COMPOSITE LEADING INDICATORS
FOR
MAJOR OECD NON-MEMBER ECONOMIES

BRAZIL
CHINA
INDIA
INDONESIA
RUSSIAN FEDERATION
SOUTH AFRICA

AND
RECENTLY NEW OECD MEMBER COUNTRIES

KOREA
NEW ZEALAND
CZECH REPUBLIC
HUNGARY
POLAND
SLOVAK REPUBLIC

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Short-term Economic Statistics Division
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OECD

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1 Introduction

The OECD developed a System of Composite Leading Indicators for its Member Countries in the early 1980's based on the "growth cycle" approach. Today the OECD compiles composite leading indicators (CLIs) for 23 of its 30 Member countries and it is envisaged to expand the country coverage to include all Member countries and the major six OECD non-member economies (NMEs) monitored by the organization in the OECD System of Composite Leading Indicators. The importance of the six major NMEs (Brazil, China, India, Indonesia, Russian Federation and South Africa) was considered first priority and a workshop with participants from the six major NMEs was held at the OECD in Paris in April 2005 to discuss an initial OECD selection of potential leading indicators for the six major NMEs and national suggestions for alternative and/or additional potential leading indicators for calculation of country specific composite leading indicators. The outcomes of this meeting and the follow-up activities undertaken by the OECD in co-operation with the participating national agencies are reflected in the CLIs presented for these economies. More detailed results on the development of CLIs for the NMEs are presented in an OECD statistical working paper published in January 2006 available at http://www.oecd.org/findDocument/0,2350,en_2649_34257_1_119684_1_1_1,00.html

CLIs for recently new OECD Member countries (Korea, Czech Republic, Hungary, Poland and Slovak Republic) have been constructed from potential leading indicators identified among indicators for each country available in the Main Economic Indicators database (MEI). This approach has also been applied to the CLIs constructed for New Zealand for which the unavailability of an industrial production series prevented the calculation of a CLI in the past.

The OECD indicator system uses univariate analysis to estimate trend and cycles individually for each component series and then a composite indicator is obtained by aggregation of the resulting de-trended components. Today, statistical techniques based on alternative univariate methods and multivariate analysis are increasingly used in cyclical analysis and some of these techniques are used to supplement the current OECD approach in the selection of leading components and the construction of composite indicators for the major six OECD non-member economies.

The OECD approach to cyclical analysis is outlined in Part A. The reference cycle, turning point and trend estimation are covered in the first two sections. Selection and evaluation of indicators are presented in the next two sections where both classical NBER analysis and modern time series analysis such as spectral and dynamic factor analysis are used in the selection and evaluation process. The construction of composite leading indicators is covered in following section and the basic methodology employed is outlined in the final section.

The characteristics of the reference series, the component series and the CLIs for each country are described in Part B. A first section for each country gives a summary describing the most important relevant features of the information presented in the tables and graphs of the subsequent country sections. A second section presents characteristics of growth cycles in the output related monthly reference series (industrial production) and the quarterly GDP series. The final reference chronology based on information from the two reference series is presented in a third part. A final section gives details on the cyclical characteristics of both component series and CLIs.

PART A

Methodology

2.1 The reference cycle

OECD CLIs are constructed to predict cycles in a reference series chosen as a proxy measure for the aggregate economy. The index of industrial production (IIP) is used as the reference series for aggregate economic activity because, besides constituting the most cyclical subset of the aggregate economy, it is available promptly and on a monthly basis for most OECD countries. In addition, the cyclical profiles of IIP and GDP in OECD countries have been found to be closely related so that the CLIs also serve as leading indicators for the GDP cycle. This is supported by the fact that the CLIs are compiled from a set of components covering a wide range of economic indicators from all sectors of the economy. IIP for total economy is used as a reference series for the majority of OECD Member countries

2.2 Turning point and trend estimation

The OECD cyclical indicator system uses the "growth cycle" or "deviation-from-trend" approach. This is necessary because essential cyclical similarities between series may be obscured by different long-term trends. Trend estimation is therefore a crucial step in detecting cyclical movements and identifying turning points. The basic method of trend estimation adopted by the OECD is a modified version of the phase-average trend (PAT) method developed by the United States NBER. This method has been designed specifically to separate the long-term trend from medium-term cycles, with the latter defined according to the criteria programmed in the Bry-Boschan computer routine for selection of cyclical turning points. The Hodrick-Prescot (HP) method is used to supplement the PAT method for extracting growth cycles and identifying cyclical turning points in particular in the case of short time series. The two de-trending methods are described in section 3.2.

2.3 Selection of Indicators

2.3.1 Data sources and pre-selection of indicators

The Main Economic Indicators (MEI) database is used as the main source for the selection of potential cyclical indicators for a country. The database covers macroeconomic indicators for the following major subject areas: (1) industrial production, (2) selected commodity output variables (crude steel, crude petroleum etc.), (3) business and consumer tendency survey series, (4) selected manufacturing variables (deliveries, stocks, new orders etc.), (5) Construction, (6) domestic trade, (7) labour market series, (8) consumer and producer prices, (9) money aggregates, (10) interest rates, (11) financial variables, (12) exchange rates, (13) international trade and (14) balance of payments data.

The coverage of potential cyclical indicators for the major OECD non-member countries included in the MEI database is however not broad enough to obtain a reasonable number of leading indicators for each country in order to calculate a composite indicator. National data sources as well as international databanks have supplemented the MEI database as sources for the selection of potential cyclical indicators.

A pre-selection of potential indicators was conducted based on the following criteria;

Relevance:

- economic significance -- there has to be an economic reason for the observed leading relationship before the series can be accepted as an indicator;

- breadth of coverage -- series with a wide coverage, in terms of the representation of the economic activity concerned, are preferred to narrowly-defined series;

Practical considerations:
- frequency of publication -- monthly series are preferred to quarterly ones;
- absence of excessive revisions;
- timeliness of publication and easy accessibility for data collection and updating;
- availability of a long time series of the data with no breaks.

In addition to above criteria, we selected potential indicators from as many as possible of the above subject areas to obtain a good representation of overall economic activity. In the final selection, we tried to obtain a fair balance of indicators from the different subject areas in order to avoid overweighting a particular economic sector. Applying above criteria between 40 and 60 monthly and quarterly indicators from all subject areas were selected for each country.

2.4 Evaluation of the Indicators

The pre-selected candidate indicators series are evaluated for their cyclical performance with a set of statistical methods including both classical descriptive and univariat methods based on the NBER approach and multivariate methods such as dynamic factor models. Multivariate methods such as cross-spectral analysis and dynamic factor analysis were restricted to the evaluation of indicators for the major six OECD non-member economies mainly due to data availability. The cyclical indicator approach requires high frequency data and consistent time series for a reasonably long period of time. In addition, most of the indicators identified as leading indicators in developed market economies are usually not available on a monthly or quarterly basis in many developing countries or they are only available for a short period of time. Detailed evaluation results for the NMEs are presented in the OECD statistical working paper published in January 2006 available at
http://www.oecd.org/findDocument/0,2350,en_2649_34257_1_119684_1_1_1,00.html

2.4.1 Turning point analysis

The performance of cyclical indicators can be evaluated a number of ways. One is to examine the behaviour of the indicators in relation to the cyclical turning points of the reference series, i.e. peak-and-trough analysis. Forecasting turning points is one of the main objectives of the cyclical indicator technique because predicting the timing of cyclical turning points is one of the least reliable activities in economic forecasting.

For peak-and-trough analysis, statistics are assembled on each series' behaviour at cyclical turning points. This includes: the mean or median leads, the mean deviation from the median and the number of extra or missing cycles when compared to the reference series. Generally, these figures are not statistically significant in the usual sense due to the limited number of turning points available over the period investigated and because most series contain irregular movements and double or multiple peaks and troughs. The median, rather than the mean, is usually used in this kind of analysis because of the relatively small number of observations. However, peak-and-trough analysis involves a substantial amount of judgement which may alter the measures significantly.

2.4.2 Cross-correlation

Cross-correlation analysis is used to complement the peak-and-trough analysis concerning the average lead of the indicator, and to give information about the extent to which the cyclical profiles of indicator and

reference series resemble each other. This is important if the cyclical indicators are to give information about the likely rate and amplitude of movements in the reference series. Thus, it is also useful to examine the "general fit" of the indicators in relation to the reference series at all stages of the cycle.

In testing the general fit, cross-correlation between lagged smoothed cyclical indicators and reference series is used. The number of months lag at which the correlation has the highest value is a guide to the average lead of the indicator over the reference series and the correlation coefficient shows the extent to which the cyclical profiles of composite indicators resemble each other. There are limitations to this method however. First, it is a measure only of the linear relationship between variables, and second, the presence of extreme values can affect the estimate of the cross-correlation coefficient.

The average lead of the cyclical indicator, as measured by the lag at which the closest correlation occurs, should not be too different from the median lag at all turning points if the composite indicator is to give reliable information both about approaching turning points as well as the evolution of the reference series.

2.4.3 Coherence and Mean Delay

Cross spectral analysis decompose a time series into a series of frequencies representing fixed-length cycles and is used here to assess the strength of the wavelength relationship between the indicator and the reference series. To determine the lead or lag of the indicator against the reference series, two statistics are used: coherence and mean delay. Coherence measures the proportion of variance explained by the indicator at a given frequency of the reference series. Mean delay measures the time difference between the indicator and the reference series.

For business cycle analysis, the periodicity range of 1.5 to 8 years is of main interest, so high coherence within this period is evidence that the indicator contains information related to the cyclical behaviour of the reference series. The coherence measure can take values between 0 and 1. Mean delay is measured in radians but is converted into a time-oriented measure to give the timing difference between the indicator and the reference series. However, the leads and lags measured by the mean delay in cross spectral analysis will rarely provide direct estimates of the time domain relationships except under specific assumptions. This means that care should be exercised in interpreting these statistics and that cross-spectral analysis should be used to verify and supplement other cyclical measures.

2.4.4 Dynamic Factor Analysis

Factor models are used to extract the common information from a set of variables or indicators which is then used for the construction of composite indicator. The common component of each indicator is estimated by eliminating the idiosyncratic noise or short-term irregularities affecting each indicator. In dynamic factor models, the cyclical timing classification of the indicators with respect to the reference series is a by-product of the decomposition procedure. For identification and selection of indicators to be considered for further analysis and included in different types of composite indicators, the following measures are used.

The ratio of the common component variance over the indicators variance is used to analyse the degree of co-movement or commonality among the indicators. A high ratio (close to 1) means strong commonality while indicators that are almost independent will have a low ratio. Indicators with a ratio below 0.3 are considered as almost idiosyncratic and would not qualify as good cyclical indicators.

The cross-correlation between the common component of each indicator and the common component of the reference series is used to identify indicators with good cyclical properties and to classify indicators as leading, coincident and lagging in relation to the reference series. High correlations at positive (negative)

lags indicate a leading (lagging) behaviour of the indicator with respect to the reference series. Indicators with the highest correlation at zero lag are classified as coincident with respect to the reference series.

An alternative cyclical timing classification of the indicators is based on the common parts with respect to that of the reference series and is performed by calculating the mean delays from the first row of the common components spectral density matrix. The automatic classification is based on the following rules: if mean delay is between -1 and 1, then the indicator is classified as coincident and if mean delay is higher than 1 (-1), then the indicator is leading (lagging) by more than one period.

2.5 Construction of Composite Leading Indicators

The final set of analysed indicators which scored best on the evaluation criteria were used as potential component series for the construction of alternative composite leading indicators for each country. For the final selection of CLI components a more thorough analysis was conducted where each indicators **behaviour at cyclical peaks and troughs** were evaluated. The measures used in this analysis focused on:

- median lead;
- standard deviation at turning points and;
- the number of extra and missing cycles when compared to the reference series.

In addition to the above turning point analysis of the indicators, special attention was also given to some practical issues such as frequency and timeliness. These practical issues are very important for the calculation of the CLI on a regular monthly basis. Smoothness is a further important issue for the final selection of CLI components. Irregular series with a high MCD/QCD value have to be smoothed and this will imply revisions to the series when next data becomes available.

The **timeliness** of the latest data available for the component series and the CLIs is set out in each CLI characteristics country table. The timeliness criteria used here refers to the ability of the component indicator to meet the publication deadline for the Main Economic Indicators publication. CLI data for a given month "t" is published at the beginning of month "t+2" This implies that component series available at this date would fulfill the timeliness criteria. This is particular problem for series with a quarterly frequency, but also for some of the monthly component series.

The **frequency** of the tendency survey series included as components in the CLIs for most countries is quarterly. This means that the delay for timely data is two months (indicated as t+4 in each CLI characteristics country table). This is in particular a problem for the construction of CLIs in countries where tendency survey series are among the best leading indicators.

Smoothness is another important characteristic for the selection of leading indicators. The months/quarters for cyclical dominance MCD/QCD value (range of 1-6 for monthly data and 1-2 for quarterly data) gives an idea of the smoothness of the series. Indicators with small MCD values are preferred in order to minimize the length of the moving average when performing smoothing. Monthly component series with MCD values of 5 or 6 are very irregular and will imply revisions to the series when new data becomes available (see CLI characteristics country tables).

The component series in a detrended form (see Section 6 for detrending methods) are aggregated into one single composite indicator. A number of steps are involved in combining individual indicators to obtain the composite indicator. These entail:

- **Periodicity**. Composite leading indicators (CLI) are calculated with a monthly periodicity. It is therefore necessary to convert quarterly component series to a monthly series. This is done using linear interpolation.

- **Smoothing**. In order to reduce the irregularity of the final composite leading indicator (CLI), component series are smoothed according to the Month for Cyclical Dominance (MCD) value.
- **Normalisation.** All component series are normalised in order to express the cyclical movements in a comparable form (for multiplicative or additive model when estimating the trend) and to homogenise their cyclical amplitude.
- **Weighting**. For each country, component series have an equal weight when aggregated into the composite leading indicator (CLI).

3 Basic Methodology

3.1 Data transformation

The OECD cyclical indicator system uses the "growth cycle" or "deviation-from-trend" approach. This is necessary because essential cyclical similarities between series may be obscured by different long-term trends. Trend estimation is therefore a crucial step in detecting cyclical movements and identifying turning points. Two different methods are used in this study for extracting growth cycles and identifying cyclical turning points: the Phase-Average Trend (PAT) method and the Hodrick-Prescott (HP) method. The two de-trending methods are described in Section 3.2.

The modified version of the PAT method adopted by the OECD is used as the basic de-trending method if data requirements are fulfilled. The advantage of this method compared to the HP method is that it may be run with input turning points which allow calibration of the PAT trend. This is also an important aspect when analysing cycles across countries, synchronisation of cycles between reference series such as industrial production and GDP and synchronisation of cycles across leading indicators within a country.

A constraint with the PAT method is the length of time period needed to run the program i.e. 99 observations or just over 8 years of data. In addition, a minimum of 4 turning points are required for the calculation of the PAT trend. On the other hand, an advantage with the HP method is the fact that it poses no restriction on the length of time series and is used on time series with less than 8 years of data. This property is also used for identification of potential turning points at the very near end of the series, last 6 months where the Bry-Boschan routine does not identify turning points.

3.2 Trend Estimation

3.2.1 The PAT Method

The basic method of trend estimation adopted by the OECD is a modified version of the phase-average trend (PAT) method developed by the United States NBER. This method has been designed specifically to separate the long-term trends from medium-term cycles, with the latter defined according to the criteria programmed in the Bry-Boschan computer routine for selection of cyclical turning points.

The PAT of a series is estimated by first dividing the series into phases. These are defined as the number of months between successive turning points. The means of the observations in each phase are then calculated and these phase-averages are used to compute a three-term moving average. The values obtained from the moving average are assigned to the mid-point of the three-phase period, known as a "triplet", to which they refer. The trend is then obtained by computing the slope between the mid-points of successive triplets. The trend is extrapolated from the last available triplet to the end of the series by a least-squares log-linear regression starting from the mid-point of the last triplet.

The growth cycle program based on the PAT method is designed to:

- select turning points (peaks and troughs) in raw (i.e. seasonally adjusted) data or in data adjusted for long-term trend;

- measure the long-term trend and its rate of change; and
- produce trend-adjusted data.

If trend adjustment is not desired the turning point routine can be used on the raw data to produce a chronology of turning points in "classical cycles" (i.e. movements in levels) . With the trend-adjustment option, the program produces a chronology of "growth cycles".

The main steps in the PAT method are as follows:

- first estimation and extrapolation of long-term trend (75 month moving average);
- calculation of deviations from moving average trend;
- correction for extreme values;
- identification of tentative turning points and determination of cyclical phases, i.e. expansions and contractions (Bry-Boschan routine);
- new estimation and extrapolation of long-term trend in original series by calculation and correction of moving averages over cyclical phases (PAT trend);
- calculation of deviations from PAT trend;
- identification of final turning points in original series (Bry-Boschan routine).

The estimation of peak and trough dates is a crucial step in the PAT procedure. First estimates are made using the Bry-Boschan routine which begins by calculating a moving-average trend estimate for the identification of turning points. The routine then executes a series of tests on the deviations from this first trend estimate so as to eliminate extreme values and turning points that are judged to be too close together. The Bry-Boschan routine specifies a minimum duration of five months for a phase and fifteen months for a cycle.

These operations are applied to various smoothed curves in order to identify turning points which coincide more and more closely with observable variation in the original series. Lastly, the turning points are sought in the original series within the five months on both sides of the turning points found at the preceding stage. The points thus identified are taken as the preliminary turning points.

3.2.2 The Hodrick-Prescott Method

As noted above, “classical” business cycles are measured in the level of time series, while growth cycles are measured in the deviation-from-trend or ratio-to-trend series. However, economic growth is the main focus of most forecasters and cyclical movements in the growth rate are of key interest. The growth cycle is closely linked to fluctuations in the growth rate and is the most frequently used approach in cyclical analysis.

Trend estimation is, however, a crucial step in the growth cycle approach. A commonly used detrending method, which measures the trend directly and then removes it, is the Hodrick-Prescott (HP) filter.

The HP filter is a simple and flexible tool for economic analysis and it is an optimal extractor of a trend, which is stochastic but moves smoothly over time and is uncorrelated with the cycle. HP filter requires

computation of the trend component Y * for t=1,2,3…of a seasonally adjusted series Y. T is estimated to minimise:

$$\sum_{t=1}^{T} (Yt - Y^*t)^2 + \lambda \sum_{t=2}^{T-1} [(Y^*t+1 - Y^*t) - (Y^*t - Y^*t-1)]^2$$

where λ is the weighting factor that controls how smooth the resulting trend is. A low value of λ will produce a trend that follows the seasonally adjusted series more closely, whereas a high value of λ will not pick-up short-term fluctuations in the seasonally adjusted series. The arbitrary choice of λ is a main weakness of the method and in most applications the value of λ is set to 1600, the value originally chosen by Hodrick and Prescott for quarterly data.

In this study, the HP filter has been computed within the model based approach of the TRAMO-SEATS program for seasonal adjustment by setting a value of λ of 129.119,77 for data with monthly frequency. The model based HP filter is calculated on the seasonally adjusted or trend-cycle data with a second order ARIMA model (0 2 2) (0 0 0) with parameters -1.925421 and 0.928102 corresponding to the chosen HP parameter λ with a maximum cycle length of 10 years (Tau set to 119.090655). In this study, the HP filter is applied to the trend-cycle series because the focus is on cyclical turning points and no major difference was found in this respect between trend-cycle and seasonally adjusted data.

The model based HP filter approach has been developed by Kaiser and Maravall and implemented in the TRAMO-SEATS program within the DEMETRA software by Jens Dossé. In the DEMETRA application of the HP model based approach used in this study, outliers classified as level shifts in the time series have been included in the trend component.

