cognitive skills compared to the benefits of programs that mainly target cognition and academic learning." From that perspective, mentoring programs – especially where mentoring is provided by practitioners rather than teachers, such as in the German CEG analyzed here – seem to be a promising intervention. However, there is currently too little evidence of its effectiveness, in particular in the context of the German vocational training system. Arguably, program effectiveness depends much on the quality of implementation, so that experiences from other countries and program provide only little indication of the benefits of a particular intervention.

3. Description of the CEG and its implementation

The aim of the CEG is to integrate low-achieving school leavers in the lower secondary school track into vocational education as quickly as possible and without participation in public-sponsored training programs. Intermediate aims are the prevention of school drop-out and support in the process of making career and qualification choices. A

further objective is to stabilize vocational training once participants have been integrated into vocational training.[1]

Mentoring starts two years before the first school-leaving certificate can be obtained; depending on the federal state, this date is at the start of the 8th or 9th form. Participation regularly ends six months after the start of vocational education, but can be extended to 24 months after the school-work transition depending on individual needs. The fact that the CEG provides a bridge between different stages and different institutional systems in secondary and post-secondary education makes it unique among the wide range of programs and measures already existing in Germany.

The target group consists of low-achieving pupils in basic secondary education, in particular those who are most at risk of school drop-out. Early tracking of pupils in secondary education is common in the education systems of most German federal states. Therefore, the CEG is not implemented in all schools, but only in schools which provide basic lower secondary education. Participating schools must lead to the first formal school-leaving certificate ("Hauptschulabschluss"). Special schools for pupils with learning disabilities ("Sonderschulen") may also participate.

The CEG was piloted in 1,000 schools in Germany since February, 2009. These schools were selected by the Federal Employment Agency in cooperation with the school administration based on their needs for support. Precedence should be given to schools without similar programs; this criterion was, however, often not particularly useful since comparable programs already existed in many federal states (IAW et al. 2010: 28). From 2012, the CEG was continued on a different legal basis. Our evaluation concerns the early experimental stage of the CEG. In particular, we look at the first two cohorts of pupils entering either in February or March 2009 or after the summer break 2009. Thus, the first cohort received support over a shorter period of time.

From 1 February 2009 to 31 July 2013, 55,551 students at lower secondary school were supported by the CEG, of which 56.7% were male and 43.3% female (see Figure 1, based on administrative data for the participants from the Federal Employment

1 These objectives are laid down in former section 421s of Book III of the German Social Code and spelled out in more detail in a technical concept of the Federal Employment Agency (BA 2011). See also the first evaluation report for the project (IAW et al. 2011).

Agency). Most admissions took place in February 2009, when mentoring by the CEG started. The administrative data show some degree of premature program drop-out: the probability of having abandoned the CEG was 19.7% one year after entry (IAW et al. 2014: 69ff.). In most of these cases, mentors identified a lack of motivation of the participants as a reason for drop-out (IAW et al. 2010: 50).

Mentors are professional coaches (often with a degree in education) or experienced practitioners (IAW et al. 2010: 34). They are employed by service providers contracted by the Federal Employment agencies.

Participants are selected by caseworkers in the Vocational Guidance Service of the local Employment Agency in cooperation with class teachers. Individual needs are the basis for the selection decision. In a survey conducted among 290 mentors, we asked about the importance of particular criteria for selection. Table 1 shows that a lack of support by parents, low performance at school and a difficult family background were all identified as important criteria. In addition, deviant social behavior (such as truancy) was also regarded as highly important. Somewhat less importance was attributed to language problems, a migration background and non-participation in similar programs. Participation is voluntary in principle; in fact, the program requires active cooperation by the participants. Inevitably, this often leads to the exclusion of pupils most in need of support from the participant group (IAW 2010: 40ff.).

A full-time mentor counsels at most 20 youths. The service provider develops a concept for mentoring at a particular school. In practice, mentors often have substantial discretion regarding the type of support delivered in the program. Figure 2 shows that the most frequent specific measures received by participants concern the process of job orientation and placement into vocational training: support with application documents, preparation of job interviews, job search training and internships. Often, the mentor does not provide these services directly but guides participants to measures carried out in the context of other support programs.

In the evaluation, the implementation of the CEG could be closely observed using both quantitative and qualitative methods. In general, the CEG was valued quite positively by participants, teachers and schools (IAW et al. 2010: 84ff.). According to the mentors, the creation of a personal relationship and trust between the mentor and the mentee is the most important challenge in the process of mentoring. In this respect, the

lack of continuity in the personal relationship between the mentor and the young person was singled out as the most problematic implementation aspect by the evaluation. The lack of continuity had two main reasons. First, many mentors gave up employment at the service providers and moved to other (presumably better-paying) jobs. One year after the start of the CEG, one third of the mentors had already quitted their employment relationships (IAW et al. 2014: 93). Second, the conclusion of secondary school at the end of the 9th or 10th form marked a change in the implementation of the CEG. Before this date, the program was implemented in a school context, while afterwards new ways of maintaining contact and arranging meeting has to be found. This break in program implementation frequently coincided with a staff change (IAW et al. 2014: 93) which hampered the development of a personal relationship and trust.

Apart from personal continuity, a variety of other problems of implementation were identified by the evaluation, such as a lack of systematic approaches by service providers, conflicts between mentors and schools, local employment agencies or other network partners, a lack of acceptance by the target group and uncertainty about the further continuation of the CEG during the experimentation stage. These factors led to a large heterogeneity in the quality of the services provided and presumably to a large diversity in the effectiveness of the program, a challenge which had to be taken into account in the quantitative evaluation.

4. Data and descriptive evidence

The data used for analysis originate from a variety of sources. The central data source is a survey of participants and non-participants collected by repeated telephone interviews (CATI) of several 1,000s of participants and non-participants over a time period of four years.

Since the responses should be linked to results of another survey conducted with school headmasters, a cluster sample of based on participating and non-participating schools was used. Based on sampling criteria such as federal state and school type, a random draw of 74 out of 209 regional clusters (based on commuting regions from Eckey et al. 2007) was made. From these clusters, 148 schools (out of the 1,000 participating schools) were selected. Schools were approached first; when they agreed to participate in the headmaster survey, pupils from these schools were contacted in

writing to arrange for telephone interviews. In the first survey wave, 2,211 program participants from these schools were interviewed (with 76.3%, the response rate was exceptionally high; see IAW et al. 2014: 15). To safeguard a sufficient number of observations from the program start, the first cohort of participants (entry in early 2009) was slightly over-sampled.[2]

To obtain a control group of non-participants, we selected neighboring non-participating schools from the same 74 regional clusters in which the participants were located.[3] From these schools, 2,268 pupils were interviewed in the first panel wave, with a response rate of 41.6%.[4] It proved to be infeasible to conduct a pre-selection of non-participants to make the composition of the non-participating group similar to the target group of the CEG; thus, many potential control interviews were not exploited in the subsequent causal analysis.

A second, third and fourth wave of CATI interviews were conducted approximately 6, 18 and 30 months after the time when the young persons should have obtained their first school-leaving certificate (in the following, "time after scheduled completion of secondary school"). 11.4% of the participants and 6.4% of the non-participants had not reached a school-leaving certificate by this time (IAW et al. 2014: 274). The response rates in these follow-up interviews ranged between 76.4% and 81.3% of the respondents in the previous wave among the participants and 72.5% and

2 The fieldwork was conducted by SOKO Institute (Bielefeld). A selectivity analysis was performed on the basis of information contained in the administrative program data. It did not reveal systematic selectivity with respect to basic characteristics such as federal state, school type and gender. However, the response rate of younger participants was found to be higher than for older participants, presumably because the former can be more easily reached for telephone interviewing in their parents' homes. Weighting factors were constructed on the basis of the selectivity and panel attrition analysis; however, these are not used in the matching analysis presented below.

3 The choice of non-participants from the same regions was done to balance regional differences in labour market conditions and, in particular, in the chances for placement in the dual vocational education system. Originally, it was intended to limit comparison to participants and non-participants from the same region. This approach was, however, abandoned because the matching quality of these "regional matches" was relatively low.

4 More details of the sampling procedure are documented in IAW et al. (2010: 12ff.) and IAW et al. (2014: 10ff.).

83.8% for the non-participants. In the fourth panel wave, 1,093 participants and 1,104 non-participants could be interviewed. Interviews lasted on average 28 minutes in the first wave but were shorter in subsequent waves. They covered the stages in the transition process, histories and experiences at school, soft skills, personal problems, peer group characteristics and a range of other topics.

The data from the CATI interviews were linked to information from the Federal Employment Agency (BA) at the individual level. This data merger serves two purposes. First, additional information used in the matching procedure could be obtained. In particular, information could be used on whether the household received the so-called unemployment benefit II, a means-tested transfer for the long-term unemployed and other persons who are able to work. Second, the administrative data source could be used to track whether or not individuals enter the dual vocational training system. In this case, the employer providing the training has to insure the trainee in the federal pension insurance. These entries are then communicated to the Federal Employment Agency and were passed on to the evaluation. In order to use these data, German data confidentiality requirements obliged us to obtain the interviewees' permission to access their data. Since permission was obtained from 97.8% of all participants and 92.2% of all non-participants, there is little concern about sample selectivity at this stage.

Table 2 shows the number of interviews remaining when certain cases are excluded.[5] A first check is whether pupils are actually in the target group of the CEG as defined by the Social Code. Clearly, this is a problem mainly in case of the non-participants. Due to the differences in the school systems and the prevalence of mixed school types in many German federal states, a relatively large number of pupils were interviewed although they were pursuing a more advanced school-leaving certificate ("Realschulabschluss") right away. These observations were excluded (line 2). The sample is further reduced by the matching of administrative data and data from the school headmaster interviews.[6] After these adjustments, there remain 1,691

5 Of the non-participants, 252 cases had to be removed since they could not be allocated to cohort.

6 A number of headmasters did not participate although they had indicated their willingness to be interviewed before the pupils were sampled.

observations in the group of participants and 1,128 non-participants in the first survey wave.[7]

In the following, we provide a first overview of the evolution of the outcome variables. We consider four different outcome variables corresponding to different states in the transition from school to work:

- Vocational education in the dual apprenticeship system; this means that the trainee spends several days per week in the training company and the remaining time in a vocational training school. With some exceptions, vocational education in this track mostly lasts between 3 and 3.5 years. The data source for this outcome is administrative data from the Federal Employment Agency.
- Vocational education in any training scheme. Apart from the dual system, this includes vocational training taking place exclusively in training schools. The distinction between the dual and the school-based system follows the type of occupation. For instance, in health or nursery occupations vocational training only takes place in vocational training schools.
- Remaining in school, whether to achieve the first school-leaving certificate (in case of grade repeaters) or to study for a more advanced certificate after the first certificate.
- Participating in prevocational education and other publicly provided schemes. These schemes are offered by the employment agencies, federal states and other levels of government and are conducted by training providers. Some of the contents of these programs are work-related, other parts aim at fostering personal development. They are usually provided for youngsters who cannot find a place in the vocational training system. Since we do not observe the last

7 Figure A1 in the Appendix shows the further loss of observations during the observation period. In the survey data, panel attrition reduces the number of cases to about 800 participants and 600 non-participants in wave 4. By contrast, the administrative data is not affected by panel attrition so that information for all participants and non-participants is available for a period of 18 months after scheduled completion of secondary school. After 18 months, only data for the first cohort can be used due to the delays in making administrative data available.

three outcomes in administrative data, information is taken from waves 2-4 of the survey.

