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Successful Apprenticeship-to-Work Transitions: On the Long-Term Change in Significance of the German School-Leaving Certificate

Felix Büchel

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Felix Büchel
Max Planck Institute for Human Development, Berlin, DIW Berlin, Technical University of Berlin and IZA, Bonn

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IZA

P.O. Box 7240
D-53072 Bonn
Germany

Tel.: +49-228-3894-0
Fax: +49-228-3894-210
Email: iza@iza.org

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ABSTRACT

Successful Apprenticeship-to-Work Transitions: On the Long-Term Change in Significance of the German School-Leaving Certificate*

The quality of labor-market entry achieved by newly qualified apprentices in West Germany is analyzed from 1948 to 1992. A bivariate probit model, using data from the BIBB/IAB employment survey, is applied to estimate simultaneously the quality of the school-to-apprenticeship transition and that of the apprenticeship-to-work transition. This shows that school leavers with lower levels of general education are selected into apprenticeships with less favorable employment prospects in all analyzed time periods. However, when controlling for this selection effect, it is only in the most recent period that lower academic achievers are further penalized for the shortcomings in their general education at the apprenticeship-to-work transition. Furthermore, the crowding-out of trainees with lower levels of general education can be observed in both the less demanding and the more challenging occupational fields.

JEL Classification: I21, J21, J24, J44, J62

Keywords: School-to-work transition, human capital components, apprenticeship system

Felix Büchel
Max Planck Institute for Human Development
Lentzeallee 94
D-14195 Berlin
Germany
Tel.: +49 30 824 06 427
Fax: +49 30-824 99 39
Email: buechel@mpib-berlin.mpg.de

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Successful Apprenticeship-to-Work Transitions:
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1. Background and Research Questions

The German dual system of vocational education has long been regarded as an exceptionally successful institution. The system affords young people leaving the general education system the opportunity to learn a trade or profession in an apprenticeship lasting several years. The term "dual" reflects the specific nature of this form of training – in addition to the practical skills acquired in on-the-job training, students spend one or two days a week at vocational school, where they acquire the necessary theoretical background knowledge (for an overview of the institutional organization of this system, see Tessaring 1993, Soskice 1994, Franz/Soskice 1995, Müller et al. 1998: 144ff, Neubäumer 1999).

The success of this type of training program for young people who do not wish to continue their education in the purely academic context is confirmed by numerous indicators, including the youth unemployment rate in international comparison (OECD 2000). This positive evaluation of the system is validated even by more complex indicators (Büchtemann et al. 1994, Winkelmann 1996). Indeed, the altogether very favorable image of the German "dual system" has prompted a number of countries – including the USA (see Harhoff/Kane 1997, Gitter/Scheuer 1997, Hamilton/Hamilton 1999) – to endeavor to adopt a similar approach. Most EU countries now offer corresponding forms of apprenticeship program, albeit with differing levels of priority (cf. Ní Cheallaigh 1995).

Recently, however, a growing body of opinion in Germany has been predicting a rather bleak future for the dual system of vocational education. Two secular trends present serious problems for the institution. First, job requirements are increasing rapidly as a result of the accelerating technological progress. This raises the question of whether instructors – particularly those working in the vocational schools – are in a position to react quickly enough and adapt the contents of the training programs to the new conditions. Second, the question arises of whether the apprentices are at all capable of satisfying the constantly increasing job requirements. This central problem is further compounded by the sustained expansion of the German education system since the late 1960s: An increasing proportion of those school leavers who, by reason of their social background, would formerly have been most likely to take up an apprenticeship, now have access to higher education. This means that, compared to the past, there is negative selection of the school leavers entering apprenticeships. As yet, the effects of these two mutually dependent and intersecting secular trends on the efficiency of the dual system – measured in terms of the employment prospects of the appren-

tices it produces – have only been investigated in rather rudimentary form; only very few sociological studies are available (Blossfeld 1988, Handl 1996, Konietzka 1999).

In this presentation, the employment prospects of recently qualified trainees will be operationalized in a proxy approach, based on the quality of their labor-market entry. The questions to be addressed are as follows: Have the employment prospects of newly qualified trainees deteriorated over the course of time? Does this hold especially for trainees with a poor level of general education or trainees in particular occupational groups? Furthermore, does the pattern of results hold when taking into account that disproportionate numbers of young adults with a poor educational background have always been selected into apprenticeships with poor employment prospects? Finally, are potential changes in the occupational risks of trainees with low levels of general education to be observed in the more demanding or in the less challenging occupational fields?

