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Useful data and tools for quickly estimating economic trends

Ho-Sup Lee
Jong Rlog Choi
Sung Joo Lim

Korea

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Ho Sup Lee (hslee72@korea.kr), Director, Statistics Korea
Jong Rlog Choi (jrchoi@korea.kr), Deputy Director, Statistics Korea
Sung Joo Lim (lim2002@korea.kr), Statistician, Statistics Korea

Ⅰ. Introduction

It is important to generate high quality rapid or flash estimates of economic performance. Statistics Korea (in short "KOSTAT") would like to focus on identifying and remedying data gaps to monitor situations like the unprecedented financial and economic turmoil of 2008 and 2009.
Various types of business cycle indicators are required to forecast future business conditions. Leading composite indexes on business conditions, which are compiled in nations such as the USA, Japan, Korea, and OECD are worth benchmarking in other countries. In Korea, the Monthly Diffusion Index of Production Activity is released quarterly. This index is compiled with 161 sub-industry production data including the service industry by our KOSTAT-CIS software program. We introduce other countries two indicator or tool with the aim of characterizing economic conditions and tracking developments in the business cycle. These include the Business Cycle Clock (BCC) and a Monthly Index of all Industry Product (IAIP).

The first indicator, the Business Cycle Clock, is being developed and will be ready in December 2009. It is being designed as an interactive application on the website of KOSTAT. This tool is useful in interpreting graphical representations of the development of 10 selected indicators. Following the Business Cycle Tracer developed by Statistics Netherlands, it provides interesting additional features to many users and clarifies the state of the economic indicators by focusing on the business cycle component of their development, filtering out short-term and erratic components.
As another high frequency indicator, a Monthly Index of all Industry Product (IAIP) is released as a comprehensive indicator about economic performance in Japan. Also, a monthly GDP is published in Statistics Canada. Statistics Netherlands has considered developing a monthly GDP estimate because it may fill the data gaps caused by the Netherlands Business Cycle Tracer (BCT) which cannot be interpreted quantitatively.
Presently, KOSTAT is developing a Monthly Index of all Industry Product similar to Japan's indicator, while a monthly GDP is expected to be a challenge in the future.
Next, we will explain the principles and ideas about the BCC and IAIP. Statistics Korea has initiated the development of the BCC and IAIP to trace business cycles and meet timeliness data requirements.

Ⅱ. **Business Cycle Clock**

1. Background of the development

The Business Cycle Clock (BCC) compensates for the limitations of the Composite Economic Index and statistics compiled by Statistics Korea. It is difficult for users to understand where key economic indicators (original and seasonal adjusted ones) are located in a business cycle phase (expansion, downturn, slowdown, recovery) and instantly recognize major aspects of an economic condition. The Business Cycle Clock is being developed based on the original concept of Statistics Netherlands, which has released the Business Cycle Tracer every month since 2005.

The Composite Economic Index has an advantage in that it represents the aggregate economic activity of a nation with one indicator. However, it is not easy for users to comprehend the cycle of the separate indicators in the Composite Economic Index. The Business Cycle Clock is being designed to complement this kind of limitation.

We envision the Business Cycle Clock becoming a tool which facilitates the analysis of medium-term economic developments and assisting the Composite Economic Index and statistics compiled and published by Statistics Korea.

2. Concept, basic principles and unique qualities

2-1. Concept

The Business Cycle Clock visualizes the state and course of the Korean economy and is basically an overall portrait of key macro-economic indicators. By comparing the developments of a selection of the main economic indicators with each other, patterns and links between indicators become visible. Their common component is a reflection of the state of the economy.

This will aid in the analysis of the macro-economic indicators which Statistics Korea publishes every month. An emphasis is being placed on the dynamics of the indicators more clearly visible and easier to interpret. This will be achieved by presenting their cyclical component, which is easier to interpret than normal mutations and focuses on medium-term developments.