Other outcomes, such as moving directly to work or doing nothing (NEET – not in employment, education or training) are disregarded due to the low number of sample individuals found in these states, which in turn is explained by the legal requirement to continue education up to age 18 in Germany.

Figure 3 shows how the probability of these outcomes evolves over time, starting with the earliest date at which the survey participants could obtain their first school-leaving certificate. From the first panel, the probability of being in dual vocation education is about 20% for CEG participants and 17% for non-participants in the first year after the start date. This probability rises to close to 40% after 12 months in case of participants and 30% for non-participants. Due to drop-outs in the first year, the probability declines until a further rise 24 months after the first school-leaving certificate could be obtained. Only a minority of those who ever enter dual vocational training do so at the earliest moment possible.[8]

Similar differences can be observed with respect to all vocational training courses. Survey information shows that close to one third of participants participate in vocational training, while the proportion is only slightly more than a quarter among the non-participants. Interestingly, the gap between participants and non-participants does not close. This suggests that the two groups of young persons pursue, on average, different pathways in the educational system. This is confirmed in the third panel, which looks at the probability of remaining in school. Unsurprisingly, this probability drops from the first to the second and third years after (scheduled) completion of the first school-leaving-certificate, but there remains a gap of ten percentage points (or 100% in relative terms) between the two groups at the end of the observation period. This is explained by a much higher likelihood of transiting to more advanced educational

8 These numbers are similar to numbers for all school leavers with basic secondary education. Based on representative data of the Federal Institute for Vocational Education, Boockmann et al. (2014) show that 18% of school leavers have entered vocational education at age 16 (the most frequent age after form 9), which rises to 30% at age 17 and more than 50% at age 18. Thus, the transition to vocational education is typically indirect and not direct in the group of school leavers with basic school leaving certificate.

tracks, in particular to the highest school-leaving certificate ("Abitur"). Thus, the graph very likely reflects differences in the ability distribution between CEG participants and non-participants.

Finally, CEG participants are far more likely than non-participants to enter prevocational training schemes in the first year. As time passes, participants of these schemes transit to other states, in particular to vocational training. At the end of the observation period, there remain roughly 5% of participants and non-participants within these schemes. Together with the NEETs, these are the least successful school leavers; the equality between the groups suggests that the ability composition of participants and non-participants is similar at the bottom of the distribution.

5. Methods

Unlike the situation in other countries, an experimental evaluation with randomized assignment of pupils to the treatment and control groups was unfeasible in the German case. Therefore, propensity score matching was used as a non-experimental method to obtain a control group representing the non-treatment outcomes of the treated individuals.

To obtain a control group of non-participants via propensity score matching, there were two possible approaches. The first option was to use non-participants from program schools, the second possibility was to use non-participants from non-program schools. The choice between these options was made on the basis of where stronger selection effects are to be expected. In the former case, the main problem is the violation of the stable unit treatment value assumption (SUTVA). In the qualitative case studies it was repeatedly stated that the CEG also influenced the group of non-participants, e.g. by extending certain types of assistance to them or by relieving teachers and other actors offering support (see IAW et al. 2014: 30). Thus, we chose to sample control observations at non-program schools neighboring the program schools, as described in section 3. The disadvantage of this approach is that not only the selection of individuals into the CEG, but also the participation at the school level has to be taken into account in the estimation of the propensity score.

Regarding individual selection, the choice of independent variables should be motivated by the empirical participation criteria elicited in the mentor survey (see Table

1). Therefore, we had to find measures for parental support and family background in particular. Indeed, family background is singled out by many existing studies as the primary determinant of the individual pathway through the educational system in Germany (see, e.g., Boll/Hoffmann 2015, Dustmann 2004).[9] Thus, if the CEG is targeted at low-achievers, parental background is an important factor for entry into the program. We included detailed information on family structure, parental education, father's and mother's employment state and resources available at home (such as own room or computer and internet access). In addition, we let the interviewees assess the level of support that they received from parents, siblings, relatives and friends.

The second major determinant of participation according to Table 1 is performance at school. We elicited self-reported school marks in mathematics, English, German and physical education, grade repetition (both actual and perceived danger) and a subjective measure of how difficult it was to keep track with the school curriculum. These assessments relate to the period two years prior to the interview in order to avoid endogeneity of school performance to program participation.

Deviant social behavior is more difficult to elicit than school performance and family background. In the interviews, the youngsters were asked about the degree of problems with teachers and classmates they had two years before the survey. Furthermore, we asked about their agreement or disagreement with the statement that "two years ago, I did not care much about what was going on at school". In addition, we included a number of questions relating to the peer group (such as friends' plans after secondary school and classmates' chances of completing their school-leaving certificates) due to the importance of peer group effects for own behavior and performance found in the literature (see, e.g., Hanushek et al. 2003). In addition, socio-demographic controls such as gender, age and disabilities were included in the propensity score estimations.

At the school level, we included a number of variables from the headmaster interviews. In particular, we used the number of programs and measures regarding the

9 According to the OECD (2012: 17), Germany is among the countries where low parental education and low socio-economic status have the highest impact on under-achievement in the education system.

school to work transition available at the school, since the (non-)availability of similar programs was among the official criteria for school selection. In addition, further variables were included in the propensity score estimations which could have had an impact on school selection and also seemed likely to have an impact on school-leavers outcomes: average class size, the share of school drop-outs, the share of pupils with a foreign language as their first language, and the presence of particular problems such as violence, crime and mobbing.

We tested various specifications with different control variables to estimate the propensity score. While the coefficients of the individual-level variables were quite stable to different specifications, the choice of school-level variables proved to be more difficult. The appendix (Table A1) reports two specifications with a more or less extensive set of school-level variables. All of the school variables in the extensive set are statistically significant, which suggests that the extensive set is more appropriate. However, the impact of the left-out covariates seems to be absorbed to a certain degree by the school type variables in the more parsimonious specification. This may be the reason why the matching results did not differ much with the specification of the propensity score.

The propensity score was estimated using a probit model. Estimation results do not confirm the lack of parental support as an important determinant of entry into the CEG. In fact, participants were more likely to give a high valuation to the support received from parents and relatives than non-participants. Family background variables seem to matter relatively little for participation, with one exception: children from households receiving public benefits were significantly more likely to participate than others. By contrast, indicators for low achievement at school significantly increased the participation probability. This applies both to school marks and expected grade retention. A migration background increases the likelihood of participation, and some of the peer variables are also significant. Among the school variables, the number of other programs had a significantly negative impact in accordance with the official selection criteria.

Based on the propensity score, radius matching (with a caliper of 0.017) and kernel matching procedures were used. Radius matching resulted in larger standard errors, otherwise results were almost identical. In the following, results from radius

matching are reported. Furthermore, it appeared sensible to compare only individuals visiting the same school type (special schools, basic secondary schools and comprehensive schools) and from the same cohort (since outcomes may be cohort-specific). Other variants of exact matching on certain characteristics were tried. For instance, we matched only individuals from the same commuting regions in order to balance regional characteristics. However, balancing of other characteristics was relatively poor in this case. Therefore, we included a small number of regional characteristics (GDP per capita, youth unemployment, apprenticeship applicant-places ratio) into the propensity score.

The balancing quality of the individual-level variables is in general satisfactory. Yet there remain a number of school variables with statistically significant differences (see Table A3 in the Appendix). This is due to the fact that these variables do not vary by individuals but by groups of individuals. It highlights the need to examine the effects of including different school variables. Mainly due to the differences in school variables, the LR statistic from a re-estimation of the propensity score on the balanced samples remains relatively high (376.9 as compared to 1,075.7 in the raw data), and the median bias is still 5.1 (14.3 in the raw data). The Smith and Todd (2005) test is passed for 92 and fails for 12 covariates (see Table A4 in the Appendix).

Judged by the Pseudo-R^2 of 37%, the joint impact of the explanatory variables on the participation decision is high. This is also reflected in the distribution of the propensity scores. While there is common support over the whole distribution of the propensity score, the shape of the distribution differs much (see Figure A2 in the Appendix). This implies that the number of potential control persons actually used is much smaller than the overall number of participants. Yet there remain about 800 control observations that are actually used in matching for the initial periods after matching.

A final important issue is that one would like to exclude students participating in similar programs from the control group to obtain a counterfactual for non-participation. In the survey, non-participants were asked whether they received individual support from a mentor who was not their teacher or a parent. This led to the exclusion of only 31 potential control observations. Since the differences in results are negligible, we report results without this sample restriction in the following.

6. Estimated treatment effects

Results from propensity score matching are displayed graphically in figure 4. The first panel concerns the transition into dual vocational education. The treatment effect of almost eight percentage points three months after (potentially) obtaining the first school-leaving certificate is just significant at the five percent level, but is subsequently reduced in magnitude and loses its significance. This is presumably due to early drop-out from apprenticeship.[10]

From 12 months after the first month in which school can be left, the treatment effect is rising to a maximum of 13 percentage points. In relative terms, the magnitude of the effect is substantial: it is roughly a third of the probability of dual apprenticeship training for the participants. Again, the effect drops in magnitude and is no longer significant from 18 month. The latter change is mainly due to the widening of the confidence interval since many observations are lost after 18 months.

The second panel shows the effects on all kinds of vocational training, including training courses taking place exclusively in training schools. As opposed to the first panel, we need to use survey data to measure outcomes here. The treatment effect is much reduced here. This suggests that some of the positive effect visible from the first panel is due to a shifting from school-based vocational training to the dual vocational training system.[11]

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10 Indeed, further analysis of the effect of the CEG on drop-out from apprenticeship showed that it actually increased the hazard rate of drop-out, rather than reducing it as intended (IAW et al. 2014: 269ff.). We explained this by the impact of the CEG on occupational choices. From the qualitative case studies, as well as from the quantitative analysis of desired occupations, it appears that the CEG supports "cooling-out" processes which lead to the acceptance of more "realistic" career options. Starting apprenticeships in an occupation which is not the most desired occupation is one of the known risk factors of apprenticeship drop-out (see Boockmann et al. 2014: 95ff.). Elaborating on these mechanisms, however, is beyond the scope of the present paper.

