



OECD Statistics Working Papers 2006/05

Composite Leading
Indicators and Growth
Cycles in Major OECD Non-
Member Economies
and recently new OECD
Members Countries

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<https://dx.doi.org/10.1787/118143571177>

Unclassified

STD/DOC(2006)5



Organisation de Coopération et de Développement Economiques
Organisation for Economic Co-operation and Development

11-Dec-2006

English - Or. English

STATISTICS DIRECTORATE

STD/DOC(2006)5
Unclassified

COMPOSITE LEADING INDICATORS AND GROWTH CYCLES IN MAJOR OECD NON-MEMBER ECONOMIES AND RECENTLY NEW OECD MEMBER COUNTRIES

OECD Statistics Working Paper

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October 2006

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JT03219544

Document complet disponible sur OLIS dans son format d'origine
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ABSTRACT

The OECD developed a System of Composite Leading Indicators (CLIs) for its Member Countries in the early 1980's based on the "growth cycle" approach and up to 2006 the Organisation compiled composite leading indicators for 23 of the 30 Member countries. Country coverage has now been expanded to include recently new OECD member countries (Korea, New Zealand¹, Czech Republic, Hungary, Poland and Slovak Republic) and the major six OECD non-member economies (Brazil, China, India, Indonesia, Russian Federation and South Africa) monitored by the organization in the OECD System of Composite Leading Indicators.

The expansion of the OECD System of Composite Leading Indicators to include the new CLIs for the six recently new OECD member countries has implications for the calculation of the *OECD total area* and the *OECD Europe area* aggregates. In addition, the inclusion of the new CLIs for all of above twelve countries opens the possibility to calculate new area aggregates such as *Major Asian economies*, *Eastern Europe* including or excluding the Russian Federation and a *World proxy* to give information on the overall global development. The importance of such new regional or area aggregates is of course very much dependent on the existence of different cyclical patterns between these new aggregates and the established ones. However, the calculation of a *World proxy* aggregate is important in itself in so far that it will represent global development better than the OECD total area aggregate.

RÉSUMÉ

L'OCDE a développé un système d'indicateurs composites avancés (CLIs) pour ses pays membres au début des années 80 basé sur l'approche du "cycle de croissance". Jusqu'en 2006, l'Organisation a compilé ces indicateurs composites avancés pour 23 de ses 30 pays membres. La couverture géographique s'est agrandie et tient compte maintenant des pays nouvellement membres de l'Organisation (la Corée, la Nouvelle Zélande, la République tchèque, la Hongrie, la Pologne et la République slovaque). Les six principales économies non membres de l'OCDE (le Brésil, la Chine, l'Inde, l'Indonésie, la Fédération de Russie et l'Afrique du Sud) ont été également introduites dans le système des indicateurs composites avancés de l'OCDE.

L'ouverture des six nouveaux pays membres au système des indicateurs composites avancés de l'OCDE a eu des implications quant au calcul des agrégats de la zone OCDE total et de la zone OCDE Europe. De plus, l'inclusion de ces indicateurs composites avancés pour les 12 nouveaux pays mentionnés ouvre la possibilité au calcul de nouveaux agrégats tels que l'Asie des 5 grands, l'Europe de l'Est avec ou sans la Fédération de Russie et une zone monde approximatif qui donnerait une information sur le développement global total. L'importance de tels nouveaux agrégats régionaux ou totaux dépend beaucoup de l'existence de schémas cycliques différents entre ces nouveaux agrégats et ceux déjà établis. Cependant, le calcul d'un agrégat monde approximatif est très important en soit car il représentera mieux le développement global que ne le faisait l'agrégat de la zone OCDE total.

¹ New Zealand is included in this group of 'new' OECD member countries for simplicity, even though it has been a member of the OECD since 1973.

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1. BACKGROUND AND INTRODUCTION

The OECD developed a System of Composite Leading Indicators (CLIs) for its Member Countries in the early 1980's based on the "growth cycle" approach and up to 2006 the Organisation compiled composite leading indicators for 23 of the 30 Member countries. Country coverage has now been expanded to include all Member countries (except Iceland) and the major six OECD non-member economies (Brazil, China, India, Indonesia, Russian Federation and South Africa) monitored by the organization in the OECD System of Composite Leading Indicators.

CLIs for the major six OECD non-member economies have been developed in co-operation with national experts, while 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* (MEI) database. This approach has also been applied to the CLIs constructed for New Zealand for which the unavailability of a monthly reference 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 have been 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. Detailed results on the development of the new CLIs are presented in a paper available on the OECD website at <http://www.oecd.org/dataoecd/35/22/36414874.pdf>.

The expansion of the OECD System of Composite Leading Indicators to include the new CLIs for the six recently new OECD member countries has implications for the calculation of the OECD total area and the OECD Europe area aggregates. In addition, the inclusion of the new CLIs for all of above twelve countries opens the possibility to calculate new area aggregates such as Major Asian economies and Eastern Europe including or excluding the Russian Federation and a World proxy to give information on the overall global development. The importance of such new regional or area aggregates is of course very much dependent on the existence of different cyclical patterns between these new aggregates and the established ones. However, the calculation of a World proxy aggregate is important in itself in so far that it will represent global development better than the OECD total area aggregate.

The main characteristics of the new CLIs and the leading indicator series included as component series in the country specific CLIs are presented in Section 2, which also includes some conclusions for future research and development. Growth cycles and reference series related to the new CLIs and their integration in the new area aggregates are covered in Section 3. The cyclical properties of the CLIs for the new area aggregates are presented in a Section 4.

1.1 Summary of recent work

The CLIs constructed for the six major OECD non-member economies and the six recently New OECD Member countries show acceptable cyclical properties for all the twelve new countries. However, it is worth noting that the results for most countries are based on data for very short time periods, 12 to 15 years, which include only 2 to 4 cycles in certain countries. Compared to the cyclical properties of the CLIs for major OECD countries the CLIs constructed for the twelve new countries show the following general cyclical characteristics:

- general fit with the reference series as measured by the peak-correlation coefficient is rather good for a majority of countries. However, for the Eastern European countries a weaker correlation is noted;
- median and peak-correlation lead show inconsistent results for several countries, in particular, for Indonesia, Russia and New Zealand. This may, however, be explained by the short time period and/or small number of cycles;
- variability of lead at all turning points as measured by the standard deviation is higher in several countries, in particular, in China, Indonesia, Russia, South Africa, New Zealand and Hungary;

A major problem with the CLIs constructed for the twelve new countries is the short time period, for which potential leading indicators are available. A further major problem is the availability of timely monthly or quarterly indicators.

Most OECD countries use indicators from several subject areas to compile CLIs. However, in the six OECD non-member economies most of the leading indicators selected come from a narrow range of subject areas. In the case of India and Indonesia the share of components related to monetary and financial statistics is over 55 per cent of the selected indicators and in Brazil and Indonesia the share of components coming from the foreign trade subject area is 40 per cent. In addition, no labour force indicators are used in any of the countries and no indicators in Indonesia, Russia and South Africa come from the production, stocks and orders subject area. Also, no indicators come from the construction, sales and transport subject area in China, India, Indonesia and Russia.

Leading indicators used as components in the calculation of CLIs for the six recently new OECD Member countries are more evenly allocated across the different subject areas in comparison to the components used in the CLIs for the six OECD non-member economies. However, 50 and 40 per cent of the components in Korea and Hungary respectively come from monetary and financial statistics and the same percentage of components in the Czech and Slovak Republics are from business tendency and consumer surveys.

New regional or Area aggregates

As mentioned above, the inclusion of the new CLIs for all of above twelve countries opens also the possibility to calculate new area aggregates such as Major five Asia Economies, Eastern Europe and a World proxy to give information on the overall global development. The importance of such new regional or area aggregates is of course very much dependent on the existence of different cyclical patterns between these new aggregates and the established ones

The cyclical development of industrial production over the period 1993-2005 in Hungary and Poland is rather well correlated with the cyclical development of industrial production in the OECD Eastern Europe Area (Czech Republic, Hungary, Poland and Slovak Republic) while the Czech and Slovak

Republics show a weaker correlation with the area aggregate. All of the above countries show reasonably good correspondence and coincident behavior against the area total. However, the cyclical characteristics show that the Czech and Slovak Republics are similar to each other and better correlated with the OECD Europe Area, while the opposite is true for Hungary and Poland who are similar and thus more related to the OECD Eastern Europe Area, given Poland dominates the area with over 50% weight. In Russia, on the other hand, the cyclical development over the period 1994-2005, is not as well correlated with the development in the OECD Eastern Europe Area

The cyclical development in the OECD Eastern Europe Area shows no major difference compared to developments in the OECD Europe Area and Euro zone aggregates. The only difference is the more pronounced cyclical amplitudes noted in the OECD Eastern Europe Area compared to the other two area aggregates. This is linked to the more dynamic development with higher growth rates in the Eastern European countries considered here compared to the development in most Western European countries.

The cyclical developments in China, India and Japan over the period 1995-2005 closely follow the development in the Asia Major 5 Area (China, India, Indonesia, Japan and Korea) with peak-correlation values around 0.90 in China and Japan and 0.83 in India at coincident timing. These results are of course very much explained by the fact that these three countries make up 89% of the area total, where the share of China alone is close to 45% of the area total. More importantly, no extra or missing turning points in relation to the area total are registered in Japan and only one minor extra cycle is registered in China and India.

The development in Australia, Korea, New Zealand and Indonesia show weak correspondence or not significant correlation with the Asia Major 5 Area. All four countries also register some extra cycles and Indonesia is missing 1 cycle in relation to the Major five Asia Area aggregate. The results for Australia and New Zealand are, however, partly explained by the fact that they are not included in the area total. On the other hand, the cyclical development since 2000 in all four countries is totally different from that of the area total.

The cyclical development of the World proxy covering OECD Member countries and the major six OECD non-member economies follows closely the development in the OECD Area over the period 1995-2005. The correspondence between the two aggregates is very close with a correlation coefficient of 0.96 at zero lag. The share of the major six OECD Non-member economies in the World proxy is 31.5%, where the share of China alone is 15.3.

The timing relationship between the twelve new countries and OECD Area and World proxy aggregates show a general tendency for Asian economies to lead both against the OECD Area and the World proxy aggregates with a clearer lead for the Asian economies against the OECD Area. China and India show significant median leads of 5 and 3 months against the OECD Area and good correspondence with the OECD Area. Korea and New Zealand register short median leads and show weak correspondence with the OECD Area. In the case of Indonesia, the correlation results are not significant while the turning point results indicate a short leading tendency.

The Eastern European countries considered here, together with Brazil and South Africa show a general tendency to lag the OECD Area and the World proxy aggregates. For most of these countries the correspondence with both area totals are rather weak, with the exception of Poland and Brazil. Russia and South Africa show extremely weak correspondence with both area aggregates.

The timing relationship between the new regional aggregates and the established OECD regional aggregates against the OECD Area and the World proxy aggregates over the period 1995-2005 show a general tendency for the different European aggregates to lag against both the OECD Area and the World

proxy aggregates. The lags for these European aggregates are most pronounced if compared with the World proxy aggregate.

The North American Free Trade Area (NAFTA) aggregate shows a coincident behaviour with both the OECD Area and the World proxy. On the other hand, the Asia Major 5 Area aggregate shows a leading tendency against both aggregates with a particular clear median lead of 4 months at all turning points against the OECD Area aggregate.

The cyclical development of all regional aggregates shows a high degree of synchronisation, as reflected in the rather high correlations against both the OECD Area and the World proxy aggregates. The co-movements between all regional area aggregates are particularly strong against the OECD Area. The cyclical correspondence is particularly strong for the NAFTA, Euro Area and Asia Major 5 aggregates with no extra or missing cycles registered against the OECD Area and World proxy aggregates. The influence of Asia in the world economy and in the World proxy aggregate is reflected by a peak-correlation of 0.84 for the Asia Major 5 aggregate against the World proxy aggregate, while all other regional areas show peak-correlations below 0.76 and as low as 0.67 for the OECD Eastern Europe Area aggregate.

The CLIs constructed for the new regional or area aggregates show acceptable cyclical properties for all three new area aggregates. However, it is worth noting that the results for all area aggregates are based on data for very short time periods, 11 to 13 years, which include only 2 cycles in the case of the Asia Major 5 Economies Area. This means that the turning point measures given are not significant in a statistical sense. In addition, the correspondence between the CLI and the reference series is rather weak for the OECD Eastern Europe Area.

