

# Creating the initial vocational qualification from the German Microcensus

Tobias Maier\* and Robert Helmrich\*\*

April 4, 2012

## Abstract

After secondary education, school leavers generally specialise to compete on the labour market. This specific knowledge can be obtained through apprenticeship (vocational education and training) or higher education. This initial vocational qualification or trained occupation is supposed to have a high impact on further career paths of individuals in countries with a high degree of standardisation in the education and training system, like Germany. However, in the German case, it is hard to find large data sources that measure the initial vocational qualification for all qualification levels (ISCED 3b-6) in conjunction with other socio-demographic variables.

The official representative statistic on the population's economic and social conditions, the labor market and education, the German Microcensus covers about 390 000 households (1% of all households in Germany) with 830 000 individuals on an annual basis. Yet, the sample only contained a question asking for the major field of study of academics in some years. In the survey year 2004, the question was expanded and now everybody was asked to specify the major field of study - regardless of their qualification level. Although the results are not for public use, the Federal Statistical Office permitted the Institute for Vocational Training and Education (BIBB) to use this additional information to reconstruct the 'initial vocational qualification' for everybody with a qualification equal or higher to ISCED 3b.

Since 2005, BIBB has now exclusive information on the 'initial vocational qualification' by heuristically combining the major field of study, the qualification level achieved and the occupation exercised. On the level of the occupation exercised, we conducted a cluster analysis for the 3-digit occupational classifications of the German Classification of Occupations 1992 (KldB 1992) on basis of the main focus of activity. To avoid misclassification in the major field of study and to solve sampling problems occurring for minor occupations we classified the initial vocational qualification into one of those 54 Occupational Fields obtained from the cluster analysis. This procedure emphasizes the employability of each individual because it connects the ability to fulfill certain tasks with the specialisation during vocational education.

This paper will demonstrate the method of creating the initial vocational qualification, it will illustrate the idea behind clustering occupations according to their main focus of activity and it will show how this method could be used for other countries carrying out the Labor Force Survey.

---

\*tobias.maier@bibb.de; Bundesinstitut für Berufsbildung (BIBB), Bonn.

\*\*helmrich@bibb.de; Bundesinstitut für Berufsbildung (BIBB), Bonn.

# 1 Introduction

After secondary education, school leavers generally specialise to compete on the labour market. This specific knowledge can be obtained through apprenticeship (vocational education and training) or higher education. This initial vocational qualification or trained occupation is supposed to have a high impact on career paths of individuals (Blossfeld 1987; Mayer and Carroll 1987), especially in countries with a high degree of standardisation in the education and training system, like Germany (Allmendinger 1989). Furthermore, the occupation itself is often used as an indicator for socio-economic status and/or occupational prestige (Hoffmeyer-Zlotnik and Warner 2011). Against this background, it is essential to have information about the initial vocational qualification in large data sets that also contain a variety of socio-demographic variables to further investigate effects of the initial vocational qualification and patterns of occupational change.

The German Labour Force Survey (LFS), an integral part of the German Microcensus, represents the official statistic on the population and the labour market in Germany and also allows for international comparisons due to similar questions in other European countries. However, information on the initial vocational qualification have not been provided in the Microcensus so far. In the survey years 1985, 1987 and 1989 alumnis of universities or Universities of Applied Sciences were asked compulsory to specify their major field of study. In the years 1991, 1993 and 1995 the answer to this question has become voluntary. Since 1995 the Microcensus is carried out on an annual basis but the major field of study was only requested in 1996 (compulsory) and in 2000 (voluntary). In 2003 the question was extended for all persons with a vocational education in a subsample and since 2005 every respondent is compulsory asked to specify the major field of study - regardless of their qualification level. Although the results are not for public use, the Federal Statistical Office permitted the Institute for Vocational Training and Education (BIBB) to use this additional information to reconstruct the ‘initial vocational qualification’ for everybody with a qualification equal or higher to level 3b of the International Standard Classification of Education (ISCED). Since 2005, the BIBB has now exclusive information on the ‘initial vocational qualification’ by heuristically combining the major field of study, the qualification level achieved and the occupation exercised.

In this paper, we describe the available data, the concept behind the initial vocational qualification and the method adapted. Furthermore, we share our thoughts about the plausibility of our results and provide some information how our approach could be adapted in other countries with the LFS. Some of the following description (specifically section 3) are based on a German explanation of the concept in Bott et al. (2010, p. 74-76).

## 2 Available data

Due to the amount of detailed occupational categories, information on individual vocational specialisation can only be based on large data sets. This requirement reduces the available data to two data sources: the Employment Samples of the Institute for Employment Research (IAB) and the German Microcensus (for methodological differences of both data sources see: Körner and Puch (2011)). Both of them have their pitfalls.