11 When we constructed a measure of participation in dual vocational training from the survey data and used it in matching, we also found that the CEG had no significant treatment effects. However, we believe that the differences between survey data and administrative data are due to the fact that the interviewees have difficulties distinguishing the dual system from school-based training (since both have practical elements). Taking into account that administrative data generally provide more exact

Part c) of Figure 4 displays the estimated effects on further attending school. In the initial six months, the treatment effect is negative and (borderline) statistically significant at the five percent level. The treatment effect is zero after 12 months and oscillates around minus two percentage points thereafter without returning to statistically significance. The fact that, as opposed to the raw differences in Figure 3, there do not seem to be large permanent effects on further education is reassuring. Apparently, propensity score matching has removed the top performers from the sample of non-participants. Hence, there seems to be no bias from differences in ability unaccounted for by the estimator. A zero impact on schooling also conforms to the program objectives which consist in integrating youths into vocational training but not into formal education.

The last graph in Figure 4 shows the estimated impact on prevocational training schemes. Again, the status information is from survey data. Initially, the CEG seems to increase participation in these schemes; the effect is statistically significant up to month six after (scheduled) completion of secondary school. It remains at a magnitude of five percentage points until month 12, after which the effect vanishes completely.

The short-run effects on education and training schemes suggest that the CEG re-directs participants from formal education to public support schemes designed to integrate youths into vocational training. Effects on participation in dual vocational training substantially increase in the second year after (regular) completion of secondary education. An explanation could be that re-directing students from schools is successful for the long-run integration into vocational training. Prevocational training schemes have often been criticized as being a mere "waiting loop" and providing no improvements in human capital (see the discussion in Beicht 2009). Our results contribute a more positive perspective. They suggest that directly after school, one "waiting loop" (school) is replaced by another (public schemes), but that this has positive effects on vocational training participation one year later. At the same time, the results imply that the primary goal of the program, immediate transition of school leavers into the vocational system, was largely missed.

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information about employment states, we prefer using these data for dual vocational training. In addition, administrative data do not suffer from (potentially selective) panel attrition.

7. Accounting for program intensity

It was noted in section 3 that local implementation of the CEG differed widely in terms of quality of service provision and level of intensity. Apart from the continuity of the personal relationship, intensity of contact, and the degree to which networks could be used as a resource. There were substantial differences in participation in individual measures, such as school-related support, job orientation and personal coaching measures. Qualitative results from the evaluation point to the fact that these differences arise not only from the supply side of support measures; participants also varied in the way in which they cooperated in the program. Yet local implementation conditions are an important precondition for the cooperation between mentors and mentees. If treatment effects are estimated regardless of implementing conditions, this may miss an important source of variation in the data and blur the estimated effects.

In the following, we highlight two dimensions: contact intensity and the number of specific support measures received by the participant. The first concerns the frequency of meetings during mentoring and depends on implementation conditions such as logistics (e.g. whether office space is provided by the school) and the degree of commitment of the mentor. A distinction was made according to whether meetings between mentor and mentee took place at least weekly (526 cases) or less frequently (693 cases). In the second case, we distinguish according to whether at least two specific support measures of the measures listed in Figure 2 were received during school (870 versus 409 participants). This variable depends on the availability of and access to network support. Thus, both variables capture different but related dimensions.

We estimate treatment effects on the transition to dual vocational training separately according to these dimensions. Table A2 contains the coefficients from the propensity score estimation. The coefficients suggest that individuals with less favorable characteristics (with respect to school performance or family background) tend to be selected more often into the higher-intensity form of implementation. For instance, pupils who were afraid of grade retention two years before the survey were

significantly more likely to participate in the program with frequent meetings or at least two support measures, but the coefficients are not significant in the other cases.[12]

The upper part of Figure 5 shows treatment effects estimated separately according to contact intensity, based on information from the participant interviews. The results show somewhat higher treatment effects in case of more intensive contacts; these effects are mostly significant, while they are mostly insignificant in case of lower contact intensity.

From the lower part of the graph, the differences in the magnitude and significance of the treatment effects are even more pronounced if we distinguish according to receipt of specific measures. Treatment effects remain at the level of 12 to 13 percentage points for a substantial period of time in case of more intensive implementation while they are insignificant in the other case except for three months.

These differences suggest that differences in implementation had substantial impacts on the estimated treatment effects. From this point of view, strengthening implementation rather than a complete re-design of the CEG seems to be a sensible policy. An important caveat, however, is that contact intensity and the number of support measures both depend on the motivation and social skills of the mentee and may not be easy to influence.

8. Conclusions

This paper has been concerned with estimating the effects of the Career Entry Guidance (CEG), a German mentoring program that extends from the last years in secondary school to the first phase in vocational training. Together with the individualized personal approach, the program is a novelty in the rich set of policies designed to facilitate the school-work transition in Germany.

Our results provide some evidence that the CEG was effective in directing low-achieving school leavers into the German dual vocational training system in the intermediate run. In the short term, the CEG decreased the likelihood of staying at school and increased the likelihood of participation in public prevocational training schemes. There are little if any effects on the immediate transition from school into the

12 Balancing statistics are contained in the lower parts of Table A4.

vocational training system. Thus, against its intention, the CEG failed to accelerate transitions into vocational education.

Evidence for a positive effect on vocational training is much stronger if there is a high intensity of contact and a minimum number of specific measures taken in the context of the CEG. Therefore, strengthening implementation rather than a complete re-design of the program seems to be a sensible policy.

A related question concerns the behavioral changes induced by the CEG. Qualitative and quantitative results from the evaluation suggest that participants are influenced by the CEG in their occupational choices. Mentors may confront participants with the qualification requirements and low labor market prospects in their desired occupations and induce them to reconsider their plans. This may result in more "realistic" occupational choices. These behavioral impacts are, however, beyond the scope of the present paper.

A further interesting question would be about the long-run consequences of the program. Studies such as Rodriguéz-Planas (2012) suggest that short-run effects may differ from long-run effects. This seems to be plausible in our case, since there seems to be an impact of the CEG on occupational choices. Moreover, by providing individual support, the CEG may strengthen individuals' non-cognitive skills even more that it raises short-term integration into vocational training. Addressing these long-run effects of the program as well as assessing its social costs and benefits seems to be an important topic for future research.

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Table 1: Criteria for participation in the program

	Importance of the criterion				
	high	**medium**	**low**	**not at all**	
Lack of support by parents	66.1	17.2	7.4	4.9	100.0
Poor marks at school	65.5	18.3	7.8	5.8	100.0
Difficult family background	65.3	18.4	8.8	4.0	100.0
Behavioral problems	60.4	21.1	10.2	5.0	100.0
Language problems	42.7	22.7	17.0	14.1	100.0
Interest in the program	38.4	27.0	25.0	6.6	100.0
Migration background	37.6	21.4	15.1	21.9	100.0
Non-participation in similar programs	26.7	19.2	16.6	28.7	100.0

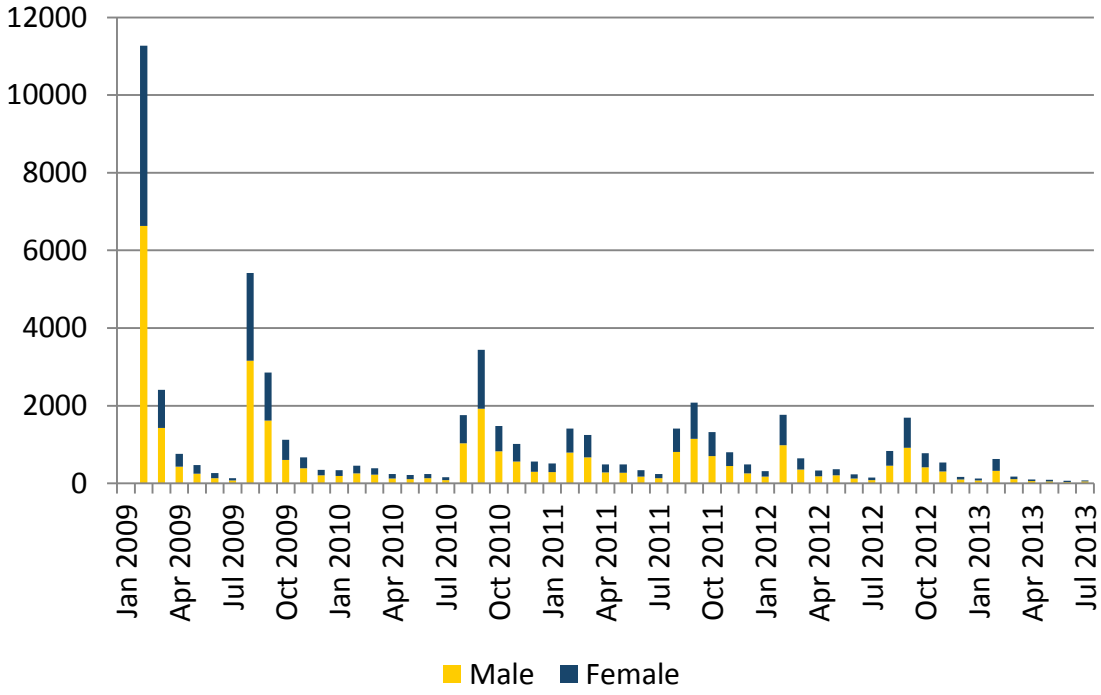
Notes: Entries are given as percentages. Rows may not sum to 100 due to rounding errors. Data source: survey of mentors (n = 290).

Table 2: Number of participants and non-participants in the sample

	Participants		Non-participants		Total
	Cohort 1	Cohort 2	Cohort 1	Cohort 2	
Number of persons interviewed	1,261	950	1,053	963	4,227
Within definition of the target group	1,255	938	965	560	3,718
With matched administrative data	1,211	914	845	519	3,489
With matched data from school survey	971	742	688	448	2,849
Used in matching	956	735	683	445	2,819

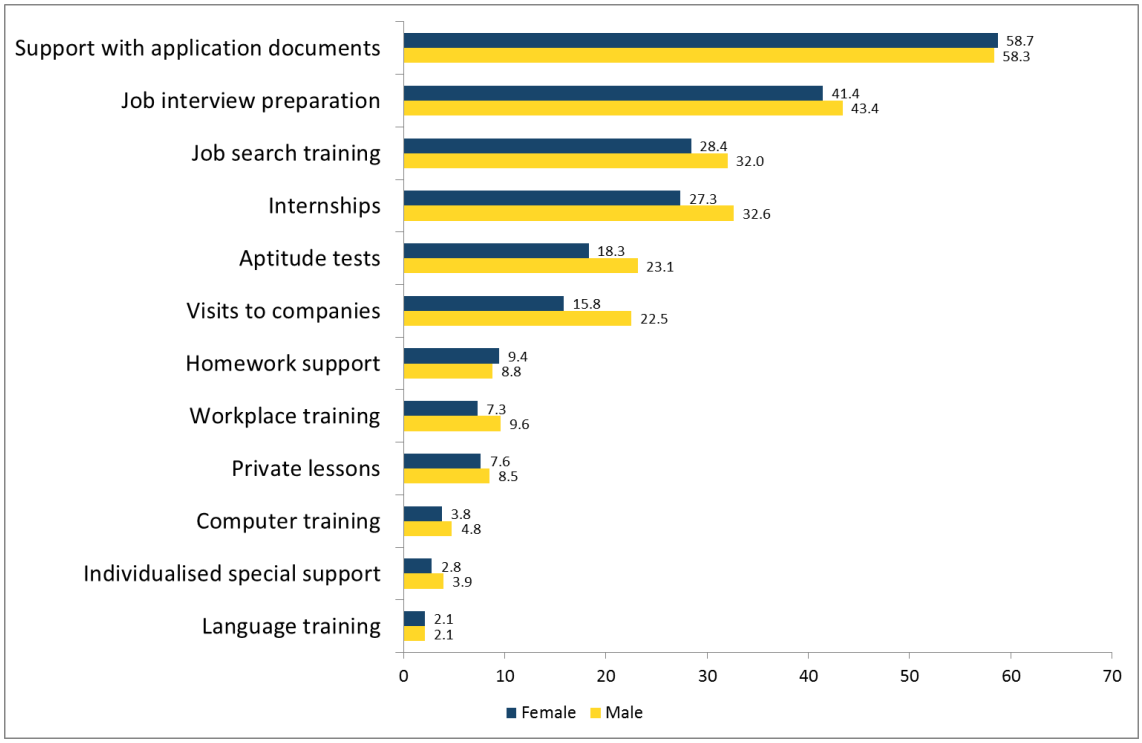
Data source: survey of participants and non-participants, administrative data.

