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Session 3:

Employment

Service occupations in Austria

Norbert Rainer

Austrian Central Statistical Office

I. Introduction

1. At the Ninth Meeting of the Voorburg Group on Service Statistics (October 1994, Sydney, Australia) one of the sessions dealt with employment and educational qualifications in the service industries. Several papers were presented in that session and various aspects were discussed: concepts of employment and educational qualifications, data sources (administrative data, population censuses, enterprise data), data availability in different countries, ways to collect data on educational qualifications, data needs for policy purposes, and others. It was emphasised that the usual minimum „core“ set of employment data (status of employment, sex, full time/part time) does not seem to be sufficient for a comprehensive analysis of employment in the services industries (for the other industries neither) and that at least some data are desirable concerning qualification and occupations.
2. This short paper should be a contribution to the Voorburg discussions concerning employment and educational qualifications in the service industries. Contrary to the discussions so far the paper concentrates on occupations and educational qualifications as such, not restricted to service industries. Furthermore, a concept of „service occupations“ is introduced and it is analysed how service occupations have changed over time and industries.
3. The data presented refer to Austria and are taken from the last two population censuses (1981, 1991). Although similar data are available from the quarterly micro census (labour force surveys), for simplicity only data of the population census have been used here.

II. Data situation in Austria

4. As in other countries one has to distinguish between economic statistics and social and demographic statistics. Both provide data on employment. However, the basic statistical units are different (establishments, enterprises and local units in economic statistics; households or persons in social and demographic statistics) and the variables regarding employment are of broader coverage in social statistics.
5. The most important administrative data source is the social security data base. Based on the data which employers have to deliver with respect to the employers and employees social security contributions the holding organisation of the social security institutions produces the official employment statistics. Employment data are shown by employment status, sex, age, industry, region, income, working time.
6. In economic statistics the employment data comprise the usual core of variables: employment status, sex, part time/full time, industry and region. So far the main statistical unit is the establishment. However, data by enterprises can be gained by aggregating the respective establishments to enterprises. Combined with the population census a census of local units is undertaken (every ten years).

7. Being now a member of the European Union and before a member of the European Economic Area, Austrian economic statistics has to be adapted to EU-concepts and -standards. Not only the new economic classifications have to be applied but the whole system of economic surveys has to be restructured. The outcome of that process will be a considerably enlarged economic statistics data system (coverage of industries, variables). However, concerning employment data no conceptual changes are foreseen as well as no change in the list of variables (except an additional variable regarding rented or leased employees).
8. In order to manage the transition to the EU-requirements (classification, statistical units, variables) it is planned that a full coverage economic census will be performed for the reference year 1995. This census will cover all market activities except agriculture. For the first time free lance activities will be covered too. So far economic censuses have been performed every five years, the last one for 1988. (The 1993 economic census has been postponed to 1995 because of the necessary transition to EU-requirements.) For the years between the economic censuses the large-scale manufacturing sector and the construction industry has been covered by full coverage surveys, the small-scale establishments on a sample basis. Only parts of the service industries had also been covered annually (on sample basis).
9. Within social and demographic statistics the population census plays an important role. The variables covered include data on the structure, sex, age of the population, structure of households, education and employment, and other demographic variables. The statistical units are the person and the household. Population census data can be tabulated by all levels of regional structure. As in other countries the population census takes place every ten years (last census in 1991).
10. With the exception of the quarterly micro census (and labour force survey), the population census is the only source for data on occupation and educational level of the population. Both the classifications of occupation and educational levels can be converted into the international classifications (ISCO 1988, ISCED).

III. Service occupations

11. Classifications of occupations are based on a set of criteria, the most important of which are kind of work performed and the skills necessary for performing a certain job. The concept of a job is distinct from the concept of an industry, even if there is obviously some coincidence. So, the occupations of chemical workers are defined as jobs performing chemical processes and/or producing chemical products. It is thus obvious that chemical workers are predominately employed in the chemical industry. The same is true for truck drivers which one would expect in the freight transportation industry. However, as there is own account freight transportation in many other industries, truck drivers are employed in those industries also.

12. Data showing employment by industry and occupation provide an additional dimension for economic analysis which cannot be gained by economic (monetary) data alone. From the point of economic statistics own account freight transportation would be an ancillary activity, the output of which is integrated in the goods produced. As for Austria such an industry x occupation matrix at a sufficient level of detail is only available from the population censuses, these data are widely used not only to analyse the changes of occupational structures but also to gain information on such phenomena like externalising (outsourcing) of activities.
13. In order to analyse occupational changes with a view to services the concept of „service occupations“ is introduced. All occupations which are characteristic to the service industries (defined according to the concept of the tertiary sector) have been labeled as service occupations. This attribution has been done on the basis of the Austrian classification of occupations (as used in the population census) but can also be done on the basis of ISCO 1988 (see **annex 1**).

