

GUDRUN BIFFL

ANNUAL WORKING HOURS AND LABOUR PRODUCTIVITY BY INDUSTRY

As labour market flexibility gains momentum and Austria is increasingly drawn into market interdependence at an international level, a closer look at the components of labour demand, in particular working hours and the ratio of wage and salary earners to persons working on their own account, is warranted. In international comparison, the Austrian labour market is characterised by pronounced reallocation of labour between industries rather than by total employment growth.

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Austria's accession to the European Union was accompanied by the adoption of international standards of classification of economic and labour market aggregates and methods of calculation of labour market indicators, which led to a break in many economic and labour market time series in Austria. Consequently there has been some uncertainty about the relative position of the Austrian labour market within the EU¹. In addition, EU membership accelerated the transformation of socio-economic patterns of behaviour, especially by increasing labour market flexibility.

In order to obtain continuous labour market time series by industry for 1965 to 1999, WIFO drew from a variety of sources for additional information to correct for statistical breaks (see Annex). Apart from the statistical landscape, the real world, which is marked by greater labour turn-over and flexibility of types of employment, renders monitoring and the evaluation of labour market developments more difficult. Demand for labour is increasingly taking the form of contract labour, outsourced work to specialists, firms and freelancers alike. Accordingly, when analysing employment, it is increasingly necessary to focus not only on the number of employed wage and salary earners but also on working hours, persons working on their own account and family helpers².

Based on the income concept³ traditionally used in Austria (which excludes employment of less than 11 hours per week), the number of workers (excluding parental leave and military service) rose from 3,143,200 in 1964 to 3,406,400 in 1999 (a plus of 263,200 or 8.4 percent), an expansion that looks relatively minor compared to international levels. When including casual employment (of 1 to 11 hours or an income below AS 3,800 per week) in 1999 – which is justified in view of the fact that this type of employment was very rare in the early 1960s – the growth was 478,000 or 15.2 percent, once again slightly lower than the EU-15 average and markedly lower than in Northern America or Japan.

The modest (in international terms) growth of overall employment should not be viewed as a sign of an insufficiently dynamic labour market: in Austria, the shift from agriculture to manufacturing and services took place rather late by international comparison, i.e., in the 1960s and 1970s. Thus, in 1964, 19.3 percent (607,800) of the total labour force worked in agriculture and forestry compared to only 145,700 or 4.3 percent of the la-

Average weekly and annual working hours per employee have been in a precipitous long-term decline.

Consequent to the weak growth of employment and the reduction of working hours per employee, the overall number of annual working hours has been shrinking from the early 1960s to the mid 1980s, at which time the trend was reversed due to a significant rise in employment.

Economic growth was bolstered primarily by a substantial rise in labour productivity; more labour input did not become necessary until the late 1980s and 1990s.

Low employment growth by international standards

¹ The discussion started off with the question of "true" unemployment (Biffel, 1997), and is presently turning to labour productivity in international comparison. The microcensus data (household survey) exhibits for Austria above-average labour force participation rates (1999 71.5 percent versus an EU average of 69.2 percent), below-average unemployment rates (4.0 percent versus 9.2 percent) and a lower labour productivity (GDP per employment) than the EU average. In contrast, on the basis of administrative data, the Austrian position vis-à-vis the EU is above the EU average in terms of labour productivity, equal with regard to the average labour force participation and below average in terms of unemployment rates.

² This contribution summarises a detailed WIFO study commissioned by the Austrian Labour Market Service, and is based on studies by Biffel (1988) and Lutz (1998).

³ The income concept (Lebensunterhaltskonzept, short LUK) is based on the idea that employment should be the basis of one's income; employment is therefore more narrowly defined than in the labour force concept (short: LFC) and does not take casual labour into account.

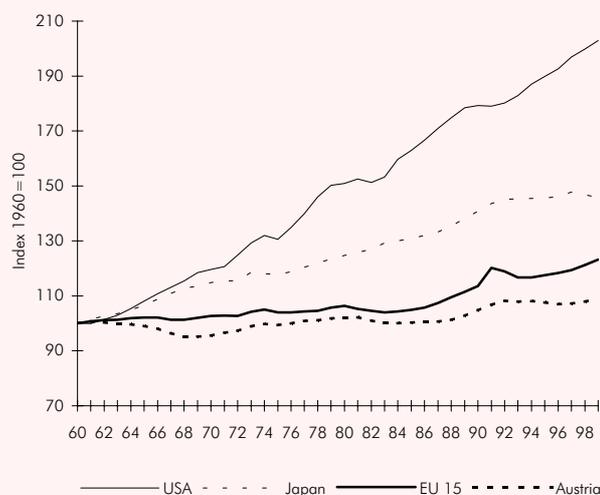
bour force in 1999. The inclusion of casual labour does not raise the share of agricultural and forestry workers in total employment significantly (1999 4.5 percent or 163,900 workers). The reallocation of labour from the primary to the secondary and tertiary sector in the 1960s and 1970s did not boost unemployment rates. Joblessness did not increase until 1981, consequent to plummeting employment in manufacturing and the demographically induced growth in labour supply (with the baby-boom generation entering the labour market)⁴. The fact that unemployment continued to rise was due not just to hysteresis effects, i.e., a rising proportion of long-term unemployed, but also to increasing turn-over unemployment (Biffi, 2000).

International Reorientation of the Standard Classification of Industries to Account for changing Production Processes

The switch from the 1968 operations-based standard industrial classification of production and employment (ISC 1968) to ÖNACE in 1995 meant that the statistical aggregation of enterprises by industry was adapted to take account of the new organisation of work within and between enterprises and industries. Where in the past operational processes were based on internal production flows, companies have since reoriented themselves towards consumers and markets. This means that internal production flows and the deployment of labour and responsibilities are in a process of change. Lateral networking and accountability gain the upper hand, at the cost of the former hierarchical and vertical structure. As a consequence, units or tasks (usually services) are increasingly outsourced to specialised enterprises or to independent operational units within an enterprise. With work and production processes in the manufacturing industry being restructured, the services sector is consequently growing beyond the level created by the growth of demand for services.

This (massive) change in production and work processes is reflected in the reclassification of industries, affecting even the distribution of employment between the aggregate of the secondary and tertiary sector.