Figure 1: Entry into the program by calendar month



Data source: administrative data.

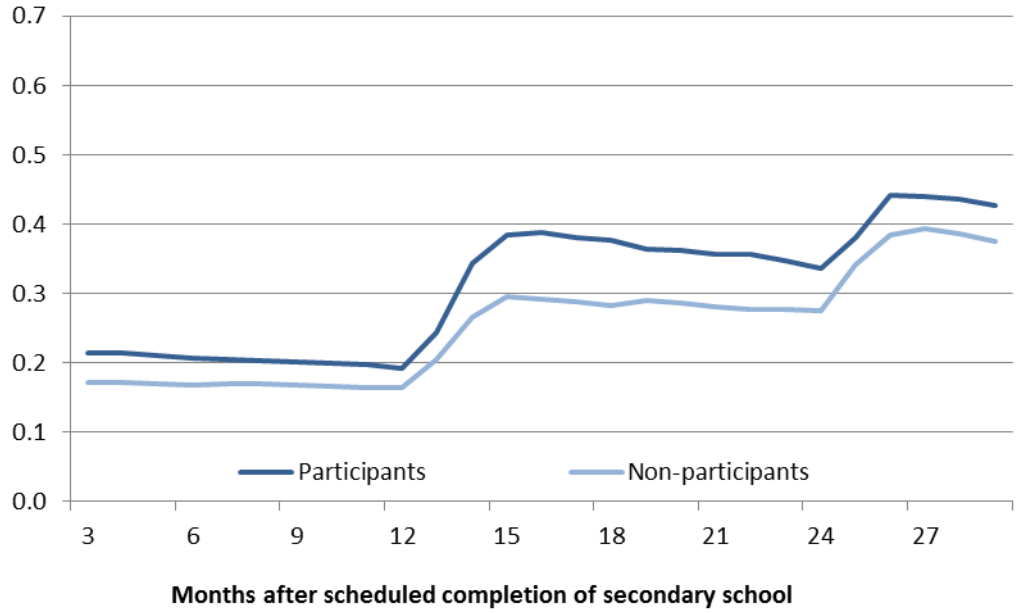
Figure 2: Specific measures provided in the first program year



Note: Numbers are shares of all participants (in percent). Data source: survey of participants (panel wave 1).

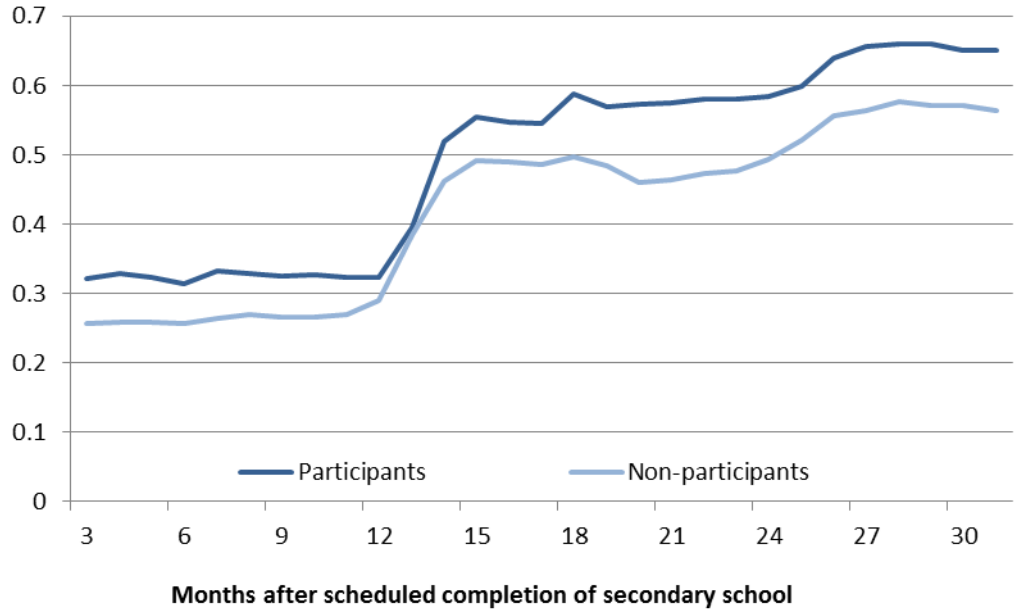
Figure 3: Participation in training, education and public programs

a) Apprenticeship training



Data source: administrative data.

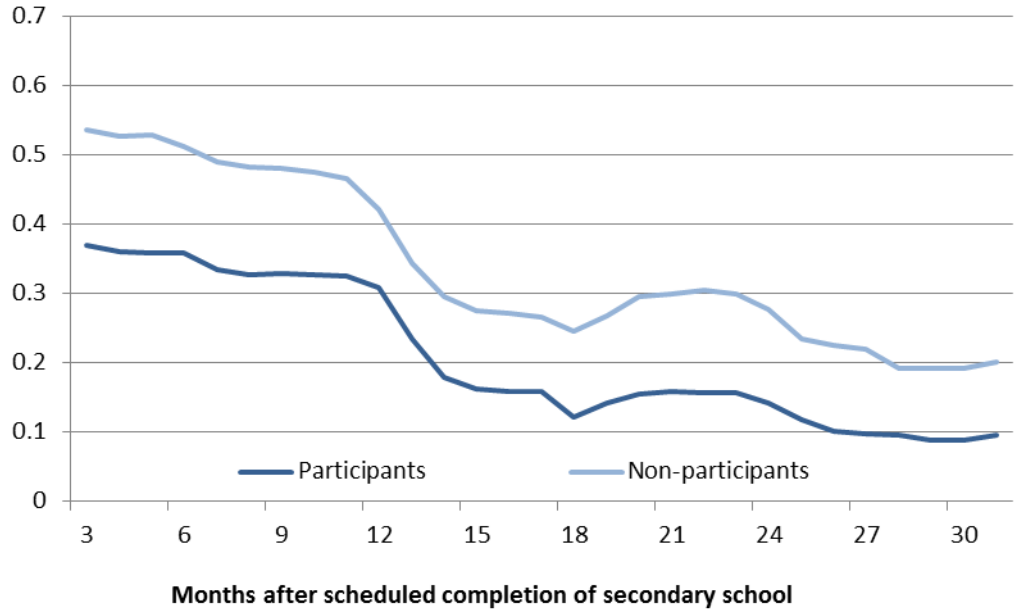
b) All types of vocational training



Data source: survey data.

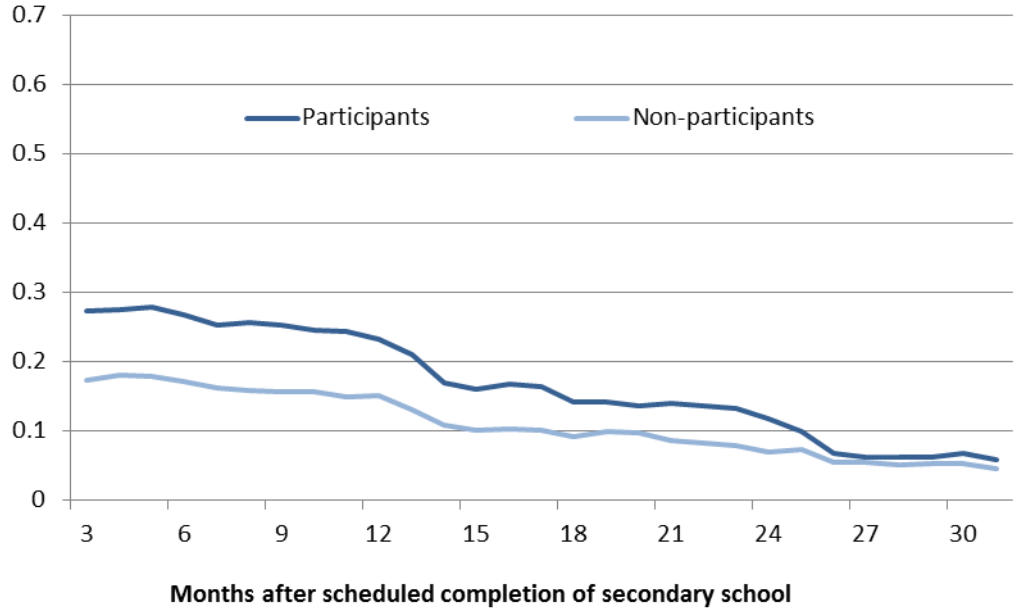
Figure 3 (continued)

c) Further schooling



Data source: survey data.