The Employment Sample of the IAB (IABS) represents an 2% sample of the statistics on employees subject to mandatory social insurance contributions produced by the Federal Employment Agency (round about 1.36 million individuals) and provides individual labour market related time series information since 1975. However, civil servants, self-employed, family members who help out in businesses or staff working a small number of hours each month (marginal employment) are not included in the data set. Besides that, these statistics merely show the level of the vocational qualification (apprenticeship, full-time vocational school qualification, trade and technical school qualification, higher education qualification) but not the specific occupation/subject studied. Employees subject to mandatory social insurance contributions who have completed apprenticeship within the dual system are the only group for which information on the initial vocational qualification is available at the level of a three-digit occupational category (Classification of Occupations 1988 (KldB 1988)). Studies focusing on the initial vocational qualification therefore constrain to employed persons with an apprenticeship education (e.g. Clark and Fahr 2001; Geel and Backes-Gellner 2009).

In contrast to the IABS the German Microcensus does not contain individual time series information. However, it is an official representative snapshot of the population and labour market, in which 1% of all households in Germany participate each year (ongoing household sample). A total of around 370 000 households comprising 820 000 persons take part in the Microcensus. Its purpose is to supply information on the economic and social position of the population, employment activity, the labour market and training. It also assists in the evaluation of other official statistics. The large scope of samples in the Scientific Use File encompasses more than 500 000 cases and permits differentiated analyses of smaller sub-groups on the basis of such criteria as various general and vocational qualifications within the population. There is a statutory requirement to provide information to the Microcensus, resulting in a very high participation rate of around 97 % of selected households. Together with the annual survey cycle of the Microcensus, this makes the data extremely valuable for analyses of social, economic and occupational change in particular. However, the initial vocational qualification of the the economically active population is not provided directly in the sample, but since the survey year 2005 it can be reconstructed by combining the ‘qualification level’ (highest level achieved according to ISCED) and the ‘major field of study’ as will be shown in the next section.

Due to the fact that the European Labor Force Survey (LFS) is an integral part of the Microcensus, some part of the information to construct the initial vocational qualification is also provided in the European Labor Force Survey, as we will demonstrate in section 6.

### **3 Concept of creating the initial vocational qualification**

The aim of the ‘initial vocational qualification’ is to map the vocational qualification of the labour force to the specialism of the highest initial or continuing training qualification achieved within a standardised classification system. Therefore, the BIBB used the survey year 2005 of the German Microcensus as this represents the first time that all prerequisites have been in place to map the vocational qualification of all persons within the working age population aged 15 and above in accordance with a uniform classification system integrating all areas of vocational training.

Educational statistics have up until now used different educational classifications to maintain a strict division between the educational areas of ‘vocational training’ and ‘(higher) education’ to record the specialism of a course of education or training leading to a qualification. Whereas vocational education and training (VET) courses have been classified in accordance with the Classification of Occupations, courses of study at institutes of higher education are classified in accordance with the subject specialism classification used in the Higher Education Statistics. Two things which both classifications have in common are the reference to the area of expertise and a more or less marked alignment towards fields of occupational deployment depending on the course of education or training concerned. This offers two different possibilities to classify the initial and continuing training specialisms, one based on the target occupational activity and the other on the specialist content. Whereas we have chosen the former way because it corresponds best to the specific national characteristics in terms of the relations between the VET system and the employment system, the other path was chosen by the Classification of Fields of Education and Training (1999)<sup>1</sup>. The principle of the initial vocational qualification links in with both of these principles. The core of the concept is the use of the Classification of Occupations, which maps occupations exercised or aspired to by the working age population within a standardised classification system structured in a hierarchical manner according to occupational affinity, as the key system for identifying the subject specialism of both vocational qualifications and higher education courses of study.

The various educational statistics relating to dual training, school-based training and

---

<sup>1</sup>See [http://ec.europa.eu/eurostat/ramon/nomenclatures/index.cfm?TargetUrl=LST\\_CLS\\_DLD&StrNom=CL\\_FIELD99&StrLanguageCode=DE&StrLayoutCode=HIERARCHIC#](http://ec.europa.eu/eurostat/ramon/nomenclatures/index.cfm?TargetUrl=LST_CLS_DLD&StrNom=CL_FIELD99&StrLanguageCode=DE&StrLayoutCode=HIERARCHIC#) (29.03.2012).

higher education already codify recognised training occupations within the dual system and fully qualifying courses offered by full-time vocational schools and trade and technical schools in accordance with the classification of (employment) occupations. This codification takes place at the lowest classification level, the 4-digit occupational classification code. The localisation of a VET course within the classification of employment occupations is aligned to the affinity of vocational knowledge and skills acquired in the course with the occupational activities during which such knowledge and skills are used or required for exercising the occupation.