Figure 1: Employment in Austria compared to international trends



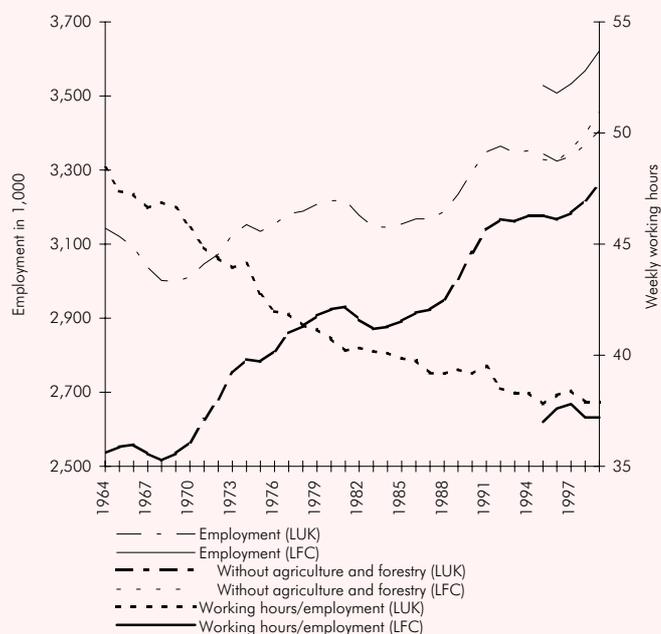
Source: OECD Labour Force Statistics, WIFO.

In the past 35 years, it was mainly the public sector in the widest sense of the term which created new jobs: whereas 363,800 persons or 11.6 percent of the total work force had worked in the public sector in 1964, by 1999 their number had swollen to 767,800 or 22.5 percent, or to fully 26.5 percent when including the casual workers. Similarly, the public sector can rightly be seen as the motor of employment growth in Austria when taking employment in the non-agricultural sector as a scale (1964 14.3 percent of all non-agriculturally employed; 1999 one quarter of the labour force according to the income concept and fully 28 percent under the labour force concept; for a definition of these terms see the Annex).

⁴ The growth in labour supply was slightly lower than the EU average and distinctly lower than in the USA and Japan.

Within the public sector, the highest growth rates were recorded in the health and social services sector and in education, where employment grew by more than 75 percent between 1964 and 1999. Private industries of similar employment growth rates were legal and other business services according to the 1968 industrial classification, and business services according to the ÖNACE categories.

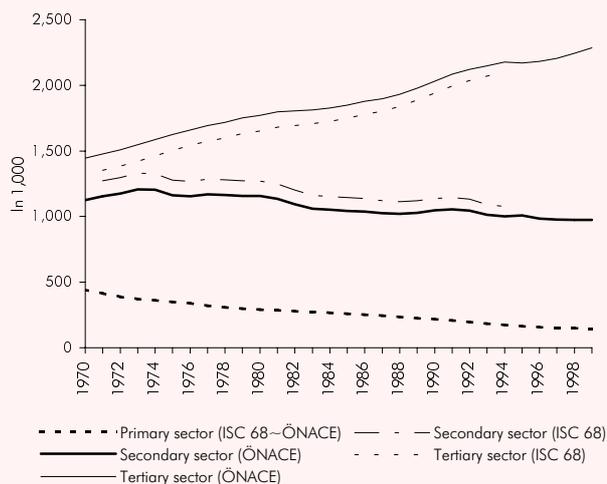
Figure 2: Trends in employment and working hours



Source: Statistics Austria, WIFO.

Figure 3: Employment by economic sectors

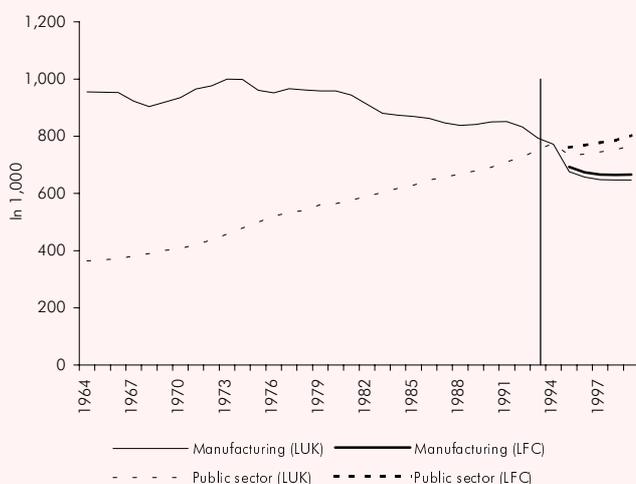
ISC 1968 and ÖNACE 1995



Source: WIFO, estimation of ÖNACE structure before 1995 by WIFO.

Figure 4: Employment in the public sector and in manufacturing

ISC 68 and ÖNACE 1995



Source: WIFO.

For Austria's private sector industries, the structural shift from the secondary to the tertiary sector occurred much later and at a much more unsteady rate than in other Western industrialised countries. In 1964, manufacturing employed 954,900 workers. That figure grew modestly, to almost 1 million, up to 1973, only to contract, slightly, in the early 1980s and again, but this time abruptly and massively, in the early 1990s⁵. By 1999, the manufacturing sector accounted for 647,400 workers, 307,500 or 32.2 percent less than in 1964. In the 1990s, manufacturing employment split into a stable and even to some extent expansive segment and a seriously shrinking segment. Industries in which employment fluctuations are due mainly to the ups and downs of the business cycle include those that manufacture intermediate products, primarily metal production and processing. The technology sector is perceptibly expansive. Among the shrinking industries, which suffer from massive long-term structural problems, are textile, clothing and leather manufacturers, the heterogeneous sector which encompasses the production of furniture, musical instruments, toys and sports equipment, but also the timber and paper industry, publishers and printers as well as food producers. The latter are faced with enormous competition from neighbouring low-wage countries to the east of Austria and need to undertake significant technological changes in order to preserve their competitiveness.

The severe job drain in the secondary sector is not just a consequence of technological progress and shifts in demand, but even more of changes in internal and inter-company work organisation. The dynamic growth of business service providers would not have occurred without the outsourcing of whole staff units to special providers.

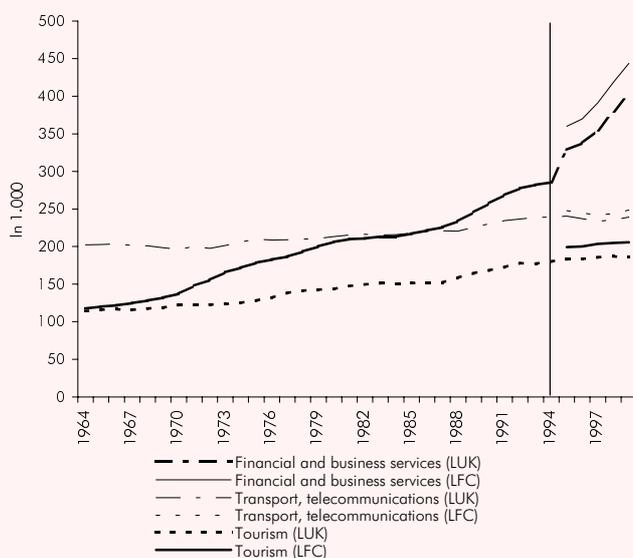
Over the past 35 years, manufacturing has seen its share of the labour force drop from 30.4 to 19 percent according to the income concept; when including casual labour, the decline was even sharper (to 18.4 percent).

