

# **The ILO Global Wage Database**

## **A methodological note**

by

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## INTRODUCTION

The ILO Global Wage Report (GWR) was initiated to capture recent trends in wages across the globe. To this effect, the ILO Conditions of Work and Employment Programme (TRAVAIL) in the Social Protection Sector, in consultation with the ILO Department of Statistics, undertook the creation of a global wage database. Given the challenges associated with creating a global wage database, an approach for the collection of wage statistics was designed to include the most reliable and unbiased data available at the national level from official sources while simultaneously working in the spirit of the Global Wage Report's foundation: to capture trends in *recent* wages in order to provide policy makers, governmental officials, and individuals with current information to make informed decisions.<sup>1</sup>

The present statistical appendix is primarily written to inform readers about the approach designed and implemented to collect the data used in the GWR. The goals of this appendix are twofold:

- (1) To clearly define the concept of wages (nominal and real) as well as all the indicators that are used in the GWR to monitor trends.
- (2) To detail the methodology used to compile the ILO's Global Wage Database in the light of the numerous difficulties associated with identifying and collecting fully comparable wage statistics.

The first part of this appendix is devoted to a discussion of the key differences between income, wages, nominal wages and real wages. The second part discusses all of the definitions of the indicators used in the GWR. The third part outlines the difficulties associated with obtaining fully comparable wage statistics which arise from differences in definition and measurement of wages across countries. This section also describes the methodology used to compile the various indicators included in the Global Wage Database.

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<sup>1</sup> Many thanks to my fellow colleagues in TRAVAIL: Patrick Belser, Sangheon Lee, and Sara Ooi and to the ILO Bureau of Statistics, for their technical expertise and contributions to this paper.

## I. BASIC DEFINITIONS

A common question which arises concerns the difference in definition between income and wages. Although formal definitions exist for both, the central difference between the two is that wages are a component of income. Income captures the relative well-being of a household (or of an individual) given all of its resources (i.e. employment, investments) and those attributed to it by means of transfer and/or third parties. Wages, on the other hand, exclusively represent the share of income (or well-being of an individual or household) derived from paid employees. Formal definitions for both are included below:

**Household income**<sup>2</sup> consists of all receipts whether monetary or in kind (goods and services) that are received by the household or by individual members of the household at annual or more frequent intervals, but exclude windfall gains and other such irregular and typically one-time receipts. Household income receipts are available for current consumption and do not reduce the net worth of the household through a reduction of its cash, the disposal of its other financial or non financial assets, or an increase in its liabilities.

**Wages**<sup>3</sup> are remuneration or earnings, however designated or calculated, capable of being expressed in terms of money and fixed by mutual agreement or by national laws or regulations, which are payable in virtue of a written or unwritten contract of employment by an employer to an employed person for work done or to be done or for services rendered or to be rendered.

An example of the difference between income and wages can be provided by the extended unemployment benefits which certain countries have provided in response to the recent financial crisis. Despite increases in the unemployment rate, the *income* of individuals may not have immediately declined, because it was temporarily offset by the extended benefits. At the same time, the *wages*, and consequently the wage component of income, of these same individuals *did* decline because they were no longer employed. Thus, because changes in wages can be offset by other components of income, falling wages cannot exclusively be translated into reductions in income.

Another important element in the Global Wage Report is the difference between nominal and real wages. Nominal wages are simply the wages that an individual takes home on the day she is paid. On the other hand, real wages are nominal wages divided by the price level. An increase (decrease) in *real* wages occurs when increases in the nominal wages received by an individual from her

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<sup>2</sup> Report from the 17<sup>th</sup> International Conference of Labour Statisticians, 2003. Resolution 1.

<sup>3</sup> Protection of Wages. Standards and Safeguards Relating to the Payment of Labour Remuneration. France: ILO Publications, 2003.

employer are greater (smaller) than the increase in the general level of prices in the economy. Declines in real wage growth could be attributed to firms' inability to increase workers' salaries in the face of diminishing profits and/or price level increases which are greater than nominal wage increases. Absent income transfer from another source, a decline in real wages will result in a decrease in the real income of families. A calculation of real wages using nominal figures is provided in box 1 using Albanian data.

**Box 1. Calculation of Real Wages using Nominal Values: The case of Albania.**

Throughout the GWR, multiple references are made to nominal and real values. Nominal values are values which have yet to be adjusted for changes in prices (inflation) which occur over time. For example, an individual with 1000 lekë in 1950 would have been able to buy a larger number of goods than an individual with 1000 lekë in 2009. This is because of increases in the price level over time. Using nominal values and price level data, real values can be calculated to account for this change. Calculating real values enables one to determine how much 1000 lekë in 2009 was worth in 1950. Primarily, real values are used to evaluate the changes in GDP and wages over time. The process of converting nominal to real values is illustrated using Albanian data below. The year 2000 is the base year used for the Consumer Price Index.

Calculation	Year										
(a)	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Nominal Wages (NW)	9063	10894	12118	13355	14820	16541	18522	19039	19993	21842	27350
Consumer Price Index (CPI)	82.5	99.6	100.0	100.0	103.1	108.5	111.1	114.2	116.9	119.7	123.2
Wage Deflator = CPI/100	0.83	1.00	1.00	1.00	1.03	1.09	1.11	1.14	1.17	1.20	1.23
Real Wages (RW) = NW / Wage Deflator	10981	10941	12123	13355	14372	15245	16679	16667	17098	18247	22196
RW Growth (%)		-0.4	10.8	10.2	7.6	6.1	9.4	-0.1	2.6	6.7	21.6

**Sources:** IMF, World Economic Outlook and ILO, Global Wage Database

## II. THE WAGE INDICATORS: DEFINITIONS

Several indicators are necessary to determine global wage trends in the GWR. Each indicator is used for a specifically defined purpose which is different, but complementary, to the others. For example, some indicators are collected in order to establish the aggregate level of wages currently in effect in a country. By contrast, other indicators are useful for analyses regarding the distribution of wages among individuals. This section reviews each of the indicators collected and used for analyses within the GWR. Most of these indicators have been identified by the ILO as part of a number of “decent work indicators” which were developed under the guidance of a tripartite

meeting of experts held at the ILO in 2008. The next section will provide more information on the various definitions and forms of measurement of these indicators.