PART B

Country Information

4 Outline of Country Sections

In the following subsections, the characteristics of the reference series, the component series and the CLIs for each country are described and the information is organised as follows:

First part

Country summary describing the most important relevant features of the information presented in the tables and graphs of the subsequent sections. The summary covers the following points:

- Reference series and reference chronology: Description of output related series (industrial production) and GDP and comparison of their turning points for determination of the final reference chronology;
- Cycles: Characteristics of growth cycles in output related series (industrial production) and GDP (duration and amplitude of phases and cycles)
- Leading indicators: Characteristics of component series (frequency, smoothness and timeliness) and their cyclical properties at turning points (lead/lag) and on reproducing reference cycle amplitudes;
- Composite leading indicators: Cyclical characteristics in terms of general fit against the reference series measured by the cross-correlation and behaviour at turning points, number of extra or missing turning points and timeliness of the calculation of the composite indicators.

Second part

Characteristics of growth cycles in the output related monthly reference series (industrial production) and the quarterly GDP series are presented in two tables, listing:

- Dates of the chronology of peaks and troughs, in months (industrial production) or mid- months of the quarters (GDP). These turning points are determined automatically using the Bry-Boschan routine;
- Duration of the cyclical phase (expansion or slowdown) in months and the duration of the cycle and the average duration of phases and cycles over the period indicated;
- Cyclical amplitudes of the expansion phase or slowdown phase as a percentage of the trend. The amplitude is calculated as the percentage above trend at peak plus the percentage below trend at trough, while making suitable allowance for the effect of irregular variation and/or extreme values.

Third part

Reference Chronology: The bottom page table contains three lists of turning points. The first column lists the turning point dates from the monthly output related series (industrial production). The second column lists the turning point dates from the quarterly GDP. The third column list the “final reference chronology”, i.e. the turning points used in the compilation of the composite leading indicator. These turning points have been determined using information from the first two columns. To ensure consistency between the final reference chronology and GDP some turning points from the monthly reference series may be shifted or sometimes dropped.

Growth cycles in the output related series (industrial production) and the quarterly GDP are compared in the chart on the top of the page. Both series are presented in their ratio to trend form and normalised in order to make the amplitude of their cyclical movements comparable. The chronology of turning points used to compute the trend in both series is the chronology automatically determined by the Bry-Boschan routine.

Fourth part

The top page table gives details on the sets of component leading indicators and some statistics on the cyclical characteristics for both component series and composite indicator. The statistics given refer to the version of the indicators without trend as shown in the chart below. The information in the table gives the following details:

- Starting date refers to the earliest period of available data for the series. The starting data for a component series indicates the period over which the trend calculation is performed. However, if the starting date for the composite indicator is shorter then the subsequent statistics is calculated from this date;
- The timeliness criteria used here refers to the ability of the component indicator to meet the publication deadline for the Main Economic Indicators publication. CLI data for a given month "t" is published at the beginning of month "t+2". This implies that component series available at this date would fulfill the timeliness criteria;
- Extra (x) or missing (m) cycles in the component series or composite indicator with respect to the final reference chronology is noted;
- Smoothness: MCD/QCD (Months/quarters for Cyclical Dominance) is defined as the shortest span of months for which the I/C ratio is less than unity. I and C are the average month-to-month (quarter-to-quarter) changes without regard to sign of the irregular and trend cycle component of the series, respectively. Although I remains approximately constant as the span of months increases, C should increase. Therefore, the I/C ratio, itself a measure of smoothness, should decline and eventually become less than unity. In practice, there are some series for which the I/C ratio at first declines as the span of months increases, and then starts to increase again without ever having dropped as low 1. Hence, there is a convention that the maximum value of MCD should be six. For quarterly series the QCD has a maximum value conventionally defined as 2.
- Median and mean lag at peaks, troughs and all turning points of the component series and composite indicator with respect to the reference series is given. These measures are expressed in months;
- Standard deviation at all turning points is given as rough measure (months) of the variability of the lead.
- Peak cross-correlation lead and value is given for the smoothed component series or composite indicator with respect to the that of the reference series

COMPOSITE LEADING INDICATORS FOR MAJOR OECD NON-MEMBER ECONOMIES

5 Brazil

Reference series and reference chronology

The monthly index of industrial production (IIP) excluding construction from the Institute of Geography and Statistics and quarterly GDP data in constant prices from the same source are used for determining the reference chronology. The IIP series is available back to 1975 while the GDP series starts in 1994. The consistency between turning points from the IIP series and from GDP over the common period since 1994 is rather good with turning points in the IIP series falling most of the time within the quarter of the GDP turning points and with no extra or missing turning points between the two series. The final reference chronology is for these reasons based solely on the IIP series.

Cycles

Over the period 1975 - 2004, industrial production registered eight growth cycles measured from peak to peak. The length of the cycle is not very stable with duration of as short as 16 months for the 7th cycle and as long as 55 and 60 months for the 2nd and 4th cycles respectively. The average duration of the cycle is 37 months with an average duration of the expansion phase of 21 months and an average duration of the contraction phase of 16 months. The amplitudes of the cyclical phases show very strong cyclical movements over the whole period.. The average amplitude of the expansion phase is 14 per cent above trend and of the average amplitude of the contraction phases is – 16 per cent below trend.

GDP registered four growth cycles measured from trough to trough since 1994. The average length of the cycle of 28 months and the average amplitude of slowdown and expansion phases is about 4 per cent below or above trend.

Leading indicators

The CLI for Brazil contains five leading indicators including one quarterly indicators from the business tendency survey carried out by the Fondation Vargas in Rio de Janeiro available since 1979. The quarterly frequency of the survey series i.e. demand expectation is a problem for the timeliness of the CLI which means that two of the component will not be updated every month which in turn will result in revisions to the CLI once a quarter. On the other hand, the demand series shows rather stable but short leads at cyclical turning points and only one extra turning point compared to the reference series.

Four leading indicators: export volume, terms of trade, semi non-durable goods production and the share price index show rather long but unstable leads and the first two indicators register also rather weak correlation with the reference series. However, all of these indicators are available on a monthly basis with a good timeliness which means that they are indispensable for the calculation of a timely CLI.

Composite Leading Indicator

The record of the CLI at predicting turning points and reproducing amplitudes of cycles has been rather good over the period since 1979 over which it is calculated. The average lead is four to five months according to the median and mean measures respectively which are calculated over the 7 cycles registered over the period 1979-2004

The CLI picked up one extra mini cycles in the mid-1980s and registered one cycle in the early 1990s not picked up in the industrial production index because of a very irregular development registered in output over this period.

Table 5.1a Brazil: Characteristics of Growth Cycles in Industrial Production 1978-2005

Phase / cycle	Turning points (dates)		Duration (months)			Amplitude (phase)
	Peak	Trough	Peak	Phase	Cycle	% of trend
Slowdown	9/1980	12/1981		15		-23.7
Expansion		12/1981	7/1982	7		10.3
Cycle No 1	9/1980		7/1982		22	
Slowdown	7/1982	3/1984		20		-16.9
Expansion		3/1984	2/1987	35		21.7
Cycle No 2	7/1982		2/1987		55	
Slowdown	2/1987	11/1988		21		-15.6
Expansion		11/1988	12/1989	13		17.1
Cycle No 3	2/1987		12/1989		34	
Slowdown	12/1989	8/1992		32		-21.9
Expansion		8/1992	12/1994	28		21.9
Cycle No 4	12/1989		12/1994		60	
Slowdown	12/1994	5/1995		5		-19.1
Expansion		5/1995	10/1997	29		12.5
Cycle No 5	12/1994		10/1997		34	
Slowdown	10/1997	12/1998		14		-13.3
Expansion		12/1998	12/2000	24		12.8
Cycle No 6	10/1997		12/2000		38	
Slowdown	12/2000	10/2001		10		-10.8
Expansion		10/2001	4/2002	6		8.5
Cycle No 7	12/2000		4/2002		16	
Slowdown	4/2002	7/2003		15		-9.0
Expansion		7/2003	6/2005	23		9.6
Cycle No 8	4/2002		6/2005		38	
Average:						
Slowdown				16.5		-16.3
Expansion				20.6		14.3
Cycle					37.1	

Table 5.1.ba Brazil: Characteristics of Growth Cycles in GDP 1994-2005

Phase / cycle	Turning points (dates)			Duration (months)		Amplitude (phase)
	Trough	Peak	Trough	Phase	Cycle	% of trend
Expansion	1/1994	2/1995		13		8.4
Slowdown		2/1995	2/1996	12		-4.6
Cycle No 1	1/1994		2/1996		25	
Expansion	2/1996	8/1997		18		3.6
Slowdown		8/1997	2/1999	18		-4.0
Cycle No 2	2/1996		2/1999		36	
Expansion	2/1999	2/2001		24		3.9
Slowdown		2/2001	11/2001	9		-2.9
Cycle No 3	2/1999		11/2001		33	
Expansion	11/2001	11/2002		12		2.1
Slowdown		11/2002	5/2003	6		-2.8
Cycle No 4	11/2001		5/2003		18	
Average:						
Expansion				16.8		4.5
Slowdown				11.3		-3.6
Cycle					28.0	

Chart 5.1 Brazil: Growth Cycles in Industrial production and GDP

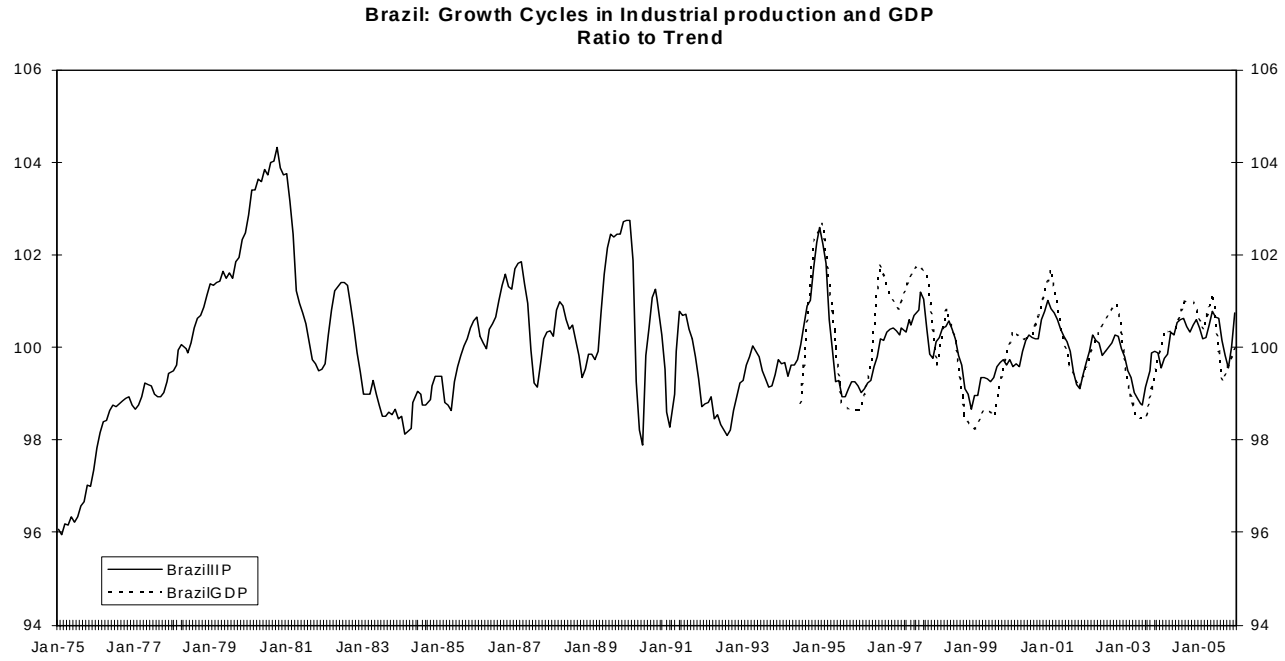


Table 5.2 Brazil: Reference Chronology

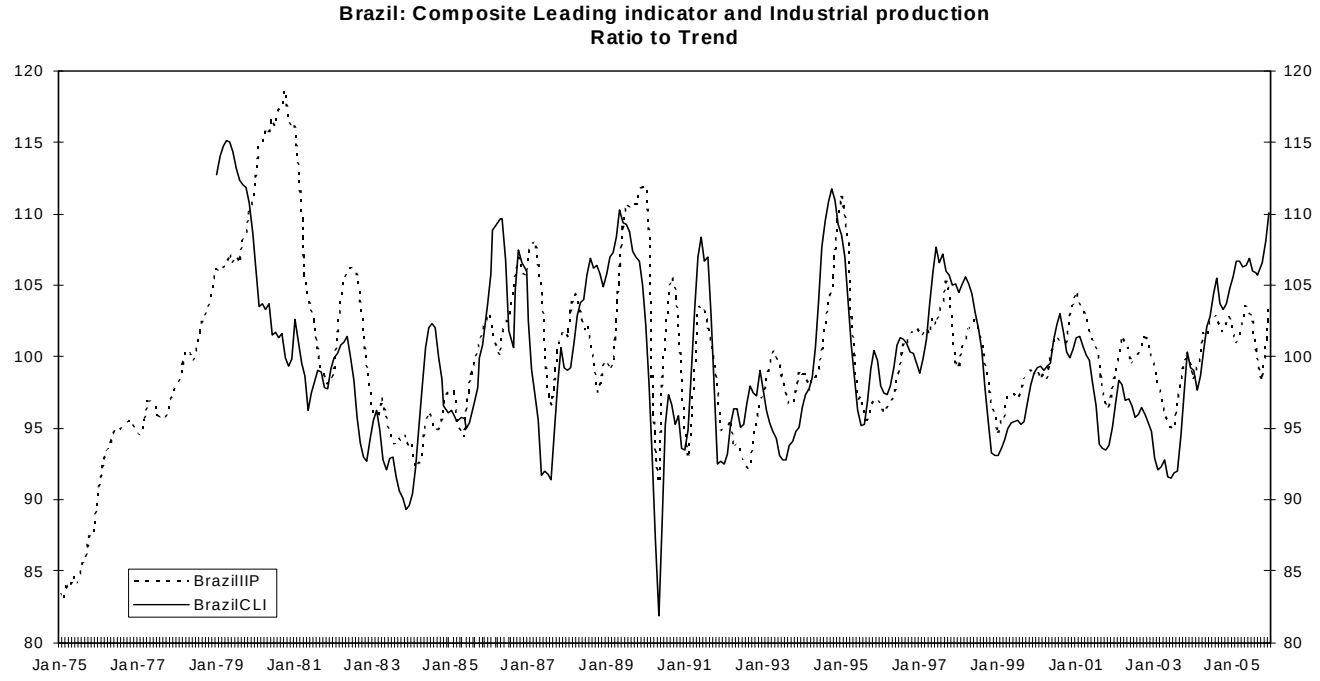
Turning points	Industrial production index	GDP	Final Reference Chronology
Peak	Sep 1980		Sep 1980
Trough	Dec 1981		Dec 1981
Peak	Jul 1982		Jul 1982
Trough	Mar 1984		Mar 1984
Peak	Feb 1987		Feb 1987
Trough	Nov 1988		Nov 1988
Peak	Dec 1989		Dec 1989
Trough	Aug 1992		Aug 1992
Peak			
Trough		Q1 1994	
Peak	Dec 1994	Q1 1995	Dec 1994
Trough	May 1995	Q1 1996	May 1995
Peak	Oct 1997	Q3 1997	Oct 1997
Trough	Dec 1998	Q1 1999	Dec 1998
Peak	Dec 2000	Q1 2001	Dec 2000
Trough	Oct 2001	Q4 2001	Oct 2001
Peak	Apr 2002	Q4 2002	Apr 2002
Trough	Jul 2003	Q2 2003	Jul 2003
Peak	Jun 2005		Jun 2005

( ) minor cycles

Table 5.3 Brazil: Characteristics of Composite Leading Indicator and Components

Indicator	Starting date	Timeliness Latest Data available at t	Extra (x), Missing (m) cycles)	Smoothness MCD/ QCD	Mean lead (+) at turning points (TP)			Median lead (+) at turning points (TP)			Standard deviation	Cross correlation (2)	
					Peak	Trough	All TP	Peak	Trough	All TP		Lead (+)	Coef.
Composite leading indicator	1979	t+2	2 x	1	5	5	5	4	4	4	4.5	2	0.61
Demand, future tendency	1979	t+4	1 x	1	7	6	7	5	2	4	7.6	8	0.44
Export volume	1981	t+2	2 m, 2 x	4	8	3	5	5	5	5	12.1	11	0.31
Semi non-durable goods production	1975	t+2	2 m	4	12	9	10	5	3	4	12.0	0	0.52
Share Price index FGV100E	1993	t+2	1 m	2	6	-2	2	4	0	4	10.0	4	0.70
Terms of trade	1979	t+2	2 m, 2 x	3	5	11	8	5	13	8	10.6	12	0.37

Chart 5.2 Brazil: Composite Leading Indicator and Industrial production



6 China

Reference series and reference chronology

A monthly series on gross industrial output calculated from production data in value terms was available up to 1999. This series was replaced in early 1994 by a series on value added in industry) in current prices. The two series are linked and recalculated by the National Bureau of Statistics (NBS) in China to values in comparable prices and this series (IIP) is used as reference series for China. The IIP series is available back to 1978 while quarterly GDP data in current prices are only available back to 1995. The final reference chronology is for these reasons based solely on the IIP series.

Cycles

Over the period 1978 - 2004, industrial output registered eight growth cycles measured from trough to trough. The average duration of the cycle is 35 months with an average duration of the expansion phase of 21 months and an average duration of the slowdown phase of 13 months. The amplitudes of the cyclical phases show rather strong cyclical movements over the period up to 1990. The strength of the amplitudes show a tendency to decrease over time during this period: the expansion phase 1979-1980 registers an increase above trend of about 16 per cent and the slowdown phase 1988-1990 registers a fall below trend of about 10 per cent.

The three cycles registered over the period 1990 to 2004 show much weaker cyclical amplitudes over both slowdown and expansion phases compared to the period before 1990. The average amplitudes of both the expansion and slowdown phases over the whole period 1978-2004 are about +/- 9 per cent compared to about +/- 6 per cent over the last three cycles.

Leading indicators

It has proved exceptionally difficult to find cyclical indicators for China, but a few of the six indicators selected as leading indicators have a significant lead. However, the cyclical characteristics of certain indicators are not consistent across the different measures: an indicator which shows a long lead according to the turning point measures like median lead show a much short lead according to the peak-correlation lead measure. The opposite relationship is noted for indicators, which show a short lead according to the median lead. All components are monthly which makes it possible to calculate a timely CLI.

One indicator closely linked to industrial output fail to track the aggregate cycle very well. The series on non-ferrous metals production misses one of the six cycles registered in output over the investigated period. The importance of foreign trade as a driving force of economic development in China is represented by an indicator on imports from Asia with very good leading properties.

Composite Leading Indicator

The record of the CLI at predicting turning points and reproducing amplitudes of cycles has been rather good over the period since 1979 over which it is calculated. The average lead is three to four months according to the median and mean measures respectively which are calculated over the 7 cycles registered over the period 1979-2004

The CLI missed one cycle in the early 1980s and picked up one extra mini cycle in the mid-1980s and registered one cycle in the early 1990s not picked up in the industrial production index because of a very irregular development registered in output over this period. Industrial production registered 7 cycles over the period 1979 to 2004 for which the CLI is calculated.

