

**BIBB-FDZ**  
**Daten- und Methodenberichte**

**Nr. 1/ 2009**

**The BIBB/IAB- and BIBB/BAuA-Surveys**  
**of the Working Population**  
on Qualification and Working Conditions  
in Germany

Version 1.1

**Data and Methodological Reports**

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<b>BIBB/IAB-, BIBB/BAuA-Employment Surveys 1979, 1985/86, 1991/92, 1998/99, 2005/06</b>	
Title	<b>BIBB/IAB- and BIBB/BAuA- Employment Surveys on Qualification and Working Conditions 1979, 1985/86, 1991/92, 1998/99, 2005/06</b>
Content	Representative German labour force cross-sections surveyed in 1979, 1985/86, 1991/92, 1998/99 and in 2005/06 each covering around 20,000 – 30,000 individuals
Unit of analysis	German individuals belonging to the (active) labour force
Design	Cross-sections; retrospective information on individuals' achievement process
Time period covered	1979-2006
Date of collections	1979; October 1985-March 1986; November 1991-February 1992; October 1998-March 1999; October 2005-March 2006
Position in the occupational attainment process <sup>1</sup>	5: employment / occupation
Institutions involved	1979-1991/92: BIBB, IAB; 1998/99-2006: BIBB, BAuA, each funded by the Federal Ministry of Education and Research (BMBF)
Keywords	Qualification (history); job activity; job skill requirements; working conditions; health
Data access <sup>2</sup>	All waves: SUF; 2005/2006: SUF, GWA, DFV
Number of variables	1979: 444 ; 1985/86: 190; 1991/92: 319; 1998/99: 789; 2006: 932
Number of cases (total)	1979: 28,828; 1985/86: 26,361; 1991/92: 34,277; 1998/99: 34,343; 2006: 932: 20.000
Response rate	44.0 percent
Population	German (active) labour force
Sampling	1979-1998/99: Multi-stage random sample (random route procedure); 2006: Gabler-Häder and Kish
Weighting and extrapolation	Design- and structure weights
Average interview length	45 minutes
Mode of data collection	1979-1991/92: Face-to-face PAPI, 1998/99: Face-to-face CAPI, 2005/06: CATI

<sup>1</sup> From a life course perspective we attach to each BIBB-data set a thematic focus by differentiating six different positions and transitions in the occupational achievement process: 1. school, 2. transition from school to vocational education, 3. vocational education, 4. transition from vocational education to employment, 5. employment / occupation, 6. continuing education.

<sup>2</sup> GWA: on-site use at BIBB workplaces for guest researchers; DFV: remote data access; SUF: Scientific use file. All BIBB-FDZ data are available for non-commercial research.

<b>1</b>	<b>Introduction .....</b>	<b>4</b>
1.1	Aim and scope of the manual .....	4
1.2	Structure of the manual .....	4
<b>2</b>	<b>Overview: The BIBB/IAB- and BIBB/BAuA surveys .....</b>	<b>4</b>
2.1	Brief description of data sets .....	4
2.2	Central characteristics .....	6
<b>3</b>	<b>Main issues and variables .....</b>	<b>7</b>
3.1	Surveys 1979-1998/1999 .....	7
3.2	BIBB-BAuA labor force survey 2005/2006 .....	7
3.2.1	Main Issues and research questions .....	7
3.2.2	Main variables .....	8
<b>4</b>	<b>Data collection and methodology .....</b>	<b>20</b>
<b>5</b>	<b>Data preparation .....</b>	<b>23</b>
5.1	Cross-sectional data .....	23
5.2	Panel data (accumulated cross-sections) .....	24
<b>6</b>	<b>Anonymisation .....</b>	<b>24</b>
6.1	Statutory regulations of data protection .....	24
6.2	Anonymisation by data access .....	25
<b>7</b>	<b>Weighting and recoding .....</b>	<b>27</b>
7.1	Weighting and extrapolation .....	27
7.2	Major reclassifications and derived variables .....	27
<b>8</b>	<b>Bibliography .....</b>	<b>30</b>
	Appendix A: Main issues and variables for the 1979, 1985/1986, 1991/1992, and the 1998/1999 study .....	31
	Appendix B: Application of ISCED-97 to the German education qualifications .....	37
	Appendix C: Key generic work skills measured by the JRA module in BIBB-BAuA 2005/2006 .....	38

## 1 Introduction<sup>3</sup>

### 1.1 Aim and scope of the manual

The manual describes the BIBB/IAB- and BIBB/BAuA surveys and thus aims at supporting especially non-German speaking researchers in their analyses of these data sets. The manual includes a detailed description of the 2005/2006 wave but also gives information on the other waves.

### 1.2 Structure of the manual

The manual is divided into six sections: It starts with a descriptive (2.1) and tabular (2.2) overview of the data. This is followed by a section on central issues and variables (3.). Section four describes the data collection. Section five discusses available data files (cross-sections, and issues of longitudinal analyses). This is followed by a section on the anonymisation of the data (6.). The manual concludes with a subsection on extrapolation and weighting issues (7.1) and major reclassifications (7.2). Appendix A includes main issues and variables for the 1979, 1985/1986, 1991/1992, and the 1998/1999 study. An application of ISCED-97 to the German education qualifications is tabulated in appendix B.

## 2 Overview: The BIBB/IAB- and BIBB/BAuA surveys

### 2.1 Brief description of data sets

The BIBB/IAB and BIBB/BAuA surveys are representative labour force cross-sections on qualification and working conditions in Germany each covering between 20,000 - 35,000 individuals. Major concerns of these surveys are to measure qualifications, career history, and detailed job characteristics in the German labour force.

To date, the Federal Institute for Vocational Training and Training (BIBB) has surveyed five cross-sections (see table 1 below): in 1979, 1985/86, and 1991/1992 data were surveyed in cooperation with the *Institute of Employment Research* (IAB) of the German Federal Labour Office (BA), and in the years 1998/99 and 2005/2006 together with the *Federal Institute for Occupational Safety and Health* (BAuA). A next wave is planned for 2011.

Table 1 (see page 3) shows survey year, population characteristics, and the number of cases for each wave.

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<sup>3</sup> The author would like to thank the experts at BIBB, Anja Hall and Michael Tiemann, who conceptualized and surveyed the 2006 wave, for their work and helpful comments. The overwhelming part of this English version of the handbook is based on their German-speaking material.

<b>Year</b>	<b>Population</b>	<b>No. of cases</b>
1979	German labour force ( <u>not</u> included: apprentices and other people in qualification schemes, armed forces, foreign workers) age 15-65 <ul style="list-style-type: none"> <li>• active</li> <li>• unemployed</li> </ul>	28,828 992
1985/86	German active labour force age 15-65	26,361
1991/92	West-German active labour force <ul style="list-style-type: none"> <li>• German</li> <li>• German speaking foreign workers</li> </ul>	23,476 614
	New Laender (east Germany) <ul style="list-style-type: none"> <li>• active</li> <li>• unemployed</li> <li>• people in retraining schemes</li> </ul>	7,851 1,880 456
1998/99	German active labour force (including German speaking foreign workers) age 15 and over, regular employment of 10 hrs/week	(about) 35,000
2005/06	German active labour force (including German speaking foreign workers) age 15 and over, regular employment of 10 hrs/week	20,000

*Table 1: Cross-sections by survey year, population and number of cases<sup>4</sup>*

All waves include measures of occupational skill requirements, the measure of technology (detailed information on the tools and machines used by the employees at the workplace), and types and levels of respondent's formal education. However, while some items were surveyed each time, others were not. Some methodological changes between the waves limit the longitudinal potential of the data as well (for details see subsection 5.2).

The 2006 (October 2005 – March 2006) data collection was carried out by *TNS Infratest Sozialforschung* (Munich) using CATI. Major concerns of the 2006 are person-related information on respondent's qualification and career, detailed job-related information (organizational information, job tasks, job skill requirements, working conditions, health etc.), as well as the matching between respondent's qualification and current job skill requirements.

<sup>4</sup> For waves 1 to 4 see Jansen 1998.

## 2.2 Central characteristics

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*Table 2: Central characteristics of the cross-sections*

<sup>5</sup> From a life course perspective we attach to each BIBB-data set a thematic focus by differentiating six different positions and transitions in the occupational achievement process: 1. school, 2. transition from school to vocational education, 3. vocational education, 4. transition from vocational education to employment, 5. employment / occupation, 6. continuing education.

<sup>6</sup> GWA: on-site use at BIBB workplaces for guest researchers; DFV: remote data access; SUF: Scientific use file. All BIBB-FDZ data are available for non-commercial research.

### 3 Main issues and variables

#### 3.1 Surveys 1979-1998/1999

For information on central issues for the first four cross-sections see appendix B. It includes information on the data sets in the *German Social Science Infrastructure Services Association* (GESIS) - *Leibniz Institute for the Social Sciences Data Holding Catalogue* (GESIS 2009).

#### 3.2 BIBB-BAuA labor force survey 2005/2006

##### 3.2.1 Main Issues and research questions<sup>7</sup>

Main issues in the 2006 survey are respondent's qualification and career history, detailed job-related information (organizational information, job tasks, job skill requirements, working conditions, health etc.), as well as the matching between respondent's qualification and current job skill requirements. Moreover it is directed to study special social groups (such as old-age, female, non-formally qualified workers, workers with different nationalities) and developments within detailed occupations, industries and vocational fields.

##### **Qualification research: The association between respondents' (vocational) education and employment**

Against the background of the peculiarities of the German education system (i.e. the dual apprenticeship system) the survey not only centres on the occupational structure at the work place - concerning respondents' educational history, the occupational structure of the apprenticeship system is considered for as well. Moreover, important issues of their occupational career as well as the matching between the (last) education and the current employment are surveyed in detail. In contrast to most other studies BIBB-BAuA 2006 thus includes information on

- Both, the highest and the most recent (vocational) educational attainment as well as respondents' educational history (up to five vocational qualifications) allowing for analysing important differentiations within the dual system<sup>8</sup>; the field of study; issues of continuing education.

