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The implementation of the German Classification of Occupations 2010 in the IAB Job Vacancy Survey

Documentation of the implementation process

Anne Müller

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Mit der Publikation von Forschungsberichten will das IAB der Fachöffentlichkeit Einblick in seine laufenden Arbeiten geben. Die Berichte sollen aber auch den Forscherinnen und Forschern einen unkomplizierten und raschen Zugang zum Markt verschaffen. Vor allem längere Zwischen- aber auch Endberichte aus der empirischen Projektarbeit bilden die Basis der Reihe.

By publishing the Forschungsberichte (Research Reports) IAB intends to give professional circles insights into its current work. At the same time the reports are aimed at providing researchers with quick and uncomplicated access to the market.

Contents

Abstract

The IAB-Job Vacancy Survey (IAB-JVS) is the only establishment survey in Germany which contains information about vacancies and new hires on an occupational level. When the new German Classification of Occupations 2010 was introduced, it became necessary to integrate it into the IAB-JVS. This report outlines the implementation of the new classification into the IAB-JVS questionnaire. It was conducted simultaneously with the renewal of the international classification, from ISCO-88 to ISCO-08. First, the purpose of the JVS and the necessity for classification is illustrated. Subsequently, the new classification is briefly introduced and the process of implementing adequate questions into the IAB-JVS is described. Also, the conducted pretest is described. The report closes with first results and a conclusion.

Zusammenfassung

Die IAB-Stellenerhebung ist die einzige Betriebsbefragung in Deutschland, die Informationen über offene Stellen und Neueinstellungen nach Berufen enthält. Als in Deutschland die neue Klassifikation der Berufe 2010 eingeführt wurde, musste diese auch in den Fragebogen der IAB-Stellenerhebung implementiert werden. Dieser Forschungsbericht behandelt die Einführung der neuen Klassifikation in den Fragebogen der IAB-Stellenerhebung. Diese wurde zeitgleich mit der Umstellung der internationalen Klassifikation der Berufe ISCO-88 auf ISCO-08 vorgenommen. Zunächst wird der Zweck der IAB-Stellenerhebung und Notwendigkeit der Abfrage von Berufsinformationen beschrieben. Anschließend werden kurz die neue Klassifikation der Berufe 2010 und die Einführung der neuen Fragen zur Erfassung der Berufsangaben vorgestellt. Dabei wird auch der Pretest beschrieben, mit dem die Fragen konzipiert wurden. Der Forschungsbericht schließt mit einigen ersten Ergebnissen und einem Fazit.

1 The IAB-Job Vacancy Survey and the need for occupational information

In Germany, it is not mandatory for firms to assign their open positions with the Federal Employment Agency (Bundesagentur für Arbeit). Therefore, only some of the vacancies are recorded in official statistics. Whether vacancies are reported to the Federal Employment Agency depends on various factors, e. g. economic branch, firm size, or region of the firm, or required qualification or occupation for the position. However, knowing the total number of vacancies which really exist is of great interest to measure labour demand as well as matching on the labour market.

The IAB-Job Vacancy Survey (JVS) is a representative survey of German establishments with its main focus on vacancies. It has been conducted by the Institute for Employment Research (IAB) yearly since 1989 and includes data given by around 14,000 establishments (for details, see Kettner et al. 2011 or Kettner and Vogler-Ludwig 2010). In the IAB-JVS questionnaire, firms are asked to give information about all of their open positions, not only the registered ones. Information on occupations plays a very important role at this point because it is well-known that whether a vacancy is being assigned to the Federal Employment Agency or not depends on the required occupation (among other factors). Therefore, some occupations are over-represented in official statistics, while others are under-represented. Although a survey the size of the IAB-JVS cannot be representative for all occupations, the collected data can help to assess the real magnitude of demand for certain qualifications. Furthermore, the IAB-JVS questionnaire asks for occupational information also for additional demand and expected bottleneck vacancies, for new hires, and for cases of unsuccessful recruitment.

