

**THE FRAGILITY OF INTERNATIONAL COMPARISONS  
OF EMPLOYMENT AND HOURS WORKED  
AN ATTEMPT TO REDUCE DATA HETEROGENEITY<sup>1</sup>**

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## **Abstract**

Macro-economic international comparisons of the labour content of growth and of labour productivity raise many methodological problems, among which the lack of homogeneity in the measure of the number of hours worked is not the least. An assessment of the accuracy of working time series commonly used is proposed here for eight OECD countries (United States, Japan, Germany, France, Italy, United Kingdom, Spain, the Netherlands). Analysing the methods and the available sources allows in a first step to identify a great part of the problems encountered by international comparisons. Estimates of employment, of annual hours worked and of hourly productivity based on common sources and common concepts are proposed in a second step. The comparison of these estimates with the national working time regulations allows, at least up to now, to confirm the results. The estimates proposed here lead in some cases to substantial revisions of the level of working times, but the inter-countries hierarchies commonly used are not substantially affected. Notwithstanding the numerous shortcomings and imperfections of the methodology presented here, its main advantage is to propose homogenous, although fragile, international comparisons of the annual average hours worked per worker.

Theme: Working hours

Keywords: Working hours, international comparisons, working time regulations, productivity.

JEL Classification : *J21, J23, O47, O57*

International comparison of the labour content of growth and more specifically of macro-economic labour productivity is the core of many methodological debates. The lack of homogeneity in data among countries and the numerous statistical breaks affect comparative studies. The multiplicity of sources and their non concordance are also source of confusion.

This paper intends to show that the systematic analysis of the methods used allows to identify a great part of the problems met by international comparisons of output per hour, at least for what concerns the measure of hours worked. It also attempts to reduce the heterogeneity of the estimates of hours worked by producing estimates of employment and of annual working time based on common concepts and a common methodology. Finally, it examines with a critical eye the estimated indicator of annual hours worked through a confrontation with other sources and examination of the national working time regulations. The international comparisons established here can therefore be considered to be intermediate between the « universal » approaches, that consider the existence of a functional equivalence of concepts (Hantrais and Letablier, 1998) and “culturalist” approaches, that put the stress on national contexts.

The comparison is made for eight countries (United States, Japan, Germany, France, United Kingdom, Italy, Spain and the Netherlands) and considers the measure of annual hours worked by employees only. The period under review covers the years 1983-1998.

### **I. A few examples of heterogeneity in the measure of hours worked**

The heterogeneity of the methods used for the estimation of hours worked is well known, but rarely summarised or surpassed. In order to measure productivity, the ideal measure would be to approach (1) the hours actually worked (2) of the persons implied in the domestic production of goods and services (3) during the year (4) on a basis allowing international comparisons. Because national statistical offices cannot make use of a unique source when estimating working hours, and also because international recommendations leave place for national arrangements, three main causes of heterogeneity can be identified.

Firstly it is impossible to compare the measures of the labour input using common concepts for all countries. Some countries produce hours worked estimates, while other produce full-time equivalent jobs or persons estimates, and other countries produce only persons estimates.

The unequal capacity of national statistical sources to cover the field of productive activities can have a non negligible influence on the measure of employment. This problem is acute for marginal activities, for small jobs or for moonlighting. Many efforts have been however accomplished in recent years to improve or to harmonise the measure of employment. With the introduction of the new European System of National Accounts, many countries have proceeded to revisions of employment time series. For example, the main source for measuring employment in Germany, as in France, is the population census. Between two population censuses, employment is estimated using administrative sources and the labour force survey. However, until very lately, those statistical sources were unable to produce reliable estimates of the number of people engaged in small jobs in Germany. Because those jobs were not covered by social insurance, they were not included in administrative statistics. They were otherwise badly captured by the labour force surveys, where the definition of employment is not based on the International Labour Office criteria (a work of at least one hour in the period under review), but on the self assessment of the interviewed person. The extension of the coverage of social insurance and two reshapes of the labour force survey questionnaire have led to raise the number of employees by 3 millions (data for 1999), i.e. by more than 10%. The integration of small jobs in Spain and their improved coverage in the United Kingdom also resulted in substantial revisions in employment levels. In some cases, the remaining differences in employment estimates are negligible. For instance, the United States and the United Kingdom still exclude unpaid family workers. Other differences are more difficult to evaluate. It is especially the case for moonlighting, for which all countries do not make a specific correction or which is estimated according to different procedures. In the Netherlands, moonlighting is considered to be equal to the residual difference between the measure of employment in the labour force survey and the other sources, after adjusting for coverage differences and error correction. In France and in Italy, the estimation of moonlighting results more from an evaluation of the fiscal fraud.

Finally, the harmonisation of the estimates of working hours or of the part time effect is far from being achieved. Among the eight countries, only five publish hours worked in their National accounts, but methods and underlying definitions are far from being identical. United Kingdom is the only country where the measure of the volume of hours worked stems directly from the continuous labour force survey, but the estimates cover only the years after 1992. The United States, Germany, France and the Netherlands use methods combining various statistical sources. However, a measure based essentially on continuous Labour force

surveys has a certain number of advantages. It allows to use directly the weekly hours worked, as the risks to underestimate holidays or vacation days is low in continuous surveys. Continuous labour force surveys are also the only sources able to capture both individual and collective factors influencing hours worked, structural and occasional overtime hours, paid or unpaid. Labour force surveys with a lower frequency do not measure appropriately variations of hours due to the business cycle or personal reasons, whereas establishment surveys largely underestimate the number of unpaid overtime hours.