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<sup>7</sup> For the BIBB research agenda see the German-speaking description on the project's website (URL: <http://www.bibb.de/de/8348.php>; last accessed January 5<sup>th</sup>, 2009).

<sup>8</sup> Such as "Berufsfachschulen", health sector schools, vocational Gymnasium, "Fachoberschule" and others (for an overview of the German vocational school types and the application to ISCED see Schneider, 2008: 87 et seqq.; for an application of ISCED-97 to the German qualifications see appendix B.)

- Association between respondents' education and work: Career issues and matching (the application / use of qualifications in current or earlier jobs as well as occupational achievement measured by objective as well as subjective indicators).

### **Research on occupations and their change: Job activity, skill and task requirements, working conditions and health in the current job**

As a second major issue the survey includes information on a wide range of skills used at work as well as working and health conditions assessed by the workers themselves. With this the survey can be located within the 'job requirements approach' (for an overview of different way of measuring skills in the adult population see Felstead and Green 2008: 5pp.). Thus BIBB-BAuA 2005/2006 allows for analysing between- and within-occupational changes in skill requirements (Handel, 2008, p. 5), i.e. studying which types of jobs skill requirements can be expected to grow versus decline in today's labor markets. The data set includes information on

- The labor contract and employment relations
- Job activity (job tasks, computer use, change within the last two years)
- Skill requirements (beside others, typical education required, requirements in on-the-job training, skills in 13 specific subject areas, demand for further training, 12 task requirements)
- Physical and mental working conditions, work load, job satisfaction
- Health discomfort in the job (23 specific disturbances and others)

In addition to job-related information respondents were asked some questions concerning the firm or organization they are employed in, such as industry branch, the size, location (federal state), and the business situation.

### **3.2.2 Main variables**

#### **3.2.2.1 Schematic overview (cf. Hall, 2008)**

Figure 1 gives an outline of the questionnaire content of the survey. Below, variables assessing person-related information and job-related activities and skills are specified (with variable names in angled brackets; variable values in parentheses).



**Socio-demographic and structural variables:** Gender, age, marital status, children, mother tongue, nationality, disability

**Basic firm/Organizational Information:** sector, industry (NACE), size, federal state, affiliates, business situation

Person

Person

Job

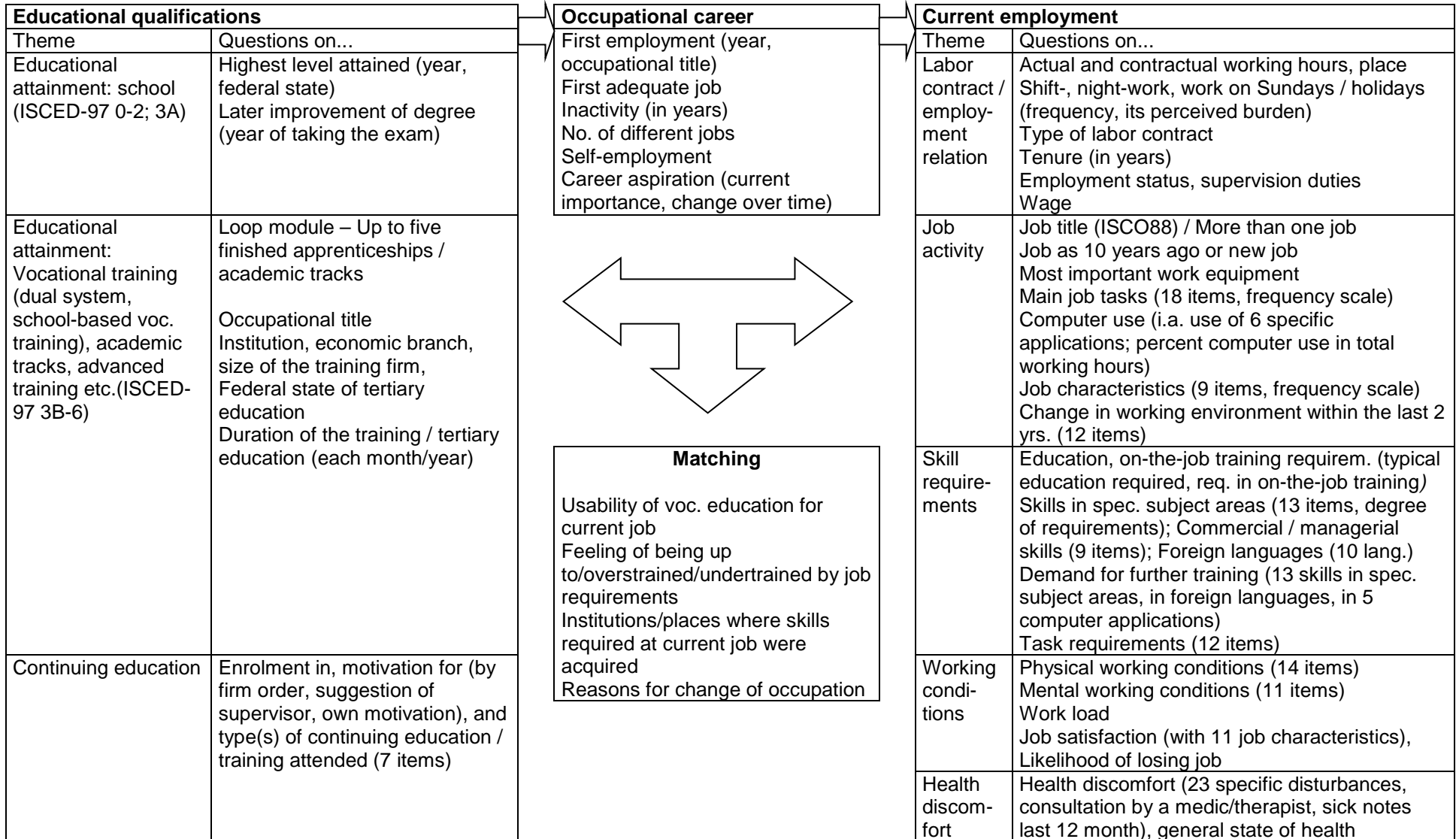


Figure 1: BIBB/BAuA Survey 2006 – Outline of the questionnaire content

### 3.2.2.2 Variable list (sorted by subject)

#### 3.2.2.2.1 Person-related information: Socio-demographic and structural variables, educational qualifications, occupational career, matching

##### Socio-demographic and structural<sup>9</sup> variables

[S1] Sex; [S2], [S2m] Month/year of birth; [F1600] Marital status; [F1601] Living together with partner (y/n); [F1603] Is partner working? (y/n); [F1604] Children in the household? (y/n); [F1605-] Children's age (categorical); [F1606-] Mother tongue (13 plus *other*); [F1607-] Nationality (13 countries/groups of countries plus *other*, stateless)

[idnum] Unique identifier; [intjahr] Year of the interview (2005, 2006); [bula] Federal state of residence; [gkpol] Political size of community (see section 7.2); [bik] BIK-type of community size (see section on 7.2); [gew\_d\_ew]: sampling weight (see section 7.1); [gew3\_05]: adjustment weight (see section 7.1); [gew3\_05\_hr]: extrapolation factor (see section 7.1).

##### Educational attainment: school and vocational education and training, and continuing education<sup>10</sup>

###### *General education (approx. ISCED-97 0-2; 3A)*

[F1100-F1101] Highest general educational degree (if foreign: [F1102] German equivalent), see section 7.2. for recoding of highest educational attainment; [F1103] Federal state where degree was attained; [F1104] Year of degree; [F1108] Overall score in round terms; [F1105-F1106] Further general school degree(s); [F1107] year of the degree(s); [F1109] Current state: in vocational education (pupil, student, trainee); [F1110] Current state: in general school, vocational school, Fachschule.

###### *Vocational education and training (approx. ISCED-97 3B-6)*

[F1200] Vocational education: certificate(s)?; [F1201] More than one degree? (y/n); [\*F1202] first (if surveyed also for the 2.-5.th degree: '\*'; for >5 number of further degrees) degree, see section 7.2. for recoding of (highest) vocational educational attainment; [\*F1203] Field of study / occupational title (Ausbildungsberuf, Studienfach), see section 7.2. for recoding into ISCO88; [\*F1204] Federal state where degree was attained; [\*F1222] Reasons for each more vocational education ('occupational re-orientation', 'to realise my career aspirations', 'getting ahead', 'qualification is based on the previous one', 'others, namely..'); [\*F1220]

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<sup>9</sup> Structural variables are variables that have been computed internally based on the screening phase information of the interview.

<sup>10</sup> For an application of the ISCED-97 scheme to the German educational qualifications see appendix B (based on Schneider 2008).

Employment during voc. education; If vocational training in the dual system (part-time vocational school plus apprenticeship): [\*F1205] Sector of workplace, where apprenticeship takes place; [\*F1206] Size of workplace; for all vocational training outside the dual system except academic tracks: [\*F1208] Specific educational institution; for advanced vocational qualifications except academic tracks (“Meister/Technikerausbildung”): [\*F1212] Degree, [\*F1213] Sector, [\*1214-\*1215] Educational institution; [\*F1216] Month/year start and end, see section 7.2. for recoding into length of the programme; [\*F1217-\*F1218] If not academic track and shorter than 12 month / longer than 48 month: reasons (‘usual for this type of qualification’, ‘training in foreign country’, pre-drawing of exam’, external exam’, preparatory step’, ‘other’).