The CLI for the World proxy (OECD Area plus the Major 6 non-member economies) shows a perfect correspondence at a short lead against the reference series over the period 1995-2005. In Asia, the CLI for the Asia Major 5 Economies Area also shows a very good correspondence at a short lead against the reference series over the same period. However, the CLI for the OECD Eastern Europe Area shows rather weak correspondence at a median lead of 4 months against the reference series over the period 1993-2005. No extra or missing turning points are registered by any of the CLIs for the new regional or area aggregates in relation to the reference series.

2. COMPOSITE LEADING INDICATORS FOR INDIVIDUAL COUNTRIES

2.1 Characteristics of Leading Indicators

A starting point for the selection of potential leading indicators in any country is to investigate the national economic structure and international linkages. This will give information on key sectors and factors to take into account when searching for potential leading indicators in a country. The component series included in the individual country CLIs for the six OECD non-member economies support this view by showing a relative high proportion of components related to international linkages such as exports/imports, terms of trade, exchange rates and the world price for crude oil. On the other hand, the component series included in the CLIs for the recently new OECD Member countries are more related to economic structure. However, in both cases, data availability is of course a key issue. The component series selected for all new country specific CLIs are presented below in Table 2.

In addition to above criteria, the potential indicators are selected from as many as possible of the subject areas set out below in Table 1 to obtain a good representation of overall economic activity. However, as noted above, the proportions of the component series from the foreign trade domain in the CLIs for the six OECD non-member economies is much higher than the share noted across OECD Member countries. Monetary and financial series are the other subject areas with high representation of component series, as in OECD countries. In the case of India and Indonesia the share of components related to monetary and financial areas is extremely high with 50 and 60 per cent of the component series respectively compared to about 26 per cent across OECD countries. The selection of potential indicators is of course very much related to data availability which partly explains the high representation of indicators from the foreign trade domain and financial areas after the 1997 financial crises in Asia. There is a lack of suitable real indicators in many Asia countries with the exception of the derived indicators from the recently implemented business tendency surveys in most of these countries.

Similarities in the statistical systems of OECD Member countries, such as the collection and publication of monthly business tendency and consumer survey indicators, explain the relatively high proportions of such indicators among the components included in the CLIs for the recently new OECD Member countries. In the case of the Czech and Slovak Republics the share of components related to business tendency and consumer surveys is very high with 50 and 40 per cent of the component series respectively compared to about 38 per cent across OECD countries. Monetary and financial indicators as well show a very high share of 50 and 43 per cent of the components in the CLIs for Korea and Hungary respectively compared to 26 per cent across OECD countries.

A major problem with the CLIs constructed for the six OECD non-member economies and the six recently new OECD Member countries is the short time period, for which potential leading indicators are available and in some cases the lack of a monthly reference series with consistent data for a reasonably long period. A further major problem is the availability of timely monthly or quarterly indicators.

The **starting date** for which consistent data are available for each component series is set out below in Table 2. Among the OECD non-member economies, most component series used for the calculation of CLIs for India, Indonesia and Russia have starting dates during the period 1990-1996, which means that CLIs for these countries can only be calculated back to 1993-1995 depending on the country. On the other hand, historical time series data for most component series used for the calculation of CLIs are available back to the mid 1970s in Brazil and South Africa while the starting dates of most Chinese CLI component series are in the early 1980s. This means that the CLIs for Brazil and South Africa can be calculated back to 1979 and 1975 respectively while the CLI for China is calculated back to 1983 (see Table 3).

For five of the six recently new OECD Member countries, the starting dates of most components series fall in the period 1991-1994 which means that CLIs for these countries can only be calculated back to a date within this period depending on country. On the other hand, historical time series data for most component series used for the calculation of the CLI for New Zealand are available back to the mid 1980s or earlier which means that the CLI can be calculated back to 1987 (see Table 3).

The **timeliness** of the latest data available for the component series for the CLIs is set out in Table 2. 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 a particular problem for series with a quarterly frequency, such as quarterly business tendency or consumer survey indicators. Timeliness is also a problem for certain statistical indicators in several countries which makes it difficult to calculate a CLI for the reference month. This is a particular a problem for the CLIs constructed for Brazil, India, South Africa and New Zealand.

The **frequency** of most leading indicator series included as components in the CLIs for all countries is monthly. However, the business tendency and consumer survey series included as components in the CLIs for Brazil, India, South Africa and New Zealand are quarterly. This means that the delay for timely data is two months (indicated as $t+4$ in Table 2). This is a particular problem for the CLI constructed for South Africa and New Zealand where two and three quarterly survey components prevent the calculation of a CLI for the reference month. The only other quarterly component series other than the quarterly business and consumer surveys is a series on hours of work in manufacturing used as input series for calculation of the CLI for Hungary.

Table 1: Leading Indicators in OECD Member Countries and Major OECD Non-Member Economies by Subject Area

Subject area	Share of Indicators by Subject area		
	Old OECD Member Countries	Major OECD Non-Member Economies	Recently New OECD Member Countries
Production, stocks and orders	7.7	14.7	2.9
Construction, sales, trade and transport	10.9	2.9	8.6
Labour force	1.9		11.4
Prices, costs and profits	7.7	2.9	
Monetary and financial	26.3	41.2	37.1
Foreign trade	5.1	23.5	8.6
Economic activity in foreign countries	2.6		
Business and consumer surveys	37.8	14.7	31.4
Total	100.0	100.0	100.0

Table 2: Leading Indicators for OECD Non-member Economies and recently New OECD Member countries

OECD Non-member Economies	Starting date	Frequency Monthly (M) Quarterly (Q)	Timeliness latest data available at t	Recently New OECD Member Countries	Starting date	Frequency Monthly (M) Quarterly (Q)	Timeliness latest data available at t
BRAZIL				KOREA			
Export volume	1977	M	t+2	BOP, Capital & Financial Accounts	1980	M	t+2
Industrial production, semi-durable and non-durable goods	1975	M	t+3	Business situation, future tendency, industry	1991	M	t+1
Share Price index, FGV 100E	1993	M	t+3	Finished goods stocks, industry	1991	M	t+2
Terms of trade	1978	M	t+3	Stocks of manufactured goods (volume)	1990	M	t+2
Order inflow, manufacturing	1978	Q	t+4	Money supply M2	1990	M	t+2
				Long term bond yield	1991	M	t+2
CHINA				NEW ZEALAND			
Money supply M2	1990	M	t+2	Money supply, M1	1977	M	t+2
Cargo handled at ports	1983	M	t+2	Business situation, future tendency, industry	1961	Q	t+4
Chemical fertilizer	1983	M	t+2	Unemployed persons, registered, inverted	1985	Q	t+4
Enterprise deposits	1978	M	t+2	Consumer confidence	1988	Q	t+4
Imports from Asia	1993	M	t+2	Retail trade, total	1992	M	t+3
Non-ferrous metals production	1983	M	t+2	Yield 3-month bank bills	1973	M	t+1
INDIA				CZECH REPUBLIC			
Business Confidence	1996	Q	t+4	Retail sales volume	1995	M	t+3
Imports	1990	M	t+3	Finished goods stocks, industry	1993	M	t+1
Exchange rate, USD, inverted	1957	M	t+2	Selling prices, future tendency, industry	1993	M	t+1
Money supply M1	1990	M	t+5	Money supply, M2	1996	M	t+2
Deposit interest rate, inverted	1996	M	t+1	Price expectations, consumers	1995	M	t+1
Share Price Index, BSE Dollex	1991	M	t+2	Share price index PX-50, total	1995	M	t+1
Production of basic goods	1994	M	t+3				
Production of intermediate goods	1994	M	t+3				
INDONESIA				HUNGARY			
Exchange rate USD	1993	M	t+2	Money supply, M1	1989	M	t+2
Exports	1993	M	t+2	Central bank, base interest rate	1983	M	t+2
Imports	1993	M	t+2	Hours of work, manufacturing	1991	Q	t+4
Discount rate	1993	M	t+2	Unemployment registered, inv.	1993	M	t+1
Share price index, JSX Composite	1993	M	t+2	Imports value	1980	M	t+3
				Share price index BUX, total	1991	M	t+1
				Production future tendency, manufacturing	1996	M	t+1
RUSSIA				POLAND			
Demand level, industry	1995	M	t+5	Production, tendency, industry	1992	M	t+1
Share price index	1995	M	t+1	Unfilled job vacancies	1990	M	t+3
Crude oil price, world	1980	M	t+1	Coal production	1980	M	t+2
Money supply M2	1996	M	t+1	Real effective exchange rate	1992	M	t+1
Net trade	1994	M	t+3	3-month WIBOR inter bank rate	1991	M	t+1
SOUTH AFRICA				SLOVAK REPUBLIC			
Permits issued: dwellings	1975	M	t+5	Retail trade sales	1995	M	t+2
Business confidence, manufacturing	1974	Q	t+4	Share price index SAX, total,	1993	M	t+1
Interest rate spread	1981	M	t+3	Production, future tendency, industry	1993	M	t+1
Motor cars sales	1975	M	t+3	Selling prices, future tendency, industry	1993	M	t+1
Order inflow, manufacturing	1970	Q	t+4	Net trade	1991	M	t+3
Share price index, total	1978	M	t+2				

2.2 Cyclical Properties of Composite Leading Indicators

The characteristics of the CLIs constructed for the six major OECD non-member economies and the six recently new OECD Member countries are presented below in Table 3. These results are compared with the historical performance of the CLIs for the United States, Japan and Germany and the United Kingdom over the last 40 years. The results show acceptable cyclical properties of the CLIs for all the twelve new countries. However, it is worth noting that the results for most countries are based on data for very short time periods, 12 to 15 years, which include only 2 to 4 cycles in certain countries. This means that the turning point measures given are not significant in a statistical sense for several countries. This is particularly a problem for the CLIs for India, Indonesia, Russia among the OECD non-member economies and Hungary, Poland and New Zealand among the recently new OECD Member countries.

The statistical criteria used to evaluate both individual components and CLIs in relation to the reference series (industrial production) include general fit measured by cross-correlation and behavior at turning points as measured by median or mean lead/lag, standard deviation around the mean, smoothness (the months for cyclical dominance MCD value gives an idea of the smoothness of the CLI) and extra and/or missing cycles.

To evaluate the length of the lead, the **median lead at turning points** is preferred to the mean, since the number of turning points is extremely small and the mean lead would be strongly affected by extreme values. The median lead at all turning points is in the range 4-8 months for all countries except India where a very short lead of 1 month is recorded and in Russia very a rather long lead of 10 months is registered.

Compared to the cyclical properties of the CLIs for the above four major OECD countries (i.e. the United States, Japan, Germany and the United Kingdom) the CLIs constructed for the twelve new countries show the following general cyclical characteristics:

- general fit with the reference series as measured by the peak-correlation coefficient is rather good for a majority of countries. The coefficient is at the same rather high level (above 0.70) as in OECD countries. However, for the Eastern European countries a weaker correlation is noted, in particular, for the Czech Republic and Hungary with a coefficient below 0.60;
- median and peak-correlation lead show inconsistent results for several countries, in particular, for Indonesia, Russia and New Zealand. This may, however, be explained by the short time period and/or small number of cycles;
- variability of lead at all turning points as measured by the standard deviation is higher in several countries, in particular for China, Indonesia, Russia, South Africa, New Zealand and Hungary;
- good smoothness of the CLI is ensured by an MCD value of 1 for all countries

The **number of missing and extra cycles** of the CLI in relation to the cycles in the reference series gives very important information about the quality of the CLI. If there are too many extra cycles, the risk that the CLI gives false signals becomes significant. Conversely, if the CLI failed to predict several cycles in the past it may not always be very reliable in anticipating changes in economic activity.

2.3 CLI performance for new additional countries

The CLI for **Brazil** registered two extra cycles 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 8 cycles over the period 1979 to 2004 over which the CLI is calculated. This is about the same track record as the OECD CLI for the United Kingdom which registered two extra cycles over the same number of cycles in industrial production (see Chart 1).