IV. Empirical evidence

14. All data in the following tables have been taken from the last two population censuses (1991, 1981). The data refer to the number of persons employed (both self-employed and employees). The classifications are the Austrian classification of occupations (sub-major groups) and the Austrian Standard Industrial Classification 1968.
15. From 1981 - 1991 total employment rose by 8.0% (**table 1**). Not surprisingly, there was a sharp decline in the employment of agriculture and forestry (- 26.2%), a decline in the secondary sector (- 6.2%), but a high increase in the tertiary sector (+ 25.2%). In 1991 the tertiary sector was responsible for 58.6% of total employment, an increase of 8.1%-points. More than two thirds of the manufacturing industries show a decline in employment. On the other hand, more than four out of five service industries show an increase in total employment.
16. Similar changes are to be reported concerning the occupational structure (**table 2**). Agricultural and manufacturing occupations decreased, the service occupations increased by 19.8%, thus by a slower rate than the increase in employment in the tertiary sector. In 1991 service occupations had a share of 66.3% of total employment.
17. From 1981 to 1991 primary, manufacturing and service occupations decreased both in the primary and in the secondary sector (**table 3**). The large increase in the employment of the tertiary sector (+ 25.2%) had the effect that in 1991 81.9% of all service occupations are to be found in the tertiary sector. The respective share for 1981 was 77.4%. At least at this high level of aggregation the occupational structure of the secondary and tertiary sector did not change significantly: in 1991 33.2% of total employment in the secondary sector were service jobs, almost the same share as in 1981 (32.6%); in the tertiary

sector the service jobs had a share of 92.7% in 1991 and 91.5% in 1981. It has thus to be concluded that the increase in service jobs is predominately due to the vast increase of the tertiary sector.

18. The strong relation between the increase in service occupations and the growth of the service industries can also be shown by using the decomposition method. Using such a method the changes of the occupational structure can (hypothetically) be split into an occupation and an industry component (and inevitably into a joint component). For the model see **annex 2**. The results can be found in **table 4**. The high decrease in primary occupations was thus due to the decrease in the industries employing primary occupations. For the decrease of manufacturing occupations both the occupational structure (35.7% of the absolute decrease) and the decrease in the respective industries (55.6%) were responsible. On the other hand, the vast increase in service occupations was predominantly the result of the increase of the industries employing service job holders.
19. With the exception of the lowest educational level (compulsory secondary school only) all other educational levels of the employed population increased at high rates (**table 5**). Again, the educational qualifications of the tertiary sector show much higher growth rates than those of the secondary sector. In 1991 89.0% of the persons with 3rd level education were employed in the service industries (86.6% in 1981). The service industries absorbed 92.8% of the increase in 3rd level educated persons and 77.5% of the increase in higher vocational and higher general secondary school educated persons.
20. Obviously, service jobs are occupations which tentatively require a higher level of education. (**table 6**). In 1991 10.5% of the service job holders had completed a 3rd level education (7.8% in 1981), 13.9% had graduated from higher vocational or higher general secondary schools (11.5% in 1981). Only 24.9% (1991) of the service job holders had only compulsory secondary schools, a much lesser share than in manufacturing jobs (36.9% in 1991). However, the penetration of higher educational levels is also true for agricultural and manufacturing occupations.
21. Lastly, **table 7** shows the educational qualifications in the service industries. The service activities distinguished in the population census were aggregated into nine broad service industries. What has been stated for the tertiary sector in total is also true for the different service industries: the growth rates of jobs requiring relatively higher education are in almost all service industries higher than those for lower educational levels.

V. Concluding remarks

22. It was the intention of this contribution to illustrate the employment dimensions „occupation“ and „educational qualification“ with a view to services. The empirical evidence shown for Austria may not be much different from those for other countries of the same stage of development. Even if the data refer to the 1980s the principal situation has not changed since.

23. Only quite a few variables were taken into account. The population census offers some more variables, such as status of employment, sex and age. However, what would be of utmost interest would be a linking of socio-economic variables with the economic data. Such a linking would allow to analyse the relations between economic performance and the employment structure of the industries. However, such a linking is not directly possible due to the fact that the employment figures by industries from economic statistics differ from those from social statistics. In economic statistics the statistical unit (enterprise, establishment) is coded according to its main activity, whereas in social statistics the industry coding has to be based on the statement of the inquired person.

