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COMPOSITE LEADING INDEXES

1. Introduction

In the last few years the BIEC Co. put its effort to develop a group of leading indexes for the Polish economy. Some of them were presented at the CIRET conferences. (Drozdowicz-Bieć, Chen, Dhrymes Jr., Zarnowitz, 1999; Drozdowicz-Bieć and Zarnowitz, 2000; Bieć and Drozdowicz-Bieć, 2002). The whole package consists of five units:

- the whole economy (Coincident and Leading Indexes),
- inflation (Future Inflation Index),
- employment (Future Unemployment Rate Index),
- foreign trade (Leading Index for Polish Export).

The first four are computed regularly on a monthly basis. They are widely presented in the media and found by many economists and experts as a useful tool for predicting future tendencies.

For all the indexes two additional measures are computed: six-month smoothed annualised growth rate and diffusion index. The growth rate informs about the direction of current (coincident index) or future (leading index) economic performance and shows how strong this tendency is or will be. The diffusion index shows how positive or negative tendencies spread in the economy, in its certain areas, and among market participants.

2. Coincident and leading indexes

Our Coincident Index has four commonly used components: the index of industrial production, retail sales, wages and salaries, and employment. Our Leading Index consists of eight components: money supply, credit liabilities of households, stock price index, new orders, inventories, financial situation of enterprises, labour productivity, and consumer confidence index. Quantitative data are taken from official statistics while some qualitative data (new orders, inventories, and consumer confidence) come from surveys.

Both indexes, coincident and leading, cover the period starting in January 1990. During this time they registered two recessions and two slowdowns (shaded area on Chart 1). One growth cycle was fully covered. The period taken under the observation is still to short to cover full business cycles. The Leading Index leads the Coincident Index by 2-3 months on the trough and 9-12 months on the peak. Table 1 presents the average leads of leading indexes and their main components at business and growth average leads of leading indexes and their main components at business and growth cycles peaks and troughs for different countries.

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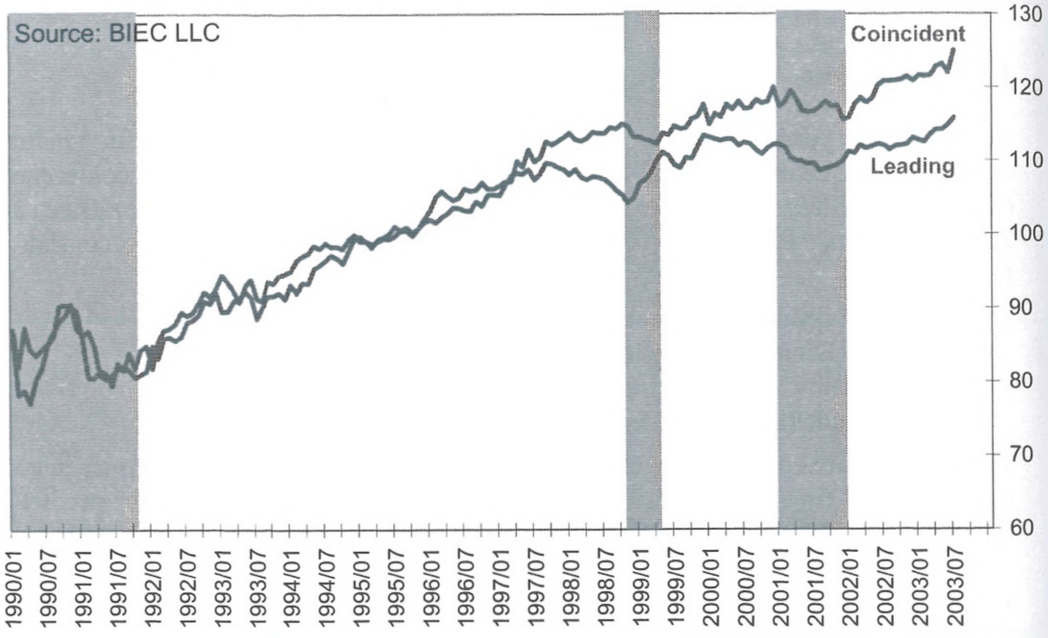
Chart 1. Coincident and Leading Indexes for Poland



Shaded areas represent business cycle slowdowns (recessions).