2. Methodology

Data and Case Selection

The empirical analyses are based on data from the BIBB/IAB employment survey. This data set was gathered by the Federal Institute for Vocational Training BIBB, Berlin, in collaboration with the Federal Employment Service's Institute for Employment Research IAB, Nuremberg. It is representative for Germany and contains retrospective information on the educational and occupational careers of approximately 34,000 residents of West and East Germany. Following surveys in 1979, 1985/86 and 1991/92, the most recent wave of the survey was conducted in 1998/99. Because the data from the latest wave of the survey has not yet been released to the public, the present study is based on data from the 1991/92 wave (for details of this database, see Jansen/Stooß 1993, p. 7ff. and p. 163ff.). The stark differences in the labor market structures of West and East Germany over the entire postwar era make it necessary for the two areas to be analyzed separately. As such, the present analysis is restricted to West Germany. The BIBB/IAB survey was restricted to members of the economically active population,[1] with non-Germans being surveyed only if they had an adequate command of the German language. As the latter kind of restriction entails obvious methodological problems, non-German respondents are excluded from the present analyses.

[1] Restricting the parent population to economically active respondents constitutes a systematic selection of trainees that should be taken into account when interpreting the results.

In the present study, the focus is on all those who have completed an apprenticeship. In the interests of homogeneity, the analyses are restricted to those who served their apprenticeship in the postwar era. Accordingly, only those who gained their apprenticeship qualification between 1948 and 1992 are included in the analyses. For the same reason, the few individuals who served an apprenticeship after completing a higher education degree are also excluded from the analyses.

Phase of Transition

Irrespective of the particular training system, the course of the future career path is largely determined by the quality of labor-market entry (see, e.g., Inkmann et al. 1998, Burgess et al. 1999, Klotz et al. 2000). Accordingly, the phase of transition from the apprenticeship to the world of work has always been of particular interest to educational and labor market researchers (Palamidis/Schwarze 1989, Büchel 1994, Helberger et al. 1994, Büchel/Neubäumer forthcoming; for an international perspective, see Shavit/Müller 1998, Gangl 2000; for an overview of current research questions, see Raffe 1997). A central advantage of this approach is that the effects of age and occupational experience are essentially neutralized, making it possible for cohort or period effects to be isolated (see, e.g., Blossfeld 1985). In the data set under analysis, respondents were asked the following question: "How did you fare immediately after your apprenticeship?" All respondents who belonged to the economically active population "immediately" after completing their vocational training (employed and unemployed respondents; the latter category including those who "only had a casual job") were taken into consideration. In other words, respondents who were neither employed nor actively looking for a job "immediately" after completing their apprenticeship, but were in further education, serving a voluntary social year, doing their military/community service, or in voluntary unemployment were not included in the analyses.

Definition of a Successful Apprenticeship-to-Work Transition

Those respondents who stated that they were unemployed or only had a casual job immediately after completing their apprenticeship were classified as "unsuccessful." The question of whether the dual system accomplishes its goal of preparing apprentices for specific occupations was also considered: Those who stated that they "found a job immediately, but not one corresponding to (their) qualifications," were classified as "unsuccessful" in terms of their – assumed – ambition to serve an apprenticeship that would later secure them an appropriate position in which their skills were fully utilized (for further information on the concept of overeducation, see Büchel 2001). The group

deemed to be "successful" thus contained those who stated that they found a job corresponding to their qualifications immediately after completing their apprenticeship.[2]

Periods of Observation

To allow for the identification of cohort or period effects, the total period of observation (1948-1992) was subdivided into three shorter periods. This division was made on the basis of the economic conditions prevailing in West Germany in each of the periods. The initial postwar period (1948-1959) was characterized by normalization and decreasing unemployment figures. This was followed by a second phase (1960-1975), with a booming economy and low unemployment. The third and final phase (1976-1992) was marked by mounting economic difficulties and growing unemployment rates; at the same time, the effects of the imposed expansion of the education system started to become apparent. All of the following analyses were conducted for each period separately.

Analysis Procedure

In a first descriptive step, highly aggregated frequency distributions, broken down by time period only, were computed for the respondents' employment status immediately after completing their apprenticeship (Table 1). In a second descriptive step, this information was broken down according to school-leaving certificate and gender (Table 2). For the sake of clarity, data on the school-leaving certificate was condensed into two categories: "poor education" (*Hauptschule* certificate or no qualifications at all) and "good education" (*Realschule* certificate or above).

Following this, the results presented in Table 2 were re-examined in a multivariate approach. For each period, binary probit models (cf. Greene 2000: 812ff.) were used to identify factors impacting on the quality of the apprenticeship-to-work transition (Table 3). Because systematic correlations were expected between the school-leaving certificate and gender, these two central variables were controlled in the form of interaction terms. The following additional control variables were also entered in the equation: occupational field of the apprenticeship (aggregated into 13 groups, with the broad group of the metalworking occupations serving as the reference category), the size of the

2 When interpreting these results, it is important to bear in mind that this proxy approach is based on a short period in the lives of the respondents: Transitions from an apprenticeship to an adequate position occurring only after a transitional period of unemployment, casual work, or skill mismatch are categorized as "unsuccessful," even though the respondent may subsequently have found a position corresponding to his or her skills within a very short period of time.

firm providing the apprenticeship training, whether the respondent served the apprenticeship in a firm authorized to provide apprenticeship training or in a public financed training center ("external training"), the sector of the firm providing the training (public sector: yes/no), the duration of the apprenticeship in years, and the unemployment rate at the time the newly qualified apprentice entered the labor market.