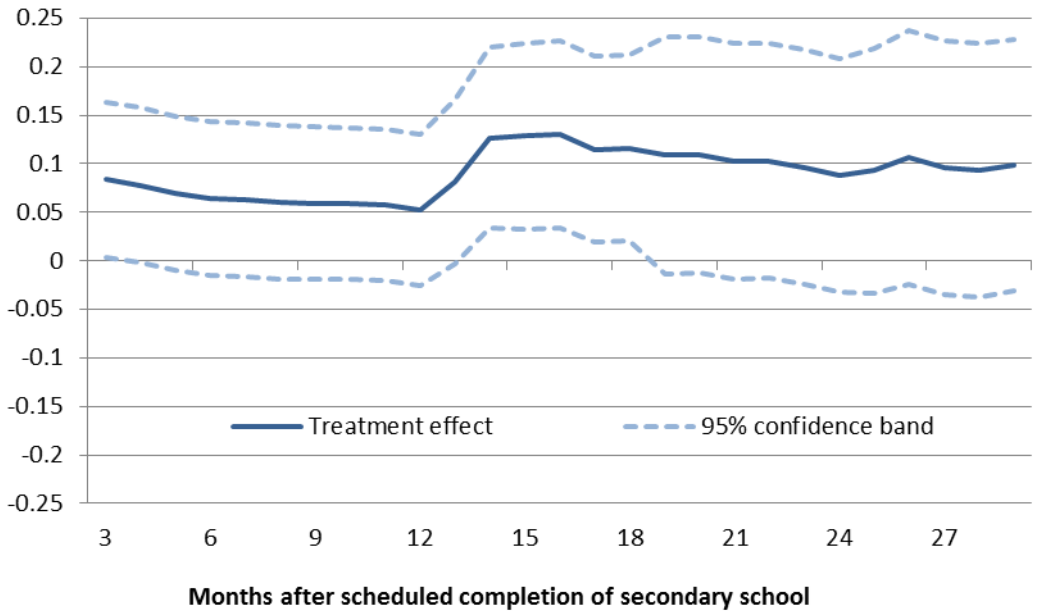
d) Prevocational education schemes



Data source: survey data.

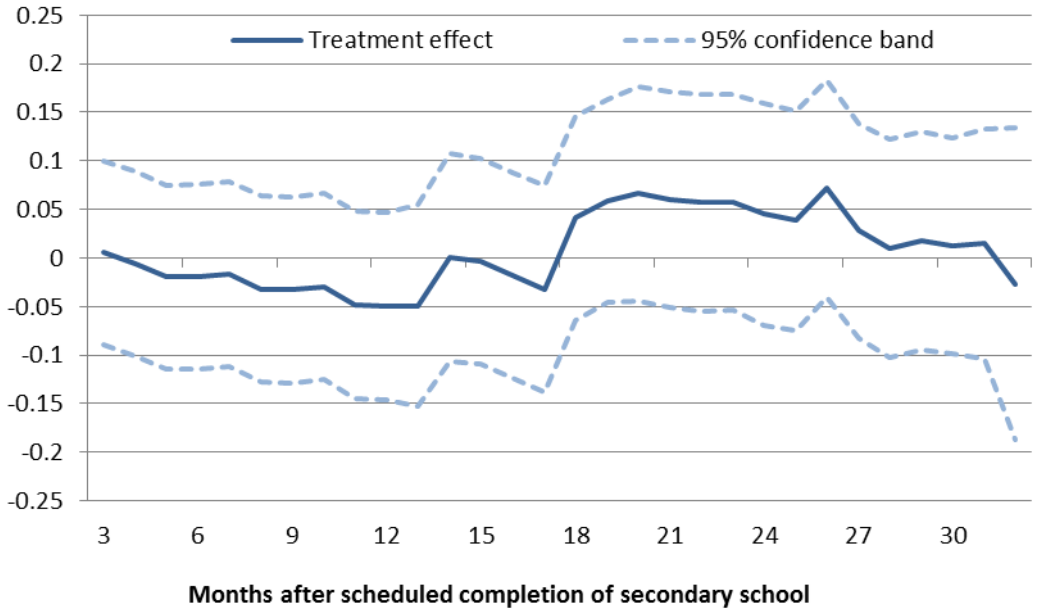
Figure 4: Estimated treatment effects of the program

a) Apprenticeship training



Data source: administrative data.

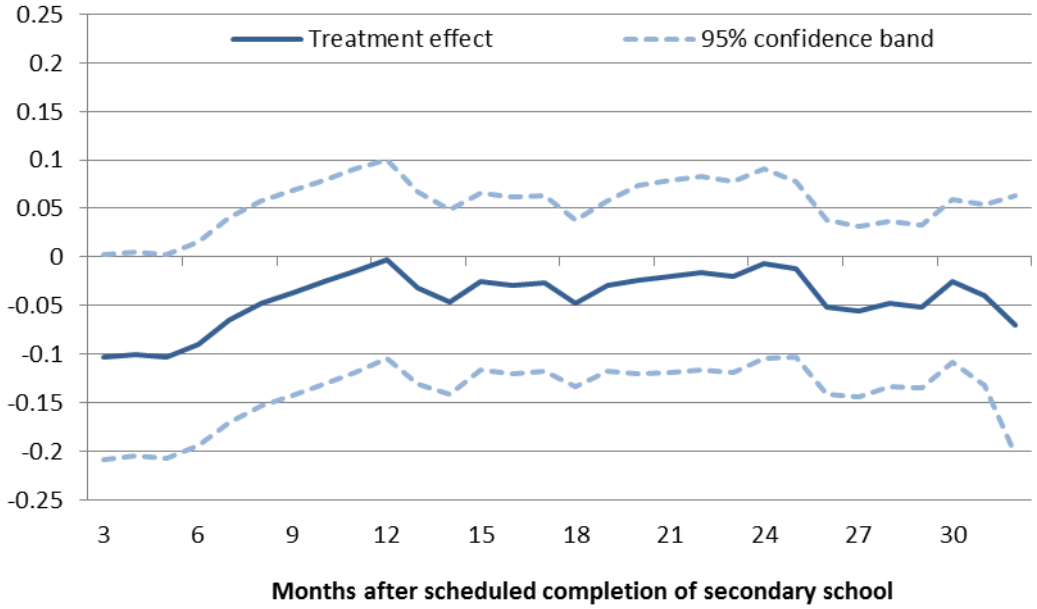
b) All types of vocational training



Data source: survey data.

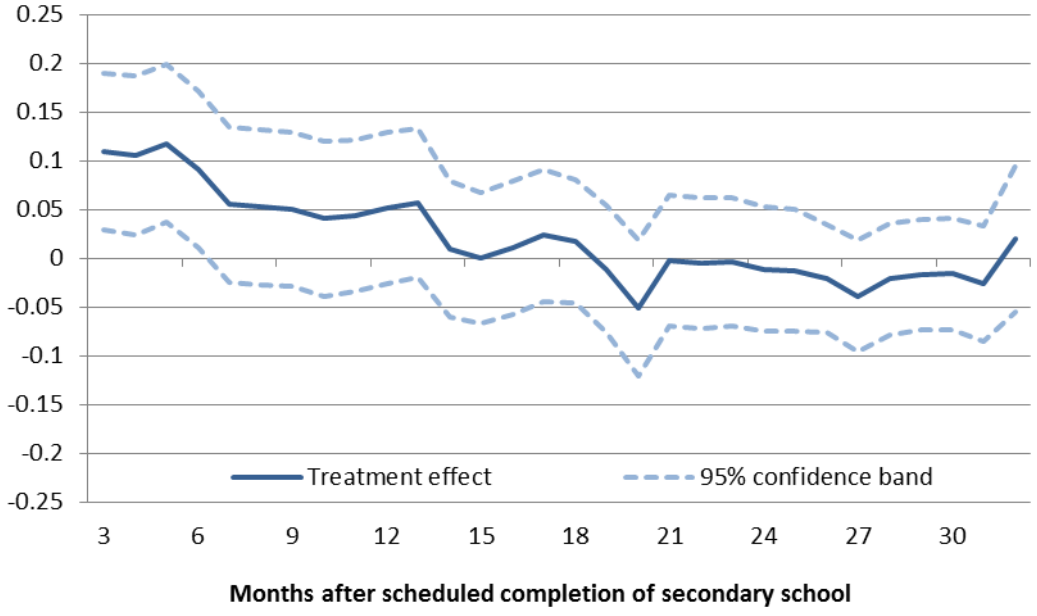
Figure 4 (continued)

c) Further schooling



Data source: survey data.

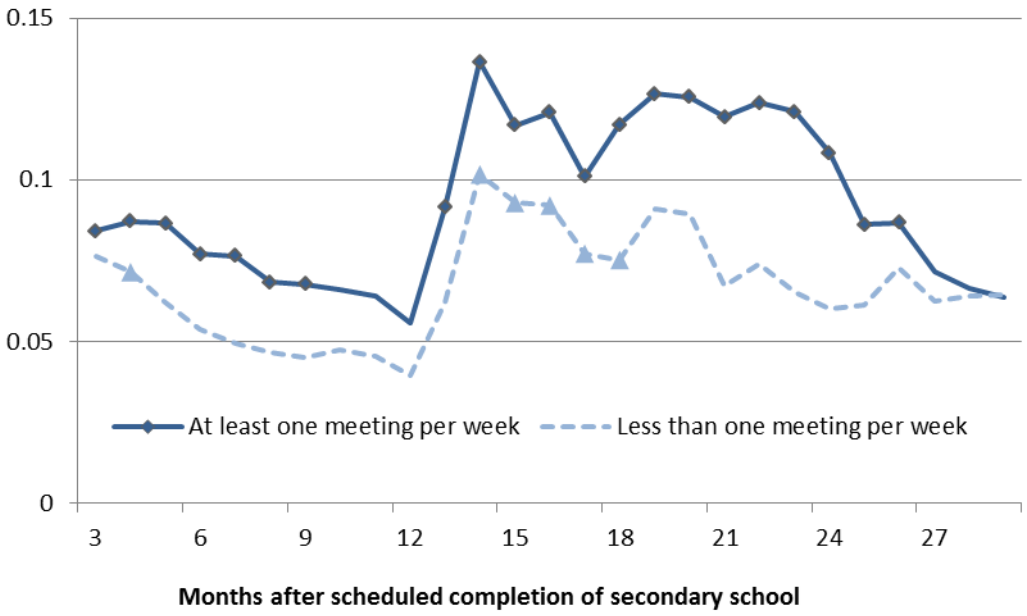
d) Prevocational education schemes



Data source: survey data.

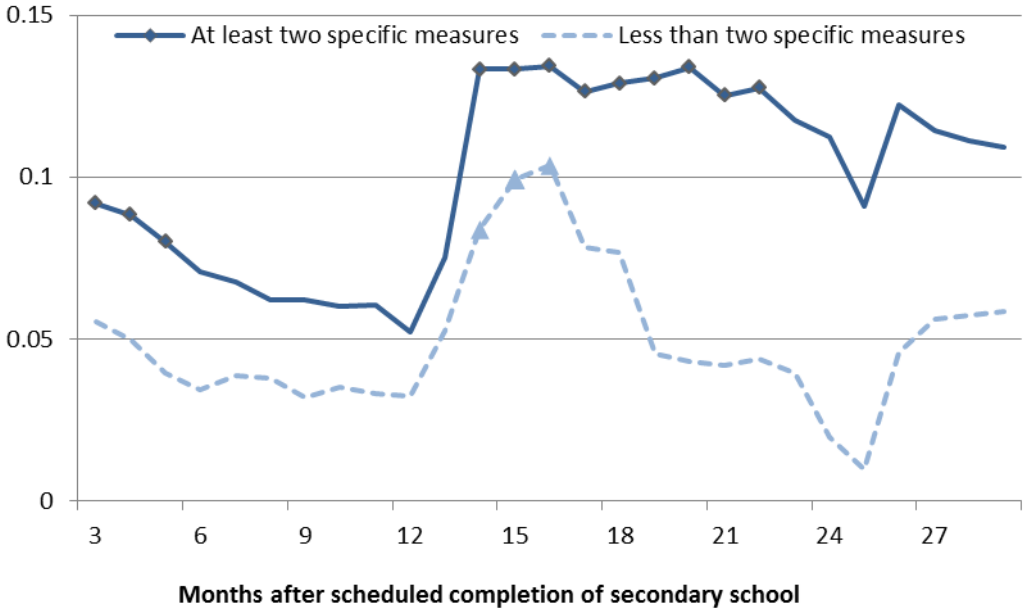
Figure 5: Estimated treatment effects by program intensity

a) By contact intensity



Data source: administrative data. Significant effects (at the 5 percent level) indicated by markers.

b) By number of specific measures



Data source: administrative data. Significant effects (at the 5 percent level) indicated by markers.