In contrast to the collapse of manufacturing employment which set in during the mid 1970s and is still continuing, employment in the transport and telecommunication industries (which are closely linked to the production of goods and services) has remained relatively stable in the long term. In 1964, that industry employed 202,100 (6.4 percent of total employment); 35 years later, the figure had risen to 239,200 according to the income concept (a plus of 37,100 or 18.4 percent; 7 percent of the entire work force). When applying the labour force concept, the figure is 248,500 or 6.9 percent.

⁵ The opening up of Central and Eastern European countries represented a sudden change in the competitive position of Austrian manufacturing industry. Restructuring and rapid investment in technological advancement were the chosen path of recovery of international competitiveness in manufacturing.

Figure 5: Employment in selected services industries

ISC 68 and ÖNACE 1995

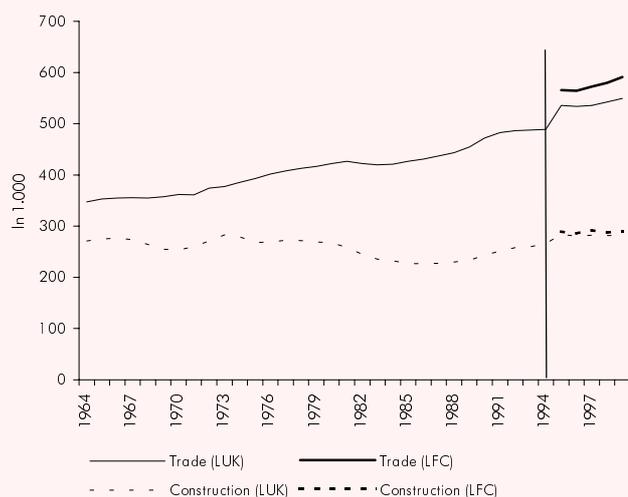


Source: WIFO.

In contrast, tourism has created significantly more jobs over the past 35 years than transport and telecommunication. In 1964 it had employed 114,100, but by 1999 it had grown to 185,800 (+71,600, +62.7 percent). Its share of the overall labour force rose from 3.6 percent in 1964 to 5.4 percent in 1999. When including casual labour, which is not infrequent in tourism, that ratio actually grew to 5.7 percent.

Figure 6: Employment in trade and construction

ISC 68 and ÖNACE 1995



Source: WIFO.

Trade has been similarly successful in its ability to create jobs over the past 35 years. In 1964-1995, the number of employed grew from 347,500 to 485,000, i.e., by 141,500 or 41 percent. Trade's share of the labour force rose from 11.1 percent in 1964 to 14.6 percent in 1994. With the change to ÖNACE in 1995 the repair industry was taken out of manufacturing and added to wholesale and retail trade, so that the figure went up to 535,800 or 16 percent of the total work force. Between 1995 and 1999,

employment in trade and repair services developed in line with the overall average (an increase to 549,100 or 16.1 percent of the labour force under the income concept). With casual employment quite regularly occurring in trade and the repair industry, the labour force concept reports a share of 16.3 percent for 1999, which is slightly higher than under the income concept.

The building industry could not improve upon its relative importance for overall employment. In 1964, 271,100 or 8.6 percent of the work force were employed in construction; by 1999, the figure had risen to just 281,400 (+10,300, +3.8 percent). Its share of overall employment fell slightly to 8.3 percent. Considering that this industry offers hardly any casual employment, its share according to the labour force concept, at 8 percent, is even lower.

Average working hours per employee were substantially pruned in the 1960s and 1970s (total employment excluding agriculture and forestry, from an average of 44 hours per week in the early 1960s to about 40 hours in the early 1980s). Ever since, weekly working hours have continued to decline, in the main as a result of increased labour market flexibility and a rising number of part-time workers and not due to a change in the statutory working hours; this fact contributed to a widening of the differences of working hours by industry. The decline of average working hours is due to a combination of factors, in particular a reduction in the statutory working week (full-time standard working hours), an extension of the minimum holiday leave and the introduction of paid care leave. Working hours have also been affected by a change in the demographic distribution of the work force, in particular the rise in the employment of women, who are more likely to hold part-time jobs than men. The declining share of self-employed also contributed to the reduction of average weekly and annual working hours. Most recently, the rising numbers of casual workers have reinforced the trend towards lower average working hours (labour force concept).

With 37.9 weekly working hours per head on average in 1999 (income concept), men worked 40.4 hours and women 34.3 hours on average. When we include the casual workers, women's weekly working hours are especially affected, since this type of employment is taken up primarily by women (according to the labour force concept 37.2 hours; for men 40.2 hours and for women 33.2 hours, 1999). However, these figures are taken from the quarterly microcensus, i.e., a household survey, which tends to somewhat overestimate actual working hours (for the issue of overestimation see the Annex).

In the USA, the average workingweek is longer than in Austria (BLS, 1997A, 1997B, data from the monthly household survey CPS). Whereas men on average worked 42 hours per week in 1993, the corresponding value for Austria was 39.8 hours according to the income concept or 39.4 hours by the labour force concept. In the USA women put in 36 hours a week on average, compared to 34.7 hours under the income concept or 33.6 hours under the labour force concept in Austria. In contrast to Austria, working hours for Americans on average became longer between 1976 and 1993 (+1 hour for men and +2 hours for women).

Agriculture and forestry have always topped the list of average working hours per week in Austria, followed by the hotel and catering industry – a consequence of the large proportion of self-employed. The long working hours reported by the self-employed and their family helpers are partly explained by the fact that, in contrast to wage and salary earners, it is extremely difficult to distinguish between hours spent on work, leisure, own production, hobby, etc. In the statistical figures, the joint production of work and spare time or child care is usually registered as work only. Farmers in particular produce goods and services not only for the market but also for their own consumption, but fail to distinguish between production for the market and for their own needs. As a result, the hours put in for marketable real net output are overestimated and subsequently labour productivity in farming is noticeably underestimated.

In the early 1960s, the average workingweek in farming and forestry was 66 hours (17.5 hours more than the overall average), and 57 hours in the catering industry (an additional 9 hours). Since then, their average working hours per week have declined disproportionately. By 1999, the workingweek in farming and forestry exceeded the general average by only 13.4 hours, and by 3 hours in the catering industry (income concept). The decline is due to changes in the employment structure, and in particular in the lower number of small operations and a greater proportion of hotel businesses. As a result, dependent employment has gained in importance at the cost of self-employed and family helpers.