2-2. Basic principles

The development of an indicator can be characterized by its business cycle component and classified into one of four possible states;

The indicator is positive and increasing - green
The indicator is positive and decreasing - orange
The indicator is negative and decreasing - red
The indicator is negative and increasing - yellow

These four options are illustrated by four quadrants of a graph, which will enable a quick analysis of the current economic state of the business cycle.

<Figure 1> Cyclical phase of Business Cycle Clock
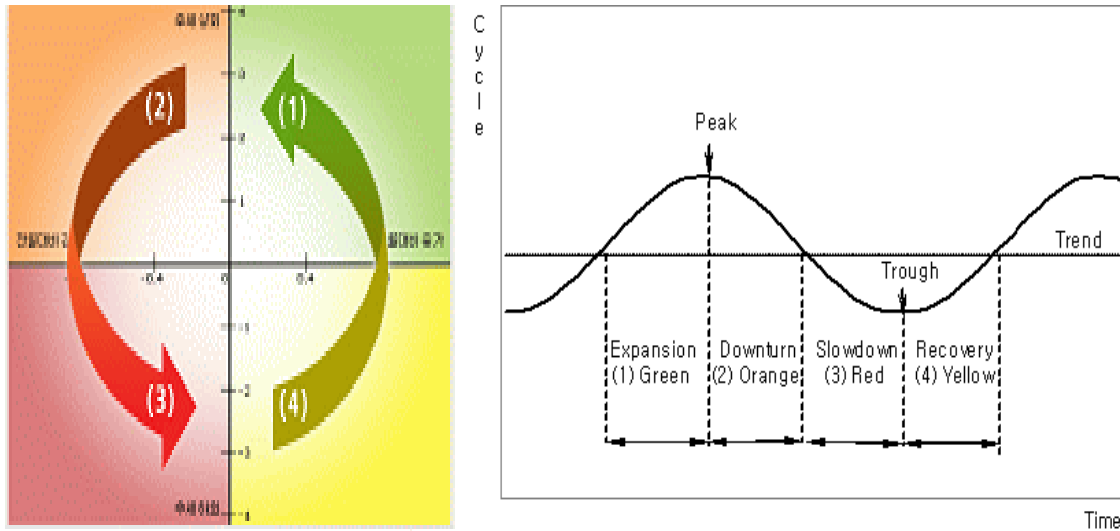
2-3. Unique qualities

The picture in time of the previous reference date of an economy is available by clicking on the menu-bar of the Business Cycle Clock. The reference date represents most important turning points on expansion and contraction in the aggregate economic activity of a nation.

The Composite Economic Indexes of Korea have been compiled since March 1981, and the monthly data is available from 1970. From 1970 to the present, the release of reference dates has been conducted 11 times during 9 growth cycles. The reference dates of an economy are used to assess the economic policies and co-movement of economic indicators.

The reference date is used for testing the business cycle behavior and studying the characteristics of economic movements. According to reference dates, the scope of the study is selected to investigate the cause and effect relationship of the corresponding cycle era. Korea is the only country that provides the reference date on the Business Cycle Clock graphical interface.
Data tables and metadata of 10 key economic indicators are linked with the statistical database of the Korea Statistical Information Service (KOSIS). The screen after clicking on the title of statistics table is composed of a statistics table and functions of data analysis.

Korea is the only country which provides the Business Cycle Clock as well as Composite Economic Index.
The composite leading, coincident, and lagging indexes are announced monthly. Also, the cyclical component of the composite coincident index and the 12 month smoothed change in the Composite Leading Index which are measured as a growth cycle in the Korean economy are released. The leading and coincident diffusion indexes are compiled internally and they are used to check economic conditions and identify turning points.

3. Criteria for the indicator selection

The Statistics Korea Business Cycle Clock has to be able to present a reflection of the current state of the economy at any point in time. This requires a balanced set of indicators which provides an undistorted and timely picture of the state of the business cycle. To achieve this, we formulated a number of criteria for the selection of the indicators. We followed the guiding principle of the Netherlands

We dropped the rather strict requirements, as these would exclude a number of very important indicators. These can be divided into criteria for individual indicators and criteria for the set as a whole.

