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Abitur and What Next? Reasons for Gaining Double Qualifications in Germany

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Abstract

This paper deals with the reasons for first taking up vocational training after obtaining the German upper secondary school-leaving certificate (Abitur) instead of going straight on to academic education. The study uses the data from the BiBB/BAuA employment survey 2006, where not only educational paths are included, but also the final marks of those interviewed who had passed the Abitur. Our key result is the positive and highly significant impact which the Abitur mark has on the probability of gaining double qualifications. This confirms the hypothesis of Büchel/Helberger (1995) according to which individuals who have passed the Abitur opt to take up in-firm vocational training before going into higher education in order to protect themselves against the risk of failing during the studies. In addition to this there are indications that individuals' education decisions are also geared towards their employment prospects after training and that double qualifications are chosen especially in fields where there are "related" occupations in Germany's dual system of vocational training. Furthermore, we do not find significant differences for the sub-samples of western Germans with a university entrance qualification (Abitur) and those with a qualification providing access to studies at a polytechnic (Fachabitur).

Zusammenfassung

Der Beitrag beschäftigt sich mit den Gründen nach dem Abitur zunächst eine duale Ausbildung aufzunehmen und dann ein Studium anzuschließen, anstatt direkt ein Studium zu beginnen. Die Studie erfolgt mit den Daten der BiBB/BAUA-Erwerbstätigenbefragung 2006, die nicht nur den Vorteil einer komplexen Abfrage von Bildungswegen hat, sondern auch die Abiturnote der befragten Abiturienten enthält. Unser zentrales Ergebnis ist der positive und hochsignifikante Einfluss der Abiturnote auf die Wahr-

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scheinlichkeit einer Doppelqualifikation. Damit wird die Hypothese von Büchel/Helberger (1995) bestätigt, dass Abiturienten sich vor ihrem Studium für die Aufnahme einer betrieblichen Berufsausbildung entscheiden, um sich damit gegen das Risiko eines Scheiterns während des Studiums abzusichern. Daneben finden sich Hinweise darauf, dass sich die individuellen Bildungsentscheidungen auch an den Arbeitsmarktchancen nach der Ausbildung orientieren und dass Doppelqualifikationen vor allem in den Bereichen gewählt werden, in denen es „verwandte“ Berufe auf der Ebene der dualen Ausbildung gibt. Weiterhin haben wir keine signifikanten Ergebnisse für die Teilstichproben der westdeutschen Abiturienten und Fachabiturienten ermittelt.

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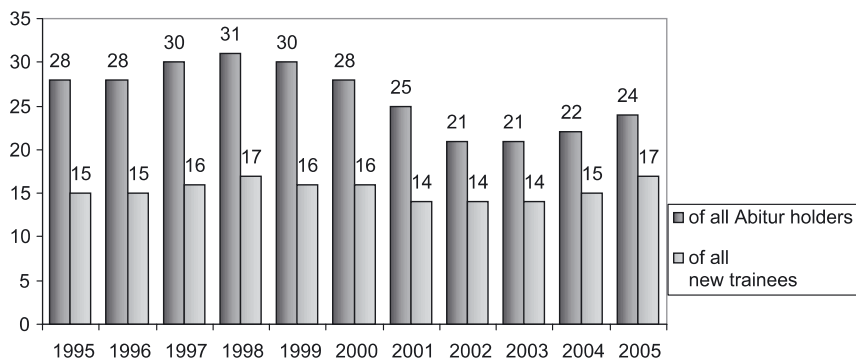
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1. Introduction