### *Continuing education*

[F1300] Enrolment in one or more courses/seminars within the last two years/in the current job; [F1301] Motivation for attendance (firm order, suggestion of supervisor, own motivation); [F1302\_01-F1302\_07] Type of continuing education / training attended (multiple answers possible: job-related attendance of conferences, trade fairs, presentations or other information events; instruction by others or learning at the workplace; attendance at quality circles, workshops, study groups, reading of job-related technical literature, professional journals; supervision / coaching at the workplace; systematic job change, such as job rotation, cross-training with other firms; computer- or web-based learning); [Additionally: *Demand for further training, see below*].

### **Occupational career**

[F1400] Year of first job; [F1401-F1402] Occupational title of first job, see section 7.2. for recoding into ISCO88; [F1404] Correspondence of *first* job with last (vocational) educational qualification; if F1404=no: [F1405] Ever a correspondent job?; [F1406] Year of first job correspondent to educational qualification; [F1407-F1408] Years of inactivity since first job; [F1409] Number of total occupational activities (i.e. jobs that were fundamentally different) performed since first job; [F1410] Self-employed during career? [F900] Importance of getting ahead (response scale ‘essential’, ‘very important’, ‘fairly important’, ‘not very important’, ‘not at all important’); [F901] Rating the same over career? If F901=no: [F902] Importance of getting ahead in the past (response scale for importance as above).

### **Matching between vocational education and current job**

[F1219] Amount of skills attained in the vocational education and training, that are useful in *current* job (response scale ‘very much’, ‘quite a bit’, ‘few’, ‘little’, ‘very little’); [F1411, F1412] Institutions/places where skills required at current job were acquired in the first / second place (vocational training in the dual system; academic track; advanced training; continuing education; on-the-job training; figuring out by myself; other, *namely*); [F409] Feeling of being

up to matched/overstrained/undertrained by job requirements; [F410] Feeling of being up to matched/overstrained/undertrained by the amount of work/workload; [F1225] Comparison of *last* (vocational) qualification with present job (response categ.: 'present job matches with what the qualification prepares for', 'present job is related to the qualification', present job has nothing to do with the qualification'). [F1226] Rating using school grades how much qualification prepares for present job (1=very good – 6 =insufficient/fail); if respondent has more than one (voc.) qualification and *last* qualification does not match with present job: [F1227] Comparison of *other* (vocational) qualification(s) with present job (response categ.: 'present job is related to the qualification', present job has nothing to do with the qualification'); [F1228] If no matching between any qualification and present job: Reasons for change in occupation / profession ('in the profession learned no job was available', 'better income in present job', 'other interests / change my job', others, *namely*).

### 3.2.2.2 Job-related information

#### Basic firm/organizational information

[F233] Federal state; [F512] Sector; [F513] Industry branch, see section 7.2. for recodes into NACE Rev. 1.1; [F514] Firm with more than one affiliates? (y/n); [F515] Firm size; [F516] Business situation ('very' good', 'good', 'less good', 'bad'); [F1516] programs to promote handicapped persons? (y/n). [F1512] Health services within the last 2 years in your firm? (y/n); [F1516] Supportive measures for disabled persons within the last 2 years in your firm? (y/n).

#### Labour contract and employment relation [current main job]

[az: Internally generated] Hours worked last week; [F200] Weekly hours as contracted; [F201] Incidence of overtime / excess work (y/n); [F202] Does this stress you? (y/n); [f203] No. of hours of excess work last month; [F204] Compensation by payment or leisure? (y/n); If [az<35]: reasons ('desire for having more time for other things', 'family / personal reasons', job with 35 or more hours was not available', 'firm reasons', 'illness, accident', 'qualification / further training in addition to job', 'partial retirement', 'collective agreement', 'prevention / healthcare', 'one or more part-time work', 'other reasons'); [f206] Real average weekly hours including other part-time; [F208] Does work time planning allow for considering family or private interests? ('often', 'sometime', 'never'); [F210] Shift-work? (y/n); [F212] Fix start / end of work? (y/n); [F213] Fixed work time given or voluntary?; [F215] Work breaks of more than 3 hours at a usual day? (y/n); [F216] Stand duty / on call service? (y/n); [F217] Does this stress you? (y/n); [F218] Sometimes work at Saturdays? (y/n); [F219] Does this stress you? (y/n); [F220] Average no. of Saturdays working per month; [F221] Sometimes work at Sundays / holidays? (y/n); [F222] Does this stress you? (y/n); [F223] Average no. of Sundays / holidays working per month; [F224] Sometimes work at night (11pm-5am)? (y/n); [F225] Does this stress you? (y/n); [F226] Average no. of nights working per month; [F228] Sometimes work home office / tele-work? (y/n); [F229] How often does this happen?

(‘always’, ‘frequently’, ‘sometimes’, ‘rare’); [F230] Is it tele-work agreed by contract? (y/n); [F232] Minutes from home to work; [F234] Do you work at frequently changing locations? (y/n); Do you work in the field? (y/n).

[stib] Status in employment (roughly ICSE-93: ‘manual worker / operative’, ‘employee’, ‘appointee’, ‘self-employed’, ‘own-account worker’, ‘freelancer’, ‘contributing family worker’, also see section 7.2);

If stib=manual worker: [F500]: specific groups (‘Operative, semi-skilled labourer’, ‘craftsmen, skilled labourer’, ‘foreman, lead worker’, ‘master craftsmen, burnisher in employee position’)

If stib=employee: [F501]: level of job complexity (‘simple tasks’, ‘qualified tasks’, ‘managerial tasks’); [F502: Are you a master craftsmen or burnisher in employee position? (y/n)]; [F503] Work by order or autonomously;

If stib= appointee’: [F504]: grade of civil services (‘in the lower grade of the civil services’, ‘in the middle..’, ‘in the upper ..’, ‘in the higher services’);

If stib= manual worker, employee, ‘appointee’: [F505]: allowed to give instructions?

If stib=self-employed [F506]: Master craftsmen?

If stib=manual worker, employee: [F507]: temporary employment; if F507=yes: [F508]: state-promoted (ABM/Mini-job); [F509]: Work for agency for temporary employment;

[F301] Supervisor status (y/n); [F302] If F301=yes: How many people do you supervise; [F510]: Tenure in years with your employer / years running the firm; [F511]: Year/ month since doing current job / activity; [F518]: Monthly gross income, see section 7.2 for information on additional wage information thru imputation; If F518: NA: [F519] Above or below 1500 EUR; if F518=400 or less or F518=below 1500: [F520]: Is it a low-paid (state-promoted) job?

## Job activity

[F100-2] Occupation, see section 7.2. for recoding into ISCO88; [F103] Would you say current job is the same as 10 years ago or have to be called ‘new’; [nt: internally generated] One or more jobs;

[F300] Most important work equipment (open question), see section 7.2. for recoding into ArbM\_feingruppen, ArbM\_hauptgruppe]

## Main job tasks (frequency)<sup>11</sup>

[F303-F319] Main job tasks (item battery, each with frequency scale ‘frequently’, ‘sometimes’, ‘never’): Q: ‘Please remember your current job as a <>. I will name some selected job tasks.

<sup>11</sup> The item battery corresponds to the task concept in the German Census (Mikrozensus). PCA isolates four different factors of tasks underlying the main job tasks items: ‘Analytic tasks’, ‘technical tasks’, ‘person-related / social service tasks’, ‘issue-related service tasks’.

*Would you please tell me how frequent these tasks appear in your job?' (random order of items)*

[F303] Manufacturing of goods; [F304] Measuring, testing, quality control; [F305] Operating, controlling machines; [F306] Repairing; [F307] Purchasing, selling; [F308] Transporting, storing, shipping; [F309] Promoting, marketing, public relations, [F310] Organizing, making plans, working out operations; [F311] Research, development; [F312] Teaching, training; [F313] Gathering information, investigating, documenting; [F314] Consulting, advising; [F314B] Consulting of colleges, external customers or other target groups?; [F315] Entertaining, accommodating, preparing food; [F316] Taking care, healing; [F317] Protecting, guarding, observing, controlling traffic; [F318] Working with computers; [F319A] Cleaning, recycling, waste disposal; [F319] Did we miss a relevant task?

#### *Computer use*

[F320] 'Do you use the computer exclusively application-oriented or beyond?' (y/n); [F321] 'Do you write computer programs or use macros in your current job?' (y/n);

*[F322\_1-F322\_6] 'Which of the following IT-activities do you perform?' (item battery, each yes/no):*

[F322\_1] Developing software, programming, analyzing systems; [F322\_2] Developing hardware, computer technology; [F322\_3] IT-administration of e.g. networks, IT-systems, databases, web servers; [F322\_4] IT-consulting, user support, instruction; [F322\_5] IT-sales; [F322\_6] Other. If F322\_4=yes: [F323] IT-consulting of colleges, external customers or other target groups?;

[F324] 'How much of your total work time do you spend on computers?'; [plus frequency measure F318, see main job tasks; plus skill requirement measure F403\_10, see skill requirements].

#### *Job characteristics (frequency)*

*[F325\_1-F325\_9] Job characteristics (item battery, each with frequency scale 'often', 'sometimes', 'never'): Q: 'I will now read some job characteristics to you. Please tell me for each of these how frequent they appear in your job? (random order of items)*

[F325\_1] Having to react to and solving unforeseeable problems; [F325\_2] Notifying / communicating difficult issues in an intelligible to all way; [F325\_3] Convincing others, compromising; [F325\_4] Making tough choice on your own responsibility; [F325\_5]

Recognizing and closing own knowledge gaps; [F325\_6] Speechmaking, giving talks; [F325\_7] Having contact to customers, clients, patients; [F325\_8] Dealing with a range of duties and responsibilities; [F325\_9] Being responsible for the well-being of others, e.g. patients, kids, clients, staff.