Table 6.1a China: Characteristics of Growth Cycles in Industrial Production 1978-2004

Phase / cycle	Turning points (dates)			Duration (months)		Amplitude (phase)
	Trough	Peak	Trough	Phase	Cycle	% of trend
Expansion	1/1979	2/1980		13		16.2
Slowdown		2/1980	2/1981	12		-9.6
Cycle No 1	1/1979		2/1981		25	
Expansion	2/1981	2/1982		12		15.6
Slowdown		2/1982	9/1982	7		-15.4
Cycle No 2	2/1981		9/1982		19	
Expansion	9/1982	4/1985		31		8.9
Slowdown		4/1985	2/1986	10		-10.2
Cycle No 3	9/1982		2/1986		41	
Expansion	2/1986	9/1988		31		11.2
Slowdown		9/1988	8/1990	23		-10.4
Cycle No 4	2/1986		8/1990		54	
Expansion	8/1990	1/1991		5		6.6
Slowdown		1/1991	12/1991	11		-10.2
Cycle No 5	8/1990		12/1991		16	
Expansion	12/1991	10/1994		34		8.9
Slowdown		10/1994	1/1995	3		-4.8
Cycle No 6	12/1991		1/1995		37	
Expansion	1/1995	5/1997		28		4.9
Slowdown		5/1997	2/1999	21		-6.3
Cycle No 7	1/1995		2/1999		49	
Expansion	2/1999	7/2000		17		5.5
Slowdown		7/2000	2/2002	19		-7.1
Cycle No 8	2/1999		2/2002		36	
Average:						
Expansion				21.4		9.7
Slowdown				13.3		-9.3
Cycle					34.7	

Table 6.1.ba China: Characteristics of Growth Cycles in GDP 1995-2004

Phase / cycle	Turning points (dates)			Duration (months)		Amplitude (phase)
	Peak	Trough	Peak	Phase	Cycle	% of trend
Slowdown	5/1997	2/2002		57		-12.8
Expansion						
Cycle No 1						
Average:						
Slowdown				57		-12.8
Expansion						
Cycle						

Chart 6.1 China: Growth Cycles in Industrial production and GDP

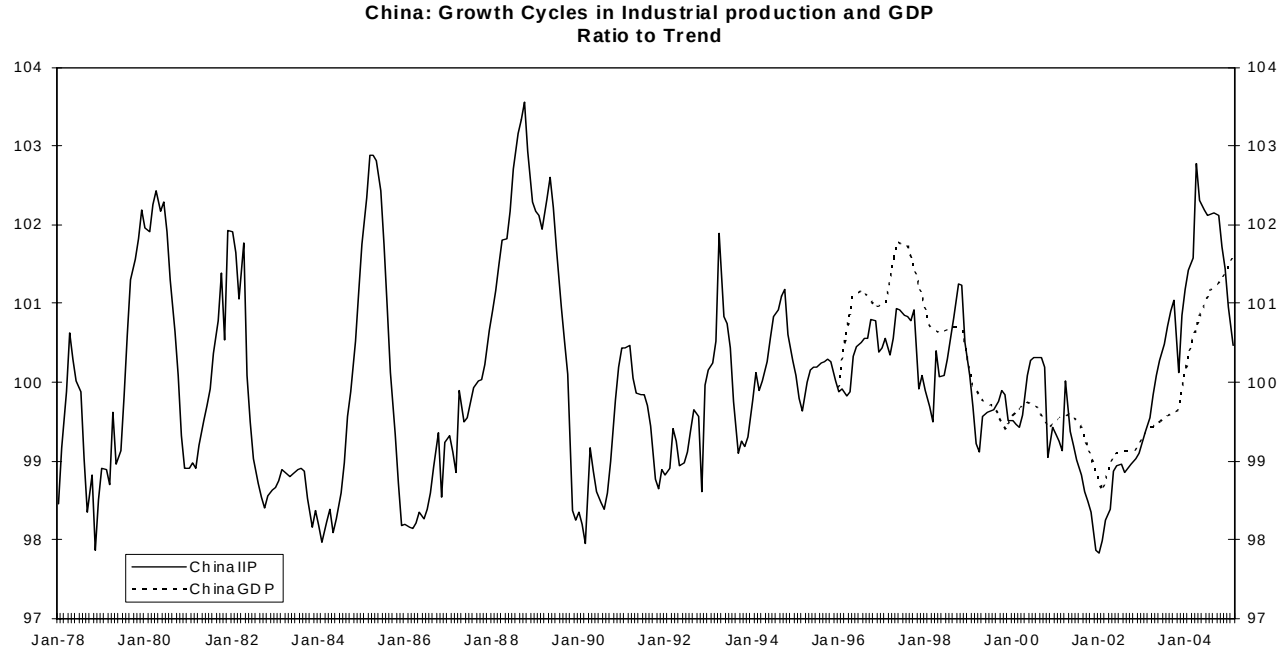


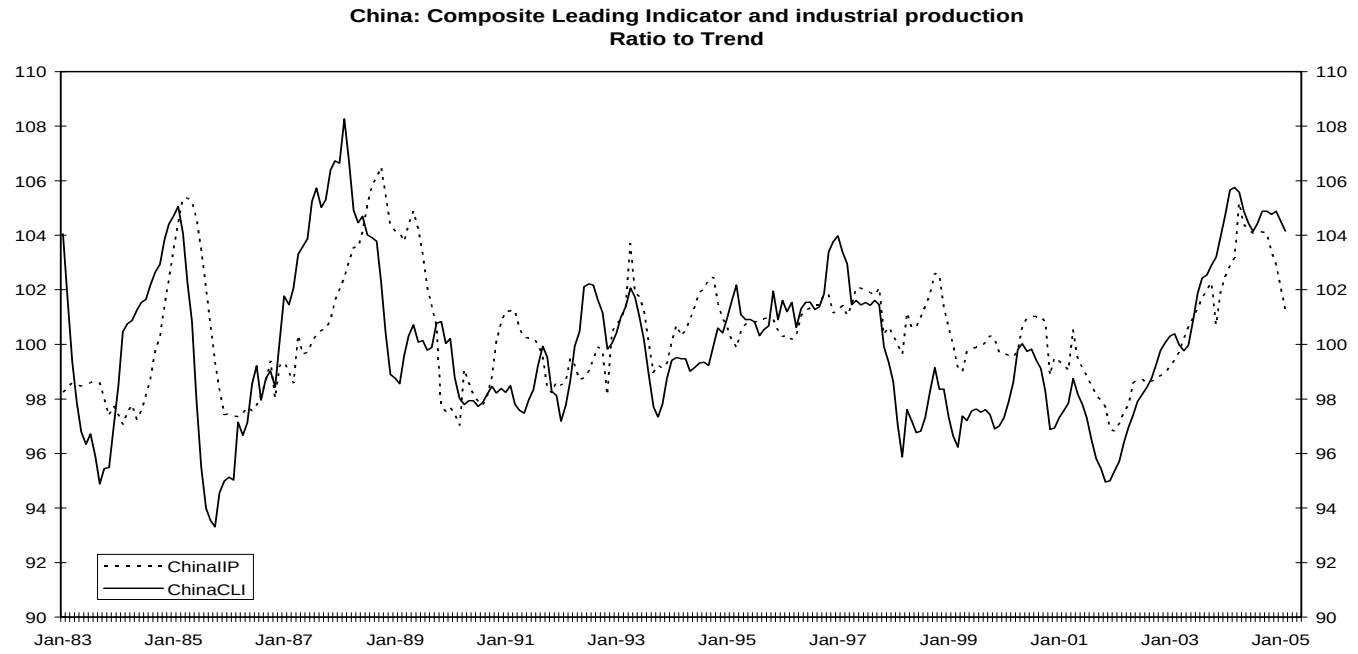
Table 6.2 China: Reference Chronology

Turning points	Industrial production index	GDP	Final Reference Chronology
Trough	Jan 1979		Jan 1979
Peak	Feb 1980		Feb 1980
Trough	Feb 1981		Feb 1981
Peak	Feb 1982		Feb 1982
Trough	Sep 1982		Sep 1982
Peak	Apr 1985		Apr 1985
Trough	Feb 1986		Feb 1986
Peak	Sep 1988		Sep 1988
Trough	Aug 1990		Aug 1990
Peak	Jan 1991		Jan 1991
Trough	Dec 1991		Dec 1991
Peak	Oct 1994		Oct 1994
Trough	Jan 1995		Jan 1995
Peak	May 1997	Q2 1997	May 1997
Trough	Feb 1999		Feb 1999
Peak	Jul 2000		Jul 2000
Trough	Feb 2002	Q1 2002	Feb 2002

Table 6.3 China: Characteristics of Composite Leading Indicator and Components

Indicator	Starting date	Timeliness Latest Data available at t	Extra (x), Missing (m) cycles)	Smoothness MCD/ QCD	Mean lead (+) at turning points (TP)			Median lead (+) at turning points (TP)			Standard deviation	Cross correlation (2)	
					Peak	Trough	All TP	Peak	Trough	All TP		Lead (+)	Coef.
Composite leading indicator	1983	t+2	1 m	1	5	6	6	3	4	4	6.5	6	0.70
money supply M2	1990	t+2	0	3	11	6	8	10	8	8	6.7	2	0.56
Cargo handled at ports	1983	t+2	1 ½ x	6	13	7	10	15	9	10	6.6	0	0.45
Chemical fertilizer production	1983	t+2	½ x	3	15	13	14	14	16	15	7.5	9	0.27
Enterprise deposits	1978	t+2	0	2	1	0	0	1	-1	1	5.5	3	0.42
Imports from Asia	1993	t+2	0	5	8	5	6	0	5	3	10.2	7	0.50
Non-ferrous metals production	1983	t+2	1 x, 1m	6	4	7	6	5	5	5	7.9	6	0.29

Chart 6.2 China: Composite Leading Indicator and Industrial production



7 India

Reference series and reference chronology

The monthly index of industrial production (IIP) excluding construction from the Ministry of Statistics and quarterly GDP data in constant prices from the same source are used for determining the reference chronology. The IIP series is available back to 1978 while the GDP series starts in 1997. The consistency between turning points from the IIP series and from GDP over the common period since 1997 is not very good with turning points in the GDP series leading at the first common trough and lagging at the last common trough and with two extra turning pints in 2001 not registered in the IIP series. The final reference chronology is for these reasons based solely on the IIP series.

Cycles

Industrial production registered seven growth cycles measured from trough to trough over the period 1978 - 2004. The average duration of the cycle is 38 months with an average duration of the expansion phase of 20 months and an average duration of the slowdown phase of 18 months. The amplitudes of the cyclical phases show very different cyclical movements over the whole period investigated. The expansion phase 1983-1984 registers an increase above trend of about 7 per cent and the slowdown phase 1984-1986 registers a fall below trend of about 5 per cent. In contrast, the expansion phase 1988-1990 shows an increase above trend of over 22 per cent while the slowdown phase1990-1993 shows a fall below trend of 24 per cent.

The strength of the cyclical phases over the last two growth cycles spanning the period 1996-2004 were much weaker than average with an increase or fall above or below trend of only about +/- 5 per cent compared to an average of about +/- 10 per cent for the whole period 1978-2004.

Leading indicators

Eight leading indicators are used to calculate the best performing CLI for India, of which three are financial and monetary indicators and one is an indicator from the business tendency survey conducted by the National Council of Applied Economic Research. The survey series is, however, only available since 1997 which is also the case for the deposit interest rate series. Two leading indicators monitor external relations and two refer to the real sector. All series are monthly except the quarterly business tendency survey indicator which makes it possible to calculate a timely CLI.

Most leading indicators show very short leads, only the three series on imports, deposit interest rate and share prices register some longer leads according to the median with leads in the range of 3-7 months. The deposit interest rate series in inverted form show a median lead of 7 months at turning points and 14 months according to the peak-correlation lead with a good fit against the reference series with a correlation coefficient of 0.83.

Composite Leading Indicator

The CLI shows a median lead of only 1 month at all turning points over the 2 cycles registered since 1995 in industrial production. However, the correlation with the reference cycle is very high with a peak-correlation coefficient of 0.89 at a lead of 3 months. No extra or missing cycles are recorded over the investigated period (see Chart 3).

Table 7.1a India: Characteristics of Growth Cycles in Industrial Production 1978-2004

Phase / cycle	Turning points (dates)			Duration (months)		Amplitude (phase)
	Trough	Peak	Trough	Phase	Cycle	% of trend
Expansion	12/1979	6/1981		18		10.9
Slowdown		6/1981	1/1983	19		-10.5
Cycle No 1	12/1979		1/1983		37	
Expansion	1/1983	2/1984		13		7.0
Slowdown		2/1984	2/1986	24		-5.4
Cycle No 2	1/1983		2/1986		37	
Expansion	2/1986	7/1987		17		9.0
Slowdown		7/1987	1/1988	6		-10.1
Cycle No 3	2/1986		1/1988		23	
Expansion	1/1988	3/1990		26		21.8
Slowdown		3/1990	1/1993	34		-24.0
Cycle No 4	1/1988		1/1993		60	
Expansion	1/1993	2/1996		37		11.2
Slowdown		2/1996	11/1996	9		-7.8
Cycle No 5	1/1993		11/1996		46	
Expansion	11/1996	10/1997		11		5.3
Slowdown		10/1997	10/1998	12		-5.2
Cycle No 6	11/1996		10/1998		23	
Expansion	10/1998	3/2000		17		5.4
Slowdown		3/2000	2/2002	23		-4.8
Cycle No 7	10/1998		2/2002		40	
Average:						
Expansion				19.9		10.1
Slowdown				18.1		-9.7
Cycle					38.0	

Table 7.1.ba India: Characteristics of Growth Cycles in GDP 1997-2004

Phase / cycle	Turning points (dates)			Duration (months)		Amplitude (phase)
	Trough	Peak	Trough	Phase	Cycle	% of trend
Expansion	8/1997	2/2000		30		3.1
Slowdown		2/2000	2/2001	12		-2.8
Cycle No 1	8/1997		2/2001		42	
Expansion	2/2001	11/2001		9		1.7
Slowdown		11/2001	11/2002	12		-4.1
Cycle No 2	2/2001		11/2002		21	
Average:						
Expansion				19.5		2.4
Slowdown				12.0		-3.5
Cycle					31.5	

Chart 7.1 India: Growth Cycles in Industrial production and GDP

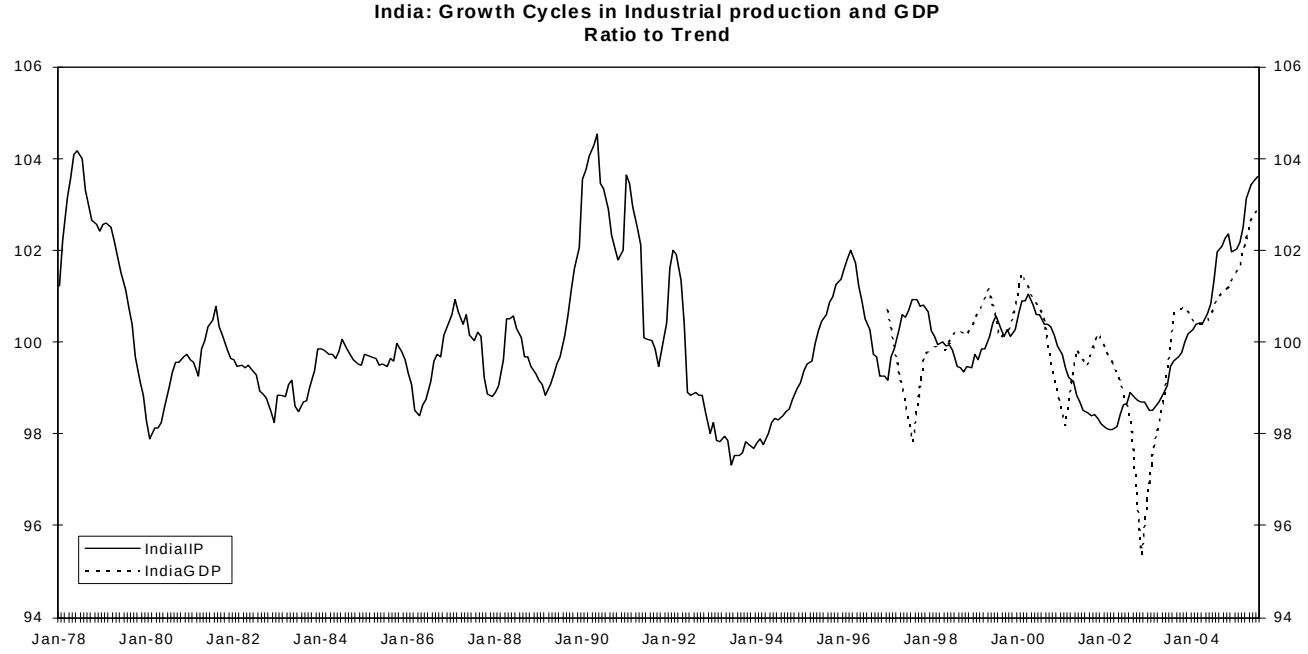


Table 7.2 India: Reference Chronology

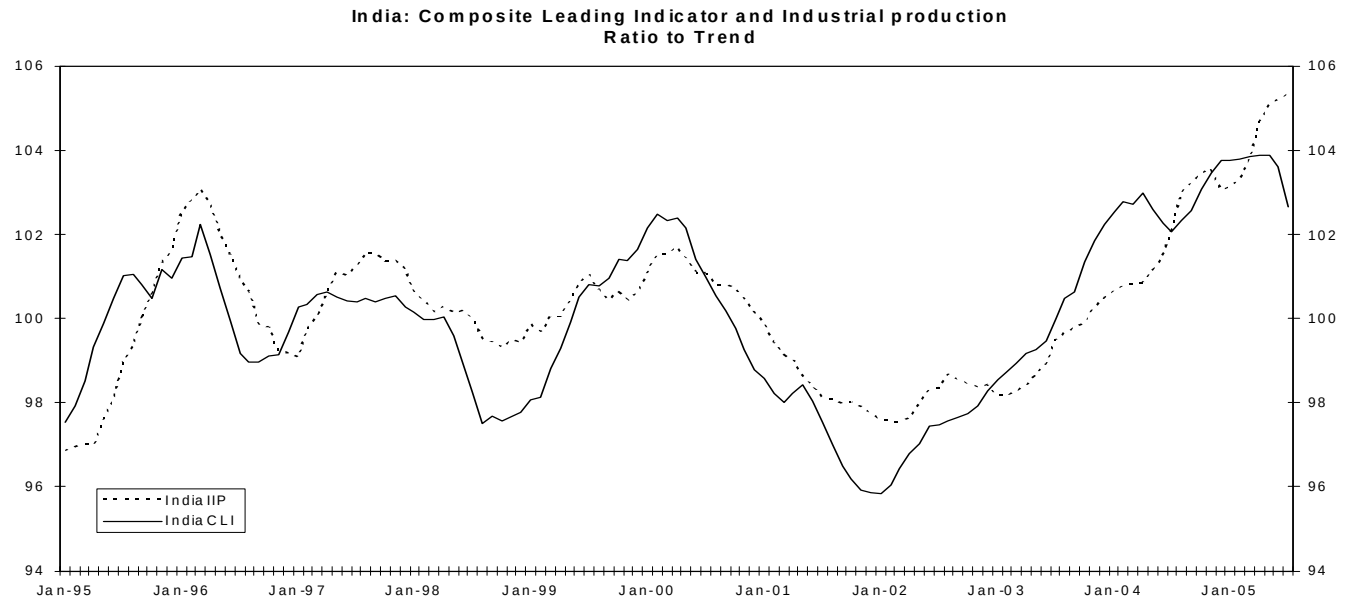
Turning points	Industrial production index	GDP	Final Reference Chronology
Trough	Dec 1979		Dec 1979
Peak	Jun 1981		Jun 1981
Trough	Jan 1983		Jan 1983
Peak	Feb 1984		Feb 1984
Trough	Feb 1986		Feb 1986
Peak	Jul 1987		Jul 1987
Trough	Jan 1988		Jan 1988
Peak	Mar 1990		Mar 1990
Trough	Jan 1993		Jan 1993
Peak	Feb 1996		Feb 1996
Trough	Dec 1996		Dec 1996
Peak	Oct 1997		Oct 1997
Trough	Oct 1998	Q3 1997	Oct 1998
Peak	Mar 2000	Q1 2000	Mar 2000
Trough		(Q2 2001)	
Peak		(Q4 2001)	
Trough	Feb 2002	Q4 2002	Feb 2002

( ) minor cycles

Table 7.3 India: Characteristics of Composite Leading Indicator and Components

Indicator	Starting date	Timeliness Latest Data available at t	Extra (x), Missing (m) cycles)	Smoothness MCD/ QCD	Mean lead (+) at turning points (TP)			Median lead (+) at turning points (TP)			Standard deviation	Cross correlation (2)	
					Peak	Trough	All TP	Peak	Trough	All TP		Lead (+)	Coef.
Composite leading indicator	1995	t+2	0	1	1	2	1	1	2	1	0.8	3	0.89
Business Confidence	1997	t+4	0	1Q	-2	3	1	-2	3	2	2.6	1	0.68
Imports	1995	t+2	1m	4	5	1	3	5	1	4	4.8	3	0.38
Exchange rate, USD, inverted	1995	t+2	0	1	2	3	3	0	2	1	4.7	8	0.77
Money supply M1	1995	t+2	1m	4	5	-3	1	5	-3	1	7.1	5	0.56
Deposit interest rate, inverted	1997	t+2	0	4	5	7	6	5	7	7	5.0	14	0.83
Share Price Index BSE Dollex	1991	t+2	0	2	8	-1	4	3	2	3	10.9	0	0.75
IIP Basic Goods	1995	t+2	0	5	-1	4	2	0	5	1	3.9	0	0.77
IIP Intermediate Goods	1995	t+2	1m	6	3	-2	1	3	-2	1	3.7	0	0.86

Chart 7.2 India: Composite Leading Indicator and Industrial production



8 Indonesia

Reference series and reference chronology

The monthly index of industrial production (IIP) covering the manufacturing sector from Statistics Indonesia (BPS) and quarterly GDP data in constant prices from the same source are used for determining the reference chronology. The IIP series is available back to 1986 while the GDP series starts in 1997. The consistency between turning points from the IIP series and from GDP over the common period since 1997 is not very good with turning points in the GDP series lagging at the first common peak and leading at the last common peak and with one extra turning pint in 2001 not registered in the IIP series. The final reference chronology is for these reasons based solely on the IIP series.