In 2007 the journal “Labour Economics” published a special issue on the subject of “Education and Risk” with the participation of such well-known authors as Joop Hartog and James Heckman. In this special issue it was emphasised that consideration of individual risks is largely absent in decisions about investment in human capital, unlike with investment in physical or financial capital (Hogan/Walker, 2007). There are, however, some seminal studies which examine the risks associated with education decisions (e.g. Levhari/Weiss, 1974). To our knowledge the discussion about the role of the vocational training of graduates which was initiated by Büchel/Helberger (1995) has not been taken up again more recently. This is surprising in the light of the prevalence of the phenomenon. Many young people in Germany complete more than one course of vocational training or education. Most of the second qualifications gained are higher qualifications. For instance one in four individuals commencing higher education in the winter semester 2005/2006 had already completed vocational training before going into higher education (cf. Heine et al., 2007). As is shown in Figure 1, the proportion of individuals who had passed the Abitur examinations concluded a new vocational training contract has declined during the last decade, whereas the proportion of the individuals commencing vocational training and had gained the Abitur as their highest school qualification has increased and reached 17% in the year 2005.

Although in the training year 2007/2008 the number of vocational training contracts concluded increased clearly compared with the previous years, especially in western Germany, the situation on the market for training places still has to be assessed as critical. After the number of newly concluded training contracts reached its peak in 1984, at 705,000 in western Germany, a steady process of decline began which reached a low in 1996 at about 435,000 new contracts (Troltsch/Walden, 2007). Since then upward and downward trends

have alternated. In the training year 2007/2008 a value like those of the early 1990s was again ascertained (Bundesinstitut für Berufsbildung, 2008). In particular for young people leaving lower secondary school (Hauptschule), access to courses of training in the dual system of vocational training is becoming increasingly difficult, on the one hand due to increased qualification requirements in the training occupations and on the other hand owing to school-leavers who have passed the Abitur examinations surging onto the market for training places.



Source: IWD 2007.

Figure 1: Abitur holders with a new vocational training contract and new trainees with Abitur 1995–2005 (as percentages)

The comparatively low share of new students as a proportion of all people with qualifications entitling them to enter higher education, (which is small compared internationally (Autorengruppe Bildungsberichterstattung, 2008, 118)), could be put down to the fact that young people who have passed the Abitur first opt to take up in-firm vocational training in order to protect themselves against the risk of failing during the studies or because they want to improve their occupational options overall. If the selected detour proves to be attractive, the individual might decide not to go on to university or polytechnic (Fachhochschule).

The question as to the economic evaluation of these educational paths also arises in so far as the higher individual opportunity costs of extended education and training paths are faced by lower incomes at least at the start of working life (Büchel/Helberger, 1995). According to the findings of Büchel/Helberger (1995), it takes people with double qualifications even longer to find a suitable job for their qualification level than people with single qualifications. Furthermore, since individual and company investment in firm-specific and occupation-specific human capital is at least partially lost when an individual commences higher education after completing company vocational training,

Büchel/Helberger (1995) come to the conclusion that the decision to go into vocational training is determined to a considerable extent by risk considerations.

Although the empirical findings of Büchel/Helberger (1995) have not remained unchallenged (Lewin/Minks/Uhde, 1996 and Bellmann et al., 1996) and have caused further empirical studies (Büchel, 1997), individual motives for gaining double or multiple qualifications have so far not been investigated in detail. One of the reasons for this are the challenges for the respondent involved in recording long and complex educational paths. The BiBB/BAuA employment survey 2006 contains retrospective information on all completed education and training. This data pool was used to examine the determinants of individuals' decisions between going straight into higher education after passing the Abitur and completing a course of vocational training between the two phases of education¹. Here the influence of the mark attained in the Abitur examinations can be taken into consideration for the first time. It is thus possible to test directly the Büchel/Helberger hypothesis, which sees an insurance strategy of the individuals as the reason for gaining double qualifications.

This paper is structured as follows: in the next section the hypotheses to be tested are presented. Then the data set and the variables used are described and the empirical findings are presented. In the fifth section these empirical findings are then discussed against the background of the current reforms in higher education. The sixth section summarises the key results.

2. Hypotheses

In this section the most important contributions to the debate on gaining double and multiple qualifications are taken up, at least in so far as they can be examined empirically using the data from the 2006 BiBB/BAuA employment survey.

