The changing nature and role of vocational education and training in Europe

WORK ASSIGNMENT 2

External factors influencing VET - Understanding the National Policy Dimension: Country Case Studies

AO/DSI/JB/Changing_Role_of_Vet/009/15

Case study focusing on Germany

prepared for CEDEFOP – European Centre for the Development of Vocational Training

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The changing nature and role of vocational education and training – overall aims

The purpose of the Changing nature and role of VET-project is to improve our understanding of how VET is changing in the countries belonging to the European Union (as well as Iceland and Norway). Over a three-year period (2016-18) the project will analyse how vocationally oriented education and training has changed in the past two decades (1995-2015) and based on these results investigate the main challenges and opportunities facing the sector today and in the future. Work is divided into six separate but interlinked themes:

(a) the changing definition and conceptualisation of VET;

(b) the external drivers influencing VET developments;

(c) the role of traditional VET at upper secondary level;

(d) VET from a lifelong learning perspective;

(e) the role of VET at higher education levels;

(f) scenarios outlining alternative development paths for European VET in the 21st century.

The study takes as its starting point that vocationally oriented education and training is something more than the traditional VET delivered at upper secondary level (in the form of school-based education or training, apprenticeships, or combinations of these). Due to the requirements of lifelong learning, we are able to observe diversification of VET with new institutions and stakeholders involved. We also see an expansion of VET to higher education areas, partly through reform of existing institutions, partly through the emergence of new institutions. This has been caused by factors internal to the education and training system as well as by external pressures linked to demographic, technological and economic changes.

This particular case study, together with 9 other case studies, provides input to theme (b) of the project ('The external drivers influencing VET developments').

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Germany

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1. Introduction

This case study outlines the most important qualitative and quantitative changes and challenges that the dual vocational education and training system in Germany had to cope with over the period of the last 20 years.

As opposed to more liberal labour market traditions, vocational education, occupations and qualifications respectively are strongly characterising the German labour market (Bosch 2016). This labour market system and educational tradition is embedded into a political system that provides an institutional infrastructure for vocational education and training. This is characterised by a corporatist governance structure. Interests of employers as well as employee associations are incorporated into the policy process and decision making on different levels.

Systemic changes and reforms in such a setting do usually take a long-term view. In recent years major challenges to the vocational education and training system have been and will continue to be demographic factors and "academic drift" on the side of learners and the withdrawal of companies from apprenticeship training on the employers' side.

Section two describes the meaning of vocational education and training with in this cultural and institutional framework. In section three the historic context of this understanding is outlined including the development of certain concepts within the vocational education and training discourse over time. In section four an overview is provided about the most important changes in terms of quantitative developments. Section 5 does address more strongly the economic dimension of vocational education and training and the potential relationship to global developments, such as global technological or labour market changes. In section six a summary and conclusion will be provided based on an analysis of continuity and change and likely future developments.

2. What is meant by VET and national VET system

Before describing in-depth, the formal side of VET, its systemic organisation, concepts and definitions (2.2) the following paragraphs describe some general traditional social images and norms on work and employment in German society (2.1).

2.1 Work and Occupation in Society

Vocational education and training in German society can only be understood when emphasis is laid upon the term "vocation" and its translations. In Germany, there exists a rather broad conception of "Beruf", which spans the boundaries of different education subsystems and qualifications. According to common sense[1], a "Beruf" refers to a position in the labour market presupposing a specialised training and education pathway that supports the acquisition of the experience, skills and knowledge required to solve the tasks in this occupation. In addition, it would open the possibility to make a living on it, and to pursue a (potentially lifelong) career within this job.

"Beruf" can refer to jobs for which there are qualifications required from an existing designated vocational education system or jobs that are associated to academic qualifications, such as medical doctor, teacher, engineer, lawyer etc.

[1] Unfortunately, a short literature query has not yielded in any kind of representative surveys on this.

It is taken for granted by families, individuals and employers that the vocational qualification not only documents the educational pathway and academic achievements but also signals the ability to perform competently in the respective occupation. This goes hand in hand with the expectation that experience within an occupation is in many cases part of the curriculum.

Not only in sociological terminology (as in the early works of the sociology of professions and occupations), but also in everyday language "Beruf" would be contrasted with a mere "job". "Job" in German language would designate an economic activity without such implications in terms of knowledge, skills, subjective identification and career perspectives. The Anglicism "jobben", used in German colloquial language, refers to a temporary activity on the labour market, the only purpose of which is to earn money. Even though there might be changes over the last decades, this notion will still be prevailing within large parts of society, especially parents and families.

However, this traditional cultural understanding of "Beruf" is changing over time and might have lost significance in relation to endogenous changes in society and "imported" notions on education and employment patterns. Major drivers of this are supposedly globalised human resources development concepts (in internationalised firms), changing educational choices and aspirations ("academic drift"), a general trend towards more flexible employment relationships and migration.

Apart from the designated system of vocational education "Berufs(aus-)bildung" or "Ausbildung" in everyday language in many cases might also refer to higher education studies (such as described above related to academic professions) and to school based programmes that lead to a qualification in certain jobs. The former applies especially to a number of occupations in personal and health-related services, such e.g. nursing, pre-school teaching or physiotherapy.

2.2 Vocational education and training system

Depending on the respective federal state (Länder-)jurisdiction, there is variety of regulations on compulsory (vocational) schooling (Vossenkuhl 2010). Usually, in case the student is not enrolled into a programme that is built on designated university preparation curriculum and certification, there is a requirement to enrol into vocational or vocational preparatory programmes in the secondary school system. Compulsory vocational schooling is part of the federal Länder general schooling jurisdictions and refers to 12 years of mandatory schooling or mandatory schooling until reaching a certain age (varies between 19 and 22).

In case of the dual vocational education system there is a complementarity between federal and Länder legislation. Vocational education and training according to the Federal Vocational Education and Training Act (Berufsbildungsgesetz, BBiG; Bundesministerium für Bildung und Forschung 2005) entitles apprenticeship trainees to vocational programmes at vocational schools. Compulsory vocational schooling is mandatory until an age between 19 and 22 anyway (see above). The BBiG stipulates that employers have to urge apprenticeship trainees to enrol and participate in vocational school programmes and have to provide them the time necessary for this. Hence, there is also a compulsory vocational schooling for apprenticeship trainees beyond the stipulated age of Länder jurisdictions. [2]

The term "Berufsausbildung" (initial vocational education and training) emphasises initial VET and is legally clearly associated with the dual system of apprenticeship. 'Continuing Vocational Training' corresponds to the German term "Berufliche Weiterbildung", that is partly also regulated to the BBiG, as "Berufliche Fortbildung", translated as "further training" (see box).

[2] This is not depending on the age of apprentices.

The following box shows the most important sentences from the BBiG illustrating the legal understanding and concepts of vocational education and training in Germany.

Part 1 General Provisions
Section 1 Vocational Training Terms and Objectives
(1) For the purposes of this Act, the term "vocational training" shall mean vocational training preparation, initial training, further training and retraining.
(2) Vocational training preparation shall serve to impart basic skills required for the acquisition of vocational competence and thus facilitate placement in initial training in a recognized training occupation.
(3) Initial training shall, through a systematic training programme, impart the vocational skills, knowledge and qualifications (vocational competence) necessary to engage in a form of skilled occupational activity in a changing working world. Initial training shall also enable trainees to acquire the necessary occupational experience.
(4) Further training shall enable individuals to maintain and upgrade or broaden their vocational competence and advance their careers.
(5) Retraining shall qualify individuals for another form of occupational activity.