Even though VET courses in Germany are already aligned to certain fields of occupational deployment, a warning should be issued at this point against coming to the ‘naïve’ and hasty conclusion that initial vocational qualification and the occupation exercised which have the same statistical codification are two sides of the same coin. Training courses provide preparation for a diverse range of employment activities. The training completed by office management and industrial clerks, for example, qualifies them to exercise both more general and more specific commercial activities which, as employment occupations however, are aligned to different occupational classification codes. This means that no one-to-one correlation can be made between initial or advanced training occupations at the level of the ‘4-digit code’ of the Classification of Occupations and the employment occupations covered by the 4-digit code. Depending on the breadth of application of a training course, occupational activities for which qualification is achieved may be spread across several different classification positions within the Classification of Occupations.

This varying quality of occupations learned and exercised is more applicable if courses of study at institutes of higher education are aligned to classification positions within the Classification of Occupations. For many courses of study, it is relatively simple to identify adequate classification positions within the Classification of Occupations. A degree in Engineering can, for example, be assigned the code for the employment occupation of mechanical engineer, a degree in Mathematics that of mathematician etc. In the case of a course of study in law, a decision needs to be taken as to whether the code for lawyer or public prosecutor and judge should be selected. In the case of this example, various plausible coding options are available in the Classification of Occupations for each respective course of study. The decision-making process can be governed by applying a majority rule. This would mean that the relevant employment classification code to be selected would be the employment classification in which more qualified lawyers are working. The reverse can, however, also occur where only a few suitable positions within the employment classification system are available to cover a diverse range of specialisms as with courses of study in languages. A loss in differentiation needs to be accepted in such instances. In the case of courses which cannot be aligned to any adequate designation of activity within the Classification of Occupations, such as Ethics, the localisation

environment in the educational classification system provides guidance for localisation in the Classification of Occupations.

Despite the problems addressed here, it is clear that courses of study at institutes of higher education can also be aligned to classification positions with the Classification of Occupations in a plausible manner. Interestingly, until 2003, the Microcensus only surveyed training specialism for (higher) education via a relatively rough classification system specially adapted for the purposes of the Microcensus by dint of its sample-based approach. This method has already been used by the IAB, who linked information in the Microcensus on the specialism studied by persons in active employment and in possession of a university or University of Applied Sciences degree with data from the Higher Education Statistics and Unemployment Statistics (Parmentier et al. 1998). In 2003, a sub-sample was for the first time surveyed using a catalogue of specialisms encompassing over 3 500 positions and bundled into around 100 main subject areas. In 2005, this was extended to include the whole sample of all general and vocational initial and continuing training qualifications. The Microcensus now collects official recognised training specialisms for all qualification levels and for the entire working age population every year.

The fact that it has been possible to implement the concept of the occupation learned, which is based on the alignment of approximately 3 500 positions contained within the catalogue of initial and continuing training and higher education specialisms used for the Microcensus to the 2 287 occupational classes in the 1992 Federal Statistical Office Classification of Occupations (KldB 1992), means that Microcensus data from 2005 onwards can be used for the following purposes:

1. Differentiated statements can be made for the working age population as a whole and for sub-groups on the utilisation of VET in the employment system with regard to such aspects as the scope of over-qualified employment or branch mobility.
2. All vocational qualifications acquired within the educational system can for the first time be set in relation as an ‘occupation learned’ to occupations exercised within the employment system. This enables an overall picture to be obtained of horizontal and vertical occupational flexibility according to specialisms. On the labour force supply side, this means transitional patterns to various employment occupations for those in possession of an initial vocational qualification and on the labour force demand side recruitment patterns for an occupation to be exercised in accordance with various occupations learned.
3. The hierarchical structure of the Classification of Occupations on the basis of occupational or professional affinity permits analyses to be conducted at various levels of aggregation, e.g. 369 occupational categories, 88 occupational groups, 33 occupational sections, 6 occupational areas (Statistisches Bundesamt 1992) or for the 54 BIBB Occupational Fields or 12 major occupational fields (Tiemann et al. 2008;

Rohrbach-Schmidt and Tiemann 2011). However, due to some analytical restrictions of the KldB 1992, analysis on the level of the occupational fields are preferred (see section 4).

## 4 Method of creating the initial vocational qualification

As mentioned before, the initial vocational qualification of the economically active population is not surveyed directly. Instead it has to be reconstructed by combining the ‘qualification level’ (highest level achieved according to ISCED) and the ‘major field of study’ in the German Microcensus; e.g. for nursing professions:

- (qualification level: ‘ISCED 5b’) + (major field of study: ‘nursing’)  
= (classification of occupation category 853 KldB 92: ‘nurses and midwives’)
- (qualification level: ‘ISCED 3b/4’) + (major field of study: ‘nursing’)  
= (classification of occupation category 854 KldB 92: ‘auxiliary nurses’)
- (qualification level: ‘ISCED 5b’) + (major field of study: ‘geriatric care’)  
= (classification of occupation category 864 KldB 92: ‘geriatric nurses’)