Table 3: Main Characteristic of Composite Leading Indicators

Country	Starting date	Extra (x), missing (m) cycles/ total number of cycles (1) x, m total		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.
<i>Major OECD</i>													
<i>Non-Member Economies</i>													
Brazil	1979	2 x	8	1	5	5	5	4	4	4	4.5	2	0.61
China	1983	1m	6	1	5	6	6	3	4	4	6.5	6	0.70
India	1995	0	2	1	1	2	1	1	2	1	0.8	3	0.89
Indonesia	1993	1m	4	1	7	3	5	7	3	7	9.3	3	0.68
Russia	1994	0	2	1	6	10	7	10	10	10	8.8	4	0.72
South Africa	1975	0	6	1	8	9	9	4	6	5	10.3	5	0.73
<i>Recently New</i>													
<i>OECD Member Countries</i>													
Korea	1991	0	7	1	7	6	7	9	6	7	3.8	7	0.73
New Zealand	1987	2 x	3	1	8	9	8	5	6	5	6.0	10	0.69
Czech Republic	1992	½ m	5	1	4	6	5	4	4	4	4.6	9	0.59
Hungary	1993	1 m	4	1	7	9	8	7	8	8	7.3	5	0.55
Poland	1993	1 x	4	1	4	8	6	5	10	6	4.2	8	0.64
Slovak Republic	1994	1 m	5	1	7	10	9	6	11	8	4.3	7	0.65
<i>OECD Member Countries</i>													
United States	1955	1m	13	1	8	5	7	7	4	6	3.6	5	0.77
Japan	1959	1x	11	1	9	5	7	9	5	8	5.4	6	0.84
Germany	1961	1x	11	1	6	2	4	7	2	3	4.3	6	0.72
United Kingdom	1972	2 x	8	1	7	7	7	7	6	7	5.0	8	0.66

(1) Excluding extra cycles which have been considered as minor.

(2) Cross-correlation for the lead at which the highest correlation occurs.

For **China**, the CLI has predicted all turning points well in advance and tracked the cyclical amplitudes very well over the short period since 1983 over which it is calculated. However, one cycle is not picked up over the 6 cycles registered in industrial output (see Chart 2).

The CLI for **India** 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).

Indonesia registered 4 growth cycles in industrial production over the period 1993-2004, of which the first cycle over the period 1994-1996 was missed by the CLI, which was only picked-up as a period of unchanged or slightly slowing growth but no real decrease in the rate of growth (see Chart 4).

For **Russia**, the CLI predicted matching turning points with a median lead of 10 months at all turning points over the two cycles registered for the short period since 1994 over which it is calculated. No extra or missing cycles are recorded for the investigated period (see Chart 5).

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 cycles are recorded in the CLI in addition to the 6 cycles registered in industrial production (see Chart 6).

The record of the CLI for **Korea** at predicting turning points and reproducing amplitudes of cycles has been very good over the period since 1991 during 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 for the period 1991-2004 (see chart 7).

The CLI for **New Zealand** shows an average lead at all turning points of 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 3 cycles registered in the reference series during the period 1987-2004 (see Chart 8).

For the **Czech Republic**, the CLI predicted turning points with an average lead of 4-5 months since 1992 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 for the period 1992-2005 (see Chart 9).

The CLI for **Hungary** shows an average lead of 8 months at all turning points according to the median measure and a lead of 5 months according to the peak-correlation measure, although the latter shows a weak fit with the reference series as indicated by a rather low correlation coefficient of 0.55. One missing cycle is recorded over the four cycles registered in the reference series over the period 1993-2005 (see Chart 10)

In **Poland**, the CLI predicted turning points with an average lead of 6 months 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 (see Chart 11).

The record of the CLI for the **Slovak Republic** at predicting turning points and reproducing amplitudes of cycles has been rather good over the period since 1994 during 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 reasonably good fit with the reference series. One missing cycle is recorded over the five cycles registered in the reference series over the period 1994-2005 (see Chart 12).

The above results are encouraging, but as stressed earlier, these results are based on evaluations over a very short time period with only 2 or 4 growth cycles registered in India, Indonesia, Russia among the OECD Non-member economies and for New Zealand Hungary and Poland among the recently new OECD Member countries. Future research and development would be needed to monitor the quality of the constructed CLIs and identify for improvements in the areas outlined below.

2.4 Selection of component series

In the selection of component series it is very important to have a broad range of indicators reflecting the cyclical development from different parts of the economy when analysing fluctuations in aggregate economic activity. In the selection of potential cyclical indicators for the investigated countries, the indicators included in the OECD system of leading indicators were used as the reference frame.

Most OECD countries use indicators from several subject areas to compile CLIs. However, as noted above, in the six OECD non-member economies most of the leading indicators selected come from narrow range of subject areas (see Table 1). In the case of India and Indonesia the share of components related to monetary and financial area is over 55 per cent of the selected indicators and in Brazil and Indonesia the share of components from the foreign trade subject area is 40 per cent. On the other hand, no labour force indicators are used in any of the countries and no indicators in Indonesia, Russia and South Africa come from the production, stocks and orders subject area and no indicators come from the construction, sales (trade) and transport subject area in China, India, Indonesia and Russia.

Leading indicators used as components in the calculation of CLIs for the six recently new OECD Member countries are more evenly allocated across the different subject areas in comparison to the components used in the CLIs for the six OECD non-member economies. However, 50 and 40 per cent of the components for Korea and Hungary respectively come from the monetary and financial area and the same percentage of components for the Czech and Slovak Republics come from business tendency and consumer surveys.

In order to have more broadly based and possibly more reliable CLIs for the six OECD non-member economies it would be necessary to investigate alternative indicators for other subject areas as well. One subject area of special interest to all of the countries considered and in particular Indonesia and Russia would be the production, stocks and orders subject area. Real indicators from this domain would be good candidates for potential leading indicators. However, such indicators are covered by qualitative indicators derived from business tendency surveys. The problem here is that the surveys are conducted on a quarterly frequency in all of the countries and both timeliness and associated revisions pose problems for the calculation of monthly CLIs. Implementation of monthly business tendency surveys by these countries would be a cost efficient way to obtain timely leading indicators reflecting the production cycle.

The results also indicate that industrial production may not be the best reference series for the aggregate economic cycle in certain countries and alternative reference series should be investigated. In addition, other series related to monetary and financial conditions, labour market conditions, foreign trade, and activity in foreign countries etc. should be analysed and new potential leading indicators may be found.

Finally, problems relating to changing cyclical behaviour, statistical problems and data availability will mean that the selected leading indicators used as components in the calculation of the new CLIs for all twelve countries will have to be monitored regularly to see if the cyclical characteristics remain stable in the future.

COMPOSITE LEADING INDICATOR AND INDUSTRIAL PRODUCTION
Percentage deviation from trend, seasonally adjusted

Chart 1: Brazil

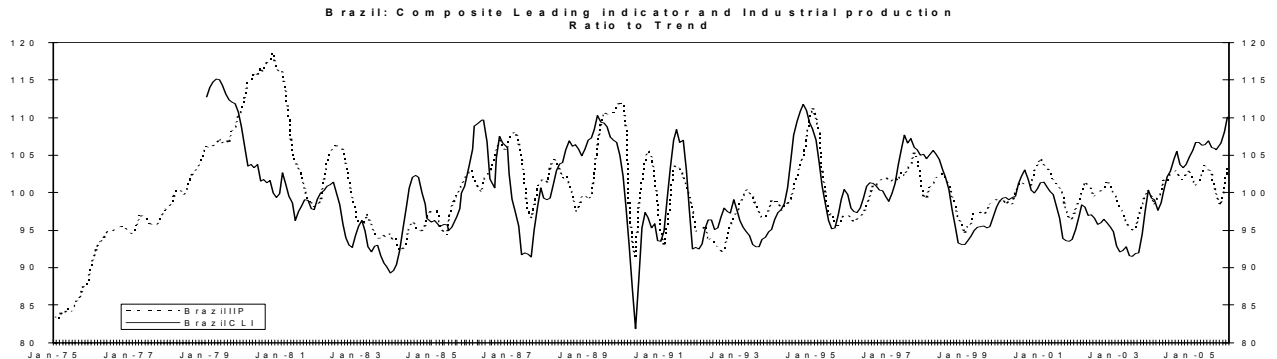


Chart 2: China

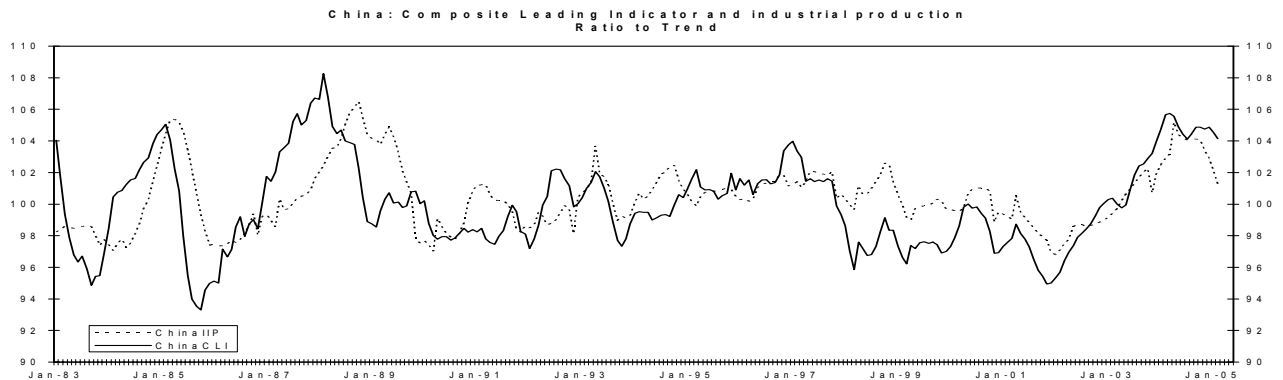


Chart 3: India

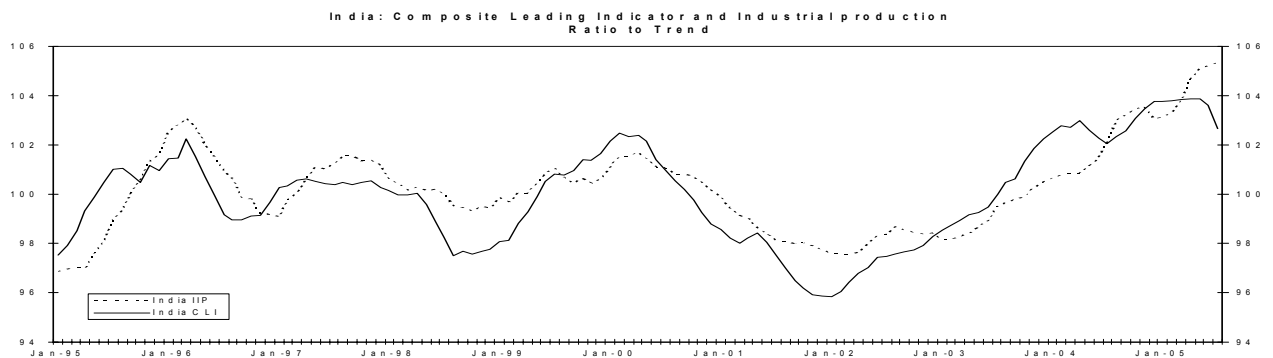
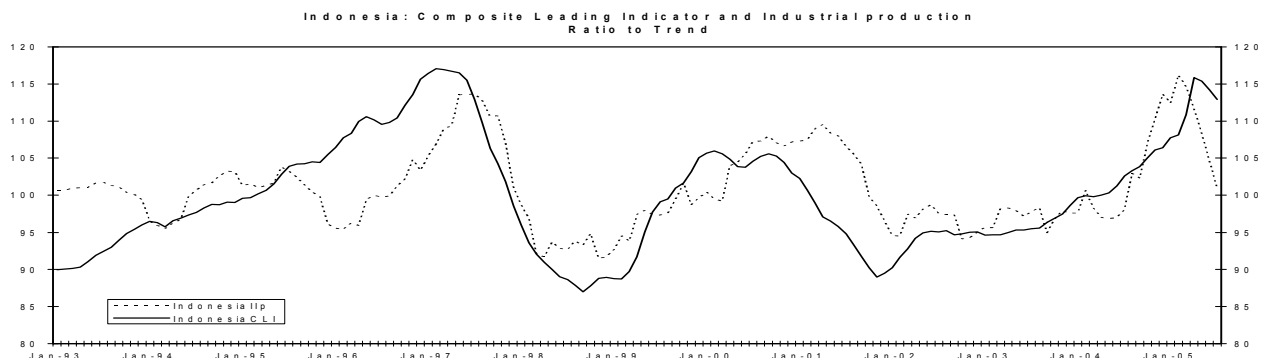


Chart 4: Indonesia



COMPOSITE LEADING INDICATOR AND INDUSTRIAL PRODUCTION
Percentage deviation from trend, seasonally adjusted