○ The criteria for individual indicators are as follows;

· Strong enough theoretical grounds for inclusion
· A sufficiently strong and timely relation with the business cycle
This means it must possess a minimum correlation of ± 0.5 with the reference composite coincident index-cycle at a maximum lead or lag of about six months
· Timely detection of major turning points in the business cycle
(within about six months, before or after)
· No or a very small number of cycles unrelated to the general business cycle (minor cycles)
· A sufficiently long time series should be available

○ The criteria for the indicator set as a whole are as follows;
· All major aspects of the economy should be represented (i.e. production, consumption, trade, labor market, confidence indicators)
· The set should be balanced, no one aspect of the economy or type of indicator should dominate the Business Cycle Clock. This will prevent non-general developments distorting the analysis.
· The whole system should be roughly coincident with the business cycle
· Major turning points in the cycle should be timely and reliably detected

Note that we do not require the indicators to be lagging, leading or coincident. The Business Cycle Clock should result in a stable representation of the business cycle, which being sensitive enough to register important new developments.

○ Selected 10 key economic indicators

| Economic Sector	Indicator	Frequency
Production	Industrial Production Index	Monthly
	Service Industry Activity Index	Monthly
Consumption	Consumer Goods Sales Index	Monthly
Investment	Index of Equipment Investment	Monthly
	Value of Construction Completed (Real)	Monthly
Trade	Exports (Real)	Monthly
	Imports (Real)	Monthly

Labor market	Number of Employed Persons	Monthly
Sentiment	Business survey Index(manufacturing)	Monthly
	Consumer Expectation Index	Monthly

4. The composition of BCC interface

A user can view the Business Cycle Clock banner on the initial screen after connecting to the KOSTAT homepage (www.kostat.go.kr). The Business Cycle Clock interface consists of three frames, including a graph (main clock), moving control buttons and a frame for selecting indicators.