For more than 20 years, the German Classification of Occupations 1988 and the revised version of 1992 (Klassifizierung der Berufe 1988/1992, KldB88 respectively KldB92) were used to record statistical numbers on employment, unemployed persons and vacancies. They were also used for the IAB-JVS data which allowed researchers to contrast vacancies with unemployed persons, for example. These classifications themselves, though, were updated versions of the original Classification of Occupations from 1970, which was developed during the 1960s. Needless to say, they were not representing the structure of today's labour market anymore. The classification needed to be modernised.

This report first gives a brief overview on the structure of the newly developed Classification of Occupations 2010. Its implementation in the IAB-JVS and occurring problems in the process are described in chapter 3. Subsequently, some results are presented. The report closes with a first conclusion in chapter 5.

2 The German Classification of Occupations 2010

The German Classification of Occupations 2010 (in the following: KldB 2010) was developed by the German Federal Employment Agency and the IAB in cooperation with the German Federal Statistical Office and constitutes a complete reform of the

system of occupation recording. The approach of renewing the classification mainly followed two aims: first, it had to represent the occupational structure in the current German labour market. Due to the very unique system of vocational training, especially the dual vocational education, representing the German labour market requires a customised classification which respects the uniqueness of its occupational segmentation. Second, the new classification needed to be comparable to the International Standard Classification of Occupations (ISCO) (for details on development, aims, structure and the classification itself, see Paulus/Matthes 2013; Bundesagentur für Arbeit 2011a; Paulus/Schweitzer/Wiemer 2010).

The KldB 2010 is hierarchically structured and records occupations in 5-positioned code numbers. On the most differentiated level 1,286 occupations can be distinguished. While the formerly valid classifications only focused on the detailed description of a certain occupation, the new structure follows two dimensions: first, the occupational tasks and their similarities or differences (positions 1 to 4 of the code number) and, on the fifth position, the required level of qualification, representing the varying complexity of certain occupations. Four levels can be distinguished:

- Helper/assistant ("Helfer"): no or only little required qualification, for example one year of vocational training; e. g. Harvest worker;
- Skilled employee ("Fachkraft"): requires occupational know-how, normally acquired by two to three years of vocational training; e. g. Carpenter;
- Specialist ("Spezialist"): requires specialised know-how and is often tied to planning or controlling tasks; normally requires vocational training plus advanced further training or tertiary education; e. g. Surgical Nurse;
- Expert ("Experte"): highest level of complexity; typically in research and development, knowledge transfer or managerial tasks; normally requires tertiary education of min. four years; e. g. Electrical Engineer.

The hierarchical structure of the KldB 2010 can be seen in table 1. For illustration, the occupation of the Geriatric Nurse (code: 82102) is used as an example.

Table 1
Hierarchical structure of the German Classification of Occupations 2010, using the example of "Geriatric Nurse"

1st Position	Occupational Area Here: Health, social sector, education (8xxxx)
2nd Position	Occupational Main Groups Here: Non-medical health, hygiene, spa occupations, medical technology (82xxx)
3rd Position	Occupational Groups Here: Care of the elderly (821xx)
4th Position	Occupational Sub-Groups Here: Occupations in geriatric care (without specialisation) (8210)
5th Position	Occupational Types Here: Occupations in geriatric care (without specialisation) – skilled employees (82102)

The arrangement of the KldB 2010 along the two dimensions represents a completely new approach compared to the older German classifications. Although transfer schemes are available, recoding the old notation and codes into the new one is only partially possible and does not lead to satisfying results yet (see Paulus/Matthes 2013: 28).

3 Implementation in the IAB-Job Vacancy Survey

In the JVS occupational information plays an important role in various contexts: in the questions for the immediately to be filled vacancies, the additional demand and expected bottleneck vacancies, the new hires, and the unsuccessful recruitment. The IAB-JVS is the first paper-and-pencil questionnaire addressed to employers to use the new classification. Therefore, no tested instrument existed which could have been adapted for the purposes of the IAB-JVS.