Vocational training according to this legal definition refers to 327 federally regulated occupations. The following table shows the 25 most popular apprenticeship training occupations according to new training contracts between employers and apprentices for the year 2016. These count for around 60% of all new training contracts. It can be seen that these cover a range of occupations from administrative clerical, trade and industrial and personal and health related services. The latter are typically those that are associated to the liberal professions, such as medical doctors and dentists, whilst the abovementioned health related (school-based) occupations refer to public health and educational services. The table also shows the gendered patterns in these occupations: in contrast to male dominated technology oriented occupations there are strongly female dominated occupations in health, social and educational services.

The Vocational Training Act also regulates different level of governance of the system spanning from the federal to the Länder and regional level. In legal terms Chambers of Commerce and industry or Chambers of crafts play an important role in the governance of the system since they are commissioned by law with the administration of firm based training within the VET system, its quality and examinations on the regional level. Chambers also host regional vocational education and training committees that are set up with representatives of employers and employee associations and representatives from vocational schools. One of their functions is to observe developments on the apprenticeship training market in their region. In addition to the regional committee, there is a Länder level committee that includes additional representatives from the Länder governments, who are also providing apprenticeship training in addition to those that are representing educational administration.

On the federal level there is a similar body that is the Main Board of the Federal Institute for vocational education and training (BIBB). This body is equally setup with representatives of employers and employee associations and representatives of the educational administration of the Länder. The main task of this body is to advise the federal government on its vocational education and training policy by commenting on the federal vocational education and training board on an annual basis. The Main board also comments on the training regulations of the federally regulated occupations. This multilevel infrastructure supports the gathering and passing on of information between different governance levels.

3. Historical context

The German VET system is based on some specific features that have long historical roots. The system is unique with regard to its governance on different levels and the incorporation different interest groups. Therefore, German VET was object of analyses for many political scientists (Culpepper 2003, Culpepper und Finegold 1999, Thelen 2004).

Apart and interrelated with this type of governance it is also remarkable that companies are substantially contributing (also economically) to the operation of the vocational education and training system. This goes hand in hand with a specific way of integrating young people from education to the world of work, that finds its roots in medieval structures of organising work the craft sector.

The system of governance can be traced back to the age modernisation and industrialisation. As opposed to other European countries different interest groups, such as artisans in craft guilds where integrated into the formation of political will which was in stark contrast to the developments across the European borders. France and UK were much more strongly liberalising their educational systems including an increased significance of public schooling.

In Germany the corporatist integration of employers has proved to be functional to the skills problem in industry during industrialisation (Greinert 1995, Greinert und European Centre for the Development of Vocational Training 2005, Greinert und Hanf 2004). This has led to a predominant position of enterprises with in the overall vocational education and training system. The idea of self and governance or subsidiarity of employers in skills responsibility and a rather broad conception of occupational tasks survived the processes of industrialisation because they were functional to the needs of industry as well as of crafts.

Schooling was regarded as an important mechanism for the state to keep control with regard to the young generation. In a way this also constituted the ongoing competition on learning time between companies on the one hand and schools on the other.

However, in terms of policy it took over 50 years of development in the 20th century until a consensus was reached on the introduction of the vocational education and training act (1969). Hence, long before the formalised system existed there was some common understanding about the essential elements of Berufsbildung. The term "dual system of vocational education" was initially coined by an expert group of the Federal government that was commissioned with advising educational reforms on different aspects and sectors of the German educational system (Deutscher Ausschuß für das Erziehungs- und Bildungswesen 1965) in the context of the educational expansion and reforms that took place across many industrial nations during this phase.

After this phase of consolidation of many long existing practices through the vocational training act, the next 20 years where are characterised through the ongoing reform of occupations and adaptation to the needs of the modernising economy and society. A crucial step in the further development of the dual system is seen in the reforms on the metal- and electrical technology occupations that started in the 80s (Herkner 2013). This reorganisation took until the end of the 80s and included a number of features that still characterise the established concept of well-regulated occupations. A major breakthrough was setting the competence to act independently (Berufliche Handlungfsähigkeit) for skilled workers as the overarching educational goal of apprenticeship training within the dual system.

According to the former president of the Federal Institute for Vocational Education and training (BIBB), Hermann Schmidt (cf. Cramer u.a. 2013), this development can be seen as a basic foundation

for the outcome orientation that is now required in the process of European co-operation and the development of national qualification frameworks.

According to Herkner (2013) the third significant phase – in terms of reforming curricular standards for vocational education and training started in the 1990s. The reorganisation of occupations also had significant effects on the necessity to invest into vocational schooling and curricular reforms, respectively. "Berufliche Handlungsfähigkeit" as an educational goal and its further specification was referred to in agreements between the Länder ministries in 1991:

„Sie [die Berufsschule] hat die Aufgabe, den Schülerinnen und Schülern den Erwerb berufsbezogener und berufsübergreifender Kompetenzen unter besonderer Berücksichtigung der Anforderungen der Berufsausbildung zu ermöglichen. Sie befähigt zur Ausübung eines Berufes und zur Mitgestaltung der Arbeitswelt und Gesellschaft in sozialer, ökonomischer und ökologischer Verantwortung." (Sekretariat der Ständigen Konferenz der Kultusministerien der Länder in der Bundesrepublik Deutschland 1991)

The ongoing reform of occupational profiles was accompanied by the implementation of the so-called "Lernfeld" concept in vocational schools in 1997 through a decision of the Länder ministries of education (Sekretariat der Ständigen Konferenz der Kultusministerien der Länder in der Bundesrepublik Deutschland 1996). "As a result, vocational curricula with their elements and contents had to relate to work and business processes and be described on the basis of competences. Regarding the German tradition of curricula, a paradigm shift can be observed, because earlier curricula were organised according to disciplines". (Bauer und Przygodda 2003).

At the same time the dual system of VET experienced a crisis that lead to an intensive discussion about the potential of the system to fulfil the requirements of a modern economy and society. Basic concepts of dual vocational education were fundamentally questioned. Major reasons for this discussion were quantitative problems on the apprenticeship labour market, new normative and educational orientations of individuals and families in association to a constant demand for and pressure to lifelong learning processes and the increased Europeanisation of Vocational education and training (Geissler 1993, Geissler 1994). This discussion persists until today and has had different phases itself. In accordance with the increasing European co-operation in VET an topic that attracted strong interest by employers as well as educational stakeholders was the demand for a more "modularised" system of apprenticeship training that could better accommodate the needs and varying preconditions of individuals (Euler 1998). Another strand of this discussion was rather dealing with the increased quantitative significance of bridging measures, that were intended to support school leavers in developing prevocational competences and finding employment on the apprenticeship labour market. Especially during the early years of the 21st century this so-called transition system ("Übergangssystem") was very strong and at the same time increasingly criticized for its inefficiency to provide learners with adequate competences and perspectives on the labour market (Autorengruppe Bildungsberichterstattung 2008)[3]. On the other hand it was stressed that a better integration into the mainstream system would be required in order to support young people in getting recognition for their learning efforts and achievements from the transition system. Instead of "queueing" school leavers in a waiting loop before they enter Vocational Education within the mainstream system , the system should be be flexibilised in order achieve recognition (Euler und Severing 2006).

Other experts have stressed that – taking existing datasets on individual educational pathways and decisions into account – the term "Übergangssystem" would be misleading because it included a wide

[3] See section 4 on the quantitative developments

range of measures and programmes that needed to be further differentiated in order to make useful contributions to an evidence base for policy decisions (Braun und Geier 2013).