Chart 5: Russia

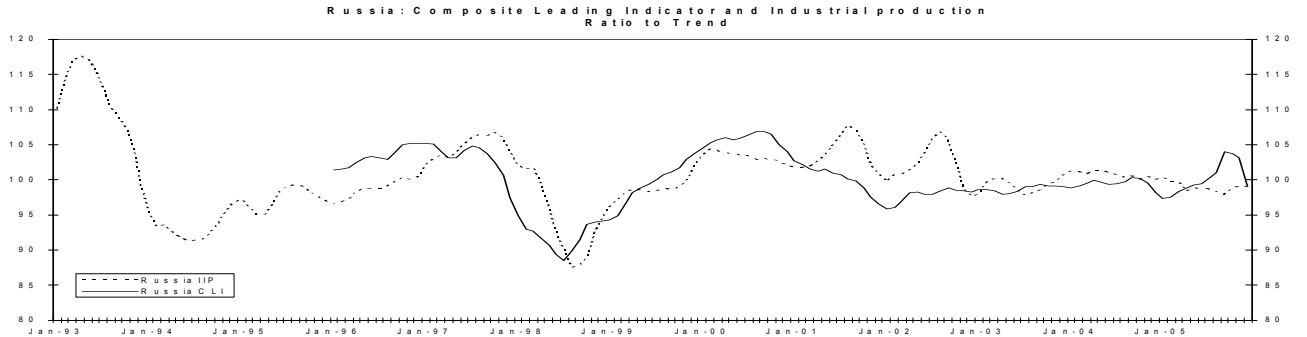


Chart 6: South Africa

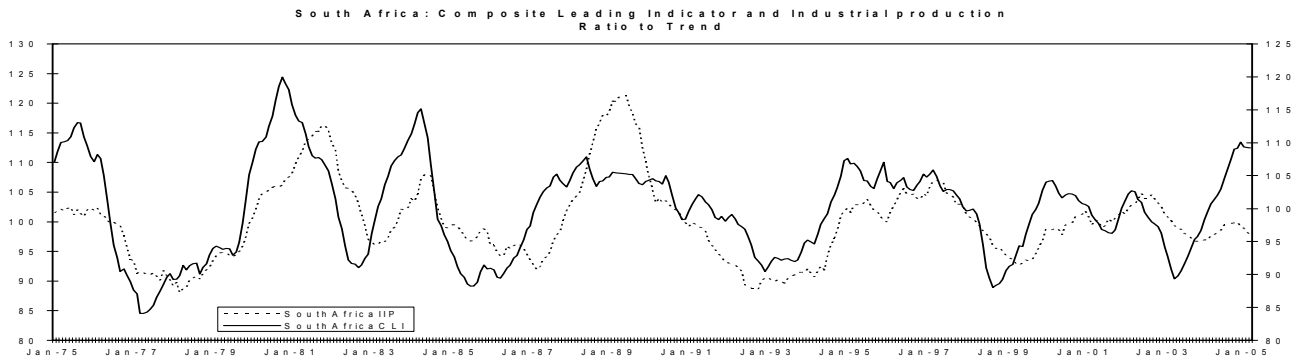


Chart 7: Korea

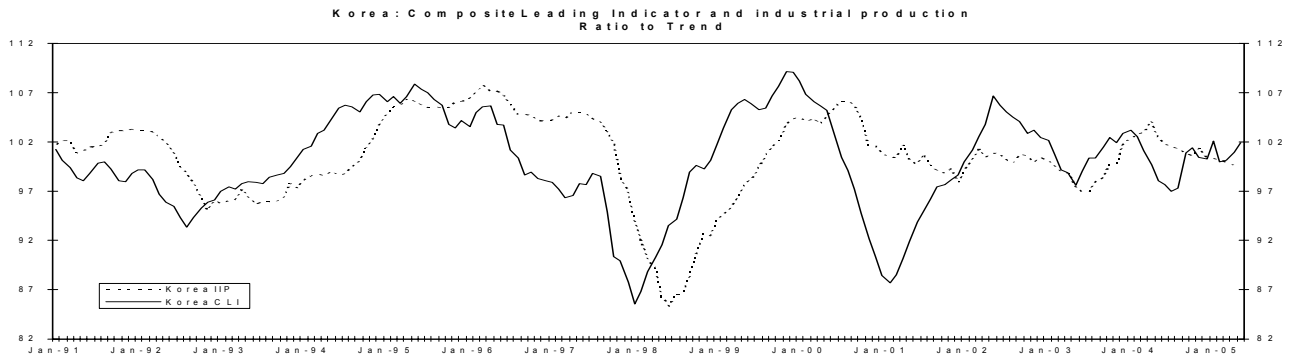
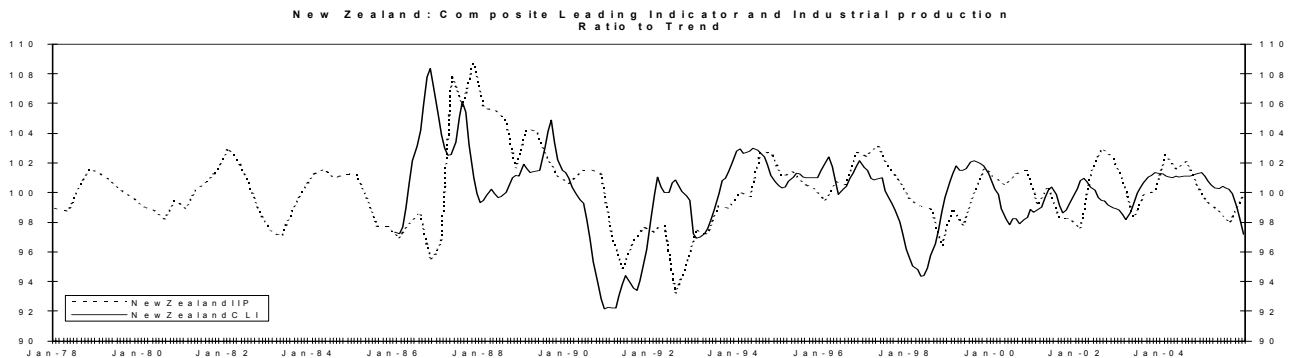


Chart 8: New Zealand



COMPOSITE LEADING INDICATOR AND INDUSTRIAL PRODUCTION
Percentage deviation from trend, seasonally adjusted

Chart 9: Czech Republic

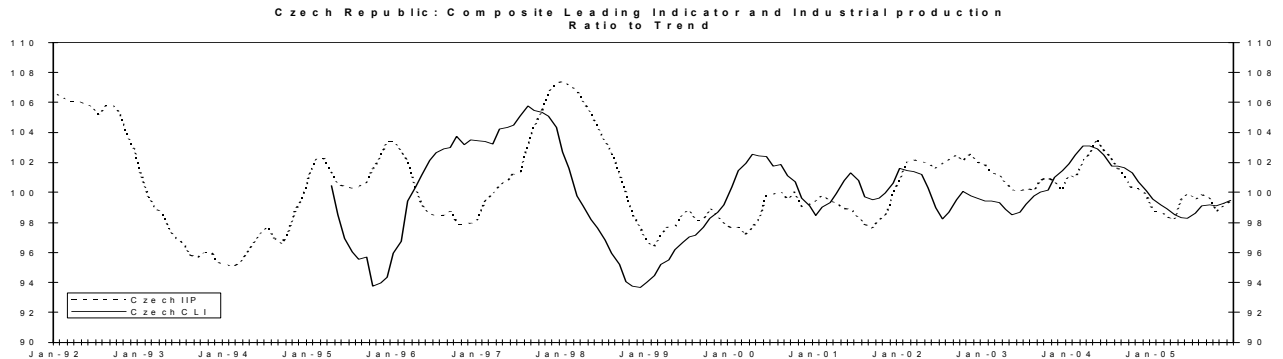


Chart 10: Hungary

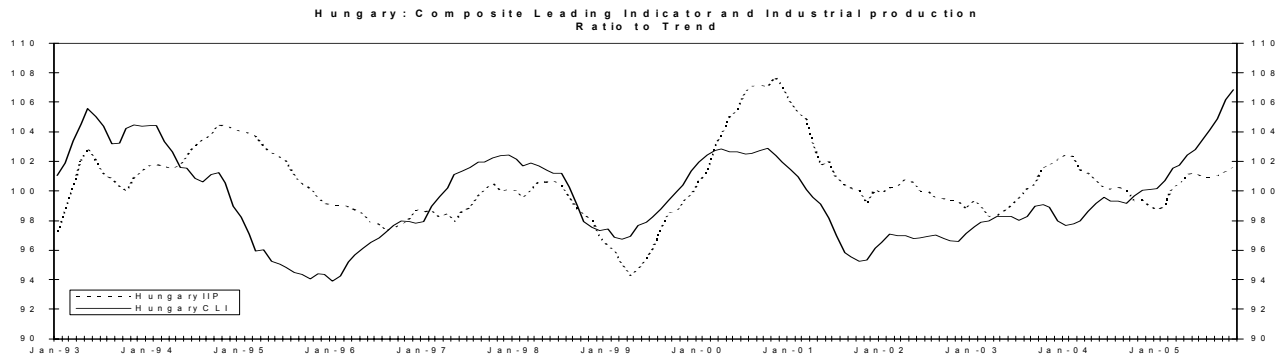


Chart 11: Poland

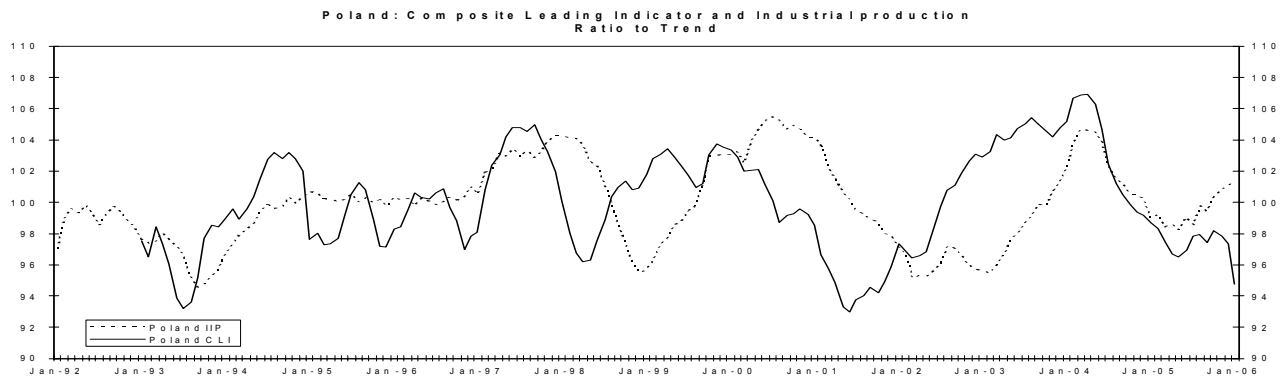
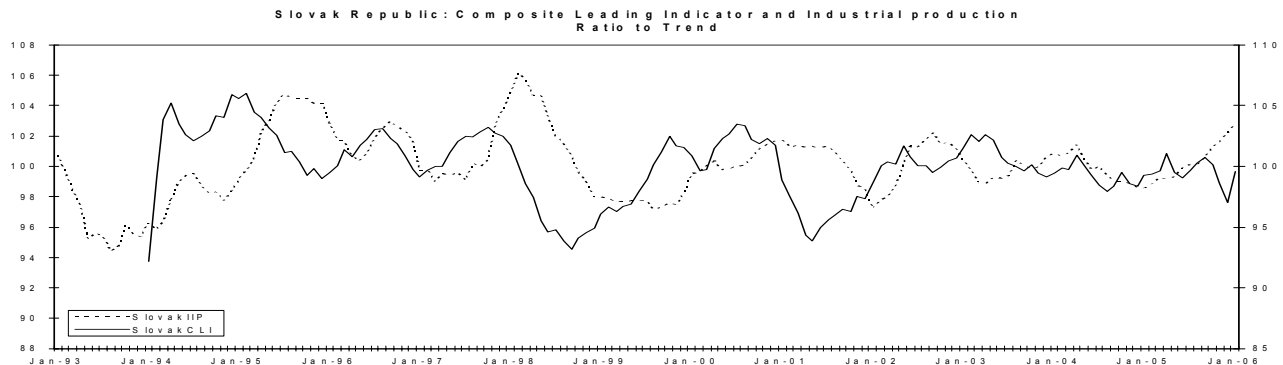