Cycles

Industrial production registered six growth cycles measured from peak to peak over the period 1986 - 2004. The average duration of the cycle is 36 months with an average duration of the expansion phase of 24 months and an average duration in the slowdown phase of 12 months.

The amplitudes of the cyclical phases show very strong cyclical movements with an average increase above trend of 23 per cent over expansion phases and an average fall below trend of about 20 per cent over slowdown phases. The Asian financial crisis which hit Indonesia in 1997 did effect the slowdown phase over the period 1997-1998 to a great extent with a fall below trend of 31 per cent.

Leading indicators

Three of the five leading indicators used to calculate the CLI for Indonesia are external indicators: imports, exports and USD exchange rate. The other two leading indicators are financial series and refer to call money rate and Jakarta composite share price index. All indicators are available on a monthly basis which makes it possible to calculate a timely CLI.

The two financial indicators show leads in the range of 6-11 months at all turning points according to the median measure with very long leads in the range of 13-14 months at peaks. The USD exchange rate series register about the same good leading performance at turning points as the two financial series.

Composite Leading Indicator

The CLI evaluated over the period since 1993 shows a median lead of 3 months at all turning points and a rather good correlation with industrial production with a correlation coefficient of 0.68.

The CLI failed to indicate clearly the first cycle over the period 1994-1996, which was only picked-up as a period of unchanged or slightly slowing growth but no real decrease in the rate of growth.

Table 8.1.a Indonesia: Characteristics of Growth Cycles in Industrial Production 1986- 2004

Phase / cycle	Turning points (dates)		Duration (months)			Amplitude (phase)
	Peak	Trough	Peak	Phase	Cycle	% of trend
Slowdown	11/1986	5/1987		6		-8.6
Expansion		5/1987	4/1990	35		12.5
Cycle No 1	11/1986		4/1990		41	
Slowdown	4/1990	11/1990		7		-13.1
Expansion		11/1990	8/1992	21		7.8
Cycle No 2	4/1990		8/1992		28	
Slowdown	8/1992	3/1994		19		-16.0
Expansion		3/1994	6/1995	15		19.7
Cycle No 3	8/1992		6/1995		34	
Slowdown	6/1995	2/1996		8		-23.6
Expansion		2/1996	5/1997	15		32.5
Cycle No 4	6/1995		5/1997		23	
Slowdown	5/1997	2/1998		9		-30.9
Expansion		2/1998	2/2001	36		27.5
Cycle No 5	5/1997		2/2001		45	
Slowdown	2/2001	12/2002		22		-29.4
Expansion		12/2002	12/2004	24		39.6
Cycle No 6	2/2001		12/2004		46	
Average:						
Slowdown				11.8		-20.3
Expansion				24.3		23.3
Cycle					36.2	

Table 8.1.b Indonesia: Characteristics of Growth Cycles in GDP 1997-2004

Phase / cycle	Turning points (dates)		Duration (months)			Amplitude (phase)
	Peak	Trough	Peak	Phase	Cycle	% of trend
Slowdown	8/1997	11/1998		15		-22.3
Expansion		11/1998	11/2000	24		8.1
Cycle No 1	8/1997		11/2000		39	
Slowdown	11/2000	11/2001		12		
Average:						
Slowdown				13.5		-22.3
Expansion				24.0		8.1
Cycle					37.5	

Chart 8.1 Indonesia: Growth Cycles in Industrial production and GDP

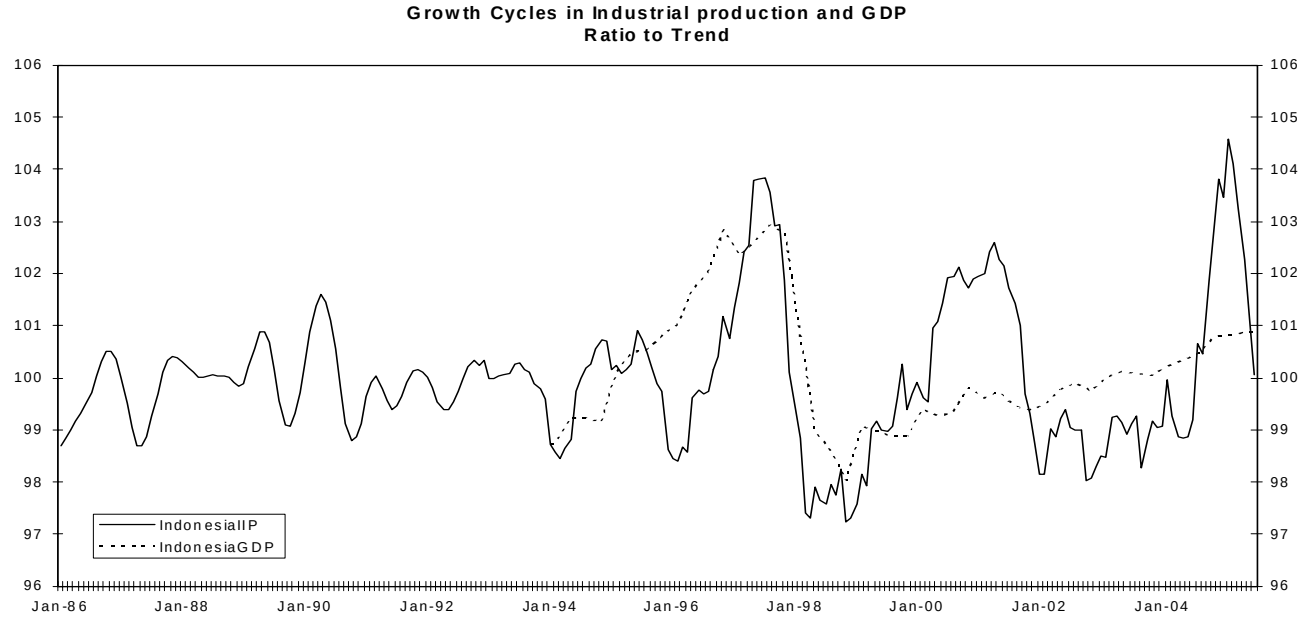


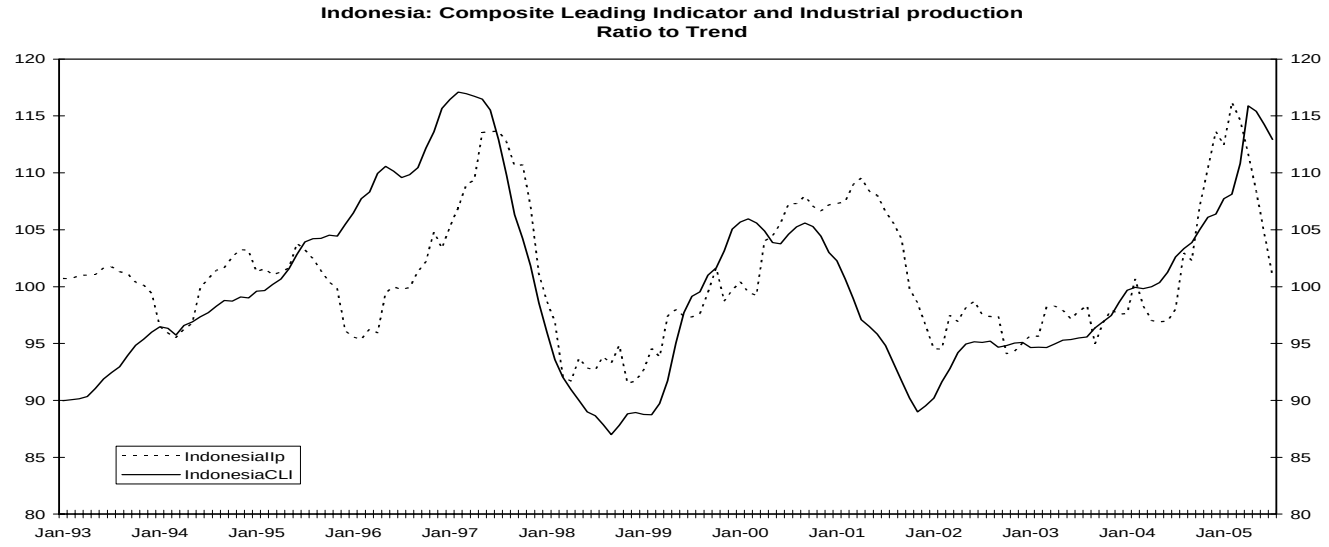
Table 8.2 Indonesia: Reference Chronology

Turning points	Industrial production index	GDP	Final Reference Chronology
Peak	Dec 1986		Dec 1986
Trough	May 1987		May 1987
Peak	Apr 1990		Apr 1990
Trough	Dec 1990		Dec 1990
Peak	Aug 1992		Aug 1992
Trough	Mar 1994		Mar 1994
Peak	Jun 1995		Jun 1995
Trough	Feb 1996		Feb 1996
Peak	May 1997	Q3 1997	May 1997
Trough	Feb 1998	Q4 1998	Feb 1998
Peak	Feb 2001	Q4 2000	Feb 2001
Trough		Q4 2001	
Peak			
Trough	Dec 2002		Dec 2002
Peak	Dec 2004		Dec 2004

Table 8.3 Indonesia: Characteristics of Composite Leading Indicator and Components

Indicator	Starting date	Timeliness Latest Data available at t	Extra (x), Missing (m) cycles)	Smoothness MCD/ QCD	Mean lead (+) at turning points (TP)			Median lead (+) at turning points (TP)			Standard deviation	Cross correlation (2)	
					Peak	Trough	All TP	Peak	Trough	All TP		Lead (+)	Coef.
Composite leading indicator	1993	t+2	1m	1	7	3	5	7	3	7	9.3	3	0.68
Exchange rate, USD, inverted	1993	t+2	1m	2	8	7	8	11	7	11	10.1	3	0.47
Exports	1993	t+2	1m	4	5	1	3	5	2	4	8.7	1	0.69
Imports	1993	t+2	1m	2	3	1	2	3	1	3	9.8	1	0.61
Call money rate, inverted	1993	t+2	0	4	11	5	8	13	10	11	8.6	7	0.61
Share price index, JSX Composite	1993	t+2	0	3	10	2	6	14	2	6	9.5	10	0.53

Chart 8.2 Indonesia: Composite Leading Indicator and Industrial production



9 Russia

Reference series and reference chronology

The monthly index of total industrial production (IIP) excluding construction from the State Statistical Bureau of the Russian Federation (SSBRF) and the quarterly GDP data in constant prices from the same source are used for determining the reference chronology. The IIP series is available back to 1993 while the GDP series goes only back to 2000. The consistency between turning points from the IIP series and from GDP over the common period since 2000 is not very good at the trough dated in August 2003 in the IIP series and in the second quarter of 2002 in the GDP series and with a minor cycle in 2001 in the IIP series not registered in the GDP series.

Cycles

Industrial production registered three growth cycles measured from trough to trough over the period 1993 - 2004. The average duration of the expansion phase of 20 months and an average duration of the contraction phase of 15 months. The amplitudes of the cyclical phases show rather strong cyclical movements with average amplitudes of contraction and slowdown phases of about +/- 13 per cent above or below trend.

GDP registered one growth cycles over the period 2000 – 2005 with a duration of 60 months, but with more symmetrical phase duration compared to the IIP series. However, cyclical amplitudes are not calculated for this short time series where the trend is estimated by the Hodrick-Prescott (HP) filter.

Leading indicators

One of the five leading indicators used to calculate the CLI for Russia is a business tendency survey indicator on demand situation in the manufacturing sector coming from a survey conducted by the Centre for Economic Analysis under the Government of the Russian Federation. Two indicators refer to external relations: net trade and world price on crude oil and two indicators refer to financial conditions: money supply and share prices.

The business tendency survey series on demand situation in manufacturing sector shows a rather short lead of 3 months according to the median at all turning points but a good track record with no extra cycles or missing cycles. The two series on net trade and crude oil price show rather long median leads of 11 months respectively. However, the crude oil price series indicated two extra cycles and the net trade series missed one cycle. The money supply series shows a good track record with no extra cycles or missing cycles, while the share price index registers three extra cycles.

Composite Leading Indicator

The CLI has predicted all matching turning points with a median lead of 10 months at all turning points and tracked the cyclical amplitudes of industrial production very well over the short period since 1996 over which it is calculated.

Table 9.1.a Russia: Characteristics of Growth Cycles in Industrial Production 1993-2004

Phase / cycle	Turning points (dates)			Duration (months)		Amplitude (phase)
	Trough	Peak	Trough	Phase	Cycle	% of trend
Expansion	7/1994	11/1997		40		16.6
Slowdown		11/1997	9/1998	10		-23.3
Cycle No 1	7/1994		9/1998		50	
Expansion	9/1998	3/2000		18		20.2
Slowdown		3/2000	3/2001	12		-3.5
Cycle No 2	9/1998		3/2001		30	
Expansion	3/2001	8/2001		5		6.2
Slowdown		8/2001	8/2003	24		-12.2
Cycle No 3	3/2001		8/2003		29	
Expansion	8/2003	12/2004		16		10.6
Average:						
Expansion				19.7		13.4
Slowdown				15.3		-13.0
Cycle					36.3	

Table 9.1.b Russia: Characteristics of Growth Cycles in GDP 2000-2004

Phase / cycle	Turning points (dates)			Duration (months)		Amplitude (phase)
	Peak	Trough	Peak	Phase	Cycle	% of trend*
Slowdown	2/2000	5/2002		27		
Expansion		5/2002	2/2005	33		
Cycle No 1	2/2000		2/2005		60	
Average:						
Slowdown				27		
Expansion				33		
Cycle					60	

* Amplitude not calculated from trend estimated by Hodrick-Prescott (HP) filter

Chart 9.1 Russia: Growth Cycles in Industrial production and GDP

Table 9.2 Russia: Reference Chronology

Turning points	Industrial production index	GDP	Final Reference Chronology
Trough	Jul 1994		Jul 1994
Peak	Nov 1997		Nov 1997
Trough	Sep 1998		Sep 1998
Peak	Mar 2000	Q1 2000	Mar 2000
Trough	(Mar 2001)		
Peak	(Aug 2001)		
Trough	Aug 2003	Q2 2002	Aug 2003
Peak	Dec 2004	Q1 2005	Dec 2004

Table 9.3 Russia: Characteristics of Composite Leading Indicator and Components

Indicator	Starting date	Timeliness Latest Data available at t	Extra (x), Missing (m) cycles)	Smoothness MCD/ QCD	Mean lead (+) at turning points (TP)			Median lead (+) at turning points (TP)			Standard deviation	Cross correlation (2)	
					Peak	Trough	All TP	Peak	Trough	All TP		Lead (+)	Coef.
Composite leading indicator	1996	t+2	0	1	6	10	7	10	10	10	8.8	4	0.72
Crude oil price, world	1980	t+2	2 x	3	12	7	10	13	4	11	8.2	3	0.50
Demand level, manufacturing	1997	t+2	0	3	1	10	5	3	10	3	7.7	7	0.33
Money supply, M2	1996	t+2	0	2	0	6	3	0	6	5	8.4	3	0.65
Net trade	1994	t+2	1m	3	5	14	10	5	14	11	9.7	7	0.45
Share price index	1996	t+2	3 x	3	8	3	6	4	3	4	6.5	1	0.67

Chart 9.2 Russia: Composite Leading Indicator and Industrial production

10 South Africa

Reference series and reference chronology

The monthly index of total industrial production (IIP) covering the manufacturing sector from Statistics South Africa and the quarterly GDP data in constant prices from the Reserve Bank of South Africa are used for determining the reference chronology. The IIP series is only available back to 1975 while the GDP series starts in 1970. The consistency between turning points from the IIP series and the GDP series over the common period since 1975 is rather good overall, with the monthly IIP turning points leading or lagging the GDP turning points with one or two quarters**.** The final reference chronology covers the period back to 1975 and is based on the turning points identified in the IIP series.

Cycles

Industrial production registered six growth cycles measured from peak to peak over the period 1975 - 2004. The length of the cycle is rather long and not very stable over the six cycles with a duration of 74 and 73 months for the first and fourth cycles respectively and as short as 23 months for the fifth cycle. The average duration of the cycle is 53 months with an average duration of the expansion phase of 27 months and an average duration of the contraction phase of 26 months. The average amplitude of expansion phases is +/- 27 per cent and the average amplitude of slowdown phases is about +/- 26 per cent.

Over the period 1970 – 2004, GDP registered eight growth cycles measured from peak to peak. The length of the cycle is rather unstable spanning a length of 84 months to 21 months with an average length of the cycle of 47 months. The amplitudes of the cyclical phases show medium strength and rather stable cyclical movements over the whole period. The average amplitude of slowdown and expansion phases is about 7 per cent below or above trend.