Hypothesis 1: Double qualifications are the result of insurance strategies

In addition to the position of graduates on the labour market, Büchel/Helberger (1995) see the negative assessment of the conditions for studying as a motive for people entitled to enter higher education (first) completing an apprenticeship in the dual system of vocational training. The levels of funding from the federal and state governments for the universities, which are also low when compared internationally, lead to the universities being permanently under great strain and thus almost inevitably to a deterioration of the quality and

¹ Thus, we do not consider sequential education careers, in which vocational training is undertaken before the Abitur is gained.

conditions of studies. According to the results of a survey of student dropouts conducted by the Higher Education Information System (Hochschulinformationssystem – HIS) the proportion of students dropping out of higher education in 2004 was 24% at universities and 17% at polytechnics. This rate has fallen compared with the results of the survey conducted in 2002 (Konsortium Bildungsberichterstattung 2006, 112). Despite this decrease, the proportion of students dropping out of higher education could be the reason for many young people with university or polytechnic entrance qualifications to use the option of company vocational training, the “secondary option” of the Abitur, in order to cover themselves against the event of failing in their studies. The less capable individuals with entrance qualifications for higher education, those who gained lower marks in their Abitur, could assess themselves as being particularly at risk of not managing to gain a degree. In fact there are indications that people with university or polytechnic entrance qualifications who have completed vocational training in the dual system have lower Abitur marks than students who have not done vocational training (Ulrich et al. 1997). Nonetheless there can of course be considerable differences between the overall Abitur mark and the marks in the individual subjects, which are the components of the Abitur certificate. These differences are relevant in so far as an individual’s achievements in his/her chosen subjects can differ from his/her average performance. Furthermore, Büchel/Helberger (1995) argue that because the employment prospects for university graduates had been deteriorated, people with university entrance qualifications tend to protect themselves by means of a strategy of cumulative education and training. However, the increase in the unemployment rates of academics during the 70s and 80s came to an end in the 90s. Additionally, the returns to education for the highly qualified have risen since then (Gernandt/Pfeiffer, 2006; Kohn, 2006; Dustmann et al., 2007, Alda et al., 2008). Although the worse employment prospects of university graduates could not provide an argument for acquire double qualifications in order to avoid unemployment in the last years, it could be regarded as a motive until the 90s – especially for women, migrants and people in Eastern Germany².

Hypothesis 2: Double qualifications are related to the vocational training course with regard to content

According to the results of the German Life History Study about 40% of the respondents from the 1964 birth cohort had begun a second course of education or training by the age of 34. 30% had even completed more than one post-school qualification. About 60% of the second qualifications were higher

² Persons who completed their training and education in the 70s and 80s are represented in the BiBB/BAuA employment survey 2006. The development of the unemployment rates of women in comparison to men are discussed in Schreyer (2008, 120–156).

qualifications. Roughly two thirds of the second qualifications were in a subject or occupation related to the first qualification, thus supplementing and expanding the first qualification. The combinations of courses of education and training mainly consist of initial vocational training in a firm followed by non-academic further training (29%) and studies at a polytechnic or university (22%) (Jacob, 2004).

Double qualifications are to be expected above all in areas in which there is a content-related connection between the training and the subsequent degree course (e.g. metal and electrical occupations and an engineering degree, commercial occupations and a degree in economics). A counter example is provided by the education sector, where it is not possible to finish apprenticeship training before studying at a university. Therefore, individuals seeking employment in this sector have to take a larger risk because the missing apprenticeship training opportunities. People with double qualifications may be “education strategists” who plan their career specifically or people who go into a related degree course after completing training due to a lack of employment prospects or not being taken on after training (Lewin et al., 1996; Herget, 1997; Ulrich et al., 1997).

In addition to these influences, the individuals’ socio-economic background, the social and cultural capital and other context factors are of importance for decisions regarding education and training or for the educational path (Bourdieu, 1983). Especially in the case of entry to university, the educational level of the parental home has often been determined as an important influencing factor (Konsortium Bildungsberichterstattung, 2006, 103). As such social context variables at the time when the education decision is made are not in the available data set, we do not go into them in more detail.