A few examples illustrate the problems encountered when using National accounts for purposes of international comparisons. In the United States the estimates of hours actually worked are mainly based on the average weekly hours paid of production and non supervisory workers in non agricultural establishments, collected by the monthly establishment survey (Current Employment Survey). Paid hours are converted into an hours at work basis with another annual establishment survey. Hence, twenty percent of the total number of employees are not covered. In the service industries, these are mainly professionals or managers, and this can lead to an underestimation of hours worked. In Germany, in France and in the Netherlands, the national statistical offices use a component method (see box 1)<sup>4</sup>. Someone comparing working time of full time employees in those three countries will therefore use weekly hours offered for France, conventional hours plus the overtime hours of the sole workers in the manufacturing industry for Germany and contractual hours plus the overtime paid hours of the first week of October for the Netherlands, three measures that are far from being homogeneous, both because of the qualities of statistical sources and of the different treatments of overtime hours.

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4. In many cases, the improvements have been achieved thanks to a systematic confrontation of statistical sources. The effort to improve the international integration of labour market statistics has been realised within the Labour Accounting Systems (Statistics Netherlands 1999, Hoffman 1997).

## Box 1

### *The different concepts of working time*

**Normal hours of work** are fixed by laws and regulations, collective agreements or arbitral awards. When they are not fixed by laws, regulations, collective agreements or arbitral awards, normal hours of work should be taken as meaning the number of hours per day or week in excess of which any time worked is remunerated at overtime rates or forms an exception to the rules or custom of the establishment relating to the classes of workers concerned.

**Contractual or legal hours of work** are fixed by laws and regulations, collective agreements or arbitral awards. This working time can apply to a day, a week, a month or a year.

**Hours actually worked** include hours really worked during normal periods of work and time worked in addition to hours worked during normal periods of work (overtime hours). They exclude hours paid for but not worked, such as paid annual leave, paid public holidays, paid sick leave, meal breaks, time spent on travel from home to work and vice versa.

**The usual hours worked**, contrary to the hours actually worked, do not apply to a specific reference period but to a normal reference period. The number of hours usually worked per week or per day corresponds to the number of hours the person normally works. In the labour force surveys, it concerns all persons in employment, even if they were absent from work during the reference period. This definition is often used in studies about working time. Contrarily to the previous definitions, it is not defined by international standards. Usual hours worked include the number of overtime hours usually worked, paid or unpaid.

**The hours offered** takes the enterprise, rather than the worker, as benchmark. They apply to full-time employees, as the working time of part-time employees is individual and fixed by the employment contracts. The theoretical hours of work offered correspond to the normal hours of work. The actually offered hours of work correspond to the hours offered during a working week not affected by accidental causes. They include collective overtime hours, exclude collective hours lost because of slack work. Hours lost or overtime hours worked because of individual reasons are not considered. This concept is defined by Eurostat.

### *The different statistical sources*

**Household-based labour force surveys** have the advantage of covering all type of employment. They are obtained from a sample of households and provide at a relatively low cost information on a regular basis, but are also subject to random errors. They are

the only source to provide information about unpaid overtime hours. They also allow to measure working hours on the basis of similar concepts in different countries. In many countries, the results are subject to regular regrossing, so that they can be used when estimating employment. But on the other hand, the field covered by those surveys is not consistent with the field of the domestic economy, and the hours collected can be affected by subjective bias.

**Establishment surveys** are supposed to collect objective and reliable information about employment and hours of work. They gather information on jobs rather than persons employed. But they cover only a subset of the establishments and the coverage is generally less complete than in the labour force surveys. It often corresponds to the private non agricultural establishments above a certain size limit and self-employed are excluded.

**Administrative sources** have the main advantage to provide information *within short delays*. They are useful for extrapolating short term trends. The information collected is precise and not subject to sample errors. But on the other hand, these sources are not exhaustive and can rarely be used in international comparisons because of their heterogeneity.

**The household-based time use surveys** collect information about the frequency and duration of human activities. They provide information about the amount of time spent to market and non market activities. They are often considered to provide alternative and more reliable information about working hours, as respondents report all activities in time-diaries and have no idea about which activities the interviewer might be pleased about or interested in.

### ***The two methods used to estimate annual hours worked***

Mainly two methods can be distinguished (Grenwood, 2000)

**The direct or averaging methodology** estimates hours worked through averaging of the weekly hours collected by the surveys. It requires a high frequency in data collection, ideally with continuous surveys.

**The component or accounting method** uses normal weekly working time, like contractual hours or usual hours, and estimates the components of the deviation to these normal weekly hours (holidays, vacations, overtime, slack work, ...). This method is more appropriate when the surveys are not frequent. Its implementation requires the use of different sources.

In most cases, and this is also true for countries where only full-time equivalent employment series are published, the part time ratio used when correcting for part-time employment comes from administrative or establishment sources. On the other hand, the relative hours worked by part time workers come from labour force surveys, except in the Netherlands, where they also come from the establishment survey. Combining different statistical sources can sometimes lead to strange results. In Germany for example, the primary source for the part time ratio was, before the revision of National Accounts, the labour force survey, whereas the primary source for the relative hours worked by part-time employees was an administrative one. It is now the other way round. But although the employment coverage was in principle the same, the relative hours worked by part-time employees in the old accounting basis was around one third higher than in the labour force survey, so that, even before taking the impact of “small jobs” into account, the methodological changes introduced with the new edition of National Accounts induced a fifty hours decrease (i.e. 3 percent) in the estimated hours worked.

