

Global and Regional Estimates of Consumer Price Inflation

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Summary - *Global and Regional Estimates of Consumer Price Inflation*

This article presents global and regional estimates of consumer price inflation as produced by ILO Bureau of Statistics in collaboration with the Federal Reserve Bank of Cleveland. Inflation estimates for about 200 countries, areas and territories, and seven aggregates (one global and six regional) are now available at <http://www.centralbankinstitute.org/index.cfm>. The Website allows users to create graphs and download data using drop-down menu options. The national CPI figures, both annual and monthly and including the CPI by expenditure groups, are collected by the ILO Bureau of Statistics and disseminated on its website <http://laborsta.ilo.org/>.

Résumé - *Estimations mondiales et régionales de l'inflation des prix à la consommation*

Cet article présente des estimations mondiales et régionales de l'inflation des prix à la consommation telles qu'elles sont produites par le Bureau de Statistique du Travail du BIT en collaboration avec la Réserve Fédérale de Cleveland. Les estimations de inflation pour environ 200 pays, régions et territoires, et sept agrégats (un mondial et six régionaux) sont maintenant disponibles à l'adresse <http://www.centralbankinstitute.org/index.cf>. Ce site internet permet aux utilisateurs de créer des graphiques et télécharger des données en choisissant le menu déroulant dans les options. Les chiffres des Indices des Prix à la Consommation (IPC) nationaux, annuels et mensuels, y compris les IPC par groupes de dépenses, sont collectés par le Bureau de Statistique du Travail du BIT et diffusés sur son site internet <http://laborsta.ilo.org/>.

Sinopsis - *Estimaciones mundiales y regionales de la inflación de los precios al consumidor*

Este artículo presenta las estimaciones mundiales y regionales de la inflación de los precios al consumidor obtenidas por la Oficina de Estadísticas de la OIT en colaboración con la "Federal Reserve Bank of Cleveland". Las estimaciones de la inflación de aproximadamente 200 países, regiones y territorios y siete totales (uno mundial y seis regionales) pueden consultarse en <http://www.centralbankinstitute.org/index.cf>. Esta página Web permite a los usuarios de crear gráficos y descargar datos seleccionando el menú desplegable en las opciones. Las cifras nacionales de los IPC, anuales y mensuales y los IPC por grupos de gastos son colectadas por la Oficina de Estadística de la OIT y divulgadas en la página Web <http://laborsta.ilo.org/>.

Global and regional estimates of various indicators have received a substantial amount of attention in recent years, and methodologies have been adopted to construct them. With the globalisation of trade and production and the liberalisation of the markets, there is an increasing interest in global and regional estimates of price inflation. International agencies, but also private international corporations and central banks, find it useful to know whether a particular region or group of countries has experienced a higher rate of inflation than the world as a whole when assessing how to allocate aid resources or investments or conducting different types of economic analysis.

To meet the need for this information, the ILO Bureau of Statistics, in collaboration with the Federal Reserve Bank of Cleveland, has been working on the development of a procedure for estimating the regional and global consumer price inflation and changes in the prices of consumer goods and services. Aggregated measures of consumer price inflation are estimated for seven regions, and these, together with monthly and annual consumer price indices (CPI) figures for some 200 countries, areas and territories around the world, are disseminated on the Website of the Federal Reserve Bank of Cleveland (USA) at: <http://www.clevelandfed.org/research/inflation>. The national CPI figures, both annual and monthly and including the CPI by expenditure groups, are collected by the ILO Bureau of Statistics and disseminated on its website <http://laborsta.ilo.org/>.

This paper introduces the new experimental estimates¹ of regional and global price changes, describes the methodology used to construct them, presents the estimates themselves, and looks at future research work that should lead to better estimates.

¹ The estimates are considered as experimental as this is still work in progress.

Introduction

Estimates of global and regional consumer price inflation can serve a number of purposes. First, they can provide a snapshot of price inflation across the globe and within its major geographical regions. Second, price inflation over time may be analysed in conjunction with other economic and social variables to draw conclusions about future trends in the global economy and about regional and national financial markets. Third, they provide global benchmarks against which the market performance of individual economies may be compared. These comparisons may play a significant role in many trade and financial decisions. Finally, they have a role in assessing the changes in cost of living, salary adjustments, etc and therefore wellbeing /capacity of working population.