In a next step, account was taken of the fact that gender and schooling correlate systematically with the choice of apprenticed trade/profession (see, e.g., Kühn/Zinn 1998). Using a bivariate probit model (cf. Greene 2000: 849ff.), the analysis described above was replicated, this time controlling in a second equation for the relationship between gender, schooling, and the choice of an apprenticeship with "poor" employment prospects (Table 4).[3] To this end, the occupations were first ordered according to the quality of the later apprenticeship-to-work transition, and the sample then split into two parts of similar size.[4] In addition, account was taken of information already available from Table 3, namely that trainees who do not serve their apprenticeship in a firm authorized to provide training have systematically lower chances of realizing a successful transition to the world of work. Serving an apprenticeship in an authorized firm was thus taken as an additional criterion for an "apprenticeship with good employment prospects".[5]

In a final step in the analysis, it was investigated whether or not the pattern of results presented in Table 3 for the total sample in each period holds when considering only occupations with "good" or "bad" employment prospects. After splitting the sample accordingly, the analysis performed in Table 3 was replicated for each of these subgroups (Table 5).[6]

3 The distribution of the covariates is documented in Table A1 in the Appendix.

4 These results are not presented in table form; information on the classification of occupations is provided in the notes to Table 4.

5 Accordingly, the cases are not distributed equally between apprenticeships with "good" and "poor" employment prospects.

6 The reference categories used in the analysis of the apprenticed trades/professions were as follows: For occupations with "poor" employment prospects: the metalworking occupations, which scored relatively low in all time periods; for occupations with "good" employment prospects: clerical occupations in banks, insurance companies, and public administration, which scored relatively high in all time periods.

3. Empirical Results

Descriptive Results

Table 1 contains the employment status distribution of those respondents who belonged to the economically active population immediately after completing their apprenticeship. This first highly aggregated analysis is broken down by the year the apprenticeship was completed only.

-- please insert Table 1 about here --

The results confirm that the German dual system of vocational education has operated at a consistently high level of efficiency over an extended period of time. Newly qualified trainees in search of work were almost entirely absorbed by the labor market throughout the entire postwar era. However, some of those who realized a seamless apprenticeship-to-work transition did have to accept a position for which they were overqualified. The proportion of those entering the labor market with this sort of skill mismatch accounted for about one-tenth of the respondents throughout the period of investigation. On the general level, it can thus be concluded that the dual system does indeed achieve its goal of enabling young adults to enter the labor market. However, the system does not appear to live up to its more specific – and assumed – goal of providing young adults with vocational qualifications that can be fully exploited on the labor market – not immediately, at least. In this respect, a notable proportion of the apprenticeship-to-work transitions must be regarded as "unsuccessful." Although the rate of unemployment among new entrants to the labor force has risen noticeably from one to four percentage points since 1975, it is still very low.[7] When interpreting these – on the whole very encouraging – results, it is important to bear in mind that the respondents who provided them belonged to the economically active population at the time the survey was conducted; in other words, that the sample itself is the result of positive selection. On the other hand, the results would not necessarily be very different if the sample had been less specific. This would only be the case if those who were not able to realize a successful apprenticeship-to-work transition immediately after completing their apprenticeship (despite being willing to work), reacted by systematically – and to a large extent permanently – withdrawing from the labor force.

In Table 2, the two categories of respondents who were "unemployed" or in an "overqualified position" immediately after completing their apprenticeship are collapsed into a single category, and compared with those who realized a "successful" transition to an adequate position. In addition, the

7 It should also be noted that these figures include respondents with casual jobs; the actual rate of unemployment is thus even lower than indicated.

results are broken down according to gender and the quality of the school-leaving certificate acquired prior to the apprenticeship; at this stage in the analysis, no differentiation is made for the type of apprenticeship chosen. Here again, the focus is on changes to be observed over time.

-- please insert Table 2 about here --

Even when broken down according to schooling and gender, the results bear out a remarkable stability in the quality of the apprenticeship-to-work transition throughout the entire period of investigation. In almost all categories, around 90% of the trainees realized an optimal transition to the world of work. A noticeable exception can be discerned in the most recent period of observation (1975-1992), however, where there is a sharp drop in the success rate of those trainees with a poor level of general education (*Hauptschule* certificate or no school-leaving certificate at all), falling to just over 80%. Gender-specific differences are negligible here.