Annual hours of work published by the OECD suffer the same kind of heterogeneity. The efforts made by this organisation to publish working hours time series covering a large period and a large number of countries explain why this source is often referred to in international comparisons. But exhaustiveness can be costly in terms of homogeneity. For most countries, apart from some adjustments (United-States and Netherlands), the OECD uses, when they are available, the series published by the National accounts. For the remaining countries, there is no systematic use of labour force surveys. As a consequence, the user of those series is confronted with the coexistence of: hours per person (United States, France, Germany, Italy, Spain, United Kingdom) or hours per job (Japan, Netherlands) ; estimates based essentially on establishment surveys or on collective agreements (United States, Japan, France, Germany, Netherlands) and estimates based on the labour force surveys (Italy, Spain, United Kingdom) ; component methods (France, Germany, Netherlands, Italy) and more direct methods (United States, Japan, Spain, United Kingdom) ; hours actually worked (United States, Japan, France, Germany, Spain, Italy, United Kingdom) and contractual hours (Netherlands). The OECD warns against the use of these time series for comparisons of levels, as the data are intended for comparisons of trends over time.

Taking into account the heterogeneity of the macro-economic existing time series, we propose in the next part to establish a more homogenous comparison basis.

## **II. An attempt to reduce the international heterogeneity in the measure of hours worked**

The main results are presented in Tables 1 and 2 and the description of the methodology is presented in Box 2. Table 1 and 2 give a comparison in level and over time based on common concepts for the eight countries, both for employment and for hours of work. Estimates of the evolution of the hourly productivity over the last fifteen years are also presented. As productivity is measured only for employees, it must be carefully interpreted. The main goal is to shed light on the impact of alternative methodological choices on the macro-economic measure of hours worked.

Considering that the main objective is to increase international comparability, the use of labour force surveys has been preferred for measuring hours worked per head. Labour force surveys are the only source allowing to use similar concepts and coverage. They also present the advantage of covering unpaid overtime hours. In a movement of increasing dilution of the boundaries of work, this approach relies on the strong hypothesis that the person itself is still best placed to report a reliable information on the time she/he spends on productive activities. The annual hours worked proposed here are based mainly on the annual European union labour force survey and on the monthly labour force surveys in the United States and in Japan. Estimates are hence made using a component method in the case of the European countries, and a quasi-direct method in the case of the United States and Japan. For European countries, a similar comparison had already been implemented by Eurostat in 1995 (Eurostat 1995). In order to facilitate the comparison with the series published by the OECD or the National accounts, both have been converted in hours per person when they were expressed initially in hours per job<sup>5</sup>.

Homogeneity has also a cost. Labour force surveys are affected by subjective bias, their quality is variable. Coverage is not the same as the National accounts. The use of a component method based on the spring results of the European union labour force survey rests on the hypothesis of reliability of the reference week, as for instance for the collection of overtime (see box 2). The correspondence between legal or negotiated vacations days and actual vacation days is far from being obvious. The ambition of the estimates is therefore not to propose a definitive and uncontested measure of annual hours worked, but rather to shed light on international comparisons.

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5. The correction are of the responsibility of the authors.



## **Box 2**

### **Main methodological choices**

The starting point is the weekly usual hours worked by full-time employees, corrected in a first step by the variation from this “norm” due to part-time employment. Part-time correction is made with the part-time ratio and the relative weekly usually worked hours (eventually smoothed) collected by the labour force survey. In a second step, weekly actually worked hours per person are calculated thanks to estimations of the main components of variations reported for the reference week (total or partial absence due to sickness, maternity, slack work, overtime hours – excluding as far as possible extra work due to variable hours worked). The weekly actually worked hours are then annualised using specific information on holidays and vacation days. Annual working hours have been estimated for the main job, but also for all jobs whenever it was possible, in order to illustrate the effect of multiple activity. Estimates of the weekly hours incorporate for two countries additional information. The small jobs not covered by the labour force survey have been reincorporated in Germany. In the Netherlands, the hours presented here are essentially originated from the Labour Accounts. This choice has been motivated by the fact that in this country, the labour force survey collects since 1992 for almost all employees contractual hours, and also because of numerous breaks of the labour force surveys over the last fifteen years. The work endeavoured within the Labour Accounts to improve statistical integration allows to consider as much more reliable the annual hours of work published in this context. Unpaid overtime hours have been added to the paid annual hours of the labour accounts, on the basis of information available for the United-Kingdom. Hours lost due to sickness and maternity leaves have been subtracted on the basis of the labour force survey. In the cases of the United States and of Japan, weekly hours actually worked by all employees in employment collected each month have been corrected when averaging them on a yearly basis. This correction intends to take into account the underestimation of holidays due to the same position of the reference week each month. A particular attention has been given to allow international comparison for each components of the estimates (main job, all jobs, full-time, part-time, leaves, etc.).