**Rapid decline of
working hours by
international standards**

Table 1: Weekly working hours by industries, broken down by income concept and labour force concept

Average weekly working hours per worker, according to the microcensus

	1964	ISC 68, income concept		1994
		1974	1984	
Hours, average of four quarterly surveys				
Agriculture and forestry	65.9	66.1	57.8	53.5
Mining	42.1	43.7	38.1	38.8
Food industry	46.6	43.4	40.9	38.5
Textiles and clothing	42.8	39.6	37.2	35.6
Timber	44.3	42.1	39.0	37.6
Paper	42.6	39.4	36.7	37.0
Chemical industry excluding oil	41.9	39.5	38.2	36.2
Oil	41.9	39.5	38.2	36.1
Stone and glass ware	44.3	40.4	38.5	36.8
Basic metal industry	42.9	40.3	37.9	36.1
Metal processing	42.9	40.3	37.9	36.2
Energy and water utilities	43.2	39.8	36.7	37.0
Construction	43.5	41.4	38.2	37.8
Trade	46.5	43.1	39.6	37.2
Catering	57.4	54.6	46.5	41.5
Transport and telecommunications	44.2	41.7	39.1	38.9
Financial services	42.8	38.9	36.5	36.3
Other services	42.4	40.1	38.0	35.3
Public sector	41.6	38.5	36.6	37.2
Total	48.4	44.1	40.1	38.3
	ÖNACE, income concept		ÖNACE, labour force concept	
	1995	1999	1995	1999
Hours, average of four quarterly surveys				
Agriculture, hunting and forestry	51.7	51.3	47.8	49.0
Mining and quarrying	37.0	36.7	36.7	36.3
Manufacturing	36.9	37.6	36.6	37.2
Electricity, gas and water supply	36.8	36.7	36.6	36.7
Construction	37.2	37.8	36.8	37.6
Trade, repair services	36.8	36.5	36.1	35.6
Hotels and restaurants	41.0	40.9	39.9	39.7
Transport, storage and telecommunication	38.4	39.0	37.9	38.4
Financial services	36.2	36.5	35.9	35.9
Real estate, renting and business services	37.0	37.3	35.7	35.9
Public administration	36.8	37.1	36.4	36.9
Education	31.7	32.4	31.1	32.0
Health	35.5	35.6	34.7	34.8
Other community, social and personal services	36.6	37.3	35.8	36.1
Private households	27.6	29.1	23.1	24.5
Total	37.8	37.9	37.0	37.2

Source: Statistics Austria.

The shrinking workingweek has been affecting all industries. In manufacturing, working hours were cut from more than 42 hours in the early 1960s to 37.6 hours in 1999 under the income concept, and slightly lower under the labour force concept (37.2 hours per week), since casual employment is rare in manufacturing. The longest hours are put in by workers in the food and timber processing industries. In all other manufacturing industries weekly working hours have levelled off, to 35.5 to 37.1 hours (1994). With the change-over to ÖNACE in 1995 it is no longer possible to break down working hours within the manufacturing sectors based on the data published by Statistics Austria.

For workers in trade, who had to put in particularly long workingweeks in the early 1960s, hours were drastically reduced over the past 35 years mainly through an increase in part-time employment, but also by shorter shop-opening hours – it was only in the late 1980s that the trend was reversed and shop-opening hours expanded; in certain instances, however, only the flexibility of shop-opening hours increased. Currently, the average workingweek is 36.5 hours under the income concept and 35.6 hours under the labour force concept, which (contrary to prevailing public opinion) is just a little below the overall average.

In the early 1960s, financial services employees worked fewer hours than people in trade, whereas today their working hours are about equal to those in trade (including

the repair industry). Hours in the construction industry are about equal to the overall average.

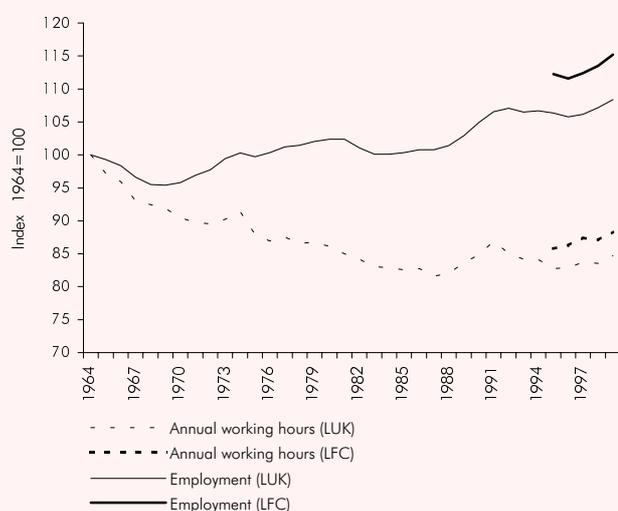
The public services in the widest sense of the term include sectors that have traditionally enjoyed the lowest working hours (income concept in 1964: 41.6 hours versus 48.4 hours for the overall economy; 1994: about 37 hours versus 38.3 hours). Since the public sector employs an above-average number of casual workers, the per-capita working hours per week under the labour force concept are markedly below the overall average. In 1999, employees in public administration, including social security institutions and the social partners (chambers), worked 37.1 hours under the income concept and 36.9 hours under the labour force concept; the figures for education are 32.4 and 32 hours, respectively, and for health services 35.6 and 34.8 hours, respectively.

By introducing the labour force concept, the European Union reacted to the trend towards more flexible working hours and a greater variety of types of employment in the early 1980s. In Austria the trend towards more flexibility took longer to establish itself, and accordingly the income concept ceased to offer detailed insights into the actual volume of labour only in the early 1990s⁶.

The net effect of the diverging trends in employment and average working hours per employed person was a decline in the annual working hours from 7,914 million in 1964 to 6,704 million in 1999 (income concept), i.e., by 1,210 million hours or 15 percent. Under the labour force concept, the overall volume of labour, i.e., the annual working hours, in 1999 was about 7,000, i.e., 12 percent below the level of the early 1960s. Accordingly, the work load was reduced over the long term but was distributed among a larger number of workers. The volume of labour did not decrease steadily, but plummeted rapidly in the 1960s and first half of the 1970s, followed by a more moderate pace until the late 1980s when a turning point was reached; the level of annual working hours increased until the early 1990s, when the onset of an economic recession brought an end to the growth phase. Since the mid 1990s annual working hours tended to expand again.