Control for Apprenticed Trade and Other Characteristics

In the next step, it was tested whether the deterioration in the employment prospects of trainees with low levels of schooling (see Table 2) holds when controlling for the apprenticed trade/profession, the structure of the firm providing the apprenticeship training, and the labor market situation at the time the apprenticeship was completed.

-- please insert Table 3 about here --

The results presented in Table 3 substantiate the descriptive findings: It was only in the most recent period of observation that a low level of schooling began to represent a risk factor at the apprenticeship-to-work transition. Men and women were hit equally by this development. In the time from 1948 to 1975, in contrast, the quality of general schooling acquired prior to the apprenticeship did not have any effect on the probability of realizing an optimal transition. It is striking that this result holds even when controlling for the diverse apprenticeships with varying employment prospects, and for the structure of the firms providing the apprenticeship training.

With respect to the control variables, it emerges that – relative to the group of metalworking occupations – the initial period of postwar reconstruction in West Germany (1948-1959) was a particularly advantageous time for newly qualified apprentices in the primary sector, construction workers, carpenters, and painters. Other than this, the chances of realizing a seamless apprenticeship-to-work

transition were more or less equal across the various trades and professions. In the boom period (1960-1974), occupation-specific differences in transition prospects became more clear cut as structural change in the labor market became apparent. The prospects of those in the metalworking occupations – still a broad occupational group – began to deteriorate. Although construction workers were still in demand, as were other manufacturers and technicians, there was now an increased demand for health care assistants and for clerical workers in banks, insurance companies, and public administration. Moreover, a longer period of apprenticeship now had a positive effect. In the most recent period of investigation, consolidation of the structural change can be observed. Only respondents in the more qualified, non-manual occupations (health care occupations and clerical positions in banks, insurance companies, and public administration) had above-average chances of realizing a smooth apprenticeship-to-work transition. Moreover, serving an apprenticeship in a small firm with less than ten employees began to have a detrimental effect. For the first time, a relationship emerged between the prevailing economic conditions and the chances of successful labor-market entry; this effect was rather weak, however. The only common feature in all three periods of investigation is that trainees who did not complete their apprenticeship in a firm authorized to provide training (i.e., who attended "external training" in public financed training center) had far less auspicious prospects than their counterparts who did serve their apprenticeship in such a company. This reflects the lack of practical on-the-job training of the latter group; a deficit which prevents these apprentices from accumulating company-specific human capital. This is worthy of note, as a large proportion of those trained in the dual system are hired by the firm they trained at after completing their apprenticeship.

Control for Selective Admission to Certain Apprenticeships

In the next step of the analysis, account was taken of the fact that the choice of apprenticed trade is largely determined by the level of general education attained by the school leavers competing for apprenticeships. Accordingly, it can be assumed that if we omit to control for this systematic selection at the school-to-apprenticeship transition (first threshold), the schooling effect yielded by the analysis of the apprenticeship-to-work transition (second threshold; see Table 3) will be biased. The results of a bivariate probit model estimating the quality of transitions at both thresholds simultaneously dependent on the level of schooling are presented in Table 4.

-- please insert Table 4 about here --

The results of Equation I (determinants of a successful school-to-apprenticeship transition, operationalized in terms of selection into an apprenticeship with promising employment prospects; upper portion of Table 4) show that, in all three periods under investigation, whether or not an applicant was granted access to a "good" apprenticeship was largely determined by the quality of his or her general school-leaving certificate. Compared with the reference group of male school leavers holding at least a *Realschule* certificate, candidates from the *Hauptschule* – independent of their gender – were at a clear disadvantage when it came to choosing apprenticeship. In all three time periods, young women with a good level of general education had the best chances of being admitted to an apprenticeship with good employment prospects.

Equation II yields the main findings of this step in the analysis (determinants of a successful apprenticeship-to-work transition, operationalized as before in terms of an immediate transition to an adequate position; lower portion of Table 4). The pattern of results presented in Table 3, indicating that a low level of general education did not represent a risk factor until the most recent period of investigation (1975-1992) when there was a marked shift in the situation, remains unchanged even after controlling for what have been shown to be very strong selection effects in the allocation of candidates to apprenticeships. The results computed for the control variables are somewhat weaker than in the original model, but the general pattern holds. In other words, in the earlier periods of investigation (1948-1974), although lower-achieving school leavers were selected into less promising apprenticeships, a "poor" school-leaving certificate no longer had a detrimental effect at the second threshold – the apprenticeship-to-work transition. In the most recent period of observation, in contrast, the situation for lower academic achievers worsened dramatically: If school leavers with low levels of general education were able to find an apprenticeship at all, it was – as always – likely to be in an occupation with poor employment prospects. What has changed, however, is that a low level of schooling now also had an adverse effect at the second threshold, the apprenticeship-to-work transition, even when controlling for the heterogeneity of the apprenticed trades/professions. It is clear that, in the most recent period of investigation, the dual system was no longer able to attain its objective of affording trainees (those in the same trades and professions, at least) equal opportunities on the labor market by certifying their competence in their chosen occupation.