Leading indicators

The CLI constructed for South Africa contains six leading indicators including two quarterly indicators from the business tendency survey conducted by the Bureau for Economic Research at the University of Stellenbosch. The quarterly frequency of the survey series is a problem for the timeliness of the CLI, but they show very stable although rather short leads at cyclical turning points and a good track record with only one extra turning point registered over the period back to 1970 or 1975

Two indicators show rather long leads at cyclical turning points: interest rate spread and share price index. However, the share price indicator shows two extra cycles in relation to the reference series. All leading indicators with exception of the two survey indicators are available on a monthly basis with good timeliness which means that they are indispensable for the calculation of a timely CLI

Composite Leading Indicator

The CLI for South Africa shows a median lead of 5 months at all turning points and a rather high cyclical correspondence with industrial production over the period since 1975. No extra or missing turning points are recorded over the 6 cycles registered in industrial production.

Table 10.1.a South Africa: Characteristics of Growth Cycles in Industrial Production 1975-2004

Phase / cycle	Turning points (dates)			Duration (months)		Amplitude (phase)
	Peak	Trough	Peak	Phase	Cycle	% of trend
Slowdown	10/1975	3/1978		29		-21.2
Expansion		3/1978	12/1981	45		37.5
Cycle No 1	10/1975		12/1981		74	
Slowdown	12/1981	1/1983		13		-27.3
Expansion		1/1983	6/1984	17		16.8
Cycle No 2	12/1981		6/1984		30	
Slowdown	6/1984	5/1987		35		-21.4
Expansion		5/1987	4/1989	23		34.9
Cycle No 3	6/1984		4/1989		58	
Slowdown	4/1989	4/1993		48		-38.4
Expansion		4/1993	5/1995	25		21.4
Cycle No 4	4/1989		5/1995		73	
Slowdown	5/1995	11/1995		6		-9.7
Expansion		11/1995	4/1997	17		14.8
Cycle No 5	5/1995		4/1997		23	
Slowdown	4/1997	3/1999		23		-22.1
Expansion		3/1999	4/2002	37		15.9
Cycle No 6	4/1997		4/2002		60	
Average:						
Slowdown				25.7		-23.3
Expansion				27.3		23.5
Cycle					53.0	

Table 10.1.b South Africa: Characteristics of Growth Cycles in GDP 1970-2004

Phase / cycle	Turning points (dates)		Duration (months)			Amplitude (phase)
	Peak	Trough	Peak	Phase	Cycle	% of trend
Contraction	2/1971	8/1972		18		-8.1
Expansion		8/1972	8/1974	24		14.4
Cycle No 1	2/1971		8/1974		42	
Contraction	8/1974	11/1977		39		-14.5
Expansion		11/1977	8/1981	45		13.9
Cycle No 2	8/1974		8/1981		84	
Contraction	8/1981	5/1983		21		-12.5
Expansion		5/1983	2/1984	9		7.8
Cycle No 3	8/1981		2/1984		30	
Contraction	2/1984	11/1986		33		-7.9
Expansion		11/1986	11/1988	24		8.8
Cycle No 4	2/1984		11/1988		57	
Contraction	11/1988	11/1992		48		-8.5
Expansion		11/1992	5/1994	18		3.0
Cycle No 5	11/1988		5/1994		66	
Contraction	5/1994	5/1995		12		-2.1
Expansion		5/1995	5/1997	24		5.8
Cycle No 6	5/1994		5/1997		36	
Contraction	5/1997	11/1998		18		-4.1
Expansion		11/1998	8/2000	21		2.8
Cycle No 7	5/1997		8/2000		39	
Contraction	8/2000	11/2001		15		-1.6
Expansion		11/2001	5/2002	6		0.7
Cycle No 8	8/2000		5/2002		21	
Average:						
Contraction				25.5		-7.4
Expansion				21.4		7.1
Cycle					46.9	

Chart 10.1 South Africa: Growth Cycles in Industrial production and GDP

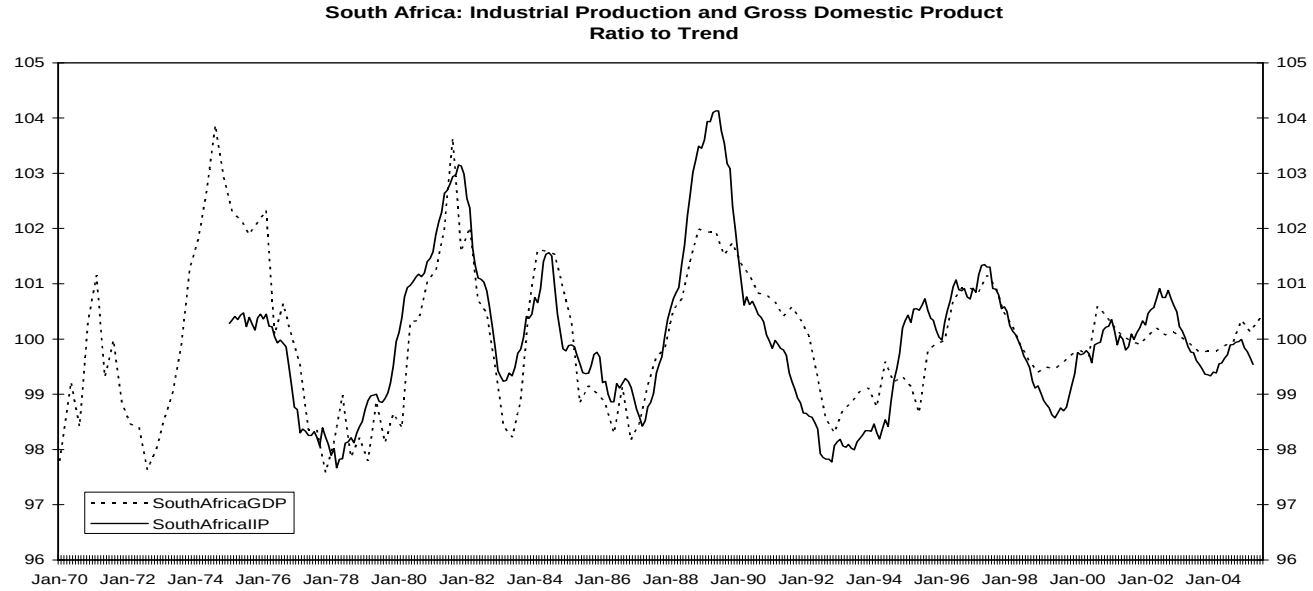


Table 10.2 South Africa: Reference Chronology

Turning points	Industrial production index	GDP	Final Reference Chronology
Peak		Q1 1971	
Trough		Q3 1972	
Peak	Oct 1975	Q3 1974	Oct 1975
Trough	Mar 1978	Q4 1977	Mar 1978
Peak	Dec 1981	Q3 1981	Dec 1981
Trough	Jan 1983	Q2 1983	Jan 1983
Peak	Jun 1984	Q1 1984	Jun 1984
Trough	May 1987	Q4 1986	May 1987
Peak	Apr 1989	Q4 1988	Apr 1989
Trough	Apr 1993	Q4 1992	Apr 1993
Peak	May 1995	Q2 1994	May 1995
Trough	Dec 1995	Q2 1995	Dec 1995
Peak	Apr 1997	Q2 1997	Apr 1997
Trough	Mar 1999	Q4 1998	Mar 1999
Peak		(Q3 2000)	
Trough		(Q4 2001)	
Peak	Apr 2002	Q3 2002	Apr 2002

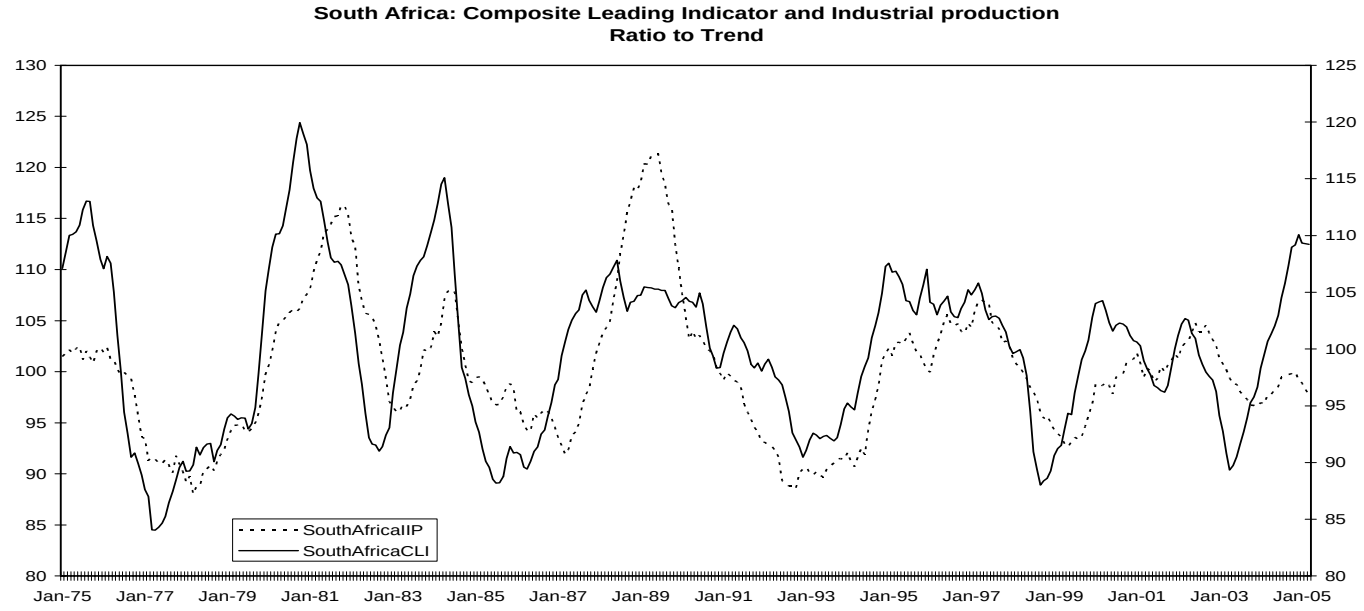
( ) minor cycles

Table 10.3 South Africa: Characteristics of Composite Leading Indicator and Components

Indicator	Starting date	Timeliness Latest Data available at t	Extra (x), Missing (m) cycles)	Smoothness MCD/ QCD	Mean lead (+) at turning points (TP)			Median lead (+) at turning points (TP)			Standard deviation	Cross correlation (2)	
					Peak	Trough	All TP	Peak	Trough	All TP		Lead (+)	Coef.
Composite leading indicator	1975	t+2	0	1	8	9	9	4	6	5	10.3	5	0.73
Building plans	1975	t+2	1 x, 2 m	6	10	7	8	11	3	8	10.6	-1	0.43
Confidence, mfg	1975	t+4	1 x	1Q	5	4	4	3	3	3	7.6	6	0.86
Interest rate spread	1996	t+2	0	2	31	9	16	31	9	10	13.1	12	0.48
Motor cars sales	1975	t+2	2 x	5	6	9	8	1	9	7	7.6	2	0.56
Order inflow, mfg	1970	t+4	1 x	1Q	7	8	5	4	4	5	9.2	8	0.62
Share prices, total	1978	t+2	2 x	2	12	10	11	14	7	9	7.7	11	0.40

***** Inverted

Chart 10.2 South Africa: Composite Leading Indicator and Industrial production



COMPOSITE LEADING INDICATORS FOR RECENTLY NEW OECD MEMBER COUNTRIES

11 Korea

Reference series and reference chronology

The monthly index of total industrial production (IIP) excluding construction from the National Statistical Office of Korea (KNSO) and the quarterly GDP data in constant prices from the Bank of Korea are used for determining the reference chronology. The IIP series is available back to 1980 while the GDP series starts in 1990. For the period 1980-1989, the reference chronology is determined on the IIP series only. The consistency between turning points from the IIP series and from the GDP over the common period since 1990 is very good overall, with the monthly IIP turning points falling within the quarter of the GDP turning points. This is the case for all turning points with exception of the peak identified in May 1996 by the IIP series with a corresponding peak identified in the third quarter of 1997 by GDP a difference of five quarters. The national coincident business cycle indicator produced by the KNSO confirms the peak in May 1996 by the IIP series and this turning point is kept in the final reference chronology.

Cycles

Over the period 1980 – 2004, industrial production registered seven growth cycles measured from trough to trough. The length of the cycle is not very stable with duration of as short as 21 months and as long as 66 months. The average duration of the cycle is 39 months with an average duration of the expansion phase of 23 months and an average duration of the slowdown phase of 16 months. The amplitudes of the cyclical phases show strong and rather stable cyclical movements with exception of the phases over the period May 1996 to August 2000, which show much stronger amplitudes reflecting the effect of the Asian financial crises in 1997.

GDP registered four growth cycles over the period 1990 – 2004 with about the same cycle and phase duration as the IIP series. However, GDP shows much smaller cyclical amplitudes compared to the IIP series with an average for both phases of about 5 per cent below or above trend.

Leading indicators

The composite leading indicator (CLI) for Korea contains six leading indicators including two indicators from the business tendency survey carried out by the Bank of Korea since 1992 on a quarterly basis. However, the business survey is conducted on a monthly basis since January 2003. Both survey indicators show medium to short leads according to the mean and median measures and good general fit with the reference series (IIP) with rather high peak-correlation coefficients.

Two other leading indicators referring to capital and financial accounts (BOP) and housing bond yield register also medium to short leads according to all turning point measures:. The BOP series register, however some extra and missing turning points with regard to the reference series. The stocks of manufactured goods series shows a very long lead according to the correlation measure with a very high peak-correlation coefficient. The money supply (M1) indicator shows also very long leads, but registers some extra and missing turning points with regard to the reference series.

Composite Leading Indicator

The record of the CLI at predicting turning points and reproducing amplitudes of cycles has been very good over the period since 1991 over which it is calculated. The average lead is 7 months according to the median and mean measures. No extra or missing cycles are recorded over the 4 cycles registered in the reference series over the period 1991-2004.

Table 11.1.a Korea: Characteristics of Growth Cycles in Industrial Production 1980-2004

Phase / cycle	Turning points (dates)		Duration (months)			Amplitude (phase)
	Trough	Peak	Trough	Phase	Cycle	% of trend
Expansion	9/1980	8/1981		11		9.1
Slowdown		8/1981	8/1982	12		-11.5
Cycle No 1	9/1980		8/1982		23	
Expansion	8/1982	6/1984		22		12.7
Slowdown		6/1984	10/1985	16		-17.0
Cycle No 2	8/1982		10/1985		38	
Expansion	10/1985	1/1988		27		20.3
Slowdown		1/1988	4/1989	15		-14.8
Cycle No 3	10/1985		4/1989		42	
Expansion	4/1989	11/1991		31		8.5
Slowdown		11/1991	1/1993	14		-12.9
Cycle No 4	4/1989		1/1993		45	
Expansion	1/1993	5/1996		40		18.2
Slowdown		5/1996	7/1998	26		-26.7
Cycle No 5	1/1993		7/1998		66	
Expansion	7/1998	8/2000		25		25.4
Slowdown		8/2000	10/2001	14		-13.0
Cycle No 6	7/1998		10/2001		39	
Expansion	10/2001	4/2002		6		7.6
Slowdown		4/2002	7/2003	15		-7.8
Cycle No 7	10/2001		7/2003		21	
Average:						
Expansion				23.1		14.5
Slowdown				16.0		-14.8
Cycle					39.1	

Table 11.1.b Korea: Characteristics of Growth Cycles in GDP 1990-2004

Phase / cycle	Turning points (dates)		Duration (months)			Amplitude (phase)
	Peak	Trough	Peak	Phase	Cycle	% of trend
Slowdown	11/1991	2/1993		15		-2.4
Expansion		2/1993	8/1997	54		8.9
Cycle No 1	11/1991		8/1997		69	
Slowdown	8/1997	5/1998		9		-12.5
Expansion		5/1998	2/2000	21		7.8
Cycle No 2	8/1997		2/2000		30	
Slowdown	2/2000	11/2001		21		-2.9
Expansion		11/2001	5/2002	6		2.1
Cycle No 3	2/2000		5/2002		27	
Slowdown	5/2002	5/2003		12		-2.0
Expansion		5/2003	2/2004	9		1.7
Cycle No 4	5/2002		2/2004		21	
Average:						
Slowdown				14.3		-4.9
Expansion				22.5		5.2
Cycle					36.8	

Chart 11.1 KOREA: Growth Cycles in Industrial production and GDP

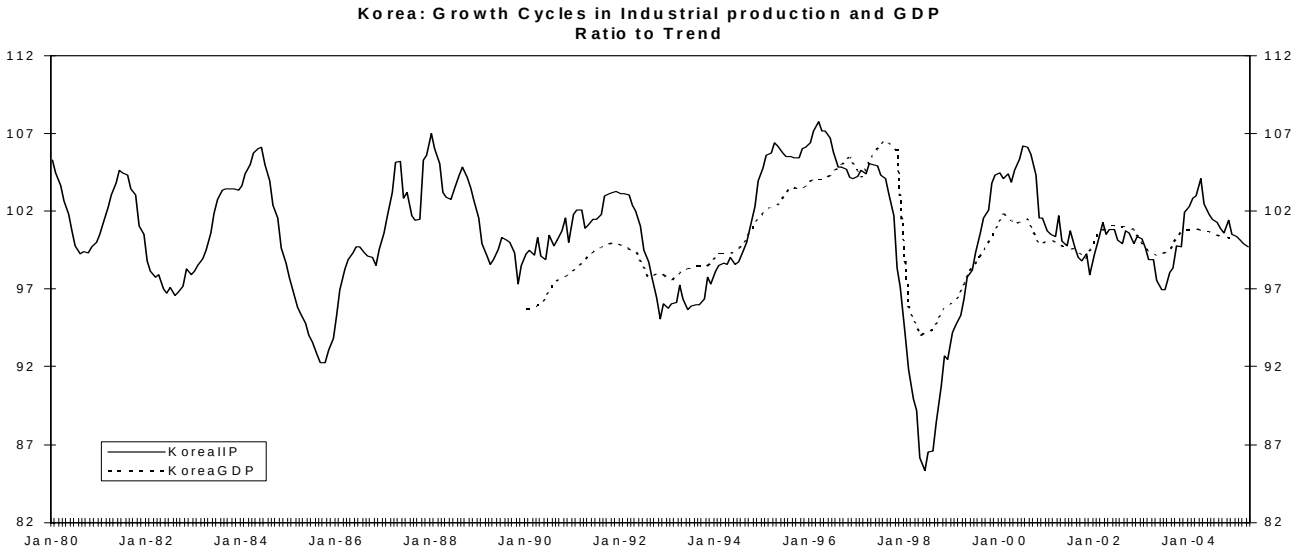


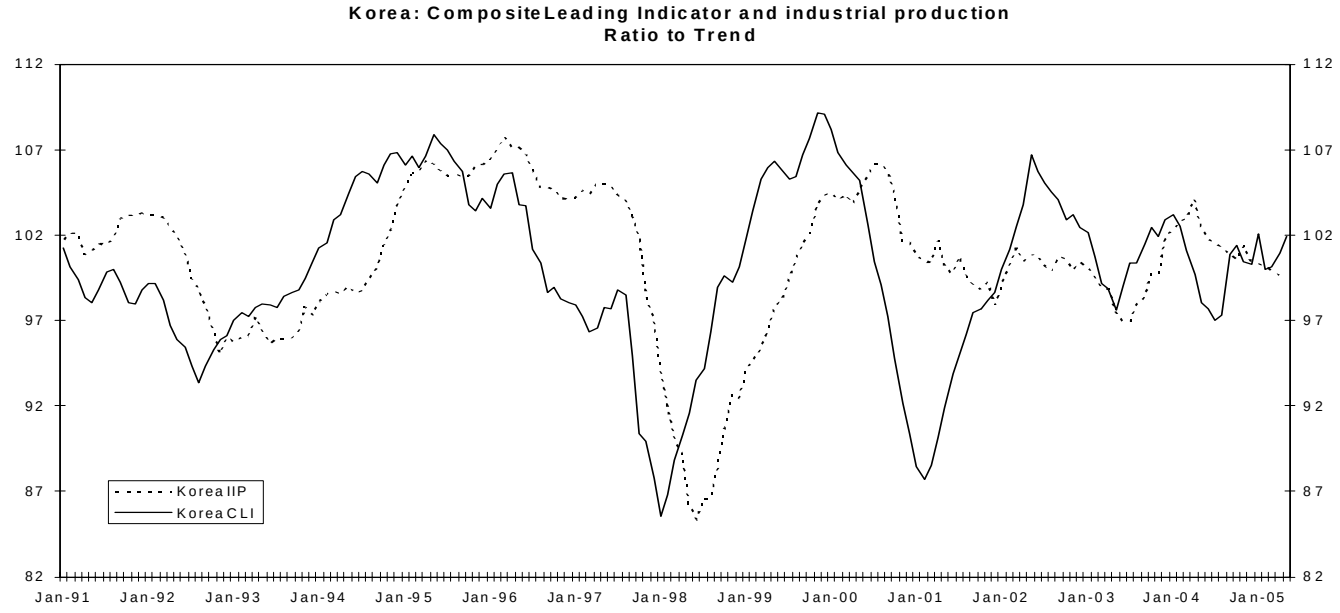
Table 11.2 Korea: Reference Chronology

Turning points	Industrial production index	GDP	Final Reference Chronology
Trough	Sep 1980		Sep 1980
Peak	Aug 1981		Aug 1981
Trough	Aug 1982		Aug 1982
Peak	Jun 1984		Jun 1984
Trough	Oct 1985		Oct 1985
Peak	Jan 1988		Jan 1988
Trough	Apr 1989		Apr 1989
Peak	Nov 1991	Q4 1991	Nov 1991
Trough	Jan 1993	Q1 1993	Jan 1993
Peak	May 1996	Q3 1997	May 1996
Trough	Jul 1998	Q2 1998	Jul 1998
Peak	Aug 2000	Q1 2000	Aug 2000
Trough	Oct 2001	Q4 2001	Oct 2001
Peak	Apr 2002	Q2 2002	Apr 2002
Trough	Jul 2003	Q2 2003	Jul 2003
Peak	Feb 2004	Q1 2004	Feb 2004

