Subsidized Vocational Training: Stepping Stone or Trap? Assessing Empirical Effects Using Matching Techniques

Eva Dettmann and Jutta Günther[a]

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1. Introduction

Traditionally, vocational education in Germany has been characterized by a dual system, i.e. the close cooperation between enterprises and public vocational schools to ensure the provision of skilled employees. The apprentice holds an individual contract with a firm, usually for three years, and receives practical education within the company. The vocational schools are in turn responsible for the theoretical training. The subjects taught in the firms and vocational schools are fixed in the Vocational Training Act (*Berufsbildungsgesetz,* VTA) or the German Crafts and Trades Regulation Code (*Handwerksordnung,* CTRC). In this way, the content of vocational education is standardized. Consequently, graduates can be expected to possess certain knowledge and skills. The dual system offers advantages for both firms and apprentices. The firms can rely on the standardized theoretical education of their apprentices without additional effort or costs. Furthermore, the practical training takes place on the job and allows firms to learn more about the strengths and weaknesses of potential future employees. The advantage for apprentices is the experience of practical work and 'everyday working life', while at the same time undergoing theoretical training for their future profession. However, the dual system incurs costs and is not always affordable, especially for smaller firms. Furthermore, small firms are not always able to provide all the subjects of a practical training set in the VTA.

a Halle Institute for Economic Research (IWH). Kleine Maerkerstrasse 8. D-06108 Halle (Saale). Germany, Eva.Dettmann@IWH-Halle.de, Jutta.Guenther@IWH-Halle.de. The authors thank Claudia Becker and Heinz P. Galler from the Faculty of Law, Economics and Business at the Martin-Luther-University Halle-Wittenberg and two anonymous referees for their very helpful comments. Furthermore, we thank colleagues at the *Centre for Social Research* (zsh), especially Christine Steiner, for the provision of data and friendly support.

For these and other reasons, some firms do not provide apprenticeships. In this context, firms and policy makers frequently discuss the introduction of a training levy to be imposed on firms that do not offer apprenticeships. This could release those firms that engage in vocational training and which contribute to the provision of skilled employees in general from their costs. In reaction to this, the federal government in Germany introduced various programs to stimulate and provide additional apprenticeships, especially in East Germany, in an effort to provide additional vocational training and to counteract the anticipated shortage of skilled employees (see e.g. Buscher et al., 2009).[1]

In East Germany, there has been much experience in 'alternative' vocational training (beyond the dual system) since the early 1990s. The breakdown of the economic system in East Germany resulted in a massive shortage of jobs and apprenticeships.[2] In reaction, the government provided financial support for dual vocational education in firms, but also for a large number of subsidized apprenticeships as an alternative to the regular dual system. As a result, various cooperations between East German firms and the local educational institutions have developed since the early 1990s. The main purpose of these education networks is to increase the number of training facilities. This is mainly realized through the outsourcing of practical training by firms to vocational training centers or through the replacement of training in one single firm by joint training actions, where apprentices receive practical training at different companies. Another important aspect of the training networks is the organization of subsidized vocational education. A unique phenomenon in East Germany is the large number of training places that provide official qualifications according to VTA or CTRC, but instead of training being offered by one firm, it is conducted in vocational training centres or in several firms via internships.[3] Apprentices acquire formal qualifications comparable to those taught in the regular dual system.

In recent years, this additional vocational training has increased the number of apprenticeships considerably. As a result, many adolescents in East Germany have acquired a professional degree, an important prerequisite for entering the labour market. Furthermore, subsidized training programs contribute to the

1 Examples are the 'Vocational Education and Training Pact' (*Nationaler Pakt für Ausbildung und Fachkräftenachwuchs*) and the 'Jobstarter' program (Federal Ministry of Education and Research 2009).

2 The German vocational training system is very similar to the Swiss and Austrian systems. A dual vocational training system similar to the one in place in Germany today also existed in the German Democratic Republic (GDR).

3 This kind of subsidized vocational education is regulated in the Training-Position-Programs East Germany and additional state programs.

social integration of adolescents at the so-called 'first threshold' (Steiner et al., 2004). In addition to this, these collaborations in education can be regarded as useful and sustainable for both firms and education institutions (Grünert and Wiekert, 2005). Their experiences could serve as a 'model' for the future development of vocational training in Germany, especially for small firms, and particularly in the face of impending demographic changes associated with the anticipated shortage of skilled employees.

Public opinion, however, regards such 'atypical' forms of vocational training as a second best solution and as less valuable than training in the regular dual system. There are various reasons for this prejudice. Two of the most common are the bad reputation of young people who do not find regular apprenticeships and the suspicion that 'nothing useful' is taught in subsidized training courses. One can question whether this is justified, but the society – resp. the government – is confronted with the question of whether and to what degree the 'alternative' vocational training is worth financing and what changes may be necessary.

It is the aim of this paper to answer the question of whether formally equal qualifications lead to equal employment opportunities, irrespective of whether one graduates from regular or alternative vocational training. In doing so, we draw on the fact that the completion (and not just the attendance) of vocational training is crucial for employment success (e.g. Reinberg and Hummel, 2005; Solga, 2005). We do not primarily engage in an evaluation study of the subsidized training programs, but scrutinize the employment success of regularly versus alternatively trained people who have earned formally equal degrees.

Unlike previous studies, this question will be answered using matching techniques to control for possible selection effects caused by different characteristics of the apprentices and the apprenticeships. In this way it is possible to identify a pure effect of the subsidy beyond the influence of the personal characteristics of the adolescents concerned or different features of the apprenticeships.

In the empirical study, we make use of unique panel micro data. While most previous studies are based on the first survey wave of the Youth Panel of the Halle Centre for Social Research (zsh), two more waves of this survey are now available. This allows a longer observation period and an increased number of cases.

In the next section we describe the subject of analysis in more detail. Subsequently, in section 3, the database and the sample are introduced. Section 4 discusses the design of the analysis, i.e. the matching method, as well as the variables chosen. The results are presented in section 5. Section 6 draws final conclusions.

2. Subject of Analysis

One important criterion for assessing the quality of vocational training is its effect on subsequent employment opportunities. The results of previous studies suggest that graduates of subsidized training are disadvantaged with respect to their job opportunities when compared to graduates from regular vocational education (Berger et al., 2007; Berger and Walden, 2003; Prein, 2005; Steiner et al., 2004). In the literature, one finds various explanations for this, e.g., lower secondary school qualifications, gender specific differences, training in the 'wrong' profession (no demand), poorer economic conditions in the relevant region, and the negative image of apprentices in subsidized training held by potential employers (e.g., Prein, 2005).

The explanations for worse employment opportunities for graduates from subsidized vocational training can be summed up as selection effects and as an image effect. On the one hand, systematic differences in employment-relevant characteristics of the graduates induce personal selection effects. On the other hand, support for occupations less in demand in the labour market, or deficits in the practical organization of training may induce profession-related selection effects. In addition, the uncertainty potential employers have about the skills of subsidized youths and the negative image of apprentices from subsidized training may induce an effect referred to as an 'image effect' in the following sections.

Related to this, another explanation is that different employment prospects may result from the practical organization of the vocational training. In the case of regular apprenticeships, the practical education is realized in one single firm that will often offer employment to successful graduates. In the case of subsidized training, however, people complete internships in different firms, and job offers are less likely after successful graduation (Berger et al., 2007).

In the literature, the negative image of the subsidized vocational training is the main subject of discussion. The image effect is usually explained through the narrow target group of supported vocational training in Germany as a whole. One should, however, consider the special feature of East German support programs as described in more detail below. It is possible that negative expectations regarding the target group of the 'traditional' German support schemes are transmitted to East German adolescents in subsidized training programs, irrespective of the particularities of the East German support schemes. This may result in worse career prospects for people with otherwise similar characteristics.[4]

4 Based on the results of a company survey, Berger et al. (2007) state that potential employers assess subsidized apprentices far more skeptically than graduates from regular vocational

Before turning to the research questions, we briefly describe the German vocational education system and the different support schemes. The education system consists of two main areas: (1) training within the dual vocational system and (2) school-based training (see Figure 1).