#### *Change in working environment the last two years*

*[F1001\_01-F1001\_12] Change in working environment the last two years: Have there been the following changes (item battery, each yes/no): Q: 'Please tell me, whether there have been the following changes in your direct working environment within the last two years. Within the last two years, have there been...?'<sup>12</sup>*

[F1001\_01]: New manufacturing technologies; [F1001\_02]: New computer programs; [F1001\_03]: New machinery or plants; [F1001\_04]: New or clearly modified products or material; [F1001\_05]: New or clearly modified services; [F1001\_06]: Were there basic restructuring or reorganization affecting your work environment; [F1001\_07]: Was there a reduction of stuff or redundancies in your work environment within the last two years?; [F1001\_08]: Is there an increase in freelancers, temporary personnel, trainees, or contract workers?; [F1001\_09]: Did you get a new direct supervisor? [F1001\_10]: Did stress and pressure increase, were they stable or did they decrease; [F1001\_11]: Did the variety auf job tasks increase, was it stable or did it decrease; [F1001\_12]: Did professional requirements increase, were they stable or did they decrease.

#### **Skill requirements<sup>13</sup>**

##### *Education and on-the-job training requirements*

[F400] What qualification is normally required to do the job you have now? ('vocational training in the dual system (part-time vocational school plus apprenticeship), full-time vocational school', 'university degree', 'Meister / Techniker degree', 'no vocational qualification needed'; [F401] Is it sufficient to get a short briefing or a longer on-the-job training to do the job you have now? [F402] And, is it usually required to participate in special courses? (y/n);

##### *Skills in specific subject areas<sup>14</sup>*

*[F403\_1-F403\_13] Cognitive skills (item battery, each with rating scale 'no such skills required', 'basic', 'specialized'): Q: 'I will now read several skills in specific subject areas*

<sup>12</sup> If self-employed question wording refers to 'your firm'; if employed less than two years, question wording 'since you are working in your current job.'

<sup>13</sup> The operationalization of job skill and task requirements is oriented at the definition of 'generic skills', 'methodological skills' and social skills' in Orth (1999, for an empirical application see Schaeper and Briedis 2004).

<sup>14</sup>PCA isolates four different factors of skills underlying the skill items: 'Generic skills', 'technical-mathematic skills', 'commercial skills', 'scientific skills'.

(german: 'Kenntnisgebiete') to you. Please tell me for each of these skills whether you require them in your current job as a <>, and, if yes, whether you require basic or specialized/professional skills (german: 'Fachkenntnisse')? In the case that you require specialized skills only for a sub domain within a specific subject area, nevertheless please state that you need specialized skills.' (F403\_1-F403\_10 random order of items)

[F403\_1] Natural scientific skills; [F403\_2] Manual / craft skills; [F403\_3] Pedagogic skills; [F403\_4] Legal skills; [F403\_5] Skills in project management; [F403\_6] Medical or custodial skills; [F403\_7] Skills in layouting, designing, visualizing; [F403\_8] Mathematical, statistical skills; [F403\_9] German language skills, writing, spelling; [F403\_10] Computer skills in application software; [F403\_11] Technical skills; [F403\_12] Commercial / managerial skills;

*if F403\_12=specialized: Q: 'In which areas do you require these specialized skills?'*

*[F405\_01-F405\_09] Specific commercial / managerial skills (each y/n):* [F405\_01] Finance; [F405\_02] Book-keeping; [F405\_03] Fiscal; [F405\_04] Accounting; [F405\_05] Credit system; [F405\_06] Controlling; [F405\_07] Sales; [F405\_8] Marketing; [F405\_9] Business administration;

[F403\_13] Foreign language skills;

*if F403\_13=specialized: Q: 'In which areas do you require these specialized skills?'*

*[F406\_01-F406\_10] Specific languages (each (y/n):* [English, French, Russian, Spanish, Turkish, Italian, Greek, Portuguese, Polish, Other]; [F407] Degree of required English skills ('basic', 'fluent wording', 'fluent writing', 'business fluent');

#### *Demand for further training*

*[F408\_01-F408\_18] Demand for further training, i.e. need for actualization or extension skills (item battery, each yes/no): Q: 'We again go into the skills that your job as <> requires. Please tell me for which of them do you have to update or broaden your skills?'*

[F408\_1] Natural scientific skills; [F408\_02] Manual / craft skills; [F408\_3] Pedagogic skills; [F408\_4] Legal skills; [F408\_5] Skills in project management; [F408\_6] Medical or custodial skills; [F408\_7] Skills in layouting, designing, visualizing; [F408\_8] Mathematical, statistical skills; [F408\_9] German language skills, writing, spelling; [F408\_10] Computer skills in application software; [F408\_11] Technical skills; [F408\_12] Commercial / managerial skills; [F408\_13] Foreign language skills; [F408\_14] Developing software, programming, analyzing systems; [F408\_15] Developing hardware, computer technology; [F408\_16] IT-administration; [F408\_17] IT-consulting, user support, instruction; [F408\_18] IT-sales.

#### *Task requirements<sup>15</sup>*

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<sup>15</sup> For a pattern of relationships among these variables see footnote 16.



[F411\_01/F412\_01-F411\_13/F412\_13] *Task requirements (item battery, each with frequency scale 'frequently', 'sometimes', 'rarely', 'never' [1\_]; each except F412\_05 supplement question: Does this stress you? (y/n) [2\_]): 'Q: 'I will now read some task requirements to you. Please tell me for each of them whether they appear frequently, sometimes, rarely or never in your job. How frequent does it appear that ...?'*

[F411\_01] You have to work under great deadline pressure; [F411\_02] Work is stipulated in the minutest details; [F411\_03] One and the same work cycle / process is repeating in the minutest details; [F411\_04<sup>16</sup>] You are confronted with new problems that remain to be understood / familiarized with; [F411\_05<sup>17</sup>] You tasks include process optimization or trying out new things; [F411\_06] You are failed or disturbed, e.g. by colleagues, low-quality material, machine malfunction or telephone calls; [F411\_07] A specific quantity, a specific minimum output / productivity, or the time to do the work is stipulated in the minutest details; [F411\_08] You are asked to do things you haven't learned or that you aren't proficient in; [F411\_09] There are diverse processes and job tasks which you have to keep an eye on simultaneously; [F411\_11] Even the slightest mistake / inattention leads to bigger financial losses; [F411\_12] You are pushing the envelope / reaching the limits of your capacities; [F411\_13] Working very quick.

## Working conditions

### *Physical working conditions*

[F600\_01/F602\_01- F600\_14/F602\_14] *Physical conditions (item battery, each with frequency scale 'frequently', 'sometimes', 'rarely', 'never'; each with supplement question (602): Does this stress you? (y/n): 'Q: 'I will now read some working conditions to you. Please tell me for each of them whether they appear frequently, sometimes, rarely or never in your job.'*

[F600\_01] Work standing up; [F600\_02] Work sitting down; [F600\_03] Carry heavy stocks of more than 20kg (men), 10kg (women); [F600\_04] Working being exposed to smoke, dust, gases, vapours; [F600\_05] Working being exposed to coldness, heat, wet, dampness, draft; [F600\_06] Working with oil, dirtiness, mud; [F600\_07] Working crouched down, kneed, reclined, overarm; [F600\_08] Working being exposed to strong tremor, crushes, vibrations; [F600\_09] Working being exposed to dazzling light, or poor visibility / bad lightening;

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<sup>16</sup> Based on Volkholz and Köchling (2002) using items F411\_04 and F411\_05 a measure of knowledge work level might be computed: 'Innovators: Workers who are frequently confronted with creative requirements', 'Flexible workers: workers who are frequently confronted with learning requirements, but who are sometimes or never required to be creative', 'Qualified routine workers: workers who are sometimes confronted with creative and learning requirements', 'basic routine workers: workers who are rarely or never confronted with creative and learning requirements'.

<sup>17</sup> See footnote 12.

[F600\_10] Working being exposed to hazardous substances, radiance; [F600\_11] Wearing protective clothing; [F600\_12] Working being exposed to noisiness; [F600\_13] Contact to micro organisms such as pathogenic germs, bacteria, mildew, viruses; [F600\_14] Working where people are smoking;

[F601] Do you smoke at your work place?; [F602] Was a threat analysis done at your workplace?

#### *Mental working conditions<sup>18</sup>*

*[F700\_02/F701\_02- F700\_13/F701\_13] Mental conditions (item battery: 'How often does it happen that ...', each with frequency scale 'frequently', 'sometimes', 'rarely', 'never'; each except F700\_04 with supplement question (701\_): Does this stress you? (y/n): Q: 'How frequent does it appear that...?'*

[F700\_02] You are allowed to plan and schedule you work by yourself; [F700\_03] You are able to influence the amount of work you have to do; [F700\_04] Your job leads to situations that weigh you down; [F700\_06] You are able to decide when to have a break; [F700\_07] You feel having an important job; [F700\_08] You were not informed about decisive decisions, changes or future plans timely [F700\_09] You don't have access to all required information to proper fulfil your tasks; [F700\_10] You feel being in a team; [F700\_11] You feel comfortable with the colleagues and your working team; [F700\_12] Your colleagues give assistance to you if you have the need for; [F700\_13] Your direct supervisor assists you if you needed.

#### *Job satisfaction, likelihood of losing job*

*[F1450\_01-F1450\_11] Job satisfaction (item battery, each with rating scale 'very satisfied, 'satisfied, 'less satisfied, 'not satisfied'), Q: 'I will now go into some aspects of your job. Please tell me whether you are very satisfied, satisfied, less satisfied or not satisfied with it in your current job as a <>. 'How much satisfied do you are ...?'*

[F1450\_01] Income; [F1450\_02] Career opportunities; [F1450\_03] Labour time; [F1450\_04] work atmosphere; [F1450\_05] Your direct supervisor; [F1450\_06] Job content; [F1450\_07] Spatial conditions; [F1450\_08] Possibilities to utilize your skills; [F1450\_09] Possibilities to educate oneself / to study further; [F1450\_10] With the tools and supplies for work, including furniture and software; [F1450\_11] With the physical conditions;

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<sup>18</sup> PCA isolates five different factors of working conditions that underlie the mental conditions items together with the task requirement items: 'Mental conditions / intensity', 'social conditions', 'autonomy, influence', 'cognitive, creative, learning conditions', 'predictability, planning conditions'.