Measurement Problems

Global inflation in its simplest sense is a measure of the average aggregate rate of increase of national prices across all countries. In principle, an estimate of global inflation can be approached as a weighted index of national price changes, similar to the way in which national CPIs are calculated from each country's regional CPIs. Estimating CPIs for the world and its regions would be a straightforward exercise if all the elements required for calculating the indexes were available and if all national CPIs were comparable. At present, however, not all of the elements are readily available in a timely fashion, and alternatives must be identified to use in place of the missing elements. Furthermore, there are discrepancies in the methodologies that affect the reliability and comparability of the estimates. To highlight only some, consider that there are differences in the definitions and concepts used, the sampling techniques, the periodicity of the data, the frequency at which it is gathered, the populations on which the indexes are based, the coverage of geographic regions and consumer items, the selection of base periods, and other constraints. Given the very diverse methodologies different countries use to calculate price inflation and the wide variation in national price movements occurring between countries and over time, it might be argued that little or no meaning can be attached to such measures of global price changes. Finally, a global CPI is likely to be subject to bias because the national CPIs in many countries are based on expenditure patterns and prices observed in urban areas only.

It is important to note that, depending on the purpose the user has in mind, a global CPI may be constructed in different ways, each with its own measurement objectives. The primary purpose of the global index might be: (i) to measure the overall change in prices paid over time by the world's populations or (ii) to assess the price inflation in the global economy.

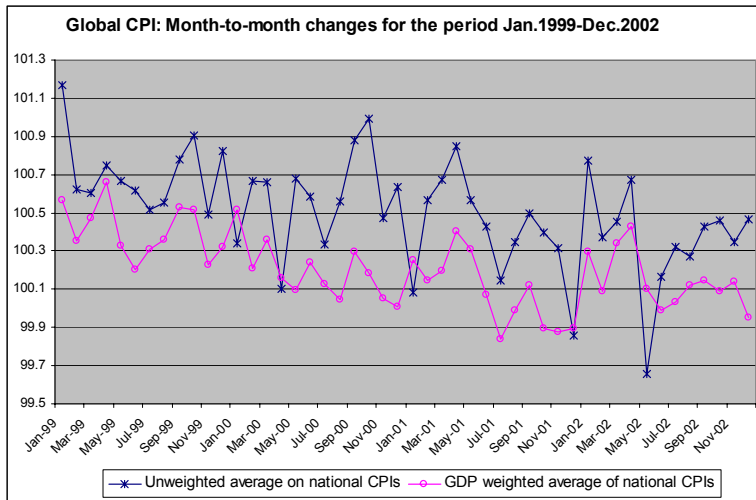
Regional and Global CPI Measures

Various methods were considered for estimating global consumer price inflation, including (i) a simple average, (ii) a weighted average, and (iii) the median price change.

Method (i) calculates the global price change as the unweighted average of price changes across all countries (that is, each of the national CPIs is weighted equally). It gives a measure that indicates the type of price changes but it is not an adequate measure of regional or global inflation because it assumes that all countries contribute equally to the global inflation regardless of their size in terms of population and/or importance in the global economy. Method (ii) calculates the global price change as a GDP- or population-weighted average of price changes across all countries. By weighting individual national price indices, the aggregate takes into account the respective size of each country's economy or population, depending on the weights selected. Method (iii) is the simplest aggregation method. The median shows the central tendency, it is simple to understand and easy to calculate, while also giving a measure that is more robust in the presence of extreme values than is the average. It however suffers from the same drawbacks as method (i).

Method (ii) was selected as the most appropriate measure of global consumer price inflation as it reflects the size of each country's economy or population and is consistent with the procedures used to calculate national CPIs.

The following chart illustrates the differences between the unweighted and weighted month-to-month global CPIs for the period January 1999 to December 2002. As can be seen, the global CPI calculated as a simple arithmetic average of the national CPIs shows a higher month-to-month changes than the weighted average.



Weights Used for Aggregation: Conceptual Issues

Once the method was decided, the issue of types of weights for aggregating national data was considered.

