

BULDING LEADING INDICATORS IN MACEDONIA-MAKLEI

MARJAN NIKOLOV

Center for Economic Analyses (CEA)

**Skopje
October, 2005**

Disclaimer: Opinions expressed in this report are those of the Center for Economic Analyses and do not represent the opinion of the USAID or any other concerned institutions.

It is the responsibility of other authors to cite this report when it has informed their research and publications.

Table of Contents

Introduction.....	4
Business cycles	5
Leading indicators.....	7
Building MAKLEI.....	7
Beyond MAKLEI.....	9
References.....	10



General information about CEA

Logo:



Address:

CENTER FOR ECONOMIC ANALYSES (CEA)

Bul. Jane Sandanski 63/3,
1000 Skopje Macedonia

Tel: + 389 (0)2 24 44 766
Mob: + 389 70 834 636

TIN: 4030003479278
Reg. 5763061

Account number:

Stopanska Banka AD Skopje
Account number: 200000856268559

Web page and e-mail:

www.cea.org.mk

www.lsg-data.org.mk

info@cea.org.mk

Note

This report was prepared under the contract provisions signed between CEA and USAID for nonexclusive services to USAID as part of a grant agreement. This report is the second in a series of such reports and provides expert opinion on the need to develop leading indicators in Macedonia. This report should be regarded as a tentative study that sets the basis for a more thorough and systematic analysis.

All methodological techniques used in this report are explained in greater detail in the papers listed in the References section and will not be explained in detail in this report.

This document will be published on the CEA web site 10 working days after submission to USAID (<http://www.cea.org.mk>).

The report has been prepared by Marjan Nikolov, MSc (marjan@cea.org.mk).

Introduction

The understanding of the aggregate fluctuations is a central goal of macroeconomics. Every economy is perturbed by disturbances of various types and sizes at more or less random intervals and those disturbances then propagate through the economy. Macroeconomic schools differ in their hypotheses concerning these shocks and propagation mechanisms. Whether there are on supply or on demand side. Whether there are symmetric or asymmetric information. Whether there is neutrality or illusion of money and all that whether it is in short or long run.

Starting with the Walrasian economy as a simplest for aggregate fluctuation continuing and moving towards more complicated model from a textbook macro (see: Romer 2001) the questions are whether the fluctuations can be understood, measured, monitored in order to recommend the most efficient economic policies for providing macroeconomic stability. Generally it is a problem of finding a technical instrument of extracting as much as possible information from the noise in order to make the most efficient decisions.

The aim of this paper is to present the need for building a tool for monitoring the Macedonian economy through available information at one state of the world and making decision for future short term macroeconomic cycles. It starts with review of Business cycle theories and continues with explaining what leading indicators are and how they are build as well as the context they can be used for. More, the building of a leading indicators was one of the tools planned with the annual working plan of CEA and agreed with USAID.

Business cycles

Business Cycles-BC can be defined as the serial correlation in the deviation of output from trend and the serial correlation of other economic variables which exhibit comovements be they pro- or counter-cyclical and with or without a lag with output. The existence for these movements can be found in statistical (economical) data all over the world. Some of those cyclical variables shows more volatility than the others, therefore a complete BC model must explain the movements not only of one variable but the comovements of others as well. Table 1 illustrates types of models depending on their linearity.

Table 1. Type of BC models depending of linearity.

MODEL	MODEL
Linear	Nonlinear
a) deterministic-without shocks	a) deterministic-without shocks
b) stochastic-with shocks	b) stochastic-with shocks

The explanation of the BC required solution to the propagation and impulse problem. Impulse problem is solved by shock-generating model and propagation problem is solved by converting the shocks emanating from the shock-generating model into a BC conforming to statistical observations.

Until late 70s the linear deterministic multiplier accelerator model was popular that can be modeled with a second order linear difference equation. This type of modeling was of little use because of the lack of existence of shocks and the necessity for stochastic modelling. Cycles of this deterministic type conserves all energy and shocks. Thus, within a stochastic environment (in which economic agents are working) this case is of little use.

The nonlinear modeling brought the ceiling and a floor in order to constrain the output (national income) between these limits to the economic possibilities. This means that the “explosiveness” must be contained into limits. In short, non-linearity is repeated cycle around an unstable equilibrium.