Chart 12: Slovak Republic



3. GROWTH CYCLES AND REFERENCE SERIES

3.1 New and Old Reference Series for the OECD Total Area and OECD Europe Area

The expansion of the OECD System of Composite Leading Indicators to include CLIs for the six recently new OECD Member countries has implications for the calculation of the OECD total area and the OECD Europe area aggregates. Since each country CLI is based on total industrial production as a reference series, the amplitude-adjusted CLIs can be weighted together using the same weights used to aggregate the industrial production indices for individual countries into CLIs for country groups. The old and new weights used for the calculation of area indices for both reference series and CLIs are reported in Annex Table 1

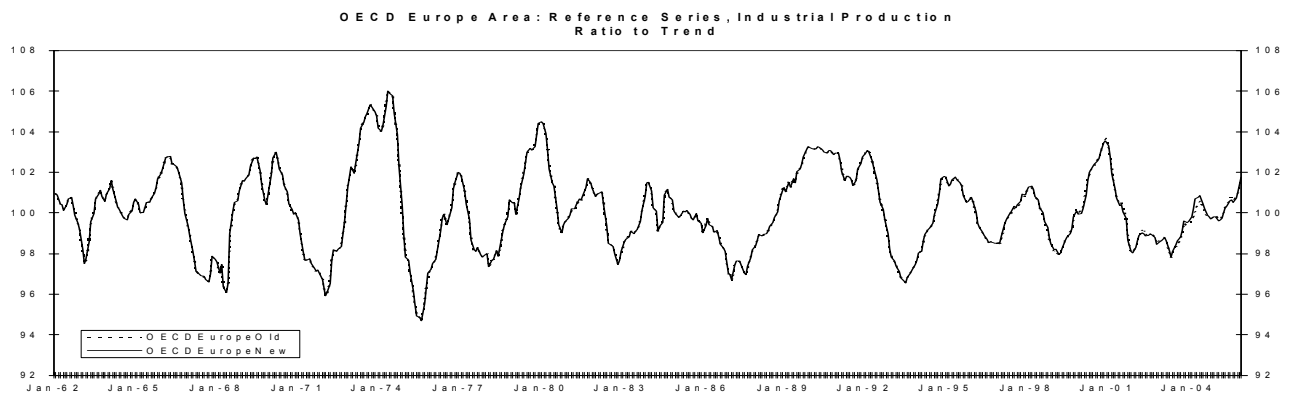
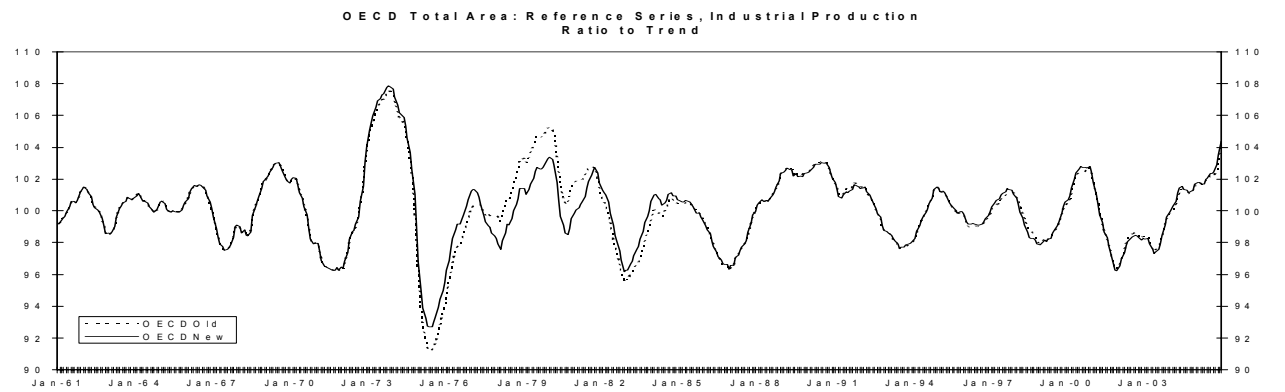
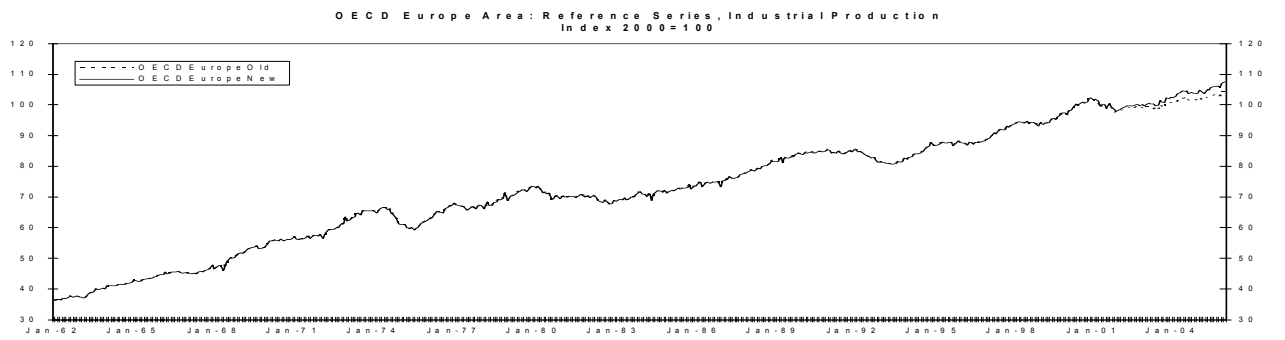
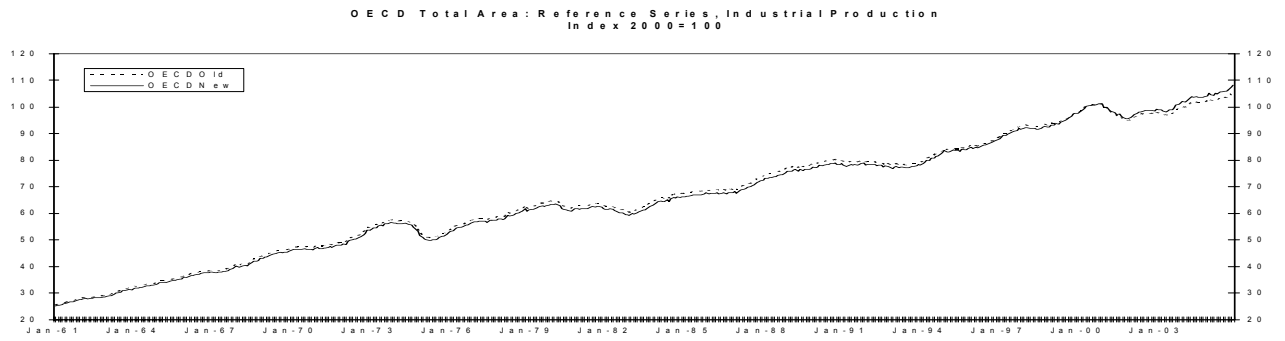
The difference between the old and new weighting patterns for the OECD total area is to a great extent explained by the inclusion of Korea in the new area aggregate, which account for over half of the share (4.4 percentage points) contributed by the new countries. In the case of the OECD Euro area, Poland accounts for about half of the share (3.8 percentage points) contributed by the four new European countries.

Charts 1 and 2 above show, for the period 1961/62 to 2005, the old and new reference series for the OECD total area and OECD Europe area in level form. For both areas, the old and new aggregates are close to identical and show the same general movements. However, a slightly stronger trend movement is noticeable in the new area aggregates for the period after 2000. The same aggregates in de-trended form, shown in Charts 3 and 4, confirm the close cyclical relationship between the old and new aggregates. The only major difference is noticeable for the OECD total area over the period 1976 to 1982 where the two minor cycles registered in both aggregates are more pronounced in the new area aggregate. The only change to the composition of the aggregate in this period is the inclusion of data for New Zealand from 1977. However, this may not alone explain the noted difference between the two aggregates. The difference is mainly explained by the fact that the de-trended aggregates in this paper are calculated directly on the level aggregates which may give slightly different results. A different method is used in the production system which aggregates country reference series in de-trended form to get the area total.

The dating of turning points in the old and new OECD total area and OECD Europe area aggregates in de-trended form is identical for most of the 28 and 32 turning points identified for the two areas aggregates respectively. However, six turning points in the OECD total area and four in the OECD Europe area aggregate are dated with a slight difference of one to three months between the old and new area aggregates. All differences between the old and new aggregate for the OECD Europe area are registered after 1995 which is not so surprising since the starting date of the reference series is within the period 1991 to 1993 for all new European countries.

The only major difference in dating between the old and new aggregate is noted for the OECD Europe area at the trough in 1996 where the difference is five months. The small differences registered in dating are, however, in some cases arbitrary and partly explained by the fact that the dating is performed in the unsmoothed de-trended series.

Charts 13-16: New and Old Reference Series for OECD Total Area and OECD Europe Area



3.2 New Regional or Area Aggregates

The inclusion of the new CLIs for all of the above twelve countries also opens the possibility to calculate new area aggregates such as Major five Asia economies and Eastern Europe including or excluding the Russian Federation and a World proxy to give information on overall global development. The importance of such new regional or area aggregates is of course very much dependent on the existence of different cyclical patterns between these new aggregates and the established ones. However, the calculation of a World proxy aggregate is important in itself in so far that it will represent global development better than the OECD total area aggregate. The world proxy covers 83.1% of total world GDP and includes OECD Member countries and the major six OECD non-member economies. The share of OECD Member countries in the World proxy is 68.5% and that of the major six OECD non-member economies is 31.5% compared to 51.3% for the major seven OECD Member countries and 22.0% for the Euro area.

OECD Eastern Europe Area

The four recently new OECD Member countries - Czech Republic, Hungary, Poland and Slovak Republic – represent a geo-political area with natural economic links which may show different cyclical patterns compared to the development in the OECD Europe area as a whole. The share of the OECD Eastern Europe area is, however, only 7.5 of the total OECD Europe area, but if the cyclical pattern between the countries in this area shows a high degree of similarity it may be interesting to calculate such an area aggregate. The following weights based on PPP adjusted GDP data are used: Czech Republic 21.1 %; Hungary 15.8 %; Poland 52.6 %; and Slovak Republic 10.5 % (see also Annex Table 2).

Major five Asian Economies

The inclusion of new CLIs for four major economies in Asia - China, India, Indonesia and Korea - makes it possible to calculate an area aggregate for Major Asian Economies which would also include Japan. The Major five Asia area aggregate has a share of close to 35 per cent of the World proxy, constituting the OECD Member countries and the major six OECD non-member countries. The major five Asia area aggregate also covers a large share of the total Asian region and would represent a good proxy for the cyclical development in the total Asian region. The following weights based on PPP adjusted GDP in industry data are used: China 44.4%; India 20.9%; Indonesia 4.9%; Japan 23.6%; and Korea 6.2% (see also Annex Table 2).

World proxy

The World proxy includes OECD Member countries and the major six OECD non-member economies – Brazil, China, India, Indonesia, Russia and South Africa – and covers 83.1% of world GDP, while OECD Member countries represent only 57.1% of world GDP. The weights used for all countries based on PPP adjusted GDP in industry data are presented in Annex Table 2. The weights for the six OECD non-member economies are as follows: Brazil 3.2%; China 15.3%; India 7.2%; Indonesia 1.7%; Russia 3.0%; and South Africa 1.1%. The weight of China is ranked second in size after the United States (25.0%) and India is in fourth place following Japan (8.1%).

3.3 Timing Relationship of Individual Countries with Regional or Area Aggregates

The turning point dates identified in the de-trended industrial production indices (reference series) are used to investigate systematic leads and lags between countries and area aggregates. The cyclical characteristics of growth cycles in industrial production in individual countries compared to regional or area aggregates are given below in Tables 4-6. The statistics used to evaluate countries in relation to the area aggregate include general fit measured by cross-correlation, behaviour at turning points as measured by the median lead/lag and extra and/or missing turning points in relation to the reference series.

OECD Eastern Europe Area

The cyclical development of industrial production over the period 1993-2005 in Hungary and Poland is rather well correlated with the cyclical development in the OECD Eastern Europe Area (Chart 17). Both countries show a peak-correlation of over 0.60 at zero lag and a median lead of one month at all turning points and no extra or missing cycles against the area total. The Czech and Slovak Republics show a peak-correlation of 0.50 at 1 and 2 months lags and median lead/lags of zero months and 1 extra cycle against the area total. The cyclical development of both countries against the area total is shown in Chart 18. All of the above countries show reasonably good general fit and coincident behavior against the area total.