## **A. The Level of Wages**

**Mean/average wages:** Mean/average wages are the sum of wages of a given number of workers in paid employment divided by the number of individuals in paid employment. Mean/average wages are often calculated by sex, occupation, or employment status (i.e. full-time or part-time). Unfortunately, extreme values (i.e. extremely high or low salaries for a given few) can lead to a result which is misrepresentative of the population it represents.

**Median Wage:** The median wage of a given number of workers in paid employment is the middle value in an ascending list of the wages earned by all individuals in a given population. The median value is generally more representative of wages earned in a given population because it is less likely to be offset by extreme values.

## **B. The Distribution of Wages**

**D9/D1:** This indicator is calculated using an ascending list of all of the wages earned in a given population. The total number of people in this population is then divided into 10 groups called deciles (each group includes an equal number of individuals – or wage observations). Once the wage deciles are created, there are two ways in which the ratios can be calculated (which vary from country to country).

1. **Decile limit calculation.** In the decile limit calculation, D1 is the upper limit of the decile containing the lowest paid workers, while D9 denotes the upper limit of the 9<sup>th</sup> highest decile of wage earners.
2. **Average decile calculation.** In the average decile calculation, D1 is the average of the decile containing the lowest paid workers, while D9 denotes the average of all values greater than or equal to the upper limit of the 9<sup>th</sup> highest decile of wage earners.

A higher D9/D1 ratio indicates a more unequal distribution of wages. Changes in the D9/D1 ratio can be decomposed into changes in inequality in the lower half of the wage distribution (D5/D1 –

where  $D_5$  is the median wage) and changes in inequality in the upper half of the wage distribution ( $D_9/D_5$ ).

**Low Pay Rate:** The low pay rate is defined as the percentage of individuals in a population which earn less than  $2/3^{\text{rd}}$  (or less than half) of the median wage. To calculate this rate, the median wage and value equivalent to  $2/3^{\text{rd}}$  of the median wage must be determined. Then the number of individuals below the  $2/3^{\text{rd}}$  value threshold must also be calculated.

**Gini Coefficient:** The gini coefficient is a measure between 0 – 1, or between 0 – 100, which is used to measure the distance from perfect equality. It is most frequently used to measure the distribution of income, but it can also be used to measure the distribution of wages. Perfect equality is a theoretical situation defined as a situation in which an equal percentage of the population generates a proportional amount of earnings in the economy. For example, perfect equality would occur when 80% of the population generates 80% of earnings in the economy. The closer the gini coefficient is to 0 (1), the more equal (unequal) a society is.

**Gender Wage Gap:** The gender wage gap can be measured as the ratio of female mean/average wages to male mean/average wages. This so-called “female wage ratio” indicates whether, on average, women earn less than men, but does directly measure wage discrimination (which is equal remuneration for work of equal value). The female wage ratio can also be a reflection of a number of other factors, including differences in the average level of education and productivity.

**The “Wage Share”:** This is an indicator of the so-called “functional” distribution of income between wages and profits. It is most frequently calculated as the sum of wage compensation of employees divided by nominal GDP. It is often seen that the proportion of GDP which is not distributed to workers is attributed to profit accumulation.

**Calculation of Wage Indicators: A Simple Example.**

There is a population of individuals with the following hourly wages:

2, 4, 10, 15, 20, 22, 24, 24, 24, 25, 26, 40, 40, 42, 50, 60, 70, 80, 90, 100

In this list (which is in ascending order), there are 20 observations which represent the hourly wages earned by 20 individuals. The *mean/average wage* in this population is equivalent to the sum of all of the wages, 768, divided by the number of individuals, 20. This gives an mean/average wage of  $768/20 = 38.4$ .

In order to calculate the *median wage*, the number of observations is divided by 2 to find the middle value ( $20/2 = 10$ ). If there were 19 observations, the median would be the 10<sup>th</sup> value. However, since there are an even number of observations, with 10 observations in the upper and lower part, the median will be the average of the 10<sup>th</sup> and 11<sup>th</sup> observation. Thus, the median value is  $(25+26)/2 = 25.5$ .

Calculating the *decile ratios* requires the calculation of the actual deciles. Calculating the deciles involves dividing the total number of observations by 10.

2, 4,	10, 15,	20, 22,	24, 24,	24, 25,	26, 40,	40, 42,	50, 60,	70, 80,	90, 100
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Consequently ( $20/10$ ), there will be 2 individuals (wage observations) in each decile. The first decile's wage is 4, the fifth decile's value is 25, and the 9<sup>th</sup> decile's value is 80. As previously mentioned, there are two ways to calculate the decile ratios:

1. Using the decile limit calculation, the D9/D1 ratio is  $80/4$ , the D9/D5 ratio is  $80/25$ , and the D5/D1 ratio is  $25/4$ .
2. Using the average decile calculation, averages for the D9 and D1 deciles must be calculated. The average for the D1 decile is  $(2+4)/2=3$  and the average for the 9<sup>th</sup> decile  $(80+90+100)/3=90$ . Using this approach, the D9/D1 ratio becomes  $90/3$ .

The *low pay rate* is determined using  $2/3$  the median value. In this example, the median value is 25.5.  $2/3$  of 25.5 is 17. In this population of 20 individuals, there are 4 people who earn less than 17. Thus the low pay rate is  $4/20*100 = 20\%$ .