Whereas the theoretical principle is very simple to adapt, it is much harder to carry it through in practice as it requires a competent knowledge of the (German) educational system. Respondents in the Microcensus have to give keywords for their study fields and some of them can for example only be conducted on an academic level and not on the medium skill level (ISCED 3b/4). Those implausible combinations have to be excluded from the analysis. As already mentioned, VET courses recognised on federal state level have already been classified in accordance with the KldB 1992 but all other vocational paths, especially courses of study at institutes of higher education, do not have this direct link to an occupational category. This has implications for the method on hand: The classification of persons with the highest qualification level on ISCED 5a and 6 into an occupational category is more challenging as for persons with a VET on ISCED-level 3b and 4. Problems also occur due to the fact that persons in higher qualification can also have more than one ‘major field of study’. However, the Microcensus captures by definition only one major study field. For other occupations like ‘teacher’, the major field of study was not necessarily corresponding with the ‘initial vocational qualification’ because the information provided like ‘physics’ did not hint on the ‘teaching occupation’ that was aspired. In those cases, it has been useful to have a look on the occupation exercised to draw back on the ‘initial vocational qualification’. In consequence, persons with qualification level ‘ISCED 5a and 6’, a major field of study ‘physics’ and ‘teacher’

in the exercised occupation have been classified as ‘teacher’ and not as ‘physicist’. The method itself can therefore be classified as rather heuristic.

Even though all codification takes place at the lowest classification level, the 4-digit occupational classification code of the KldB 1992, we prefer to conduct statistical analysis on the level of the 54 BIBB Occupational Fields (Tiemann et al. 2008). These occupational fields are grouped at the level of the occupational categories (3-digit codes) via cluster analysis from the KldB 1992 on the basis of comparable job characteristics and branch dominance. Thus, in contrast to the KldB 1992 occupational classification scheme, they show greater intra-homogeneity and, at the same time, greater inter-heterogeneity in their main focus of activity (Tiemann et al. 2008; Rohrbach-Schmidt and Tiemann 2011). For some occupations with higher sample sizes and rather doubtless reconstruction of the initial vocational qualification (especially on the medium skill level), analyses are also conducted on the deeper disaggregated 3-digit-level of the KldB 1992. But due to the homogeneous focus of activity in the BIBB Occupational Fields, this occupational clustering represents most adequately the employability given with a specific initial vocational qualification. This has also practical advantages when analysing occupational changes. The 3-digit-level of the KldB 1992 differentiates between occupations with more or less similar job contents. Job changes can therefore conclude in a change of the occupational category even though the person is still fulfilling the same duties as before. The measured rate of occupational change would therefore be overestimated due to artificial changes in the occupational category (Hall 2010). The occupational fields of the BIBB assure in this case that occupational changes are only measured if the main focus of activity changes significantly. Besides that, it is still possible to differentiate between qualification levels within the occupational fields to distinguish between different skill requirements in an occupation.