This discussion around the "Übergangssystem" was also accompanied by an increased call on greater flexibility as regards to training regulations, providing employers greater leeway in adapting regulations to their specific needs and to individual capacities and interests. This discussion around the "modularisation" of vocational education and training (Pilz und Li 2016) was amplified through the increased Europeanisation of vocational education and training policies (Grollmann u.a. 2005, Grollmann u.a. 2006) that resulted in several initiatives and actions in order to implement European instruments, such as EQF and ECVET. There was also an intensive discussion about the compatibility of these instruments with the "Berufsprinzip" (Drexel 2005) .

An additional challenge to the governance of the system is that measures on this level suffer from a highly differentiated share of responsibilities between different levels and departments (labour, education, family and social affairs, state departments and regional actors) and sources of funding. The need for a close coordination of different regional actors was emphasised in many proposals (Kruse 2010).

In 2005 a reform of the vocational training act was passed, that included a number of alterations. All in all a major direction was strengthening school based VET and the role of teachers within regional committees. A regulation was included that allowed graduates of vocational full time schooling to be admitted to the final examinations a the chambers in order to compensate for a lack of firm-based apprenticeships. Access to chamber examinations was also eased for workers with substantive occupational experience. Instead of twice of the apprenticeship training time only 1.5 times of occupational experience need to be verified.

4. Changes in Enrolments

In the following section changes within the vocational education and training system and with regard to its role in the overall education system are described based on available statistics. Most of the described changes can be traced back to the time before 2005, however, reporting has changed in 2005 and therefore we will restrict the analyses to this point.

Due to the differentiation of programmes across the Federal Länder the integrated description of flows of students from one programme to another in a historical perspective is a challenging task. A newly developed reporting system on the federal level was established only recently (Konsortium Bildungsberichterstattung u.a. 2006). The Federal Institute for vocational education and training has developed the so called integrated education and training reporting system (Dionisius u.a. 2013). This system distinguishes between four sectors:

- vocational education and training according to the vocational training act
- preparation for vocational education and training
- school-based vocational education and training and
- take up of a study program at the higher education level.

The sectors represent the options that are available for a young school graduate, when leaving school. Again, according to the different regulations in place across the Federal countries, this can be persons who leave the school system before or after secondary level I and enter initial training and education or it can be students leaving the

education system after secondary level II for further studies and education after obtaining the qualification for high education studies.

Table 2: Data for section 3 on enrolments

The balance between enrolments in general and vocational education at (a) lower secondary, (b) upper secondary; and (c) tertiary levels;	**a). „Übergangssystem“** **b). Datenreport/Berufsbildungsbericht, ggf. Statistisches Bundesamt** **c). I Zahlen zu Universitäten/Fachhoschulen**
How the structure of VET has changed with respect to enrolment in types of programmes (e.g. work-based versus school-based provision);	**Berufsbildungsbericht /Datenreport (Indikatoren ab A 5…)**
The broad subject areas encompassed within VET (increasing or decreasing in scope);	**Datenreport/Berufsbildungsbericht** **Anzahl der Neuabschlüsse nach Ausbildungsberufen, ggf. nach Wirtschaftsbereichen**
The level at which VET qualifications are provided.	**Nicht/kaum relevant/ II. Zahlen zu Fortbildungsprüfungen**
Information on changes in the socio-demographic structure of the VET student population (age, gender, social status) would also be very much appreciated.	**Datenreport/Berufsbildungsbericht** **Entwicklung des Durchschnittsalters**

Figure 1 shows the number of beginners distributed across the four options, independent of their age. Hence, information includes students leaving the first level of secondary schooling and students that are leaving the second level of secondary education. Eventually, the figure provides an overview on how the different groups of students that start an education or training after compulsory education are distributed across the different sectors (Dionisius und Illiger 2017).

Changes within vocational education and training

In 2016 34. 7% of students that started a full-qualifying vocational education and training programme. This group includes 68.1% that were starting a program according to the vocational training act. 31.9% were starting a full-time school-based vocational education and training programme. This includes 24.7% who commence a programme in health-related or education- and social-service related occupations.

Changes in prevocational education ("transition sector")

Only 14.7% were entering the transition sector as opposed to around 22% in 2005. Accordingly, the above mentioned discussion around the integration of the transition system has calmed down. The programmes in the so-called transition system would normally be referenced as pre-vocational education according to international education statistics. It is important to acknowledge however, that becoming student is this sector is not necessarily the result of curricular progression and educational decisions after the preceding programme, but might be the result of not entering employment within the vocational education system. Again it is worthwhile to stress that the age of students in this sector can cover a wide range as well as motivations and orientations.

Changes in higher education preparation and enrolment

The figures also accompany the debate around an increased "academisation" of educational decisions, which is depicted in the 25% that were preparing for university studies and another quarter that started a programme at one of the higher education institutions. This contrasts with 17% in 2005.

In terms of absolute numbers the number of those that are entering the higher education system has outstripped the number of those that are entering vocational education according to the vocational education and training act for the first time in 2014. Partly, this can be explained through the fact that across all federal states the number of school years in general secondary education was reduced to 12 years, so that in many states there were two age cohorts leaving higher secondary education at the same time. However, it is characteristic for a general trend of a decreasing significance of vocational education according to the vocational training act as opposed to other forms of continuing the educational pathway, e.g. in the higher education sector. This tendency might also be result of an increasing share of educational cohorts that leave the education system with university entrance qualification. While in 1996 there were 31.5 % of the respective age population who obtained a higher education entrance qualification their share was 46.6% in 2015 (Statistisches Bundesamt 2016).

Over the last years the number of drop-outs from higher education study programmes has increased, therefore there is an ongoing discussion how to attract higher education drop-outs to vocational education (Heublein 2014). Another trend that has grown over the last years is the development of dual study programmes in the higher education sector. Some of these integrate a classical dual system apprenticeship into the higher education programme. Such models are referred to as integrated dual programme models. In addition, there exists a number of other structures, that are not the well-defined (Krone 2015). Numbers of companies that participate in such programmes as well as students have more than doubled since 2004: in 2004 there were around 45 000 Students enrolled in to dual programmes and in 2016 there were around 100 000.

5. Interplay between external and internal factors

In this section we will address how certain demographic changes and technological developments might influence the further development of the vocational education and training system. This also includes some developments with regard to general labour market policies in Germany.

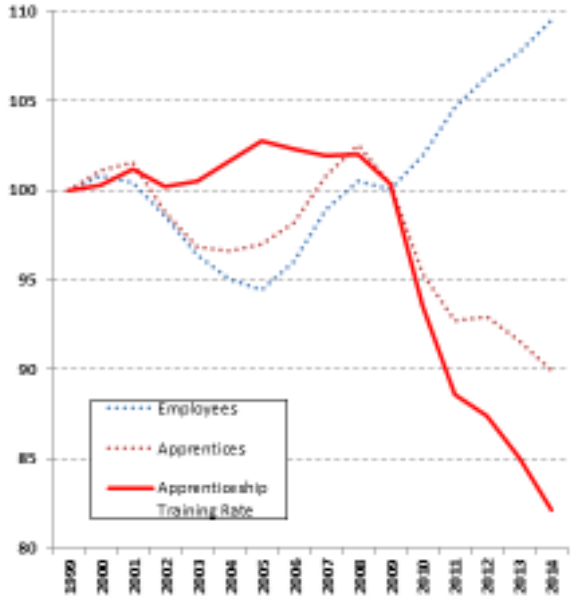
The labour market and the apprenticeship training market