TABLE 1:

Employment 1981 - 1991 by industries
number of persons; source: population census

	1991	1981	1991 - 1981 changes absolut	in % of 1981
Agriculture and fishing	201.256	273.935	-72.679	-26.5
Forestry and hunting	13.218	16.555	-3.337	-20.2
Primary sector	214.474	290.490	-76.016	-26.2
Electricity, gas and water supply	40.167	40.970	-803	-2.0
Mining of coal	1.919	4.665	-2.746	-58.9
Mining of metal ores	1.043	2.916	-1.873	-64.2
Extraction of crude petroleum & natural gas	2.630	6.740	-4.110	-61.0
Production of salt	525	816	-291	-35.7
Mining of magnesite	1.023	2.437	-1.414	-58.0
Other mining and quarrying	1.197	1.376	-179	-13.0
Quarrying of stone, sand and clay	5.388	6.962	-1.574	-22.6
Manufacture of food products	96.716	105.350	-8.634	-8.2
Manufacture of beverages & tobacco products	15.063	18.529	-3.466	-18.7
Textile weaving and spinning	13.673	20.455	-6.782	-33.2
Manufacture of knitted and crocheted fabrics	8.239	16.064	-7.825	-48.7
Finishing of textiles, textile printing	3.520	3.642	-122	-3.3
Manuf. of bed, table, toilet or kitchen linen	2.095	1.881	214	11.4
Manufacture of wearing apparel	43.405	59.438	-16.033	-27.0
Manufacture of other textiles	13.753	13.451	302	2.2
Manufacture of footwear	11.176	18.229	-7.053	-38.7
Manuf. of leather & leath. products, incl. imitation leather	4.126	5.733	-1.607	-28.0
Manufacture of wood & wooden boards	18.484	20.144	-1.660	-8.2
Manufacture of wood products	81.172	81.140	32	0.0
Manuf. of music instr., toys & sports goods	8.930	8.649	281	3.2
Manuf. of articles of paper and paperboard	14.331	15.787	-1.456	-9.2
Manuf. of paper products, bookbinding	9.912	10.693	-781	-7.3
Printing	31.214	29.308	1.906	6.5
Publishing	16.030	12.257	3.773	30.8
Manufacture of rubber & plastic products	28.407	28.737	-330	-1.1
Manufacture of chemicals & chem. products	51.168	52.311	-1.143	-2.2
Manuf. of refined petroleum, gas & coke products	4.064	4.461	-397	-8.9
Cutting, shaping and finishing of stone, manufacture of bricks	9.546	15.525	-5.979	-38.5
Manuf. of ready mixed concrete, other ceramic products, other non metallic mineral products	22.358	19.728	2.630	13.3
Manufacture of glass & glass products	9.754	9.847	-93	-0.9
Manuf. of basic metals & semi-fin. products	44.414	70.036	-25.622	-36.6
Manuf. of structural metal products and other fabricated metal products	107.500	98.782	8.718	8.8
Manuf. of machinery & equipment	91.480	82.261	9.219	11.2
Manufacture of electrical equipment	93.935	98.225	-4.290	-4.4
Manufacture of transport equipment	88.519	99.353	-10.834	-10.9
Manuf. of prec. med. opt. instr. & watches	17.508	18.695	-1.187	-6.3
Construction (general contractors)	179.243	183.399	-4.156	-2.3
Building completion and finishing	46.739	41.759	4.980	11.9
Carpentry and wood construction	9.742	8.972	770	8.6
Tenismaths	2.263	2.656	-393	-14.8
Building installation	60.085	56.169	3.916	7.0
Secondary sector	1,312.456	1,398.548	-86.092	-6.2