And of course there might be other reasons for gaining double qualifications: According to Buttler/Tessaring (1993) it is becoming increasingly obvious that education is no longer seen as specifically qualifying for an occupation but is more a case of improving occupational options overall. In their opinion the main aim of those participating in education is to delay the decision regarding a certain choice of occupation for as long as possible and at the same time to obtain the best possible option for oneself. Which options are chosen depends more on the expected employment prospects than on the contents and conditions of the respective vocational training courses. In principle large uncertainty, e.g., in regions with worse labour market conditions seems to be important as well. However, the great advantage of Abitur is that it leaves all career paths open. Jacobs (2007) is of the opinion that some school-leavers with qualifications entitling them to enter higher education first take up employment, in some cases in the form of vocational training, also in order to obtain better information about the returns to higher education.

3. Data Set and Descriptive Analysis

The BiBB/BAuA employment survey 2006 is conducted as a representative computer-assisted telephone interview (CATI) of 20,000 working people in Germany. The survey was conducted jointly by the Federal Institute for Vocational Education and Training (Bundesinstitut für Berufsbildung – BiBB) and the Federal Institute for Occupational Safety and Health (Bundesanstalt für Arbeitsschutz und Arbeitsmedizin – BAuA) from October 2005 until March 2006. The population is people in gainful employment aged 15 or above (excluding trainees). An activity for at least ten hours per week on a regular basis for payment (“core employees”) consists of regarded as gainful employment. The differences compared to the microcensus which usually occur with surveys on a voluntary basis were corrected by means of a multilevel, iterative weighting procedure.³

The survey focused firstly on questions about the employee’s job. Secondly questions were asked about the relationship between the occupational activity or the occupational status and the employee’s qualifications. Here information was gathered about the types of education, training and further training which led to a vocational qualification. The details on the training occupations were given the four-digit code of the occupational class according to the “Classification of Occupations”, edition 1992, of the Federal Statistical Office.

Table 1

Multiple qualifications by school-leaving certificate and age (as %)

Highest school-leaving certificate	No school-leaving certificate	Lower secondary leaving certificate	Intermediate school-leaving certificate*	Abitur, Fachabitur**	Total
No vocational qualifications	58.5	13.6	6.5	8.1	10.5
One vocational qualification	33.9	67.5	65.7	57.4	62.9
Multiple voc. qualifications	7.6	18.9	27.8	34.5	25.6
Age	15 – 30	31 – 40	41 – 50	51 and above	Total
No vocational qualifications	18.6	8.3	8.6	9.2	10.5
One vocational qualification	69.4	62.6	60.5	61.3	62.9
Multiple voc. qualifications	12.0	29.1	30.9	29.4	26.6

* incl. the intermediate secondary school of the GDR (Polytechnische Oberschule – POS), certificate of aptitude for specialised upper secondary studies (Fachoberschulreife); ** incl. the upper secondary school of the GDR (Erweiterte Oberschule – EOS).

Source: BiBB/BAuA employment survey 2006, weighted data, own calculations.

³ Further information about the methodology can be found under www.BiBB.de/arbeit-im-wandel.

The BiBB/BAuA employment survey 2006 demonstrates that roughly one in four employees possess multiple qualifications. In the 31–40 age group about one in three employees has more than one post-school qualification (cf. Table 1). This rate largely corresponds to the result obtained by Jacob (2004) for the 1964 birth cohort, for which she ascertained a proportion of some 30% of people up to the age of 34 who had gained more than one qualification. The employment survey also shows that the phenomenon of gaining multiple qualifications also occurs among older people and hardly changed over the three older age cohorts.⁴

4. Multivariate Analysis

The results in this paper refer to employed people who have passed the Abitur or the Fachabitur (certificate of aptitude for specialised higher education, e.g. at a polytechnic) and who gained their school-leaving certificate in Germany. Only people who went straight into higher education or first completed a course of vocational training in the dual system⁵ and then went on to take a degree after passing their Abitur or Fachabitur examinations are observed. This comprises about 60% of all individuals passing the Abitur. Most of the remaining third of the employees surveyed had completed a training course in the dual system of vocational training (some of them then expanding this with a further training qualification) or a course of vocational training within the education system (e.g. Berufsfachschule), or had not (yet) gained a qualification.