Decline in the annual working hours came to a halt in the late 1980s

Figure 7: Employment and annual working hours



Source: WIFO.

Average annual working hours per worker were cut from 2,518 in 1964 to 1,968 in 1999, according to the income concept. If casual workers are included, the value for 1999 was 1,931 hours. Under the income concept, Austrian workers put in slightly more hours in 1993 and 1997 than their counterparts in the USA; this is not the case, however, if we apply the labour force concept for Austria (1993 1,905 hours for men and 1,526 for women in the USA 1,981 hours for Austrians; 1997: 1,966 hours in the USA, 1,985 hours in Austria according to the income concept or 1,959 hours according to

⁶ The industrial structure of the annual working hours is distorted by differences in the employment of casual workers.

the labour force concept; BLS, 1997A, van Ark – McGuckin, 1999). According to other data (IMD, 2000), annual working hours in the USA in the late 1990s were significantly higher than in Austria (1998: 1,916 hours versus 1,728 in Austria). These differences are reflected in hourly productivity rates.

The industrial structure of man-hours is affected by differences in per-capita working hours and labour productivity of the various industries. In 1964, the public sector reported an annual level of working hours of 787 million, by 1999 it had more than doubled to 1,706 million. The public sector's share of the total volume of labour was 25 percent (under the income concept) in 1999, up from just 10 percent in 1964.

Table 2: The distribution of annual working hours by industry

	1964	1968 industry classification, income concept		1994
		1974	1984	
Percentage shares				
Agriculture and forestry	26.3	17.3	12.3	7.3
Mining	0.7	0.6	0.4	0.2
Food industry	4.0	3.8	3.6	2.8
Textiles and clothing	5.6	4.6	3.4	1.8
Timber	2.9	2.8	2.9	2.9
Paper	1.7	1.9	1.7	1.6
Chemical industry excluding oil	1.4	2.1	2.0	1.7
Oil	0.3	0.3	0.3	0.2
Stone and glass ware	1.6	1.5	1.3	1.2
Basic metal industry	1.5	1.9	1.8	1.0
Metal processing	8.2	10.3	9.7	8.9
Energy and water utilities	0.8	0.9	1.0	0.9
Construction	7.7	8.3	7.0	7.8
Trade	10.6	11.9	13.2	14.2
Catering	4.3	4.9	5.6	5.8
Transport and telecommunications	5.9	6.2	6.7	7.3
Financial services	3.3	4.8	6.2	8.1
Other services	3.1	2.7	3.2	3.6
Public sector	9.9	13.3	17.9	22.5
Total	100.0	100.0	100.0	100.0
ÖNACE, income concept				
	1995	1999	ÖNACE, labour force concept	1999
Percentage shares				
Agriculture, hunting and forestry	6.8	5.8	7.3	6.0
Mining and quarrying	0.4	0.4	0.4	0.4
Manufacturing	19.8	18.9	19.4	18.4
Electricity, gas and water supply	1.0	0.9	0.9	0.8
Construction	8.4	8.3	8.2	8.1
Trade, repair services	15.7	15.5	15.6	15.7
Hotels and restaurants	6.0	5.9	6.1	6.1
Transport, storage and telecommunication	7.3	7.2	7.2	7.1
Financial services	3.3	3.2	3.2	3.1
Real estate, renting and business services	6.3	8.4	6.6	8.7
Public administration	13.6	13.8	13.3	13.4
Education	3.0	3.1	2.9	3.2
Health	4.2	4.5	4.3	4.7
Other community, social and personal services	4.2	4.0	4.3	4.2
Private households	0.1	0.1	0.1	0.2
Total	100.0	100.0	100.0	100.0

Source: Statistics Austria, WIFO calculations.

In manufacturing, the decline in the number of man-hours, from 2,160 million in 1964 to 1,266 million in 1999 (a minus of 44 percent), was much more marked than the decline in employment. Manufacturing's share of the total volume of labour fell from 27 percent in 1964 to 19 percent in 1999 under the income concept and to 18.4 percent under the labour force concept.

The tourism industry, which made up 4.3 percent of the total volume of labour in 1964 had raised its share to 5.9 percent according to the income concept and to 6 percent according to the labour force concept by 1999. The banking sector's share declined somewhat (1964 about 3.3 percent of the volume of labour, 1999 3.2 percent under the income concept and 3.1 percent under the labour force concept).

In spite of a reduction of the number of man-hours between 1964 and 1999, real net output could be more than doubled over the period – the consequence of technological progress, a more highly skilled work force and more efficient work organisation, i.e., factors which have a positive impact on labour productivity.

Interest in the development of labour productivity and in the relative position of Austria in an international context has grown in the wake of Austria's increasingly global activities, and in particular with Austria's accession to the European Union and the concomitant rise in labour and capital mobility. Differences between average labour productivity (an indicator of a country's competitiveness) and per-capita income (GDP per capita is an indicator of the standard of living)⁷ are, apart from the fundamental factors of technology, human, financial and real capital stock, the result of differences between annual working hours per worker and the share of actively employed in the working-age population. In analysing labour productivity it is therefore useful to start out with the development of these components. They are affected not just by market factors but also by political decision-making processes.

Hourly labour productivity is just one of several criteria by which one may assess a country's international competitive position and standard of living; other labour market indicators are the degree to which the population is integrated in the labour force (labour force participation rate by age and gender) and the unemployment rate. International comparisons of hourly productivity just as well as comparisons over time within a country, have to take the development of a complex set of macroeconomic indicators into account, if insight into the driving forces behind productivity changes is to be gained.

The difference between per-capita output in different years⁸ is a result of the change in hourly productivity between two dates and the change in the level of working hours per person:

$$(1) \left(\frac{GDP}{Pop} \right)^{t_1-t_0} = \left(\frac{GDP}{WH} \right)^{t_1-t_0} + \left(\frac{WH}{Pop} \right)^{t_1-t_0},$$

GDP . . . gross domestic product, *Pop* . . . population, *WH* . . . annual working hours; logarithmic differences each.

Two thirds of the productivity increase of 6.5 percent achieved between 1995 and 1999 were accordingly obtained from increasing hourly productivity (+3.8 percent during the period of observation), and one third resulted from a rise in average hours worked per inhabitant.

The difference between working hours per inhabitant in the two points in time is the result of a change in the following components: hours worked per gainfully employed person, ratio of gainfully employed persons to the total labour force; ratio of the total labour force to working-age population (15 to 64 years old) and the share of the working-age population in the overall population:

$$(2) \left(\frac{WH}{Pop} \right)^{t_1-t_0} = \left(\frac{WH}{E} \right)^{t_1-t_0} + \left(\frac{E}{LF} \right)^{t_1-t_0} + \left(\frac{LF}{Pop_{15-64}} \right)^{t_1-t_0} + \left(\frac{Pop_{15-64}}{Pop} \right)^{t_1-t_0},$$

E . . . gainfully employed persons, *LF* . . . labour force (gainfully employed plus unemployed).