			1991 - 1981	
	1991	1981	changes absolut	in % of 1981
Wholesale trade	168.894	123.145	45.749	37.2
Retail trade	352.845	328.374	24.471	7.5
Storage and warehousing	3.849	2.565	1.284	50.1
Hotels and restaurants	226.716	174.450	52.266	30.0
Road transport	33.229	28.139	5.090	18.1
Freight transport by road	34.622	27.441	7.181	26.2
Railway transport	68.257	71.396	-3.139	-4.4
Water transport	2.253	2.547	-294	-11.5
Air transport	9.194	5.683	3.511	61.8
Pipel., trav. ag. & tour operators	11.316	6.517	4.799	73.6
Forwarding agencies	24.473	18.004	6.469	35.9
Post and telecommunications	65.375	58.411	6.964	11.9
Financial intermediation	85.229	68.378	16.851	24.6
Private insurance	39.701	32.371	7.330	22.6
Real estate & business activities	94.064	68.315	25.749	37.7
Architectural and engineering activities	30.359	19.514	10.845	55.6
Photographic activities	2.685	2.157	528	24.5
Personal hygiene and beauty treatment	37.783	31.105	6.678	21.5
Cleaning activities	39.083	24.869	14.214	57.2
Chimney cleaning	3.653	3.873	-220	-5.7
Funeral and related activities	2.257	2.122	135	6.4
Cultural, recreat. & sporting activities	46.842	32.516	14.326	44.1
Health and social work	249.226	175.842	73.384	41.7
Education, research and development	173.013	138.380	34.633	25.0
Public administration	257.664	201.602	56.062	27.8
Extra-territor. organizations & bodies	4.239	3.631	608	16.7
Compulsory social security	20.641	19.465	1.176	6.0
Legal membership organizations	9.672	9.194	478	5.2
Voluntary membership organizations	15.162	11.480	3.682	32.1
Religious organizations	13.023	15.524	-2.501	-16.1
Activities of private households employing domestic personnel	11.433	11.536	-103	-0.9
Care-takers	20.600	3.937	16.663	423.2
Tertiary sector	2,157.352	1,722.483	434.869	25.2
Total	3,684.282	3,411.521	272.761	8.0

TABLE 2:

Employment 1981 - 1991 by occupations
number of persons; source: population census

	1991 - 1981			
	1991	1981	changes absolut	in % of 1981
Agricultural occupations	209.366	282.802	-73.436	-26.0
Forestry occupations	12.708	16.422	-3.714	-22.6
Primary occupations	222.074	299.224	-77.150	-25.8
Crane, earth-moving & rel. plant operators	18.450	20.285	-1.835	-9.0
Machine operators, firepersons	14.850	17.164	-2.314	-13.5
Miners, quarrymen and related workers	6.217	11.994	-5.777	-48.2
Potters, glassmakers, stonemasons & related workers	18.170	18.782	-612	-3.3
Metal processers	9.943	14.210	-4.267	-30.0
Metalworking occupations	46.809	56.019	-9.210	-16.4
Metal trade labourers	13.589	8.404	5.185	61.7
Wood preparation workers, paper makers	21.350	22.761	-1.411	-6.2
Chemical processers & rel. leather manufactures	16.741	15.743	998	6.3
Spinners, weavers, text.prod.finish.& rel. workers	17.141	24.146	-7.005	-29.0
Bricklayers, plasterers, scaffolders	62.792	66.014	-3.222	-4.9
Carpenters	21.298	23.588	-2.290	-9.7
Painters, varnishers	29.112	28.880	232	0.8
Glaziers, roofers, floor layers & rel. workers	17.405	16.565	840	5.1
Civil engineering workers	26.230	34.158	-7.928	-23.2
Construction labourers	35.565	32.658	2.907	8.9
Food & beverage processers	54.039	53.724	315	0.6
Tailors, dressmakers, sewers & rel. workers	53.785	68.301	-14.516	-21.3
Furriers, leather goods makers	11.868	19.789	-7.921	-40.0
Joiners & related woodworkers	74.392	72.533	1.859	2.6
Rubber, plastics & paper products makers	17.694	15.817	1.877	11.9
Printers and related workers	26.610	26.099	511	2.0
Jewellers, prec.instr.makers & rel. workers	18.229	18.089	140	0.8
Locksmiths (fitters), mechanics & rel. workers	160.250	153.970	6.280	4.1
Panel beaters(sheet met.work.), plumbers	62.857	68.869	-6.012	-8.7
Electrical workers	110.346	99.791	10.555	10.6
Labourers n.e.c., workers n.e.c.	54.549	66.114	-11.565	-17.5
Secondary occupations	1,020.281	1,074.467	-54.186	-5.0