### C. Legal Wage Indicators

**Ratification of the ILO Minimum Wage Convention<sup>4</sup> 26:** This is a binary variable, which takes the value 1 if a Member State has ratified the Minimum Wage-Fixing Machinery Convention (1928).

**Ratification of the ILO Minimum Wage Convention 131:** This is a binary variable, which takes the value 1 if a Member State has ratified the Minimum Wage-Fixing Convention, with special reference to developing countries (1970).

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<sup>4</sup> Ratification and the full text of ILO Conventions can be found at: <http://www.ilo.org/ilolex>

**Minimum Wage:** This is the level of the minimum wage, which can be expressed in absolute value or relative to mean/average wages. Minimum wages are defined as “... the lowest level of remuneration permitted... which in each country has the force of law and which is enforceable under threat of penal or other appropriate sanctions. Minimum wages fixed by collective agreements made binding by public authorities are included in this definition.”<sup>5</sup> For the purposes of the GWR, only minimum wages which have statutory application (i.e. are legally binding) are included.

### **III. DATA, MEASUREMENT, AND COMPARABILITY**

The previous section provided a general definition of wages in order to introduce indicators that can be used to analyze wage trends. Unfortunately however, despite the existence and value of an internationally standardized statistical concept, differences in cultural contexts, institutions and access to resources result in statistical measures of wages which are not fully comparable across countries. Primarily, countries’ wage statistics vary by:

1. Definition of Wages
2. Type of Survey and Number of Surveys conducted (Household versus Enterprise)
3. Frequency (Monthly, Quarterly, Annual, Biennial, etc)
4. Population Measured (Full-time employees, all employees, formal sector)
5. Unit of Measurement (Daily wages, weekly, monthly, annual)
6. Consideration for Seasonality

This section reviews each of these subjects in some detail and discusses how the ILO Global Wage Database has been compiled in light of these differences. Furthermore, this section outlines how attempts to correct for differences in measurement have been employed.

#### **A. THE LEVEL AND DISTRIBUTION OF WAGES**

##### ***(1) What are the differences in the definitions of wages across countries?***

An initial problem which arises when cross country comparisons are made is tied to the varying definitions of wages employed in different countries. In some instances, the definition may be based

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<sup>5</sup> ILO: *Minimum wages: Wage-fixing machinery, application and supervision*, Report III (Part 4B) (General Survey), International Labour Conference, 79<sup>th</sup> Session, Geneva, 1992.

on the exclusion of specific items related to wages. For example, one country could exclude bonuses from its calculation of earnings whereas another could include them. In other instances the concept of wages may include family allowances (i.e. being paid more simply for having a larger family), while in other parts of the world family allowances are not considered as a component of wages or the very notion of family allowances may not exist.

An ILO publication called “*The Protection of Wages, Standards and Safeguards Relating to the Payment of Labour Remuneration*”<sup>6</sup> provides specific examples regarding differences in cross-country wage specifications. Some examples from this text have been included below to demonstrate the extent to which wage definitions vary across the globe.

- (1) In the USA, for example, wages are generally defined to include, among many items, both vacation and sick leave (21). However, this definition varies even at the US state level. Examples are provided from both Michigan and Minnesota where the definition of wages explicitly excludes both of these items (22). There are also multiple definitions of wages in Sri Lanka and Panama (24).
- (2) In Brazil and the Democratic Republic of the Congo, family allowances are *excluded* from the concept of wages, whereas in Egypt, Kuwait, and the Syrian Arab Republic they are *included* (22, 20).
- (3) In the USA, the notion of severance pay is included in the definition of wages, whereas it is not in Mauritius (21).
- (4) In other countries, a coherent definition of wages is inexistent (ex Bulgaria, Madagascar, Central African Republic) (24).

Consequently, in light of the differences in definitions and the absence of wage figures which are completely disaggregated for every country by each component of wages (i.e. bonuses, family allowances, sick leave, etc.), it is impossible to have fully comparable statistics. This is why the GWR has until this day focused on identifying *changes* over time *within* countries instead of comparing wage *levels across* countries.

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<sup>6</sup> Protection of Wages, Standards and Safeguards Relating to the Payment of Labour Remuneration. France: ILO Publications, 2003.

## *(2) Which data source?*

For each country, potential sources for wage data are identified from national websites. If data are not available from a national site, then a regional source is used. If data are not available from a regional site, then data from an international source are used. The GWR data are initially obtained from national sources as national sources are usually the only source for which the most recent (monthly/quarterly) wage data are available. Although some regional and international sources may have indices, national sites are generally the only source for actual gross values.

The exception to this rule is for Latin America. For all countries which have provided their micro-data in time, the ILO/SIAL (Information System and Labour Analysis) of the regional office in Latin America has calculated directly all statistics used in the GWR. For countries which had not provided data to ILO/SIAL in time for the report (or for countries from which another more recent source through 2008 or 2009 was available), such as Brazil, monthly survey data has been obtained from the national statistical office.

In several cases (particularly for developed countries), there are multiple sources for wage data which are obtained from various surveys. In the event that there are multiple surveys, the survey selected is the survey which contains mean/average nominal wages through the second quarter of 2009. Generally, these figures are available from either household or enterprise surveys (Box 1 discusses the difference between these two types of surveys). However, it is also possible that the most recent mean/average wage figures are available through national account estimates (ex: Germany). In some developing countries, wages are only available in the form of aggregate compensation (ex: Kenya). Recent data for mean/average wages are used as the primary selection criterion for a source, because it is usually the most readily available wage indicator (as opposed to the median wage for example).

**Box 2: Differences between an enterprise and a household survey.**

Household and enterprise surveys provide comprehensive data on the labour force and serve as means to measure pay from employment. Household survey data are collected from households through different ways (ex: in person, telephone). On the other hand, enterprise surveys are conducted directly with companies and data are obtained from payroll records.