The dominant area is the dual vocational system, in which approximately 70 percent of all apprentices in Germany participate (Federal Institute for Vocational Training and Research, 2009). It includes firm-internal and firm-external training in professions according to VTA and CTRC. The 'firm-internal training' covers the regular vocational training as described above (practical training on the job plus theoretical education in public vocational schools). 'Firm-external training' covers all kinds of publicly supported vocational education.[5] In West Germany, this support is focused on physically or mentally disabled as well as disadvantaged young people and amounts to approximately five percent of all apprenticeships in dual vocational education (Federal Institute for Vocational Training and Research, 2009).[6]

In East Germany, besides support for disabled and disadvantaged young people, additional support programs have existed since the early 1990s, a result of the structural weaknesses of the East German economy. The so-called Training-Position-Programs East Germany (*Bund-Länder-Ausbildungsplatzprogramme Ost*) and additional state programs focus on 'market-disadvantaged adolescents'; young people who live in regions with shortages of in-company training places and who did not enter a regular apprenticeship at the beginning of a training year (Federal Institute for Vocational Training and Research, 2009). These programs focus on qualifications according to VTA and CTRC in occupations and sectors which are expected to be competitive.[7] Formally, the training for market-disadvantaged persons belongs to the dual vocational education (see

training. They argue that this skepticism arises from the firm's uncertainty about the motivation and abilities of the youths and the reasons for the support.

5 The kind of financing rather than the place where the training takes place is significant in this classification (Federal Institute for Vocational Training and Research, 2009).

6 The support is regulated in the Social Security Code (SGB) II and III and is organized mainly by the Federal Employment Agency. Adolescents with educational deficits (mainly young people with an immigrant background, from educationally disadvantaged families and without school-leaving qualifications), who did not find a regular apprenticeship are defined as disadvantaged young people (Federal Ministry of Education and Research, 2009).

7 This is an integral part of the annual agreement between federal and state governments regarding the Training-Position-Programs. In exceptional cases, however, it is possible to receive governmental support for school-based training (see e.g. Federal Ministry of Education and Research, 2008b).

Figure 1), but its realization is different from the regular training with respect to the practical aspect of the curriculum. The subsidized vocational training in East Germany is usually organized as 'external' training and 'workplace-related' training.[8] The training is characterized in both cases by the combined teaching of theoretical and practical skills. In vocational schools the apprentices receive theoretical education like 'regular' apprentices. The practical skills are taught in vocational training centres in the case of the 'external' training, and (at least one half of the training) in internship firms in the case of the 'workplace-related' training (Berger, 2006).

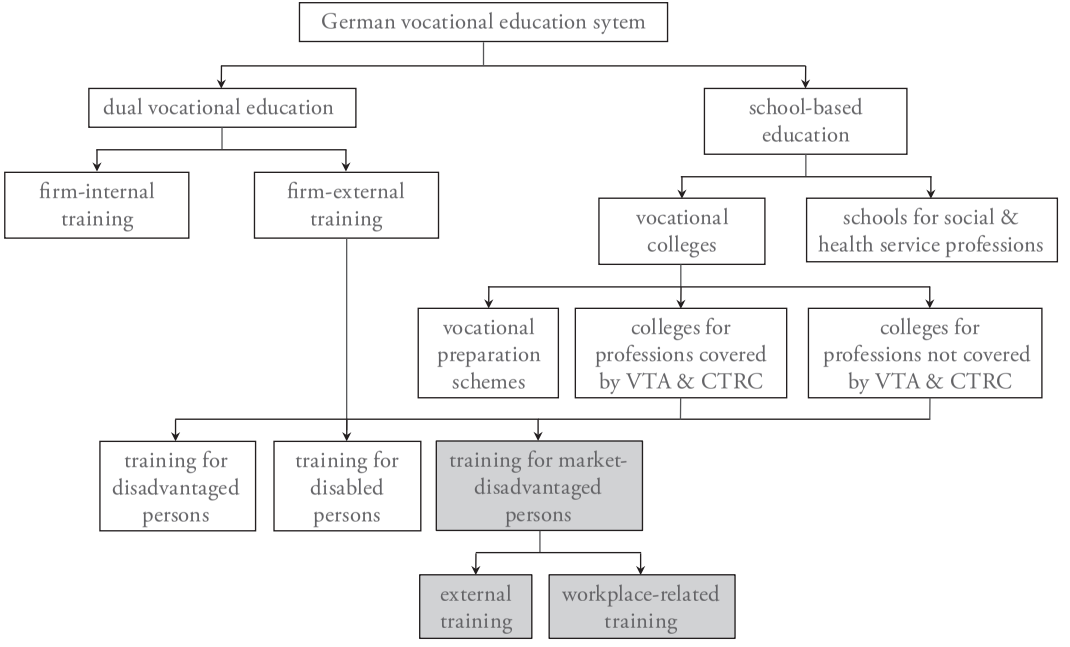
By the mid-2000s, about 25 percent of all apprentices in the East German dual vocational education system participated in 'firm-external' training. About half of these apprentices were in programs designed for disadvantaged youths, according to the Social Security Code II and III, and about 40 percent were supported by specific East German programs, i.e. the Training-Position-Programs and additional state programs (Federal Institute for Vocational Training and Research, 2009). These figures show that supported vocational education still played an important role in East Germany at the end of the observation period.[9] But they also suggest that in practice it is not easy to distinguish between 'disadvantaged' and 'market-disadvantaged' apprentices. In regions with a difficult labour market situation the definition of 'disadvantaged youth' is less precise (Federal Institute for Vocational Training and Research, 2009). So it is possible that some 'market-disadvantaged' persons are supported through programs which are actually intended for 'disadvantaged' persons. This might partially explain the image effect discussed above. Potential employers are possibly unable to determine whether an applicant who completed a subsidized apprenticeship is 'disadvantaged' or simply unable to find a regular apprenticeship owing to the regional economic situation in East Germany.

The other pillar of the German vocational education system, school-based education, covers about 30 percent of apprenticeships and includes education in vocational colleges (about 80 percent) and education in schools for social and health service professions (about 20 percent). More than half of the adolescents in vocational colleges complete occupational training, but a number of preparatory vocational courses are also provided, supported by the government within

8 In order to avoid confusion with the above-mentioned 'official' definition of 'firm-external training', this real firm-external training is denoted as 'external training' in the following.

9 Currently, the number of subsidized apprenticeships in East Germany makes up over one fifth, 30 per cent of which are still financed by Training-Position-Programs and additional state programs (Federal Institute for Vocational Training and Research, 2012).

Figure 1: The German Vocational Education System



Source: Federal Ministry of Education and Research (2008a), author's depiction.

the framework of subsidies for disabled and disadvantaged persons.[10] In some colleges, professional qualifications covered by VTA and CTRC, e.g. for bank clerks or electricians, are provided (about 15 percent). The majority of vocational colleges, however, offer training for additional professions not regulated in VTA or CTRC but subject to state laws, e.g. physical therapy or social work (Federal Institute for Vocational Training and Research, 2009).

This paper analyzes the employment opportunities for young people who graduated successfully from subsidized apprenticeships in East Germany during the period 1995–2006. In a first step, we analyze whether the employment opportunities for these graduates would be better if they had finished training without government support. In a second step, considerations regarding the practical organization of subsidized training programs are included, distinguishing between 'external' and 'workplace-related' training. Thus, treatment is defined according to the type of the first successfully completed vocational training spell, and not according to whether an individual started vocational training. Our definition of treatment is motivated by the insight that successful completion of vocational training is a vital prerequisite for employment.[11] We regard employment as an important indicator for the quality of subsidized vocational training. Against this background, our study deals with two research questions: (1) would graduates from subsidized vocational training experience better employment opportunities if they had completed regular vocational training? and (2) is the negative effect of support stronger in 'external' than in 'workplace-related' training?

Previous studies have shown that the poorer employment opportunities that graduates from subsidized vocational training are exposed to can be explained by personal and occupation-related selection effects and the negative image these graduates have in the opinion of employers. Using matching techniques in our analysis, we try to control for these selection effects as far as our data allows, and thus to identify a largely unbiased effect of the subsidy. In the literature, this effect is associated mainly with an image effect. Besides the image effect, the type of organization to which the training program belongs can influence graduates' future employment opportunities. In general, this practical education has two effects: on the one hand, apprentices become familiar with everyday working life,

10 The most common preparatory schemes in Germany are the occupational preparation year (*Berufsvorbereitungsjahr*) and the basic vocational training year (*Berufsgrundbildungsjahr*).

11 The importance of professional qualifications for labor market success is clear not only when looking at the persistently high unemployment rates of unskilled persons in Germany; it is emphasized again and again in the literature (see e.g. Reinberg and Hummel, 2005 or Solga, 2005).

while on the other employers have the chance to familiarise themselves with the abilities of an apprentice. While in the case of regular apprenticeships the entire practical education is usually realized in one training firm, subsidized apprentices spend less time with one company. This can have both advantages and disadvantages as regards future employment with these firms. Getting to know various employers provides a wider network, while short-term affiliation reduces the time available in which to convince supervisors of one's qualities. This holds true if we look at apprentices in subsidized as compared to regular training and mostly for those who attend 'external' education.