	1991	1981	1991 - 1981 changes absolut	in % of 1981
Engin.science & nat.science professionals/ technicians	163.988	122.014	41.974	34.4
Health professionals & technicians	87.938	65.718	22.220	33.8
Teachers, educators	158.807	129.625	29.182	22.5
Legal prof., human and social scientists	28.277	20.827	7.450	35.8
Religious professionals, social workers	25.822	17.146	8.676	50.6
Artists, journalists and sportspersons	41.961	29.047	12.914	44.5
Managers in admin., industry & finance	81.754	38.435	43.319	112.7
Office and financial clerks	137.365	131.960	5.405	4.1
Administrative clerks	47.181	55.756	-8.575	-15.4
Bookkeepers, cashiers and related workers	102.125	104.269	-2.144	-2.1
Other clerical workers	256.178	189.129	67.049	35.4
Comp.equip.operators, data entry operators	12.616	15.184	-2.568	-16.9
Managers (wholes.&retail), advert. salespersons	96.254	71.323	24.931	35.0
Merchants, salespersons	286.089	259.287	26.802	10.3
Hotel and restaurant managers	50.317	48.487	1.830	3.8
Waiters, cooks	118.400	89.630	28.770	32.1
Other rest. & hotel serv.workers, housekeep.	66.615	62.639	3.976	6.3
Cleaners	150.956	133.752	17.204	12.9
Hairdressers, beauticians & rel.workers	38.597	32.869	5.728	17.4
Health service workers	61.476	37.477	23.999	64.0
Protective service work., armed forces	92.905	56.227	36.678	65.2
Other service workers	7.677	3.764	3.913	104.0
Transport supervisors	44.401	39.204	5.197	13.3
Postal service workers, messengers	45.064	43.268	1.796	4.2
Transport conductors	3.989	5.003	-1.014	-20.3
Vehicle drivers	114.684	107.533	7.151	6.7
Transport service auxiliary occupations	20.219	22.975	-2.756	-12.0
Freight handlers, warehouse workers	100.272	105.282	-5.010	-4.8
Service occupations	2,441.927	2,037.830	404.097	19.8
Total	3,684.282	3,411.521	272.761	8.0

TABLE 3:

Industries and occupations 1981 - 1991
number of persons; source: population census

	1981			
	Primary sector	Secondary sector	Tertiary sector	Total
Primary occupations	282.086	4.666	12.472	299.224
Secondary occupations	2.468	938.646	133.353	1,074.467
Service occupations	5.936	455.236	1,576.658	2,037.830
Total	290.490	1,398.548	1,722.483	3,411.521

	1991			
	Primary sector	Secondary sector	Tertiary sector	Total
Primary occupations	207.903	762	13.409	222.074
Secondary occupations	1.874	875.149	143.258	1,020.281
Service occupations	4.697	436.545	2,000.685	2,441.927
Total	214.474	1,312.456	2,157.352	3,684.282

	changes in % of 1981			
	Primary sector	Secondary sector	Tertiary sector	Total
Primary occupations	-26.3	-83.7	7.5	-25.8
Secondary occupations	-24.1	-6.8	7.4	-5.9
Service occupations	-20.9	-4.1	26.9	19.8
Total	-26.2	-6.2	25.2	8.0

TABLE 4:

Industry x occupation matrix 1981 - 1991
Decomposition-analysis
number of persons; source: population census

	absolut changes 1991 - 1981	= occupation component	+ industry component	+ joint component
Agricultural occupations	-73.436	-4.316	-69.282	162
Forestry occupations	-3.714	-1.128	-2.593	7
Primary occupations	-77.150	-5.443	-71.876	169
Crane, earth-moving & rel. plant operators	-1.835	-535	-1.298	-2
Machine operators, firepersons	-2.314	-1.370	-581	-363
Mincrs. quarrymen and related workers	-5.777	-2.603	-3.247	73
Potters, glassmakers, stonemasons & related workers.	-612	1.414	-1.096	-930
Metal processers	-4.267	-73	-3.424	-770
Metalworking occupations	-9.210	-8.073	-1.025	-112
Metal trade labourers	5.185	6.274	-246	-843
Wood preparation workers, paper makers	-1.411	98	-1.321	-188
Chemical processers & rel., leather manufactures.	998	1.937	-703	-236
Spinners, weavers, text.prod.finish.& rel. workers	-7.005	-1.008	-6.025	28
Bricklayers, plasterers, scaffolders	-3.222	-2.748	-728	254
Carpenters	-2.290	-2.600	229	81
Painters, varnishers	232	-1.599	2.112	-281
Gilaziers, roofers, floor layers & rel. workers	840	-540	1.639	-259
Civil engineering workers	-7.928	-9.126	1.821	-623
Construction labourers	2.907	3.196	-232	-57
Food & beverage processers	315	4.056	-3.073	-667
Tailors, dressmakers, sewers & rel. workers	-14.516	-2.023	-12.049	-443
Furriers, leather goods makers	-7.921	-1.924	-5.978	-19
Joiners & related woodworkers	1.859	938	992	-71
Rubber, plastics & paper products makers	1.877	2.121	-192	-53
Printers and related workers	511	-999	1.816	-306
Jewellers, prec.instr.makers & rel. workers	140	-694	1.149	-315
Locksmiths (finers), mechanics & rel. workers	6.280	9.024	-1.706	-1.038
Panel beaters(sheet met.work.), plumbers	-6.012	-7.503	1.410	82
Electrical workers	10.555	9.748	859	-53
Labourers n.e.c., workers n.e.c.	-11.565	-14.737	782	2.391
Secondary occupations	-54.186	-19.351	-30.114	-4.721