Although the quality of data for household surveys is generally considered to be lower than that of enterprise surveys, household surveys have a more expansive coverage. Since household survey data are obtained from individuals or family members (who may only have partial information on the employment status of others), they are subject to forms of measurement error. These forms of measurement error can be avoided by obtaining data directly from companies, as is done in enterprise surveys. The smaller sample size of household surveys could also reduce the accuracy of the results. However, as previously mentioned, often times the broader coverage provided by household surveys compensates for the measurement error inherent within them. For example, in developing countries, establishment surveys will overlook the prevalent and smaller formal, or informal and unregistered companies.

Generally, each survey complements the other by nature of the different information it provides. The two surveys vary in three primary ways:

(1) They vary by the types of information they specialize in obtaining. Whereas comprehensive population characteristics are obtained from household surveys, detailed industrial classifications are much more reliably obtained from enterprise surveys.

(2) They differ in regards to the breadth of the population they reach. Enterprise surveys only include non-agricultural workers, and they exclude self-employed and business owners. Furthermore, enterprise surveys are often limited to companies that have at least 5 or 10 employees. In addition to the workers included in the enterprise surveys, household surveys can also cover agricultural workers, the self-employed, workers in private households (such as domestic workers), unpaid workers, and workers on unpaid leave (note that some of these categories may also capture some parts of the informal economy).

(3) They vary in their measures of both employment and unemployment. Household surveys count the number of employed individuals available across the entire economy. Each individual in a household survey is either employed or unemployed (we do not *always* know how many jobs this individual has). In contrast, enterprise surveys count the number of *jobs* in the formal economy. In enterprise surveys, if an individual works part-time in two companies, she would be counted twice because she is on two payrolls.

Unfortunately, using surveys that contain the most recent statistical data raise several concerns and difficulties. Notably, monthly and quarterly figures are usually revised as more data become available and they are often subject to seasonal changes during the year. In most developed countries, there are usually annual, biennial or quadrennial surveys which are conducted in order to provide a more accurate and comprehensive assessment of wages. However, given that these surveys are published on a less regular basis, they provide less timely information. Box 2 discusses the advantages generally associated with these less frequent but more thorough “wage structure” surveys and some considerations to be made when using monthly and quarterly figures.

**Box 3: Differences in real wage growth between enterprise and household surveys. Country**

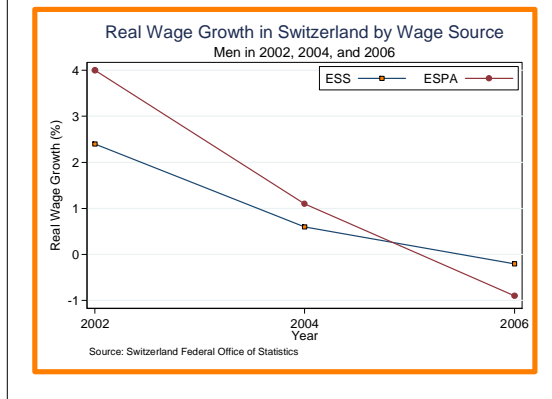
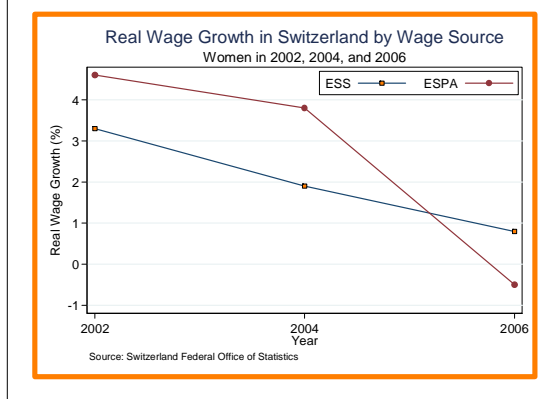
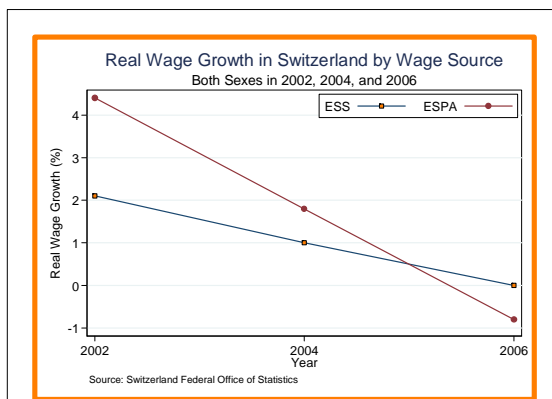
**Illustrations.**

**Switzerland**

In Switzerland, two primary sources of wage data are from the Swiss Labour Force Survey (ESPA) and the Swiss Wage Structure Survey (ESS). The former is a household survey which provides annual data regarding about 105,000 households and an additional 15,000 foreigners. The latter is an enterprise survey (also a “wage structure” survey in the case of Switzerland) which provides biennial data from approximately 46,300 public and private entities. The ESS only includes companies with at least two wage earners.

As the graphs to the right clearly demonstrate, there is variation in real wage growth between the two surveys. For example, across all three graphs (which show wage growth for both sexes, as well as for women and for men separately), the ESPA has higher wage growth in 2002 and 2004 and a lower decline in 2006. The variation however, is clearly explained by the difference in methodologies used by the two surveys, the populations that they target and/or the differing definitions of wages.

For the purposes of the ILO Global Wage Database, the ESPA was used because it has the most extensive data on average earnings annually through 2008. This is in contrast to the ESS, which is only available once every two years.



Furthermore, data for 2008 were only available after the publication of the GWR 2009 Update.