If not stated otherwise the variables used refer to the point in time, when the individuals gain their upper secondary school-leaving certificate (Abitur/Fachabitur). As already mentioned, people who gain their Abitur after completing vocational training are excluded.

4.1 Empirical Strategy and Operationalisation

If hypothesis 1 applies, people with good school marks and a high-quality school-leaving certificate less frequently choose the path of double qualifications as they have less need to cover themselves against the event of failing to gain a degree by completing vocational training beforehand. Hypothesis 1 is tested using a set of three variables. The type of school-leaving certificate (Fachabitur or Abitur), the mark and the age at which the Abitur/Fachabitur was passed are included in the model. The Abitur mark is computed as the average of the marks in the different subjects and, therefore, measured as an

⁴ As some 95% of the second qualifications are gained by the age of 40, a quasi-cohort effect underlies the age differentiation shown here.

⁵ School-based vocational training is excluded due to its limited comparability.

ordinal variable with one decimal place. According to hypothesis 1, people who gained the Fachabitur, people with lower marks and older people (as an indicator of people who had to repeat one or more classes) should be more likely to opt for gaining double qualifications after leaving school. Since with increasing age, the time available for a higher education qualification to pay for itself decreases, the age squared is also included in the model.

Four variables are included to test hypothesis 2. These variables indicate the field in which the individuals studied: in the technical field, in the sciences, in the field of health and education or in another field.⁶ If the hypothesis holds, double qualifications can be expected less frequently in the field of health, social sciences and education than in the other fields as there are very few occupations in the dual system of vocational training (e.g. doctor's assistant) in this occupational field. In this field it is therefore less likely that the training occupation is related in content to a subsequent degree course. Consequently double qualifications are expected to occur above all in the technical field (metal and electrical occupations followed by a degree course in engineering) and in natural sciences or the arts (commercial training and a degree course in economics).

As was done in Büchel/Helberger (1995), gender and migration background⁷ are also included in the model. As another control variable the year in which the school-leaving certificate was gained is included in the model. Because of the different employment conditions in model 3 a dummy is included which indicates where the school-leaving certificate was gained, in eastern or western Germany.

In the following, various logit models are estimated. Here the dependent variable takes on the value "zero" when the person goes into higher education immediately after leaving school and the value "one" when he or she first completes vocational training in the dual system and then goes on to higher education.

There are in principle two causes of the differences between the different sub-groups examined in the following: differing endowments of the two sub-groups and/or differences in the way that the characteristics in the sub-groups are assessed. The marginal effects of the sub-groups are therefore compared using the seemingly unrelated cluster-adjusted sandwich estimator suggested by Weesie (1999). The hypotheses to be tested are:

⁶ For the individuals who gain double qualifications the occupational field of their studies can not be available at the time when the person leaves school. Accordingly the occupational field of the subsequent field of study is used.

⁷ In the BiBB/BAuA employment survey 2006 it is possible to distinguish between the characteristics "foreign national" and "German national with a migration background". As this differentiation does not provide any additional insights, we only distinguish between people with and without a migration background in the following.

$$(1) \quad F(\bar{\eta}_A + \beta_A D) - F(\bar{\eta}_A) = F(\bar{\eta}_B + \beta_B D) - F(\bar{\eta}_B)$$

for the marginal effect of the binary variable D and

$$(2) \quad f(\bar{\eta}_A)\beta_A = f(\bar{\eta}_B)\beta_B$$

for the marginal effect of a continuous variable.

Where $F(\cdot)$ denotes the link function of a probit model, $\bar{\eta}_X$ the middle linear prediction in model X , β_X the coefficient in model X and $f(\cdot)$ the first derivation of the probit function. The test statistic of the generalised Hausman test is χ^2 -distributed with one degree of freedom (Gerner / Stegmaier, 2008).