[F1451] 'Altogether, how much satisfied are you with your job all in all?' ('very satisfied, 'satisfied, 'less satisfied, 'not satisfied')

[F517]: How do you assess the risk of being laid off in the near future? ('very high', high', 'moderate' 'no risk at all')

## Health

*[F1500\_01-F1500\_23] Incidence of the following complaints while working or immediately after working (y/n), Q: 'The last part is on health disturbances relating to your current job. Please tell me whether the following health disturbances occur while you are working or immediately after you finished working'.*

[F1500\_01] Backache, pain in the back; [F1500\_02] Pain in the neck, the collar; [F1500\_03] Pain in the arms, hands; [F1500\_04] Pain in the haunch; [F1500\_05] Pain in the knee; [F1500\_06] Pain in the legs, feet, swollen legs; [F1500\_07] Headache; [F1500\_08] Cardialgia, twinges, chest pain; [F1500\_09] Shortness of breath; [F1500\_10] Cough; [F1500\_11] Runny nose, errhine; [F1500\_12] Eyestrain, irritated eyes, redness, itching, tears; [F1500\_13] Skin irritation, itch; [F1500\_14] Insomnia; [F1500\_15] Fatigue, exhaustion; [F1500\_16] Stomach trouble, problems with digestion; [F1500\_17] Worsening of hearing, ringing in the ears; [F1500\_18] Nervousness, irritability; [F1500\_19] Abjection; [F1500\_20] Vertigo; [F1500\_21] Burnout; [F1500\_22] Depression; [F1500\_23] Other complaints, pains;

*[F1501\_01-F1501\_23] If F1500\_01-F1500\_23=yes, for each: Medical attendance by a doctor or therapist (y/n); Q: 'I will again read those disturbances to you that occur at your job. Please tell me for each of them whether they have been medicated by a doctor or therapist.'*

[F1501\_01] Backache, pain in the back; [F1501\_02] Pain in the neck, the collar; [F1501\_03] Pain in the arms, hands; [F1501\_04] Pain in the haunch; [F1501\_05] Pain in the knee; [F1501\_06] Pain in the legs, feet, swollen legs; [F1501\_07] Headache; [F1501\_08] Cardialgia, twinges, chest pain; [F1501\_09] Shortness of breath; [F1501\_10] Cough; [F1501\_11] Runny nose, errhine; [F1501\_12] Eyestrain, irritated eyes, redness, itching, tears; [F1501\_13] Skin irritation, itch; [F1501\_14] Insomnia; [F1501\_15] Fatigue, exhaustion; [F1501\_16] Stomach trouble, problems with digestion; [F1501\_17] Worsening of hearing, ringing in the ears; [F1501\_18] Nervousness, irritability; [F1501\_19] Abjection; [F1501\_20] Vertigo; [F1501\_21] Burnout; [F1501\_22] Depression; [F1501\_23] Other complaints, pains;

[F1502] What is your general state of health ('perfect', 'very good', 'good', 'suboptimal', 'poorly/sick'); [F1503] Have you been signed off due to illness or accident during the last 12 months? (y/n); [F1505] If F1503=yes: How many days?; [[F1512, see basic firm information] Health services within the last 2 years in your firm? (y/n)]; [F1513] Did you participate in these services? (y/n); [F1514] Do you have an official / accredited disability? (y/n); [F1515] If

F1514=yes: degree of disability? ('less than 50 %', 50% or more'); [[F1516, see basic firm information] Supportive measures for disabled persons within the last 2 years in your firm? (y/n)]

## 4 Data collection and methodology<sup>19</sup>

Prior to the main study a methods test as well as two field tests were conducted (*Sozialwissenschaftliches UmfrageZentrum*, Duisburg; *TNS Infratest Sozialforschung*, München). The main study was undertaken from Oktober 2005 until March 2006 by *TNS Infratest Sozialforschung*, München, using computer-based telephone interviewing techniques (CATI). 20,000 people in the active labour force were interviewed by a total number of 532 Interviewers. Several measures of quality assurance were taken, including interviewer training, interviewer monitoring, and plausibility checks (for details, see Hartmann 2006a).

### Study population

The study population are people belonging to the labour force, age 15 and over, with a regular work time of at least 10 hours per week. Being in the labour force was defined as having a paid work. The labour force, however, as specified here, includes

- People that temporarily pause employment (up to three months) due to maternity leave, parental leave, special leave
- Helping family members, even though they do not have a regular wage
- Paid employment that is performed parallel to a qualification (e.g. students, internships, traineeships, specialised training)
- Foreigner, if sufficient German language skills

In contrast, people in paid voluntary jobs were not selected. People with an employment relationship that is part of the first (vocational) education (within the dual system) are not part of the study population as well. Equally, people in military services, civil services, or voluntary social or ecological year do not belong to the reference population.

### Sample frame and sample design

Two-stage probability sampling:

- Primary sampling units: Households, sampling frame: Gabler-Häder-Procedure (generation of regionally representative phone numbers).

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<sup>19</sup> This description is based on Hartmann 2006b.

- Secondary sampling units: Person within a household, sampling frame: Kish-selection grid. These target persons were asked whether they belong to the study population (including German speaking foreign workers, age 15 and over, and regular employment of 10 hrs/week (for details, see *study population*)).

Sampling design leads to design effects due to differing sampling probabilities (over-representation of households with more than one phone connections; under-representation of persons living in larger households). These design effects were corrected by calculating a design weight (see below).

### Representativeness

The sample proportionality is affected by the two-stage sampling (household, target person) and non-response. This demands the calculation of two sample weights:

- **Design weight:** Correcting for two-stage sampling design effects (i.e. differing sampling probabilities for households with one or more phone connections and for the target persons within the household)
- **Adjustment weight:** Adjusting for non-contacts and refusals (see table 3 below) that lead to systematic biases. These were corrected by multi-stage, iterative procedures factoring for the distribution in *federal state of residence, Eastern-/Western part of Germany, male/female, marital status, age, education, nationality, labor market status (active/non-active)* (reference data are from the German census 2004 and 2005 (1 per cent sample of the German population)).

The final weighting model has an efficiency of 67.4 and a standard deviation of 0.695 (Hartmann 2006b: 10). A table showing high structural congruence between the final weighting model and the census data 2005 for selected variables can be found in Hartmann (2006b: 14-16).

In addition to an *a posteriori* adjustment of the sample, *a priori* mechanisms for affecting the sample structure have been implemented to account for the expected higher non-response of lower educated workers (manual workers) in telephone-interviewing. As from January 2006 the probability of manual workers to enter the sample has been increased successfully by screening control mechanisms.

**Field work and sample size**

Table 3 below shows the characteristics of the field work and sample sizes.

<b>Gross (total)</b>	<b>262,876</b>	<b>100.0 %</b>
Wrong phone number		36.3%
Problems with cable		2.4%
Fax / Modem		4.2%
Duplicate		0.1%
Regional cell indeterminated		-
Maximum number of contacts		0.1%
Total: wrong numbers		43.0%
<b>Adjusted gross</b>	<b>149,036</b>	<b>100.0%</b>
Complete cell		-
No private household		5.5%
No person in the target group		-
<b>Total: Neutral failures</b>	<b>8,267</b>	<b>5.5%</b>
<b>Remaining addresses</b>	<b>141,573</b>	<b>100.0%</b>
No information on F101 (occupation)		0.0%
Not answering the phone		7.9%
Phone engaged		0.4%
Private answering machine		1.6%
Breaking off the interview		1.1%
No communication in the household		2.0%
Contact person is busy		0.2%
No communication with target person		0.6%
Target person is sick, no appointment possible		0.0%
Target person does not have the ability		0.4%
Target person is busy		0.1%
Contact person refuses		34.6%
Target person refuses		5.9%
No appointment possible		1.2%
Other failures		-
<b>Total: failures</b>	<b>79,320</b>	<b>56.0%</b>
<b>Realised interviews, of which</b>	<b>62,253</b>	<b>44.0%</b>
Completed interviews with people belonging to the labour force (as defined above, average length around 40 minutes)	20,000	
Short interviews with people not belonging to the labour force	33,539	
Short interviews with non-working population	8,714	

*Table 3: Central characteristics of the field work*

## 5 Data preparation

By now all four waves are available for the scientific community as Scientific-Use-Files. These files can be accessed via GESIS Leibniz Institute for the Social Sciences<sup>20</sup>. The 2006 data are additionally available through remote data access and through separate BIBB-workplaces for guest researchers (for differences between these three data version see section six below). A cumulated file including information on all five waves is not available so far (but see section 5.2. below).

### 5.1 Cross-sectional data

Data experts at BIBB and the BIBB Research Data Centre (BIBB-FDZ) have spent effort in data documentation, data preparation and the creation of supplementary tools for the BIBB/BAuA-Labor Force Survey 2006.

Detailed documentation material (in German language) can be downloaded at the BIBB-BAuA website (BIBB/BAuA 2009) or the BIBB-FDZ website. Equally, these documents can be e-mailed on request. With regard to the data collection, handbooks describing the fieldwork and weighting issues, respectively (Hartmann 2006a, 2006b) are available. Concerning the content of the 2006 data there are separate documents on the coding of the descriptive occupational information (Hartmann and Schütz 2006), a variable list (Hall 2009), the details on specific variables (Hall 2009), as well as details on variables when analysing the data via remote access or safe guest researcher places at BIBB-FDZ (Rohrbach 2009). Moreover, we call attention on selected results and publications based on the 2006 data at our websites. In addition to these documents the Scientific-Use-File CD-Rom includes the questionnaire as well as some SPSS-syntax files for recoded variables.