Hours per person have been multiplied by the employees in employment from the National Accounts, converted previously in persons when the National Accounts publish only jobs (Japan, United States, United Kingdom). In order to illustrate the consequences of the use of different concepts and methods on the measure of employment, employment series based on the four concepts (persons, jobs, full-time equivalent persons, full-time equivalent jobs) have been estimated, even when they were already available in the National Accounts. The part-time ratio, the multiple-activity ratio and the relative hours are based in this case on the labour force surveys (except for the Netherlands and the United Kingdom). For the United States, a part-time ratio based on the usual hours worked has been retropolated for the years preceding 1994.

**Table 1 : Employment (employees)**

<i>Level in 1998 (basis 100 for employment in persons)</i>									
		USA	Japan	France	Germany*	Italy	Spain	Netherlands **	UK
1	Persons	100	100	100	100	100	100	100	100
2	Jobs	105.8 (1)	104.4 (1)	102.8 (1)	101	110.4 (2)	100.8 (2)	104.9 (2)	103.9 (1)
3	Full-time equiv. Persons	91.7 (1)	-	93.2 (2)	87.1 (1)	-	95.2 (1)	79 (1)	82 (1)
4	Full-time equiv. Jobs	94.6 (2)	-	93.3 (1)	87.3 (1)	96.8 (2)	95.4 (2)	82 (2)	-
<i>Average annual growth rates 1983-1998 (1987-1998 for Spain)</i>									
5	Persons	2. (1)	1.5 (1)	0.7	0.5 (2)	0.5 (2)	1.9 (2)	1.9 (1)	0.6 (1)
6	Jobs	2.1 (1) 2.1 (2)	1.4 (2)	-	0.5 (1)	0.6 (2)	1.9 (2)	2.1 (2)	0.7 (2)
7	Full-time equiv. Persons	2.1 (1)	-	0.4 (1) 0.5 (2)	0 (1)	0.4 (1)	1.8 (1)	-	-
8	Full-time equiv. Jobs	2.1 (2)	-	-	0 (1)	0.4(1) 0.3 (2)	1.8 (1) 1.9 (2)	1.5 (2)	0.4 (1)

\* West Germany before 1991.

\*\* For the evolutions : estimates on the basis of reropolations for the years prior to 1995.

(1) Author's estimates. (2) National accounts, except for Netherlands (Labour Accounts).

**Table 2 : Annual hours of work per person and productivity per hour (employees)**

		USA	Japan	France	Germany*	Italy	Spain	NLD **	UK
<i>Average annual hours actually worked (1998)</i>									
1	OECD	1856	1954	1501	1430	1566	1765	1406	1703
2	National accounts	1786	-	1501	1430	-	-	1360	1690
3	Hours worked per person (main job)	1860	2040	1580	1493	1656	1782		1652
4	Hours worked per person (all jobs)	1894	2066	1596	1498	1715	1790	1392	1671
5	Difference (4) - (1) en %	2 %	5.7 %	6.3 %	4.8 %	9.5 %	+ 1.4 %	- 1 %	- 2 %
6	Difference (4) - (2) en %	6 %	-	6.3 %	4.8 %	-	-	+ 2.3 %	- 1.1 %
<i>Average annual growth rates of hours actually worked 1983-1998 (1987-1998 for Spain)</i>									
7	OECD	+ 0.2	- 0.9	- 0.3	- 0.8	- 0.3	0	- 0.7	0.2
8	National accounts	0.0	-	- 0.3	- 0.8	-	-	- 0.6	-
9	Author's estimates	+ 0.3 (1) + 0.3 (2)	- 0.9 (1) - 0.9 (2)	- 0.2 (1)	- 0.7	- 0.3 (1) - 0.2 (2)	- 0.1 (1)		0
<i>Average annual growth rates of productivity per hour 1983 et 1998 (1984-1998 for United Kingdom, 1987-1998 for Spain)</i>									
10	OECD	1.2	2.3	1.7	2.6	1.9	0.8	1.6	2.0
11	National accounts	1.3	-	1.7		-		1.5	
12	Author's estimates*	1.0	2.3	1.6	2.5	1.8	0.9	1.5	2.2

N.B. : the series published by the OECD and the National accounts have been converted into hours per person.

\* All jobs.

(1) : Main job. (2) : All jobs.

The main lesson of this exercise is that, after elimination of concepts differences, the choice of an homogenous measure based on the same type of statistical sources and on a common method affects much more the estimated levels than the trends over time, except in the cases of United States and United Kingdom.

Table 1 gives an idea about the impact of concept differences on employment estimates. With 10.4% employees having more than one job, Italy is the country where the gap between the number of jobs and the number of persons employed is the most important, but a relatively high frequency of multiple activities can also be observed in the United States, the Netherlands and in Japan. In all countries, with the exception of Japan, the propensity of employees to cumulate different jobs has increased in the last fifteen years. This has however little impact on the average growth rates of employment, except perhaps in the Netherlands.

The comparison also highlights differences in the development of part-time employment. The United States is the only country where the employment measured in full-time equivalent jobs or persons grew at a “higher” rate than the measure in persons over the last fifteen years. The proportion of part-time employment was already relatively high in the seventies and has slightly declined since the beginning of the eighties. Moreover, American part-time employees tend to work longer hours. The strongest impact of part-time development can be found in the Netherlands and in Germany<sup>6</sup>. In Germany, this is essentially due to the upsurge of small jobs during the last ten years. In the Netherlands, the proportion of small jobs, with low hours of work, was already high at the beginning of the eighties and the average hours of part-time jobs that were created since then is longer than in Germany. The impact of part-time development is more or less the same in France and in the United Kingdom. The part-time ratio is higher in the United Kingdom than in France, part-time employees work fewer hours in the United Kingdom than in France, but development of part-time was much more pronounced in France than in the United Kingdom, especially in the eighties. Finally, there is almost no impact of part-time development in Spain and in Italy, where the increase of part-time employment is much more recent. It is however less true in Italy when employment is measured in jobs rather than in persons employed.