Table 11.3 Korea: Characteristics of Composite Leading Indicator and Components

Indicator	Starting date	Timeliness Latest Data available at t	Extra (x), Missing (m) cycles)	Smoothness MCD/ QCD	Mean lead (+) at turning points (TP)			Median lead (+) at turning points (TP)			Standard deviation	Cross correlation (2)	
					Peak	Trough	All TP	Peak	Trough	All TP		Lead (+)	Coef.
Composite leading indicator	1991	t+2	0	1	7	6	7	9	6	7	3.8	7	0.73
BOP, Capital & Financial Accounts	1980	t+2	2 x, 2 m	6	6	8	7	4	8	6	12.6	4	0.48
Business situation, future tendency, industry	1992	t+4	0	1Q	5	4	5	3	4	4	5.2	1	0.72
Finished goods stocks, industry	1992	t+4	1 x	1Q	7	7	7	5	7	7	7.6	2	0.63
Stocks of manufactured goods	1990	t+2	1 ½ x	2	9	6	8	13	5	5	6.3	14	0.77
Money supply M2	1990	t+2	1 x, 2 m	2	12	11	11	13	11	13	5.7	17	0.51
Long term bond yield	1991	t+2	1 x	2	12	15	13	11	15	15	6.1	5	0.34

Chart 11.2 Korea: Composite Leading Indicator and Industrial production



12 New Zealand

Reference series and reference chronology

The quarterly index of total industrial production (IIP) excluding construction from Statistics New Zealand (SNZ) and the quarterly GDP data in constant prices also from SNZ are used for determining the reference chronology. The IIP series is available back to 1987 while the GDP series starts in 1970. The consistency between turning points from the IIP series converted to monthly frequency and from the GDP over the common period since 1987 is rather good overall, with the monthly IIP turning points leading or lagging the GDP turning points with one or two quarters**.** The final reference chronology covers the period back to 1987 and is based on the turning points identified in the IIP series.

Cycles

Over the period 1970 – 2004, GDP registered ten growth cycles measured from trough to trough. The length of the cycle is rather stable with exception of the sixth cycle, with a length of 81 months spanning the period 1986 to 1992. The amplitudes of the cyclical phases show medium strength and rather stable cyclical movements over the whole period. The average amplitude of slowdown and expansion phases is about 7 per cent below or above trend.

Industrial production (IIP) registered three growth cycles over the period 1987 – 2004 with a bit longer cycle and expansion phase duration compared to the GDP series. This is explained by the short extra cycle registered in GDP over the period 1994. The average amplitudes of slowdown and expansion phases are 8 and 6 per cent below or above trend respectively.

Leading indicators

The composite leading indicator (CLI) for New Zealand contains six leading indicators including one quarterly indicator from the business tendency survey carried out by the New Zealand Institute of Economic research since 1962 and one indicator from the consumer survey conducted by the Westpac Banking Corporation since 1989. The survey indicators on business expectations in manufacturing show rather short lead of 5 months at all turning points according to the median measure, while the consumer confidence indicator shows longer leads on all measures and a register a good general fit with the reference series (IIP) with rather high peak-correlation coefficient.

The retail trade indicator shows rater short lead at all turning points according to all measures but a good general fit with the reference series with a rather high peak-correlation coefficient. On the other hand, the registered unemployment series (inverted) and the interest rate series (3-months bank bills) show rather long leads according to the all turning point measures. However, the interest rate series register a weak general fit with the reference series and register three extra cycles. The money supply series show also rater long lead at turning points, but register two extra cycles in comparison with the reference cycle.

Composite Leading Indicator

The record of the CLI at predicting turning points and reproducing amplitudes of cycles has been very good over the period since 1967 over which it is calculated. The average lead at all turning points is 5 to 8 months according to the median and mean measures respectively. However, two extra minor cycles in 1988-89 and 1992-93 are recorded over the 10 cycles registered in the reference series over the period 1967-2004.

Table 12.1.a New Zealand: Characteristics of Growth Cycles in Industrial Production 1987-2004

Phase / cycle	Turning points (dates)		Duration (months)			Amplitude (phase)
	Trough	Peak	Trough	Phase	Cycle	% of trend
Expansion	8/1992	11/1996		51		13.8
Slowdown		11/1996	11/1998	24		-8.5
Cycle No 1	8/1992		11/1998		75	
Expansion	11/1998	8/2000		21		5.4
Slowdown		8/2000	8/2001	12		-3.9
Cycle No 2	11/1998		8/2001		33	
Expansion	8/2001	8/2002		12		4.6
Slowdown		8/2002	5/2003	9		-4.3
Cycle No 3	8/2001		5/2003		21	
Average:						
Expansion				28.0		7.9
Slowdown				15.0		-5.6
Cycle					43.0	

Table 12.1.b New Zealand: Characteristics of Growth Cycles in GDP 1970-2004

Phase / cycle	Turning points (dates)		Duration (months)			Amplitude (phase)
	Trough	Peak	Trough	Phase	Cycle	% of trend
Expansion	8/1972	8/1974		24		15.4
Slowdown		8/1974	5/1975	9		-12.2
Cycle No 1	8/1972		5/1975		33	
Expansion	5/1975	11/1976		18		9.4
Slowdown		11/1976	2/1978	15		-12.3
Cycle No 2	5/1975		2/1978		33	
Expansion	2/1978	2/1979		12		8.2
Slowdown		2/1979	5/1980	15		-5.9
Cycle No 3	2/1978		5/1980		27	
Expansion	5/1980	8/1981		15		4.9
Slowdown		8/1981	2/1983	18		-7.1
Cycle No 4	5/1980		2/1983		33	
Expansion	2/1983	2/1984		12		11.2
Slowdown		2/1984	2/1986	24		-10.3
Cycle No 5	2/1983		2/1986		36	
Expansion	2/1986	5/1989		39		9.8
Slowdown		5/1989	11/1992	42		-9.2
Cycle No 6	2/1986		11/1992		81	
Expansion	11/1992	2/1994		15		5.5
Slowdown		2/1994	8/1994	6		-1.4
Cycle No 7	11/1992		8/1994		21	
Expansion	8/1994	5/1997		33		2.9
Slowdown		5/1997	5/1998	12		-4.6
Cycle No 8	8/1994		5/1998		45	
Expansion	5/1998	2/2000		21		4.4
Slowdown		2/2000	2/2001	12		-3.3
Cycle No 9	5/1998		2/2001		33	
Expansion	2/2001	11/2002		21		2.3
Slowdown		11/2002	5/2003	6		-1.6
Cycle No 10	2/2001		5/2003		27	
Average:						
Expansion				21.0		7.4
Slowdown				15.9		-6.8
Cycle					36.9	

Chart 12.1 New Zealand: Growth Cycles in Industrial production and GDP

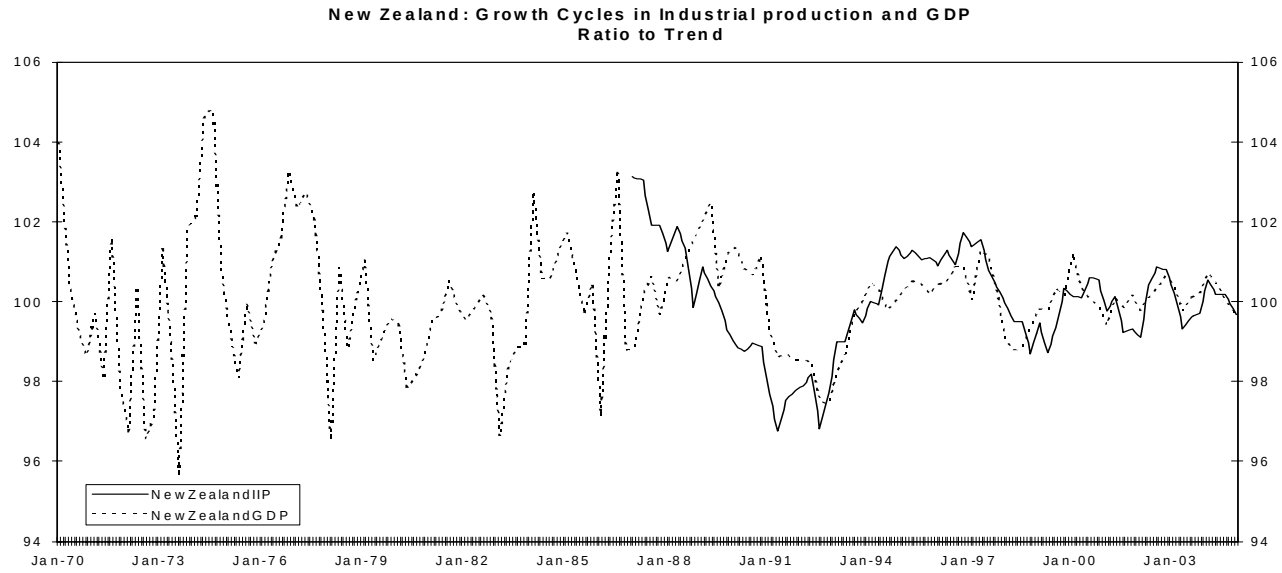


Table 12.2 New Zealand: Reference Chronology

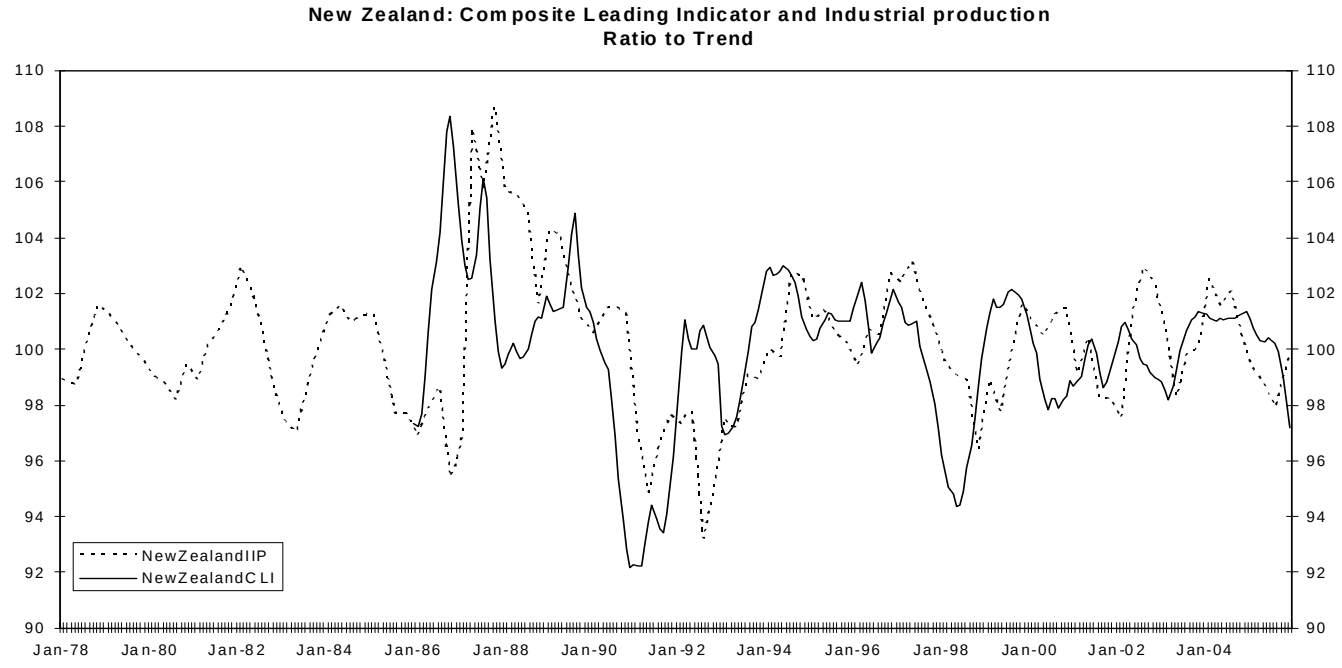
Turning points	Industrial production index	GDP	Final Reference Chronology
Trough		Q3 1972	
Peak		Q3 1974	
Trough		Q2 1975	
Peak		Q4 1976	
Trough		Q1 1978	
Peak		Q1 1979	
Trough		Q2 1980	
Peak		Q3 1981	
Trough		Q1 1983	
Peak		Q1 1984	
Trough		Q1 1986	
Peak		Q2 1989	
Trough	Aug 1992	Q4 1992	Aug 1992
Peak		(Q1 1994)	
Trough		(Q3 1994)	
Peak	Nov 1996	Q2 1997	Nov 1996
Trough	Nov 1998	Q2 1998	Nov 1998
Peak	Aug 2000	Q1 2000	Aug 2000
Trough	Aug 2001	Q1 2001	Aug 2001
Peak	Aug 2002	Q1 2002	Aug 2002
Trough	May 2003	Q2 2003	May 2003
Peak	Feb 2004	Q1 2004	Feb 2004

( ) minor cycles

Table 12.3 New Zealand: Characteristics of Composite Leading Indicator and Components

Indicator	Starting date	Timeliness Latest Data available at t	Extra (x), Missing (m) cycles)	Smoothness MCD/ QCD	Mean lead (+) at turning points (TP)			Median lead (+) at turning points (TP)			Standard deviation	Cross correlation (2)	
					Peak	Trough	All TP	Peak	Trough	All TP		Lead (+)	Coef.
Composite leading indicator	1987	t+2	2 x	1	8	9	8	5	6	5	6.0	10	0.69
Business situation, future tendency, industry	1962	t+4	1 x	1Q	9	8	9	5	7	5	6.0	9	0.35
Consumer confidence	1989	t+4	0	1Q	6	6	6	8	5	7	8.5	9	0.63
Retail trade, total value	1993	t+2	0	5	7	5	6	8	3	4	6.1	0	0.58
Unemployment, registered, inverted	1986	t+2	1 m	2	13	10	11	12	6	11	11.1	9	0.54
Money supply, M1	1967	t+2	2 x	2	10	8	9	8	5	6	8.6	9	0.55
3-month bank bills rate	1974	t+2	3 x	2	10	9	9	8	9	8	7.1	11	0.37

Chart 12.2 New Zealand Composite Leading Indicator and Industrial production



13 Czech Republic

Reference series and reference chronology

The monthly index of total industrial production (IIP) excluding construction from the Czech Statistical Office (CSO) and the quarterly GDP data in constant prices also from the CSO are used for determining the reference chronology. The IIP series is available back to 1992 while the GDP series starts in 1995. The consistency between turning points from the IIP series and from the GDP over the common period since 1995 is totally different over the period up to 1999, but shows some consistency thereafter. The final reference chronology is for this reason based solely on the IIP series.

Cycles

Over the period 1992 – 2005, industrial production registered five growth cycles measured from trough to trough. The length of the cycle is rather stable with an average duration of the cycle of 27 months and with an average duration of the expansion phase of 16 months and an average duration of the slowdown phase of 11 months. The amplitudes of the cyclical phases show rather strong cyclical movements over the whole period with an average amplitude above or below trend of about 9 per cent.

GDP registered only two growth cycles over the period 1995 – 2005 with about double cycle and phase duration as the IIP series. The amplitudes of the cyclical phases are less pronounced compared to the IIP series with average amplitude above or below trend of about 5 per cent.

Leading indicators

The composite leading indicator (CLI) is constructed from six leading indicators including two indicators from the business tendency survey carried out by the Czech Statistical Office (CSO) since 1993 and one indicator from the consumer survey also conducted by the CSO since 1995. All survey indicators show medium to short leads according to the mean and median measures and most indicators show reasonable good general fit with the reference series (IIP) with medium high peak-correlation coefficients. A missing cycle in relation to the reference series is registered by two survey indicators.

Two indicators on retail sales volume and money supply show long median leads of 10 months at all turning points, but the money supply indicator is not very well correlated with the reference series as indicated by a very low peak-correlation coefficient. A final indicator on share prices shows medium leads according to the median measure and a very good tracking record with no extra or missing turning points in relation to the reference cycle.

Composite Leading Indicator

The record of the CLI at predicting turning points and reproducing amplitudes of cycles has been rather good over the period since 1992 over which it is calculated. The average lead is 4-5 months according to the median and mean measures respectively. No extra cycles and only half a missing cycle are recorded over the five cycles registered in the reference series over the period 1992-2005.