The cyclical characteristics presented in Table 4 show that the Czech and Slovak Republics are better correlated with the OECD Europe Area than with the OECD Eastern Europe Area, while the opposite is true for Hungary and Poland.

In Russia, on the other hand, the cyclical development over the period 1994-2005, is not as well correlated with the development in the OECD Eastern Europe Area (Chart 18). The development in Russia shows a peak-correlation of 0.43 at a lead of 3 months and a median lead of 5 months at all turning points and 2 extra and 1 missing cycle against the area total. These results indicate that the development in Russia is leading the cyclical development in the OECD Eastern Europe Area, but do not show a reasonably stable cyclical pattern at turning points with the area total. The development in Russia shows about the same cyclical results if compared with the OECD Europe Area (Table 4).

The cyclical development in the OECD Eastern Europe Area is compared with the developments in the OECD Europe Area and the Euro Zone in Chart 19. The results presented in Table 4 show that there is no major difference in the cyclical development between the different area aggregates as indicated by median lead/lags of zero months between all aggregates. The only difference, as illustrated in Chart 19, is the more pronounced cyclical amplitudes noted in the OECD Eastern Europe Area compared to the other two area aggregates. This is linked to the more dynamic development with higher growth rates in the Eastern European countries considered here compared to the development in most Western European countries.

Major five Asian Economies

The cyclical developments in China, India and Japan over the period 1995-2005 closely follow the development in the Asia Major 5 Area as indicated by high correlation coefficients of around 0.90 in China and Japan and 0.83 in India at coincident timing (Charts 20 and 21 and Table 5). More importantly, no extra or missing turning points in relation to the area total are registered in Japan and only one minor extra cycle is registered in China and India.

The developments in Australia, Korea, New Zealand and Indonesia show weak correspondence or no significant correlation with the Asia Major 5 Area (Chart 22 and Table 5). The results for Australia and New Zealand are, however, partly explained by the fact that they are not included in the area total. On the

GROWTH CYCLES IN INDUSTRIAL PRODUCTION
Percentage deviation from trend, seasonally adjusted

Chart 17: Hungary, Poland and OECD Eastern Europe Area

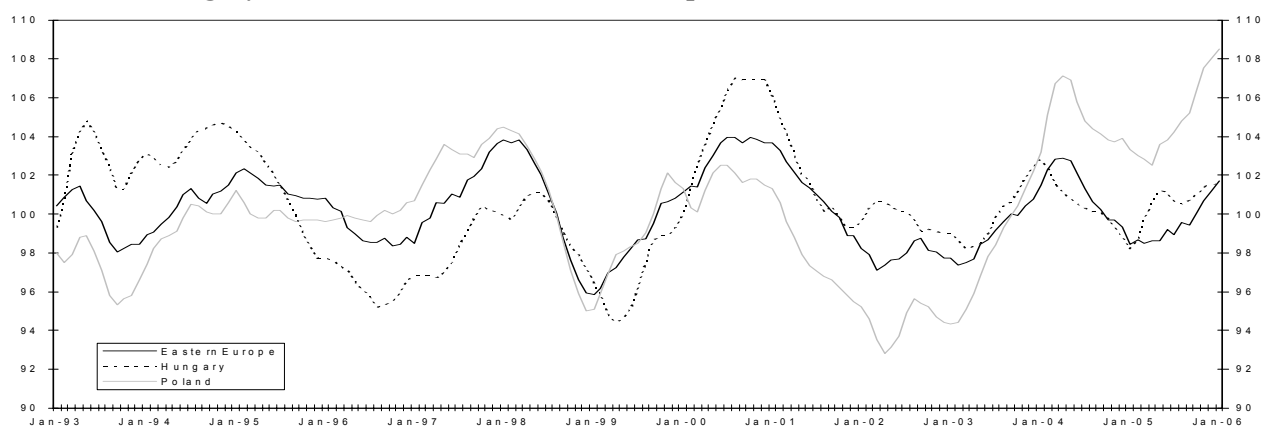


Chart 18: Czech and Slovak Republics, Russia and OECD Eastern Europe Area

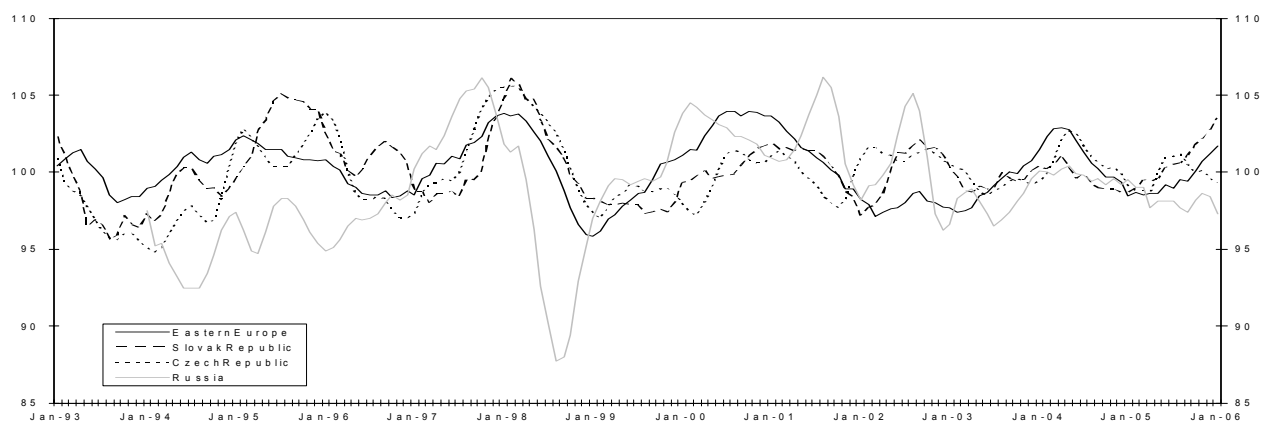
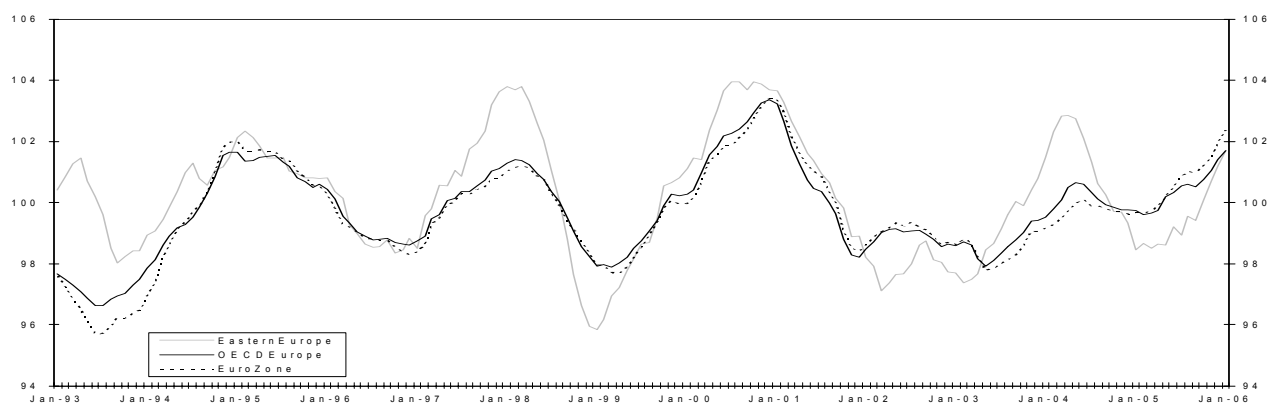


Chart 19: OECD Europe Area, Euro Zone and OECD Eastern Europe Area



GROWTH CYCLES IN INDUSTRIAL PRODUCTION
Percentage deviation from trend, seasonally adjusted

Chart 20: China, India and Asia Major 5 Economies

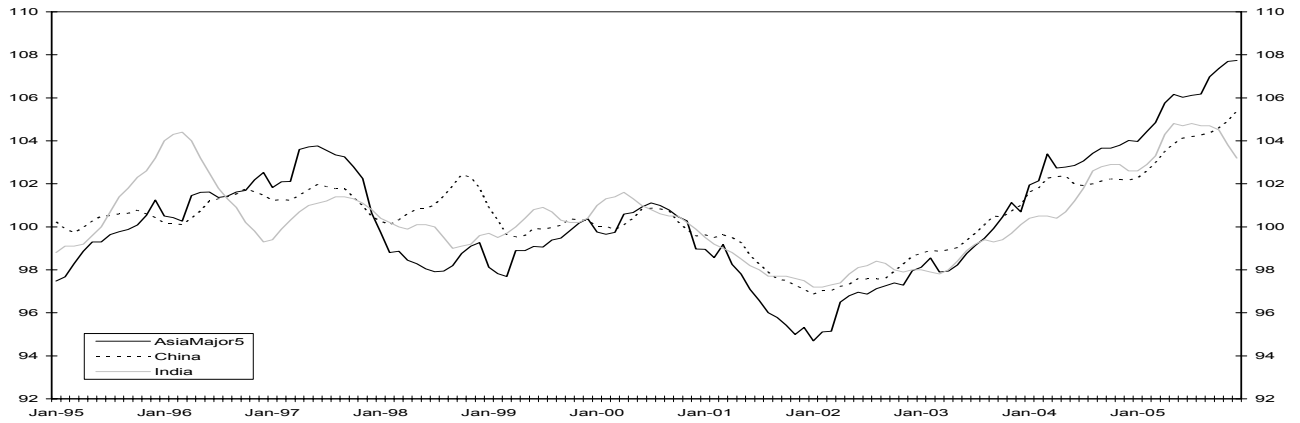


Chart 21: Japan, Korea and Asia Major 5 Economies

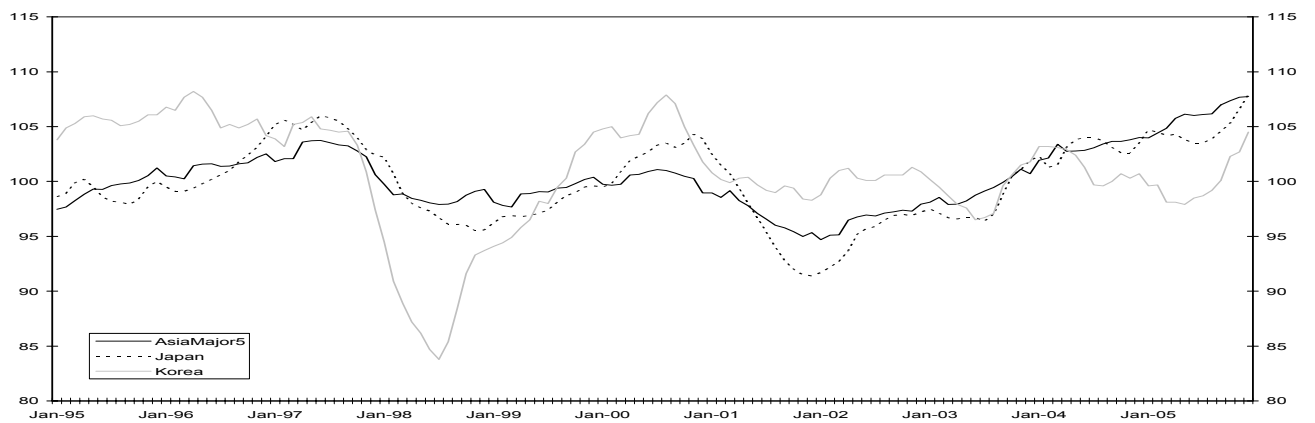
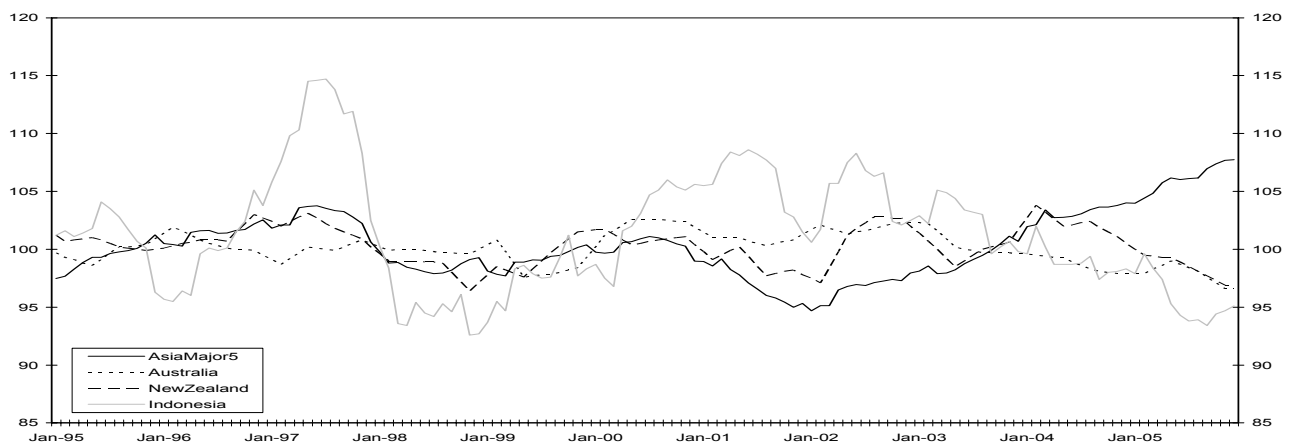


Chart 22: Australia, New Zealand, Indonesia and Asia Major 5 Economies



other hand, the cyclical development since 2000 in all four countries is totally different from that of the area total.