Table 1. The average leads (–) of leading indexes and their components at peaks and troughs of business and growth cycles

Index	USA		Germany		Italy		France		Poland	
	P	T	P	T	P	T	P	T	P	T
Productivity	–10	–1	–11	–2	–13	–1	–8	–3	–4	0
Orders	–9	–2	–6	–5	–8	na	–12	–4	–12	–4
Inventories	na	na	–11	–8	na	na	–10	–4	–8	–5
Stock prices	–8	–4	–15	–6	–13	–5	–12	–6	–12	–3
Money supply	–12	–1	–12	–1	–10	na	na	na	–11	–7
Interest rate spread	–26	–13	–20	–11	na	na	na	na	–23*	–12*
Consumer confidence	–14	–4	–15	–5	–16	–4	na	na	–14	na
Leading Index	–8	–4	–8	–3	–7	–3	–7	–3	–8	–3

P – peak; T – trough; (–) lead in months; na – not available;
* interbank 3-month real interest rate.

Source: The Conference Board, ECRI, FIBER, and BIEC LLC.

In spite of different definitions and different sources for all the above listed leading components, there is a big similarity in their behaviour on peaks and troughs.

The short characteristics of the entire period since January 1990 is presented below.

Recession of 1990 – 1991

On the basis of our indicators, recession in the Polish economy persisted until October 1991. At the beginning of the 90s industrial production rapidly decreased. From April 1991, real wages in enterprises decreased systematically. Money supply was very slow, especially in 1991. The financial situation of enterprises worsened during this period. The inflow of new orders was very slow up to September 1991. Household debts increased substantially, which can be explained by extremely high interest rates (70-80%). These rates can be seen as a result of high inflation. (Inflation was 250% in 1990 and 60% in 1991.) The chaos that resulted from the abrupt change to free market produced difficulties in linking market participants. An additional factor deepening this recession was the collapse of trade with the former COMECON.

Recovery and growth till 1997

Many events allow us to be certain that end of 1991 marked the beginning of recovery. We can observe growth in production, an improvement of financial situation of enterprises, as well as slower employment decrease. Money supply was growing steadily. Orders in enterprises were increasing, as was productivity, and inventories.

From 1993 we observe a very stable and strong growth. Almost all components of our Coincident and Leading Indicators improved during that period. At the beginning, rapid growth was also caused by growing economic activity in European Union (especially in Germany – Poland's largest partner in foreign trade) and by the next devaluation of Polish currency (zloty).

During this period, inflation dropped from 35% in 1993 to 14% in 1997; the unemployment rate dropped from 16% in 1994 to 10% in 1997; private enterprise's share in GDP grew from 52% in 1993 to 65-70% in 1997; privatisation was continuing and the financial market was developing.

Slowdown, October 1998 to April 1999

The components of our Leading Index registered the first signs of coming slowdown at the very beginning of 1997. Since the spring of 1997 credit liabilities of households declined from month to month. The Warsaw Stock Price Index lost more than half of its real value between March 1997 and October 1998. Inventories of finished goods in industry stopped falling after April 1997 and grew by more than 20% by November 1998. Between July 1997 and December 1998, new orders in manufacturing industry fell steeply. Labour productivity in industry worsened the least and for the shortest period of time. It fell by 8% from July 1998 to January 1999. Money supply was the only leading index component that did not predict the slowdown.

These tendencies deepened in the first half of 1997 and brought the leading index down. At that time, many Polish and foreign economists were very optimistic and did not predict any disturbances; some of them even advised to cool the economy down. The Polish economy grew by almost 7% per year. In order to prevent higher inflation, central bank raised the interest rates. Unfortunately, at the same time a financial crisis occurred in Russia.

Growth of Poland's total output started to slow down in October 1997 and dropped drastically by October 1998. Our Leading Index predicted this development about 13 months earlier (the peak in the leading index occurred in September 1997 while the peak in the coincident index occurred in October 1998). The growth rate of GDP fell from 5% in the third quarter of 1998 to 2.9% in last quarter of 1998 and further to 1.5% in the first quarter of 1999. As a consequence of the slowdown, income per capita and real wages decreased.

Both domestic and foreign factors contributed to this short slowdown in Polish economy. The most important domestic causes included relatively slow privatisation, relatively soft fiscal policy, and neglected tax reform. Among foreign factors the most important ones were the consequences of Russian crisis and a slower growth in European Union, especially in Germany.