4.2. Results

Table 2 first shows the results for western and eastern Germany. It is obvious that only few significant results are found for people who gained their school-leaving certificate in eastern Germany. The employment biographies and decisions in the GDR clearly followed different patterns from those in West Germany. The following analyses therefore refer to western Germany, with the exception of the model in Table 3, which depicts the results of another estimate that included all individuals who gained their school-leaving certificate in eastern or western Germany after 1990.

Hypothesis 1

Although the age at which the school-leaving certificate was gained is insignificant in both models, the mark and the type of school-leaving certificate clearly point to the individuals concerned pursuing an insurance strategy. Thus individuals who have gained the Abitur choose the path of double qualifications, in other words the insurance strategy, less frequently than individuals with the Fachabitur, and school-leavers with relatively low marks do so more often than school-leavers with good marks. In this respect the hypothesis suggested by Büchel/Helberger (1995) is confirmed here. As was found by Büchel/Helberger (1995), gender and migration background have no additional explanatory power for the education and training decision. However in the regression for the subsample of the persons who gained their Abitur after 1991 those persons who had a migration background less often choose a double qualification strategy. This result is in contrast to the theoretical expectation formulated in hypothesis 1 but may be explained by the problems of persons with a migration background to find a vocational training place in a firm (see Seibert, 2008).

As the sample just covers working people there might be a selection problem in the analysis. It could be argued, that just successful people (who are

working) are included. For two reasons we think that this is a minor problem. First, the unemployment rate for qualified people in Germany (academics as well as people with vocational training) is quite low (Reinberg/Hummel, 2007). Secondly, if there is a selection problem the effects for the variables representing the insurance strategy in our analysis are biased. As we only analyse employed people and we assume that the unemployed people with Abitur are more often those with bad grades, the effect is likely underestimated.

Table 2
**Probit estimates of the determinants of double qualifications (yes / no),
marginal effects**

	Western Germany	Eastern Germany	χ^2 (1)
Abitur (dummy)	-0.0557* (0.0286)	-0.1189 (0.1082)	0.24
Abitur mark	0.0745*** (0.0095)	0.0274 (0.0200)	5.05**
Age on gaining highest school-leaving certificate	0.0119 (0.0409)	0.0029 (0.0864)	0.01
(Age on gaining highest school-leaving certificate) ²	-0.0008 (0.0010)	-0.0007 (0.0012)	0.01
Year in which school-leaving certificate gained	0.0039*** (0.0007)	-0.0013 (0.0012)	15.68***
Field of studies (reference: health and education)			
Technical degree course (dummy)	0.1091*** (0.0270)	0.2174*** (0.0585)	1.47
Degree course in sciences (dummy)	0.1427*** (0.0223)	0.2292*** (0.0675)	0.50
Other field of studies (dummy)	0.1223*** (0.0272)	0.3156*** (0.0819)	2.39
Female (dummy)	-0.0033 (0.0130)	0.0063 (0.0260)	0.09
Migration background (dummy)	0.0206 (0.0298)	0.0214 (0.0950)	0.00
Number of cases	2560	593	
Pseudo- R^2	0.09	0.10	

Standard errors below the coefficients in parentheses

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Source: BiBB / BAuA employment survey 2006, own calculations.

Table 3

**Probit estimates of the determinants
of double qualifications (yes / no), marginal effects**

	Western and eastern Germany from 1991 onwards
Abitur (dummy)	-0.1461** (0.0725)
Abitur mark	0.0561*** (0.0156)
Age on gaining highest school-leaving certificate	0.1810 (0.1164)
(Age on gaining highest school-leaving certificate) ²	-0.0047 (0.0028)
Year in which school-leaving certificate gained	-0.0049 (0.0037)
Field of studies (reference: health and education)	
Technical degree course (dummy)	0.2054*** (0.0648)
Degree course in sciences (dummy)	0.2670*** (0.0545)
Other field of study	0.2146*** (0.0584)
Female (dummy)	-0.0309 (0.0213)
Migration background (dummy)	-0.0479* (0.0266)
School-leaving certificate gained in eastern Germany (dummy)	-0.0025 (0.0281)
Number of cases	861
Pseudo-R ²	0.13

Standard errors below the coefficients in parentheses

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Source: BiBB / BAuA employment survey 2006, own calculations.