Gathering occupational information was little complex for the former classifications and required only one question each which simply asked for the precise name of the occupation. The KldB 2010, however, requires more detailed specifications, especially on the different levels of qualification. These are supposed to not being easy to answer by the persons in charge in the firms. Because the terms used in the KldB 2010 (helper, skilled employee, specialist, expert, as described above) are not clearly dedicated to a precise meaning in colloquial language they have to be clearly defined. To identify the most reasonable way to phrase the respective questions, a pretest was conducted during spring 2012. 25 persons who were in authority for human resources in their firms were interviewed face-to-face. For this, a short questionnaire was developed, including different versions of possible new questions, which the respondents were asked to autonomously answer to begin with (figure 1).

Subsequently, the interviewers asked for potential problems with answering the questions. The interviewers gave the feedback that in conclusion the new questions could be answered without difficulties by almost all interviewed persons. However, it became evident that specifying the definition of the levels of qualification is indispensable since expressions like “specialist” and “expert” emerged as being hard to distinguish for the respondents. A version of the question which included a detailed explanation of the levels of qualification was easier to answer for most of the respondents. Concurrently, it was necessary to find a rather short and place-saving question design. Regarding the immediately to-be-filled vacancies, the following design was implemented in the IAB-JVS questionnaire for the fourth quarter of 2012:

Figure 1
Question for immediately to-be-filled vacancies as implemented in the IAB-JVS questionnaire IV.2012 (translated)

XX. For which **occupations** are you searching for employees for the **immediately to-be-filled vacancies**? Please name the **5 occupations** with your **highest demand**. For each occupation, please fill in the quantity **in total** and for **each specific level of qualification** (see definition below).

Please note: *On the back side of the "Frequently asked questions" sheet you will find an example how to answer this question.*

Please state occupations precisely*, e.g. "Mechanical Engineer", not only "Engineer", "Car Mechanic", not only "Mechanic", "Geriatric Nurse", not only "Nurse".*

1. Occupational title **Quantity**

Among them: **quantity** per qualification level

Helper Skilled Specialist Expert

2. Occupational title **Quantity**

Among them: **quantity** per qualification level

Helper Skilled Specialist Expert

3. Occupational title **Quantity**

Among them: **quantity** per qualification level

Helper Skilled Specialist Expert

4. Occupational title **Quantity**

Among them: **quantity** per qualification level

Helper Skilled Specialist Expert

5. Occupational title **Quantity**

Among them: **quantity** per qualification level

Helper Skilled Specialist Expert

Definition of qualification levels:

Helper = unskilled or semi-skilled activities, no or only little required qualification, for example one year of vocational training.

Skilled = requires occupational know-how, normally acquired by two to three years of vocational training.

Specialist = requires specialised know-how and is often tied to planning or controlling tasks; normally requires vocational training plus advanced further training or tertiary education.

Expert = highest level of complexity; typically in research and development, knowledge transfer or managerial tasks; normally requires tertiary education of min. four years.

Source: IAB-JVS 2012.

In the case of the latest hire and the latest unsuccessful recruitment, only one occupation had to be named. There, the level of qualification was asked for using check boxes. In addition to the definition of the levels of qualification below the first question referring to occupations, an extra sheet was designed which contained examples how to correctly answer the questions.

4 Results and first evaluations

To the current state of analysis, the implementation of the new classification of occupations can be seen as successful. For the immediately to-be-filled vacancies the number of analysable cases remained at the same level as in 2011, i. e. before the extensive redesign of the respective question, and amounted to 5,076. Table 2 shows the weighted results by occupational sectors (aggregated first and second position of the code) and required level of qualification (fifth position of the code).