## 5 Plausibility of the results

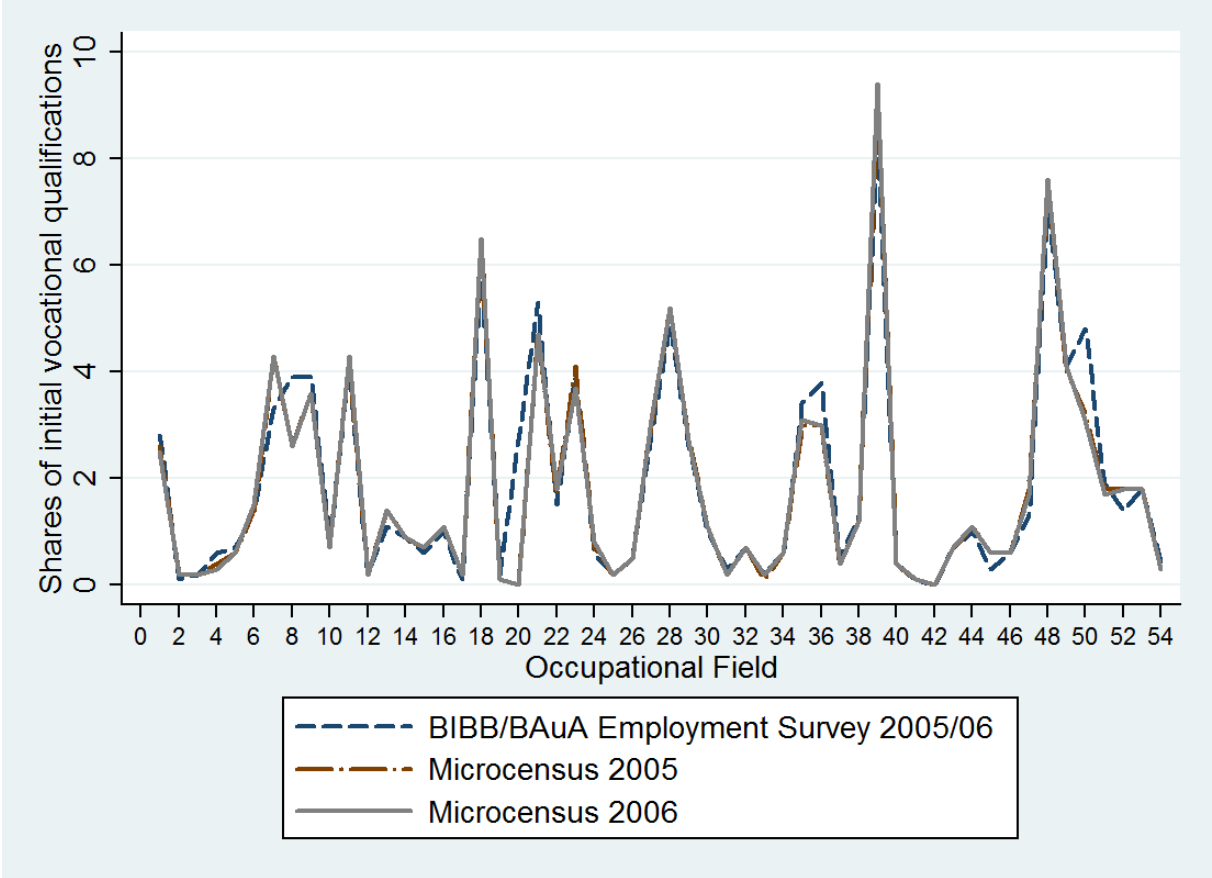
If additional new information is gained from administrative or official data sources, it is always difficult to verify the accuracy of the results obtained, because the data source itself represents an official statistic and is often used as reference point for other surveys. In the case of the initial vocational qualification there are two possible ways to verify the plausibility of the results. On the one hand results could be compared to other official data sets like the SIAB, mentioned in section 2. In this case comparisons have to be made for the subsample of persons with a completed VET (ISCED 3b and 4). On the other hand, results could be compared to survey data with smaller sample sizes, which collect the necessary information directly, e.g. through direct questions.

Due to the sample size and also due to the general quality of the process produced data, a comparison to the IABS would normally be preferable. However, due to the



tight connection between the KldB 1992 and the VET courses, we are most confident about our classification method for initial vocational qualifications at the medium skill level. It is therefore of greater interest to see how the concept performs for those with higher education as well as for self-employed, civil servants and family members who help out in businesses and who are not represented in the IABS. The BIBB/BAuA-Employment Survey 2005/06 (Zopf and Tiemann 2010) is one of the few samples that contain direct information on the ‘highest vocational qualification’ achieved. The sample is based on information on 20 000 individuals, who are older than 15, who work at least 10 hours a week and are being paid for this. The initial vocational qualification is identified directly in this survey by asking for the exact nomenclature/occupational title of (the highest) vocational education, preferably the nomenclature recorded in the apprenticeship certificate/university degree/major field of study. For alumni of universities it is also verified if it has been a teaching post study programm.

Figure 1: Shares of initial vocational qualifications in the active labour force in Microcensus 2005, 2006 and BIBB/BAuA Employment Survey 2005/06



Source: Microcensus of the German Federal Statistical Office, BIBB/BAuA Employment Survey 2005/06; own illustration

Figure 1 presents the shares of initial vocational qualifications in the active labour force in the BIBB/BAuA Employment Survey 2005/06 and the Microcensus surveys 2005 and 2006. All shares sum up to 100% over all 54 occupational fields. As can be seen, there

are almost no differences in the shares between the two Microcensus surveys 2005 and 2006. However, the Microcensus deviates from the Employment Survey in the producing occupations ‘7: Metal construction, plant construction, sheet metal construction, installation, fitters’, ‘8: Industrial mechanics, tools mechanics’ and ‘9: Vehicle and aircraft construction, maintenance occupations’. Whereas the first occupations seems to be overestimated in the Microcensus compared to the Employment Survey, the other two occupations are rather underestimated. The Microcensus also so seems to underestimate the amount of trained ‘35: Managing directors, auditors, management consultancy’, ‘36: Administrative occupations in the public sector’ and ‘50: Teaching occupations’ dominated by higher qualified persons. Especially for teaching occupations the result could be expected because teaching occupations are asked directly in the Employment survey, whereas in the Microcensus it has been necessary to deduce the initial vocational qualification from the occupation exercised. The underestimation of managers and administrative occupations hints to a problem occurring with the chosen approach: even though there exist special educational paths to become a manager or administration clerk, both occupational fields are also open for various different vocational educations, the major field of study in the Microcensus might not catch this variety. It has to be noted that the differences in occupational field ‘20: Unspecified auxiliary workers’ occur because there have not been any persons with this qualification in the Employment Survey.