Keynes brought the idea that a government is an agency acting to improve public welfare by trying to reduce the amplitude of the cycle using counter cyclical monetary and fiscal policy. The government posses no objective function or at least have one that conflicts with the public interest. But by political theory, government might run the economy to maximize long-run profits of the capitalists and there might be a link between economical and political events. There are difficulties also of so called “fine-tuning” when anti-cyclical policies had effects in the wrong phase of the cycle.

In the late 1960s and early 1970s inflation and unemployment both rises which was inconsistent with the Phillips curve and Keynesian income-expenditure diagram. Then alternative monetarist theory arose out of the work by Friedman, by analyzing relationship between the levels of and changes in the money supply and the levels of and changes in nominal national income. They find a strong relationship between them but with lag in changes of national income (output). That is how the adaptive expectations augmented Phillips curve was developed.

Later in the 80s two theories have had major role: Equilibrium BC and Political BC. They are contradictory in way that PBC assumes that voters (electorate) forms their expectations in “short sided view”, whilst EBC assumes that economic agents formed rationally expectations on the basis of knowledge of the economic model. Also, PBC gives the government a major role in generating cycle, whilst EBC that government influences the cycle by generating random monetary shocks. Still, PBC and EBC are complementary in a way that the government needs to be endogenized in BC models and a theory of game is required.

In EBC, with assumption of rational expectation and perfect flexible prices and market clearing, the neutrality of money in this theory is certain. Money could only lead to changes in the price level or inflation. Also by EBC models information are symmetric, which means that workers, unions, firms, share the same information set and monetary policy could not be used for short-run economic stabilization because the short-run trade off between inflation and unemployment will no longer exist. In that way the fixed rate of money growth is unnecessary. But to explain the persistence on the effect of monetary shocks economic agents are viewed as operating in “islands” markets and the price changes gives a signal from which information has to be extracted before a response can be made (signal extraction problem). But in the market economy agents cannot be expected to stay fixed while more information is collected.

In PBC essence is that the government is also an agent whit own maximizing utility related to electoral support rather than general economic welfare. In order to maximize its vote share the government might create a cycle in output, unemployment, inflation. In the side of voters, they are “short sighted” and behave on the most recent economic outcomes, and are unable to forecast the effects of current policies in the next electoral period. These kinds of theories are more political in a sense that the rule class is on the top and take all profits. Thus, the state runs the economy in order to maximize long-run aggregate profits and does so by creating a cycle in unemployment. These models are based on unemployment, inflation, electoral period.

Real Business Cycle-RBC models view is that fluctuation caused by technology shocks (supply side) are exogenous. Critics on that are that productivity shifts are as result of other shocks in the economy meaning they are secondary reaction only.

RBC replaces impulse mechanism of the earlier models (unanticipated money) with supply-side-shocks in technology. Propagation mechanisms are retained and developed.

Simply, it was noted in the early 1980s that real equilibrium of a full information model could move around driven by fluctuations in technology. In that way fluctuations will be generated in aggregate output and employment as rational individuals respond to changes in relative prices by changing their labor supply and consumption decisions.

Broad regularities have been identified in the statistical property of economic series. A theory of BC to be successful should be able to explain not just cyclical behavior of output but also cyclical behavior in other economic variables.

Leading indicators

Among economists there is agreement about some BC facts. These facts are labeled as stylized facts. The main stylized facts are:

1. Output movements tend to be correlated across all sectors of the economy.
2. Industrial production, consumption and investment are procyclical and coincident. Government purchases also tend to be procyclical.
3. Investment is much more volatile over the course of the business cycle than consumption, although spending on consumer durables is strongly procyclical.
4. Employment is procyclical and unemployment counter-cyclical.
5. The real wage and average labor productivity are procyclical, although the real wage is only slightly procyclical.
6. The money supply and stock prices are procyclical and lead the cycle.
7. Inflation and nominal interest rates are procyclical and lagging.
8. The real interest rate is acyclical.

All of these variables are going through episodes of expansion, peak, contraction and trough. The usual one cycle duration is from one to 10/12 years.