The Business Cycle Clock combines both a graph and selection window into a one page interface including an animation control below the graph for viewing economic evolution in a dynamic fashion. As can be seen in figure 2, each indicator is represented by its own graphical symbol, and by putting the cursor over the symbol, the title of the indicator is highlighted within the graph.
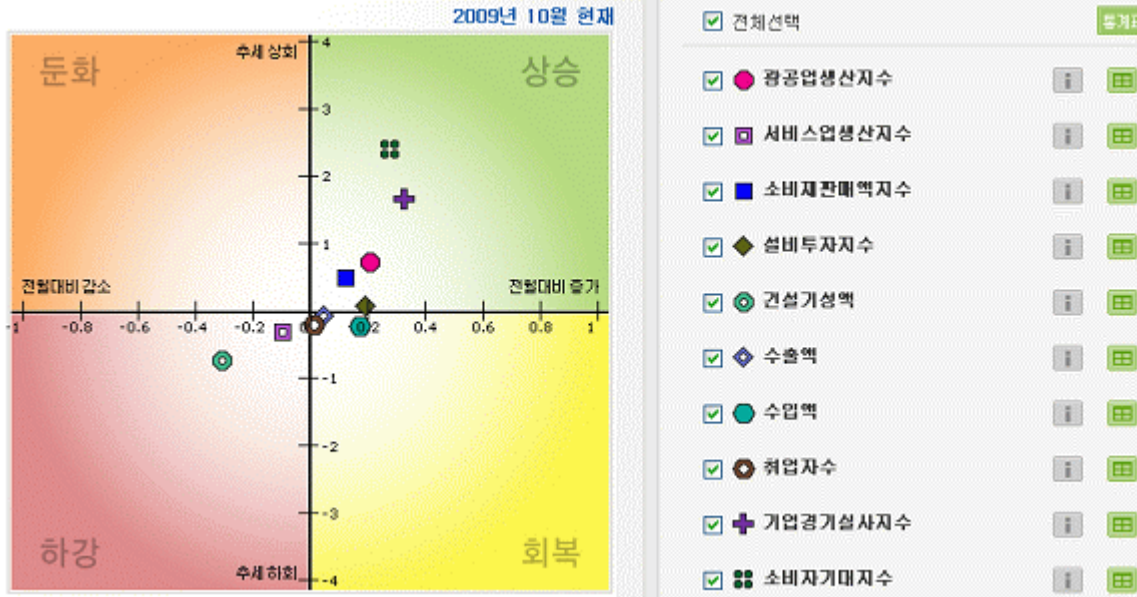
<Figure 2> Business Cycle Clock Display
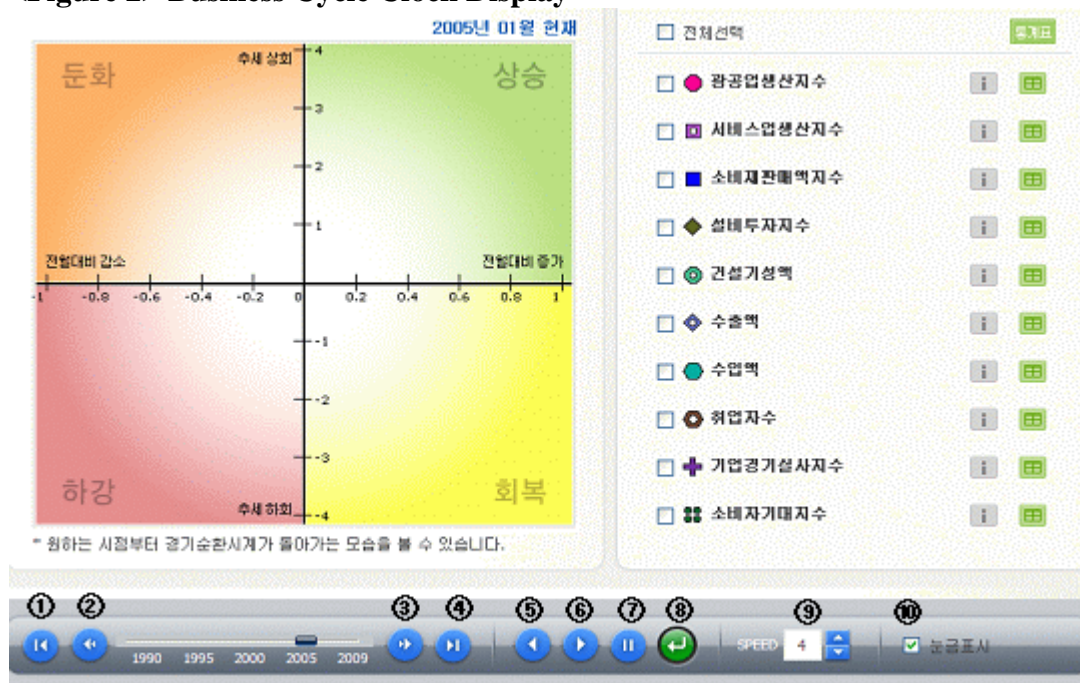
① To start of timeline ② Previous month ③ Next month ④ To end of timeline
⑤ Play animation(rewind) ⑥ Play animation(forward) ⑦ Pause animation
⑧ Repeat animation on/off ⑨ Increase/decrease animation speed ⑩ Units on axes

5. Example on the utilization of BCC

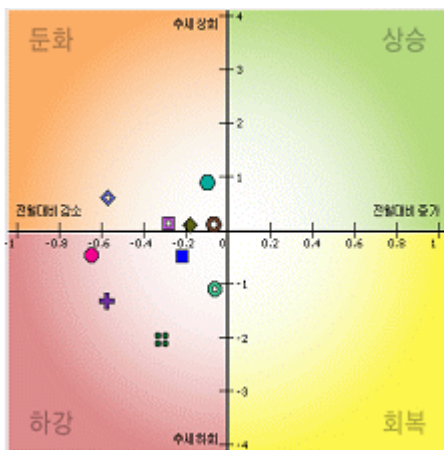**5-1. Analysis of October 2009 using Business Cycle Clock**