The impact of differences in the methods implemented to estimate full-time equivalent employment (in persons or in jobs) is highlighted by the gaps between the changes over time in the series of the National Accounts and of our estimates. The gap is negligible in the case

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6. Figures for Germany must be cautiously interpreted, as they do not include the small jobs prior to 1991.

of the United States, small in most of the other countries, but reflects the difficulties encountered when correcting for part-time development. Besides, we didn't present any full-time equivalent series for Japan. This decision was motivated mainly by the fact that the perception of part-time is biased in the monthly labour force survey in Japan (see *supra*).

The comparison of the different estimates of annual working hours presented in Table 2 shows that the use of common sources and methods for all countries can lead in some cases to substantial revisions of the levels of hours worked. In countries where the National Accounts or the OECD use mainly establishment surveys (United States, Japan, France, Germany), the use of the labour force surveys leads to upwards revisions of the annual hours of work by more than 4 percent. This is only partly the case for the United States, where the hours estimates of the OECD are close to the hours estimated with the labour force survey, but this small difference could be due to a statistical artefact<sup>7</sup>. For United Kingdom and Spain, the use of the continuous national survey or of the community survey proves to have little impact on the hours estimated<sup>8</sup>.

Without fundamentally modifying hierarchies between countries, the use of the labour force surveys leads in some cases to substantial revisions of the differences between countries. The annual hours of work are very high in Japan, even when compared to the United States. Spain, Italy and the United Kingdom are the European countries where the annual hours of work of employees are the highest. Employees work even longer hours in Italy than in the United Kingdom when multiple activity is integrated. France is in an average position in Europe, but the gap with the “long hours countries” is smaller in our estimates. Germany and Netherlands are in the low range, but the specificity of the Dutch case stronger.

The comparison of the changes of hours worked and of productivity shows only a minor impact of sources and methods on the estimates over time contrary to the levels. This is true for all but two countries. In the United Kingdom, the difference is mainly due different hypothesis for vacations<sup>9</sup>. In the United States, it reflects the increasing gap in the eighties between the hours paid collected in the establishment survey and the hours declared by employees in the labour force survey. Measuring the productivity with the labour force survey

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7. Using the number of employees of the labour force survey to convert the number of hours worked per job of the National Accounts can lead to exaggerate the final level of hours worked per person. Indeed, employment growth has been underestimated in the labour force survey since the beginning of the nineties. This is due to the absence of regrossing of the labour force survey (Juhn and Potter, 1999).

8. The case of Italy is less clear, as both estimates rely theoretically on the same source.

leads to a downwards revision of the average productivity growth over the last fifteen years by 0.3 percentage point.

The previous developments have shown that it is possible to some extent to propose estimates of hours worked based on common concepts and a common source. The confrontation of the hierarchies proposed with socio-institutional information, and also with other statistical sources, is a useful tool to test the validity of the estimates.

### **III. International comparisons of hours of work<sup>10</sup> and national working time regulations**

As they rely on the hypothesis of a relative advantage of the labour force surveys over the other sources in international comparisons, the estimates presented above are obviously fragile. In a context of growing diversification of productive systems, it becomes more and more complex to come to a clear definition of the hours worked dedicated to producing goods and services, and to propose any definitive and homogenous measure. In order to get a better idea of the reliability of the estimates, it is of some interest to confront them with other information, like the basic or contractual hours, the time-use surveys, the national working-time regulations. This is what we attempt to do in the following part. The main conclusion is that this exercise tends to confirm the information delivered by the labour force surveys, but raises also some questions.

#### ***a) Consistency of international working hours hierarchies based on the labour force surveys with national working-time regulations***

Notwithstanding a general trend towards more diversification, flexibility and decentralisation of working time regulations since the mid-eighties (Freyssinet 2000), the present state of regulations relative to working time is still very dependant on specific national contexts. A first idea about the degree of dissemination of the statutory or contractual working time and about the usually worked overtime hours may in principle be drawn from the comparison between the usual weekly hours worked declared in the labour force surveys and the weekly hours collected by the establishment surveys. It may also be possible to approach the impact of all overtime hours on the weekly hours worked by adding overtime hours collected in establishment surveys to the basic or contractual working hours, and comparing

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9. Using the weekly actually worked of the reference weeks, this is done by the national statistical office and the OECD, rests implicitly on the hypothesis that the number of paid vacation days have not changed in the eighties. Our estimates incorporate an increase in the number of vacations days at the beginning of the eighties (Blyton, 1985).

10. The comparison is made only for the hours of work. For a more detailed analysis, see Bruyère and Chagny, 2002.

them to the weekly usual hours worked plus overtime hours worked in the reference week collected in the labour force surveys.