Table 2
Weighted numbers of immediately to-be-filled vacancies by occupational sectors in Germany, KldB 2010, IV.2012

Level of qualification / Occupational sector	Total	Helper	Skilled	Specialist	Expert	Not specified
Total	714,200	74,500	436,400	92,600	98,600	12,100
Agriculture, Forestry, Gardening and Livestock Industry	14,500	*	*	*	*	*
Production and Manufacturing	55,000	*	43,100	5,700	*	*
Production Technology	109,700	*	60,300	19,700	28,700	*
Construction and Architecture	63,500	*	39,200	11,200	9,200	*
Foods and Gastronomy	50,300	13,600	33,100	3,300	*	*
Health Care	72,700	*	52,000	10,400	7,400	*
Humane Sciences and Arts	28,500	*	13,200	3,000	10,900	*
Trade, Sales and Distribution	40,600	*	25,600	9,800	5,100	*
Management and Administration	33,000	*	18,100	3,600	5,400	*
Commercial Services	78,100	*	59,600	10,700	7,900	*
Information Technology and Applied Sciences	22,500	*	1,600	6,300	14,700	*
Protection and Safety	12,800	*	*	*	*	*
Transport and Logistics	65,200	10,200	52,400	*	*	*
Cleaning	8,600	5,200	2,800	*	*	*
Occupation not specified	59,200	23,900	13,900	6,700	2,600	12,100

* insufficient number of cases.
Source: IAB-JVS 2012.

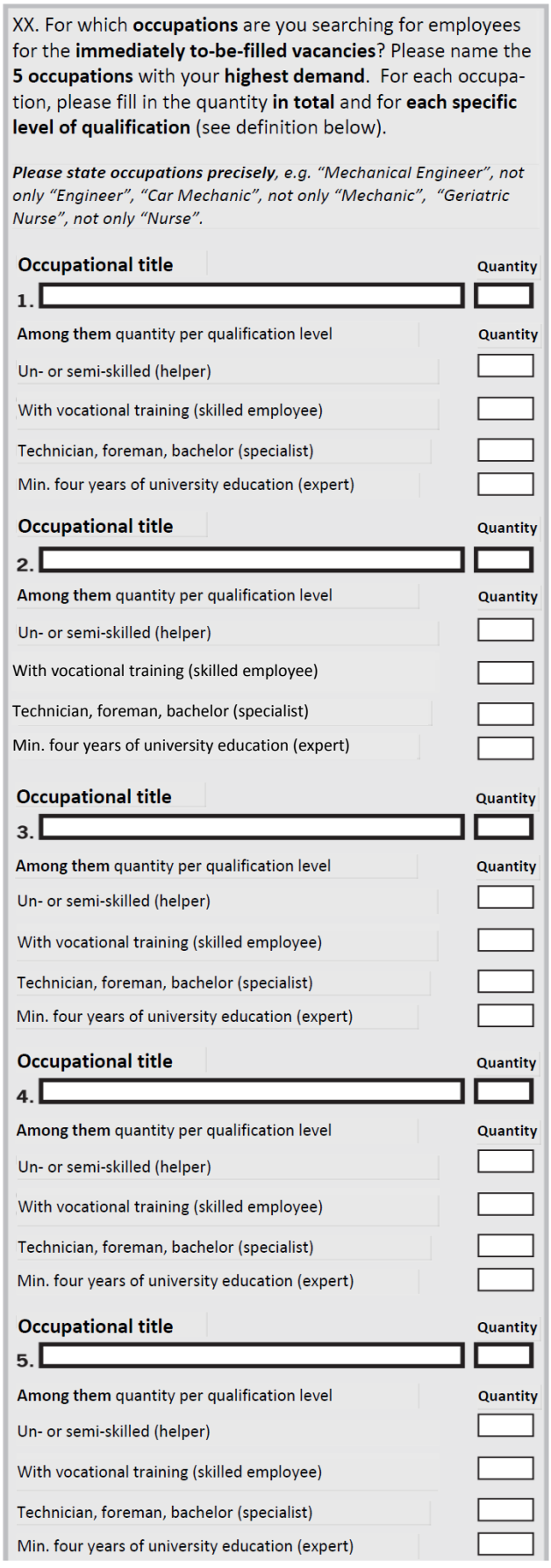
In total, the weighted number of immediately to-be-filled vacancies for the fourth quarter of 2012 was 783,900. However, the weighted number of immediately to-be-filled vacancies by occupations does not sum up to this amount. Three main reasons are responsible for this: first, not all firms who report vacancies also report the respective occupations; second, only the five occupations with the highest demand are asked for. This systematically excludes the less required occupations in large firms, where more than five occupations are searched for. Third, partially the occupational information given by the firms were too unspecific to codify them into a KldB 2010-code (see row “Occupation not specified”). For such cases, a set of extra codes was developed which includes codes for quite unspecific occupational titles e. g. “engineer”, “teacher” or “technician”. The extra codes contain a fifth position similar to the regular codes which allows us to include these cases in analyses concerning the skill level only. This was the fact for 59,200 cases (weighted, table 2). Additionally, 12,100 (weighted) cases were not assigned to a certain level of qualification by the respondents.