Concerning data preparation section 7 gives detailed information on the weighting and extrapolation issues (7.1.) and on additionally computed variables (thru recoding or imputation, see 7.2). For the future it is planned to broaden the spectrum for analysis of the BIBB-BAuA 2006 data by additionally supplying users with programs for the computing of international classifications (e.g. ISCED-97, ISEI), and by providing aggregate data for relevant units in the BIBB-BAuA data (e.g. industries, regional information).

Finally, supplementary tools for the standardized access to the data have been developed. In addition to application forms and user guidelines there are test data (as Stata and SPSS data files, see section 6.2) for remote data access downloadable at our website [www.bibb-fdz.de](http://www.bibb-fdz.de).

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<sup>20</sup> The data can be ordered at (URL): <https://dbk.gesis.org/dbksearch> (last access April 12<sup>th</sup>).

## 5.2 Panel data (accumulated cross-sections)<sup>21</sup>

To date there is no cumulated file including information on more than one of the four waves available. However, it is planned to build up an accumulated file which should include the basic socio-demographic variables as well as some other relevant items for which comparable information can be generated.

However, longitudinal analyses are not without problems (see Hall 2009). As shown in table 2 (on page 4) sampling methods and data collection mode have been changed through the waves. In the course of these methodical changes in some cases question ordering has changed as well. With regard to the questionnaire content some major changes have been made throughout time so that there are some variables for which there is information for only one wave. Moreover, for some variables a harmonization of the (longitudinal) information in one classification scheme is not easily manageable. For example, the classification of the industry activity has been coded in a BIBB-specific scheme until wave 1998/1999. Furthermore, an accumulation of the waves requires a harmonization of the sample (see table 1, p. 3). This includes the variables *working status* (in 1991/1992 also unemployed as well as people with retraining from East-Germany have been surveyed), *age* (in 1979 only people until age 65 were surveyed), *working time* (greater equal 10 hours per week), *occupational status* (helping family members were firstly survey in 1998/1999), *West-German resident* (East-Germany from 1991/1992 on), and *nationality* (workers without German nationality were firstly surveyed in 1991/1992).

## 6 Anonymisation

### 6.1 Statutory regulations of data protection

Access to BIBBs' SUF data is exclusively granted in line with the European data protection regulations, in particular Chapter 89 of the Regulation (EU) 2016/679: General Data Protection Regulation (GDPR) and its national amendments, in particular § 27 of the German Data Protection Act (BDSG). Accordingly, data may be left for independent scientific research if it is impossible to establish a reference to a unique survey unit ("anonymity"). In order to achieve this goal without any exception, the organization and/or the researcher(s) have to establish specific technical and organizational data security arrangements, making unauthorized access to BIBBs' SUF data impossible, respectively. BIBBs' Research Data Centre (BIBB-FDZ) recommends that researchers with data access be specifically obliged to complying with the GDPR (c.f. our respective SUF using guidelines).

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<sup>21</sup> For a German-speaking paper on the 2006 study in comparison to the 1998/1999 study see Hall (2009).



BIBB-FDZ staff get insights into research questions, methods, and analyses of researchers only for the purpose of providing advice, improving the BIBB-FDZ service, and ensuring compliance with the guidelines of the GDPR. BIBB employees who are not belonging to BIBB-FDZ staff get no insights into any activities of researchers.

## ***6.2 Anonymisation by data access***

In all versions of the data identifiers have been removed. Additionally, information on some sensible variables has been coarsened to guarantee that a de-anonymisation of records is not possible. Table 4 (see page 26) shows those variables that have been coarsened and the differences in the anonymisation of the BIBB-BAuA 2005/2006 data between the different data access facilities.

<b>Data access facility</b>			
(Variable names and no. of cases in parentheses)			
<b>Variable description</b>	<b>SUF</b>	<b>Remote access</b> (key variable for SUF: <i>idnum</i> )	<b>Safe centre at BIBB-FDZ: Data from SUF plus</b>
Place of residence	Federal State (bula: n= 20,000)	Raumordnungs-region <sup>22</sup> (Raumordnungsregio n: n=20,000)	Raumordnungs-Region <sup>20</sup> (Raumordnungsregion: n=20,000))
Mother tongue: other, <i>namely</i>	Not included	Full text (tf1606s: n=486)	Full text (tf1606s: n=486)
Industry branch	NACE Rev. 1.1 Division (f513nace: n=19,831)	Full text (tf513: n=19,514)	Full text (tf513: n=19,514)
Occupational information current job, first job	ISCO-88 unit-groups (f100_i88: n=19,996, f1401i88: n=19,921)	Full text (tf100, tf102: n=20,000, n=720, tf1401, tf1402: n=15,871, n=651)	Full text (tf100, tf102: n=20,000, n=720, tf1401, tf1402: n=15,871, n=651))
Most important work equipment	Recoded(ArbM_- feingruppen: n=19,368, ArbM_- hauptgruppe: n=19,368)	Full text (tf300: n=19,368)	Full text (tf300: n=19,368)
Further frequent job activities	Not included	Full text (tf319s: n=2,044)	Full text (tf319s: n=2,044)
Further knowledge in foreign languages	Not included	Full text (tf406s: n=768)	Full text (tf406s: n=768)
General education degree abroad: name of country	Not included	Full text (tf1103s: n=830)	Full text (tf1103s: n=830)
Vocational educ. degree abroad: name of country	Not included	Full text (tf1204s: n=593)	Full text (tf1204s: n=593)
Reasons for 2 <sup>nd</sup> , 3 <sup>rd</sup> etc. vocational education started: other, <i>namely</i>	Not included	Full text (tg1222s-ti1222s: n <sub>TG</sub> =1676, n <sub>TH</sub> =347, n <sub>TI</sub> =49)	Full text (tg1222s-ti1222s: n <sub>TG</sub> =1676, n <sub>TH</sub> =347, n <sub>TI</sub> =49)
Reasons for change in occupation / profession: other, <i>namely</i>	Not included	Full text (tf1228s: n=1,850)	Full text (tf1228s: n=1,850)
Institutions/places where skills required at current job were acquired in the first / second place: other, <i>namely</i>	Not included	Full text (tf1412, tf1414: n=1,080, n=1,338)	Full text (tf1412, tf1414: n=1,080, n=1,338)

Table 4: Anonymisation by data access facilities

<sup>22</sup> There are 97 regions (= "Raumordnungsregionen") covering the 16 German federal states. It is planned to supply researchers at BIBB-FDZ with context information (e.g. unemployment rates) at the level of these or more aggregated regional units.

## 7 Weighting and recoding

### 7.1 Weighting and extrapolation

The sample proportionality is affected by the two-stage sampling (household, target person) as well as non-contacts and non-response. This demands the calculation of weighting factors (see section 4 and Hartmann 2006b).

The data set includes a sampling weight *gew\_d\_ew* that equals the inverse of the probability that the observation is included in the sample. Then, an adjustment weight [*gew3\_05*] and an extrapolation factor [*gew3\_05\_hr*] each including the design weight were added to the data. Researchers that aim at producing values corresponding to census data thus should weight their data with *gew3\_05*. To arrive at census corresponding values but grossed up for parameters in the population analyses should be run with *gew3\_05\_hr*.

### 7.2 Major reclassifications and derived variables

Based on the screening phase of the interview the information on respondents residence have been used to internally compute two standardized measures of the community size [*gkpolf*] and [*bik*] as well as their geographic location (SUF: [*bula*], remote access and safe centers [*Raumordnungsregion*]). *gkpolf* distinguishes between 7 community size groups<sup>23</sup>, whereas *bik* has ten categories<sup>24</sup>. *bula* contains information on the federal state the residence of the respondents is located (16 states). For more detailed regional analyses, there are 97<sup>25</sup> areas below the federal state in *Raumordnungsregion*. Equally, the status in employment [*stib*] has been computed based on the information in the screening phase of the interview. It includes the categories 'manual worker / operative', 'employee', 'appointee', 'self-employed', 'own-account worker', 'freelancer', 'contributing family worker', and thus is similar to ICSE-93.

Occupation and industry information which have been surveyed in full text have been recoded in national as well as international classification schemes. The industry information

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<sup>23</sup> 1-1,999, 2,000-4,999, 5,000-19,999, 20,000-49,999, 50,000-99,999, 100,000-499,999, 500,000-99,999,999.

<sup>24</sup> 1-1,999, 2,000-4,999, 5,000-19,999, 20,000-49,999, 50,000-99,999 (transition area / periphery), 50,000-99,999 (central area), 100,000-499,999 (transition area / periphery), 100,000-499,999 (central area), 500,000-99,999,999 (transition area / periphery), 500,000-99,999,999 (central area).

<sup>25</sup> Since August 1st, 2008 the classification contains 96 regions (aggregation of no. 60 and no. 61).

[f513nace] thus is available at the structure level two (60<sup>26</sup> in Nace 1.1 divisions identified by two-digit numerical codes) of the Statistical Classification of Economic Activities in the European Community, NACE (rev. 1.1)<sup>27</sup>, and the German national equivalent (*Klassifikation der Wirtschaftszweige*, Ausgabe 2003). Current job [f100\_i88], first job [f1401i88] and apprenticeship job [F1203i88-J1203i88] are coded in the 1988 International Standard Classification of Occupations (ISCO-88) at the unit-group level (4-digit) as well as in the German national equivalent (*Klassifizierung der Berufe*, 1992 and 1988 revision). Moreover, based on occupation, industry and task items a variable with 54 occupational fields [berufsfeld] was added (for the definition of these occupational fields see Tiemann et al. 2008).