What now needs to be explored is whether the crowding-out of trainees with lower levels of education occurs primarily in their traditional occupational sector or in the sector requiring higher levels of training. If the former were the case, this would imply, for example, that a hairdresser who atypically had a *Realschule* certificate would have better employment prospects than a fellow trainee with a *Hauptschule* certificate. In other words, *Hauptschule* leavers would face stiff competition in their traditional sector of the less demanding occupations. If, on the other hand, the latter were the

case, it would mean that a *Hauptschule* graduate who atypically was capable of completing an apprenticeship in a bank could no longer count on his or her future employment prospects being determined by this most recently acquired and highest-level qualification alone. Such a development would be highly detrimental to the career opportunities of former *Hauptschule* students.

Transitions from Different Sorts of Apprenticeships

The results presented in Table 5 show that, until 1974, the quality of the school-leaving certificate acquired prior to the apprenticeship had no significant effect on the respondents' chances of realizing a successful apprenticeship-to-work transition in either the less demanding apprenticed trades or the more challenging professions. In the most recent period of investigation, however, there was a marked change in the pattern of results: Compared with their peers with apprenticeships in comparable occupations but higher levels of general education, *Hauptschule* leavers who atypically succeeded in completing an apprenticeship in an occupation with good employment prospects had significantly lower chances of later realizing a successful apprenticeship-to-work transition. In other words, the leveling-out effect of the apprenticeship qualification apparent in the first two periods of investigation has diminished. A somewhat weaker, but nonetheless significant effect can be observed in the sector of the less demanding apprenticed trades, where a higher school-leaving certificate still pays off in the long run for those with a good level of general education who atypically decide to serve this kind of apprenticeship. Here, again, former *Hauptschule* students of both genders are at an equal disadvantage.

-- please insert Table 5 about here --

Where the control variables are concerned, a fairly even picture emerges in all models. This reflects the clear division of the apprenticed trades/professions into those with "good" and "poor" employment prospects. With respect to the negative influence that the harsh economic situation in the most recent period of investigation was observed to have on the chances of realizing an optimal apprenticeship-to-work transition, however, it is worth noting that this development only hit those seeking jobs in the less demanding occupations, but that the effect here was highly significant. This, too, is an important result, confirming that the career prospects of less qualified applicants are more dependent on economic factors.

Comparison of the magnitude and strength of the schooling effects determined for former *Hauptschule* students in the models estimated for apprenticeships with "good" and "poor" employment

prospects in the most recent time period shows that the crowding-out of newly qualified apprentices with low levels of schooling is more widespread in the more challenging sector than in the less demanding occupations. This might imply that within this more challenging domain (e.g., health care occupations and clerical occupations in banks, insurance companies, and public administration) job requirements in terms of vocational education and work experience are constantly rising, and that it is increasingly difficult for *Hauptschule* graduates to meet these demands. However, it is also conceivable that job requirements have in fact remained constant over time, but that the continuing expansion of the education system has led to increasing negative selection in the *Hauptschule*. This, too, would result in former *Hauptschule* students – even those with an apprenticeship in a more demanding occupation – having increasing difficulty in competing with fellow apprentices with higher levels of general education on the labor market. The fact that this crowding-out effect has even hit apprentices with lower levels of schooling in their traditional occupational sector of less demanding jobs – albeit to a lesser extent – should be a matter of concern for educational policy-makers, as it raises the question of which functional training routes, if any, are still open to *Hauptschule* students. Although the rate of successful apprenticeship-to-work transitions is still reassuringly high, even for trainees with a *Hauptschule* certificate, this finding cannot conceal the fact that the components of human capital acquired in general education are becoming increasingly important on the German labor market. As an apprenticeship in the dual system is still the dominant form of vocational training in the non-academic domain in Germany, this realization should have far-reaching implications for curriculum development at vocational schools.

4. Summary and Conclusions

The present study explored apprenticeship-to-work transitions using data from the 1991/92 wave of the BIBB/IAB employment survey. Respondents who secured a position corresponding to their qualifications immediately after completing their apprenticeship were deemed to have realized a successful transition. Particular attention was paid to developments in the prospects of former *Hauptschule* students over an extended time period (1948-1992).

The results show that the rate of successful transition is generally very high. In the most recent period of observation (1975-1992), however, trainees with only a *Hauptschule* certificate or no school-leaving certificate at all – irrespective of their gender – were significantly less likely to achieve a successful transition than their peers with a higher level of general education. This pattern of results holds when controlling for the occupation chosen, the characteristics of the firm providing the apprenticeship training, and the economic conditions prevailing at the time the apprenticeship

was completed. Strikingly, the pattern even holds when controlling simultaneously for the systematic selection occurring at the transition from school to certain apprenticeships. The chances that trainees with lower levels of general education will realize a successful apprenticeship-to-work transition have decreased, both in their traditional occupational sector of the less demanding trades and in the more challenging (but non-academic) occupational sector.