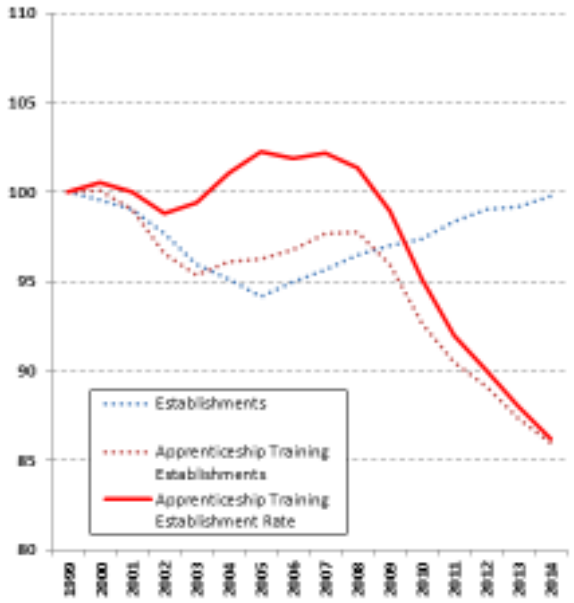
Over the last years - not least due to demographic reasons - the situation on the apprenticeship training market has eased. This relates especially to the large number of learners who exited from secondary education to the so-called transition system (Dionisius u.a. 2013). However, increasingly learners opt out of the traditional vocational education pathway in favour to the constantly expanding higher education opportunities. This "academic drift" that had started much earlier in many other industrial states is certainly aggravated through some drivers from the international level, such as the introduction of Bologna and the respective two level qualification system, that has not existed before and an increased awareness of learners about the possibility of different educational options. All in all – especially given the supportive macroeconomic environment - the apprenticeship market is characterised through a lack of applicants, even though there is a huge differentiation according to regional labour markets (Bundesinstitut für Berufsbildung 2017). Immigration and integration of refugees is increasingly mentioned as one policy option that might support balancing the quantitative lack of skills.

However, potentially more important, the supply of apprenticeship places has decreased constantly over the last years (see Figure 2). Companies and firms are not engaged anymore in apprenticeship provision as they were 10 years ago. This puts pressure on the vocational education and training system according to the vocational education and training act since the supply of apprenticeship positions is prerequisite to the functioning of the system. However, it is important to state here, that it is only about 20% of German companies who are involved into apprenticeship training at all (Bundesinstitut für Berufsbildung 2017: 10). Based on a panel analyses of firms Mohr u.a. (2015) identified three groups, that differ in terms of their motivation.

- One group is principally committed to the apprenticeship model but is especially mentioning reasons (for an overview of reasons see Figure 2: Training-Establishment rate and apprenticeship training rate

Apprenticeship Training and Training Establishment Rate





- Figure 3) that lies with in the pool of applicants, the most important of which is that there is a lack of applications or that vocational education is not sufficiently attractive to potential applicants. In addition dissatisfaction with the applicants who were mediated through the employment agency or because of the fact that applicants cancelled their contract.
- The second type of firm especially stresses that there is no need for internally skilled staff. The preferred recruitment option is to take on skilled workers from the external labour market. Typically, this is associated to overarching group company decisions or measures of restructuring.
- The last group was labelled as the cost-benefits optimiser. This type mentions all the reasons with specific emphasis on the costs and benefits of apprenticeship training.

Are those groups and the firms decisions now reflecting mainly internal pressures and challenges are they associated to larger structural developments on the German labour market that might be influenced by overarching global trends? First of all, Figure 2: Training-Establishment rate and apprenticeship training rate

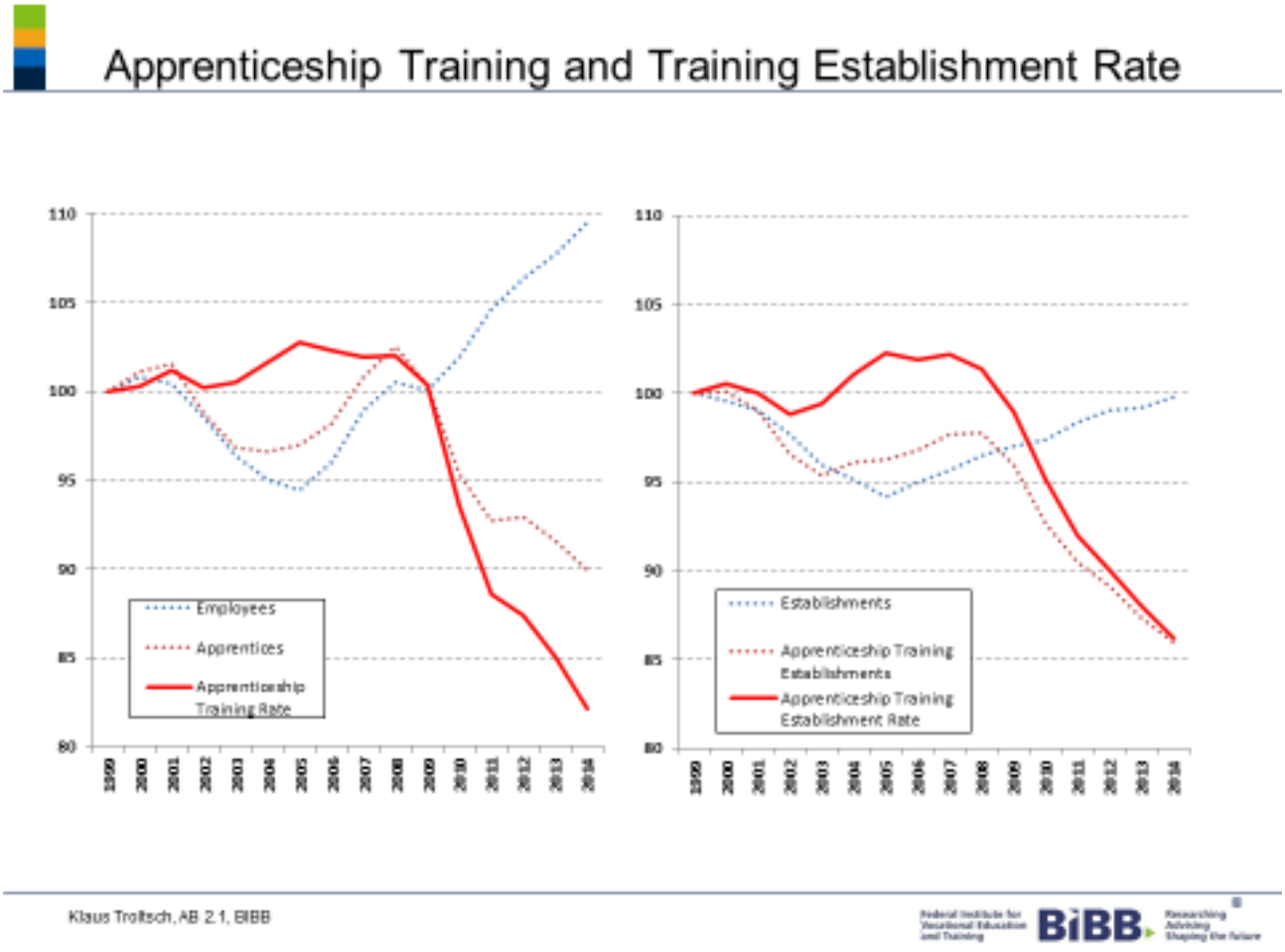


Figure 3 shows that new options that have been introduced mediated through processes of internationalisation or global pressure have merely influenced firms' behaviour: firms are not significantly employing low or no-skilled workers as a substitute to apprentices and as a result of labour market reforms (Hartz reforms) ´that might have rendered this more attractive. Secondly, firms do not tend to substitute apprentices with the newly emerging group of Bachelor graduates, that were not existent on the labour market before the introduction of the Bologna reforms in higher education. Interestingly, the group that has an affirmative apprenticeship motivation – in terms of enterprise characteristics- includes those companies that are significantly contributing to the German export industry.