	absolut changes 1991 - 1981	= occupation component	+ industry component	+ joint component
Engin.science & nat.science professionals/ technicians	41.974	27.852	11.305	2.816
Health professionals & technicians	22.220	-2.506	24.847	-121
Teachers, educators	29.182	-4.788	34.942	-972
Legal prof., human and social scientists	7.450	1.136	5.959	355
Religious professionals, social workers	8.676	5.404	1.521	1.751
Artists, journalists and sportspersons	12.914	3.357	8.401	1.156
Managers in admin., industry & finance	43.319	35.405	4.358	3.556
Office and financial clerks	5.405	-15.609	22.445	-1.431
Administrative clerks	-8.575	-17.017	12.027	-3.585
Bookkeepers, cashiers and related workers	-2.144	-13.568	13.625	-2.201
Other clerical workers	67.049	32.141	31.399	3.509
Comp.equip.operators,data entry operators	-2.568	-3.960	1.940	-548
Managers(wholes.&retail), advert.salespersons	24.931	11.636	11.301	1.995
Merchants, salespersons	26.802	3.175	23.666	-39
Hotel and restaurant managers	1.830	-9.815	14.336	-2.691
Waiters, cooks	28.770	1.760	25.683	1.326
Other rest.& hotel serv.workers,housekeep.	3.976	-9.040	14.106	-1.089
Cleaners	17.204	-24.227	47.574	-6.142
Hairdressers, beauticians & rel.workers	5.728	-1.363	7.131	-41
Health service workers	23.999	6.112	15.042	2.845
Protective service work., armed forces	36.678	17.268	14.240	5.170
Other service workers	3.913	2.065	1.131	717
Transport supervisors	5.197	-2.060	7.586	-329
Postal service workers, messengers	1.796	-3.165	5.631	-670
Transport conductors	-1.014	-874	4	-143
Vehicle drivers	7.151	-5.503	13.712	-1.059
Transport service auxiliary occupations	-2.756	-1.821	-1.020	85
Freight handlers, warehouse workers	-5.010	-7.198	1.858	330
Service occupations	404.097	24.795	374.751	4.551

TABLE 5:

**Employment 1981 - 1991 by industries and level of highest completed education
number of persons; source: population census**

1981				
	Primary sector	Secondary sector	Tertiary sector	Total
University	969	20.442	112.925	134.336
Non-university education at the 3rd level	32	397	28.038	28.467
Higher vocational school	1.532	46.201	76.919	124.652
Higher general secondary school	1.421	24.083	100.538	126.042
Intermediate vocational school	40.210	105.181	258.440	403.831
Apprenticeship	49.496	603.680	557.082	1,210.258
Compulsory secondary school	196.830	598.564	588.541	1,383.935
Total	290.490	1,398.548	1,722.483	3,411.521
1991				
	Primary sector	Secondary sector	Tertiary sector	Total
University	1.185	26.970	170.154	198.309
Non-university education at the 3rd level	166	724	63.950	64.840
Higher vocational school	3.239	69.846	133.739	206.824
Higher general secondary school	1.609	24.112	131.930	157.651
Intermediate vocational school	40.329	106.979	332.512	479.820
Apprenticeship	71.266	644.835	776.584	1,492.685
Compulsory secondary school	96.680	438.990	548.483	1,084.153
Total	214.474	1,312.456	2,157.352	3,684.282
%-change of 1981				
	Primary sector	Secondary sector	Tertiary sector	Total
University	22.3	31.9	50.7	47.6
Non-university education at the 3rd level	418.8	82.4	128.1	127.8
Higher vocational school	111.4	51.2	73.9	65.9
Higher general secondary school	13.2	0.1	31.2	25.1
Intermediate vocational school	0.3	1.7	28.7	18.8
Apprenticeship	44.0	6.8	39.4	23.3
Compulsory secondary school	-50.9	-26.7	-6.8	-21.7
Total	-26.2	-6.2	25.2	8.0

TABLE 6:

**Employment 1981 - 1991 by occupations and level of highest completed education
number of persons; source: population census**

	1981			Total
	Primary occupations	Secondary occupations	Service occupations	
University	1.337	2.175	130.824	134.336
Non-university education at the 3rd level	43	188	28.236	28.467
Higher vocational school	1.793	6.555	116.304	124.652
Higher general secondary school	1.450	7.086	117.506	126.042
Intermediate vocational school	40.665	42.153	321.013	403.831
Apprenticeship	52.256	530.128	627.874	1,210.258
Compulsory secondary school	201.680	486.182	696.073	1,383.935
Total	299.224	1,074.467	2,037.830	3,411.521