Short recovery in 1999

At the end of 1998, our leading index rose sharply, taking only five months to recover from its 1997-98 decline. Credit liabilities of households were the first among the leading indicators to warn about the slowdown, and they were again the first to show the recovery. Already in April 1998 the rate of credits issued started to rise. After November 1998, the optimism in the stock market returned and the Warsaw Stock Price Index rose again. From the end of 1998, inventories started to fall and since January 1999 we observe a systematic increase in new orders. The financial standing of businesses also improved greatly since the beginning of 1999. Among our leading indicators, only consumer confidence index has not shown any improvement. Real wages, retail sales, industrial production and other components of leading and coincident indexes improved significantly.

Three months after our leading index predicted a recovery (in February 1999) the economy started returning to the path of high growth; output increased, retail sales became higher, and income per capita improved. Real GDP grew by 1.5% in the first quarter of 1999, 3% in the second, 5% in the third, and 6.2% in the fourth quarter.

Slowdown and recession, 2000 – 2001

Our Leading Index reached a peak in December 1999. The same was the case with most of its components. New orders in industry, inventories, financial situation of enterprises and productivity started to decline since January 2000 and dropped sharply in the second half of 2000. The Warsaw stock price index (WIG) and money supply (M3) declined since October 2000. The Leading Index has led the peak of the Coincident Index by 12 months. The recession registered by the Coincident Index was preceded by a slowdown, which is common for most business cycles. The slowdown occurred from January 2000 to April 2001. After that we could observe a short and mild recession from May 2001 to January 2002. During this period the growth rate of both indexes was negative and diffusion index was below 50%.

Stagnation and recovery, February 2002 to October 2003

During the fall of 2001, our Leading Index registered the first signs of recovery. But the improvement was not vigorous. The growth rate of the coincident and leading indexes was almost flat up to the second quarter of 2003. The diffusion index was around 50%. These are the reasons why 2002 and the first quarter of 2003 should be considered a period of stagnation. The signs of recovery can be seen in the second quarter 2003.

3. Future Inflation Index

Inflation is closely tied to the business cycle. Most statistical data show that almost each slowdown or recession is associated with a downturn in the rate of inflation and most upturns in the business cycle or growth cycle have been accompanied by an upturn in the rate of inflation. The asymmetry in duration of business cycles after World War II is closely associated with longer periods of growing rather than falling inflation. Swings in the rate of inflation usually lag a business or growth cycle. In some high-developed economies the last business cycle that had a long period of expansion in the 90's does not show such a close relation between economic boom and growing inflation. Some economists explain this fact by strong central banks' policy focused on inflation goal. Others explain it by high growth of productivity in the boom of 90's. In my opinion this second factor is crucial. Growing productivity prevents rising prices during expansion.

The beginning of new century brought a new concern about deflation and its possible impact on the economy.

When developing the index for inflation I tried to focus on the main trend of inflation, not on its monthly changes. Therefore, the Future Inflation Index (FII) does not predict changes in the CPI connected with short run factors. FII has eight components: import prices, prices in services, labour unit cost, product unit cost, government (national) debt, producers' prices forecast, capacity utilisation in industry and exchange rate of zloty to dollar and euro. FII is computed from the beginning of 90's but it is only useful for predicting inflation starting in 1998. The reason is high inflation in the first half of 90s and not entirely free market relations in some areas such as financial or labour markets (Chart 2).

In selecting the components of Future Inflation Index (FII) we should remember different reasons causing the rise of consumer prices. Some of them are related to the supply, others to the demand side of the economy, some have short-term effects, and others long-term effect. In some cases, even short-time supply shocks, like rapid growth of raw material prices, can create inflation in the long term.

Import and service prices reflect possible rising costs of output. Similar relation is between unit labour costs and costs per output unit and future rise or fall of consumer price index. Since payment for labour constitutes the largest single cost and since unit labour costs have generally been rising, the share of unit labour costs usually has been positive and closely related to the change in prices.