Hypothesis 2

In all of the models the dummies for the field of studies have significantly positive effects. In all fields double qualifications are more common than in the field of health, social sciences and education. This supports the hypothesis that double qualifications, whether planned or unplanned, are selected above all in fields in which there are “related” occupations in the dual system of

vocational training. Whereas it seems unlikely that the employee's decision to gain a double qualification affects the motivation and ability to reach a certain Abitur mark and the age on passing the Abitur examination, however, the choice of a certain field of study could be associated with the individual's decision to gain a double qualification. Therefore, the coefficients of the dummies indicating different fields of study may be biased⁸.

Finally the positive influence of the year in which the school-leaving certificate was gained, shows that double qualifications are rising over time

5. Consequences for Education and Training Policy

The results presented here point among other things to the insurance hypothesis (hypothesis 1) of Büchel/Helberger (1995). These risk considerations of people with school qualifications entitling them to go on to higher education can lead to an inefficient allocation of resources for several reasons. At first, the occupation-specific human capital gained during vocational training is at least partially lost as a result of the double qualifications. Secondly, firms' investment in dual-system vocational training becomes more unattractive as those completing training more frequently leave the firm in order to go on to higher education and therefore the firm's investment in human capital is lost and further staff recruitment costs are also incurred. Thirdly, the increasing demand for training places by people who have passed the Abitur leads to a rise in the level of requirements regarding the prior education of applicants for training places.⁹ This crowds out applicants with intermediate or lower secondary school-leaving certificates by those with the Abitur, which can be observed on the market for training places (Büchel/Helberger 1995). These two authors suggested changes to university education as a response to this behaviour. In order to minimise the fear of failure and thus also the risk of those with university entrance qualifications, a more practical basic degree course, supplemented by work experience, should lead to a qualification that qualifies the holder for an occupation. On the basis of this qualification it is then possible to continue higher education with a classical academic university degree course. An "insurance" against failure, in the form of vocational training before higher education, would then no longer be necessary and the duration of education and training would decrease.

⁸ Biased estimates would also be obtained if the missing information on Numerus Clausus regularities was relevant.

⁹ However technical and organisational changes might also have an independent impact on the level of entry requirements of applicants for training places. This development is reflected above all in the development of new training regulations for example for mechatronics technicians and specialist IT technicians.

The results of the estimates in Table 4, however, are not in favour of these considerations and reforms. Here the model was calculated separately for western Germans with the Abitur and the Fachabitur. In the case of the individuals who had obtained the Abitur, the Abitur mark has a highly significant influence on the decision regarding the subsequent education and/or training. In the case of people who had obtained the Fachabitur, who are entitled to study only at polytechnics (Fachhochschulen) or at a few combined university/polytechnics (Gesamthochschulen), the Abitur mark is obviously of hardly any importance. However, the difference between the marginal effects of the two groups is insignificant. The hypothesis that people with the Abitur and people with the Fachabitur make the same considerations can therefore not be rejected.

Table 4

Probit estimates of the determinants of double qualifications (yes/no) by school-leaving certificate, marginal effects

	Abitur	Fachabitur	χ^2 (1)
	Model 4	Model 5	
Abitur mark	0.0742*** (0.0097)	0.0538 (0.0372)	0.23
Age on gaining highest school-leaving certificate	-0.0183 (0.0403)	0.1461 (0.1076)	2.35
(Age on gaining highest school-leaving certificate) ²	0.0001 (0.0010)	-0.0046* (0.0026)	2.50
Year in which school-leaving certificate gained	0.0036*** (0.0007)	0.0071** (0.0033)	2.83*
Field of studies (reference: health and education)			
Technical degree course (dummy)	0.1209*** (0.0293)	0.0366 (0.0700)	0.65
Degree course in sciences (dummy)	0.1471*** (0.0226)	0.0198 (0.0818)	2.35
Other field of study	0.1125*** (0.0278)	0.1787 (0.1139)	0.35
Female (dummy)	-0.0024 (0.0132)	0.0110 (0.0543)	0.05
Migration background (dummy)	0.0212 (0.0306)	-0.0531 (0.0553)	2.01
Number of cases	2380	180	
Pseudo-R ²	0.09	0.19	