3. Database and Sample

The empirical study is based on a survey which was conducted by the Halle Centre for Social Research (zsh) during the period 2002 to 2006, known as the 'Youth Panel'.[12]

3.1 The Youth Panel

Young people born between 1980 and 1985 with main residence in East Germany (excluding Berlin) were interviewed for the panel: those individuals born between 1980 and 1983 were interviewed in the years 2002, 2003 and 2004, while the 'younger youths' born in 1984 and 1985 were interviewed in 2003, 2004 and 2006. Thus, the interviewed persons were at least 17 years old at the time of the first survey. The survey covers the period from 1995 to 2004 or 2006, respectively. Information such as year of birth, gender, citizenship, residence, household membership, and information on their own children was collected from the young people. The data on education included the type of school attended, the highest school-leaving degree, and also the final grade and the exact school-leaving date.

The main topic of the survey was the education and employment history after graduating from mandatory secondary school. All training and employment periods after secondary school, qualifications acquired as well as information on apprenticeships and employment experiences, i.e. the profession, sector and size of the firm, were documented.[13] Additionally, data on the monthly net income,

12 The panel was created in a research project on the labor market mobility of young people in East Germany. For more information see Halle Centre for Social Research (zsh) (2003).

13 The indication of the occupations is based on the classification system of the German Federal Statistical Office from 1992. See Tillmann (2004).

the kind of possible governmental support, and an assessment of various aspects of the apprenticeship or employment were provided. Information on how the apprenticeship or employment was found and who possibly supported the search is also available.[14] Overall, information on 32,254 labour market spells of 10,665 interviewed young people is available.

3.2 The Sample

From the data set, we use information about young people who completed a vocational education. Specifically, the first successfully completed vocational training is the basis for the analysis of employment opportunities after completion of this training. Accordingly, 9,251 labour market spells of 3,048 young people can be analyzed.

The identification of adolescents in subsidized vocational training courses is based on information provided by the interviewees. Since some people interviewed might not have known that their apprenticeship was subsidized, the proportion of subsidized vocational training in our sample could be underestimated (Steiner et al., 2004).

Subsidized, non-subsidized as well as 'external' and 'workplace-related' vocational training is differentiated according to Prein (2005) and Steiner et al. (2004).[15] The occupational information in the data set is summarized to twelve fields of professions based on the classification system of the Federal Statistical Office of Germany (Statistisches Bundesamt, 1992).[16] The main characteristics of the adolescents in the sample can be found in Table 1, for the data set as a whole as well as for the samples relevant to our analysis.

The youths in the sample as a whole (column 2 of Table 1) were on average 20 years old when they finished their first vocational training. The proportion

14 Each of the three waves contains additional information on special topics (social networks and mobility, financial aspects, leisure activities and expectations for the future). Since this information is only available for changing subgroups of the interviewed youth, it cannot be considered in the analysis.

15 The following is regarded as supported training: (1) apprenticeships, where the apprentice has an indenture with an educational institution, (2) apprenticeships, where the interviewees have received financial support, and (3) education in vocational colleges, where governmental support is provided. Of the supported training the following is deemed to be external vocational education: (1) government-supported education in vocational colleges and (2) firm-external training where the practical part of the training is not organized as an internship. Other supported training is regarded as 'workplace-related' training.

16 In the fields 'mining and mineral-extraction' and 'miscellaneous workforce' no finished training courses were found in the sample. Therefore, they are not included in Table 1.

of men in the sample accounts for 54 percent. All young people and their parents have German citizenship. Only three percent have own children. Nearly half of the young people in the data set (44 percent) run their own households.[17]

The share of adolescents without any school-leaving qualification is only about 1 percent. Fifteen percent of them successfully completed the 9th grade of secondary school (*Hauptschule*) and about three quarters have the advanced secondary school certificate (*Realschulabschluss*). Only about 10 percent of the adolescents have the general university entrance qualification (*Abitur*). The average final school grade is about 2.5.[18]

After finishing school, about half of the adolescents immediately started an apprenticeship and completed it successfully. Before the (successfully completed) apprenticeship started, about two percent did their military or civilian service, six percent completed an occupational preparation year (*Berufsvorbereitungsjahr*), one percent was employed, four percent were unemployed, and three percent started, but did not finish other occupational training. More than half of the adolescents (58 percent) secured the apprenticeship through their own efforts, and about one fifth with the assistance of family members, friends or colleagues. About a quarter of the youths contacted public agencies, such as an employment agency, in an effort to find an apprenticeship.

An apprenticeship in the dual vocational education system is the predominant type – nearly four out of five young people finished their training within this system.

Many of the apprentices (about 20 percent) completed training in the field of metalworking and electrical trades.[19] Further common occupational fields are organization, office and administrative professions (16 percent), goods and services agents (13 percent) as well as miscellaneous manufacturing occupations (11 percent).[20]

17 This includes their own flat, a shared household with a partner, a flat-sharing community, as well as boarding schools.

18 Information on the final school grade is available for only approx. 40 percent of the persons in the sample.

19 These fields include mechanical engineers, plant manufacturers, vehicle assemblers, mechanics, lathe operators, but also toolmakers, gas installers, plumbers, dental technicians, opticians and watchmakers.

20 Accountants, commercial clerks, tax and administration experts, office administrators, secretaries, cashiers, as well as managers and computer scientists belong to the field of organization, office and administrative professions.
The professional field of goods and services agents includes bank clerks, insurance specialists, wholesale and retail salespersons, specialized shop assistants and gas station attendants, among others. (➜)

Adolescents were educated most commonly in Saxony (30 percent) and Thuringia (22 percent). About half of the youth completed their apprenticeship in the period 2003–2006, the other half in the previous period.

Nearly one half of the youth found employment directly after the apprenticeship, while about one third remain unemployed.

The comparison of graduates of regular and subsidized apprenticeships (third and fourth column of Table 1) shows clear differences in the case of some characteristics. The percentage of men is significantly higher in the subsample of regular training (56 vs. 46 percent). Also, the proportion of young people who finished 9th grade at secondary school is approximately twice as high among young people in subsidized training courses. In contrast, the share of persons who hold a university entrance qualification is three times higher among the graduates of regular training. Nevertheless, the secondary school certificate is the most common school-leaving qualification in both subsamples (77 and 69 percent, respectively).

The number of persons who completed an occupational preparation year before the apprenticeship started is three times higher among subsidized youth. About three out of five of the young people in regular vocational training, but only two of five of those who were subsidized found their apprenticeship through their own efforts. In contrast, about half of the young people in subsidized apprenticeships were assisted by vocational guidance centres or an employment agency in find their apprenticeship, about twice as many as in the sample in regular training.

Differences in the distribution of apprenticeships in the professional fields are observable mainly in the fields of 'metal and electrical trades' and 'miscellaneous services'.[21] Within the group of trainees in regular apprenticeship, metal and electrical trades account for as much as 22 percent. This is a share almost twice as high as for the adolescents in subsidized training. The opposite is true for miscellaneous services: here, the proportion among the subsidized youth (14 percent) is almost twice as high as in the sample of non-subsidized youth (eight percent). Also, the proportion of apprentices in health service professions is slightly higher among the young persons in subsidized training (11 vs. nine percent).[22]

The field 'miscellaneous manufacture occupations' covers very different professions, e.g. paper manufacturing and wood processing professions, chemists and related professions, occupations in the textile and clothing sector, craft professions such as stonemasons, sculptors, potters, glassblowers, painters, printers, and food processing occupations such as bakers, butchers and cooks.

21 The area of miscellaneous services includes professions in the hotel and catering business, hairdressers, beauticians and occupations related to cleaning and waste management.

22 Besides doctors and pharmacists, medical-technical assistants, nurses and other therapeutic professions are included in this occupational field.