National CPIs may be aggregated into regional indices by weighting each country’s CPI by any number of measures, but it is important to remember that the measure selected affects the interpretation of the resulting aggregate. Weighting national CPIs either by GDP or population size was considered. When weighting by GDP, the weights represent the share of each country’s GDP in the GDP of the region. When weighting by population, they represent the country’s share of the region’s population. Using GDP means that each country’s price index contributes to the aggregate according to its share of GDP. Countries with high GDP would have more influence on the regional CPI than the countries with low GDP. In this respect, therefore, the estimated global price inflation might not accurately measure the effect of consumer price inflation on the living standard of the world’s population. Using population weights means that each country’s price index contributes to the aggregate according to its share of total population in the region.

If the main objective of the regional indices is to estimate the general effect of inflation on the economy in the respective region, GDP weights may be more appropriate. On the other hand, if the main objective is to estimate the effect of inflation on the living standard of the population in the region, then population weights might be judged as more appropriate as these population-weighted CPIs would take into account the number of people who are experiencing high (or low) inflation.

To be consistent with the weights used to calculate the national CPI, it was considered that the most appropriate weighting pattern should be based on the household consumption expenditure of each country since this component of the GDP is composed primarily of expenditures by resident households on new durable and non-durable goods and services.

Unfortunately, as the required data (household consumption expenditure estimates converted to a common currency, US dollars, using Purchasing Power Parities (PPPs)) are not commonly available for all countries, nor for all years, it was decided to use GDP estimates deflated by PPP as the weights.

Methodology for Compiling Totals

The following section briefly describes the methodology used for compiling global and region totals.

Global and regional price indices are calculated as a weighted geometric average of national price indices, with the weights being each respective country’s 1999 GDP in current international dollars based on purchasing power parity (PPP)².

The 1999 GDP data have been used because, at the time this project started, these were the most recent data available. In order to provide a reliable and relevant measure of current inflation, however, a changing set of

² World Bank estimates available at http://unstats.un.org/unsd/cdb/cdb_source_xrxx.asp?source_code=45

GDP weights will need to be introduced to allow for the changing importance of countries within regions over time.

The weight of a country is its share in the total GDP for the world of region, and is expressed as percentage.

A geometric average rather than an arithmetic average is used because it is less affected by extreme values and is regarded as more suitable for groups where the dispersion of indices is considerable.

Country Composition of Regions

Another point for consideration was the basis on which countries should be grouped. Researchers and analysts might be interested in any number of potential groups, but initially it was decided to assign countries into one of six categories and provide alternative groups later. The first two categories are developed and transition countries. Countries not assigned to either of these are then grouped by geographical location. The standard UN Country and Region Classification³ was used as a starting point for making decisions on the main groups. Modifications were made to account for the specificity of the CPI. For example, the transition countries from Central and Eastern Europe and Commonwealth of Independent States were grouped in a separate group from other countries in transition because of the similar trends in the price inflation they experienced at the beginning of 90's.

CPI estimates are produced for the following main country groups:

1. Developed
2. Transition
3. Asia and Pacific
4. Latin America and the Caribbean
5. Sub-Saharan Africa
6. Middle East and North Africa

A full list of the countries whose data are included in each group is available at <http://www.clevelandfed.org/research/inflation/Index.cfm>. The global CPI estimate covers all countries for which CPI series are available.

Practical Procedure for Estimating Global and Regional CPIs

This section provides general information on the way in which the global and regional estimates are calculated.

1. An initial dataset is created using the CPI data (general indices) available at the ILO website⁴.
2. In order to include countries which compile only quarterly or semi-annual CPIs in the aggregates, the dataset is adjusted and the values for the missing months are estimated/imputed.
3. Additional adjustments are made for countries that have breaks in their series.
4. Finally, the dataset for the countries that have multiple series is adjusted either by averaging their available series or by selecting the most appropriate one. Preference is given to series having wider national geographical coverage and relating to all income groups, provided they are no less current than more narrowly defined series.
5. Another dataset is created with 1999 GDP values for all countries for which the CPI series are available, and the weights are calculated. As the same countries must be compared from one period to another, adjustments of weights are made each month for any changes in country coverage. In calculating the aggregated GDP and deriving the weights, only those countries that have CPI data available for both period t and period t-12 are included. The countries that have no CPI data for either period are excluded from the aggregated GDP.
6. Because the CPI data for some countries are not available through to the end of a given period for which the global and regional averages are calculated, the missing data are estimated. It is assumed

³ <http://unstats.un.org/unsd/methods/m49/m49regin.htm>

⁴ <http://laborsta.ilo.org/>

that the rate of change in the missing country data is the same as the rate of change in the weighted total or average of the reported country data for that region.