Although it is clear that both sources have similar trends, the actual levels and growth rates can be slightly different. The choice of a wage source depends on the end use of the researcher; neither one nor the other is incorrect. If someone is looking for a wage source which captures the entire economy (including small businesses and some informal work) the ESPA is the more appropriate source. On the other hand, if someone is looking for wages in the formal economy with industry and occupational variables clearly defined and standardized, the ESS is the more appropriate source.

### **United States**

In the United States, the Bureau of Labor Statistics uses both enterprise and household surveys to assess labour market conditions. It provides two independent monthly estimates of employment from the Current Employment Survey (enterprise survey) and the Current Population Survey (household survey). Although both surveys often show similar results, they can also differ with respect to their employment projections. For example, after the 2001 crisis, the enterprise survey projected a considerable loss in employment and a slow recovery of the labour market. In contrast, the household survey indicated a comparatively faster recovery<sup>7</sup>. Some of this difference was attributed to the counter-cyclical nature of self-employment. Subsequently, the use of household survey results during economic downturns, without consideration for the counter-cyclical nature of self-employment, could prove to be misleading. Using both enterprise and household surveys allows for researchers to more easily identify trends and more accurately assess the current state of the economy.

### **Developing countries**

Enterprise surveys generally only include companies which have a specified minimum size. Consequently, this kind of survey may overlook jobs being created by smaller start-up companies or companies in the informal economy. As self-employment and small start-up businesses are prolific among countries in Latin America and the Caribbean, household surveys remain the more effective and widely used method of obtaining information from a large sample size of the population. The same is true of Sub-Saharan Africa. Incidentally, it should also be noted that the company size limitation (i.e. at least 5 employees) in the survey's design, can also affect the results of enterprise surveys in developed economies as well.

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<sup>7</sup> Economic Letter 2004-23; August 27, 2004 of the Federal Reserve Bank of San Francisco.

### *(3) Which types of employees?*

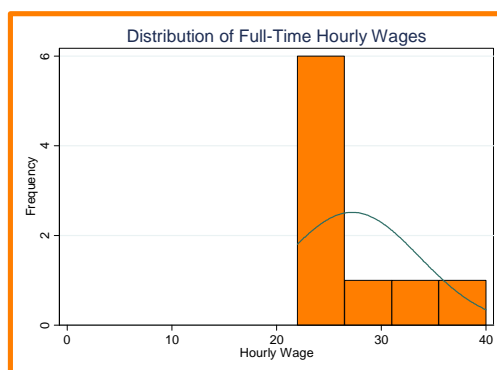
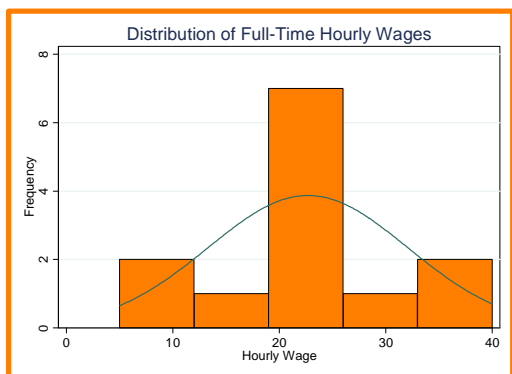
Once a wage source has been selected, the type of employees must be selected. Some countries only provide data for all employees whereas others distinguish between the wages earned by full and part time employees. It should also be noted that in some countries disaggregated data are not provided because part-time work represents a negligible part of the workforce. Ideally, a comparison between various countries' full and part time workers would be conducted. However, even if the data on both groups were available, this type of comparison is further subject to complications as a result of the "composition effect". The composition effect is particularly important within developed nations and is described in detail in box 3. Given the complications associated with the aggregation of full and part time wages, only wages for full time employees are taken whenever available.

Although choosing wages for full time workers enables a partial elimination of the composition effect, doing so potentially skews the interpretation of the gender pay gap (see box 4). Specifically, since part time work is predominant among women, the earnings of full time women are likely subject to some form of selection bias. For example, if full time women have more experience than part time women, their earnings are likely to be higher. In the event that the majority of women in a country work part time (and a relatively small percentage work full time), the gender pay gap will be underestimated if the wages used to estimate it are based on full time work.

A third case arises, and complicates both cross-country comparison and interpretation, when countries provide the wages for "full time equivalent" workers. Generally, full time equivalent wages are calculated by multiplying the hourly wages of part time workers by the number of hours required to complete a full time work week (this becomes the part time worker's full time salary). This has the aggregate effect of incorporating part time work into aggregate calculations in order to estimate one average of all employees' wages.

**Box 4: Full-time and part-time composition effects.**

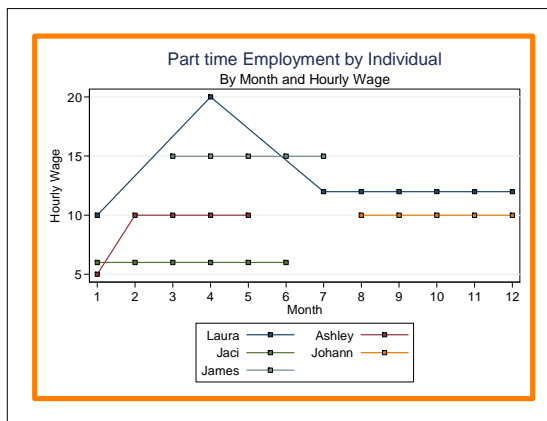
One kind of composition effect occurs (with respect to mean/average wages) when a non random group of full-time workers lose their jobs. For example, the graph on the left shows the distribution of hourly wages of 13 individuals. The mean/average wage among these 13 workers appears to be about 20. The graph on the right shows the new distribution of hourly wages when individuals who lose their jobs are not a random group of individuals. For example, in the financial crisis, one might argue that those who initially lost their jobs would be young workers with the lowest wages. If this is the case, the lower half of the wage distribution disappears (as shown in the graph below on the right). Consequently, the mean/average wage also increases to between 25 – 30. In reality, the increase in the level (and potential growth) of mean/average wages is not a result of increasing productivity and wages, but a change in the composition of people who work.