Table 1: Characteristics of the Adolescents and the Apprenticeships in the Sample

			subsidized apps.		
characteristics	total sample	regular apps.	total	workplace related	external
number of persons	3048	2556	492	324	167
subsamples					
regular app.	0.81	–	0.00	–	–
subsidized app.	0.19	–	1.00	–	–
workplace-related training	0.13	–	0.69	–	–
external training	0.06	–	0.31	–	–
socioeconomic factors					
age	19.96	20.01	19.74	19.71	19.82
male	0.54	0.56	0.46	0.42	0.55
born in Germany	1.00	1.00	1.00	1.00	0.99
German citizenship	1.00	1.00	1.00	1.00	1.00
parents German citizenship	1.00	1.00	1.00	1.00	1.00
own children	0.03	0.03	0.02	0.02	0.02
own household	0.44	0.43	0.48	0.50	0.42
school-leaving qualification					
no school-leaving qualification	0.01	0.01	0.02	0.02	0.04
secondary school (9th form)	0.15	0.12	0.25	0.22	0.31
secondary school certificate	0.76	0.77	0.69	0.73	0.61
university entrance qualification	0.09	0.10	0.03	0.03	0.04
final grade at school[a]	2.46	2.40	2.55	2.54	2.59
individual labor market experiences before vocational training started					
start immediately	0.42	0.44	0.32	0.37	0.23
military or civilian service	0.02	0.02	0.01	0.01	0.02
occupational preparation year	0.06	0.04	0.15	0.12	0.23
employment	0.01	0.01	0.00	0.00	0.00
unemployment	0.04	0.04	0.06	0.04	0.09
not finished training	0.03	0.03	0.04	0.04	0.04
search information					
app. result of own effort	0.58	0.62	0.41	0.46	0.30

characteristics	total sample	regular apps.	subsidized apps.		
			total	workplace related	external
help of family or friends	0.20	0.21	0.19	0.21	0.13
assistance of public agencies	0.27	0.22	0.48	0.43	0.59
characteristics of the apprenticeship					
dual vocational education	0.78	0.79	0.73	0.74	0.71
agriculture & forestry	0.03	0.03	0.03	0.04	0.01
metalworking & electrical trades	0.20	0.22	0.12	0.13	0.10
construction	0.08	0.09	0.06	0.04	0.12
misc. manufacturing occupations	0.11	0.12	0.10	0.10	0.11
technical occupations	0.04	0.03	0.04	0.04	0.06
goods and services agents	0.13	0.13	0.15	0.16	0.10
organization, office and administration	0.16	0.16	0.18	0.16	0.24
health services	0.09	0.09	0.11	0.12	0.10
caring and educational occupations	0.05	0.05	0.05	0.06	0.03
misc. services	0.09	0.08	0.14	0.15	0.12
economic environment					
Brandenburg	0.13	0.14	0.12	0.12	0.11
Mecklenburg-Western Pomerania	0.10	0.10	0.10	0.10	0.10
Saxony	0.30	0.29	0.31	0.32	0.31
Saxony-Anhalt	0.15	0.16	0.14	0.12	0.17
Thuringia	0.22	0.22	0.21	0.19	0.28
app. completed 1999–2002	0.46	0.52	0.21	0.15	0.33
app. completed 2003–2006	0.53	0.47	0.79	0.85	0.66
labour market status directly following the vocational education					
employment	0.47	0.52	0.28	0.31	0.21
unemployment	0.35	0.31	0.51	0.49	0.56
other voc. training	0.04	0.04	0.05	0.06	0.03
subsidized employment	0.01	0.01	0.01	0.01	0.00

Note: Information given as proportion of youth with the mentioned characteristics, exception: age (arithmetic average);
a information available for approx. 40 percent of the persons in the sample.
Source: Youth Panel of zsh, authors' calculations.

The majority of the subsidized apprentices completed their training at the end of the observation period (2003–2006), with only one fifth of them finishing in the period 1999–2002. Among the graduates of regular vocational training, the proportion of completions is almost balanced between the two periods.

About one half of the graduates of regular vocational training were employed directly after finishing their apprenticeship, while this is the case for only a quarter of the graduates from subsidized training. The proportions of persons in unemployment are one third vs. one half. This observation suggests that young people who completed subsidized vocational education have less favourable career prospects than graduates of regular training.

In the last two columns of Table 1, the characteristics of the subsamples of graduates of 'workplace-related' training (col. 5) and 'external' training (col. 6) are reported. The persons in the subsamples differ mainly with regard to gender, school-leaving qualification, and some characteristics of the apprenticeship. Among the persons in 'workplace-related' training the proportion of men is much lower (42 vs. 55 percent), the secondary school certificate is more common (73 vs. 61 percent), and the proportion of persons who completed the 9th grade of secondary school is smaller (22 vs. 31 percent). When searching for an apprenticeship, own efforts and help of the family and friends is more frequent among adolescents in 'workplace-related' training (46 vs. 30 percent resp. 21 vs. 13 percent), while assistance of public agencies is less frequent than among youth in 'external' training (43 vs. 59 percent).

Differences can also be observed in the distribution of occupations. The proportion of persons in construction professions is four times higher among the adolescents in 'external' training.[23] Also, organizational, office and administrative occupations are more common (24 vs. 16 percent). In contrast, professions in the field of goods and services agents are more often the subject of 'workplace-related' training (16 vs. 10 percent).

The employment opportunities are more limited for graduates of 'external' training. Only about one fifth of the adolescents were employed immediately after graduation, whereas more than half remain unemployed. Among the graduates of 'external' training, the respective proportions are one third and almost one half.

The descriptive statistics reveal that the characteristics are not equally distributed in the different groups. These differently distributed personal characteristics

23 This professional field covers bricklayers, concreters, pavers, road and rail track builders as well as carpenters, roofers, plasterers, glaziers and interior decorators.

and profession-related factors may be an explanation for the different employment opportunities for these groups.

However, it is not clear from the comparison of characteristics whether public support itself has an impact on employment prospects. In order to answer this question it is necessary to try to control for the personal and profession-related selection effects. In other words, a largely unbiased identification of the negative effect of support requires the use of appropriate evaluation methods. We use matching techniques to find comparable adolescents for the subsidized persons in order to control for selection effects as far as possible.

4. Matching Method and Variables

The fact that one graduated from subsidized instead of regular vocational training is expected to reduce the probability of finding an employment adequate to the relevant qualification compared to graduating from regular training. In order to analyze this subsidy effect, the employment prospects of adolescents in subsidized vocational training are compared with the chances of their counterparts in regular vocational training. Furthermore, the persons in both organizational types of subsidized training ('workplace-related' and 'external') are compared.[24]

We apply matching since we believe that in this way we can eliminate most of the differences in the relevant characteristics.[25] The matching is based on the idea of identifying 'statistical twins' for the persons to be analysed, commonly referred to as 'treatment group'. For each of those persons, one or more individuals from the comparison sample (or 'non-treatment group') are assigned. The counterparts of all analyzed persons are summarized in a specific sub-group of the non-treatment group, the so-called 'control group'. As a result, the employment prospects of the adolescents in both groups, the treatment group and the constructed control group, should be the same, if the support itself has no impact.[26]

24 The Matching process described in the following is the same for both steps of the analysis.

25 Since the beginning of the 1990s, matching has been a widespread technique in empirical research, mainly in evaluation studies, but also a field of intensive theoretical research. Some of the most influential studies are Abadie and Imbens (2002); Angrist and Hahn (2004); Bergemann et al. (2004); Cochran and Rubin (1973); Dehejia and Wahba (2002); Fredriksson and Johansson (2003); Heckman and Hotz (1989); Heckman et al. (1998); Heckman et al. (1999); Imbens and Wooldridge (2008); Lechner (1998); Rosenbaum and Rubin (1983).

26 For a more detailed presentation of the main idea of matching and necessary assumptions, see eg. Caliendo and Hujer (2006).

4.1 The Matching Process

We try to identify the so-called treatment effect for the treated, i.e. the average effect of participation in subsidized apprenticeships for the supported persons, compared to their situation without participation.[27] For this effect, matching is based on two basic assumptions, the Conditional Independence Assumption (CIA) and the Common Support Condition. The first assumption (CIA) states that the potential employment prospects are equal for persons who reveal identical characteristics, irrespective of graduating from subsidized or regular training.[28] The Common Support Condition (Sianesi, 2004) or 'Overlap' (Crump et al., 2009) means that it must be possible to find persons with the observed values of the matching variables in both samples, subsidized youth as well as persons in regular training.

A potential difficulty encountered with matching is that the search for 'statistical twins' is based entirely on observable characteristics. Thus, potential heterogeneity in unobservable factors may not be removed. A commonly recommended solution to this drawback is to combine matching with the Difference-in-Differences approach (Smith and Todd, 2005). Another solution is to construct indicators for potentially unobservable factors (see, e.g. Reinowski et al., 2005). Since in the present study the database contains much detailed information on the youth, we try to capture the impact of unobservable factors by constructing indicator variables.