5-2. Recent movement of key economic indicators using the BCC
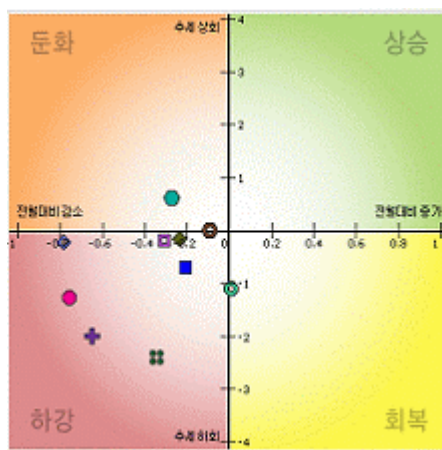
<Figure 3> Business Cycle Clock for Korea

- The global financial crisis spanned the second half of 2008 and is represented in the movement of the Business Cycle Clock since as key indicators were headed further into a trough.

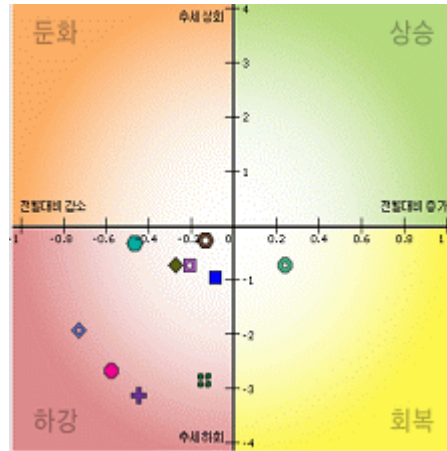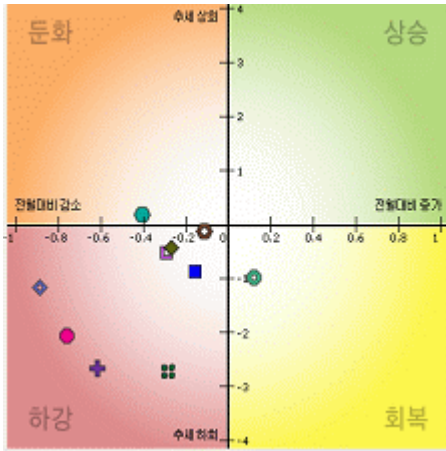September 2008   October 2008
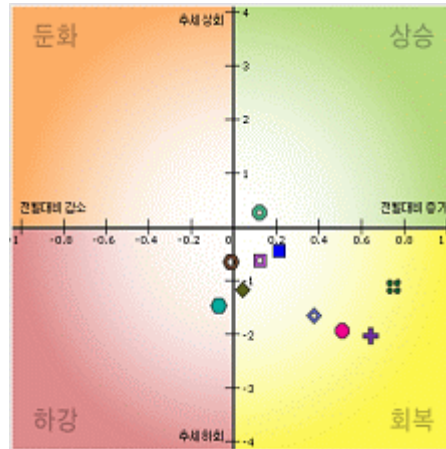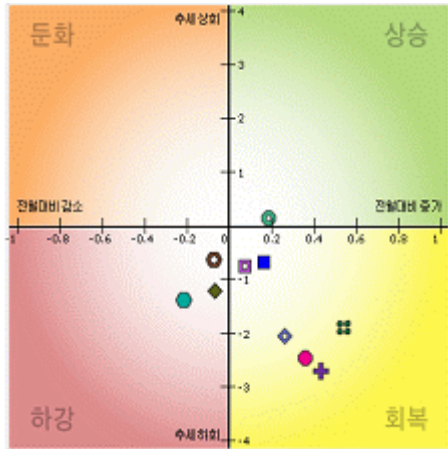