The second kind of composition effect is related to full and part-time workers. Generally, full-time workers represent a “stable” source of wage data. Full-time work implies a form of commitment to the workforce for an extended period. Consequently, the mean/average wages of full-time workers can be compared over time because they usually represent the same workers. On the other hand, part-time work is more variable. Individuals who work part-time are likely to do different kinds of work for potentially different wages and/or intermittent periods.

For instance, to the right is a graph which includes the wages of five imaginary individuals who work part-time over the period of one year. Although most of the five workers have the same wage over the entire year, there is not one month in which all five workers are working at the same time.

Consequently, quarterly changes in mean/average wages are a function of two factors: (1) real wage growth or decline and (2) changes in the composition of the part-time work



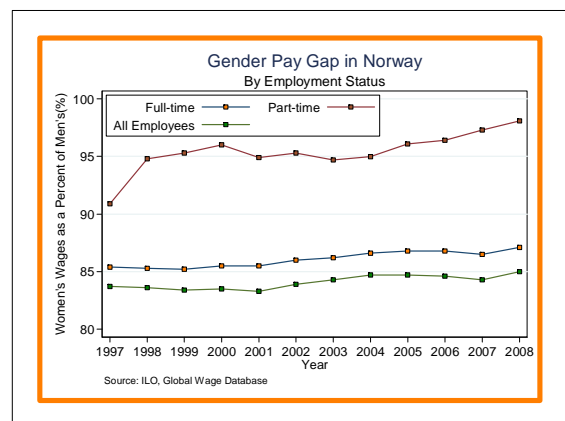
force. Since part-time workers are also likely to move in and out of the labour force, annual figures for part-time work are also subject to a composition effect. Without controlling for other factors, simple averages

cannot differentiate between changes in productivity or changes in the composition of the part-time labour force.

**Box 5: Estimation of the gender pay gap (GPG) in Norway. Variations in the pay gap as a result of differences in employment status.**

As can be seen from graph below, the gender pay gap (GPG), measured as the female wage ratio (see definitions in Section II above), varies enormously by employment status. For example, in 2008 the GPG for part-time workers was only 1.9%, whereas for full-time employees the gap was 12.9% and for all-employees nearly 15%.

Interestingly, the gender pay gap is larger for all employees than it is across full and part-time employees individually. This is particularly surprising given that it might be expected that an average would lie between, and not below, the two other categories of workers. However, the differences between the various employment status GPGs are easily explained. Among those who work part-time, women represent about 81% of workers between 1997 – 2008. It is also common knowledge that men who work part-time often earn less than men who work full time. Subsequently, the GPG for women who work part time is quite small.



In contrast, among those who work full-time, only 39% of individuals are women. Additionally, as previously mentioned, women who work full-time are likely subject to some form of selection bias. Given their characteristics, these women are likely to earn more than an average woman selected at random. These women are also likely to have more work experience and consequently higher earnings than a woman working part-time. As such, it is not surprising that the GPG is smaller than the GPG across the entire population.

Across the entire population, women represent approximately 53% of total workers. The GPG across the entire population comprises workers of both employment status groups. Consequently, because (1) the vast majority of women work part-time and (2) earn salaries which (in absolute value) are on average only about 78% (across all years) of what full-time men earn, the average GPG across all employment statuses is lower than for the two individual employment statuses. Thus, relying exclusively on data regarding full-time female workers is likely to underestimate the magnitude of the gender pay gap insofar as the entire active working population is concerned.

#### *(4) Which time period?*

The time unit in which wages are expressed (hourly, weekly, and monthly) varies from country to country. Whereas some countries only provide monthly figures, others may provide hourly, weekly and/or a combination of several. The availability of different measures of wages presents important implications for comparison. Specifically, aggregate measures of wages (i.e. weekly or monthly) implicitly incorporate the number of hours an individual has worked into her salary. Subsequently, fluctuations in aggregate wage figures (i.e. weekly or monthly) could represent changes in hours worked in place of, or in addition to, a change in the hourly wages earned.

When data on hours worked are available, changes in earnings can partially be attributed to fluctuations in the number of hours worked. However, even if data regarding hours worked are available, the extent to which a change in hours has affected a change in wages is difficult to measure. In contrast, hourly wages do allow for more accurate assessment of changes in real wages associated with productivity or inflation. Box 5 shows an example of how monthly wage figures can vary based on the initial unit (i.e. monthly, hourly, weekly) of wages available.

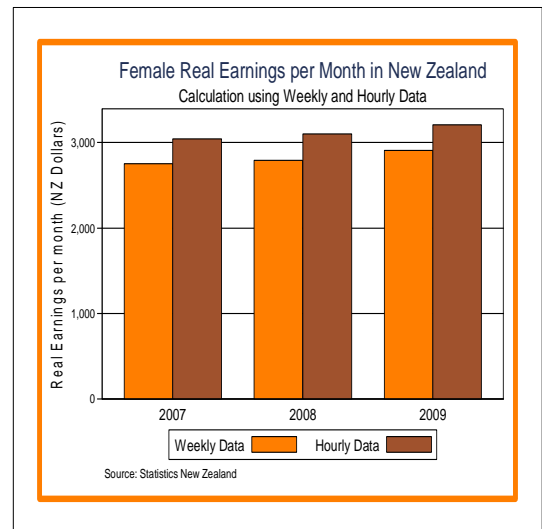
In the ILO wage database, wage data are standardized to the monthly level. In the case of hourly earnings, the hourly rate is multiplied by the standard workweek in a given country. The standard workweek is determined using the ILO's Working Time Database<sup>8</sup>. If data regarding the standard number of hours worked was not available, attempts were made to determine the level using national sources and/or secondary sources as necessary. Note that the growth rate of hourly wages will not change even if it is multiplied by the number of hours worked in a standard workweek. If weekly data are available, weekly earnings are multiplied by 52 weeks and divided by 12 months to calculate the monthly rate. In the event that only annual figures are available, they are divided by 12 months.