In order to find adequate partners for the youths in subsidized training, it is necessary to consider every relevant variable in the matching process, i.e. all characteristics that influence the employment prospects as well as the kind of financing scheme of the apprenticeship (subsidized vs. non-subsidized). One might consider examining the correspondence of every single variable; however, such exact matching is inefficient (Racine and Li, 2004) and raises the potential problem of being unable to find partners that correspond in every variable value, particularly if many (mainly metrically scaled or nominally scaled) matching variables are considered (Black and Smith, 2004). Reducing the number of variables considered is not a feasible option, because in this case the CIA is violated. For this reason, the information must be summarized in an appropriate way. A particular problem in the present study and in empirical studies in general, is that

27 In the literature, different estimators of average treatment effects – with different results for the estimated effects – are discussed. See eg. Imbens (2004) for a systematic overview.

28 This assumption has various names in the literature. Besides CIA (Lechner, 2001), it is referred to as 'Ignorable Treatment Assignment' (Rosenbaum and Rubin, 1983) or 'Unconfoundedness' (Imbens, 2004).

the matching variables to be considered are differently scaled. So, a summarized measure of correspondence has to be used.[29]

The results of a simulation study performed in advance suggest that a statistical distance function, the Mahalanobis Matching Distance, is an appropriate solution to the problem, especially if mainly nominally scaled variables are included in the matching. This function is proposed by Kaufmann and Pape (1996) and can be briefly described as weighted average of scale specific measures for every scale level that occurs in the matching variables. Here, metrically and nominally scaled variables are included, so the Mahalanobis Distance (Mahalanobis, 1936) and the Generalized Matching Coefficient (Kaufmann and Pape, 1996) are combined. The number of variables of one scale is used as weight for the respective distance function.[30] Because of its superiority in comparison to other distance functions mentioned in the study, the Mahalanobis Matching Distance is used to summarize the distance information for the variables considered in our study.

On the basis of distance information, partners for the analyzed adolescents in subsidized vocational training are found using an assignment process with replacement. In this process, the best available partner is assigned to each person, irrespective of whether the partner is already assigned to other persons or not. In order to assess the quality of the matching process, non-parametric tests for related samples are used. Because the considered variables are differently scaled, it is not possible to use one test for all covariates. Thus, scale specific tests are applied: for metrically scaled variables, the Wilcoxon sign-rank test (Büning and Trenkler, 1994) is used and for dichotomous nominal variables the McNemartest (Siegel, 1997) is applied. As no test for related samples is available for polytomous nominal variables, the χ^2-test of homogeneity (Büning and Trenkler, 1994) is used.

Before applying the described matching procedure, the compliance with the Common Support Condition of every single variable is examined for each person in both the analysed and the comparison sample. The condition is regarded as fulfilled for one person if at least one person in the other subsample with corresponding values can be found. If the condition is not met for one or more characteristics of a person, this person must be removed from the sample.

29 The most commonly used measure in empirical studies is the Propensity Score. But in the literature it is criticized that in small samples the risk of biased treatment effect estimation is high, because despite equal Propensity Scores the control group may consist of persons that are not 'statistical twins' of the youth in subsidized training regarding their employment perspectives (Fröhlich, 2004; Zhao, 2004).

30 For a detailed description of this distance function and the simulation results, see Dettmann (2009).

4.2 The Matching Variables

In order to find adequate partners for the youth in subsidized training, all characteristics that influence the employment prospects and the financing scheme of the apprenticeship (subsidized vs. non-subsidized) must be considered. The selection of these variables is based on theoretical considerations and the results of previous studies on employment prospects, particularly career opportunities for young people.[31]

The most important determinants of employment prospects are socioeconomic factors, characteristics of the apprenticeship, and the general labour market situation. Furthermore, the labour market history and the support of persons in the youth's social environment must be considered when explaining employment opportunities.[32]

From the data, information concerning the age at completion of vocational training, gender, type of school-leaving qualification (no degree, finished secondary school (9th form), secondary school certificate, university entrance qualification), kind of household (own household or living in parents' household), and the existence of own children are used for the matching process. Age is typically expected to have a negative influence on employment opportunities. The younger the job applicant, the greater – ceteris paribus – is his or her employment probability since wages are lower, flexibility assumed to be higher and scope for influence presumably greater.[33] It is also taken into account that men and women have different labour market perspectives, as suggested for example by the development of gender-specific unemployment rates in the observation period.[34]

In the case of equal professional qualifications it is expected that a higher school-leaving qualification will have a positive impact on the employment

31 Since the support of apprentices is orientated to their prospects in the labor market, all factors relevant to employment perspectives are also relevant to the financing scheme – with one exception, the occupation-specific characteristics. Therefore, their relevance to the apprenticeship will not be mentioned separately in the following.

32 Of course, there is always a great deal of additional information that would be desirable when trying to estimate employment opportunities, e.g. more detailed family background, self-confidence, appearance and respectfulness during the interview, as well as unobservables such as motivation or potential alcohol problems. But even if the Youth Panel does not contain such information, we are convinced that it is the best available data set for our research questions.

33 Of course, being a younger applicant can also have disadvantages for employers, such as less experience of life or some practical disadvantages, such as not having a driving license etc.

34 While at the beginning of the observation period (1995), the unemployment rate of men was approximately 3 percent lower than that of women (approximately 12 percent), a higher unemployment rate among men was observed in the period between 2001 and 2006. For further details see Federal Employment Agency (2008).

opportunities of adolescents, since the school-leaving qualification can be interpreted as an indication of the general abilities and efforts of an applicant. The same applies to the final school grade. Unfortunately, this information is available for fewer than half of the adolescents in the sample. Therefore we cannot use the grade information for matching.[35]

The kind of household (own versus parents) can be seen as a reference to the independence of young people. In addition, the incentive to finance life through one's own income is presumably higher for adolescents living in their own household. In the case of young women in particular, own children are considered to be a barrier to employment. Therefore, they are also taken into account when matching.

Information on nationality and place of birth is also available in the data, but this is not used for matching because all adolescents in the sample have German nationality and were born in Germany. The same applies to the citizenship of their parents.

The type of vocational training and occupation are employment-relevant characteristics. The occupational information in the data is summarized to twelve fields of professions (as described in section 3). The type of vocational education (dual vocational training vs. school-based training) is considered for matching, since the differentiation between the two sectors by means of the occupational fields is not entirely possible. Information on the vocational qualification is available in the data for fewer than half of the persons in the sample and therefore cannot be considered.

The location of vocational training and the date of completion are used to capture the general situation of the labour market. The location is divided into three regions: Central Germany (Saxony, Saxony-Anhalt and Thuringia), North-East Germany (Brandenburg and Mecklenburg-Western Pomerania), and the West German states including Berlin.[36] The labour market perspectives are better in the latter region than in the other two regions in East Germany.[37] The youth in the sample completed their apprenticeships in the period 1995 to 2006. These

35 Because this information is one of the most important predictors of future employment opportunities, we do an additional analysis for the subsample of persons who successfully completed their first vocational training and reported their final school grade to check the robustness of our results. See Figure 4 and Table 4 in the Appendix for the results of this additional analysis.

36 Despite their heterogeneity, these 11 states are grouped into one region, because the proportion of adolescents who do their vocational training here (in West Germany and Berlin) is comparatively low (10 percent). See Table 1.

37 This is confirmed, e.g. by the comparison of the unemployment rates in the federal states in the period 1995 to 2006 (Federal Employment Agency, 2008).

12 years are classified in three periods according to the labour market conditions over time. The labour market situation in the years 1995–1998 was characterized by a rapidly increasing unemployment rate; in the years 1999–2002 it developed relatively steadily to a high level and increased again slightly in the years 2002–2006.[38]

In addition, the data contains information on whether the vocational education started immediately after secondary school, and if not, what the youth did before the start of vocational training. We regard previously started, but not successfully completed, training, possible employment and unemployment periods, a completed occupational preparation year, and the completion of military or civilian service as of particular importance to employment opportunities.[39] These data are also considered for matching.

The social environment of adolescents is another important aspect of career prospects. In the literature, the influence of family background on decisions regarding school and vocational education as a precondition of employment prospects is explicitly emphasized.[40] However, the focus of our study is less on the explanation of different educational decisions in the past than on the explanation of different career opportunities, taking into account the outcome of previous educational decisions. The support that a young person receives from the environment when looking for an apprenticeship or employment is another influential factor.[41] Therefore, a network indicator is constructed that contains both family support as well as support of friends or colleagues.

In addition, the indicator of the adolescent's motivation in the labor market summarizes information on a person's efforts to find an apprenticeship. It is expected that the employment opportunities of highly motivated persons are better that of those who are less driven. The network and motivation indicators together with information on the labor market history allow us to control for unobservable heterogeneities regarding the adolescent's behaviour in the labor market and thus to ensure that selection bias is largely removed through matching.