According to this breakdown into components, the 20-hour increase in working hours per inhabitant between 1995 and 1999 was essentially due to a rise in the number of working hours per gainfully employed person and a boost of the labour force participation rate. The ratio of working-age population to total population remained stable, as did the ratio of gainfully employed to the labour force.

This simple breakdown into components clearly marks out the key sources for the change in labour supply and employment. This paper takes only a cursory look at the composition of the labour supply and employment, since it focuses on the industrial

Labour productivity

⁷ Per-capita GDP is not a welfare indicator per se, but it is a good proxy since it highly correlates with a country's affluence. The distribution of wealth and income flows is not addressed, however, as Amartya Sen points out in his Radcliffe Lectures (1972).

⁸ The same applies to productivity comparisons between countries (see Maddison, 1995, Summers – Heston, 1991).

pattern of productivity. An in-depth analysis of labour productivity in Austria would need to study these components and their role in greater detail.

In view of statistical breaks over the observation period of 1965-1999, the level of labour productivity for the overall economy (GDP per capita, per gainfully employed person and per working hour) is calculated for the period of 1995 to 1998 only. For the overall real net output, calculations are available from Statistics Austria (ESA 1995 at 1995 prices), according to which GDP in 1998 was ATS 2,410 billion. At 8.1 million inhabitants this made for ATS 298,000 on average per capita. In terms of working-age persons (1998 5.5 million), the real net output was ATS 442,000 per person; in terms of economically active persons as defined by the labour force concept it was ATS 675,300 per person, and in terms of economically active persons as defined by the income concept it was ATS 715,400. Hourly productivity (GDP per working hour) was ATS 350 (labour force concept) or ATS 364 (income concept).

An attempt to judge the relative position of Austria in an international context is rendered difficult by exchange rate fluctuations which impact on the valuation of GDP in common currency and thus impair comparisons between productivity levels. In 1998, overall labour productivity in Austria in terms of per-capita GDP was 17 percent below the U.S. rate, 13 percent below Japan, but 16 percent above the EU average.

In terms of employed persons, labour productivity in Austria was just 5 percent (income concept) or 10 percent (labour force concept) behind the USA and exceeded the EU average by 7 percent (labour force concept), since labour force participation is much higher in the USA (49 percent of the total population) than in the EU (41 percent) and Austria (45 percent). The gap is further narrowed when we look at GDP in terms of hours worked, although it is difficult to determine it with greater certainty given that data on actual annual working hours per worker are rather vague. For our international comparison, we used data obtained by the International Institute for Management Development (IMD)⁹. According to their figures, hourly productivity in Austria lagged behind the USA by 6 percent, was lower by 2 percent than in Japan and 14.8 percent above the EU average¹⁰. According to WIFO calculations, Japan, the EU and Austria have lost ground to the USA in terms of productivity over the past five years.

Austrian labour productivity in excess of EU average

Table 3: An international comparison of overall labour productivity, 1998

		USA	Japan	EU 15	Austria
GDP	ATS billion	97,246	43,224	96,307	2,410
Population	million	270.3	126.5	375.0	8.1
Gainfully employed	million	131.5	65.1	152.9	3.6
Working hours per gainfully employed and year		1,916	1,871	2,069	1,931
GDP	ATS 1,000 per capita	359.8	341.7	256.8	297.5
	ATS 1,000 per gainfully employed	739.5	664.0	629.9	675.0
	ATS per working hour	386	355	304	350

Source: OECD; working hours: IMD; WIFO (Austria: ESA 95 at 1995 prices).

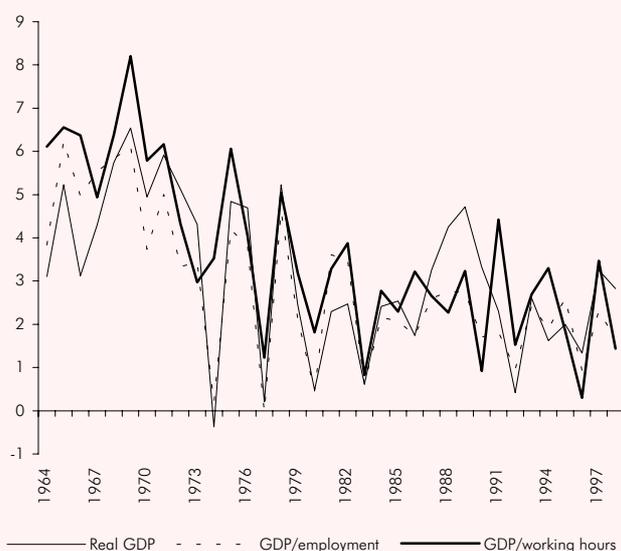
For a more long-term comparison, the only data available are rates of change of GDP and labour productivity per worker and working hour as provided in the income concept. In Austria, hourly productivity and productivity per worker reached top levels in the 1960s and early 1970s, followed by a slow decline until the early 1990s. From 1993, overall labour productivity started to recover, and hourly productivity went up again in 1994. Labour productivity shows a high positive correlation with economic growth: when the economy grows briskly, labour productivity rises as well, whereas a recession slows down dynamics.

⁹ According to the IMD study for 1998, average annual working hours per worker, at 1,728 hours, were about 10 percent below those in the USA and 16 percent lower than in the EU.

¹⁰ If we use the labour force participation rate as determined by the microcensus for Austria, labour productivity (GDP per employed person) is about 5 percent lower than the EU average. Hourly productivity is, however, about the same in either calculation, since the annual volume of labour is virtually the same: the effect of the higher number of gainfully employed in the EU Labour Force Survey (about 4 million) is compensated by the lower average working hours per employed person, lifting hourly labour productivity in Austria above the EU average.

Figure 8: Economic growth and labour productivity

Income concept, percentage change over previous year



Source: Statistics Austria, WIFO.

The productivity level per worker and per working hour was calculated for 1995-1998, broken down by industry. Hourly productivity is somewhat underestimated for the overall economy as well as for industries, since periods of absence due to holiday or sickness leave are not adequately taken into account in the annual working hours as given in the microcensus. Yet in spite of the gaps in the database, the calculations should provide an adequate presentation of the relative labour productivity of industries.

The highest level of productivity per worker is to be found in utilities, i.e., energy and water supply, at triple the overall average. An extremely capital-intensive sector, it also boasts above-average skills for its human resources. Second place is taken by the banking and insurance industry, an industry where once again qualification, know-how and technology encourage labour productivity. They are followed by the real estate, renting and business services industry, with education and research a close runner-up.