A recent analysis has examined in how far specific features of the German labour market (such as centralised collective as opposed to firm-level wage bargaining) can explain the motivation to provide apprenticeships as proposed by Acemoglu und Pischke (1999). Neubäumer (2016) describes institutional changes on the German labour market that led to less wage compression and lower returns of apprenticeship and has collected evidence that these have not resulted in a reduced motivation to provide apprenticeships. Instead, firms might change training procedures towards more training at the work place and thus by decreasing their net training costs. It is still an open question in how far this might affect the training quality positively or negatively. However, the reintegration of firm-based training into productive work processes is seen as a potential strength of modernised dual vocational education and training (Grollmann und Rauner 2007). In an additional econometric study on 85 occupational profiles Jansen (2016) has shown that the increased firm based leeway through the introduction of different options within training regulations might lead to an enhanced take up of apprentices through firms.

Digitalisation and technological developments

Another international driver that is being under discussion over the last years is the effect that increased digitalisation might have on skill needs of companies and consequently on training behaviour of firms.

During the 80s and 90s the constant reform of the vocational education and training system and occupational profiles was characterised through the integration technological developments into existing occupational profiles. In the IT-Sector profiles were developed that became very attractive among school leavers (see e.g. the Fachinformatiker/-in in Table 1).

Projections from the eighties and nineties that indicated a substitution of jobs through digital technologies did not prove. Recent studies – based on the analysis of firm and employee data as well as on projections - on the effect of the so-called fourth industrial revolution do not indicate a clear trend into the one or other direction, increased or decrease significance of the vocational education and training system (Helmrich u.a. 2016, Troltsch 2016).

Migration

Experts see immigration widely as an economic necessity to outweigh demographic effects and resulting shortages of skilled labour in the future. However, Germany has not yet developed a law on immigration. Given the expected shortages economic migration is still rather low and in many cases restricted to high-level qualifications. However, figures in this group of immigrants do not match the projected demands (Geis und Orth 2016).

With regard to the wave of refugees that have entered the country since 2015, there are increasingly measures on how to integrate refugees through becoming part of the vocational education and training system or how to recognise the qualifications that they bring from their home countries. Entry to occupational positions and recognition of individual achievements is intended to be eased by

the establishment of a law on the recognition of foreign qualifications (Erbe u.a. 2015). Data on qualifications indicates a strong demand for measures of integrating and training refuges over the coming years (Maier u.a. 2016).

6. Summary and conclusions

This paper has reported on the most important qualitative and quantitative changes over the last 20 years in the German vocational education and training system. Despite those changes, we can see that there are a number of structural characteristics of German vocational education and training that have not changed significantly over the last 20 years. Nevertheless structures were constantly challenged by a number of developments by the societal and economic environment.

German vocational education and training remains governed by a corporatist approach to vocational education and training policies, in which there is a share of responsibilities between employers and employee's associations.

In qualitative terms the notions that are at the background for training regulations today have changed in two waves:

- In the 90s, based on large reforms to the metal and electrotechnical occupational profiles a consolidation of the inherent potential of the strong tradition of vocational education and training was put forward. This was in alignment with modern ideas on human resource development and increased responsibility at the individual worker level. This had effects on the modernisation of school curricula and pedagogical ideas accordingly. However, on the practical level this curricula progress will potentially not have reached each and every firm and school that is involved in apprenticiship training and there are still diverse conceptions in place.
- This rather coherent set of pedagogical and organisational developments was challenged by the problem of thousands of young people who were queueing up for an apprenticeship position within the vocational education and training system in the early years of the 21st century. An increased demand for individualised and "flexible" training offers was articulated and proposed.

Today, in terms of educational sub-systems there as a competition between vocational education and higher education that has not seen an equivalent in terms of numbers in earlier periods. However, when looking at firms' recruitment behaviour there is no clear indication for a full withdrawal from vocational education as established in the dual system. Digitalisation does not necessarily seem to be a major driver of further academisation as opposed to a strong vocational education system. Vocational education and training as it is organised in Germany through the federal Vocational Training Act seems to be so strongly intertwined with the overarching labour market and economic system, that it is affected by global drivers of change as much as the German economy itself. The liberalisation of the labour market of the last 20 years does apparently not (yet) produce significant changes in firms' recruitment and training policies. Therefore, there remain two major issues that are likely to continue having a longer term effect on the vocational education and training system: Increased co-ordinated immigration as a reaction to skill shortages and the orientations of individuals and families towards higher education, that might even mutually reinforce each other.

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Annex for Germany

Table 1: The most popular apprenticeship occupations in the dual system

Rangliste 2016 der Ausbildungsberufe[+] nach Neuabschlüssen in Deutschland

Beruf	Deutschland NAA	Anteil männliche Auszubildende	Anteil weibliche Auszubildende	Deutschland Rang	Rangänderung* zum Vorjahr	Alte Länder	Rangänderung* zum Vorjahr	Neue Länder und Berlin	Rangänderung* zum Vorjahr
Kaufmann/ -frau für Büromanagement [3)]	28.656	26,7	73,3	1	0	1	0	1	0
Kaufmann/-frau im Einzelhandel	25.191	48,0	52,0	2	0	2	0	3	0
Verkäufer/-in	23.850	44,8	55,2	3	0	3	0	2	0
Kraftfahrzeugmechatroniker/-in	21.465	95,7	4,3	4	0	4	0	4	0
Industriekaufmann/ -frau	17.934	41,0	59,0	5	0	5	0	15	-3
Medizinischer Fachangestellte/-r	15.822	2,3	97,7	6	0	6	1	13	0
Kaufmann/-frau im Groß- und Außenhandel	14.463	60,4	39,6	7	0	7	-1	17	0
Elektroniker/-in	13.290	97,7	2,3	8	1	8	1	7	1
Zahnmedizinischer Fachangestellte/-r	12.780	1,7	98,3	9	1	10	0	11	3
Industriemechaniker/-in	12.714	93,4	6,6	10	-2	9	-1	13	-2
Fachinformatiker/-in	12.093	92,1	7,9	11	3	11	2	18	5
Anlagenmechaniker/-in für Sanitär-, Heizungs- und Klimatechnik	11.679	98,5	1,5	12	-1	12	0	12	3