38 Dividing the period into these three phases is based on official statistics from the Federal Employment Agency (2008).

39 Referring to own studies, Heckman et al. (1997) emphasize that previous labor market experience is a crucial determinant of an individual's labor market choices and employment prospects.

40 The relationship between educational decisions of children and adolescents and their parents' educational attainment and 'way of life' (e.g. employment and occupational status or the number of books in the household) is often stressed in the literature (see Von Below, 1999; Woessmann, 2004).

41 The relevance of social structures and networks to the explanation of unequal employment perspectives and training decisions is stressed, e.g. in Solga (2005).

5. Results

Our empirical study should answer the questions of whether graduates from subsidized vocational training would experience better employment opportunities if they had completed regular vocational training, and whether a possibly negative effect of support is stronger in the case of 'external' than of 'workplace-related' training.

The identification of adolescents in subsidized vocational training and non-subsidized training, as well as the definition of 'external' and 'workplace-related' vocational training is based on combined information on the type of contract and the financing scheme (see subsection 3.2).

In the analysis, we first investigate a possible quantitative effect, i.e. whether there is a difference in the share of employed persons between graduates from subsidized training and the control group. Secondly, we consider possible differences in the quality of employment between people from subsidized training and the control group, such as professional status, income situation, atypical employment, type of contract and regular monthly working time.[42]

The assessment of the matching results (see Tables 4 and 5 in the Appendix) shows that the applied matching procedure is to a large extent able to reduce the initial heterogeneity of the subsamples and to adjust the distribution of the relevant characteristics in the compared groups. Thus, we believe that we can identify largely unbiased effects of the support.[43]

5.1 Comparison of Subsidized and Regular Apprenticeships

In the first step, we evaluate subsidized vocational education by comparing the employment success of graduates from subsidized apprenticeships with that of the control group, i.e. graduates from regular training. Figure 2 shows the share of employment in the group of subsidized versus regular apprenticeships right after education and in total (throughout the period of observation).

The comparison reveals remarkable differences. Immediately after completion of vocational training, only about a quarter of the graduates of subsidized

42 Based on own empirical analyses, Berger et al. (2007) state that graduates of subsidized training are more frequently employed in atypical, less favorable jobs.

43 In order to check the robustness of the Matching results, an optimal Nearest Neighbor Matching, Random Matching and an optimal full Matching are used additionally to identify the comparison group. The results of all assignment processes are compared by non-parametric tests. The comparison shows that Matching with replacement is best suited to the present data to find 'statistical twins'.

training are employed while in the control group the proportion is nearly 50 percent. The proportion of employed youths increases in both groups over time – among the subsidized youths to about one half and in the control group to about two thirds over the 12 year period of observation. Both immediately after training as well as in the course of the observation period, the employment opportunities of young graduates of subsidized vocational training are fewer than those of their counterparts from regular apprenticeships. This observation confirms a negative effect of support.

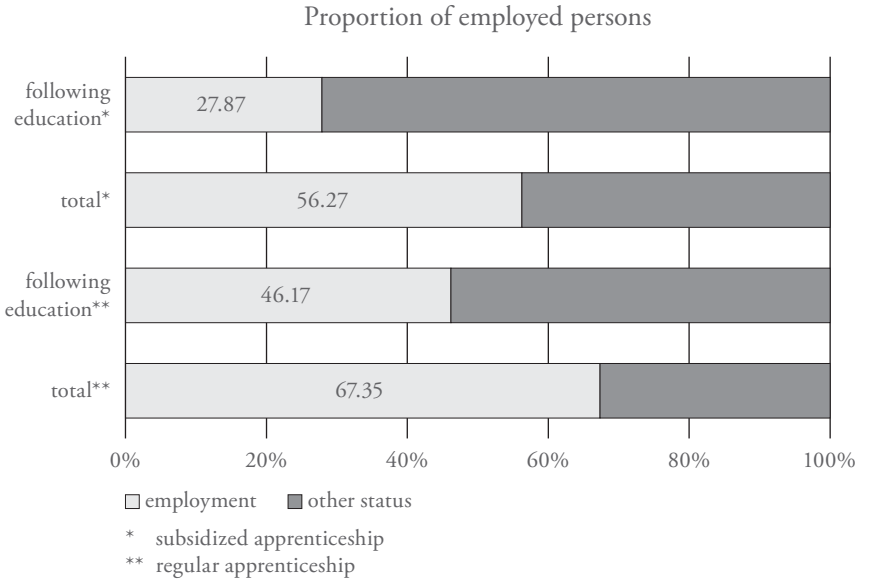
Besides the quantitative aspect, employment has a qualitative dimension. To this end, some characteristics of the first employment after vocational training are summarized in Table 2. The information is given in absolute figures in the case of the number of (employed) persons, the duration until transition to work and net income, and as a percentage of the employed persons in the compared groups for the job details.

The results show that the employment prospects of graduates from subsidized apprenticeships also differ with respect to some characteristics of the employment taken. For instance, subsidized apprentices take on average five months before finding their first employment, approximately three months longer than comparable graduates from regular training. This can be partly explained by looking at the percentage of young people who receive a job offer from their training firms after graduation. This share is comparably small among the subsidized persons (19 percent), whereas nearly 44 percent of their counterparts in regular apprenticeships receive such an offer. Not all recipients accept this offer; nevertheless, the information suggests that the expected advantage of regular apprenticeships regarding the organization of the practical training is a relevant component in explaining the effect of support.[44] Furthermore, the proportion of young persons who start a job that corresponds to their qualification is much higher among the regular apprentices (86 vs. 72 percent) and their net income is on average about 70 Euro per month higher compared to subsidized apprentices.[45]

44 Against the background of the image effect discussed in the literature and the much shorter contact of subsidized apprentices with firms, the 15 percent of graduates who received a job offer from their internship firms can be regarded as a success, because it shows that they were able to convince potentially skeptical employers of their employability. But the comparison to regular apprenticeships shows that this success could have been even greater for the observed youths. In this sense, the effect of support could be interpreted as 'less positive' than that of regular training instead of 'negative'.

45 Information on the net income is available for only 76 percent of the employed youths.

Figure 2: Share of Employed Persons (Percent) – Subsidized versus Regular Apprenticeships



Note: Share of employed persons significantly different between subsidized apprentices and their counterparts (McNemartest at the 5 percent level); 'following education' – right after graduation; 'total' – throughout observation period (12 years).
Source: Youth Panel of zsh; authors' calculations.

In contrast, no significant differences are observed regarding the kind of job these young people take up. About 40 percent of the employed persons in both groups have 'normal' contracts (permanent full-time employment), about three quarters of them are employed in skilled jobs, most persons (about 85 percent) work full time, and about half of the job starters work overtime.

The observed differences in employment quantity and quality reveal a negative effect of support on employment prospects compared to regular vocational education. This is consistent with the results of previous studies that find a negative quantitative employment effect of subsidized training (PREIN, 2005; STEINER et al., 2004). The supposedly more precarious labor market position of subsidized adolescents, however, is not consistent with the data – unlike the results of BERGER et al. (2007).

Table 2: Characteristics of the First Employment after Vocational Education – Subsidized versus Regular Apprenticeships

characteristics	subsidized apprenticeship	regular apprenticeship
number of persons	574	392
proportion of employed persons*	56.27	67.35
job offer*	18.89	43.56
job search duration* (months)	4.98 (0.48)	2.22 (0.29)
net income* (Euro)[a]	924.37 (21.62)	994.89 (21.76)
normal job	41.78	43.09
adequate job*	71.53	86.12
working overtime	48.63	49.19
kind of job		
full time	86.30	87.80
part-time	11.99	10.57
marginal part-time	0.68	0.81
changing	1.03	0.81
type of contract		
permanent	45.89	46.34
temporary	52.74	49.59
no contract	1.03	1.63
self-employed	0.00	1.63
position		
low skilled[b]	16.78	8.13
skilled[c]	72.26	78.46
higher skilled[d]	9.25	10.16
highly skilled[e]	0.00	2.44

Notes: Information given in absolute figures (net income and job search duration) or as percentage of the employed persons; * statistically significant differences between subsidized apprentices and their counterparts; for net income and job search duration standard error of the mean in parentheses.