The first codification into KldB 2010-codes was accompanied by some problems. The major issue evolved from the differences in the required levels of qualification the firms assigned to certain occupations and the levels the KldB 2010 allowed for the appropriate occupation. Taking the occupation “geriatric nurses” as an example, the problem becomes obvious: The term “Altenpfleger” (geriatric nurse) is tied to the level of “skilled employee” in the KldB 2010 because “Altenpfleger” is an occupation which can only be practised after a regulated vocational training. But, there also is the occupation of the “Altenpflegehelfer” (geriatric care assistant), which requires a lower level of qualification. However, cases occurred where the firm put the word “Altenpfleger” in the box for the occupational title, but assigned the helper-level to it. Therefore, two KldB 2010-codes were possible: If the level of qualification the firm specified was taken as the main criterion, it would be the code 82101 (geriatric care – helper). But, if the phrase itself was decisive, the code 82102 (geriatric care – skilled employee) would be the right codification. To allow for a reproducible and consistent coding, a decision about how to treat such cases had to be made. Since most of the German occupational titles are explicit – there is a separate word for geriatric nurse on the helper-level – it was decided to take the occupational title as the first and major criterion for coding. Only in cases where the KldB 2010 provides several levels of qualification for one and the same phrase, the level-specification the firm stated is taken into account. Since the original information provided by the firms is available in the data irrespective of the given code, two different possible ways of analysing the level of required qualification exist: first, the level the firm specified or, second, the last position of the respective code (as displayed in table 2).

Whether the qualification level the firms assigned to a certain occupation conforms to the level provided by the corresponding code varies with respect to the qualification level itself. In the cases of helpers or skilled employees 60 respectively 80 per cent of the cases were identical. For experts, it was 70 per cent. Assigning the correct level for specialists turned out to be difficult for firms: only in about 40 per cent of all cases the levels were identical. This should be taken into account in the decision which way of analysing the qualification level should be used: Applying the qualification level given by the firms leads to e. g. lower shares of specialists and higher shares of helpers. This might be misleading, depending on the research question. One reason for the differences regarding the qualification levels might be that at least some of the respondents did not read (or not follow) the definitions for those levels, which were placed below the question. To put the levels of qualification more in the focus of the respondents, the question design was changed (see figure 2). In the questionnaire for the fourth quarter of 2013, the levels of qualification are now being defined directly next to the respective box. With this, the accordance between level stated by the firm and the one allowed for in the KldB 2010 might increase.

Further problems that occurred in the process of coding were, among others, the need to take the economic sector into account to specify the correct code (e. g. employees in service without further specification), the similarity between some occupational titles in German which made correct coding error-prone (e. g. Zimmerfrau – chambermaid and Zimmermann – carpenter), or some mistakes in the thesaurus which was used for the coding. When the institute in charge for data collection and coding sent the first results of the implementation, the new KldB 2010-codes were quality checked at the IAB and existing errors were reported back to the coders. After reworking, the codification into KldB 2010 was satisfying. Also, the thesaurus was improved, providing an improved starting point for coding in the future.