Labour productivity is lowest in agriculture and forestry, at just half the overall average. As already noted above, their real net output is underestimated by factors such as production for own consumption, or an inadequate distinction between time inputs for production, leisure, hobby and household. The same holds true for the hotel and catering business, which takes the last but one position in a hierarchy of labour productivity broken down by industry.

The ranking of industries by hourly productivity in terms of real net output per working hour is essentially the same as that for productivity per worker, and even ratios are similar. Accordingly, hourly labour productivity is highest in the electricity, gas and water supply industry (ATS 1,179), followed by the financial services industry (ATS 874) and the real estate sector (ATS 595). At fourth place we already find education and research, at ATS 583. That industry's relatively high hourly labour productivity is the result of low working hours per worker and, at the same time, high qualifications and thus above-average salaries – the main value-adding element in this industry. On the other hand, hourly labour productivity is very low in public administration in the widest sense of the term, due to its low real net output (which is basically determined by the total payroll). Here, an important factor appears to be the relatively high proportion of low to medium skills of the work force, as well as the age structure combined with a strictly applied seniority principle.

The level of labour productivity depends primarily on the input of real and financial capital, and human resources.

Table 4: Productivity per worker, by industry

Value added per worker, 1995-1998, labour force concept

	1995	1996	1997	1998
		ATS, at 1995 prices		
Agriculture, hunting and forestry	282,621	325,048	335,592	354,582
Mining and quarrying	541,627	553,480	551,431	560,298
Manufacturing	641,656	672,860	707,484	732,397
Electricity, gas and water supply	1,916,308	2,018,091	2,159,631	2,224,678
Construction	612,334	639,460	626,308	662,332
Trade, repair services	510,323	521,207	524,575	532,970
Hotels and restaurants	438,839	435,071	427,872	438,266
Transport, storage and telecommunication	670,594	718,290	762,031	789,035
Financial services	1,363,916	1,380,301	1,537,341	1,627,352
Real estate, renting and business services	1,253,659	1,216,238	1,165,884	1,101,705
Public administration	322,366	329,595	328,843	325,763
Education	990,883	969,267	963,232	972,405
Health	830,970	811,540	620,857	622,697
Other community, social and personal services	500,197	484,197	486,299	505,162
Total	638,702	655,010	660,949	675,344

Source: WIFO.

Table 5: Hourly labour productivity by industry

Value added by working hours, ÖNACE, labour force concept

	1995	1996	1997	1998
		ATS, at 1995 prices		
Agriculture, hunting and forestry	113.7	127.3	129.1	138.3
Mining and quarrying	283.8	284.6	279.8	282.1
Manufacturing	337.1	349.7	362.8	380.7
Electricity, gas and water supply	1,006.9	1,048.9	1,128.6	1,178.6
Construction	320.0	329.7	324.7	340.6
Trade, repair services	271.9	273.1	275.6	287.9
Hotels and restaurants	211.5	210.7	206.2	210.7
Transport, storage and telecommunication	340.3	359.7	378.7	396.2
Financial services	730.6	725.3	801.2	874.2
Real estate, renting and business services	682.5	651.5	620.4	594.6
Public administration	170.3	173.7	171.8	170.2
Education	612.7	561.4	556.3	582.6
Health	460.5	438.4	336.3	344.1
Other community, social and personal services	268.7	262.3	257.6	268.4
Total	332.0	336.5	337.5	349.6

Source: WIFO.

In contrast, labour productivity is particularly high in the energy sector, not least because, unlike the public sector, it has a high capital intensity and thus labour productivity is positively affected by high capital productivity.

Because of the different factors that determine labour productivity in the various industries, it does not make sense to compare productivity levels across industries, one may gain some insight into the relative competitiveness of certain industries by an international comparison, however. It would make sense to design an index of labour productivity by industry and monitor it over time. This is way beyond the scope of this paper, however. Our calculations are to give an indication of Austria's relative competitiveness and the population's standard of living in international comparison – which in turn is an important information for economic and labour market policy decision-making. Nevertheless, the calculations outlined here cannot provide more than a starting point for more in-depth analysis.

**Annex: Notes on
statistical and
methodological
approach**

Employment

The time series for employment is composed of modules, which are based upon the quality of information, giving priority to administrative data over household survey data; the number of wage and salary earners and civil servants is taken from the Federation of Austrian Social Security Institutions, whereas the number of self-employed is a WIFO estimate, with the benchmark taken from the population census (every ten years). These benchmarks were linked for the period between on the basis of the microcensus household survey, social security data of farmers and non-agricultural self-employed persons as well as membership data from interest representations (Chamber of Agriculture and Economic Chamber).

The figures for the 1964-1994 period are calculated on the basis of the traditional Austrian "Lebensunterhaltskonzept" (income concept) according to which employment is counted only in the case of full individual social insurance coverage (granted by a member of the Federation of Austrian Social Security Institutions). A person co-insured with an individually insured gainfully employed person, such as a student, housewife or pensioner, may also put in some gainful work, in the main casual work. In the case of self-employed and their family helpers, casual employment, which is defined by the administration as a marginal earnings threshold of some AS 3,800, and by the household survey as working hours of 1 to 11, is not included in the income concept.

In order to present the data in line with the labour force concept customarily applied in the EU, WIFO in 1995 started to develop a time series for gainful employment including casual work. According to the labour force concept, every person who works for more than one hour per week is considered to be gainfully employed. Accordingly, the labour force concept, by including casual work, has a much wider perception of what constitutes gainful employment than the income concept. The income concept is based upon the old conception of employment, which should provide enough income to cover one's income. To establish the number of casual workers, WIFO has used the Federation's figures for the persons covered by accident insurance only in the case of wage and salary earners and microcensus figures of persons working between 1 and 11 hours for the self-employed.

The time series for employment based on the income and labour force concept thus obtained by WIFO deviates somewhat from the microcensus time series. The microcensus has a greater number of employed persons than WIFO, which is mainly due to a higher figure of self-employed and their family helpers. The difference is not so much the result of extending the definition of gainful employment to include activities associated with only a few hours of regular work (1 to 11 hours a week: the labour force concept), but rather the consequence of the survey, the sample weights and projection methods: based on the labour force concept, the microcensus includes in its number of gainfully employed not only casual workers, which are covered by accident insurance only, but also persons, who are fully insured (health and retirement), who may receive a pension of some sort and continue to work on a regular basis. Yet at the same time the Federation has a larger number of casual workers on record than the microcensus. This discrepancy suggests that the microcensus tends to pick up a certain amount of employment, which does not carry full social security coverage. Accordingly, the microcensus is likely to record a certain amount of off-the-books working hours for persons, who are counted amongst casual workers in the Social Security statistics.