Chart 2. Future Inflation Index (FII) and CPI

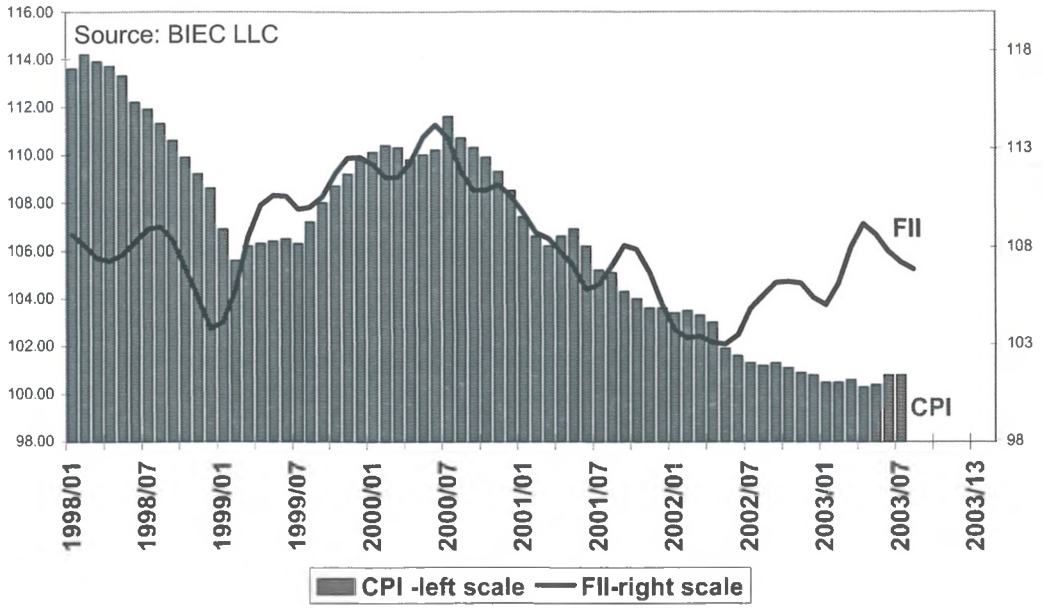


Table 2. The average lead (–) of Future Inflation Index and its components at peaks and troughs to the CPI

Index	P	T	Index	P	T
Import prices	–7	–3	National debt	–16	–9
Service prices	–4	–1	Producers prices (forecast)	–5	–4
Labour unit cost	–9	na	Capital utilisation	–3	–4
Product unit cost	–3	–3	Exchange rate	–3	–3
Future Inflation Index (FII)	–5	–3			

P – peak; T – trough; (–) lead in months; na – not available.
Source: BIEC LLC.

Capital utilisation has very good long lead of the future inflation. When the economy approaches a capacity constraint, there is a tendency for higher unit costs of production because less efficient equipment is brought on steam to meet demand.

Usually, producers are ready to raise prices if the demand (or their dominant market position) allows them to do it. Therefore this series, although very volatile, has a steady lead of 3-4 months to the CPI.

The exchange rate of Poland's currency to dollar and euro is a direct determinant of the costs of imports of raw materials and finished goods for Polish producers. Import prices of consumer goods are information for Polish producers about the level to which they can rise their prices. The appreciation of zloty tightens export and may cause a fall in prices for consumer goods if they have no substitute from imports.

A lot of worldwide data shows a high correlation between the rate of inflation and the growth rate of total debt of nonfinancial borrowers – government and business enterprises. Fast growing national debt may lead to a depreciation of national currency, rise in real interest rates, higher costs of making business, etc. Those may lead to an upward trend in inflation.

FII is more volatile than CPI. We can observe rather big spread in lead of the peaks and the troughs for different components (see Table 2). National debt has the longest lead (more than one year), while exchange rate has the shortest lead (2-3 months). The Future Inflation Index (FII) predicted the upward trend in CPI index in 1999 by 2 months and the downward trend in 2000 by 3 months.

4. Future Unemployment Rate Index

The unemployment rate is negatively correlated with the business cycle pattern and has a few months lag to peaks and troughs. Recessions and recoveries do not affect all aspects of the labour market at the same time. Additionally, most series that come from labour market are very volatile due to high seasonality and to changes in definition and methodology of collecting data.

The Future Unemployment Rate Index (FURI) consists of five components: the number of new registered unemployed, the number of people who get a job, the number of job offers, the expected changes in number of workers in industry in the next few months and the future demand of economy for labour. The first three sets of data come from Central Statistical Office, the expected changes in the number of workers in industry come from business survey and the future demand for labour force is especially created for purpose of this index.