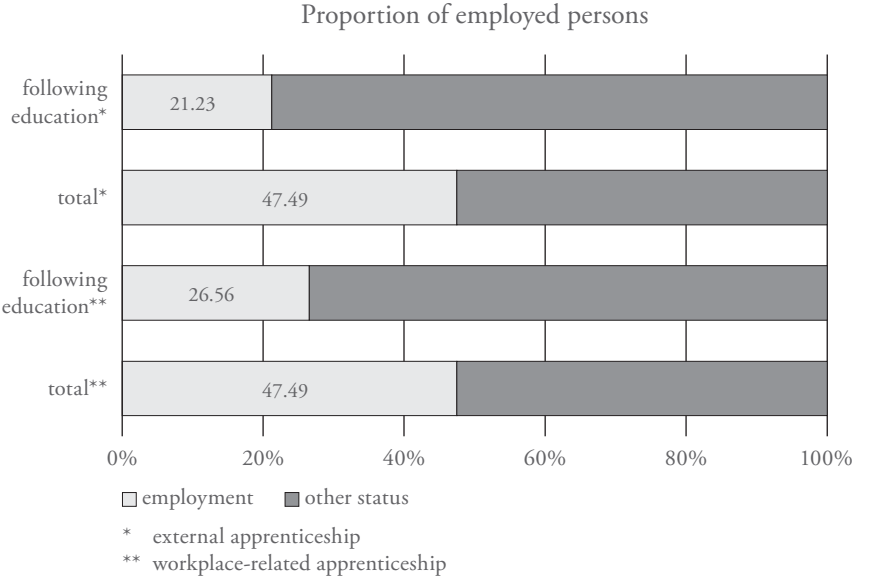
[a] information available for about 76 percent of the employed persons; [b] no vocational education degree required; [c] vocational education degree required; [d] master craftsmen, technicians required; [e] academic degree required.

Source: Youth Panel of zsh; authors' calculations.

5.2 Comparison of 'External' and 'Workplace-Related' Apprenticeships

The second step in the analysis will answer the question of whether the effect of support is stronger for adolescents in 'external' training than for those in 'workplace-related' training. As Figure 3 shows, the quantitative effect for graduates from 'external' training and the effect for comparable graduates from 'workplace-related' training is very similar. Immediately after training, about one fifth of subsidized adolescents are employed, only five percent fewer than in the control group. Over the entire observation period, the proportion of persons employed increases to almost one half in both groups.

Figure 3: Share of Employed Persons (Percent) – External versus Workplace-Related Apprenticeships



Note: Share of employed persons not significantly different between external apprentices and their counterparts (McNemartest at the 5 percent level); 'following education' – right after graduation; 'total' – throughout observation period (12 years)
Source: Youth panel of zsh; authors' calculations.

Table 3: Characteristics of the first Employment after Vocational Education – External versus Workplace-Related Apprenticeships

characteristics	external apprenticeship	workplace-rel. apprenticeship
number of persons	179	128
proportion of employed persons	47.49	47.49
job offer*	7.06	20.90
job search duration* (months)	6.59 (1.22)	3.75 (0.74)
net income* (Euro)[a]	934.50 (39.23)	913.10 (53.63)
normal job	43.48	40.98
adequate job	67.65	60.66
working overtime	49.28	42.62
kind of job		
full time	89.86	85.25
part-time	7.25	14.75
marginal part-time	1.45	0.00
changing	1.45	0.00
type of contract		
permanent	44.93	45.90
temporary	49.28	54.10
no contract	4.35	0.00
self-employed	0.00	0.00
position		
low skilled[b]	18.84	24.59
skilled[c]	69.57	62.30
higher skilled[d]	10.14	13.11
highly skilled[e]	0.00	0.00

Notes: Information given in absolute figures (net income and job search duration) or as percentage of the employed persons; * statistically significant differences between external apprentices and their counterparts; for net income and job search duration standard error of the mean in parentheses.

[a] information available for about 67 percent of the employed persons; [b] no vocational education degree required; [c] vocational education degree required; [d] master craftsmen, technicians required; [e] academic degree required.

Source: Youth Panel of zsh; authors' calculations.

Although there is no quantitative employment effect, Table 3 reveals some differences in qualitative aspects of the first employment. For instance, only seven percent of the graduates of 'external' training, but about 20 percent of the control group receive a job offer. This may partly explain the three month longer job search by 'external' apprentices. Also, the net income of the analysed group is about 20 Euro less than in the control group.[46] Regarding the kind of job, the kind of contract and the job position, the graduates of 'external' education do not differ from their controls.

Altogether, the comparison of the two types of subsidized vocational training does not show a stronger quantitative effect of support for graduates from 'external' training, but does reveal some differences in the qualitative dimension of the employment.

6. Conclusions

The subject of this research addresses a particular phenomenon in the East German vocational education system. Besides various types of education cooperation between firms and vocational training centres, there exists a wide range of publicly supported apprenticeships for so-called 'market-disadvantaged' persons in structurally weak regions. These support schemes are intended to increase the number of apprenticeships in East Germany since during the 1990s and 2000s in particular many young people faced unemployment after leaving school owing to the shortage of apprenticeships in East German regions.[47]

This provides opportunities not only for youths but also offers many small firms in East Germany a chance to meet their future demand for skilled employees. Small firms' engagement in subsidized vocational training, e.g. by providing internships, can be regarded as a possibility to learn more about potential future employees at a relatively low cost (compared to regular vocational training). But for various reasons, such 'atypical' forms of education have a bad reputation among both the public and potential employers. Previous analyses of subsidized vocational education reveal that the employment prospects of subsidized apprentices are less propitious than those of graduates of regular vocational training.

46 Information on the net income is available for only 67 percent of the employed youths.

47 Here we face a general problem of subsidization, namely the issue of crowding out effects. We cannot tell whether and to what degree firms possibly rely on publicly subsidized vocational training instead of making greater efforts themselves to provide regular apprenticeships.

The intention of this paper was to analyze whether this less positive employment outlook can be traced backed to real differences between the adolescents in subsidized and regular training, or whether it is the effect of support itself, as stated in previous studies. Using unique micro data, we applied matching techniques in order to control as far as possible for selection effects resulting from different personal and profession-related characteristics. In this way, we believe we can largely identify an unbiased effect of the support. Besides the 'general effect' of support, it is of special interest whether the type of practical training in subsidized education has an influence on the strength of the effect, i.e. whether the effect is stronger for subsidized youths in 'external' than in 'workplace-related' training.

The analysis is based on unique individual data (the Youth Panel) offering a large variety of relevant variables. The results based on replacement matching show that young people who successfully completed a subsidized education are disadvantaged regarding their employment opportunities solely due to the kind of vocational education they completed. Even if personal and profession-related influences on the employment prospects are controlled for, as far as our data allows us, the probability of finding adequate employment is lower than for the control group. Besides this quantitative effect, the comparison of employment characteristics shows that the graduates of subsidized training work in slightly less favourable and lower paid jobs. Another interesting result is the higher percentage of graduates of regular training who receive a job offer from their training firm after graduation, compared to that of subsidized youths. This suggests an influence of the type of practical training. A greater opportunity for firms to get to know potential future employees works to the advantage of regular apprentices as far as their employment prospects immediately after graduation are concerned.

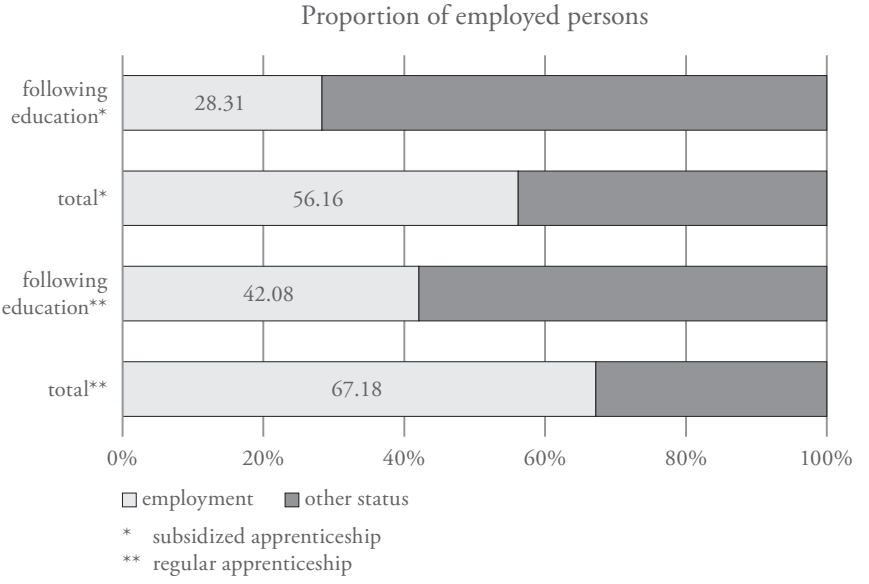
The comparison of the two types of subsidized vocational training ('external' and 'workplace-related') does not show a quantitative employment effect, but some qualitative aspects of the subsequent employment differ. In particular, one can conclude from the higher percentage of graduates from 'workplace-related' training who receive a job offer that contact with a firm as such matters, independent of the period one spends within this firm.