Rangliste 2016 der Ausbildungsberufe[+] nach Neuabschlüssen in Deutschland

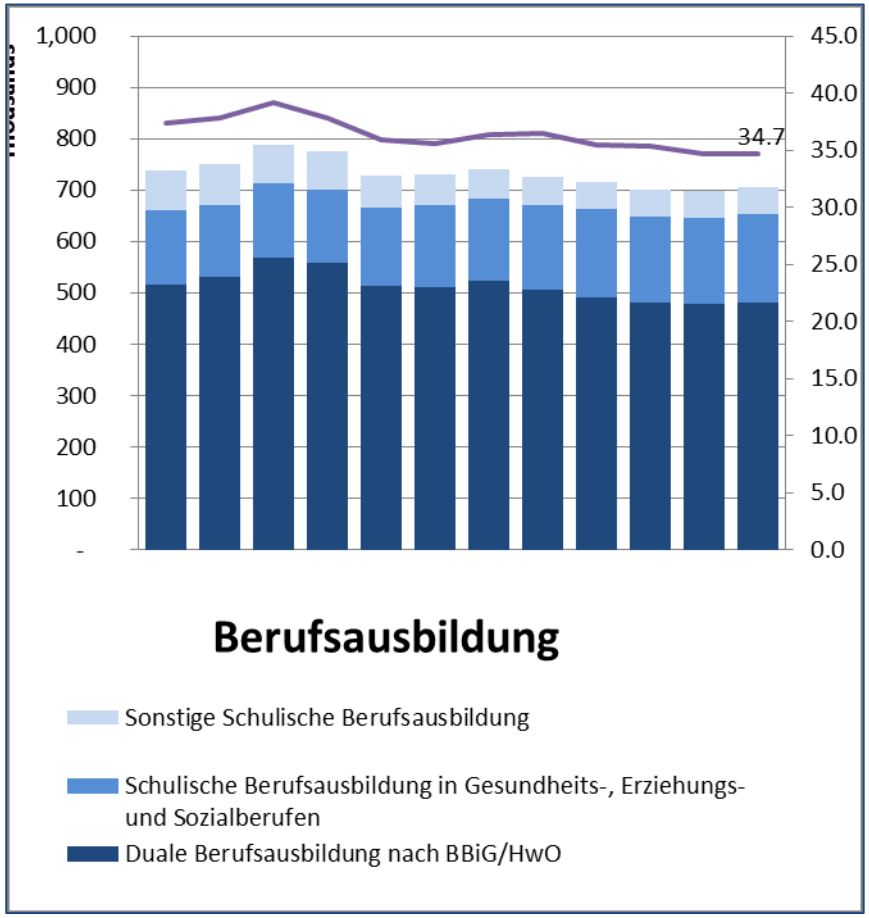
Beruf	Deutschland NAA	Anteil männliche Auszubildende	Anteil weibliche Auszubildende	Deutschland Rang	Rangänderung* zum Vorjahr	Alte Länder	Rangänderung* zum Vorjahr	Neue Länder und Berlin	Rangänderung* zum Vorjahr
Friseur/-in	10.950	16,7	83,3	13	0	13	1	8	-1
Fachkraft für Lagerlogistik	10.317	88,4	11,6	14	1	14	1	9	1
Hotelfachmann/-frau	9.468	33,7	66,3	15	1	16	0	6	0
Bankkaufmann/-frau	9.435	47,5	52,5	16	-4	15	-4	25	-5
Koch/ Köchin	9.144	76,5	23,5	17	0	17	0	5	0
Mechatroniker/-in	7.959	92,2	7,8	18	1	19	3	10	-1
Tischler/-in	7.731	88,0	12,0	19	-1	18	0	20	1
Fachverkäufer/-in im Lebensmittelhandwerk	6.918	15,9	84,1	20	0	20	-1	26	2
Steuerfachangestellter/ Steuerfachangestellte	6.879	31,7	68,3	21	0	21	-1	27	-1
Maler/-in und Lackierer/-in	6.540	83,9	16,1	22	0	22	-1	32	-2
Elektroniker/-in für Betriebstechnik	6.456	94,0	6,0	23	1	23	0	23	2
Verwaltungsfachangestellter/ Verwaltungsfachangestellte	6.285	28,7	71,3	24	2	25	3	16	0
Zerspanungsmechaniker/-in	5.934	93,2	6,8	25	-2	27	-3	19	0

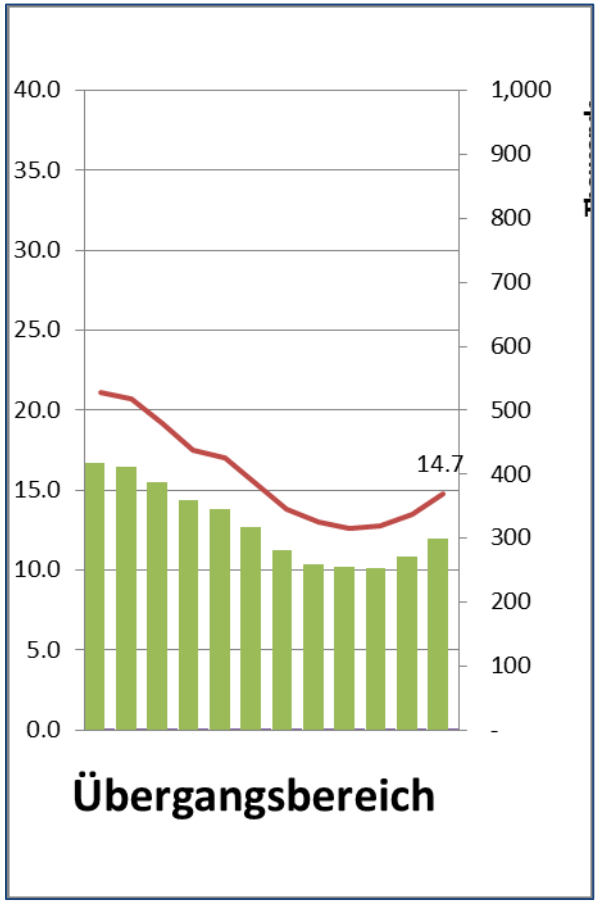
Table 2: Data for section 3 on enrolments

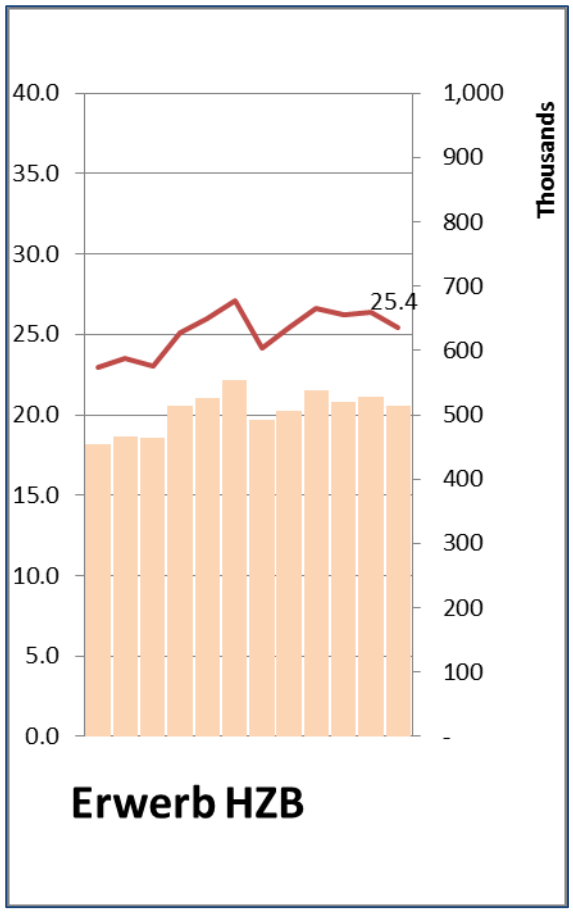
The balance between enrolments in general and vocational education at (a) lower secondary, (b) upper secondary; and (c) tertiary levels;	**a). „Übergangssystem“** **b). Datenreport/Berufsbildungsbericht, ggf. Statistisches Bundesamt** **c). I Zahlen zu Universitäten/Fachhoschulen**
How the structure of VET has changed with respect to enrolment in types of programmes (e.g. work-based versus school-based provision);	**Berufsbildungsbericht /Datenreport (Indikatoren ab A 5…)**
The broad subject areas encompassed within VET (increasing or decreasing in scope);	**Datenreport/Berufsbildungsbericht** **Anzahl der Neuabschlüsse nach Ausbildungsberufen, ggf. nach Wirtschaftsbereichen**
The level at which VET qualifications are provided.	**Nicht/kaum relevant/ II. Zahlen zu Fortbildungsprüfungen**
Information on changes in the socio-demographic structure of the VET student population (age, gender, social status) would also be very much appreciated.	**Datenreport/Berufsbildungsbericht** **Entwicklung des Durchschnittsalters**