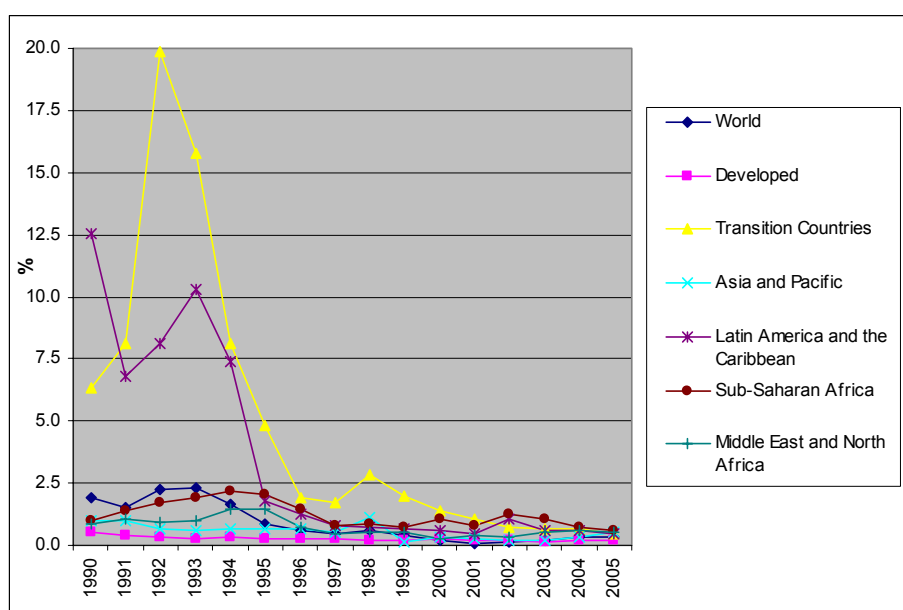
Inflation series for each country and region are calculated as percent changes, either from month to month or year to year index series.

The 12-month rate of change shown in the tables is calculated as the percentage variation over 12 months for monthly series, over four quarters for quarterly series and over one year for annual series.

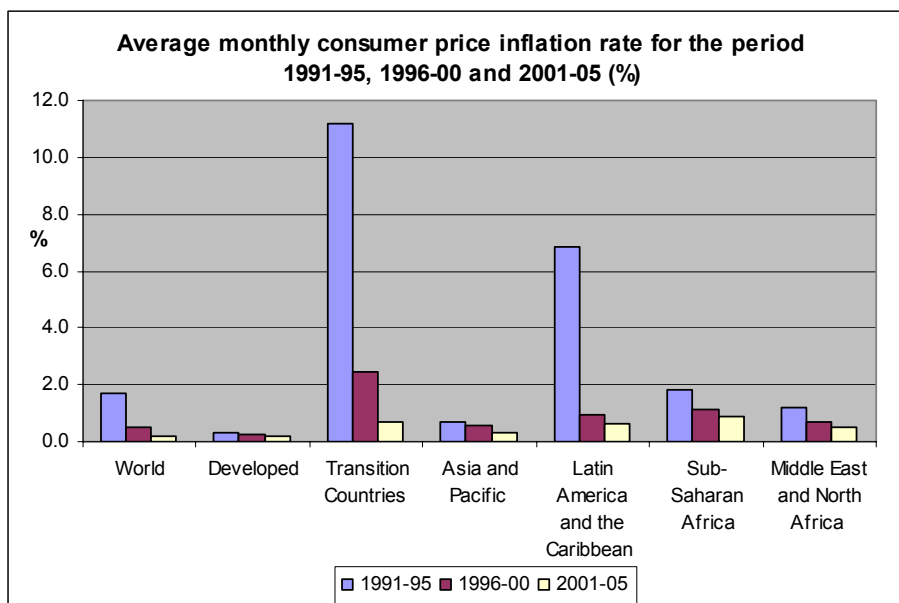
The estimates for regional and global inflation in 1990–2005 resulting from this procedure are presented in the table and charts below.