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<sup>8</sup>ILO Database of Conditions of Work and Employment Laws: <http://www.ilo.org/travaildatabase/servlet/workingtime>

**Box 6: Changes in real monthly earnings growth in New Zealand among women. Differences in growth using weekly and hourly data.**

The graph below calculates two forms of monthly earnings. The weekly data column displays the real average earnings, standardized to monthly values (value x 52 weeks/12 months) using weekly data provided by the national statistics office in New Zealand. The hourly data column shows the average earnings, standardized to monthly values (value x 40 hours x 52 weeks/ 12 months), using hourly data. As can clearly be seen, the assumption that everyone works 40 hours, 52 weeks a year, overestimates the average monthly earnings of women in New Zealand.



When the growth rates of hourly and weekly data are examined more closely, they are closely related, but nonetheless different. Using hourly data, wages grew by 1.8% in 2008 and 3.5% between 2008 and 2009. Using the weekly data, wages grew by slightly less in 2008 (1.3%) and slightly more between 2008 and 2009 (4.2%). The difference in the growth of earnings between both measures is indicative of two factors: (1) women worked fewer hours between 2007 – 2008 (reason for which the growth in weekly earnings is not as high as that of hourly) (2) women worked slightly more between 2008 – 2009. Having both sets of data allows for these two inferences to be made. However, in the absence of hourly data or weekly/monthly data with hours worked, it is difficult to assess the causal factors of changes in wages.

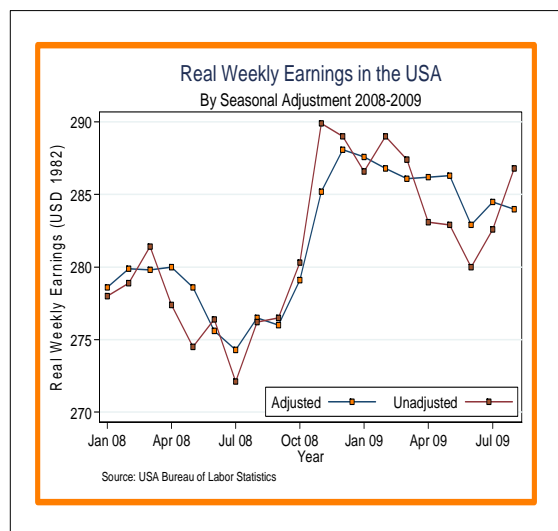
**(5) Accounting for seasonality?**

The seasonal part of a series can be defined as “...effects that follow a more or less regular pattern each year and arise from systematic, calendar related influences.”<sup>9</sup> For example, during holiday seasons stores may hire additional part-time workers. Another example of seasonality occurs during warmer months when the wages in the construction industry are higher because of the added demand for construction work. Eliminating seasonal effects allows for researchers to see actual changes in wages in order to accurately assess trends. In the GWR, seasonally adjusted figures are used when they are available. Box 6 provides an example of the variation in wages which can occur in the absence of seasonal adjustment.

<sup>9</sup> USA BLS Monthly Labor Review, April 2006. Seasonal Adjustment in the ECI and the Conversion to NAICS and SOC. p. 13.

### Box 7. Wage variation and seasonality: Real earnings in the USA.

As can be seen from the graph to the right, seasonally adjusted and unadjusted figures for real weekly earnings in the USA show similar trends, but are considerably smoother for the former. Although approaches to seasonal adjustment can vary, the USA also uses their seasonal adjustment process to adjust for measurement error which arises because of seasonality. For example, data for the Current Employment Survey are collected from the pay period including the 12<sup>th</sup> of the month. However, some months have fewer working days than others. Consequently, these differences, which could be incorrectly interpreted as growth or a decline in monthly wages, are accounted for using the seasonal adjustment process.



When seasonally adjusted figures are used in comparison with other countries' non-seasonally adjusted figures, this should be considered (even if the extent to which the adjustment plays a role is unknown). For example, although it is possible to calculate the difference between seasonally and non-seasonally adjusted data for the USA, this is not necessarily the case for most countries where the former are unavailable. Furthermore, the extent to which the use of seasonally adjusted data plays a role depends on the time period for which the data are used. For instance, if annual growth rates (January 2008 to January 2009) are calculated, there is a .1% difference between the growth rate of real wages using seasonally adjusted and unadjusted figures. However, if quarterly changes are calculated using both types of data, there is considerably more variation. For instance, using seasonally adjusted figures, there is a .5% decline in real wages from Q1 2008 to Q2 2008. If non-seasonally adjusted figures are used, the decline between Q1 2008 and Q2 2008 more than doubles to 1.2%

#### *(6) How to collect wage data by gender?*

Given that mean/average wages are obtained from the survey containing the most recent wage data, these surveys often do not collect mean/average wage figures disaggregated by gender. For this reason, wage estimates by gender are collected in conjunction with mean/average wages for both sexes where possible. Wage statistics are also collected because they provide useful information regarding the distribution of wages by sex. As previously mentioned, knowing the distribution of wages by sex is important in order to correctly interpret wage trends given the existence of both the gender pay gap and composition effects.

However, for instances in which the survey containing the most recent data for mean/median/average wages for both sexes does not include data disaggregated by gender, another source is sought out for inclusion in the database. The different sources used for each indicator are clearly listed in the wage database. If there is more than one secondary source, the source is selected using the same considerations for mean/median/average wages for both sexes outlined above in this section.