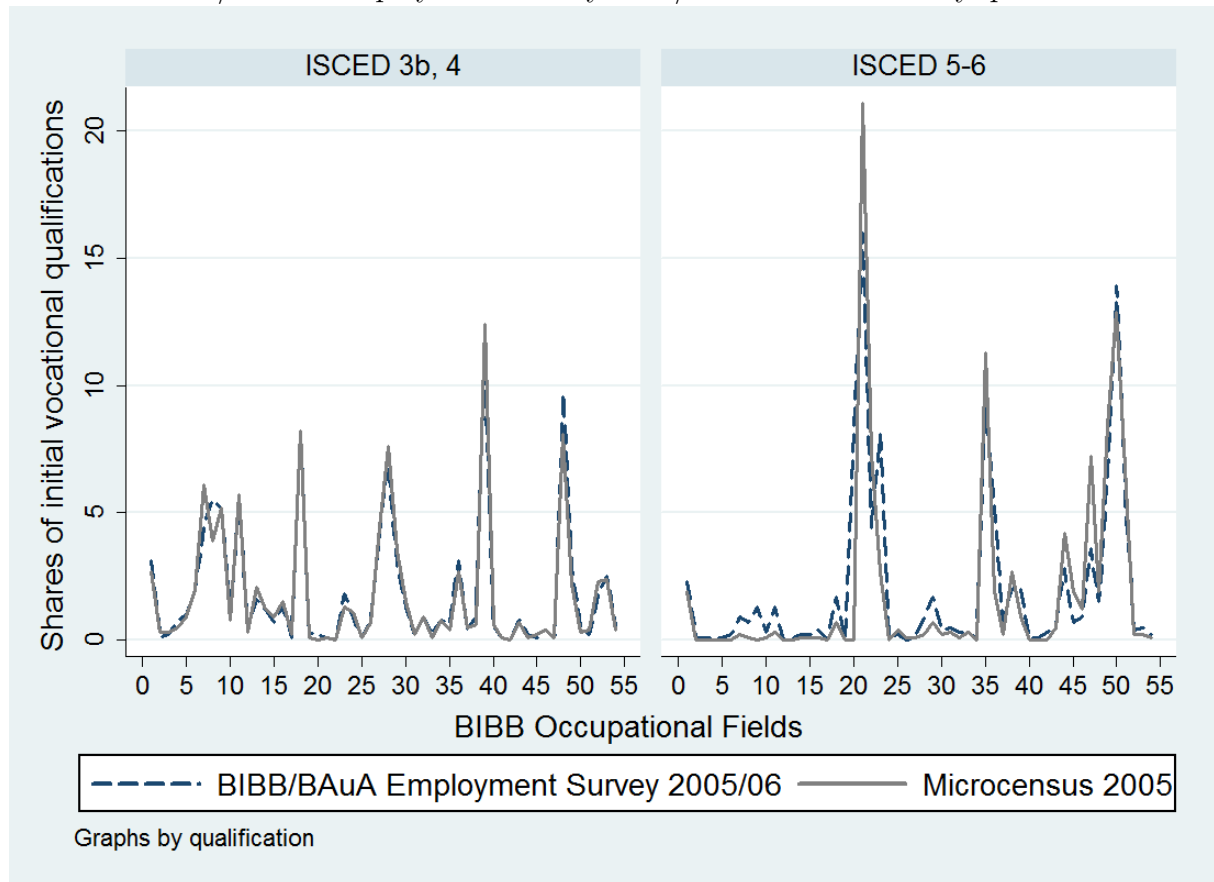
Figure 2 differentiates in the shares of initial vocational qualifications in the active labour force between the medium skill level (ISCED 3b, 4) and the higher skill level (ISCED 5-6). As before, all shares sum up to 100% over all 54 occupational fields in each skill level. It can be seen that deviations between the Microcensus and the Employment survey mainly occur at the higher skill level. On the one hand this is due to the smaller sample size in the Employment Survey for high skilled persons (n=6935) and the unequal distribution of highly skilled persons over the 54 occupational fields. On the other hand it highlights the challenges involved in the construction of the initial vocational qualification for academics: in contrast to VET courses recognised on federal state level they just cannot directly be linked to an occupational category.<sup>2</sup>

The comparisons of the Microcensus and the Employment Survey shown in figure 1 and 2 make no claim to be complete, instead they give an indication about the performance of the concept of the initial vocational qualification in the Microcensus. Even though the results seem very plausible on the level of the occupational fields, the classification rules can still be improved for the 3-digit-occupational categories. Further survey years of the Microcensus (2006 until 2009) have increased the number of cases for certain combinations of ‘qualification level’, ‘major field of study’ and ‘occupation exercised’. In some cases it can also help to use further information in the data, like the migration background (educational paths are different in other countries) or the year when the vo-

---

<sup>2</sup> The ‘outlier’ occupational field 21 represents the engineers.