In spite of all the doubts one can have about the establishment of a common comparison basis, the confrontation of the different types of information relative to the weekly hours of work and to the overtime hours worked by full-time employees provides consistent results. Very long usual hours worked of full-time employees in the labour force surveys go generally in hand with limited working-time regulations (United-States 42,3 hours in 1997, United Kingdom 44 hours), or working-time regulations allowing derogation (Japan, 45 hours). In the United States, there is no statutory norm for working time, except for the overtime regulation (the Fair Labour Standard Act). Most managers and professionals are not covered by the regulation. The frequency of overtime work collected by the establishment survey is the highest of the eight countries. There is no statutory working-time norm in the United Kingdom, except the 1993 European working time directive (who came into force in 1998 in the United-Kingdom), that provides, among others, for a maximum 48 hour working week averaged over a reference period. With the disappearing of many collective agreements at the national level since the end of the seventies, the number of employees covered by collective agreements has sharply declined (Rubery, 1998). The normal average weekly hours of work reported in the establishment survey are stable since the mid-seventies. They are low (38 hours), but overtime work is very developed in comparison with the other European countries, a result that is also confirmed by the Community labour force survey. Overtime supplements are in fact an essential part of the remuneration for specific groups of workers in the United Kingdom and are defended by the trade unions during the negotiations on working time. The total weekly hours collected by the establishment survey (i.e. the sum of the normal hours and the overtime paid hours) are however much lower than the usual hours reported in the labour force survey. The gap amounts to four hours per week, that is to say a 10%.difference. When the comparison is restricted to the same coverage, the following findings come out: the match between usual hours declared in the labour force survey and the normal hours reported by the establishment is the worst for managers and professional occupations, paid overtime is on average the same, but unpaid overtime, not reported in the establishment survey, amounts on average 1,9 hours and is concentrated in managers, administrators and professional occupations, in education, financial intermediation and real estate, renting and other business industries (ONS, 2000). A non negligible part of the gap between the two statistical sources is

hence due to relatively high unpaid overtime, but the findings highlight also the difficulties encountered by some occupational groups to define their time spent to productive activities.

In Japan, the 40 working hours norm impeded by the revision of the Labour code in 1987 is far from being reached, even if the standard five days working week has gained importance. In 1985, less than half of the employees working in establishment employing more than 30 workers were entitled to two days off each week. In 1997, this percentage is 87%. The relatively high centralised level of working hours regulation is compensated by many derogatory schemes (Hippo, 1992) and allows a high level of overtime hours. In fact, there was no statutory provision setting up an upper limit to the amount of overtime work before 1999. The guidelines issued by the government stipulated an annual upper limit of 360 hours, but with no statutory power (Yamakawa, 1998). Earnings on a hourly basis, which concerns also professional occupations, is a strong incentive to overtime work. Attempts to reduce these incentives have been made through the introduction of new working hours schemes, but with poor results (Araki, 1996). By the end of the nineties, the number of paid overtime hours measured for a comparable field is one of the highest after the United States.

In Spain, usual hours worked by full-time employees are higher than in the other European countries. Overtime hours reported in the labour force survey and in the establishment surveys are very low. The high proportion of workers and the strict limits set by legislation to overtime work, at least until 1994, can explain the high predominance of the 40 hours legal norm, which concerns about 70 percent of the full-time employees in the labour force survey.

At the end of the nineties, usual hours worked by full-time employees were close in France and Germany (39,8 hours in 1998 in France, 40,1 in Germany), and lower than in Spain. The classification would have been quite different on the basis of the weekly hours offered of the French establishment survey and of the German contractual hours. Indeed, Germany shares with Italy a very low contractual weekly working time, but the comparison between the weekly hours offered and the contractual weekly hours is biased. At a first glance, the gap observed in France between hours offered (ACEMO survey) and the usual hours worked (labour force survey) is small, it amounts to around 2 percent since 1983. But when the comparison is made for the two measures on the same coverage, the difference is close to 4 percent, as the employees not covered by the establishment survey tend to work shorter hours. Considering also that the hours offered include structural collective overtime hours and are not corrected for specific waiting time that are not necessarily considered as working time

(like for transportation occupations), the gap between the usual hours worked and the hours offered would be even greater in France.

In Germany, the maximum legal ceiling for weekly working time is high, but the statutory provisions admitted a relatively short compensation period until 1994. In collective agreements, the threshold for overtime pay is much lower. Collective agreements allowing fluctuation of weekly working time have been developed in the eighties, but were implemented essentially in the following decade. In France, where the statutory working time regulation is predominant, legal provisions about the maximum weekly working time are similar to the German ones<sup>11</sup>, but there are (legal) quota for overtime hours. On the other hand, modulation of working hours was not very frequently used before the 35 hours law came in force. On the basis of the labour force survey, overtime work is more developed in Germany than in France. The average number of weekly overtime hours is indeed in Germany the highest after United Kingdom. This leads to consider that collective agreements admit a relatively high amount of overtime hours in Germany.

Finally, the level of weekly hours worked by full-time employees is in all cases –on the basis of contractual hours or of usual hours worked - the lowest in Italy. This is essentially due to low weekly hours of work in public administrations (12 percent of the employees). Overtime work measured in the labour force survey is not very developed and this is consistent with a low ceiling for overtime work in the collective agreements<sup>12</sup>.

Even if the examples of the United Kingdom and of France show that it is rather difficult to interpret the differences between statistical sources, the analysis of working time regulations appears to confirm the information delivered by the labour force surveys and provides useful tools for highlighting the differences in weekly working time of full-time employees.