World proxy

The cyclical development of the World proxy covering OECD Member countries and the major six OECD non-member economies closely follows the development in the OECD Area over the period 1995-2005. The correspondence between the two aggregates is very close with a correlation coefficient of 0.96 at zero lag (Chart 24 and Table 6). The share of the major six OECD Non-member economies in the World proxy is 31.5%, where the share of China alone is 15.3%.

The timing relationship between the individual OECD non-member economies and the recently new OECD Member countries are presented below in Table 6. The results show a general tendency for Asian economies to lead both against the OECD Area and the World proxy aggregates with a clearer lead for the Asian economies against the OECD Area. China and India show significant median leads of 5 and 3 months against the OECD Area and good correspondence with the OECD Area as reflected by correlations of 0.69 and 0.66 respectively. Korea and New Zealand register short median leads of 1 and 2 months respectively and show weak correspondence with the OECD Area. In the case of Indonesia, the correlation results are not significant while the turning point results indicate a short leading tendency.

The Eastern European countries considered here and Brazil and South Africa show a general tendency to lag the OECD Area and the World proxy aggregates (Chart 24). For most countries the correspondence with both area totals are rather weak, with the exception of Poland and Brazil which show correlations of 0.81 and 0.61 against the World proxy. Russia and South Africa show extremely weak correspondence with both area aggregates (Table 6).

Regional Area Aggregates

The timing relationship between the new regional aggregates and the established OECD regional aggregates against the OECD Area and the World proxy aggregates over the period 1995-2005 are presented in Table 7. The cyclical developments of the regional aggregates are illustrated in Chart 23. The results show a general tendency for the different European aggregates to lag against both the OECD Area and the World proxy aggregates. The Euro Area and the OECD Europe Area aggregates show median lags of 4 and 3 months respectively while the OECD Eastern Europe Area aggregate show at a median lag of 2 months all turning points against the OECD Area. The lags for all European aggregates are even more pronounced if compared with the World proxy aggregate.

The North American Free Trade Area (NAFTA) aggregate shows a coincident behaviour with both the OECD Area and the World proxy. On the other hand, the Asia Major 5 Area aggregate shows a leading tendency against both aggregates with a particular clear median lead of 4 months at all turning points against the OECD Area aggregate.

The cyclical development of all regional aggregates shows a high degree of synchronisation, as reflected in the rather high correlations against both the OECD Area and the World proxy aggregates. The co-movements between all regional area aggregates are particularly strong against the OECD Area with peak-correlations close or above 0.80 for all regional aggregates except the OECD Eastern Europe Area which registers a peak-correlation of 0.70. The high cyclical correspondence is also reflected in the few extra and missing cycles registered in the regional area aggregates against the OECD Area and World proxy aggregates. The influence of Asia in the world economy and in the World proxy aggregate is reflected by a peak-correlation of 0.84 against the World proxy aggregate, while all other regional areas show peak-correlations below 0.76 and as low as 0.67 for the OECD Eastern Europe Area aggregate.

GROWTH CYCLES IN INDUSTRIAL PRODUCTION
Percentage deviation from trend, seasonally adjusted

Chart 23: OECD Area, OECD Europe Area, NAFTA and Asia Major 5 Economies

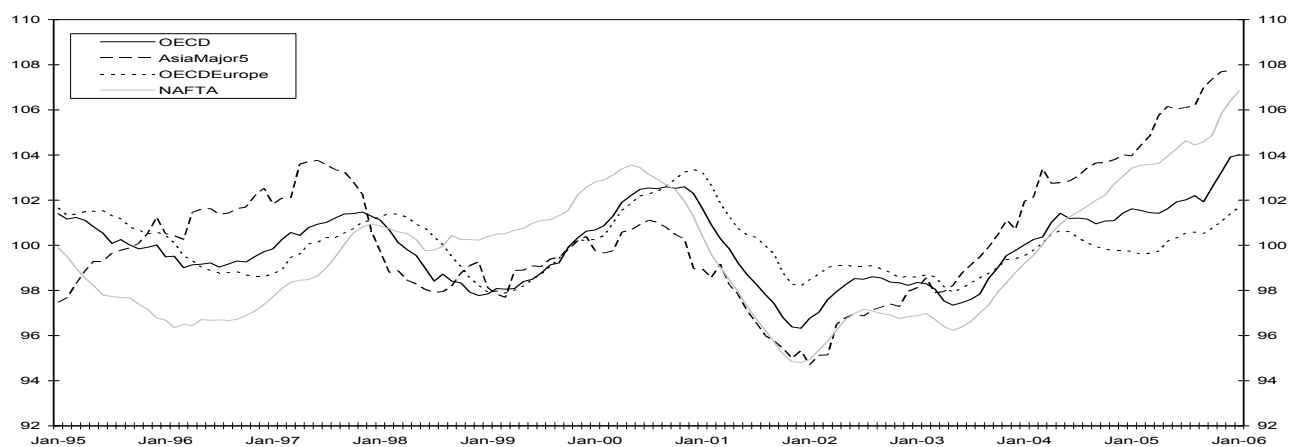
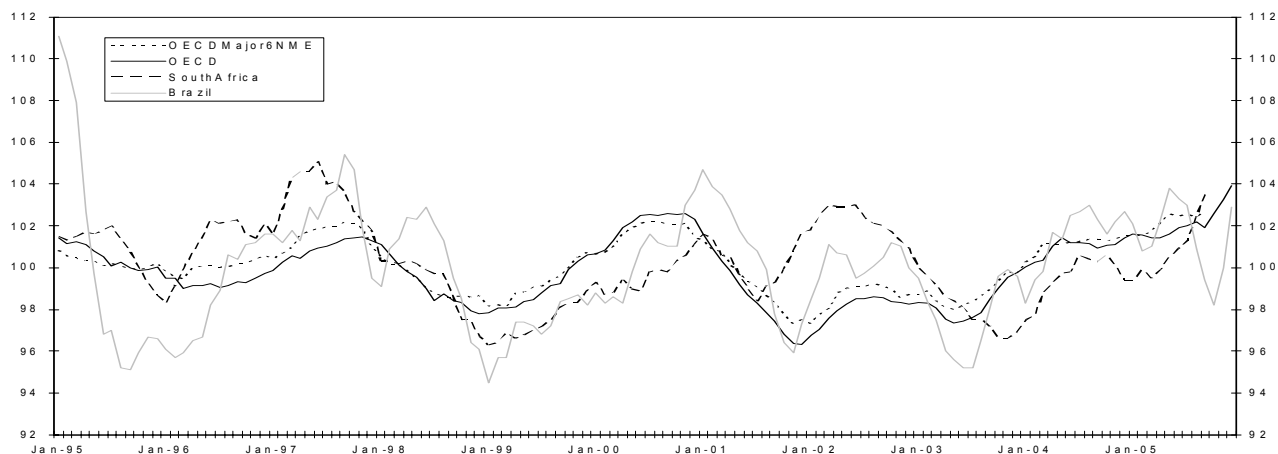


Chart 24: Brazil, South Africa, OECD Area and OECD Area plus Major 6 Non-member Economies



CHARACTERISTICS OF GROWTH CYCLES
Growth Cycles in Industrial Production in Countries Compared to Regional or Area Aggregates

Table 4: OECD Eastern European Countries

	Starting Date	Extra/ Missing Cycles	OECD Europe Area					Cross correlation	Extra/ Missing Cycles	OECD Eastern Europe Area				
			Median lead(+) at turning points (TP)							Median lead(+) at turning points (TP)				
			Peak	Trough	All TP	Lead (+)	Value			Peak	Trough	All TP	Lead (+)	Value
Czech Republic	1993	1 x	0	-3	0	-3	0.66	1 x	-1	0	0	-1	0.50	
Hungary	1993	0	3	1	2	2	0.48	0	2	0	1	0	0.63	
Poland	1993	0	1	1	1	0	0.47	0	1	1	1	0	0.64	
Russia	1994	1 x, ½ m	4	7	6	5	0.31	2 x, 1 m	4	6	5	3	0.43	
Slovak Republic	1993	1 x	-1	-1	-1	-3	0.68	1 x	-1	2	0	-2	0.50	
Euro Zone	1993	0	-1	0	0	0	0.93	1 m	-1	-1	-1	0	0.68	
OECD Europe	1993							0	-1	0	0	0	0.76	

Table 5: Major Asian Economies and OECD Pacific Countries

	Starting Date	Extra/Missing Cycles	Major 5 Asian Economies				Cross correlation		
			Median lead(+) at turning points (TP)					Lead (+)	Value
			Peak	Trough	All TP	Lead (+)			
Australia	1995	½ x	-3	-2	-3	ns	ns		
China	1995	1 x	1	3	1	0	0.91		
India	1995	1 x	1	-1	-1	0	0.83		
Indonesia	1995	½ x, 1 m	-3	-2	-2	ns	ns		
Japan	1995	0	-2	-1	-2	-2	0.90		
Korea	1995	2 x	7	2	2	0	0.29		
New Zealand	1995	1 ½ x	4	-2	1	6	0.37		

Table 6: OECD Non-member Economies and Recently New OECD Member Countries

	Starting Date	Extra/ Missing Cycles	OECD Area					Cross correlation	Extra/ Missing Cycles	OECD Area plus Major 6 NME Area				
			Median lead(+) at turning points (TP)							Median lead(+) at turning points (TP)				
			Peak	Trough	All TP	Lead (+)	Value			Peak	Trough	All TP	Lead (+)	Value
China	1995	1 x	5	3	5	2	0.69	1 x	3	-2	1	1	0.69	
India	1995	1 x	5	1	3	3	0.66	1 x	3	2	3	2	0.68	
Indonesia	1995	1 m	2	1	1	ns	ns	0	2	2	2	ns	ns	
Korea	1995	1 x	3	0	2	3	0.42	1 x	0	0	0	4	0.49	
New Zealand	1995	½ x	6	1	1	4	0.37	½ x	5	2	3	3	0.54	
Czech Republic	1995	½ x	0	-2	-2	-4	0.49	½ x	0	-1	0	-6	0.39	
Hungary	1995	1 x	1	-3	-2	-2	0.38	1 x	-4	-2	-2	-3	0.44	
Poland	1995	1 x	-1	0	-1	-1	0.68	1 x	-1	1	1	0	0.81	
Russia	1995	1 ½ x	-4	1	-1	-1	0.22	1 ½ x	3	2	3	-1	0.34	
Slovak Republic	1995	1 x	-3	-5	-3	-5	0.56	1 x	-4	-4	-4	-6	0.46	
Brazil	1995	½ x	-2	0	-1	-2	0.58	½ x	-3	1	1	-3	0.61	
South Africa	1995	0	0	1	1	-1	0.26	0	1	1	1	-2	0.36	
OECD Area	1995							0	-1	0	1	0	0.96	

ns=not significant

Table 7: OECD Regional Area Aggregates

	Starting Date	Extra/ Missing Cycles	OECD Area					Cross correlation	Extra/ Missing Cycles	OECD Area plus Major 6 NME Area				
			Median lead(+) at turning points (TP)							Median lead(+) at turning points (TP)				
			Peak	Trough	All TP	Lead (+)	Value			Peak	Trough	All TP	Lead (+)	Value
NAFTA	1995	0	1	0	0	1	0.81	0	1	1	1	0	0.71	
OECD Europe	1995	1 x	-2	-3	-3	-2	0.84	1 x	-4	-1	-4	-3	0.76	
Euro Area	1995	0	-3	-4	-4	-4	0.83	0	-5	-2	-5	-4	0.76	
OECD Eastern Europe	1995	1 x	-1	-4	-2	-3	0.70	1 x	-4	-5	-4	-3	0.67	
Major 5 Asian Economies	1995	0	4	1	4	3	0.79	½ m	2	2	2	2	0.84	

4. COMPOSITE LEADING INDICATORS FOR NEW REGIONAL OR AREA AGGREGATES

The characteristics of the CLIs constructed for the new regional or area aggregates are presented below in Table 8. The results show acceptable cyclical properties of the CLIs for all three new area aggregates. However, it is worth noting that the results for all area aggregates are based on data for very short time periods, 11 to 13 years, which include only 2 cycles in the case of the Asia Major 5 Economies Area. This means that the turning point measures given are not significant in a statistical sense. In addition, the correspondence between the CLI and the reference series is rather weak for the OECD Eastern Europe Area.