The decision makers, investors and other economic agents are asking the question when the recovery of the economy will start. Which variables give us the early warning?

The OECD has compiled Composite Leading Indicators (CLI) since the beginning of the 1980s for 22 Member countries. OECD CLI provide reliable signals for future turning points. Such questions are of especially importance for a country such as Macedonia.

One instrument that can be used to give answer to these short run sighted questions is the building of Macedonian composite leading indicators-MAKLEI.

Building MAKLEI

MAKLEI should be economic relevant, statistically proved and available in time.

A construction of a MAKLEI will require:

- 1 Identifying reference series
- 2 Selecting potential indicators
- 3 Calculation of cyclical pattern
- 4 Comparison of reference series and indicators
- 5 Distinguishing among leading / coincident / lagging
- 6 synchronization and normalization
- 7 Finally calculation of MAKLEI

Reference series usually are:

- manufacturing production
- GDP (and its componenst)
- inflation
- employment

Potential leading indicators can be:

- Confidence producers / consumers
- Activity / orders companies
- International indicators
- Money: M1, share price, credits
- Prices: interes rates, exchange rate
- Approvals for construction
- Vacancies, bankrupties

Calculation of cyclical pattern will require:

- Seasonality calculation (Census X12)
- Noise extraction (month-to-month fluctuations)
- Trend definition (long-run growth) Hodrick-Prescott (HP) filter

Comparison of reference series and indicators can be thorough:

- cross correlation (whole sample)
- average leads/lags on turning points

Indicators can be useful if they are:

- leading with more than few months
- cross correlation is at least 0.5
- equal numbers of turning points
- available in time
- long time series available without breaks

The MAKLEI building will require:

- normalizing (equal amplitude) indicators
- synchronizing (lead turning points on average zero) indicators
- calculation of MAKLEI with weights that are equal maybe using regression and/or principal components or cluster analyses.

Beyond MAKLEI

The forecasting process is really depending on the frequency of time series but usually it goes quarterly. These forecasts can be used in a more sophisticated macro model, for monitoring, early warning systems etc.

Forecasting creates systematic errors in but there is no alternative to control future especially the complex economic causalities.

The MAKLEI can:

- predict turning point
- improve more sophisticated model-based forecast
- give graphical presentation for public
- improve statistical system of Macedonia
- it is easy to calculate with software (E-Views for example)

For example, CPB uses a macro-econometric model as the core of its forecasting process. At the same time, they maintain a system of leading indicators in order to spot turning points in economic activity. Their system of leading indicators features a similar kind of disaggregation as the macro-econometric model does. This facilitates the incorporation of information from the leading indicators in the model-based forecasts by means of add-factors in specific behavioral equations. Moreover, this approach has the advantage that they can analyze in more detail the Dutch business cycle.

The final point is that the economy is a complex environment to operate for the economic agents including businesses and the government. They all need tool to extract as much as information from the historical data in order to answer questions of importance for the economic decision making. Developing such tools will require a lot of technical knowledge and work. This paper aimed at addressing the need for developing the MAKLEI.

References

- 1. Frontiers of business cycle research**
Thomas F. Cooley, editor, 1995 by Princeton University Press
- 2. Modern business cycle theory**
Robert J. Barro, editor, 1989 by Harvard University Press
- 3. A modern guide to macroeconomics**
Snowdown & Vane & Wynarczyk, 1994 Edward Pub. Company
- 4. Macroeconomics**
Hall & Taylor, 1991 by W.W. Norton & Company, Inc.
- 5. The business cycle after Keynes**
A.W. Mullineux, 1984 by Wheatsheaf books LTD
- 6. Microeconomic theory**
Walter Nicholson, 1998 by The Priden Press
- 7. Advanced macroeconomics**
Romer & David, 1996 by McGraw-Hill: New York
- 8. Difference equations**
Naum Celakoski, 1986 by University Press-Skopje
- 9. Using leading indicators in a model-based forecast**
Henk Kranendonk, CPB (http://www.cpb.nl/nl/cpbreport/1997_3/s2_2.pdf)
- 10. Information leading indicators**
OECD (<http://www.oecd.org/dataoecd/6/2/2410332.pdf>)