This latter aspect should be analysed in more detail in further research. Greater involvement by firms in all types of vocational training might make it easier for both sides of the labor market: subsidized apprentices would have a better chance of convincing potential employers of their abilities, and of reducing common prejudices against (persons from) alternative types of education. At the same time, it would open up opportunities for small firms, not only in East Germany, to maintain or extend the vocational education of their own junior staff. Demographic

changes and an increasing demand for skilled labor in an aging society are likely to force firms to seriously consider all sources of qualified employees. Against this backdrop and mindful of the relevance of human capital for economic well-being, it is even more important to overcome the existing unfavorable image of subsidized vocational training.

Appendix

Figure 4: Share of Employed Persons in Percent (Subsample) – Subsidized versus Regular Apprenticeships



Note: Share of employed persons significantly different between external apprentices and their counterparts (McNemartest at the 5 percent level); 'following education' – right after graduation; 'total' – throughout observation period (12 years)
Source: Youth Panel of zsh; authors' calculations.

Table 4: Characteristics of the First Employment after Vocational Education (Subsample) Subsidized vs. Regular Apprenticeships

characteristics	subsidized apprenticeship	regular apprenticeship
number of persons	246	174
proportion of employed persons*	56.16	67.18
job offer*	21.54	39.08
job search duration* (months)	4.73 (0.50)	2.91 (0.48)
net income* (Euro)[a]	939.49 (24.08)	959.97 (24.42)
normal job	40.89	35.50
adequate job*	74.32	82.84
overtime	49.33	55.62
kind of job		
full time	85.78	81.07
part-time	12.00	15.38
marginal part-time	0.89	1.78
changing	1.33	1.78
type of contract		
permanent	44.00	42.01
temporary	55.56	52.66
no contract	0.44	2.37
self-employed	0.00	2.37
position		
low skilled[b]	15.11	8.88
skilled[c]	75.11	74.56
higher skilled[d]	8.89	13.02
high skilled[e]	0.00	2.96

Notes: Information given in absolute figures (net income and job search duration) or as percentage of the employed persons; * statistical significant differences between subsidized apprentices and their counterparts; for net income and job search duration standard error of the mean in parentheses.

[a] information available for about 79 percent of the employed persons; [b] no vocational education degree required; [c] vocational education degree required; [d] master craftsmen, technicians required; [e] academic degree required.

Source: Youth panel of zsh; authors' calculations.

Table 5: Assessment of the Matching Results – Subsidized (P) vs. Regular Training (NP)

	mean[a]			test[b]	
characteristics	P	NP	C	result	p-value
age	19.74	20.01	19.92	1	0.00
male	0.46	0.56	0.45	0	0.74
own children	0.02	0.03	0.03	0	0.44
parent's household	0.52	0.57	0.54	0	0.14
no school-leaving qualification	0.02	0.01	0.02	0	0.25
secondary school (9th form)	0.25	0.12	0.24	0	0.13
secondary school certificate	0.69	0.77	0.70	0	0.07
university entrance qualification	0.03	0.10	0.04	0	0.45
start immediately	0.32	0.44	0.31	0	0.29
military or civilian service	0.01	0.02	0.01	0	0.62
occupational preparation year	0.15	0.04	0.11	1	0.00
employment	0.06	0.04	0.06	0	0.48
unemployment	0.00	0.01	0.00	0	1.00
not finished training	0.04	0.03	0.04	0	0.48
dual vocational education	0.73	0.79	0.73	0	0.25
agriculture & forestry	0.03	0.03	0.03	0	1.00
metalworking & electrical trades	0.12	0.22	0.13	0	1.00
construction	0.06	0.09	0.07	0	0.81
misc. manufacture occupations	0.10	0.12	0.14	1	0.00
technical occupations	0.04	0.03	0.03	0	0.15
goods and services agents	0.15	0.13	0.12	0	0.07
organization, office and administration	0.18	0.16	0.20	0	0.24
health services	0.11	0.09	0.11	0	1.00
caring and educational occupations	0.05	0.05	0.05	0	0.55
misc. services	0.14	0.08	0.13	1	0.05
Brandenburg	0.12	0.14	0.10	0	0.24
Mecklenburg-Western Pomerania	0.10	0.10	0.09	0	0.54
Saxony	0.31	0.29	0.33	0	0.27
Saxony-Anhalt	0.14	0.16	0.12	0	0.10
Thuringia	0.21	0.22	0.21	0	0.90

	mean[a]			test[b]	
characteristics	P	NP	C	result	p-value
app. completed 1999–2002	0.21	0.52	0.22	0	0.37
app. completed 2003–2006	0.79	0.47	0.78	0	0.37
app. result of own effort	0.19	0.21	0.17	0	0.27
help of family or friends	0.41	0.62	0.42	0	0.18
Sum of squared distances					0.96
No. of subsidized adolescents					575
No. of controls					394
Common support:					
No. of excluded persons (P)					0
No. of excluded persons (NP)					2

Notes: [a] Proportion of persons with the respective characteristics in the sample of subsidized adolescents (P), adolescents in regular vocational training (NP), and the control group (C); [b] Scale specific tests; metrical variables: Wilcoxon sign-rank test, dichotomous: McNemartest, polytomous: χ^2-test for homogeneity. Significance level: 5 percent.

Table 6: Assessment of the Matching Results – Firm-External (P) vs. Workplace-Related Training (NP)

	mean[a]			test[b]	
characteristics	P	NP	C	result	p-value
age	19.81	19.70	19.54	1	0.00
male	0.54	0.41	0.49	0	0.08
own children	0.02	0.02	0.00	0	0.13
parent's household	0.58	0.49	0.62	0	0.36
no school-leaving qualification	0.71	0.74	0.73	0	0.07
secondary school (9th form)	0.04	0.02	0.02	0	0.22
secondary school certificate	0.32	0.22	0.34	0	0.18
university entrance qualification	0.61	0.74	0.62	0	0.25
start immediately	0.04	0.03	0.02	0	0.13
military or civilian service	0.23	0.37	0.26	0	0.18
occupational preparation year	0.02	0.00	0.00	0	0.25

	mean[a]			test[b]	
characteristics	P	NP	C	result	p-value
employment	0.23	0.12	0.21	0	0.47
unemployment	0.09	0.04	0.08	0	1.00
not finished training	0.00	0.00	0.00	0	1.00
dual vocational education	0.04	0.03	0.01	0	0.07
agriculture & forestry	0.01	0.04	0.01	0	1.00
metalworking & electrical trades	0.10	0.13	0.10	0	0.48
construction	0.12	0.04	0.08	0	0.15
misc. manufacture occupations	0.11	0.10	0.14	0	0.07
technical occupations	0.06	0.04	0.03	0	0.13
goods and services agents	0.11	0.16	0.16	0	0.07
organization, office and administration	0.24	0.16	0.21	0	0.18
health services	0.11	0.12	0.09	0	0.45
caring and educational occupations	0.03	0.06	0.04	0	1.00
misc. services	0.12	0.15	0.14	0	0.45
Brandenburg	0.11	0.13	0.09	0	0.34
Mecklenburg-Western Pomerania	0.10	0.11	0.11	0	0.82
Saxony	0.31	0.31	0.33	0	0.71
Saxony-Anhalt	0.17	0.12	0.13	0	0.21
Thuringia	0.27	0.18	0.27	0	0.85
app. completed 1999–2002	0.33	0.15	0.32	0	0.68
app. completed 2003–2006	0.67	0.85	0.68	0	0.37
app. result of own effort	0.30	0.46	0.34	0	0.23
help of family or friends	0.13	0.21	0.14	0	0.66
Sum of squared distances					0.76
No. of subsidized adolescents					181
No. of controls					128
Common support:					
No. of excluded persons (P)					1
No. of excluded persons (NP)					10

Notes: See Table 5.

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SUMMARY

Using replacement matching on the basis of a statistical distance function we try to answer the question of whether subsidized vocational training is related to a negative image effect for the graduates.

The results show that young people with equal qualifications acquired during subsidized vocational training are disadvantaged solely due to the kind of education they have received. The probability of finding adequate employment is lower than in the control group. Besides the 'general effect' of support we also find less favourable job opportunities for those who attended 'external' as compared to 'workplace-related' training.