***(7) Which choice of inequality indicators?***

The measures of inequality include the: decile ratios (D9/D1, D5/D1, D9/D5), gini coefficient, and low pay rate. Initially, all of these indicators are attempted to be collected from the same survey from which the average nominal wages are obtained. Ideally, this is done in order to enable direct comparison across the various indicators. However, as previously explained, detailed inequality measures are often unavailable from the same surveys which provide the most recent wage statistics. Monthly or quarterly surveys rarely (if ever) provide these data. Consequently, other sources are used for the inequality indicators. In some instances, national sources have been used however, in other instances, regional or international sources are used.

When inequality measures using wages are not available, the inequality measures for income have been provided in the database. However, as discussed in part I of this paper, income and wages are two conceptually and statistically different measures of inequality. Income inequality is a measure of the inequality which exists between individuals once all forms of resources contributing to the well-being of these individuals are combined. On the other hand, wage inequality is measured using components of income directly and exclusively related to paid employees.

The difference in inequality measures using income and wages vary based on country contexts. For example, since wages are only a component of income and since government policies contribute to reduced inequality through income and not wages, measures of wage inequality might be larger than income inequality. However, the inverse situation could equally apply (income inequality is greater than wage inequality). For example, in some countries capital income (from personal investments) could be so large that despite government intervention designed to reduce income inequality, income inequality is still larger than wage inequality.

## **B. LEGAL WAGE INDICATOR**

### ***(8) How do you choose a minimum wage?***

Minimum wages are an important policy tool for social protection. Minimum wage policies vary across countries in five primary ways:

1. Level: both in terms of the amount and measure (i.e. hourly, daily, weekly, monthly)
2. Fixing mechanism(s) through which the levels are determined.
3. Population(s) covered (i.e. by industry, geographic region, etc.).
4. Enforcement and legal obligation.
5. Frequency and mechanism through which levels are updated.

Given the international differences highlighted above, the collection of minimum wage statistics across countries requires a standardized methodological approach. Similar to the procedure used for mean/average wages, the aforementioned difficulties and techniques used to create a standardized database are discussed below.

### ***Which source?***

1. Minimum wage levels are initially obtained from national sources. Often levels are published on national statistical websites, the Ministry (Department) of Labour, or State department websites. In the event that data from a national source are unable to be located, regional sources are consulted. If regional sources do not provide data, secondary sources have been used as necessary.

### ***Which minimum wage?***

2. Ideally, the minimum wage selected for inclusion in the database would represent the minimum wage applicable to the entire population of a country. However, in reality, countries often set minimum wages by geographic region and/or industry. Subsequently, given that there are often multiple minimum wages in each country, the following approach is used to select the minimum wage included in the ILO Global Wage Database:

- a. For countries in which there is one national minimum wage (i.e. United States), the national minimum wage is used.
- b. For countries in which a national minimum wage does not exist and there are multiple minimum wages which vary by geographic location in a country, an average of regional minimum wages is calculated. If the full set of geographical minimum wages is not available, this is approximated through an average of major regions (i.e. China).
- c. For countries in which a national minimum wage does not exist and there are multiple minimum wages which vary by industry, the minimum wage for manufacturing is used. In the event that a minimum wage for manufacturing is not available, a similar substitute is used. Unfortunately, “similar substitutes” vary by country (i.e. American Samoa: fish canning, processing, and can manufacturing minimum wage is used).
- d. For countries in which a national minimum wage does not exist and there are multiple minimum wages which vary by industry *and* geographic location, the minimum wage for manufacturing in the capital, or largest city, or largest cities is used. If a minimum wage does not exist for manufacturing, a similar substitute is used (i.e. South Africa: minimum wage applies to employees in the wholesale and retail sector for region “A” which is a region which includes Cape Town).
- e. For countries in which a *non obligatory* national minimum wage exists, and multiple obligatory minimum wages by industry and region exist, the national minimum wage is used (i.e. India).
- f. For countries in which a national minimum does not exist, but are in place (generally by industry) through collective agreements, minimum wage levels are *excluded* from the database (i.e. Switzerland, Germany).<sup>10</sup>

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<sup>10</sup> Additional information regarding some countries of these countries is included in the ILO Database of Conditions of Work and Employment Laws: <http://www.ilo.org/travaildatabase/servlet/minimumwages>

### *Which time frame?*

3. Countries readjust minimum wage levels at different frequencies and through different mechanisms. Some minimum wages readjust biannually, whereas others are adjusted in a given month during the year, and others every few years. Given the variation in time frames regarding minimum wage readjustment, the GWR uses the level in force on the 31<sup>st</sup> of December of the current year. In the case of the 2009 update of the GWR only data through 2008 are considered. If 2009 data were also included, the database would be a combination of (1) minimum wages which changed in 2009, (2) minimum wages which did not change, and (3) minimum wages which were expected to change in 2009, but were not as yet in effect as of the date of publication of the GWR. Limiting figures to 2008 eliminates this problem.

### *How are minimum wage figures standardized?*

4. Minimum wages are standardized to monthly levels in the ILO Global Wage Database. However, as previously mentioned, some countries set the levels of their minimum wage(s) differently. For example, some minimum wages are hourly, whereas others are daily, weekly, or monthly. In the event that minimum wage figures are available monthly, monthly figures are used. Otherwise, weekly figures are multiplied by 52 weeks and divided by 12 months. Daily figures are multiplied by the number of days normally worked in a given country and then by 52 weeks divided by 12 monthly. Hourly figures are multiplied by the number of hours generally worked in a day. Daily figures are then transformed into weekly using the number of days worked in a week and finally multiplied by 52 weeks divided by 12 months. Data regarding the number of hours and/or days worked in a week in a given country are initially obtained from the ILO Database of Conditions of Work and Employment Laws (see footnote 8). If data are not available from this database, national sources are consulted. If national or regional sources are uninformative, secondary sources are consulted where necessary.