November 2008   December 2008

- Additionally, the movement after Global Financial Crisis in the first half of 2009 year is represented in the Business Cycle Clock as key Indicators were passing a trough. Indicator such as the BSI already began to expand.
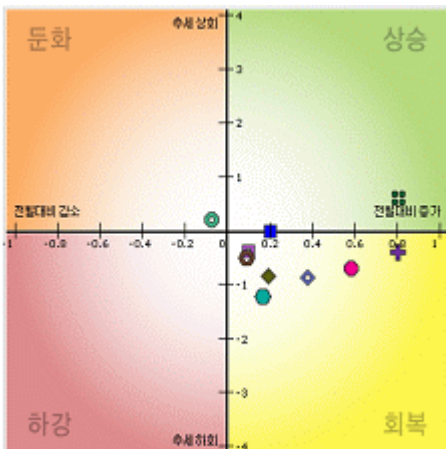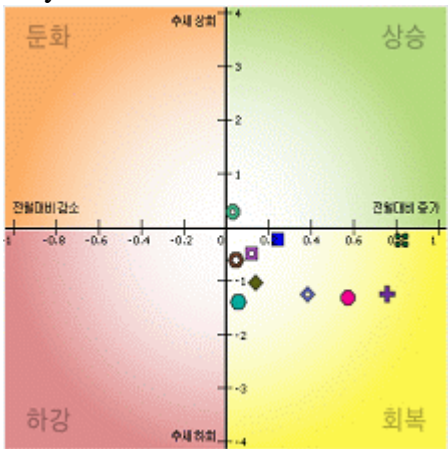
March 2009

April 2009

May 2009

June 2009

5-3. Use of Business Cycle Clock

Because the Business Cycle Clock provides the location and movement on business cycle phase visually, it makes the spread of the understanding of the current economic state and the business cycle and enhances the user's interest concerning statistical indicators.

As the cycle of the separate indicators from which seasonal, irregular and trend components are removed is displayed trough a graphical tool, users are able to analyze the various information.

KOSTAT is confident that the Business Cycle Clock will provide a tool that accurately analyzes the early turning point of a business phase, medium-term development (above or below trend) and short-term development (increasing or decreasing).

Ⅲ. The development of the Index of All Industry Product

1. Overview

The Index of All Industry Product (IAIP) is an index that represents the flows and changes in goods and services in all industries of the country. Other existing economic indices are inadequate in assessing the overall economy because they are separately measured by each industry such as manufacturing and service industry. As for the GDP, which is measured quarterly, there are limits to prompt reflection of economic trends.

In order to overcome these limits, the Index of All Industry Product has designed to measure the monthly production of all industries as a whole. In other words, it has the merit of providing rapid statistics which include of all industries. It can be used for analyzing the supply side of the

overall economy. Statistics Korea plans to fully develop the Index of All Industry Product by the end of 2009.

2. Scope

The Index of All Industry Product covers 19 industry divisions; (A) 'Agriculture, forestry and fishing', (B) 'Mining and quarrying', (C) 'Manufacturing', (D) 'Electricity, gas, steam and water supply', (F) 'Construction', (O) 'Public administration and defense', (E) 'Sewage, waste management, materials recovery and remediation activities', (G) 'Wholesale and retail trade', (H) 'Transportation', (I) 'Accommodation and food service activities', (J) 'Information and communications', (K) 'Financial and insurance activities', (L) 'Real estate activities and renting and leasing', (M) 'Professional, scientific and technical activities', (N) 'Business facilities management and business', (P) 'Education', (Q) 'Human health and social work activities', (R) 'Arts, sports and recreation related services' and (S) 'Membership organizations, repair and other personal services', of the Korean Standard Industry Classification, excluding (T) 'Activities of households as employers' and (U) 'Activities of extraterritorial organizations and bodies'.