	1991			Total
	Primary occupations	Secondary occupations	Service occupations	
University	1.674	3.443	193.192	198.309
Non-university education at the 3rd level	194	300	64.346	64.840
Higher vocational school	3.548	10.989	192.287	206.824
Higher general secondary school	1.722	8.976	146.953	157.651
Intermediate vocational school	40.697	47.529	391.594	479.820
Apprenticeship	74.645	572.820	845.220	1,492.685
Compulsory secondary school	99.594	376.224	608.335	1,084.153
Total	222.074	1,020.281	2,441.927	3,684.282

% - change of 1981				
	Primary occupations	Secondary occupations	Service occupations	Total
University	25.2	58.3	47.7	47.6
Non-university education at the 3rd level	351.2	59.6	127.9	127.8
Higher vocational school	97.9	67.6	65.3	65.9
Higher general secondary school	18.8	26.7	25.1	25.1
Intermediate vocational school	0.1	12.8	22.0	18.8
Apprenticeship	42.8	8.1	34.6	23.3
Compulsory secondary school	-50.6	-22.6	-12.6	-21.7
Total	-25.8	-5.0	19.8	8.0

TABLE 7:

**Employment 1981 - 1991 by service industries and level of highest completed education
number of persons; source: population census**

Wholesale and retail trade

	1991	1981	1991 - 1981 changes absolut	in % of 1981
University	14.949	9.701	5.248	54.1
Non-university education at the 3rd level	576	208	368	176.9
Higher vocational school	25.240	12.595	12.645	100.4
Higher general secondary school	19.285	14.870	4.415	29.7
Intermediate vocational school	63.819	53.977	9.842	18.2
Apprenticeship	260.763	202.462	58.301	28.8
Compulsory secondary school	137.107	157.706	-20.599	-13.1
Total	521.739	451.519	70.220	15.6

Hotels and restaurants

	1991	1981	1991 - 1981 changes absolut	in % of 1981
University	2.023	895	1.128	126.0
Non-university education at the 3rd level	313	68	245	360.3
Higher vocational school	6.154	1.964	4.190	213.3
Higher general secondary school	7.103	3.544	3.559	100.4
Intermediate vocational school	28.316	20.750	7.566	36.5
Apprenticeship	86.767	53.472	33.295	62.3
Compulsory secondary school	96.040	93.757	2.283	2.4
Total	226.716	174.450	52.266	30.0

Transport, storage and communication

	1991	1981	1991 - 1981 changes absolut	in % of 1981
University	2.900	2.276	624	27.4
Non-university education at the 3rd level	210	68	142	208.8
Higher vocational school	10.792	5.868	4.924	83.9
Higher general secondary school	12.782	9.422	3.360	35.7
Intermediate vocational school	22.545	17.956	4.589	25.6
Apprenticeship	131.094	102.531	28.563	27.9
Compulsory secondary school	72.245	82.582	-10.337	-12.5
Total	252.568	220.703	31.865	14.4

Financial intermediation (including private insurance)

1991 - 1981

	1991	1981	changes absolut	in % of 1981
University	8.396	4.274	4.122	96.4
Non-university education at the 3rd level	169	60	109	181.7
Higher vocational school	21.212	9.290	11.922	128.3
Higher general secondary school	15.976	13.165	2.811	21.4
Intermediate vocational school	32.952	29.577	3.375	11.4
Apprenticeship	30.210	25.151	5.059	20.1
Compulsory secondary school	16.015	19.232	-3.217	-16.7
Total	124.930	100.749	24.181	24.0

**Real estate, renting and business activities
(without research and development)**

1991 - 1981

	1991	1981	changes absolut	in % of 1981
University	24.568	13.156	11.412	86.7
Non-university education at the 3rd level	439	105	334	318.1
Higher vocational school	20.657	8.643	12.014	139.0
Higher general secondary school	12.638	7.561	5.077	67.1
Intermediate vocational school	26.679	19.422	7.257	37.4
Apprenticeship	41.007	27.456	13.551	49.4
Compulsory secondary school	43.856	42.385	1.471	3.5
Total	169.844	118.728	51.116	43.1

**Public administration, compulsory social security,
legal membership organisations**

1991 - 1981

	1991	1981	changes absolut	in % of 1981
University	22.430	17.514	4.916	28.1
Non-university education at the 3rd level	3.289	1.543	1.746	113.2
Higher vocational school	20.277	9.964	10.313	103.5
Higher general secondary school	27.113	21.104	6.009	28.5
Intermediate vocational school	49.775	38.556	11.219	29.1
Apprenticeship	111.391	73.245	38.146	52.1
Compulsory secondary school	57.941	71.966	-14.025	-19.5
Total	292.216	233.892	58.324	24.9