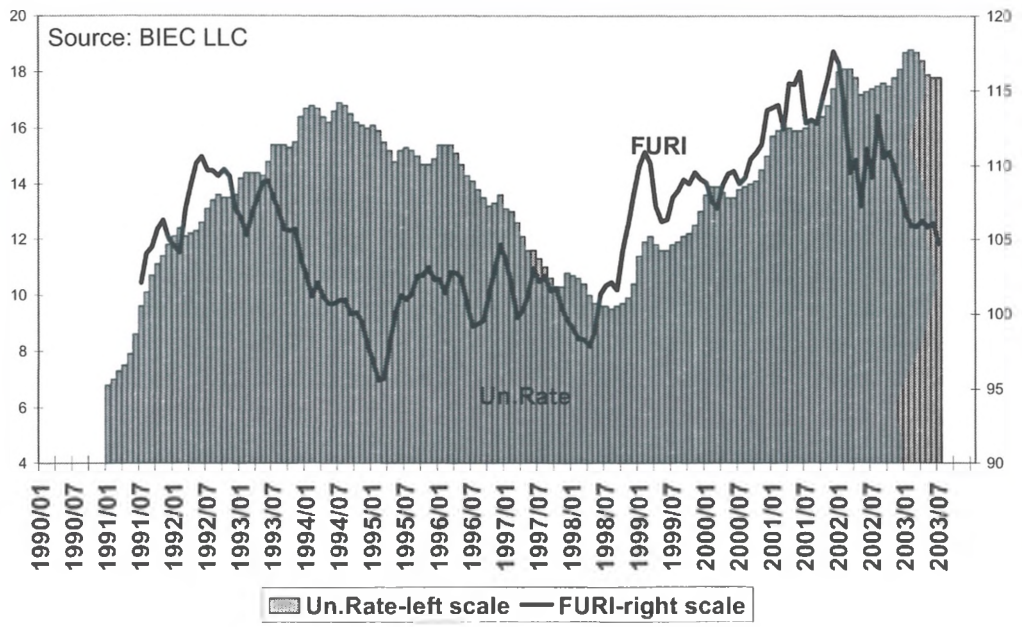
Let me now explain this last component. It is a well-known fact that employment data is not the exact inverse of the unemployment rate. It may happen that an economy is developing at a quite high rate accompanied by high unemployment. Businesses create new jobs (vacancies) but unemployment rate does not decrease. We can observe such situation in two cases. The first one occurs when the structure of supply of labour differs substantially from the demand for labour. It may happen as a result of rapid changes in the technology. But if the market is free, this lack of equilibrium will be eliminated in a short period of time. The experience of Polish economy in the mid 90's shows that economy can reach high rate of development and have a growing unemployment rate. This phenomenon was related to fast growing labour productivity. It should be added that Polish enterprises were 3-4 times less efficient than average efficiency in EU countries and 7-8 times less efficient than those in the US. It means that there was a lot of labour force and equipment not efficiently used in production

Table 3. The average lead (–) or lag (+) of future unemployment rate index and its components at peaks and troughs to the unemployment rate

Index	P	T	Index	P	T
New jobs	–10	–4	Future demand for labour	–11	–11
New unemployed	+6	–6	Future changes in employment	–12	–13
Number of people getting jobs	–8	–16	Future Unemployment Rate Index	–15	–8

P – peak; T – trough; (–) lead in months, (+) lag in months.
Source: BIEC LLC.

Chart 3. Future Unemployment Rate Index and registered unemployment rate



process. There were gaps in management and organisation. As enterprises started to be under free market pressure and decided to be more efficient they had to rise the productivity and in consequence layoff a surplus of workers. This observation leads me to conclude that probably only if the growth rate of whole economy is higher then the growth rate of labour productivity, there is economic opportunity for new job creation and absorption of unemployed workers. If the growth rate of economy is lower than the growth rate of productivity, economy is not able to absorb the layoff employees. The Leading Index is a good proxy for future growth rate of the economy. Therefore, the future demand for labour can be determined by the ratio of the growth rate of Leading Index to the growth rate of labour productivity. The lead of Future Unemployment Rate Index to the unemployment rate reported by the CSO and the lead of each component are presented in Table 3.

5. Conclusion

Leading and coincident indicators can be used in many types of analyses. They provide an analyst with a tool that covers a rather complex economic structure in a form of few data series. Looking at trend development on any single statistical indicator over time might not be enough. The economy is a structure with many dimensions. Understanding of it is needed to reap full benefits from leading and coincident indexes.

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