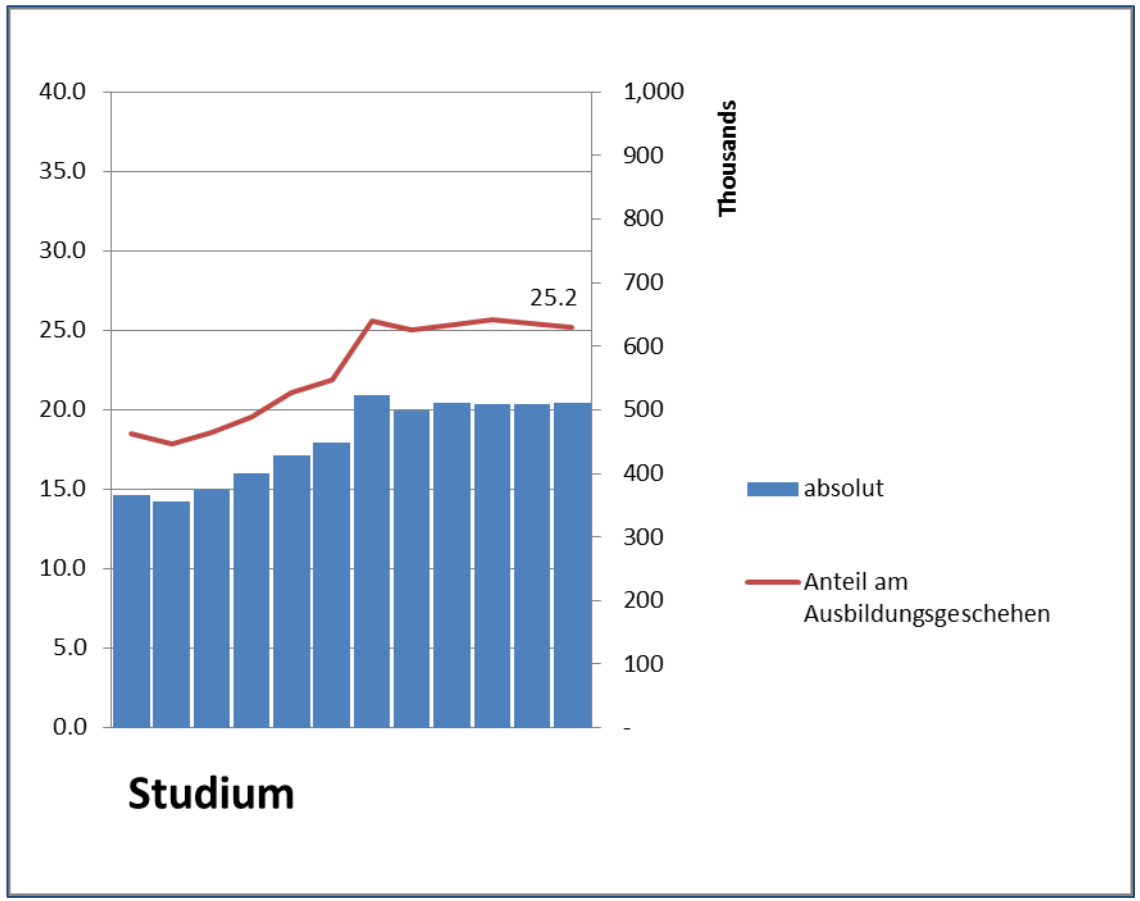
Figure 1 :"Integrated education and training reporting system"

A4.1 Schaubild 2: Entwicklung der Sektoren des Ausbildungsgeschehens 2005 bis 2016 - absolut und relativ (100% = Alle Anfänger/-innen im Ausbildungsgeschehen









Quelle: "Integrierte Ausbildungsberichterstattung" und "Schnellmeldung Integrierte Ausbildungsberichterstattung" auf Basis der Daten der statistischen Ämter des Bundes und der Länder und der Bundesagentur für Arbeit, Datenstand: 18.11.2016 und 14.03.2017

Table 3: Learner streams from 1992 -2006

Übersicht 2.1/1: Zahl der Einmünder/innen, Ausbildungsanfänger/innen von 1992 bis 2006 in Bildungsgängen, die zu einem Berufsabschluss führen bzw. eine berufliche Grundbildung vermitteln

		Jahr															Veränderungen			
		1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2006 zu 2005		2006 zu 1992	
Zeile 1	**Absolventen/Absolventinnen aus allgemeinbildenden Schulen**	**759.737**	**779.737**	**804.020**	**840.527**	**871.552**	**894.906**	**904.637**	**917.669**	**918.748**	**910.784**	**918.997**	**929.806**	**945.381**	**939.279**	**946.766**	**7.487**	**0,8%**	**187.029**	**24,6%**
Zeile 2	Neue betriebliche Ausbildungsverträge zum 30. September	k.A.	k.A.	k.A.	k.A.	k.A.	k.A.	k.A.	*550.231*	*564.379*	*557.357*	*512.524*	*497.265*	*518.928*	*505.191*	*524.206*	*19.015*	*3,8%*	k.A.	k.A.
Zeile 3	Neue außerbetriebliche Verträge zum 30. September	k.A.	k.A.	k.A.	k.A.	k.A.	k.A.	k.A.	*80.784*	*57.314*	*56.879*	*59.799*	*60.369*	*54.052*	*44.989*	*51.947*	*6.958*	*15,5%*	k.A.	k.A.
Zeile 4	**Neue Ausbildungsverträge zum 30. September insgesamt**	**595.215**	**570.120**	**568.082**	**572.774**	**574.327**	**587.517**	**612.529**	**631.015**	**621.693**	**614.236**	**572.323**	**557.634**	**572.980**	**550.180**	**576.153**	**25.973**	**4,7%**	**-19.062**	**-3,2%**
Zeile 5	Berufsfachschüler/innen in BBiG/HwO-Berufen im 1. Schuljahr	3.697	4.100	4.296	4.644	6.787	14.550	15.619	14.553	13.281	12.830	12.207	13.466	17.033	16.194	16.656	462	2,9%	12.959	350,5%
Zeile 6	Berufsfachschüler/innen vollqualifizierend außerhalb BBiG/HwO im 1. Schuljahr	49.503	54.982	53.732	58.067	62.263	73.797	76.816	78.691	87.081	91.709	101.158	115.022	118.202	120.246	119.397	-849	-0,7%	69.894	141,2%
Zeile 7	Schüler/innen in Berufen des Gesundheitswesens im 1. Schuljahr	47.578	49.426	51.129	53.321	53.803	44.703	44.219	44.188	42.735	43.500	45.901	47.796	46.827	47.495	49.830	2.335	4,9%	2.252	4,7%
Zeile 8	**Vollqualifizierende schulische Berufsausbildung insgesamt**	**100.778**	**108.508**	**109.157**	**116.032**	**122.853**	**133.050**	**136.654**	**137.432**	**143.097**	**148.039**	**159.266**	**176.284**	**182.062**	**183.935**	**185.883**	**1.948**	**1,1%**	**85.105**	**84,4%**
Zeile 9	Berufsfachschüler/innen 1. Ausbildungsjahr in Bildungsgängen, die eine berufl. Grundbildung vermitteln	110.252	119.574	130.156	131.925	140.418	141.320	143.085	141.692	149.624	151.653	161.615	178.254	194.966	202.869	202.129	-740	-0,4%	91.877	83,3%
Zeile 10	Schüler/innen im Berufsgrundbildungsjahr (Vollzeit)	31.325	31.589	34.869	37.924	39.966	40.229	40.856	39.677	41.236	40.495	43.204	49.216	48.079	50.137	47.937	-2.200	-4,4%	16.612	53,0%