### ***b) Holiday and vacation time : two major determinants of the annual working hours***

Although holiday and vacation days are two major determinants of the annual working hours, they are very badly measured by all non continuous labour force surveys. In Japan for instance, the labour force survey is conducted on a monthly basis. But because the reference

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11. The period under review is 1983-1998 and does hence not cover the 35 hours law specific regulations.

12. It is difficult to evaluate the gaps between statistical sources in the Netherlands in the absence of usual worked hours. Nevertheless, the total hours measured as the sum of contractual hours, paid overtime and unpaid overtime was higher than in France and Germany, before the last working time reduction agreements, and this is consistent with higher legal hours in the Netherlands.

week is nearly always the same, only two holidays on a total of fifteen are taken into account by the survey. This represents an overestimation of one hundred hours of the annual hours worked. The main problem is therefore that even if the number of legal or contractual holidays and vacation days is relatively easy to obtain, it is very rare to gather information about their actual incidence in most countries.

When available, such data show that the institutional or economic context, like the length of service or the frequency of fixed term labour contracts, are crucial and cause in some cases substantial differences between legal and actual figures. This can be illustrated by several examples. In the United States, the number of paid vacation days is fixed by labour contracts. It increases along with the length of service. This is also the case in Japan, with similar figures. This is in fact essentially the high turnover in the United States that explains why the employees were entitled on average to only ten vacation days in the United States in 1998, whereas the Japanese employees were entitled to 17,5 days.

Both Japan and Spain publish two kinds of time series for vacation days of employees. The first concern the entitlements, the second the actual days of paid vacation. In 1998, the actual number of paid vacation days amounted only 9 days in Japan. In Spain, employees were entitled to 20-22 vacation days, but the number of actual days of paid vacation amounted only 13.6 days. In Japan, the difference may be due among other to the predominance of small and medium establishments, to a relatively bad social coverage of sickness leave (Japan Institute of Labor, 2001). The high frequency of fixed-term contracts (33.6% of all employees in 1997) may provide an explanation in the case of Spain.

### ***c) The international heterogeneity in the definitions of part-time work***

The numerous and complex reasons for working part-time, along with the development of this type of contract, have increased the need for international statistical figures. But the estimates of part-time work is made difficult by the coexistence of multiple definitions. The disparity of national administrative definitions of part-time work is mainly explained by the late adoption of international recommendations<sup>13</sup> in this field. When the definition of part-time relies upon an hours threshold, it ranges from 30 hours in the United Kingdom to 35 hours in the United States. Other countries define part-time contracts in reference to the working hours of full-time contracts, but part-time working hours must not exceed 77% of

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13. The ILO Part time convention was adopted in 1994. The European directive of 1997 considers that the part-time worker refers to an employee whose normal hours of work, calculated on a weekly basis or on average over a period of employment of up to one year, are less than the normal hours of work of a comparable full-time worker.

full-time working hours in Spain (since 1994), whereas in France (since 2000) and in Germany, part-time work refers to an employee whose normal hours of work are less than the normal hours of work of a comparable full-time worker. In Japan, there are three definitions for part-time work. The first is identical to the definition used in France and in Germany (establishment survey), the second refers to a hours threshold (labour force survey). The last one defines part-time more as non regular contract than in reference to the working hours of a full-time worker, and the people classified under this definition as part-time worker by their employer do not necessarily work fewer hours than the other regular workers (Kezuka, 2000, Houseman and Osawa, 1995).

In order to reduce the comparability problems due to the heterogeneity of the national administrative part-time concepts, a second type of definitions relies upon the use of a hours threshold common to all countries (Van Bastelaer, Lemaître and Marianna, 1997) The method is relatively easy to implement on the basis of the labour force surveys, but has three main disadvantages. It is firstly very sensitive to the hours threshold. Distributions of the weekly hours shows high value for certain particular values peaks specific to each country. Thus, a modification of one hour only in the threshold can have a substantial impact on the part-time ratio at the proximity of these peaks. Secondly, it leads to ignore national institutional particularities: in most countries, the rights of part-time workers are or were until recently not the same as those of full-time workers. To some extent, the common threshold leads to consider that working time can be defined by objective criteria. This is why it is in fact seldom used in international comparisons of annual working hours. Thirdly, the use of a hours threshold is delicate for some occupations whose working hours are not easy to measure in the labour force surveys. In Italy for instance, the use of a 30 hours threshold multiplies by almost two the part-time ratio ( (14,8% against 7,6% in 1998). This is essentially explained by the low usual hours worked by full-time employees in the public administrations, and especially teachers.

Because of their consistency with national definitions, administration sources or establishment surveys would be good candidates for measuring part-time ratios, but this is possible neither for all countries, nor for a large coverage. The choice has been made to use for the estimates of the annual working hours the labour survey measures, based in the European countries essentially on the self-assessment of interviewed persons<sup>14</sup>. This is mainly because the groups of hours declared are to some extent quite in accordance with the

administrative definitions. In other words, they represent a good compromise between the international comparability objective and the legal, contractual or social reality lying behind the national administrative definitions. Nevertheless, the use of the labour force survey can introduce other bias in the international comparisons. This is the case for Japan. The definition of part-time is based on a 35 hours threshold for the weekly hours actually worked at all jobs. This measure is often presented in international comparisons. But the use of the actually worked hours leads in general to large exaggeration of the part-time ratio. In fact, among the 20,7 percent of employees considered as working part-time in 1997, only half reported working usually less than 35 hours. In 30 percent of the cases, persons worked less than 35 hours either for familial reasons, or because of slack work (Sakashita 2000).