From the perspective of human capital theory (Mincer 1974), in the 1948-1974 period, the components of human capital acquired in the course of the apprenticeship (vocational education and work experience) proved to be more important than those acquired in general education. From the perspective of signaling theory (Spence 1973), it can thus be concluded that the most recently acquired or highest-level qualification (namely the apprenticeship) was of particular importance in this period (for a examination of both of these theories, see Weiss 1995). The dual system was thus able to fulfill its objective of providing occupational certificates that afforded trainees equal opportunities on the labor market, irrespective of the level of general education acquired prior to the apprenticeship. Since 1975, this has no longer been the case. From the perspective of human capital theory, all components of human capital now seem to be of importance. The greater importance now attached to the components acquired in general education indicates that, in an increasingly complex world of work, employees are expected to have better cognitive qualifications, and that the dual system is no longer able to compensate for deficits in the domain of general education. From the perspective of signaling theory, all educational qualifications have now become relevant. In the course of the expansion of the education system, a poor school-leaving certificate has come to be regarded as the expression of negative selection; furthermore, this unfavorable signaling effect can no longer be completely offset by gaining a “good” apprenticeship in the dual system of vocational education.

It remains only to consider the implications of these findings for educational policy. Failure to respond to the finding that former *Hauptschule* students are becoming significantly less competitive on the labor market would assume that these students and their parents are aware that the increasing negative selection of *Hauptschule* students resulting from the expansion of the German education system incurs serious risks for those who are not capable of keeping up with the trend to higher levels of education. One possible response to these findings would be to enhance the quality of instruction in *Hauptschulen*. Another option would be to introduce new forms of training to the dual system, geared to *Hauptschule* leavers – for example, by setting up shorter or less demanding training programs in occupations with good employment prospects. Though it is clear that putting these recommendations into practice will require heavy investment in terms of both resources and time, it is safe to assume that failing to respond will, in the long run, incur far greater costs.

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Table 1: Transitions from completed apprenticeship to work, by time period and first employment status, in % (West Germany, 1948 – 1992)

First employment status after completing apprenticeship:	Year of completing apprenticeship: 1948–1959	1960-1974	1975-1992
Adequate position	89	89	86
Overqualified position	10	10	10
Unemployed	1	1	4
Total	100	100	100
N of cases	2560	4401	5469

Only persons employed at time of interview (1991/92).

Foreigners and those few respondents who acquired a university degree before starting an apprenticeship were excluded.

Only persons belonging to the economically active population immediately after completing their apprenticeship (those going on to further education, doing military/community service, or in voluntary unemployment were excluded).

Weighted frequencies; unweighted number of cases.

Source: Own calculations based on data from the BIBB/IAB Employment Survey, 1991/1992.

Table 2: Transitions from completed apprenticeship to work, by time period, gender, previous schooling, and first employment status, in % (West Germany, 1948 – 1992)

	Year of completing apprenticeship:								
	1948–1959			1960-1974			1975-1992		
	First employment status after completing apprenticeship:								
	AD	OV, UE	Total	AD	OV, UE	Total	AD	OV, UE	Total
Schooling prior to apprenticeship:									
Hauptschule certificate or lower ("poor schooling")									
Men	90	10	100	90	10	100	83	17	100
Women	88	12	100	87	13	100	81	19	100
Realschule certificate or higher ("good schooling")									
Men	87	13	100	90	10	100	90	10	100
Women	91	9	100	92	8	100	89	11	100
N of cases:									
Hauptschule certificate or lower									
Men			1627			2087			1765
Women			464			930			783
Realschule certificate or higher									
Men			324			825			1368
Women			145			559			1553
Total			2560			4401			5469

AD: Adequate position ("successful transition" in view of previous training)
OV: Overqualified position, UE: Unemployment ("unsuccessful transition" in view of previous training).

Only persons employed at time of interview (1991/92).

Foreigners and those few respondents who acquired a university degree before starting an apprenticeship were excluded.

Only persons belonging to the economically active population immediately after completing the apprenticeship (those going on to further education, doing military/community service, or in voluntary unemployment were excluded).

Weighted frequencies; unweighted number of cases.

Source: Own calculations based on data from the BIBB/IAB Employment Survey, 1991/1992.