Table 13.1.a Czech Republic: Characteristics of Growth Cycles in Industrial Production 1992-2005

Phase / cycle	Turning points (dates)		Duration (months)			Amplitude (phase)
	Trough	Peak	Trough	Phase	Cycle	% of trend
Expansion	2/1994	2/1996		24		12.1
Slowdown		2/1996	12/1996	10		-10.4
Cycle No 1	2/1994		12/1996		34	
Expansion	12/1996	1/1998		13		13.0
Slowdown		1/1998	1/1999	12		-13.1
Cycle No 2	12/1996		1/1999		25	
Expansion	1/1999	8/2000		19		8.7
Slowdown		8/2000	9/2001	13		-8.1
Cycle No 3	1/1999		9/2001		32	
Expansion	9/2001	9/2002		12		8.7
Slowdown		9/2002	6/2003	9		-5.8
Cycle No 4	9/2001		6/2003		21	
Expansion	6/2003	5/2004		11		6.6
Slowdown		5/2004	3/2005	10		-9.3
Cycle No 5	6/2003		3/2005		21	
Average:						
Expansion				15.8		9.8
Slowdown				10.8		-9.3
Cycle					26.6	

Table 13.1.b Czech Republic: Characteristics of Growth Cycles in GDP 1995-2004

Phase / cycle	Turning points (dates)		Duration (months)			Amplitude (phase)
	Trough	Peak	Trough	Phase	Cycle	% of trend
Expansion	1/1994	8/1996		31		8.3
Slowdown		8/1996	2/1999	30		-6.9
Cycle No 1	1/1994		2/1999		61	
Expansion	2/1999	11/2000		21		2.4
Slowdown		11/2000	8/2002	21		-1.8
Cycle No 2	2/1999		8/2002		42	
Average:						
Expansion				26.0		5.4
Slowdown				25.5		-4.3
Cycle					51.5	

Chart 13.1 Czech Republic: Growth Cycles in Industrial production and GDP

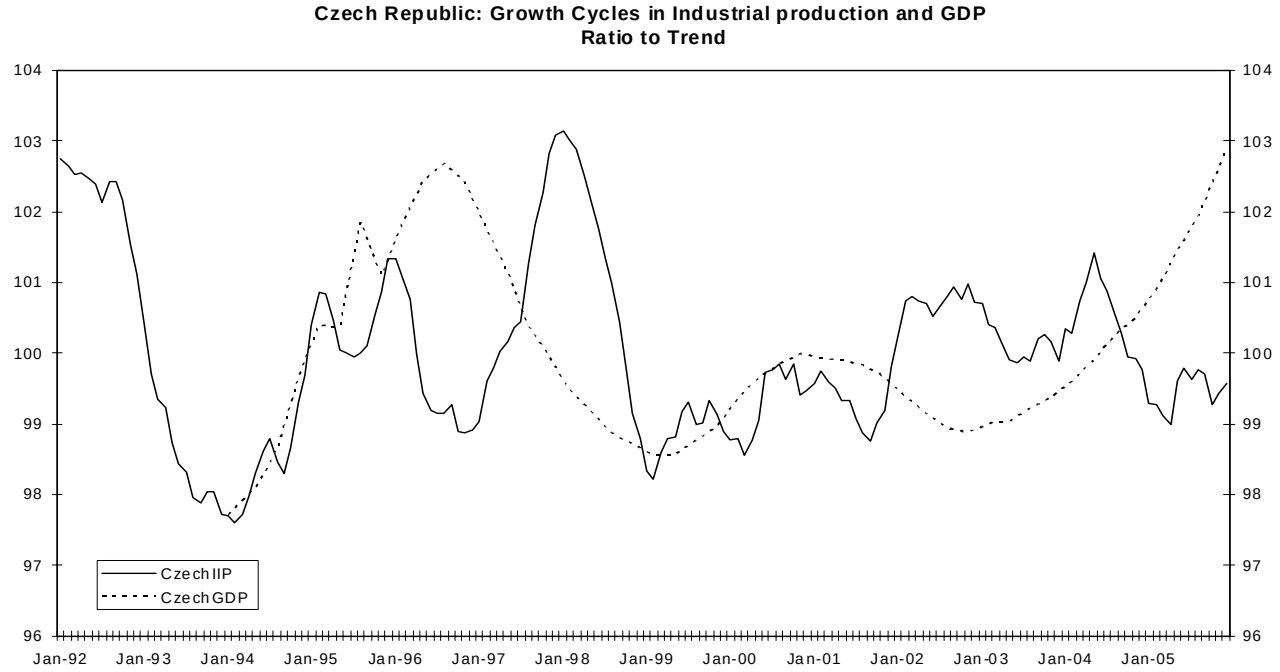


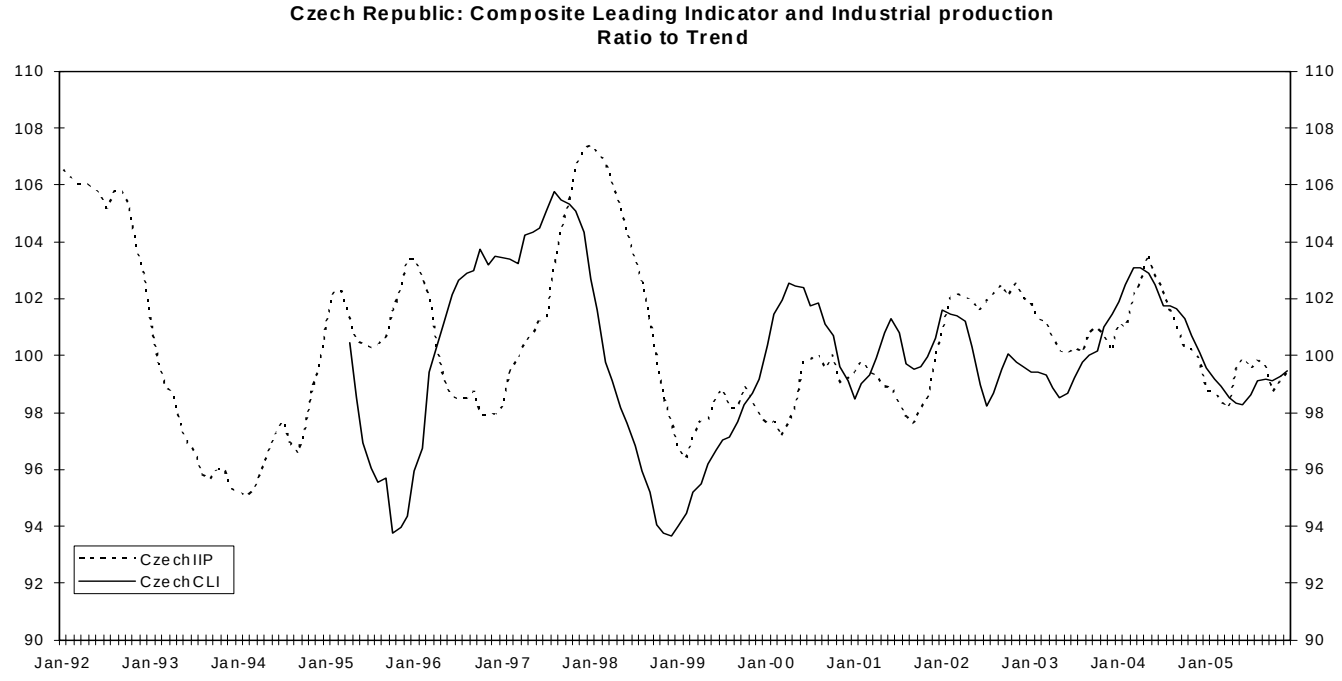
Table 13.2 Czech Republic: Reference Chronology

Turning points	Industrial production index	GDP	Final Reference Chronology
Trough	Feb 1994	Q1 1994	Feb 1994
Peak	Feb 1996	Q3 1996	Feb 1996
Trough	Dec 1996		Dec 1996
Peak	Jan 1998		Jan 1998
Trough	Jan 1999	Q1 1999	Jan 1999
Peak	Aug 2000	Q4 2000	Aug 2000
Trough	Sep 2001		Sep 2001
Peak	Sep 2002		Sep 2002
Trough	Jun 2003	Q3 2002	Jun 2003
Peak	May 2005		May 2005
Trough	Mar 2005		Mar 2005

Table 13.2 Czech Republic: Characteristics of Composite Leading Indicator and Components

Indicator	Starting date	Timeliness Latest Data available at t	Extra (x), Missing (m) cycles)	Smoothness MCD/ QCD	Mean lead (+) at turning points (TP)			Median lead (+) at turning points (TP)			Standard deviation	Cross correlation (2)	
					Peak	Trough	All TP	Peak	Trough	All TP		Lead (+)	Coef.
Composite leading indicator	1992	t+2	½ m	1	4	6	5	4	4	4	4.6	9	0.59
Finished goods stocks, industry	1993	t+2	1m	5	7	4	5	4	3	4	7.0	6	0.51
Retail sales, volume	1995	t+2	1m	5	10	9	9	10	10	10	3.2	11	0.60
Selling prices, future Tendency, industry	1993	t+2	½ m	4	3	1	2	1	0	1	5.7	4	0.60
Price expectations, consumers	1995	t+2	1m	3	0	2	1	1	-2	-1	5.2	3	0.49
Money supply, M2	1996	t+2	½ m	3	7	9	8	8	11	10	8.1	19	0.29
Share price index, total	1995	t+2	0	4	5	7	6	5	7	5	5.3	13	0.39

Chart 13.2 Czech Republic Composite Leading Indicator and Industrial production



14 Hungary

Reference series and reference chronology

The monthly index of total industrial production (IIP) excluding construction from the Hungarian Central Statistical Office (HCSO) and the quarterly GDP data in constant prices also from the HCSO are used for determining the reference chronology. The IIP series is available back to 1993 while the GDP series starts in 1995. The consistency between turning points from the IIP series and from GDP over the common period up to the trough in the first half of 2003 is very consistency with turning points in the IIP series within the quarter of the turning points in GDP. However, the cycle in the IIP series over the period 2003 to 2004 is not registered in the GDP series. The final reference chronology is for this reason based solely on the IIP series.

Cycles

Over the period 1993 – 2005, industrial production registered four growth cycles measured from peak to peak. The length of the cycle is not very stable with duration of as short as 17 months and as long as 41 months. The average duration of the cycle is 31 months with an average duration of the expansion phase of 14 months and an average duration of the slowdown phase of 17 months. The amplitudes of the cyclical phases show medium strong cyclical movements with about +/- 9 per cent above or below trend.

GDP registered two growth cycles over the period 1995 – 2005 with average duration of 40 months and with an average duration of the expansion phase of 23 months and an average duration of the slowdown phase of 17 months. The amplitudes of the cyclical phases show very weak cyclical movements compared to the IIP series with amplitudes of about a bit over +/- 1 per cent above or below trend.

Leading indicators

The composite leading indicator (CLI) is constructed from seven leading indicators from different statistical subject areas. Five indicators relating to money supply, interest rate, hours of work, unemployment and share prices show long leads in the range of 9-13 months at all turning points according to the median measure. Two indicators related to production expectations and imports register medium to short leads at all turning points, but show good general fit with the reference series (IIP) with high peak-correlation coefficients. One or two missing cycles in relation to the reference series are registered by five of the seven indicators while an extra cycle is noted by two indicators. No extra or missing cycles is registered by the imports indicator.

Composite Leading Indicator

The record of the CLI at predicting turning points and reproducing amplitudes of cycles has been rather good over the period since 1993 over which it is calculated. The average lead is 8 months at all turning points according to the median measure and a lead of 5 months according to the peak-correlation measure with a weak fit with the reference series as indicated by a rather low correlation coefficient of 0.55. One missing cycles is recorded over the four cycles registered in the reference series over the period 1993-2005.

Table 14.1.a Hungary: Characteristics of Growth Cycles in Industrial Production 1993-2004

Phase / cycle	Turning points (dates)		Duration (months)			Amplitude (phase)
	Peak	Trough	Peak	Phase	Cycle	% of trend
Slowdown	12/1994	9/1996		21		-9.5
Expansion		9/1996	5/1998	20		4.9
Cycle No 1	12/1994		5/1998		41	
Slowdown	5/1998	2/1999		9		-8.6
Expansion		2/1999	1/2001	23		16.1
Cycle No 2	5/1998		1/2001		32	
Slowdown	1/2001	5/2003		28		-11.9
Expansion		5/2003	12/2003	7		7.6
Cycle No 3	1/2001		12/2003		35	
Slowdown	12/2003	12/2004		12		-8.5
Expansion		12/2004	5/2005	5		6.3
Cycle No 4	12/2003		5/2005		17	
Average:						
Slowdown				17.5		-9.6
Expansion				13.8		8.7
Cycle					31.3	

Table 14.1.b Hungary: Characteristics of Growth Cycles in GDP 1995-2004

Phase / cycle	Turning points (dates)		Duration (months)			Amplitude (phase)
	Trough	Peak	Trough	Phase	Cycle	% of trend
Expansion	8/1996	6/1998		22		1.9
Slowdown		6/1998	2/1999	8		-1.0
Cycle No 1	8/1996		2/1999		30	
Expansion	2/1999	2/2001		24		1.3
Slowdown		2/2001	5/2003	27		-1.2
Cycle No 2	2/1999		5/2003		51	
Average:						
Expansion				23.0		1.6
Slowdown				17.5		-1.1
Cycle					40.5	

Chart 14.1 Hungary: Growth Cycles in Industrial production and GDP

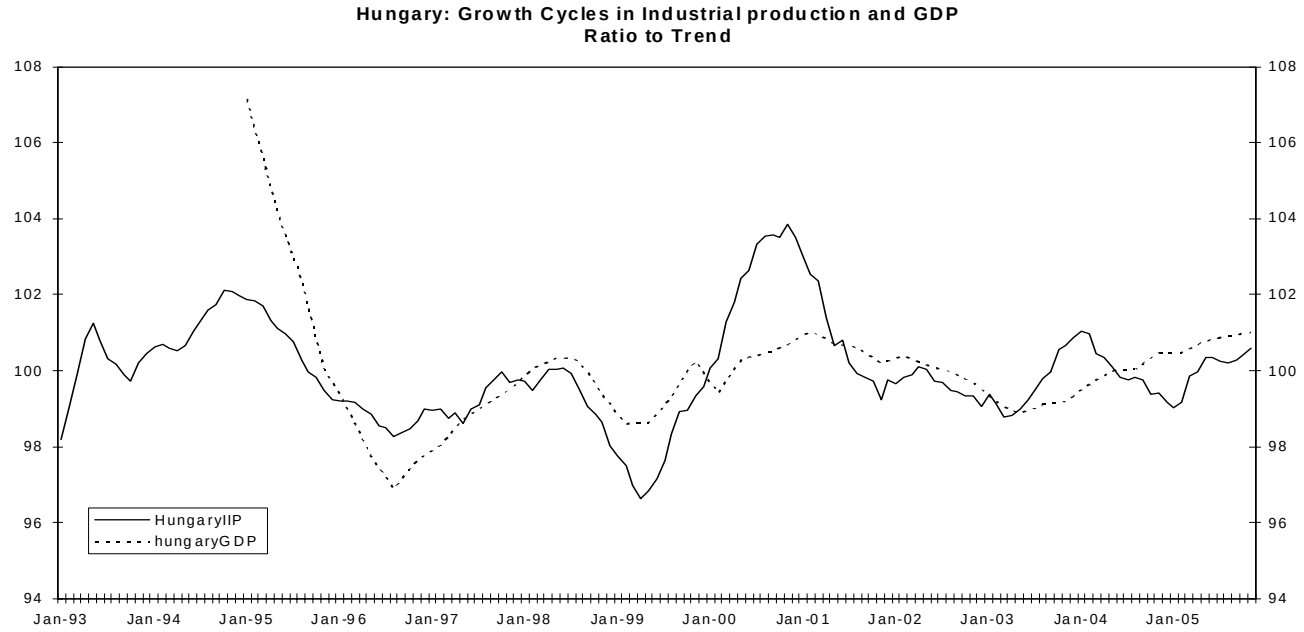


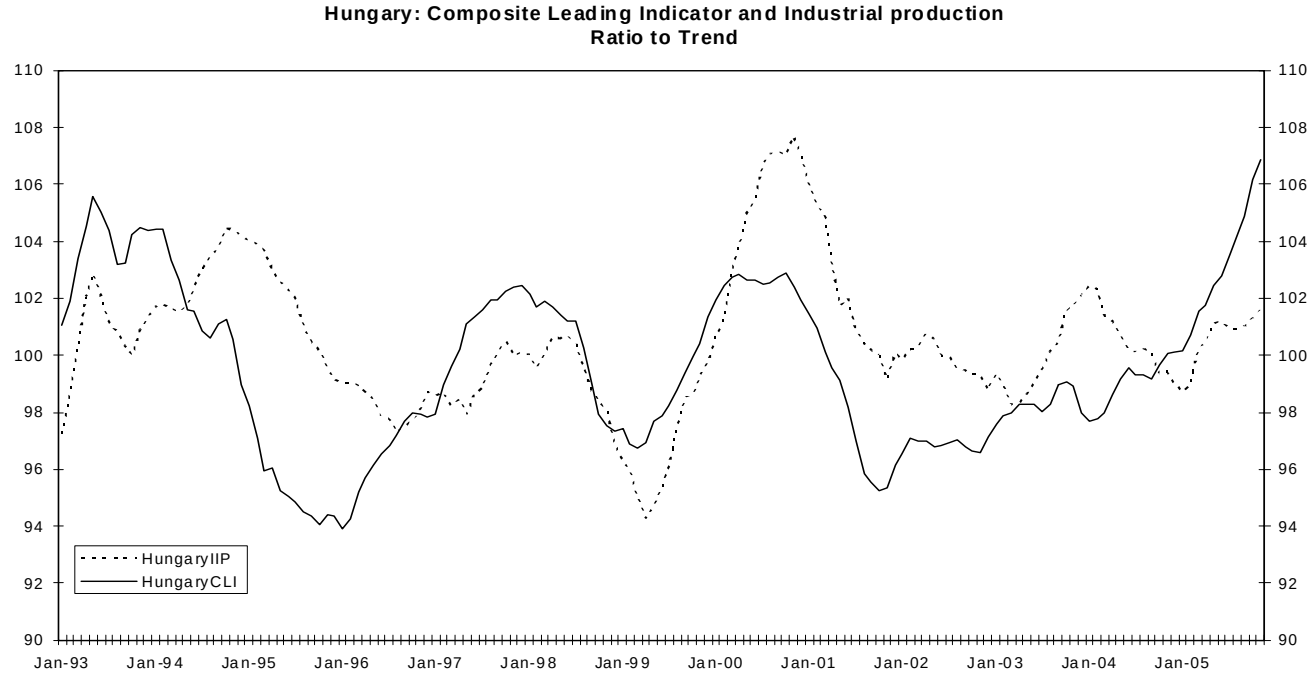
Table 14.2 Hungary: Reference Chronology

Turning points	Industrial production index	GDP	Final Reference Chronology
Peak	Dec 1994		Dec 1994
Trough	Sep 1996	Q3 1996	Sep 1996
Peak	May 1998	Q2 1998	May 1998
Trough	Feb 1999	Q1 1999	Feb 1999
Peak	Jan 2001	Q1 2001	Jan 2001
Trough	May 2003	Q2 2003	May 2003
Peak	Dec 2003		Dec 2003
Trough	Dec 2004		Dec 2004
Peak	May 2005		May 2005

Table 14.3 Hungary: Characteristics of Composite Leading Indicator and Components

Indicator	Starting date	Timeliness Latest Data available at t	Extra (x), Missing (m) cycles)	Smoothness MCD/ QCD	Mean lead (+) at turning points (TP)			Median lead (+) at turning points (TP)			Standard deviation	Cross correlation (2)	
					Peak	Trough	All TP	Peak	Trough	All TP		Lead (+)	Coef.
Composite leading indicator	1993	t+2	1 m	1	7	9	8	7	8	8	7.3	5	0.55
Money supply, M1	1990	t+2	1 ½ m	1	13	9	11	13	5	10	8.6	13	0.48
Central Bank, base interest rate	1991	t+2	1 x	2	13	14	14	13	14	13	5.3	10	0.35
Hours of work, manufacturing	1991	t+4	2 m, 1 x	1	11	4	7	11	4	9	5.3	7	0.42
Production, future tendency, manufact.	1996	t+2	1 ½ m	4	7	7	7	5	7	5	7.8	0	0.62
Unemployment registered, inverted	1993	t+2	1 m	1	11	11	11	12	13	13	5.2	12	0.40
Imports, value	1980	t+2	0	6	1	4	3	3	4	3	4.0	0	0.72
Share price index	1991	t+2	2 m	2	10	7	9	10	7	9	2.7	6	0.20

Chart 14.2 Hungary: Composite Leading Indicator and Industrial production



15 Poland

Reference series and reference chronology

The monthly index of total industrial production (IIP) excluding construction from the Central Statistical Office of Poland (GUS) and the quarterly GDP data in constant prices also from the GUS are used for determining the reference chronology. The IIP series is available back to 1991 while the GDP series starts in 1995. The consistency between turning points from the IIP series and from GDP over the common period since 1995 is not so good at the peak in June 2000 and the trough in May 2002 according to the IIP series, while other turning points are better aligned. The final reference chronology is for this reason based solely on the IIP series.