Education, research and development

	1991 - 1981			
	1991	1981	changes absolut	in % of 1981
University	48.400	34.159	14.241	41.7
Non-university education at the 3rd level	52.999	24.195	28.804	119.0
Higher vocational school	16.792	23.602	-6.810	-28.9
Higher general secondary school	11.714	15.935	-4.221	-26.5
Intermediate vocational school	12.977	12.191	786	6.4
Apprenticeship	14.481	10.376	4.105	39.6
Compulsory secondary school	15.650	17.922	-2.272	-12.7
Total	173.013	138.380	34.633	25.0

Health and social work

	1991 - 1981			
	1991	1981	changes absolut	in % of 1981
University	33.032	21.062	11.970	56.8
Non-university education at the 3rd level	5.093	1.538	3.555	231.1
Higher vocational school	7.060	2.385	4.675	196.0
Higher general secondary school	15.537	9.061	6.476	71.5
Intermediate vocational school	79.644	54.300	25.344	46.7
Apprenticeship	46.436	25.505	20.931	82.1
Compulsory secondary school	62.424	61.991	433	0.7
Total	249.226	175.842	73.384	41.7

Other service activities

	1991 - 1981			
	1991	1981	changes absolut	in % of 1981
University	13.456	9.888	3.568	36.1
Non-university education at the 3rd level	862	253	609	240.7
Higher vocational school	5.555	2.608	2.947	113.0
Higher general secondary school	9.782	5.876	3.906	66.5
Intermediate vocational school	15.805	11.711	4.094	35.0
Apprenticeship	54.435	36.884	17.551	47.6
Compulsory secondary school	47.205	41.000	6.205	15.1
Total	147.100	108.220	38.880	35.9

Annex 1:

International Standard Classification of Occupations (ISCO 1988)

Conceptual framework:

- kind of work performed or job:
defined as a set of tasks and duties executed, or meant to be executed, by one person; a set of jobs whose main tasks and duties are characterised by high degree of similarity constitutes an occupation
- skill:
defined as the ability to carry out the tasks and duties of a given job;
two dimensions:
 - skill level: which is a function of the complexity and range of the tasks and duties,
 - skill specialization: defined by the field of knowledge required, the tools and machinery used, the materials worked on or with, as well as the kinds of goods and services produced.

Hierarchy:

- 10 Major groups (eight linked to the four skill levels)
- 28 Sub-major groups
- 116 Minor groups
- 390 Unit groups

Structure and author's assignment to agricultural (A), manufacturing (M) and service (S) occupations:

1	Legislators and senior officials	S
2	Professionals	S
3	Technical and associate professionals	S
4	Clerks	S
5	Service workers and shop and market sales workers	S
6	Skilled agricultural and fishery workers	A
7	Craft and related trades workers	M
8	Plant and machine operators and assemblers	
81	Stationary-plant and related operators	M
82	Machine operators and assemblers	M
83	Drivers and mobile-plant operators	S
9	Elementary occupations	
91	Sales and services elementary occupations	S
92	Agricultural, fishery and related labourers	A
931	Mining and construction labourers	M
932	Manufacturing labourers	M
933	Transport labourers and freight handlers	S
0	Armed forces	S

Annex 2:

Decomposition model (table 4)

Basic data:

- O_0 : Employment by occupations 1981 (56 x 1)
 O_1 : Employment by occupations 1991 (56 x 1)
 I_0 : Employment by industries 1981 (76 x 1)
 I_1 : Employment by industries 1991 (76 x 1)
 X_0 : Occupation x industry matrix 1981 in relative terms (56 x 76)
 X_1 : Occupation x industry matrix 1991 in relative terms (56 x 76)

Definitions:

$$\Delta O = O_1 - O_0$$

$$\Delta I = I_1 - I_0$$

$$\Delta X = X_1 - X_0$$

Model:

$$O_0 = X_0 * I_0$$

$$X_1 = \Delta X + X_0$$

$$O_1 = X_1 * I_1$$

$$I_1 = \Delta I + I_0$$

$$\begin{aligned}\Delta O &= O_1 - O_0 = X_1 * I_1 - X_0 * I_0 \\ &= (\Delta X + X_0) (\Delta I + I_0) - X_0 * I_0 \\ &= \Delta X * I_0 + X_0 * \Delta I + \Delta X * \Delta I\end{aligned}$$

$\Delta X * I_0$: occupational component

$X_0 * \Delta I$: industry component

$\Delta X * \Delta I$: joint component