Table 3: Determinants of a successful apprenticeship-to-work transition, by time period (binary probit models, West Germany, 1948 – 1992)

	Year of completing apprenticeship:		
	1948–1959	1960-1974	1975-1992
Variable:	Coeff.	Coeff.	Coeff.
Poor schooling, male	.117	-.009	-.239**
Poor schooling, female	.113	-.084	-.283**
(Good schooling, male)			
Good schooling, female	.184	.045	-.113
Farmer, gardener, miner	.412+	.151	.194
(Metalworker)			
Electrician	.158	.172	.099
Textile worker	-.090	.286	-.028
Food worker	-.094	-.125	-.013
Construction worker	.345*	.474**	.198
Carpenter, painter	.289*	.164**	.079
Other manufacturers	.219	.742	.025
Technician	.272	.326	.077
Clerical worker	.104	.284**	.200*
Sales clerk	.011	-.042	.141
Health care assistant	.282	.455*	.389**
Other service occupation	.324	.271+	.063
Firm: < 10 employees	-.092	-.090	-.128*
(Firm: 10 – 1000 employees)			
Firm: > 1000 employees	.289+	.168	.086
No firm (external training)	-.273*	-.318**	-.303**
Public sector	.095	.060	-.028
Duration of training (years)	.090	.138**	.064
Unempl. rate at end of training	-.019	-.007	-.017+
Constant	.915**	.760**	1.113**
Mean of dependent variable	.894	.896	.862
Likelihood ratio statistic	36.6	85.0	80.8
N	2557	4395	5466

Significance levels: ** (p < .01) , * (p < .05), + (p < .10).

Dependent variable: 1 = "successful" apprenticeship-to-work transition (immediate move to adequate position); 0 = "unsuccessful" transition (move to overqualified position or unemployment).

Only persons employed at time of interview (1991/92).

Foreigners and those few respondents who acquired a university degree before starting an apprenticeship were excluded.

Only persons belonging to the economically active population immediately after completing the apprenticeship (those going on to further education, doing military/community service, or in voluntary unemployment were excluded).

Source: Own calculations based on data from the BIBB/IAB Employment Survey, 1991/1992.

Table 4: Combined determinants of first entering an apprenticeship with good employment prospects and later realizing a successful apprenticeship-to-work transition, by time period (bivariate probit models (FIML), West Germany, 1948 – 1992)

	Year of completing apprenticeship:		
	1948–1959	1960-1974	1975-1992
Variable:	Coeff.	Coeff.	Coeff.
Equation I:			
(Determinants of entering an apprenticeship with "good" employment prospects)			
Poor schooling, male	-.190*	-.395**	-.670**
Poor schooling, female	-.393**	-.746**	-.626**
(Good schooling, male)	(.)	(.)	(.)
Good schooling, female	.525**	.258**	.361**
Constant	.069	.212**	.082*
Equation II:			
(Determinants of later realizing a "successful" apprenticeship-to-work transition)			
Poor schooling, male	.123	-.013	-.260**
Poor schooling, female	.126	-.090	-.302**
(Good schooling, male)	(.)	(.)	(.)
Good schooling, female	.169	.047	-.102
Farmer, gardener, miner	.482	.131	.114
(Metalworker)	(.)	(.)	(.)
Electrician	.232	.151	.019
Textile worker	-.091	.286	-.028
Food worker	-.095	-.125	-.011
Construction worker	.417	.453+	.118
Carpenter, painter	.362*	.143	.078
Other manufacturers	.219	.722*	.023
Technician	.341	.306	.002
Clerical worker	.174	.264*	.122
Sales clerk	.011	-.042	.140
Health care assistant	.349	.436+	.316+
Other service occupation	.395	.271	.061
Firm: < 10 employees	-.093	-.090	-.127*
(Firm: 10 – 1000 employees)	(.)	(.)	(.)
Firm: > 1000 employees	.289+	.168	.086
No firm (external training)	-.310+	-.306*	-.254*
Public sector	.098	.060	-.027
Duration of training (years)	.091	.138**	.064
Unempl. rate (end of train.)	-.019	-.007	-.017+
Constant	.874**	.771**	1.151**
RHO(I,II)	.048	-.013	.051
N	2557	4395	5466
Dep. mean of Equation I	.151	.399	.336
Dep. mean of Equation II	.894	.896	.862
Log-L	-1911.5	-4201.9	-4888.7
N	2557	4395	5466

Significance levels: ** (p < .01) , * (p < .05), + (p < .10).

Dependent variable of Equation I: 1 = Having completed a type of apprenticeship with "good" employment prospects; 0 = other.

Apprenticeships with "good" employment prospects: In all three periods: primary sector occupations; electricians; construction workers; technicians; clerical workers in banks, insurance agencies, and public administration; health care occupations (in all cases: if apprenticeship served in company authorized to provide apprenticeship training). Additionally for 1948-1959 period: carpenters, painters; other service occupations. Additionally for 1960-1974 period: carpenters, painters; other manufacturers. See text for information on the selection procedure.

Dependent variable of Equation II: 1 = "successful" apprenticeship-to-work transition (immediate move to adequate position); 0 = "unsuccessful" transition (move to overqualified position or unemployment).

Only persons employed at time of interview (1991/92).

Foreigners and those few respondents who acquired a university degree before starting an apprenticeship were excluded.