3. Method

The Index of All Industry Product is a constant index based on the year 2005 and is measured on a monthly basis. It consists of five sub-indices including the Mining and Manufacturing Production Index, the Service Industry Activity Index, the Construction Industry Activity Index, the Agriculture, Forestry and Fisheries Production Index, and the Public Administration Sectors Production Index. It measures five industry sectors : mining and manufacturing; service industry; construction industry; public administration sectors and agriculture; forest and fisheries; according to the Korean Standard Industry Classification, and produces the overall index by calculating the weighted average of the individual indices. The weight is the share of each sector as a percentage of its GDP(value added).

4. The Indices of All Industry Activity (Japan)

The Indices of All Industry Activity is a similar index measured in Japan. It aims to assess the supply-side production activities of the economy, and is also made up of 5 sectors. Based on the year 2005, the index measured on a monthly basis except for the Indices of Agriculture, Forestry and Fisheries, which is measured on a yearly basis because of a lack of data.

Although there is no major difference between the two indices, the electricity, gas and water industries are included in the Industrial Production Index in the Index of All Industry Product while they are represented in the Indices of Tertiary Industry Activity in the Indices of All Industry Activity.
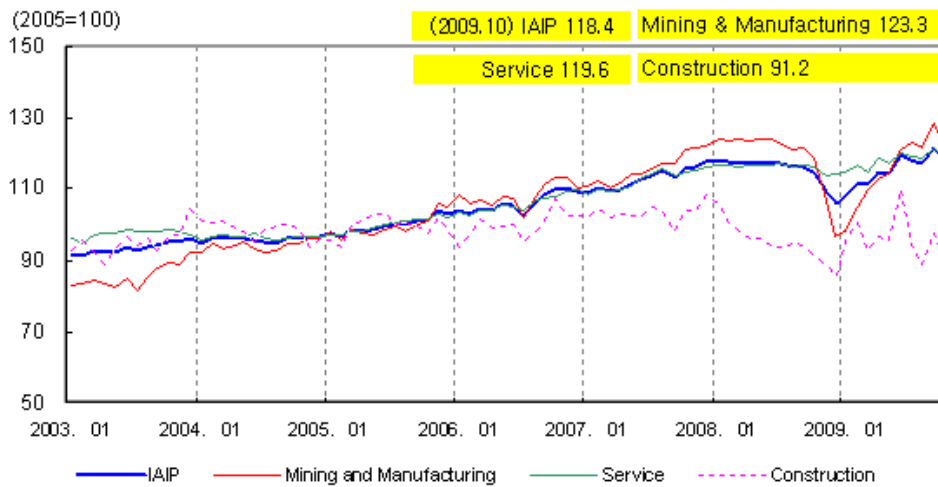
While the Index of All Industry Product is measured by calculating the average of the individual indices weighted by the share of each sector as a percentage of its GDP (value added) of the base year, the Indices of All Industry Activity uses the average of the individual indices weighted by the share of each sector as a percentage of the value-added of the input-output tables of the base year.

5. Result of analysis

The Index of All Industry Product, is computed using only three sectors including mining and manufacturing, construction, and service industries and excludes public administration sectors and agriculture, forest and fisheries.
Mining and manufacturing, construction, and service industries include 90.45% of all industries. The share of GDP (value added) based on the year 2005 of mining and manufacturing and electricity, gas, and water industries is 30.06%, whereas for service industries, it is 52.75%, and 7.64% for construction. X-12 ARIMA, developed by the U.S. Bureau of the Census, is used for its seasonal adjustment.