Figure 2: Shares of initial vocational qualification in the active labour force in Microcensus 2005 and BIBB/BAuA Employment Survey 2005/06 - differentiated by qualification level



Source: Microcensus of the German Federal Statistical Office, BIBB/BAuA Employment Survey 2005/06; own illustration

ational qualification was obtained (VET courses and their labelling change over time), to get some new insights for reclassifying the initial vocational education of some persons. In light of this, it would also be desirable to gain some information from other countries, on how they deal with the information of the ‘major field of study’ in the LFS.

## 6 Adaption of the method for the Labour Force Survey

The European Labour Force Survey (LFS) is an integral part of the German Microcensus. Most variables from both surveys are equal. The exercised occupation and the initial vocational qualification are both specified in the EU-Regulation 377/2008. For the exercised occupation the collected data have to be classified according to the International Standard Classification of Occupations (ISCO 08) on level 4 but at least on level 3 (see variable ISCO4D in Table 1). For the initial vocational qualification the data is collected according to two variables: The highest level of education or training successfully com-

Table 1: Commission Regulation (EC) NO 377/2008 of 25 April 2008 (abridgment of codification)

Name	Description
ISCO4D	Occupation: ISCO08 coded at 3 or if possible 4 digit level
HATLEVEL	Highest level of education or training successfully completed: Classification of Education (ISCED) coded at 2 digit level
HATFIELD	Field of highest level of education or training successfully completed: Classification of Education Field (ISCED-field) coded at 1 digit level

pleted (HATLEVEL) and the field of highest level of education or training successfully completed (HATFIELD - see table 1). HATLEVEL is classified on ISCED level 2 and HATFIELD is classified on ISCO level 1. This means that the variable HATFIELD is not differentiated enough to reconstruct the detailed initial vocational qualification in the LFS. To adapt the concept of the ‘initial vocational classification’ in other countries it would therefore be recommendable to apply for the ISCO-field on level 3 at the responsible offices, if the information is gained on a more detailed level. In the German case, ‘the field of highest level of education or training successfully completed’ is originally collected without any specification in the questionnaire, instead the respondents state a keyword for their field of highest education or training successfully completed. So, it might also be possible for some countries that the necessary data for the field of ‘highest level of education or training successfully completed’ are available by keywords and can be coded on the level needed.

## 7 Conclusion and outlook

The German Microcensus is the official representative statistic of the German population and labour market. However, it provides no information on the initial vocational qualification for the active labour force during the last two decades. The BIBB has now used the 2005 survey year of the Microcensus to heuristically combine the ‘major field of study’ and the ‘qualification level’ into an initial vocational qualification. This paper presented the concept behind this approach (section 3) and also described the adapted method (section 4). On the level of the BIBB-Occupational Fields (Tiemann et al. 2008), which emphasises the employability of each individual by clustering occupations according to their main focus of activity, the distribution of the initial vocational qualifications among the active labour force seems plausible if compared to the BIBB/BAuA Employment Survey. However, those comparisons (section 5) cannot be seen as a proof for the correctness of the method, they only give an indication about the performance of the concept of initial vocational qualification in the Microcensus. It becomes apparent that classification of persons with the highest qualification level on ISCED 5a and 6 into an

occupational category is more challenging as for persons with a VET on ISCED-level 3b and 4. This is because most of the latter ones, namely VET courses recognised at the state level, are already linked to an occupational category.

Even though the results seem very plausible on the level of the occupational fields, there are still some combinations of ‘qualification level’, ‘major field of study’ and ‘occupation exercised’ that are not solved at the current state. It is expected that more recent survey years (Microcensus surveys 2006 until 2009) will increase (or at least not increase) the number of cases for those uncertain combinations, so that it will be easier to decide whether this combination should be transformed into an initial vocational qualification or not. In some cases, classification could possibly be improved on the 3-digit-level by the use of further information in the data, like the migration background or the year when the vocational qualification was obtained. This is why the current algorithm is not for public use at the moment.

Besides those ongoing improvements in the classification algorithm, the initial vocational qualification has also to be recoded into the new German Classification of Occupations 2010 (KldB 2010), which complies with the ISCO 2008. Therefore, it would be desirable if the presented concept can also be applied in other countries with the LFS to share experiences and to compare results on international level.