Cycles

Over the period 1991 – 2005, industrial production registered four growth cycles measured from trough to trough. The length of the cycle is not very stable with duration of as short as 23 months and as long as 64 months. The average duration of the cycle is 40 months with an average duration of the expansion phase of 24 months and an average duration of the slowdown phase of 16 months. The amplitudes of the cyclical phases show rather strong cyclical movements with +/- 13 per cent above or below trend.

GDP registered two growth cycles over the period 1995 – 2005 with an average duration of 37 months and with less symmetrical phase duration compared to the IIP series. The amplitudes of the cyclical phases show medium strong cyclical movements with +/- 4 per cent above or below trend.

Leading indicators

The composite leading indicator (CLI) is constructed from five leading indicators from different statistical subject areas: tendency surveys, real, financial, external. Three indicators relating to real effective exchange rate, 3 month inter-bank interest rate and coal production show long leads in the range of 9-16 months at all turning points according to all turning point measure. An indicator on unfilled vacancies registers also long lead at all turning points according to the median measure while the survey indicator on production tendency shows a short lead. All leading indicators show good general fit with the reference series (IIP) with high peak-correlation coefficients. An extra cycle in relation to the reference series is registered by four of the five indicators and a missing cycle is noted by one indicator.

Composite Leading Indicator

The record of the CLI at predicting turning points and reproducing amplitudes of cycles has been rather good over the period since 1993 over which it is calculated. The average lead is 6 months at all turning points according to the median measure and a lead of 8 months according to the peak-correlation measure with a rather good fit with the reference series as indicated by a correlation coefficient of 0.64. One extra minor cycle is recorded in addition to the four cycles registered in the reference series over the period 1993-2005.

Table 15.1.a Poland: Characteristics of Growth Cycles in Industrial Production 1991-2005

Phase / cycle	Turning points (dates)			Duration (months)		Amplitude (phase)
	Trough	Peak	Trough	Phase	Cycle	% of trend
Expansion	11/1991	4/1992		5		9.4
Slowdown		4/1992	10/1993	18		-8.6
Cycle No 1	11/1991		10/1993		23	
Expansion	10/1993	2/1998		52		12.3
Slowdown		2/1998	2/1999	12		-11.2
Cycle No 2	10/1993		2/1999		64	
Expansion	2/1999	6/2000		16		12.6
Slowdown		6/2000	5/2002	23		-16.5
Cycle No 3	2/1999		5/2002		39	
Expansion	5/2002	4/2004		23		18.3
Slowdown		4/2004	3/2005	11		-14.8
Cycle No 4	5/2002		3/2005		34	
Average:						
Expansion				24.0		13.1
Slowdown				16.0		-12.8
Cycle					40.0	

Table 151.b Poland: Characteristics of Growth Cycles in GDP 1995-2005

Phase / cycle	Turning points (dates)			Duration (months)		Amplitude (phase)
	Peak	Trough	Peak	Phase	Cycle	% of trend
Slowdown	2/1998	2/1999		12		-2.5
Expansion		2/1999	11/1999	9		4.0
Cycle No 1	2/1998		11/1999		21	
Slowdown	11/1999	2/2003		39		-5.8
Expansion		2/2003	5/2004	15		4.1
Cycle No 2	11/1999		5/2004		54	
Average:						
Slowdown				25.5		-4.1
Expansion				12.0		4.0
Cycle					37.5	

Chart 15.1 Poland: Growth Cycles in Industrial production and GDP

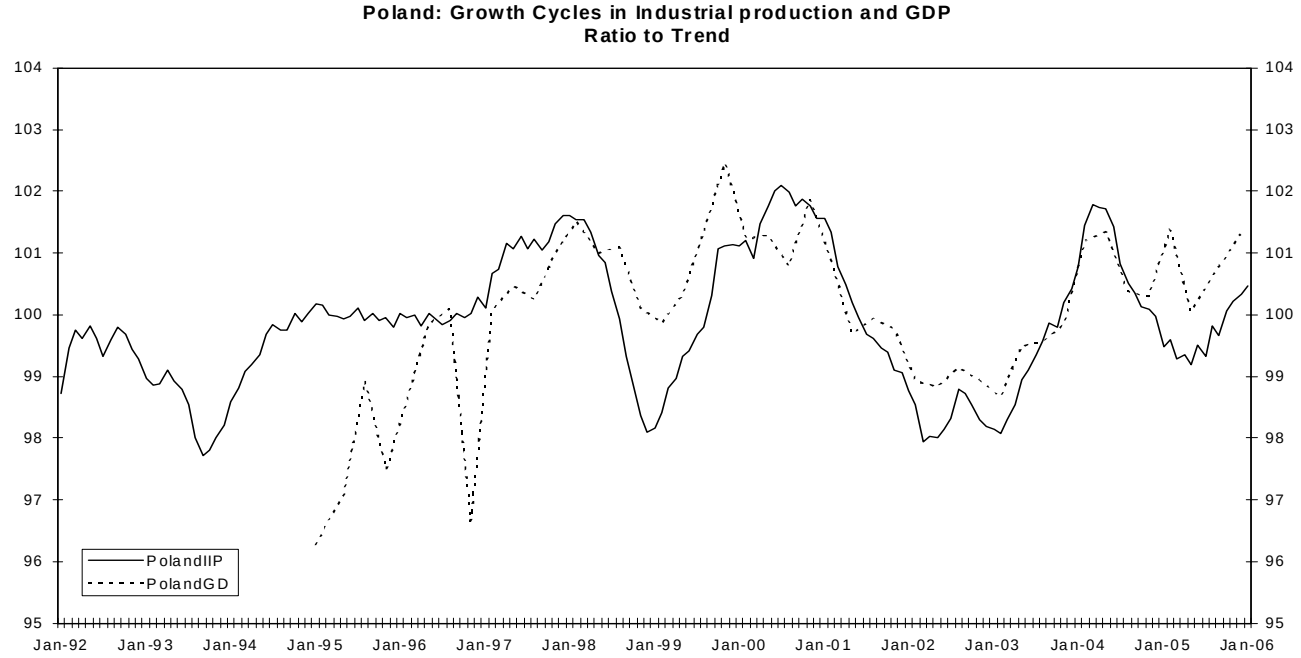


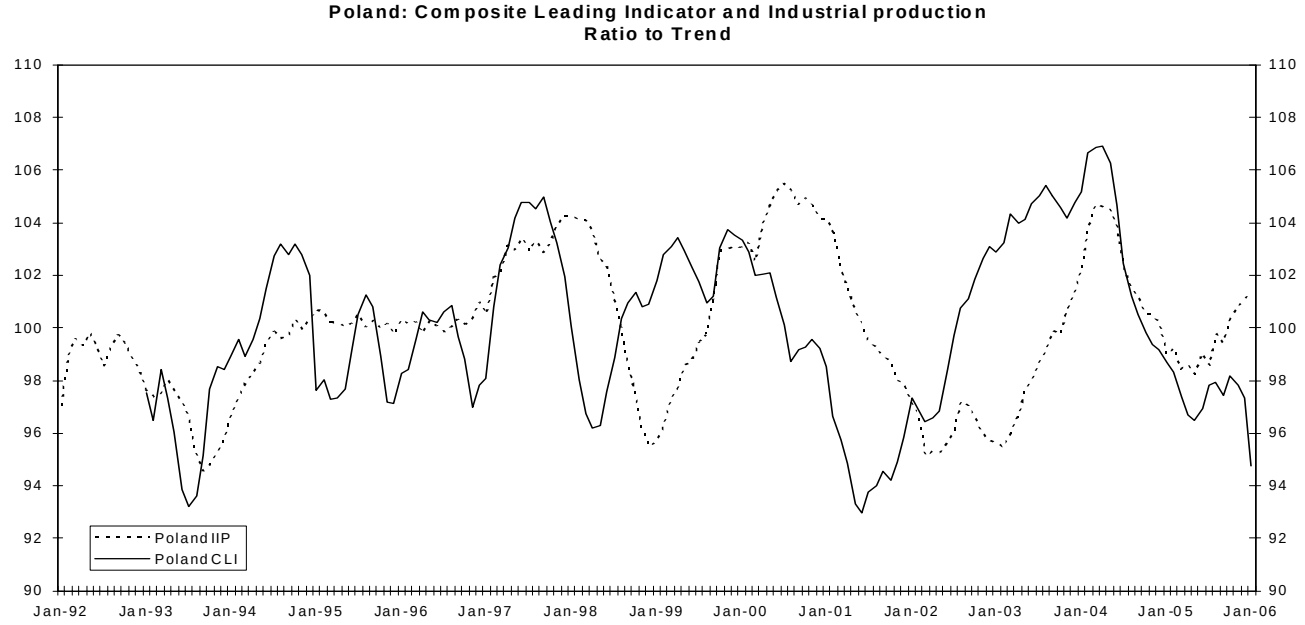
Table 15.2 Poland: Reference Chronology

Turning points	Industrial production index	GDP	Final Reference Chronology
Trough	Nov 1991		Nov 1991
Peak	Apr 1992		Apr 1992
Trough	Oct 1993		Oct 1993
Peak	Feb 1998	Q1 1998	Feb 1998
Trough	Feb 1999	Q2 1999	Feb 1999
Peak	Jun 2000	Q4 1999	Jun 2000
Trough	May 2002	Q1 2003	May 2002
Peak	Apr 2004	Q2 2004	Apr 2004
Trough	Mar 2005		Mar 2005

Table 15.3 Poland: Characteristics of Composite Leading Indicator and Components

Indicator	Starting date	Timeliness Latest Data available at t	Extra (x), Missing (m) cycles)	Smoothness MCD/ QCD	Mean lead (+) at turning points (TP)			Median lead (+) at turning points (TP)			Standard deviation	Cross correlation (2)	
					Peak	Trough	All TP	Peak	Trough	All TP		Lead (+)	Coef.
Composite leading indicator	1993	t+2	1 x	1	4	8	6	5	10	6	4.2	8	0.64
Production, tendency, industry	1993	t+2	1 x	6	3	4	3	3	1	2	4.8	2	0.51
Real effective exchange rate	1993	t+2	1 ½ m	2	5	11	8	5	11	9	4.0	9	0.38
3 month interbank rate	1992	t+2	1 ½ x	2	15	12	14	17	15	16	5.7	16	0.71
Unfilled vacancies	1990	t+2	1 x	3	8	6	7	7	9	9	8.02	5	0.59
Production of coal	1980	t+2	1 x	5	13	11	12	13	11	11	5.0	9	0.38

Chart 15.2 Poland: Composite Leading Indicator and Industrial production



16 Slovak Republic

Reference series and reference chronology

The monthly index of total industrial production (IIP) excluding construction from the Statistical Office of the Slovak Republic (SOSR) and the quarterly GDP data in constant prices also from the SOSR are used for determining the reference chronology. The IIP series and GDP are both available back to 1993. The consistency between turning points from the IIP series and from GDP is not very good. The IIP series register five cycles and 9 turning points while GDP only register one cycle and 3 turning points over the same period. The final reference chronology is for this reason based solely on the IIP series.

Cycles

Over the period 1993 – 2005, industrial production registered five growth cycles measured from trough to trough. The length of the cycle is not very stable with duration of as short as 14 months and as long as 44 months. The average duration of the cycle is 27 months with an average duration of expansion and slowdown phases of 13 and 14 months respectively. The amplitudes of the cyclical phases show rather strong cyclical movements with 11 per cent above trend at expansions and – 9 per cent below trend at slowdowns.

GDP registered one growth cycles over the period 1993 – 2005 with duration as long as 124 months and with the same length of expansion and slowdown phases. The amplitudes of the cyclical phases show medium strong cyclical movements with 4 per cent above trend at expansions and – 8 per cent below trend at slowdowns.

Leading indicators

The composite leading indicator (CLI) is constructed from five leading indicators including two indicators from the business tendency survey carried out by the Slovak Statistical Office (SOSR) since 1994. Both survey indicators show medium to short leads according to the mean and median measures and both indicators show rather weak general fit with the reference series (IIP) with below medium high peak-correlation coefficients. An extra cycle in relation to the reference series is registered by both survey indicators.

Two other leading indicators register also medium to short leads according to all turning point measures: share price index and a series on net trade. The share price index shows, however, a lead of 13 months according to the correlation lead, but one and a half extra cycle is registered in relation to the reference series. A last component series included in the composite indicator is a series on retail sales volume which shows a long lead on all turning point measures and a rather good general fit with the reference series, but the indicator register one missing cycles in relation to the reference series.

Composite Leading Indicator

The record of the CLI at predicting turning points and reproducing amplitudes of cycles has been rather good over the period since 1994 over which it is calculated. The average lead is 7 to 8 months at all turning points according to the median measure and the peak-correlation measure respectively with a medium good fit with the reference series as indicated by a correlation coefficient of 0.65. One missing cycles is recorded over the five cycles registered in the reference series over the period 1994-2005.

Table 16.1.a Slovak Republic: Characteristics of Growth Cycles in Industrial Production 1993-2004

Phase / cycle	Turning points (dates)			Duration (months)		Amplitude (phase)
	Trough	Peak	Trough	Phase	Cycle	% of trend
Expansion	7/1993	8/1995		25		15.9
Slowdown		8/1995	3/1997	19		-11.5
Cycle No 1	7/1993		3/1997		44	
Expansion	3/1997	3/1998		12		13.3
Slowdown		3/1998	10/1999	19		-13.4
Cycle No 2	3/1997		10/1999		31	
Expansion	10/1999	1/2001		15		8.0
Slowdown		1/2001	3/2002	14		-7.9
Cycle No 3	10/1999		3/2002		29	
Expansion	3/2002	7/2002		4		10.3
Slowdown		7/2002	5/2003	10		-7.8
Cycle No 4	3/2002		5/2003		14	
Expansion	5/2003	3/2004		10		6.4
Slowdown		3/2004	12/2004	9		-6.3
Cycle No 5	5/2003		12/2004		19	
Average:						
Expansion				13.2		10.8
Slowdown				14.2		-9.4
Cycle					27.4	

Table 16.1.b Slovak Republic: Characteristics of Growth Cycles in GDP 1993-2004

Phase / cycle	Turning points (dates)			Duration (months)		Amplitude (phase)
	Trough	Peak	Trough	Phase	Cycle	% of trend
Expansion	1/1993	2/1998		61		4.5
Slowdown		2/1998	5/2003	63		-8.2
Cycle No 1	1/1993		5/2003		124	
Average:						
Expansion				61.0		4.5
Slowdown				63.0		-8.2
Cycle					124	

Chart 16.1 Slovak Republic: Growth Cycles in Industrial production and GDP

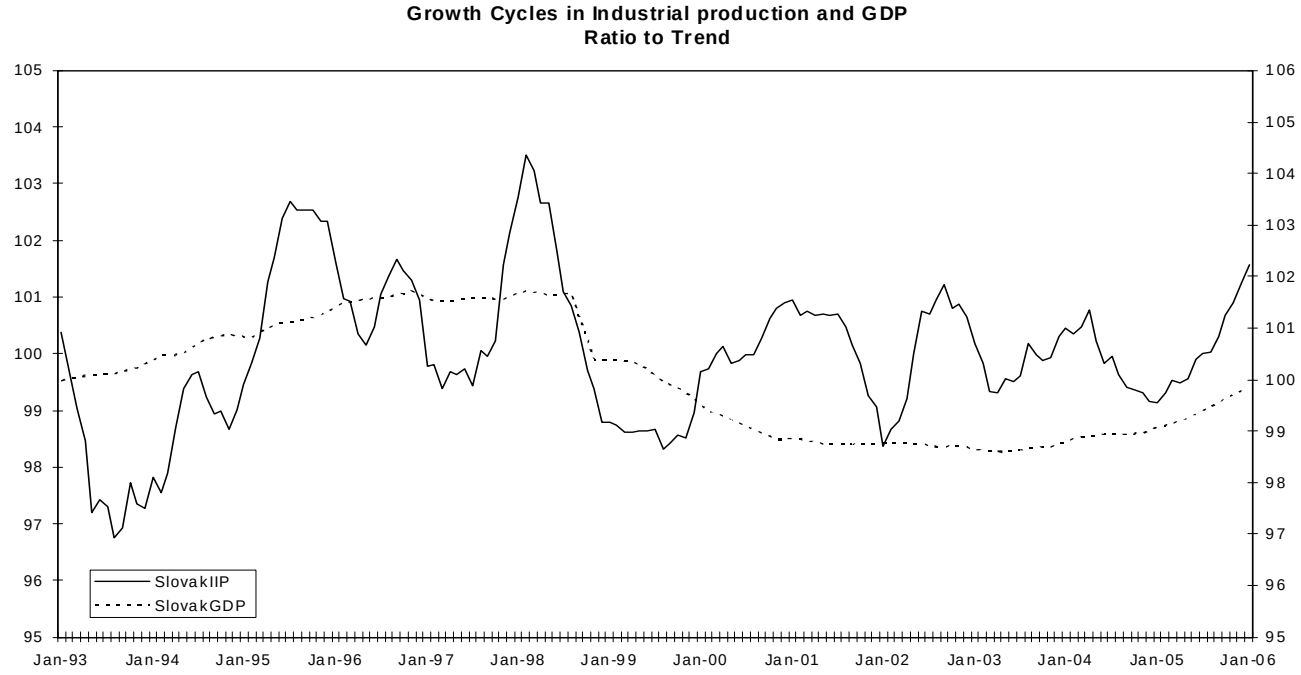


Table 16.2 Slovak Republic: Reference Chronology

Turning points	Industrial production index	GDP	Final Reference Chronology
Trough	Jul 1993	Q1 1993	Jul 1993
Peak	Aug 1995		Aug 1995
Trough	Mar 1997		Mar 1997
Peak	Mar 1998	Q1 1998	Mar 1998
Trough	Oct 1999		Oct 1999
Peak	Jan 2001		Jan 2001
Trough	Mar 2002		Mar 2002
Peak	Jul 2002		Jul 2002
Trough	May 2003	Q2 2003	May 2003

Table 16.3 Slovak Republic: Characteristics of Composite Leading Indicator and Components

Indicator	Starting date	Timeliness Latest Data available at t	Extra (x), Missing (m) cycles)	Smoothness MCD/ QCD	Mean lead (+) at turning points (TP)			Median lead (+) at turning points (TP)			Standard deviation	Cross correlation (2)	
					Peak	Trough	All TP	Peak	Trough	All TP		Lead (+)	Coef.
Composite leading indicator	1994	t+2	1 m	1	7	10	9	6	11	8	4.3	7	0.65
Retail trade sales, volume	1995	t+2	1 m	5	14	7	10	10	9	10	7.8	19	0.55
Production, future tendency, industry	1994	t+2	1 x	6	5	4	5	3	6	5	7.7	3	0.34
Selling prices, future tendency, industry	1994	t+2	1 x	5	9	15	12	7	16	15	5.2	7	0.48
Share price index	1994	t+2	1 ½ x	3	5	5	5	5	5	5	11.4	13	0.41
Net trade	1993	t+2	1 m	6	6	5	6	7	3	5	6.0	6	0.33

Chart 16.2 Slovak Republic: Composite Leading Indicator and Industrial production