Appendix

Table A1: Estimation results for the propensity score (all participants)

Independent variables		Variable set 1	Variable set 2
Individual level variables			
Female	G	-0.12	-0.17*
Age	G	0.01*	0.01*
Migration background	F	0.23*	0.22*
Migration background: n/a	F	-0.28	-0.39
Household receives welfare benefits	C	0.43*	0.48*
Both parents in household	C	-0.28	-0.16
At least one parent unknown/deceased	C	0.18	0.09
Parents: n/a	C	0.37	0.07
Father employed	C	-0.19	-0.13
Father not in employment	C	-0.20	-0.15
Father's employment: n/a	C	-0.10	-0.04
Father's education: university	C	-0.20	-0.24
Father's education: none	C	0.13	0.09
Father's education: n/a	C	0.01	0.01
Mother employed	C	0.06	0.07
Mother not in employment	C	-0.06	0.08
Mother's employment: n/a	C	0.22	0.22
Mother's education: university	C	-0.25	-0.26
Mother's education: none	C	0.10	0.13
Mother's education: n/a	C	0.03	-0.01
Lives with mother	C	0.04	0.01
Lives with father	C	0.25	0.21
Lives with stepfather or stepmother	C	0.12	0.13
Lives with siblings	C	0.18*	0.13
Lives with other persons	C	-0.09	-0.06
Available: own desk for homework	C	0.41*	
Available: own room	C	-0.11	
Available: access to computer	C	0.19	
Available: access to internet	C	-0.09	
Friends' plans after secondary school: work	P	-0.01	0.04
Friends' plans after secondary school: further schooling	P	-0.10	-0.10
Friends' plans after secondary school: n/a	P	0.34*	0.33*
Pupil has been at the same school from 5th form	B	0.18*	
Grade repeater	B	-0.00	0.01
Marks in English: good	B	-0.01	-0.11
Marks in English: bad	B	0.61*	0.51*
Marks in English: fair	B	0.21	0.17
Marks in German: good	BE	-0.48*	-0.40*

Independent variables		Variable set 1	Variable set 2
Marks in German: bad	BE	-0.08	0.05
Marks in German: fair	BE	-0.22	-0.13
Most in class will obtain school-leaving certificate: yes	P	-0.18*	-0.17*
Most in class will obtain school-leaving certificate: no	P	0.06	
Most in class will obtain school-leaving certificate: n/a	P	0.06	
Afraid of grade retention 2 years before survey: yes	B	0.26*	0.23*
Afraid of grade retention 2 years before survey: no	B	0.12	0.05
Afraid of grade retention 2 years before survey n/a	B	-0.73	-0.63
Problems with keeping track 2 years before survey: yes	B	0.09	-0.09
Problems with keeping track 2 years before survey: no	B	-0.10	-0.04
Problems with keeping track 2 years before survey: n/a	B	1.12	-1.32*
Problems with teachers 2 years before survey: yes	D	0.05	
Problems with teachers 2 years before survey: no	D	-0.01	
Problems with teachers 2 years before survey: n/a	D	-1.36*	
Problems with classmates 2 years before survey: yes	D	-0.13	
Problems with classmates 2 years before survey: no	D	-0.04	
Problems with classmates 2 years before survey: n/a	D	-1.02*	
Indifference towards school 2 years before survey: yes	D	-0.09	-0.06
Indifference towards school 2 years before survey: no	D	-0.07	-0.08
Indifference towards school 2 years before survey: n/a	D	-1.15*	-1.29*
Physically disabled	G		-0.12
Support in case of problems at school: teachers	A		0.06
Support in case of problems at school: family	A		0.06
Support in case of problems at school: others	A		-0.10
Support in case of problems at school: none	A		0.18
No problems at school	A		0.24
Support in case of problems at school: n/a	A		0.91
Support at home: parents	A	0.20*	
Support at home: siblings	A	-0.01	
Support at home: relatives	A	0.55*	
Support at home: friends	A	-0.25	
School level variables			
Number of programs at school	S1	-0.16*	
Average class size (8th form)	S2	-0.09*	
Share of pupils with foreign language as their first language	S2	0.02*	
Share of school drop-outs	S2	-0.01*	
Pupil-teacher ratio: high	S2	0.27*	
Problems at school: violence	S2	-0.19*	-0.27*
Problems at school: crime	S2	-0.19*	-0.17*
Problems at school: mobbing	S2	-0.30*	-0.23*
Problems at school: health problems	S2	0.21*	0.16*
Comprehensive school		-0.23	-0.80*

Independent variables	Variable set 1	Variable set 2
Basic secondary school	-0.35	-0.71*
District level variables		
GDP p.c. in district (2009)	0.00	-0.02
Youth unemployment rate in district	-0.08*	
Apprenticeship applicants / places	0.25	0.48*
Constant	3.16*	1.26
Pseudo-R^2	0.37	0.28
Observations	2803	2813

Notes: Independent variables belong to the following groups: A–lack of support by parents, B–poor marks at school, C–difficult family background, D–behavioral problems, E–language problems, F–migration background, G–socio-demographics, P–peer group, S1–schools without existing programs, S2–schools with specific problems. * means significance at the 5 percent level.

Table A2: Estimation results for the propensity score (according to intensity)

Independent variables	Contact intensity		Measures	
	high	low	2+	<2
Individual level variables				
Female	-0.17 *	-0.08	-0.18 *	0.00
Age	0.01 *	0.01	0.01 *	0.01
Migration background	0.40 *	0.11	0.24 *	0.22 *
Migration background: n/a	-0.01	-0.59	-0.27	-0.25
Household receives welfare benefits	0.47 *	0.41 *	0.38 *	0.53 *
Both parents in household	-0.33	-0.18	-0.24	-0.35
At least one parent unknown/deceased	0.19	0.16	0.14	0.31
Parents: n/a	0.65	-0.27	0.59	0.41
Father employed	-0.23	-0.22	-0.32 *	-0.09
Father not in employment	-0.04	-0.32	-0.34	0.01
Father's employment: n/a	-0.22	-0.08	-0.14	-0.10
Father's education: university	-0.07	-0.37	-0.14	-0.37
Father's education: none	0.01	0.17	0.14	-0.03
Father's education: n/a	0.00	0.01	0.05	-0.06
Mother employed	0.17	-0.03	0.15	-0.03
Mother not in employment	-0.03	-0.12	0.11	-0.34
Mother's employment: n/a	0.31	0.15	0.28	0.22
Mother's education: university	-0.28	-0.22	-0.27	-0.27
Mother's education: none	0.23 *	0.00	0.10	0.11
Mother's education: n/a	0.02	-0.02	-0.04	0.10
Lives with mother	0.11	-0.05	0.02	0.12
Lives with father	0.37	0.15	0.25	0.33
Lives with stepfather or stepmother	0.19	0.15	0.11	0.21
Lives with siblings	0.15	0.24 *	0.14	0.24 *
Lives with other persons	-0.15	-0.07	-0.11	-0.12
Available: own desk for homework	0.42 *	0.41 *	0.43 *	0.45 *
Available: own room	-0.09	-0.11	-0.06	-0.16
Available: access to computer	0.36	0.06	0.18	0.24
Available: access to internet	-0.23	0.07	-0.04	-0.12
Friends' plans after secondary school: work	0.09	-0.06	-0.04	-0.01
Friends' plans after secondary school: further schooling	-0.04	-0.10	-0.04	-0.15
Friends' plans after secondary school: n/a	0.33 *	0.40 *	0.36 *	0.33 *
Pupil has been at the same school from 5th form	0.21 *	0.15	0.15	0.27 *
Grade repeater	-0.05	0.04	-0.02	0.02

Independent variables	Contact intensity		Measures	
	high	low	2+	<2
Marks in English: good	0.20	-0.10	-0.13	0.20
Marks in English: bad	0.93 *	0.45 *	0.51 *	0.78 *
Marks in English: fair	0.46 *	0.09	0.16	0.30
Marks in German: good	-0.61 *	-0.44	-0.19	-0.89 *
Marks in German: bad	-0.07	-0.18	0.23	-0.58
Marks in German: fair	-0.42	-0.14	0.05	-0.61 *
Most in class will obtain school-leaving certificate: yes	-0.10	-0.19 *	-0.15	-0.15
Most in class will obtain school-leaving certificate: no	0.22	-0.03	0.11	0.05
Most in class will obtain school-leaving certificate: n/a	0.41	-0.31	-0.12	0.28
Afraid of grade retention 2 years before survey: yes	0.31 *	0.19	0.28 *	0.17
Afraid of grade retention 2 years before survey: no	0.22 *	0.04	0.16	0.08
Afraid of grade retention 2 years before survey n/a	-0.65	-0.96	-0.90	-1.09
Problems with keeping track 2 years before survey: yes	0.17	-0.01	0.22 *	-0.10
Problems with keeping track 2 years before survey: no	-0.18	-0.05	-0.03	-0.30 *
Problems with keeping track 2 years before survey: n/a	1.06	1.14	0.63	1.41
Problems with teachers 2 years before survey: yes	0.01	0.10	-0.06	0.19
Problems with teachers 2 years before survey: no	0.07	-0.11	-0.06	0.04
Problems with teachers 2 years before survey: n/a	-1.27	-1.41 *	0.00 *	-1.43 *
Problems with classmates 2 years before survey: yes	-0.14	-0.14	-0.10	-0.15
Problems with classmates 2 years before survey: n/a	-1.15	-1.00	0.00 *	-0.69
Indifference towards school 2 years before survey: yes	-0.03	-0.14	-0.04	-0.14
Indifference towards school 2 years before survey: no	-0.08	-0.07	-0.05	-0.10
Indifference towards school 2 years before survey: n/a	-1.71 *	-0.77	-1.49 *	-0.93
Support at home: parents	0.19 *	0.22 *	0.21 *	0.17
Support at home: siblings	-0.02	-0.04	-0.01	-0.02
Support at home: relatives	0.51 *	0.63 *	0.68 *	0.36
Support at home: friends	0.00 *	0.08	-0.19	-0.32
School level variables				
Number of programs at school	-0.17 *	-0.14 *	-0.16 *	-0.13 *
Average class size (8th form)	-0.10 *	-0.09 *	-0.09 *	-0.11 *
Share of pupils with foreign language as their first language	0.02 *	0.02 *	0.01 *	0.02 *
Share of school drop-outs	-0.01 *	-0.01 *	0.00	-0.01 *
Pupil-teacher ratio: high	0.28 *	0.20	0.32 *	0.02
Problems at school: violence	-0.22 *	-0.18 *	-0.21 *	-0.19 *
Problems at school: crime	-0.20 *	-0.20 *	-0.19 *	-0.20 *
Problems at school: mobbing	-0.31 *	-0.28 *	-0.33 *	-0.20 *