Figure 2
Question for immediately to-be-filled vacancies as implemented in the IAB-JVS-questionnaire IV.2013 (translated)



XX. For which **occupations** are you searching for employees for the **immediately to-be-filled vacancies**? Please name the **5 occupations** with your **highest demand**. For each occupation, please fill in the quantity **in total** and for **each specific level of qualification** (see definition below).

***Please state occupations precisely**, e.g. "Mechanical Engineer", not only "Engineer", "Car Mechanic", not only "Mechanic", "Geriatric Nurse", not only "Nurse".*

Occupational title	**Quantity**
1.	
Among them quantity per qualification level	**Quantity**
Un- or semi-skilled (helper)	
With vocational training (skilled employee)	
Technician, foreman, bachelor (specialist)	
Min. four years of university education (expert)	
Occupational title	**Quantity**
2.	
Among them quantity per qualification level	**Quantity**
Un- or semi-skilled (helper)	
With vocational training (skilled employee)	
Technician, foreman, bachelor (specialist)	
Min. four years of university education (expert)	
Occupational title	**Quantity**
3.	
Among them quantity per qualification level	**Quantity**
Un- or semi-skilled (helper)	
With vocational training (skilled employee)	
Technician, foreman, bachelor (specialist)	
Min. four years of university education (expert)	
Occupational title	**Quantity**
4.	
Among them quantity per qualification level	**Quantity**
Un- or semi-skilled (helper)	
With vocational training (skilled employee)	
Technician, foreman, bachelor (specialist)	
Min. four years of university education (expert)	
Occupational title	**Quantity**
5.	
Among them quantity per qualification level	**Quantity**
Un- or semi-skilled (helper)	
With vocational training (skilled employee)	
Technician, foreman, bachelor (specialist)	
Min. four years of university education (expert)	

Source: IAB-JVS 2013.

As in the past years, the codification into ISCO-codes is derived from the KldB codes and not from the answers of the responding firms directly. Since it was one of the main goals in the process of the conception of the KldB 2010 to gain a better comparability with the ISCO-08, converting the codes led to satisfying results, as can be seen in table 3.

Table 3
Weighted numbers of immediately to-be-filled vacancies by occupations in Germany, ISCO-08, IV.2012

Total	714,200
Managers	10,000
Professionals	100,900
Technicians and associate professionals	145,100
Clerical support workers	97,700
Service and sales workers	68,600
Skilled agricultural, forestry and fishery workers	7,400
Craft and related trades workers	135,500
Plant and machine operators, and assemblers	56,300
Elementary occupations	34,200
Not specified	58,500

Source: IAB-JVS 2012.

5 Conclusion

The necessity for generating a new classification of occupations for the German statistics was obvious, but its implementation in the IAB-JVS was accompanied by some challenges. First, an adequate question design had to be developed and tested. After a first glance on the data, decisions for a reproducible and consistent coding had to be made to codify the firms' answers into the KldB 2010 for the first time. Remaining errors in the thesaurus or in the codifications themselves had to be eliminated. Finally, the correct codes could be transferred into ISCO-08.

At large, the implementation led to good results in the numbers of answers given by the firms as well as in the weighted results. Nevertheless, some potential error sources were exposed and – as far as possible – corrected. One affected the terms used for the levels of qualification. As stated in section 3, the words helper, skilled employee, specialist and expert are not clearly dedicated to a certain meaning in colloquial language and therefore had to be defined. In the process of evaluation the answering behaviour of the responding firms, it became probable that at least some of them did not read these definitions. Therefore, the design of the questions was changed for the fourth quarter of 2013 to put the levels of qualification more in the focus. Although the implementation of the Classification of Occupations 2010 at first faced some teething problems, it is now possible to use all the advantages of the new classification when analysing data from the IAB-JVS.

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Institute for Employment Research
of the Federal Employment Agency
Regensburger Str. 104
D-90478 Nuremberg

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For further inquiries contact the author:

Anne Müller
Phone +49.911.179 6767
E-mail anne.mueller@iab.de