The data on working hours were obtained from the microcensus from 1968 onwards. For the previous period, working hours are taken from the survey of manufacturing industry. The microcensus data are subject to a large error margin due to third-party information and the survey method. In many fields, no clear distinction has been made between gainful employment, household work, unrecorded employment (moonlighting), voluntary work, etc. The problem becomes obvious when looking at the differences resulting from the income concept and labour force concept. For this particular study, the average weekly working hours as provided by the microcensus for the income concept was multiplied by the number of gainfully employed as supplied by WIFO and the Federation (income concept). For the series based on the labour force concept, working hours were obtained from the microcensus figures for the labour force concept.

The weekly working hours obtained by the microcensus take into account average periods of absence due to illness, holiday or unemployment, as well as the average overtime. The extent to which the four survey periods over one year used (quarterly values) are representative of annual working hours is difficult to judge. Sundays and public holidays appear to be well accommodated in the annual average, whereas absence due to holidays does not seem to be fully reflected in the microcensus, considering that most

Working hours

working families with children take their holiday leave in July and August, i.e., in months where no household survey is carried out.

Average annual working hours per worker are calculated by multiplying the average weekly working hours per worker by 52, broken down by industries – a method which tends to overestimate annual working hours, on the one hand because the quarterly average of the microcensus underestimates the amount of annual unemployment (unemployment in Austria is highest in January and February), and on the other hand because of the bunching of holidays in July and August. In addition, underrecording of the periods of sick leave appears to result in an overestimate of actual annual working hours per worker.

The volume of labour is calculated from the average per-capita weekly working hours, multiplied by the number of gainfully employed persons and 52 weeks. This method takes into account the share of the economically active population in total population as well as the change in per-capita working hours. The average working hours per year and worker are then obtained by dividing the figure by the number of all persons that have worked in the course of the year. For calculating the volume of labour in 1995-1999, the working hours were taken from the microcensus by industry and economic status using the labour force concept.

Comparative data for labour productivity are available only for 1995-1998, since measuring methods, categories, etc. had been changed before and different price indices were used to deflate the real net output in the periods ahead. Comparisons by levels are heavily dependent on the estimation and survey techniques used, so that it is not possible to link the current levels of productivity by industry to the ones prior to 1995. A comparison of overall labour productivity in Austria and abroad highlights the problem: Considering that the Austrian microcensus is a quarterly rather than monthly survey, it overestimates the volume of labour per person and year (as outlined above). Per-capita GDP, i.e., the indicator that links real net output to the total population, furnishes a better indication of Austria's relative labour productivity vis-à-vis the USA, Japan and the EU. If, however, we do not use the WIFO time series of labour volume and the population data from census data extrapolation but microcensus data instead (population data in the Microcensus excludes persons in institutions, it is therefore lower than the one used in the WIFO calculation base and employment is higher), we obtain a noticeably lower labour productivity in Austria than that arrived at by this study.

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Annual man-hours (volume of labour)

Labour productivity

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Annual Working Hours and Labour Productivity by Industry – Summary

As labour market flexibility gains momentum, a closer look at the composition of labour demand, i.e., the number of persons working and their average annual working hours, is warranted in order to gain an insight into the development of the volume of labour and labour productivity in the light of economic growth.

In Austria, employment growth during the period under analysis has been rather weak by international standards. While total employment doubled between 1960 and 1999 in the USA, expanded by close to 50 percent in Japan and by 20 percent in the EU 15, it increased by only 9 percent in Austria. This does not, however, imply that the Austrian labour market was insufficiently dynamic. It is much rather the result of comparatively modest growth of labour supply and pronounced catching-up of labour productivity. Austria was late in reallocating labour from agriculture and forestry to the secondary and tertiary sector: in the early 1960s, almost 20 percent of the labour force were working in agriculture and forestry, whereas in 1999 only 4.3 percent of total labour sufficed to produce a considerably higher agricultural output. The public sector was the industry with the most dynamic employment growth: while only 12 percent of the overall work force worked in the public sector in the early 1960s, their number had swollen to more than a quarter 35 years later. The greatest growth occurred in health and education, paralleled only by business services in the private sector. The secondary sector experienced a significant decline in its employment share, from 30 percent in 1964 to 18 percent in 1999.

In Austria, according to WIFO calculations, the total volume of labour, i.e., the average annual working hours per worker multiplied by the number of workers, declined by 12 percent between 1964 and 1999. It diminished rapidly in the 1960s and early 1970s and moderately thereafter until the late 1980s. Ever since then the volume of labour has been subject to pronounced cyclical fluctuations, but has nevertheless shown basically a rising trend. In spite of the smaller volume of labour in 1999 relative to 1964, the value of output has more than doubled over that time span as a result of massive productivity increases.

Annual working hours have come down considerably over the past 35 years. Employees were working for 2,518 hours a year in the early 1960s, compared to 1,931 hours in 1999. International data on annual working hours are difficult to come by. According to figures by the Bureau of Labor Statistics, the number of annual working hours per worker in the USA in the 1990s was somewhat higher than in Austria (1997: USA 1,966, Austria 1,959). But an international survey carried out by the International Institute for Management Development found significantly lower numbers for the annual working hours per worker, still putting USA ahead of Austria, however: 1,916 hours for the USA, as compared to 1,871 hours for Japan, 2,069 hours for the EU 15, and 1,728 for Austria in 1998. The figures for working hours per worker and year are of crucial importance for ranking countries by the level of their hourly labour productivity.

Interest in the development of labour productivity has grown internationally in the wake of globalisation, and in Austria also as a result of EU membership and the concomitant rise in capital and labour mobility. Labour productivity may be taken as an indicator of the competitiveness of an economy, per-capita GDP as an indicator of the living standards of a country. Differences between these indicators arise, apart from GDP, from differences in annual working hours per worker, the proportion of employed persons in the labour force, the activity rate and the proportion of working age population to total population.

In 1998, per-capita GDP in Austria was 17 percent below the U.S. rate, 13 percent below Japan but 16 percent higher than in the EU. GDP per employed person, however, was only 5 to 10 percent lower in Austria than in the USA and 7 percent higher than in the EU. This results from the fact that the USA have a higher employment rate than the EU and Austria (USA 49 percent, EU 41 percent, Austria 45 percent). The difference is even smaller when we calculate the hourly labour productivity. Even though the actual working hours per worker are known only with a high degree of uncertainty, evidence suggests that Austria lags behind the USA by 6 to 10 percent, is fairly even with Japan and exceeds the EU average by some 15 percent.