CPI Estimates for the World and the Main Country Groups

The chart below shows the average monthly consumer price inflation rates for the period 1991-2005 for the world and the six regions. It can be seen that the monthly inflation rate at the global level has been decreasing from about 2.0% at the first half of the 1990's to about 0.3% in 2005.



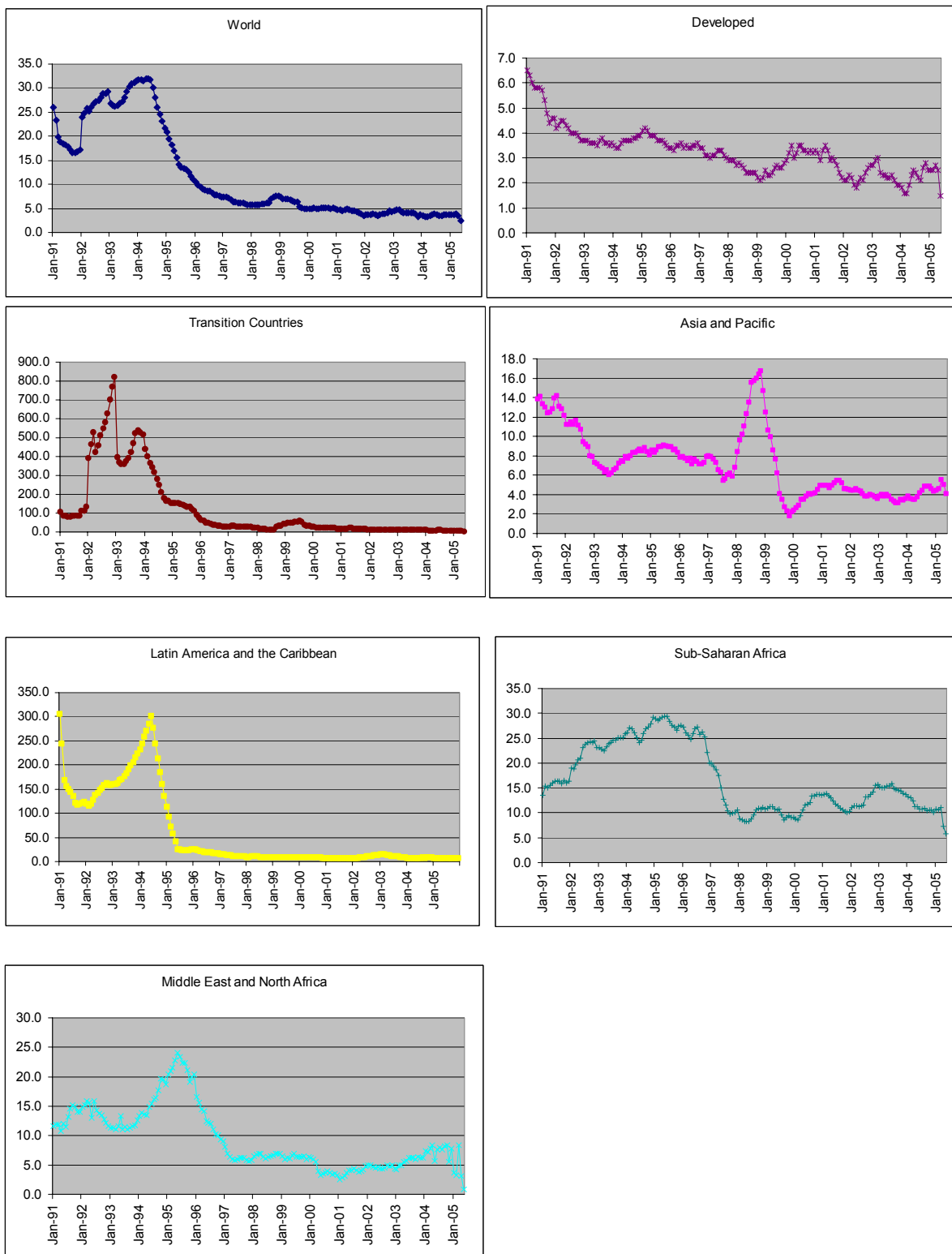
Consumer price inflation differs greatly across regions. The chart below shows the average monthly consumer price inflation for the periods 1991-95, 1996-2000 and 2001-2005, by region. The period 1991-95 was characterised by high inflation in transition countries and in Latin America, with a monthly inflation of about 11% and 7%, respectively. After this period of mainly high inflation, the monthly rates in these two regions fell to less than 2.5% in 1996-2000 and to less than 1% in the period 2001-2005. The monthly inflation rate in the developed countries dropped from 0.3% in 1991-95 to 0.25% in 1996-2000 and 0.2% in 2001-05.