Independent variables	Contact intensity		Measures	
	high	low	2+	<2
Problems at school: health problems	0.27 *	0.16 *	0.20 *	0.20 *
Comprehensive school	-0.07	-0.21	0.01	-0.35
Basic secondary school	-0.26	-0.28	-0.15	-0.36
District level variables				
GDP p.c. in district (2009)	0.00	0.00	0.00	0.00
Youth unemployment rate in district	-0.09 *	-0.08 *	-0.09 *	-0.08 *
Apprenticeship applicants / places	0.25	0.29	0.19	0.35 *
Constant	1.99	3.42 *	2.27 *	2.94 *
Pseudo-R^2	0.40	0.36	0.37	0.39
Observations	1,894	2,007	2,198	1,700

Note: * means significance at the 5 percent level.

Table A3: Balancing tests: individual variables (all participants)

Variable	Sample	Treated	Controls	t-Stat.	P-value
Female	Unmatched	0.41	0.49	-3.81	0.00
	Matched	0.41	0.43	-0.75	0.45
Age	Unmatched	198.47	197.41	2.30	0.02
	Matched	198.53	196.77	4.22	0.00
Migration background	Unmatched	0.42	0.31	5.52	0.00
	Matched	0.42	0.45	-1.23	0.22
Migration background: n/a	Unmatched	0.01	0.01	-1.29	0.20
	Matched	0.01	0.01	1.01	0.31
Household receives welfare benefits	Unmatched	0.33	0.21	5.94	0.00
	Matched	0.32	0.30	0.86	0.39
Both parents in household	Unmatched	0.63	0.64	-0.62	0.54
	Matched	0.63	0.64	-0.65	0.52
At least one parent unknown/deceased	Unmatched	0.04	0.04	0.72	0.47
	Matched	0.04	0.05	-0.59	0.56
Parents: n/a	Unmatched	0.00	0.00	0.81	0.42
	Matched	0.00	0.00	1.00	0.32
Parents: separated	Unmatched	0.33	0.32	0.29	0.77
	Matched	0.33	0.31	0.89	0.38
Father employed	Unmatched	0.67	0.74	-3.67	0.00
	Matched	0.68	0.74	-3.12	0.00
Father not in employment	Unmatched	0.06	0.05	0.30	0.77
	Matched	0.06	0.04	2.37	0.02
Father's employment: n/a	Unmatched	0.13	0.11	1.81	0.07
	Matched	0.13	0.14	-0.56	0.57
Father unemployed	Unmatched	0.14	0.10	3.09	0.00
	Matched	0.14	0.09	3.53	0.00
Father's education: university	Unmatched	0.02	0.05	-3.83	0.00
	Matched	0.02	0.02	1.30	0.20
Father's education: none	Unmatched	0.15	0.10	3.91	0.00
	Matched	0.15	0.18	-2.02	0.04
Father's education: n/a	Unmatched	0.39	0.34	2.46	0.01
	Matched	0.39	0.39	-0.18	0.86
Father's education: vocational training	Unmatched	0.44	0.51	-3.59	0.00
	Matched	0.44	0.41	1.33	0.18
Mother employed	Unmatched	0.55	0.64	-3.85	0.00
	Matched	0.55	0.58	-1.34	0.18
Mother not in employment	Unmatched	0.03	0.04	-1.09	0.28
	Matched	0.03	0.02	1.35	0.18
Mother's employment: n/a	Unmatched	0.33	0.25	4.03	0.00
	Matched	0.33	0.33	0.05	0.96
Mother unemployed	Unmatched	0.08	0.07	0.91	0.37

Variable	Sample	Treated	Controls	t-Stat.	P-value
	Matched	0.08	0.07	1.58	0.11
Mother‘s education: university	Unmatched	0.02	0.05	-3.95	0.00
	Matched	0.02	0.02	0.22	0.82
Mother‘s education: none	Unmatched	0.28	0.19	4.84	0.00
	Matched	0.28	0.24	2.12	0.03
Mother‘s education: n/a	Unmatched	0.27	0.24	1.52	0.13
	Matched	0.27	0.30	-1.15	0.25
Father’s education: vocational training	Unmatched	0.43	0.51	-4.14	0.00
	Matched	0.43	0.45	-0.89	0.37
Lives with mother	Unmatched	0.93	0.93	0.17	0.87
	Matched	0.93	0.93	-0.03	0.97
Lives with father	Unmatched	0.68	0.68	-0.30	0.76
	Matched	0.68	0.69	-0.65	0.51
Lives with stepfather or stepmother	Unmatched	0.12	0.11	0.53	0.60
	Matched	0.12	0.08	3.53	0.00
Lives with siblings	Unmatched	0.80	0.75	2.87	0.00
	Matched	0.81	0.81	0.00	1.00
Lives with other persons	Unmatched	0.09	0.11	-1.31	0.19
	Matched	0.10	0.09	0.82	0.41
Available: own desk for homework	Unmatched	0.94	0.92	1.48	0.14
	Matched	0.93	0.93	0.64	0.52
Available: own room	Unmatched	0.79	0.84	-2.61	0.01
	Matched	0.79	0.80	-0.58	0.56
Available: access to computer	Unmatched	0.95	0.95	0.35	0.72
	Matched	0.95	0.96	-0.85	0.40
Available: access to internet	Unmatched	0.92	0.93	-0.78	0.43
	Matched	0.92	0.92	0.05	0.96
Friends‘ plans after secondary school: work	Unmatched	0.10	0.09	0.61	0.55
	Matched	0.10	0.07	2.38	0.02
Friends‘ plans after secondary school: further schooling	Unmatched	0.32	0.42	-4.86	0.00
	Matched	0.32	0.27	2.88	0.00
Friends‘ plans after secondary school: n/a	Unmatched	0.14	0.08	4.65	0.00
	Matched	0.14	0.17	-2.07	0.04
Friends‘ plans after secondary school: vocational training	Unmatched	0.44	0.42	1.30	0.19
	Matched	0.44	0.49	-2.47	0.01
Pupil has been at the same school from 5th form	Unmatched	0.72	0.73	-0.84	0.40
	Matched	0.71	0.73	-0.81	0.42
Grade repeater	Unmatched	0.47	0.37	3.99	0.00
	Matched	0.47	0.53	-2.42	0.02
Marks in English: good	Unmatched	0.13	0.23	-5.97	0.00

Variable	Sample	Treated	Controls	t-Stat.	P-value
	Matched	0.13	0.16	-1.48	0.14
Marks in English: bad	Unmatched	0.11	0.05	4.83	0.00
	Matched	0.10	0.10	0.27	0.79
Marks in English: fair	Unmatched	0.65	0.65	-0.01	0.99
	Matched	0.67	0.65	0.73	0.47
Marks in German: good	Unmatched	0.16	0.28	-7.20	0.00
	Matched	0.15	0.14	0.56	0.58
Marks in German: good	Unmatched	0.05	0.02	3.44	0.00
	Matched	0.05	0.05	-0.53	0.60
Marks in German: fair	Unmatched	0.76	0.67	4.74	0.00
	Matched	0.77	0.78	-0.56	0.58
Most in class will obtain school-leaving certificate: yes	Unmatched	0.60	0.69	-4.07	0.00
	Matched	0.61	0.55	2.79	0.01
Most in class will obtain school-leaving certificate: no	Unmatched	0.08	0.05	2.70	0.01
	Matched	0.08	0.06	1.75	0.08
Most in class will obtain school-leaving certificate: n/a	Unmatched	0.01	0.01	0.46	0.64
	Matched	0.01	0.01	-0.05	0.96
Most in class will obtain school-leaving certificate: indifferent	Unmatched	0.31	0.25	2.73	0.01
	Matched	0.30	0.37	-3.84	0.00
Afraid of grade retention 2 years before survey: yes	Unmatched	0.25	0.17	4.08	0.00
	Matched	0.25	0.25	-0.21	0.83
Afraid of grade retention 2 years before survey: no	Unmatched	0.52	0.61	-4.13	0.00
	Matched	0.52	0.58	-2.99	0.00
Afraid of grade retention 2 years before survey: n/a	Unmatched	0.00	0.02	-4.20	0.00
	Matched	0.00	0.01	-1.24	0.21
Afraid of grade retention 2 years before survey: indifferent	Unmatched	0.23	0.20	1.84	0.07
	Matched	0.23	0.17	4.17	0.00
Problems with keeping track 2 years before survey: yes	Unmatched	0.19	0.12	4.77	0.00
	Matched	0.18	0.18	0.01	1.00
Problems with keeping track 2 years before survey: no	Unmatched	0.41	0.52	-5.30	0.00
	Matched	0.41	0.43	-1.02	0.31
Problems with keeping track 2 years before survey: n/a	Unmatched	0.00	0.01	-2.64	0.01
	Matched	0.00	0.00	-0.30	0.76
Problems with keeping track 2 years before survey: indifferent	Unmatched	0.40	0.35	2.25	0.02
	Matched	0.40	0.38	1.07	0.29
Problems with teachers 2 years before survey: yes	Unmatched	0.21	0.16	3.02	0.00