The statistical criteria used to evaluate CLIs in relation to the regional or area reference series (industrial production) include general fit measured by cross-correlation and behavior at turning points as measured by median or mean lead/lag, standard deviation around the mean, smoothness (the months for cyclical dominance MCD value gives an idea of the smoothness of the CLI) and extra and/or missing cycles.

The CLI for the **World proxy** (OECD Area plus the Major 6 non-member Economies) shows a perfect correspondence at a short lead against the reference series over the period 1995-2005 as illustrated in Chart 25. The median lead at all turning points is 2 months and the general fit with the reference series as measured by the peak-correlation coefficient is 0.92 at a lead of 3 months. No extra or missing turning points are registered by the CLI in relation to the reference series.

In Asia, the CLI for the **Asia Major 5 Economies Area** shows also a very good correspondence at a short lead against the reference series over the period 1995-2005 (Chart 26). The median lead at all turning points is 3 months and the correspondence with the reference series as measured by the peak-correlation coefficient is 0.85 at a lead of 3 months. No extra or missing turning points are registered by the CLI in relation to the reference series.

In Europe, the CLI for the **OECD Eastern Europe Area** shows rather weak correspondence at a long lead against the reference series over the period 1993-2005 (Chart 27). The median lead at all turning points is 4 months and the correspondence with the reference series as measured by the peak-correlation coefficient is 0.39 at a lead of 7 months. No extra or missing turning points are registered by the CLI in relation to the reference series.

Table 8: Main Characteristic of Composite Leading Indicators

Regional or Area Aggregates	Starting date	Extra (x), missing (m) cycles/ total number of cycles (1)		Smoothness MCD/QCD	Mean lead (+) at turning points (TP)			Median lead (+) at turning points (TP)			Standard deviation	Cross correlation (2)	
		x	m		total	Peak	Trough	All TP	Peak	Trough		All TP	Lead (+)
OECD Area plus Major 6 NME	1995	0	2	1	3	5	4	2	4	2	2.6	3	0.92
Asia Major 5 Economies Area	1995	0	2	1	11	2	6	11	2	3	7.4	3	0.85
OECD Eastern Europe Area	1993	0	4	1	5	6	6	5	4	4	4.8	7	0.39

COMPOSITE LEADING INDICATOR AND INDUSTRIAL PRODUCTION
Percentage deviation from trend, seasonally adjusted

Chart 25: OECD Area plus Major 6 Non-member Economies

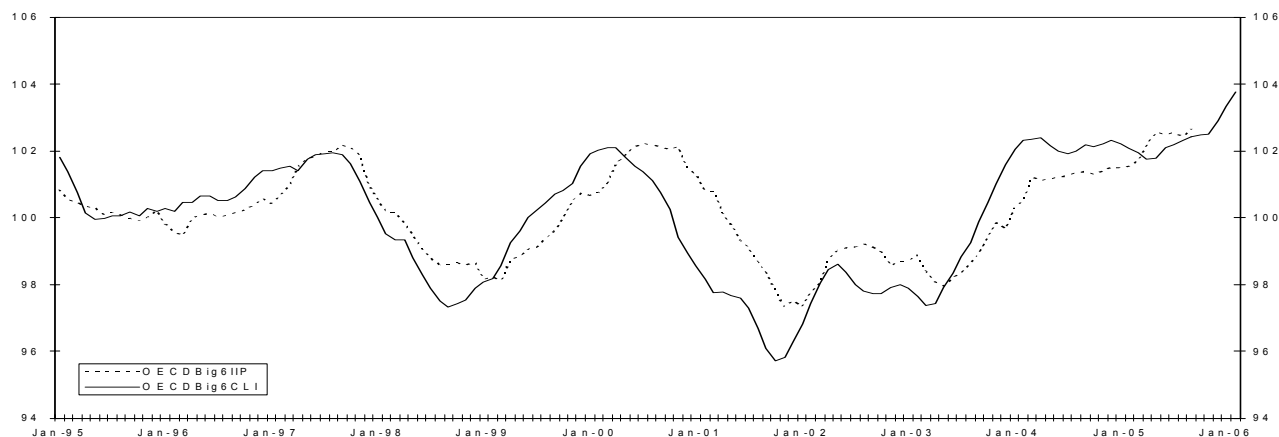


Chart 26: Asia Major 5 Economies Area

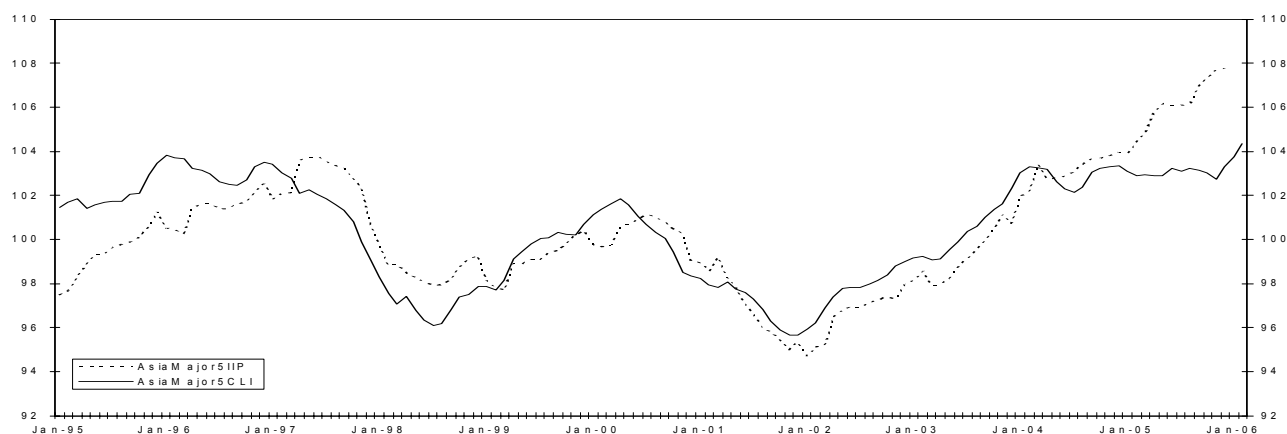
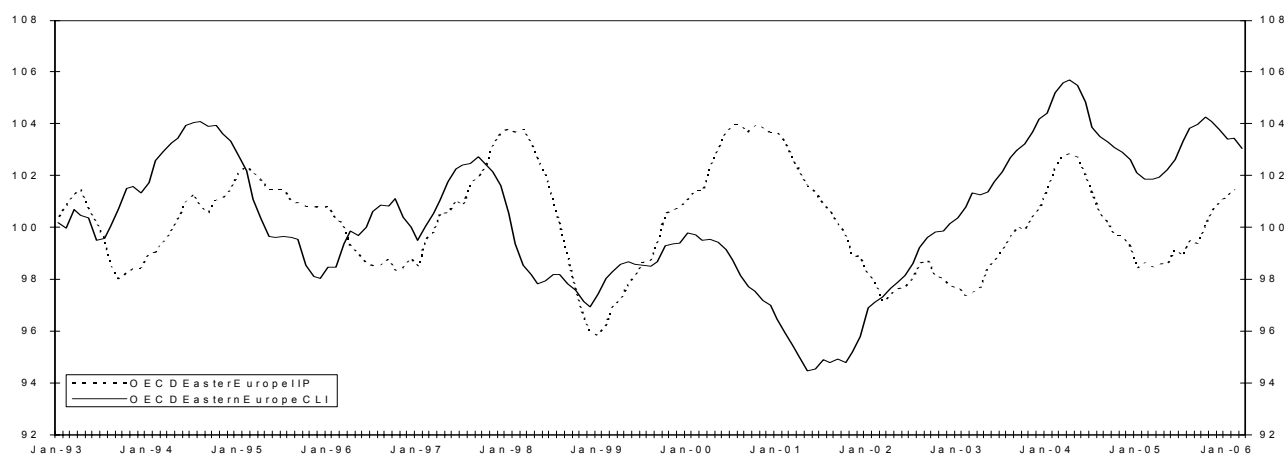


Chart 27: OECD Eastern Europe Area



**ANNEX Table 1: Country Weights for Regional or Zone Area Reference Series and CLIs
PPP adjusted GDP weights in per cent, 2004**

	OECD Total Area			OECD Europe Area		
	New weights	Old weights	Difference	New weights	Old weights	Difference
Australia	1.6	1.8	-0.2			
Austria	0.9	0.9		2.2	2.3	-0.1
Belgium	1.0	1.0		2.4	2.6	-0.2
Canada	4.1	4.5	-0.4			
Czech Republic	0.7		0.7	1.8		1.8
Denmark	0.5	0.5		1.2	1.3	-0.1
Finland	0.6	0.6		1.4	1.6	-0.2
France	5.0	5.5	-0.5	12.5	13.5	-1.0
Germany	8.3	9.0	-0.7	20.5	22.2	-1.7
Greece	0.4	0.4		1.0	1.1	-0.1
Hungary	0.5		0.5	1.3		1.3
Ireland	0.6	0.6		1.4	1.6	-0.2
Italy	5.4	5.9	-0.5	13.4	14.5	-1.1
Japan	14.5	15.7	-1.2			
Korea	4.4		4.4			
Luxembourg	0.1	0.0	0.1	0.1	0.1	
Mexico	3.3	3.5	-0.2			
Netherlands	1.4	1.5	-0.1	3.5	3.8	-0.3
New Zealand	0.3		0.3			
Norway	1.0	1.1	-0.1	2.4	2.6	-0.2
Poland	1.5		1.5	3.8		3.8
Portugal	0.6	0.6		1.5	1.6	-0.1
Slovak Republic	0.3		0.3	0.6		0.6
Spain	2.8	3.0	-0.2	6.9	7.5	-0.6
Sweden	0.9	1.0	-0.1	2.3	2.5	-0.2
Switzerland	0.7	0.8	-0.1	1.8	2.0	-0.2
Turkey	1.9	2.0	-0.1	4.7	5.0	-0.3
United Kingdom	5.4	5.8	-0.4	13.3	14.4	-1.1
United States	31.5	34.1	-2.6			
Total	100.0	100.0		100.0	100.0	

ANNEX Table 2: Country Weights for Regional or Zone Area CLIs
PPP adjusted GDP weights in per cent, 2004

	World proxy	OECD Eastern Europe	Major 5 Asian Economies
Australia	1.3		
Austria	0.6		
Belgium	0.7		
Canada	2.1		
Czech Republic	0.4	21.1	
Denmark	0.4		
Finland	0.3		
France	3.7		
Germany	5.0		
Greece	0.5		
Hungary	0.3	15.8	
Ireland	0.3		
Italy	3.5		
Japan	8.1		23.6
Korea	2.1		6.2
Luxembourg	0.1		
Mexico	2.2		
Netherlands	1.1		
New Zealand	0.2		
Norway	0.4		
Poland	1.0	52.6	
Portugal	0.4		
Slovak Republic	0.2	10.5	
Spain	2.2		
Sweden	0.6		
Switzerland	0.5		
Turkey	1.2		
United Kingdom	3.9		
United States	25.0		
Brazil	3.2		
China	15.3		44.4
India	7.2		20.9
Indonesia	1.7		4.9
Russia	3.0		
South Africa	1.1		
Total	100.0	100.0	100.0

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