## References

- ALLMENDINGER, JUTTA (1989): Educational Systems and Labor Market Outcomes. *European Sociological Review* 5(3): 231–250.
- BLOSSFELD, HANS-PETER (1987): Entry into the Labour Market and Occupational Career in the Federal Republic. In: TECKENBERG, WOLFGANG (Ed.), *Comparative studies of social structure - Recent research on France, the United States, and the Federal Republic of Germany*, New York/ London: Sharpe. 86–115.
- BOTT, PETER; HELMRICH, ROBERT; SCHADE, HANS-JOACHIM and WELLER, SABRINA INEZ (2010): Datengrundlagen und Systematiken für die BIBB-IAB-Qualifikations- und Berufsfeldprojektion [Data basis and taxonomy for the BIBB-IAB qualification and occupational fields projections]. In: HELMRICH, ROBERT and ZIKA, GERD (Ed.), *Beruf und Qualifikation in der Zukunft. BIBB-IAB-Modellrechnungen zu den Entwicklungen in Berufsfeldern und Qualifikationen bis 2025 [Occupations and qualification in the future. BIBB-IAB model calculations in occupational fields and qualifications until 2025]*, Bonn: Bundesinstitut für Berufsbildung. 63 – 80.
- CLARK, DAMON and FAHR, RENÉ (2001): The Promise of Workplace Training for Non-College-Bound Youth: Theory and Evidence from German Apprenticeship. IZA Discussion Paper No. 378.
- GEEL, REGULA and BACKES-GELLNER, USCHI (2009): Occupational Mobility Within and Between Skill Clusters: An Empirical Anaysis Based on the Skill-Weights Approach. Leading House Working Paper No. 47.
- HALL, ANJA (2010): Wechsel des erlernten Berufs. Theoretische Relevanz, Messprobleme und Einkommenseffekte [Changes of the occupation learned. Theoretical relevance, measurement problems and income effects]. *Zeitschrift für Berufs- und Wirtschaftspädagogik*. Sonderheft 24: 157–174.
- HOFFMEYER-ZLOTNIK, JÜRGEN H.P. and WARNER, UWE (2011): Concepts of Labour Status and their Operationalisation in Cross-National Comparative Social Surveys. *Metodoloski zvezki* 8(1): 99–113.
- KÖRNER, THOMAS and PUCH, KATHARINA (2011): Coherence of German Labour Market Statistics. Federal Statistical Office of Germany. Statistics and Science. Vol. 19. [https://www.destatis.de/DE/Publikationen/StatistikWissenschaft/Band19\\_CoherenceLabourMarket1030819119004.pdf?\\_\\_blob=publicationFile](https://www.destatis.de/DE/Publikationen/StatistikWissenschaft/Band19_CoherenceLabourMarket1030819119004.pdf?__blob=publicationFile).
- MAYER, KARL ULRICH and CARROLL, GLENN R. (1987): Jobs and classes: structural constraints on career mobility. *European Sociological Review* 3(1): 14 – 38.
- PARMENTIER, KLAUS; SCHADE, HANS-JOACHIM; SCHREYER, FRANZISKA; CYPRIAN, RÜDIGER and GAWOREK, MARIA (1998): Akademiker/innen - Studium und Arbeitsmarkt [Academics - higher education and the labour market]. MatAB 1.1/1998. <http://doku.iab.de/matab/1998/mat1.pdf>.
- ROHRBACH-SCHMIDT, DANIELA and TIEMANN, MICHAEL (2011): Mismatching and job tasks in Germany - rising over-qualification through polarization? *Empirical Research in Vocational Education and Training* 3(1): 39–53.
- STATISTISCHES BUNDESAMT (1992): Klassifikation der Berufe 1992 (KldB 92). Gliederungsstruktur bis zur 4 Steller Ebene. [Classification of Occupations 1992. Classification structure until the 4-digit level]. Statistisches Bundesamt. Wiesbaden.

TIEMANN, MICHAEL; SCHADE, HANS-JOACHIM; HELMRICH, ROBERT; HALL, ANJA; BRAUN, UTA and BOTT, PETER (2008): *Berufsfeld-Definitionen des BIBB auf Basis der KldB1992 [Occupational field definitions of the BIBB on the basis of the KldB 1992]*. Nummer 105 in *Wissenschaftliche Diskussionspapiere*. Bonn: Bundesinstitut für Berufsbildung, 2. Auflage.

ZOPF, SUSANNE and TIEMANN, MICHAEL (2010): BIBB/BAuA-Employment Survey 2005/06. *Schmollers Jahrbuch. Journal of Applied Social Science Studies* 130(3): 409–420.

## 8 Acknowledgments

The authors only present the methodology of creating the initial vocational qualification. This whole project would not have been possible without the commitment of further employees of the section ‘Qualification, Occupational Integration and Employment’ of the BIBB, namely in alphabetical order: Peter Bott, Uta Braun, Felix Bremser, Anja Hall, Anna Höver, Ingrid Leppelmeier, Michael Tiemann, Hans-Joachim Schade, Manuel Schandock, Sabrina Ines Weller and Susanne Zopf.

Furthermore, BIBB thanks the German Federal Statistical Office for its support in implementing the concept of the initial vocational qualification by providing access to the major field of study.