Only persons belonging to the economically active population immediately after completing the apprenticeship (those going on to further education, doing military/community service, or in voluntary unemployment were excluded).

Source: Own calculations based on data from the BIBB/IAB Employment Survey, 1991/1992.

Table 5: Determinants of realizing a successful apprenticeship-to-work transition, by time period (selected types of apprenticeships, binary probit models, West Germany, 1948 – 1992)

	Year of completing apprenticeship:					
	1948–1959		1960-1974		1975-1992	
	Type of apprenticeship (indicated by employment prospects):					
	good	poor	good	poor	good	poor
Variable:	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.
Poor schooling, male	.010	.191	.065	.054	-.333**	-.183*
Poor schooling, female	.050	.159	-.026	-.119	-.332**	-.210*
(Good schooling, male)	(.)	(.)	(.)	(.)	(.)	(.)
Good schooling, female	.161	.179	-.006	.158	-.171+	-.006
Farmer, gardener, miner	.212		-.005		-.028	
(Metalworker)		(.)		(.)		(.)
Electrician	.053		-.135		-.186	
Textile worker		-.073		.159		-.131
Food worker		-.085		-.187		-.059
Construction worker	.335+		.079		-.050	
Carpenter, painter	.151		-.164			.028
Other manufacturers		.209	.327			-.004
Technician	.349		.090		-.158	
Clerical worker	(.)		(.)		(.)	
Sales clerk		.023		-.156		.050
Health care assistant	.182		.130		.124	
Other service occupation	.214			.186		-.030
Firm: < 10 employees	.070	-.165+	-.139	-.061	-.169*	-.083
(Firm: 10-1000 employees)	(.)	(.)	(.)	(.)	(.)	(.)
Firm: > 1000 employees	.337	.027	.041	.376*	.106	.063
No firm (external training)		-.165		-.212*		-.178*
Public sector	.107	.144	.113	-.029	.028	-.104
Duration of training (years)	.078	.078	.104	-.010	.158*	-.004
Unempl.rate at end of train.	-.012	-.024	-.055	.029	.009	-.034**
Constant	1.012*	.955**	1.213**	1.245**	.946**	1.409**
Mean of dependent variable	.918	.873	.927	.868	.891	.837
Likelihood ratio statistic	8.6	17.2	13.0	29.4	30.2	26.2
N	1184	1376	2031	2370	2492	2977

Significance levels: ** (p < .01) , * (p < .05), + (p < .10).

Types of apprenticeship with "good" or "poor" employment prospects are gained from weighted crosstabs (time period * type of apprenticeship * success of apprenticeship-to-work transition).

Apprenticeships with "good" employment prospects: In all three periods: primary sector occupations; electricians; construction workers; technicians; clerical workers in banks, insurance agencies, and public administration; health care occupations (in all cases: if apprenticeship served in company authorized to provide apprenticeship training). Additionally for 1948-1959 period: carpenter, painter; other service occupations. Additionally for 1960-1974 period: carpenter, painter; other manufacturers. See text for information on the selection procedure.

Dependent Variable: 1 = "successful" apprenticeship-to-work transition (immediate move to adequate position); 0 = "unsuccessful" transition (move to overqualified position or unemployment).

Only persons employed at time of interview (1991/92).

Foreigners and those few respondents who acquired a university degree before starting an apprenticeship were excluded.

Only persons belonging to the economically active population immediately after completing the apprenticeship (those going on to further education, doing military/community service, or in voluntary unemployment were excluded).

Source: Own calculations based on data from the BIBB/IAB Employment Survey, 1991/1992.

Appendix Table: Unweighted Means of Covariates Used in Equation II, Table 4.

	Year of Completing Apprenticeship:		
	1948–1959	1960-1974	1975-1992
Poor schooling, male	.635	.474	.322
Poor schooling, female	.181	.211	.142
(Good schooling, male)			
Good schooling, female	.056	.127	.284
Farmer, gardener, miner	.039	.021	.021
(Metalworker)			
Electrician	.044	.076	.069
Textile worker	.051	.026	.014
Food worker	.045	.033	.035
Construction worker	.078	.036	.036
Carpenter, painter	.096	.044	.042
Other manufacturers	.038	.028	.030
Technician	.017	.031	.027
Clerical worker	.169	.225	.259
Sales clerk	.127	.160	.133
Health care assistant	.021	.043	.090
Other service occupation	.024	.037	.044
Firm: < 10 employees	.402	.299	.289
(Firm: 10-1000 employees)			
Firm: > 1000 employees	.073	.087	.107
No firm (external training)	.055	.076	.079
Public sector	.064	.099	.139
Duration of training (years)	3.035	3.068	2.916
Unempl. rate at end of training	5.950	1.142	6.741
N	2557	4395	5466

Source: Own calculations based on data from the BIBB/IAB Employment Survey, 1991/1992.

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