#### **IV. Evolution of the annual working hours : what can the comparisons between different sources tell us?**

The major risk of making estimates on the base of the labour force surveys is to give too much economic content to a biased measure. From this point of view, the analysis of the comparative evolutions over time provides further information and raises new questions.

The prominent fact is that, except for France and Japan, an increasing divergence appeared in recent years between the hours worked estimated on the basis of the establishment surveys or contractual sources on one hand and of labour force surveys on the other hand. In Germany for instance, the weekly paid hours (i.e. the sum of the contractual hours and of the overtime hours of workers in the manufacturing industry) of full-time employees decreased by 2.2 percent between 1991 and 1998 in the establishment survey, whereas the weekly hours (i.e. sum of the usual hours and of the overtime hours) of full-time wage and salary workers did hardly change in the labour force survey.

In the United States and in the United Kingdom, the average hours worked measured on the basis of the establishment survey (using same definitions) have remained almost unchanged since the beginning of the eighties, whereas they increased by more than 3 percent on the basis of the labour force surveys. In both countries, this is due to a higher proportion of employees declaring very long hours in the labour force survey. In the United States, this increase was shared by all industries and all occupations. In the United-Kingdom, Bell and al. (Bell and al., 2000) show that this increase is mainly due to the increasing part of women working as managers or professionals in total employment. Preferring the establishment

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14. Spain, Germany and United Kingdom combine the criteria of hours threshold and self-assessment.

survey for the United States and the labour force survey for the United Kingdom can hence have substantial impact on the relative appreciation of macro-economic productivity of both countries.

There are mainly two possible candidates for explaining the divergent evolution of the measures<sup>15</sup>. The establishment surveys may not be able to measure correctly working time components that have tended to increase, like the unpaid overtime hours. But the difference may also be due to an increasing imprecision of the hours reported in the labour force surveys.

Increasing difficulties of respondents to evaluate within a short lapse of time their hours of work can lead them to give normative responses, or even to give no answer on the hours they work. In Germany for instance, the stability of the usual worked hours is due to an increasing proportion of employees declaring a 40 hours week. As the labour force questionnaire gives no explicit possibility to declare variable usual hours, it cannot be ruled out that the increasing role of flexible or fluctuating working time arrangements has led some persons to answer instead normatively. In France for instance, nearly 13 percent of the persons in employment declared irregular usual working hours in 1998.

Another criticism can be made about the labour force surveys. The development of services jobs with no stable working hours and an increasing flexibility of working time schedules could lead to an increasing exaggeration of the hours declared in the labour force surveys. Robinson and Bostrom (1994) have compared the hours worked estimated by individuals in the labour force survey to the time devoted to work reported in time diaries. They came to the conclusion that the comparison with time diaries reports suggests a high and growing trend of American workers to exaggerate their hours worked since the sixties. People who estimate working long hours tend to overestimate the most the time they work. On the other hand, persons who estimate working few hours tend to underestimate the time they work.

The results must however be cautiously interpreted, as the comparison between labour force surveys and time use surveys can be biased. On the basis of a survey relying on departure and return time, Jacobs (Jacobs, 1998) re-examines the results obtained by

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15. It seems that the divergences are not due, neither in the United-States nor in Germany, to different statistical coverage. Abraham, Spletzer and Stewart (1998) show in the case of the United-States that even if the weekly hours worked based on the labour force survey of the employees not covered by the establishment survey grew faster than the weekly hours of the employees covered by the establishment survey, the difference are not large enough to explain the gap.

Robinson and Bostrom and attributes them to a statistical artefact of regression to the mean. Moreover, he finds no correlation between the socio-economic, psychological or demographic factors candidate factors and the exaggeration of the working time. To conclude, there is finally no reason today to reject a priori the pertinence of measures of working time based on the own estimates of the interviewed persons in the case of the United States.

## **V. Concluding remarks**

Despite numerous sources of heterogeneity, it is possible to estimate annual hours of work allowing international comparisons on a relatively homogenous basis. If the use of a common method has little impact on the trends over time, the systematic use of the labour force survey can lead to some substantial revisions of the gaps between countries, even if inter-countries hierarchies are not substantially affected.

There are many ways to gather better estimates and to improve the method. One way is to use the quarterly labour force surveys like in Spain or in Italy. Another is to make more detailed analysis of the gaps between sources in different countries, as in the United Kingdom. Reliable estimates of vacation and holiday time require however the development of continuous labour force surveys or the implementation of specific surveys. If evaluating the impact of part-time work raises many problems, related among others to the subjective bias of self-appreciation, it seems that the concepts used in the labour force surveys are more or less reliable, but differences can be examined closer. Overtime hours have been a crucial factor of the evolution of working time in some countries (United Kingdom and United States), but their measure is far from being easy in a context of increasing working time deregulation. This illustrates again the advantage that will be gained with the evolution towards continuous surveys, like for instance in France. Finally, analysing the accuracy of the hours reported in the labour force surveys requires a systematic confrontation with the time use surveys. Nevertheless, many arguments tend not to infirm, at least until now, the validity of the labour force surveys, at least for what concerns the construction of macro-economic indicators for time trend analysis.

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