The data include detailed information on respondents' vocational educational career, i.e. information on up to five vocational education and training programs respondents have attained. With regard to the kind of degree attained in these programs analyses with the BIBB/IAB-labor force data 1998/99 demonstrated that respondents have difficulties in assigning their vocational training to the official descriptions used in the questionnaire. Using different criteria and information on study length, occupational title and educational institution for each of the up to five programs a variable was computed that includes adjusted information on the vocational degree [F1202\_korr to J1202\_korr]. Equally, a variable for the highest vocational educational attainment has been computed using the same rules [max1202]. Moreover, with regard to vocational education for all (up to five) programs information on beginning and end of the program (month, year) have been recoded in four-scaled variables indicating the length of the program with *one up to eleven months*, *12 up to 22 months*, *23 up to 48 months*, and *more than 48 months* [f1216dn-j1216dn].

To account for item non-response in the earnings variable and thus possible estimation, inference or precision problem an additional wage variable including imputed values for missing earnings have been computed. There have been 3,044 out of 20,000 (15 %) item non-responses on the monthly gross income variable [F518]. However, these respondents were asked to specify whether their income is below 1500 Euro [F519]. Only 357 of the 3,044 respondents refused to answer this question as well. Using information from both income variables and other income-relevant variables in the data missing incomes were imputed by a multi-stage estimation (Alda and Rohrbach, 2009) based on Gartner (2005). Three variables have been added to the 2006 data file: a variable with imputed income data for the 3,044 missings [exp\_wage\_imp\_miss], a variable with imputed data for the missings and 137 extreme values [exp\_wage\_imp\_extr]. An indicator variable [wage\_imp\_gruppe] informs about the belonging of the values to both groups.

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<sup>26</sup> To account for specific comparative questions NACE Rev. 2 (as well as the International Standard Industry Classification (ISIC, Rev.3) include two more divisions (Undifferentiated goods- (96) and services-(97) producing activities of private households for own use) and thus have 62 divisions.

<sup>27</sup> For correspondence tables between NACE and ISIC see the UN Classification Registry (URL: <http://unstats.un.org/unsd/cr/registry/> (last access April 12<sup>th</sup>). For correspondence tables between different revisions of NACE see the EUROSTAT Index Tables of Correspondence (URL: [http://ec.europa.eu/eurostat/ramon/rerelations/index.cfm?TargetUrl=LST\\_REL](http://ec.europa.eu/eurostat/ramon/rerelations/index.cfm?TargetUrl=LST_REL) (last access April 12<sup>th</sup>).

Based on the information on respondent's general educational degrees [F1100-F1102, F1106] an eleven-scaled variable on highest general education degree has been computed [bildungnr]. A reduced five-scaled version of this variable is *maxbild5*.

The information on respondent's most important work equipment ([F300], open question) has been reclassified in two categorical variables: *ArbM\_feingruppen* with about 50 specific work tools and equipment and *ArbM\_hauptgruppe* with 14 values indicating main groups of work equipment (e.g. informing whether the respondent's most important work equipment is a machine, a means of transport, an apparatus etc.).

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## Appendix A: Main issues and variables for the 1979, 1985/1986, 1991/1992, and the 1998/1999 study

The following text is a reproduction from the German Social Science Infrastructure Services Association (GESIS) Leibniz Institute for the Social Sciences Data Holding Catalogue (GESIS 2009) study descriptions (see 'abstract' / 'content')<sup>28</sup>.

### Qualifikation und Berufsverlauf / Qualification and Course of Employment 1979 (ZA-Study-No.: 1243)

Determination of qualification and course of professional career. The investigation is divided into the following sections:

1. Education and training
2. Further education and retraining
3. Career course
4. Current employment
5. Mobility

Topics: 1. Education and training: school education; school achievements; degree level and year of degree; subject area with year of conclusion of vocational training; start and conclusion of company vocational training; training occupation; judgment on relevance in practice for employment today of knowledge acquired in school education and in apprenticeship; company size, economic area and branch of economy of company doing training; remaining with or leaving company doing training and reasons for departure.

2. Further education and retraining: participation in courses for occupational further education and retraining within or outside the company within the last five years; type of courses; usability of the knowledge acquired there for current occupational activity; course length.

3. Career course:

a) on first employment: employment in training occupation; type of first employment; economic area, branch of economy, company size and status in profession.

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<sup>28</sup> The author thanks GESIS for the allowance to print the GESIS catalogue information in this manual.

b) for the points in time 1970 as well as 1974 (later more accurately for the survey year 1979) information on occupation at that time was obtained: type of occupation; area of business affiliation of company; company size and length of company employment.

c) in case of unemployment since 1974 the following was asked: frequency and length of unemployment.

4. Current employment: again the following was surveyed: branch of economy and economic area as well as company size and exercised occupation; work areas, detailed determination of the requirements at work and of job-specific knowledge; characteristics of occupation; materials used for work; detailed information on physical position and efforts at work; place of acquiring qualification for current occupation; usability of acquired training and further education; occupational satisfaction; (scale).

5. Mobility: information on change of occupation and career changes associated with this; reasons for change of occupation; connection of training, further education and change of occupation; number of employers with whom one was employed; length of employment with current employer; satisfaction with course of professional life up to now; degree of possible reduction in earning capacity; city size; ZIP (postal) code.

Demography: age; sex; marital status; number of children; ages of children (classified); income; social origins; city size; state.

### **Qualifikation und Berufsverlauf / Qualification and Course of Employment 1985/86 (ZA-Study-No.: 1790)**

Determination of qualification and course of professional career. The investigation is divided into the following sections:

1. Current employment
2. Education and training
3. Further education and retraining
4. Mobility

Topics: 1. Current employment: working hours; professional position; branch of economy and area of economy; company size and occupation exercised; major areas of activity; functions as superior; materials used for work; income; place of acquiring qualification for the current occupation; satisfaction with occupation (scale); working conditions and stress; year of first employment; participation, qualification and acceptance of use of program-controlled materials for work (only for a sub-group).



2. Education and training: school education; final degree and year of conclusion; conclusion of school vocational training; conclusion of company vocational training; occupation learned; company size and economic area of the training company; remaining with or departing from the training company and reasons for leaving; utility of training.

3. Further education and retraining: participation in courses of occupational further education and retraining within the last five years both within and outside of the company; type and topics of the courses; course duration.

4. Mobility: change of occupation and changes in occupational situation connected with this; reasons for the change of occupation; time of first as well as last change of occupation; occupation last practiced; change of occupation and change of employer or job; connection of training, further education, use of knowledge, use of technology and health with the change of occupation; moving for occupational reasons; length of employment with current employer; degree of possible employment disability.

**Erwerb und Verwertung beruflicher Qualifikationen (Qualifikation und Berufsverlauf) / Acquisition and Application of Occupational Qualifications (Qualification and Course of Employment) 1991/92 (ZA-Study-No.: 2565)**

Qualification, description of activity and career course.

Topics: 1. Current or last employment: average time worked each week; occupational activity; economic area; area of business; company size; occupational position; since when self-employed; judgment on the economic situation of the company; limited or unlimited terms of employment; ABM position {job creation measure}; ABM activity as continuation of previous work; duration of company employment; fear of lay-off; perceived difficulties to find a new position.

2. Special qualification characteristics: characterization of activities conducted at work; most important activity at work; activity as full-time trainer; personally training apprentices; proportion of working hours for training others; formal entitlement to train; superior activity; assessment whether one's own activity could as well be performed by a man or a woman or by less skilled; school or company further education as most important sources of knowledge for the current activity characterization of special areas of knowledge for the current activity; areas of knowledge in which knowledge through further education would be necessary.

3. Materials for work: detailed determination of the materials for work used by the respondent in the activity, thus e.g. means of transport, vehicles, tools, machines, hand-controlled or automatic machines, production facilities, office equipment, computers, precision engineering as well as optical equipment, instruments for medical and chemical processes; identification of the most important materials for work; work with program-controlled materials for work.

4. Working conditions and satisfaction: stressful working conditions; most important social and psychological job demands; general work satisfaction; satisfaction with the individual factors of the job such as income, prospect of promotion, atmosphere at work, surroundings, job stress and further education possibilities.
5. Unemployment: unemployment in the last two years; entire duration of unemployment.
6. School and vocational training: school degree; year of school degree; conclusion of apprenticeship or partial training as skilled worker; apprenticeship discontinued; training occupation; type of acquisition of conclusion of apprenticeship; length of apprenticeship; use of knowledge from the apprenticeship in the current activity; area of business of the company doing the training; size of the company doing the training; remaining with company doing the training after conclusion of apprenticeship; job appropriate to training; length of remaining in company after conclusion of apprenticeship; description of the transfer and the situation between apprenticeship and lasting job; master or technician examination; school degrees and year of last degree; subject area and job title.
7. Course of employment: year of first regular employment; number of employers up to now; interruption of employment for more than six months; duration and reason for interruption of employment; participation in special qualification measures and further education courses before return to occupation.
8. Occupational further education: participation in courses and seminars in the last 5 years as well as currently; type and area of the course (distance education, outside work or within the company); acquisition of a certificate for the course; full-time or part-time course; duration of course; most important purposes of the course; use of other further education opportunities; information on knowledge of foreign languages; longer stay abroad.
9. Occupational mobility: change of occupation; change of company; becoming self-employed or remaining with the same employer after a change of occupation; motives for change of occupation; qualitative improvement in occupational situation through change of occupation; moves in the course of professional life.
10. Demography: size of household; living together with a partner; children in household and their ages; year of birth of respondent; country in which childhood was spent; German citizenship. The following questions were posed in the eastern part of the country: currently looking for work; search for work in the previous occupation; assessment of the occupational future; employment status; retraining occupation; desired occupation or compromise solution; retraining in the company or in a training facility; participation exclusively in further education or participation in normal work of the company; impact of short time work; short time work zero; date of leaving the last position; type of last position; having a firm position before start of unemployment; date of leaving this position.