(Figure 4 : Seasonally Adjusted Index)

(Figure 5 : Original Index)
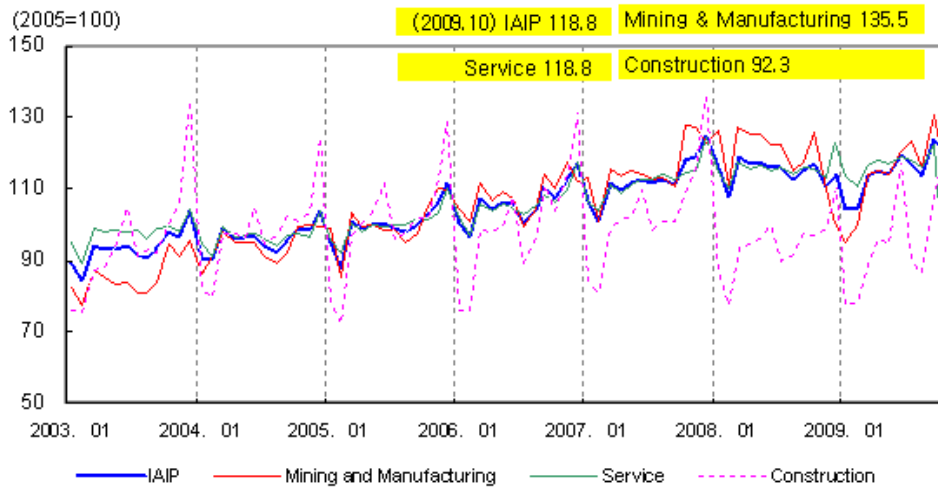
As Figure 4 and 5 show, the Index of All Industry Product of October 2009 decreased 2.6% from the previous month but increased 1.3% from the same month last year. Mining and manufacturing decreased 3.7% from the previous month but increased 0.1% from the same month last year. Service industries decreased 1.3% from the previous month but increased 2.8% from the same month last year. Construction decreased 6.7% from the previous month but increased 4.8% from the same month last year.

6. Conclusion

The Index of All Industry Product can be used as a tool for understanding short-term production activities and trends from a supply-side perspective and making an analytical assessment of various indicators. As it can provide both timely and comprehensive measurements, the index is useful in assessing short-term production trends in all industry sectors and can be widely used by the government in formulating public policy decisions and conducting post-evaluations.

Statistics Korea plans to develop this index by the end of 2009 and make it public in 2011 after simulating to get a high quality for one year.

Ⅳ. Conclusion

As explained, Statistics Korea has initiated the development of the IAIP and BCC to meet timeliness data requirements and trace business cycles. Statistics Korea would like to focus on identifying and remedying data gaps to monitor unprecedented financial and economic turmoil.

Various economic indicators are used to rapidly monitor economic recessions and recoveries. For example, the major statistics from the manufacturing industry produce data such as Industrial Production Index (IPI), exports and electronic sales.

In addition to the development of the IAIP and BCC, Statistics Korea is preparing to release Industrial Production Index (IPI) a few days earlier than now. The IPI is published on the last day of the following month. We will consider publicizing the index earlier only after solving a few problems

Another indicator that tracks economic trends rapidly is the Service Industry Activity Index(SIAI). There is the Service Industry Activity index and Wholesale & Retail Sale Index which concerns the statistics of monthly service industry activity. Compared with the release data of the other countries, the Industry Activity Index is published a few days earlier than in the EU, EK and Japan and the Retail Sale Index is published at least ten days later than in the EU, EK, Japan, and China. As explained, KOSTAT tries to release Industrial Production Index (IPI) a few days earlier than the present release date. The SIAI is published on the last day of the following month.

There is a possibility of publishing the Retail Sale Index five days earlier than the present release date. However, rapid publication of the SIAI is difficult because of the problem of gathering data. The Retail Sale Index will be published at the end of next year after checking the statistics quality management.

Discussion throughout the seminar will significantly contribute to the understanding of the production, dissemination and use of rapid estimate with their availability, timeliness and comparability. KOSTAT anticipates that the outcome of this second seminar will be appreciated as part of the overall regional and global assessment of the availability, timeliness and quality of basic economic statistics. In addition, KOSTAT looks forward to the report of the findings and recommendations of the twice seminars at the next session of the Statistical Commission in February 2010.

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