Standard errors below the coefficients in parentheses. Samples restricted to Western Germany
 * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Source: BiBB / BAuA employment survey 2006, own calculations.

When it is taken into account that polytechnics have long been practice-orientated and have provided qualifications which qualify the holder for an occupation, and that they were introduced for precisely that reason, the changes to university studies suggested by Büchel/Helberger are in theory equivalent to the bachelor and masters courses. For sure the implementation of the courses at German universities in the context of the Bologna Process is at the moment not finished and deals with several other problems. But even if this process once will be successful accomplished, the bachelor and master courses have to be called into question with regard to reducing the number of people gaining double qualifications if the empirical results of our study are corroborated by further studies.

The quality and conditions of higher education are of key importance for the Büchel/Helberger hypothesis. The HIS studies on the motives of higher education drop-outs show that in addition to a lack of motivation to study and financial problems, the reasons given for dropping out of higher education include occupational reorientation and, only in fourth place, achievement problems (Konsortium Bildungsberichterstattung, 2006, 112).

6. Summary

This empirical study was conducted using the data from the BiBB/BAuA employment survey 2006, which not only has the advantage of a complex survey of educational paths but also contains the final marks of those interviewed who had gained the Abitur. Our key result is the positive and highly significant influence of the Abitur mark on the probability of gaining double qualifications in the sub-sample of university graduates who passed their Abitur examinations in eastern Germany after 1990 or in western Germany. This therefore confirms Büchel/Helberger's (1995) hypothesis that people who have passed the Abitur opt to do vocational training before going on to higher education in order to cover themselves against the risk of failure during the studies. We interpret the significance of the year in which the Abitur was gained as confirmation of the hypothesis that the individual education/training decision can be regarded nowadays as a strategy to improve occupational options. Moreover, we found empirical evidence in favour of the hypothesis that double qualifications are selected above all in the fields in which there are "related" occupations in the dual system of vocational training.

The risk considerations of people with qualifications entitling them to enter higher education can lead not only to an inefficient allocation of resources and less willingness to provide vocational training on the part of firms but also to applicants for training with lower and intermediate school-leaving certificates being crowded out by those who have gained the Abitur. We therefore also discussed the arguments put forward by Büchel/Helberger (1995) for making

changes to university education in order to reduce the fear of failure and thus also the risk of those entitled to enter higher education. The changes suggested correspond largely with the idea of the bachelor and masters courses introduced in the context of the Bologna Process, which is not yet finished and struggles with several other problems. Since our empirical results for the subsamples of western Germans with the Abitur and western Germans with the Fachabitur do not differ significantly, we do not expect the newly created possibility of studying for a bachelor degree alone to lead to a reduction in the proportion of graduates with double qualifications. This assessment is made, however, under the assumptions that the diplomas that have so far been awarded by German polytechnics are largely equivalent to the new bachelor degrees and that our empirical results are corroborated by further studies.

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Appendix: Summary statistics

Variable	Mean	Std. Dev	DV
double qualification	0.130		yes
Abitur	0.938		yes
Abitur mark	2.152	0.652	no
age on gaining highest school-leaving certificate	19.436	1.548	no
year in which school-leaving certificate gained	1982.47	10.022	no
technical degree course	0.218		yes
degree course in science	0.289		yes
other field studies	0.169		yes
migration background	0.042		yes
female	0.462		yes
Number of observations	3465		

DV indicates dummy variables.

Source: BiBB / BAuA employment survey 2006, own calculations.