The next table shows the year-over-year percentage changes for the period 1990-2005 by region. It shows falling rates of global annual inflation. After the years of double-digit inflation in 1990-95 and predominantly high inflation in 1996-2000, global rates fell to less than 5% in 2000-05. The most marked decreases were recorded in the transition countries, and the most stable, continuously low and decreasing inflation was recorded in the developed countries.

| | World | Developed Countries | Transition Countries | Asia and Pacific | Latin America and the Caribbean | Sub-Saharan Africa | Middle East and North Africa |
|------|--------------|----------------------------|-----------------------------|-------------------------|--|---------------------------|-------------------------------------|
| 1991 | 18.9 | 5.5 | 92.6 | 13.2 | 158.3 | 15.8 | 13.0 |
| 1992 | 26.8 | 4.1 | 567.1 | 10.2 | 141.1 | 22.2 | 14.0 |
| 1993 | 28.4 | 3.6 | 436.7 | 6.7 | 183.9 | 24.2 | 11.6 |
| 1994 | 28.7 | 3.7 | 271.0 | 8.2 | 233.5 | 26.4 | 16.0 |
| 1995 | 15.0 | 3.8 | 128.9 | 8.7 | 45.1 | 28.3 | 21.5 |
| 1996 | 8.6 | 3.5 | 39.6 | 7.5 | 19.4 | 25.3 | 12.3 |
| 1997 | 6.4 | 3.2 | 26.6 | 6.6 | 11.9 | 13.8 | 6.2 |
| 1998 | 6.3 | 2.6 | 20.3 | 13.3 | 9.0 | 9.5 | 6.7 |
| 1999 | 6.2 | 2.4 | 43.8 | 6.0 | 8.2 | 10.0 | 6.3 |
| 2000 | 5.1 | 3.3 | 20.1 | 3.7 | 7.5 | 11.7 | 4.2 |
| 2001 | 4.4 | 3.0 | 16.0 | 4.9 | 6.1 | 11.8 | 3.8 |
| 2002 | 3.9 | 2.2 | 9.9 | 4.1 | 9.3 | 12.8 | 4.7 |
| 2003 | 4.1 | 2.3 | 8.5 | 3.6 | 10.9 | 14.8 | 5.7 |
| 2004 | 3.7 | 2.2 | 8.2 | 4.2 | 6.8 | 11.3 | 7.7 |
| 2005 | 3.8 | 2.7 | 5.5 | 5.2 | 6.5 | 7.1 | 6.6 |

The charts below show the annual inflation rates (price change between the current month and the same month the previous year) by region in 1990-2005.



Dissemination and Future Work⁵

Inflation data for about 200 countries, areas and territories and seven aggregates (one global and six regional) are now available at <http://www.centralbankinstitute.org/index.cfm>. The Website allows users to create graphs and download data using drop-down menu options.

The following series are available:

⁵ For any comments and suggestions you may have on this database, please contact the ILO Bureau of Statistics by email: stat@ilo.org or by regular mail: ILO Bureau of Statistics, Route des Morillons, 4, CH-1211 Geneva 22, Switzerland.

- Month-to-month per cent changes by country, region and the world,
- Year-to-year per cent changes by country, region and the world,
- Annual inflation rates (price change between the current month and the same month the previous year) by country, region and the world.

In the next stage, it is planned to add other groups to the Website, such as sub-regional groups, more groups by level of development, groups by income level, and trade groups, and other data, such as past CPI levels, basket weights, percent urban and percent rural population. One aim is to add data so that users can aggregate the national data in any way that they would like. After that, additional information on each country, such as its location, income per capita, and possibly percent urban and rural population may be included. Farther down the road, it is hoped to add other CPI series (e.g., CPI minus rent; clothing, electricity and fuel, weights; average food prices), which would be annual data only.