**Erwerb und Verwertung beruflicher Qualifikationen (Qualifikation und Berufsverlauf) /  
Acquisition and Application of Occupational Qualifications (Qualification and Course  
of Employment) 1998/99 (ZA-Study-No.: 3379)**

Description of work responsibilities, working conditions, job stress and possible changes of the situation at work.

Occupation education and further education as well as individual mobility conduct.

Topics:

1.) Cross-section part:

occupation practiced (classification of occupation according to the occupation codes of the Federal Bureau of the Census of 1992); assessment of personal occupation as traditional or modern; further employment or side jobs; weekly working hours in primary and side job; stating materials for work with which one often works within the framework of the occupational activity (the respondents selected from lists with materials for work organized according to categories; such categories were e.g.: simple craft tools, precision engineering and special tools, power craft tools, soldering and welding equipment, machines, plant equipment, measuring devices, diagnosis equipment, computers, office communication equipment and writing equipment, means of transport, computer programs); occupational position; position at work; subject to mandatory social security; type of employment (limited, unlimited, temporary work, job-creation measure); duration of employment with current employer and length of activity exercised in the current company; assessment of the risk of lay-off; economic area and area of business of the employing company; stating the location of additional branches and branch offices of the employing company; company size; assessment of the economic situation of the company; chronological organization of occupational activity (changing shift, night shift, holiday work and overtime); gross income and supplements; stating how frequently certain work responsibilities are carried out (e.g. training, teaching, consulting, informing, trade fairs, testing, supervising, repairing, purchasing and sales, acquisition, advertising, marketing, organizing, producing, researching); presence of formal entitlement to train apprentices as part of activity exercised, as well as time spent looking after the apprentices; gender of superior; personal status as superior; possibility of also exercising activity with lesser or other qualification; place of acquisition of qualification necessary for occupational activity; requirement of special knowledge for the activity exercised; assessment of the necessity of deepening this knowledge through further education; changing working locations; participation in duties outside the office; characterization of selected working conditions and job stress (e.g. working on one's feet, lifting heavy loads, working with smoke and dust, dealing with dangerous materials, wearing protective clothing); estimated necessity of hearing protection with noise; having too much expected from work demands; frequency of selected work demands (e.g. deadline stress, precise regulations, repetitive activities, new duties);

perceived change of work stress and work requirements as well as changes in the company in the last two years; changes of personal job situation; reduction in personnel; restructuring; outsourcing; occurrence of health complaints during or immediately after work; inability to work in the last 12 months; presence and participation in company medical check-ups and health promotion measures in the company; work satisfaction (scale); personal impact from mobbing; participation in measures for further education or retraining measures in the last 5 years; use of further education opportunities in the last 2 years; knowledge of foreign languages; reasons for longer stays abroad (except vacation); duration of employment; number of all employers up to now; reasons for change of employer; assessment of change of employer regarding improvement in occupational situation; temporary self-employment during working life; number and time of changes of occupation that took place as well as reasons for the change and resulting improvements of occupational situation; moves for occupational reasons; number and points in time of unemployment; status besides employment; ages of children in household; living together with a partner; employment of partner; existing disabilities; place where youth was spent; immigration year; citizenship; state; size of municipality class; degree of technology of the workplace and primary work equipment; highest occupation training final examination. Additionally for the self employed: area of business; branch; number of employees subject to mandatory social security in the company; structure of employees (trainees, family members, temporary work force, temps, etc.); founding year; start of self-employment activity; presence of cooperative relationships. Additionally with freelancers: basis of occupational activity (fee, based on contract for specific task, based on hours); number of companies for which the activity is exercised; weekly working hours; arrangement of working hours; start of activity in current company and activity as freelancer in general; assessment of the risk that the working relationship will be ended by the company.

## 2.) Longitudinal part:

school education: type, year and city of school degree; school degree completed later; college; doctorate; post-doctoral qualification as university lecturer; participation in measures preparatory for occupation, year of primary occupational training, occupational technical school, obligatory practical training; type, beginning and end of occupational training; type of facility at which occupational training took place; conclusion of occupational training; reasons for non-conclusion; area of business, locations and size of company doing the training; financial support of instruction (student aid, scholarship); usability of knowledge and skills gained during training in current activity; whereabouts after training; appropriateness of job after training; duration of possible unemployment, odd jobs, military service or alternative service or a voluntary social year after training.

## Appendix B: Application of ISCED-97 to the German education qualifications

This table is taken from Schneider 2008 (p. 98, table 6, columns 1 2, 3, 4). Values in per cent reflect educational attainment for individuals aged 25-65.

National categories	ISCED-97 (OECD)	ISCED-97 (ideal)	Microcensus 2004 <sup>1</sup>
No formal qualification	0/1	0/1	2.08
Volks-/Hauptschulabschluss			10.16
Anlernausbildung; internship; pre-vocaitonal training year	2A	2B	1.12
Realschulabschluss / Mittlere Reife		2A	2.36
Polytechnisch Oberschule (GDR)			0.55
Vocational training in the dual system, training for intermediate public services			47.29
Vocationally qualifying Berufsfach-/Kollegschulabschluss; one-year health sector school	3B	3C	3.00
Fachhochschulreife			0.42
Abitur / allgemeine or fachgebundene Hochschulreife	3A	3A	2.43
3B + 3A or 3A + 3B	4A	4A, 4B	5.58
Meister/Techniker; equivalent Fachschulabschluss; two-to three-year health sector school; Fach-/Berufsakademie	5B	5B	7.69
Fachschulabschluss (GDR)			1.76
College of public administration			0.86
Fachhochschulabschluss	5A(med)	5A(med)	5.20
Universitätsabschluss	5A(long)	5A(long)	7.93
Doctorate	6	6	1.58

Notes: <sup>1</sup> One per cent sample of the German population, Individuals aged 25-64 (in per cent).

## Appendix C: Key generic work skills measured by the JRA module in BIBB-BAuA 2005/2006<sup>29</sup>

### Cognitive skills

Level of mathematical, statistical skills [rating scale: 'no such skills required', 'basic ..', 'specialized ..']: [F403\_8]; Level of German language skills, writing, spelling [rating scale: see above]: [F403\_9]; Level of skills in specific foreign languages [F403\_13, F406\_01-F406\_10, F407]; Level of computer skills in application programs [rating scale: see above]: [F403\_10]; Frequency of working with computers [frequency scale 'frequently', 'sometimes', 'never']; [F318]; Problem-solving: Having to react to and solve unforeseeable problems [frequency scale 'frequently', 'sometimes', 'never']; [F325\_1]; You are confronted with new problems that remain to be understood / familiarized with [frequency scale 'frequently', 'sometimes', 'rarely', 'never'; supplement question: Does this stress you? (y/n)]: [F411\_04]; Work is stipulated in the minutest details: [F411\_02]; One and the same work cycle / process is repeating in the minutest details: [F411\_03]; There are diverse processes and job tasks which you have to keep an eye on simultaneously: [F411\_09].

### Interaction/social skills ['How often ...'; frequency scale 'frequently', 'sometimes', 'never']

Frequency of teaching, training: [F313]  
 Frequency of consulting, advising: [F314]  
 Frequency of consulting of colleges, external customers or other target groups: [F314B]  
 Frequency of taking care, healing: [F316]  
 Frequency of notifying / communicating difficult issues in an intelligible to all way: [F325\_2]  
 Frequency of convincing others, compromising: [F325\_3]  
 Frequency of speechmaking, giving talks: [F325\_6]  
 Frequency of having contact to customers, clients, patients: [F325\_7]  
 Frequency of being responsible for the well-being of others, e.g. patients, kids, clients, staff: [F325\_9]

### Learning skills

Frequency of recognizing and closing own knowledge gaps [frequency scale 'frequently', 'sometimes', 'never']; [F325\_5]  
 You tasks include process optimization or trying out new things [see above] [frequency scale 'frequently', 'sometimes', 'never']; [F411\_05]  
 You are asked to do things you haven't learned or that you aren't proficient in [see above]: [F411\_08]  
 Continuing education: Enrolment within the last 2 years: [F1300], Motivation of attendance: [F1301]; Kind of training (7 items): [F1302-01-F1302-07]  
 Demand for further training / need for actualization or extension of skills in 18 specific subject areas, i.e. cognitive and computer skills (for these 18 items respondents were asked how much they require these skills in their job: F403\_1-F403\_13 (cognitive skills) and F322\_1-F322\_6 (computer skills))

### Physical skills [Frequency: 'How often ...'; frequency scale 'frequently', 'sometimes', 'rarely', 'never';

Perceived load: 'Does this stress you?: Yes/no)  
 Work standing up: [F600\_01]; Work sitting down: [F600\_02]; Carry heavy stocks of more than 20kg (men), 10kg (women): [F600\_03]; Working being exposed to smoke, dust, gases, vapours: [F600\_04]; Working being exposed to coldness, heat, wet, dampness, draft: [F600\_05]; Working with oil, dirtiness, mud: [F600\_06]; Working crouched down, kneed, reclined, overarm: [F600\_07]; Working being exposed to strong tremor, crushes, vibrations: [F600\_08]; Working being exposed to dazzling light, or poor visibility / bad lightening:

<sup>29</sup> This reorganisation of items into a scheme of key generic work skill reflects the author's efforts at the OECD and Cedefop 'International seminar on measuring generic work skills using the Job Requirements Approach' (OECD / Cedefop 2009).

[F600\_9]; Working being exposed to hazardous substances, radiance: [F600\_10]; Wearing protective clothing: [F600\_11]; Working being exposed to noisiness: [F600\_12]; Contact to micro organisms such as pathogenic germs, bacteria, mildew, viruses: [F600\_13]; Working where people are smoking: [F600\_14]

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