Zeile 11	Schüler/innen im Berufsvorbereitungsjahr	37.156	46.464	51.734	55.512	65.198	66.364	66.806	68.606	72.787	75.810	79.496	79.284	80.559	77.667	71.907	-5.760	-7,4%	34.751	93,5%
Zeile 12	**Schüler/innen, die eine berufliche Grundbildung erwerben, insgesamt**	**178.733**	**197.627**	**216.759**	**225.361**	**245.582**	**247.913**	**250.747**	**249.975**	**263.647**	**267.958**	**284.315**	**306.754**	**323.604**	**330.673**	**321.973**	**-8.700**	**-2,6%**	**143.240**	**80,1%**
Zeile 13	Eintritte in berufsvorbereitenden Maßnahmen (im Kalenderjahr)	70.400	72.690	85.521	96.354	107.086	110.523	128.145	137.618	145.130	154.192	182.997	162.692	164.227	157.250	155.516	-1.734	-1,1%	85.116	120,9%
Zeile 14	Eintritte in Einstiegsqualifizierung (im Kalenderjahr)	.	.	.	.	.	.	.	.	.	.	.	.	6.227	29.065	36.957	7.892	27,2%	entfällt	entfällt
Zeil 15	**Eintritte in BA-finanzierte Maßnahmen der Berufsvorbereitung insgesamt (inkl. EQJ)**	**70.400**	**72.690**	**85.521**	**96.354**	**107.086**	**110.523**	**128.145**	**137.618**	**145.130**	**154.192**	**182.997**	**162.692**	**170.454**	**186.315**	**192.473**	**6.158**	**3,3%**	**122.073**	**173,4%**
Zeile 16	**Fachoberschüler/innen in der 11. Klasse**	**23.194**	**25.225**	**29.204**	**32.129**	**36.888**	**39.769**	**41.630**	**43.971**	**45.687**	**47.550**	**51.115**	**54.364**	**57.494**	**58.644**	**61.302**	**2.658**	**4,5%**	**38.108**	164,3%
Zeile 17	**Studienanfänger/innen**	**290.800**	**279.631**	**267.946**	**262.407**	**267.469**	**267.445**	**272.473**	**291.447**	**314.956**	**344.830**	**358.946**	**377.504**	**358.870**	**356.076**	**344.967**	**-11.109**	**-3,1%**	**54.167**	**18,6%**
Zeile 18	**Arbeitslose Jugendliche unter 20 Jahren (Jahresdurchschnitt)**	**88.215**	**90.015**	**92.415**	**95.222**	**107.297**	**113.539**	**108.488**	**101.246**	**101.342**	**100.699**	**100.101**	**84.299**	**75.062**	**123.701**	**108.466**	**-15.235**	**-12,3%**	**20.251**	**23,0%**

Absolventen/Absolventinnen allgemeinbildender Schulen ohne Teilnehmer/innen am zweiten Bildungsweg (Abendhaupt-, Abendrealschule, Abendgymnasium, Kolleg) und ohne Teilnehmer/innen an der Schulfremdenprüfung (entsprechend den Sonderauswertungen für den Berufsbildungsbericht).

Die Zahl der niedersächsischen Absolventen/Absolventinnen mit Realschul- oder vergleichbarem Abschluss für 2004 wurde geschätzt.

Kursiv gedruckte Zahlen verweisen auf Schätzungen.

Die Schätzung der betrieblichen und außerbetrieblichen Verträge erfolgte ab 2006 auf einer neuen Grundlage. Diese führt zu rechnerisch deutlich höheren Anteilen außerbetrieblicher Verträge. Deshalb ist der für 2006 ermittelte Wert nicht mit den Vorjahreswerten vergleichbar.

Quellen: Statistisches Bundesamt, Bundesagentur für Arbeit, Bundesinstitut für Berufsbildung.

Figure 2: Training-Establishment rate and apprenticeship training rate

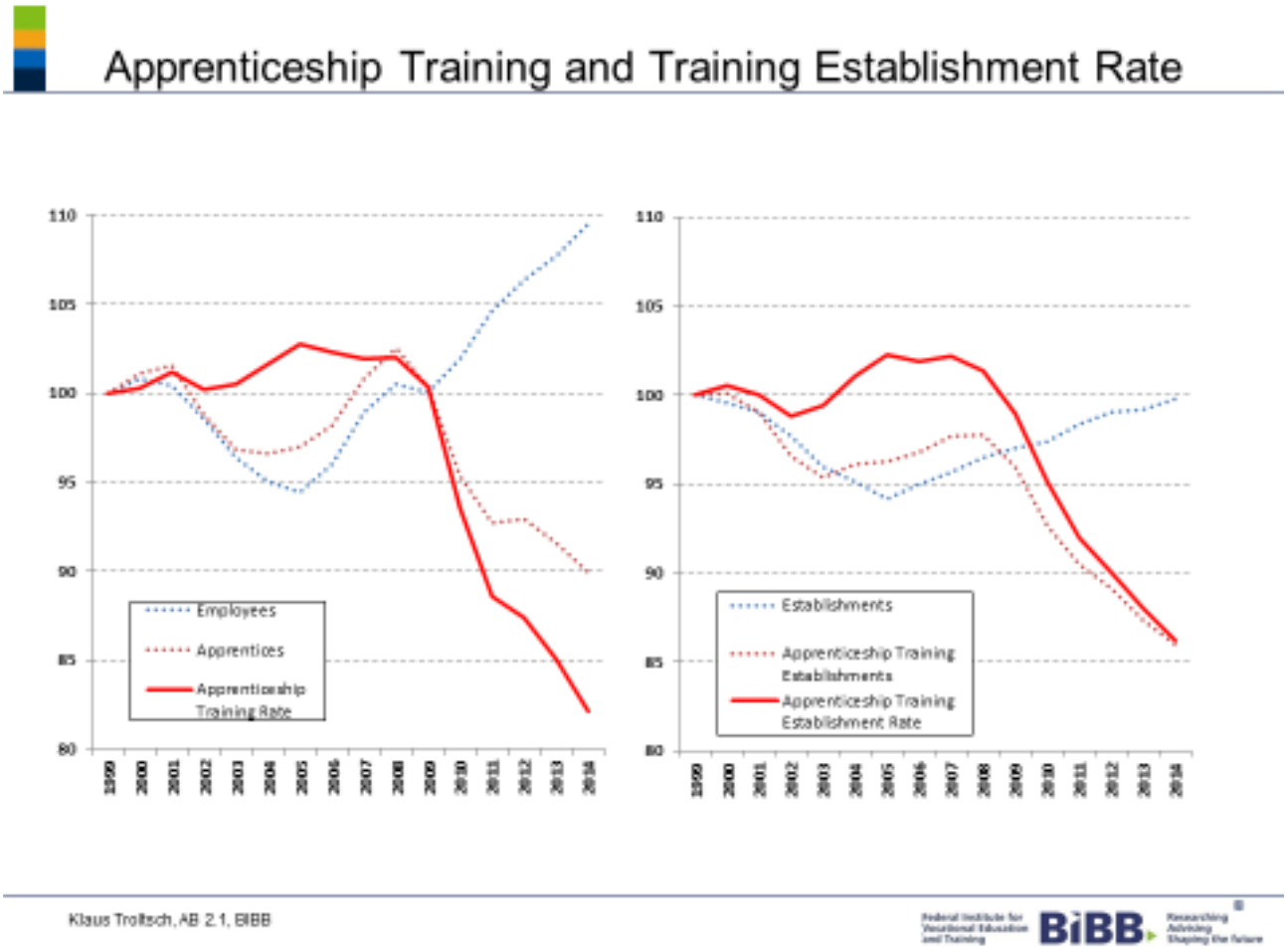


Figure 3: Reasons for companies to withdraw from apprenticeship provision