Variable	Sample	Treated	Controls	t-Stat.	P-value
	Matched	0.21	0.21	-0.05	0.96
Problems with teachers 2 years before survey: no	Unmatched	0.49	0.54	-2.49	0.01
	Matched	0.49	0.49	-0.21	0.83
Problems with teachers 2 years before survey: n/a	Unmatched	0.00	0.02	-4.97	0.00
	Matched	0.00	0.00	-1.75	0.08
Problems with teachers 2 years before survey: indifferent	Unmatched	0.30	0.28	1.10	0.27
	Matched	0.30	0.29	0.47	0.64
Problems with classmates 2 years before survey: yes	Unmatched	0.17	0.13	2.08	0.04
	Matched	0.17	0.15	1.07	0.29
Problems with classmates 2 years before survey: no	Unmatched	0.54	0.59	-2.64	0.01
	Matched	0.54	0.57	-1.93	0.05
Problems with classmates 2 years before survey: n/a	Unmatched	0.00	0.02	-4.32	0.00
	Matched	0.00	0.00	-1.36	0.17
Problems with classmates 2 years before survey: indifferent	Unmatched	0.29	0.25	2.10	0.04
	Matched	0.29	0.27	1.42	0.16
Indifference towards school 2 years before survey: yes	Unmatched	0.13	0.10	2.02	0.04
	Matched	0.13	0.17	-2.95	0.00
Indifference towards school 2 years before survey: no	Unmatched	0.59	0.67	-3.65	0.00
	Matched	0.59	0.60	-0.27	0.79
Indifference towards school 2 years before survey: n/a	Unmatched	0.00	0.03	-5.58	0.00
	Matched	0.00	0.00	-1.20	0.23
Indifference towards school 2 years before survey: indifferent	Unmatched	0.28	0.20	3.95	0.00
	Matched	0.28	0.23	2.90	0.00
Support at home: parents	Unmatched	0.63	0.64	-0.42	0.67
	Matched	0.63	0.65	-0.65	0.52
Support at home: siblings	Unmatched	0.27	0.25	0.90	0.37
	Matched	0.27	0.25	0.88	0.38
Support at home: relatives	Unmatched	0.05	0.02	3.22	0.00
	Matched	0.04	0.03	2.20	0.03
Support at home: friends	Unmatched	0.00	0.01	-2.79	0.01
	Matched	0.00	0.00	0.26	0.80
Number of programs at school	Unmatched	6.88	8.05	-14.82	0.00
	Matched	6.93	6.42	6.30	0.00
Average class size (8th form)	Unmatched	20.67	23.94	-14.82	0.00
	Matched	21.01	21.19	-0.88	0.38
Share of pupils with foreign language as their first language	Unmatched	34.12	25.28	8.20	0.00

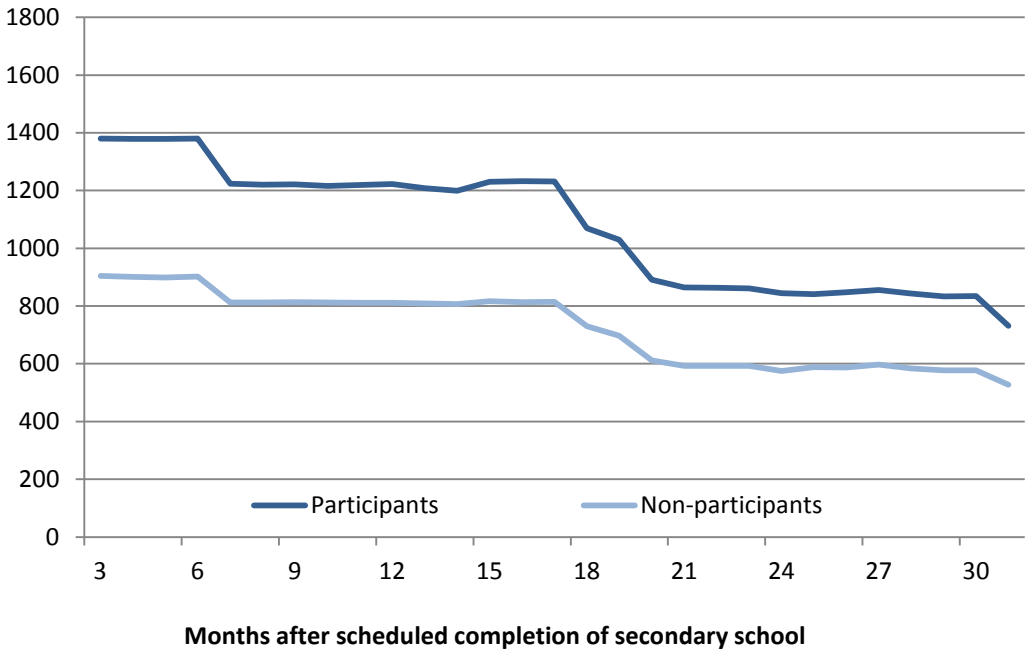
Variable	Sample	Treated	Controls	t-Stat.	P-value
	Matched	33.40	28.71	4.58	0.00
Share of school drop-outs	Unmatched	14.60	9.10	5.01	0.00
	Matched	12.99	14.04	-0.94	0.35
Pupil-teacher ratio: high	Unmatched	0.17	0.18	-0.75	0.45
	Matched	0.18	0.13	3.39	0.00
Problems at school: violence	Unmatched	4.15	4.72	-14.06	0.00
	Matched	4.21	4.10	2.42	0.02
Problems at school: crime	Unmatched	4.60	5.02	-12.00	0.00
	Matched	4.63	4.61	0.56	0.57
Problems at school: mobbing	Unmatched	3.79	4.25	-11.64	0.00
	Matched	3.82	3.79	0.86	0.39
Problems at school: health problems	Unmatched	4.19	4.20	-0.31	0.76
	Matched	4.20	4.13	1.58	0.11
GDP p.c. in district (2009)	Unmatched	30933.00	28342.00	4.82	0.00
	Matched	30896.00	28454.00	4.85	0.00
Youth unemployment rate in district	Unmatched	4.46	4.88	-3.68	0.00
	Matched	4.47	4.10	3.24	0.00
Apprenticeship applicants / places	Unmatched	0.82	0.75	4.94	0.00
	Matched	0.82	0.86	-2.77	0.01

Table A4: Balancing tests: summary

Sample	Pseudo-R^2	LR-statistic	p-value	Mean bias	Median bias
All participants					
Raw	0.353	1075.7	0.000	15.2	14.3
Matched	0.100	376.9	0.000	6.6	5.1
Smith/Todd Test		Passed:	92	Failed:	12
At least one meeting per week					
Raw	0.391	811.3	0.000	16.3	14.2
Matched	0.057	65.0	0.955	4.7	2.8
Smith/Todd Test		Passed:	75	Failed:	29
Less than one meeting per week					
Raw	0.337	742.6	0.000	14.9	12.6
Matched	0.067	103.2	0.100	5.4	4.2
Smith/Todd Test		Passed:	69	Failed:	35
At least two specific measures					
Raw	0.357	879.6	0.000	15.1	12.8
Matched	0.078	158.1	0.000	6.3	4.9
Smith/Todd Test		Passed:	69	Failed:	35
Less than two specific measures					
Raw	0.376	654.0	0.000	16.5	14.9
Matched	0.084	75.3	0.809	5.3	4.1
Smith/Todd Test		Passed:	82	Failed:	22

Figure A1: Observation numbers for measurement of outcomes

a) Survey data



b) Administrative data

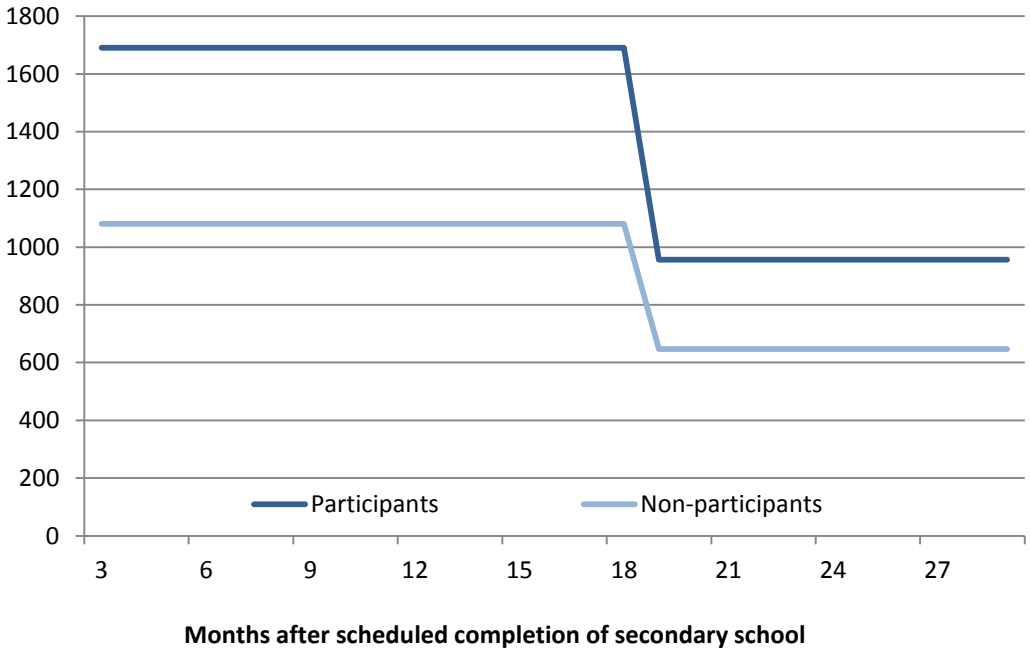
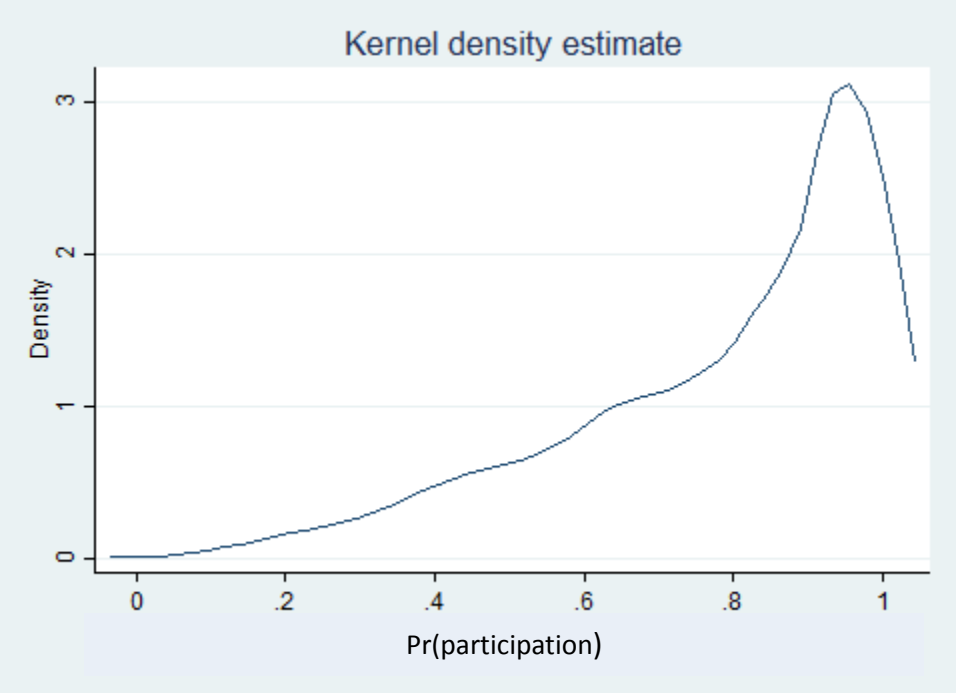


Figure A2: Distribution of the propensity score (all participants)

a) Participants



b) Non-participants