



Doctorate Drs. Ard H.J. den Reijer
at the Maastricht University School of Business
and Economics

Title: *“Macroeconomic Forecasting using Business
Cycle Leading Indicators”*

Supervisors: Prof. Dr. F.C. Palm; Prof. Dr. L.H. Hoogduin, UvA
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Curriculum Vitae

Ard den Reijer (1976) obtained a MA in Economics in 2000 and MSc in Econometrics and Operational Research in 2005, both at Tilburg University. His master's thesis was written during an internship at the Economic Research Department of Rabobank in Utrecht, the Netherlands. From 2000 to 2008, he worked at the Research Unit of the central bank of the Netherlands, De Nederlandsche Bank (DNB). He has published scientific articles in Applied Econometrics and International Development, Applied Economics Quarterly, De Economist, Journal of Business Cycle Measurement and Analysis and Journal of Forecasting. He is affiliated with the Euro Area Business Cycle Network. In 2008, he joined the Modeling Unit of the Monetary Policy Department of the central bank of Sweden, Sveriges Riksbank. More information can be obtained from his website www.reijer.info.

Abstract

An accurate assessment of the current and near future macroeconomic outlook is crucial information in the decision process of policy makers and businesses. Big-Data refers to an environment that is characterized by the explosion in quantity and quality of potential relevant data, mainly due to progress in recording and storage technology. The information age posed central banks with the challenge of executing monetary policy in a data-rich environment. Policymakers and applied forecasters are keen on extracting information from a large variety of data series describing economic activity at a more disaggregate level.

The key objective of this thesis is to develop and compare short- and medium term forecasting models based on small and large collections of leading indicator variables aimed at, mainly Dutch, key macroeconomic variables such as inflation, gross domestic product (GDP), staffing employment and the business cycle.

Interview

Who works with these forecasting models: companies, central banks or government institutions?

“Forecasting macroeconomic key variables at a short to medium term horizon is important for both monetary authorities and private agents who try to understand and react to the central bank's behaviour. The Maastricht Treaty formulates a clear mandate for the monetary authority of the Eurozone being the collective of European Union member states that have adopted the euro as their sole currency. The Eurosystem consists of the European Central Bank and the National Central Banks of the member states of the euro area. The mandate is to maintain price stability and is given a quantitative content by the inflation rate, which is the rise in the general level of prices of goods and services in an economy over a period of time. The goal is an inflation rate for the euro area that should be close to, but below 2% in the medium term. The Eurosystem executes a two-pillar monetary policy strategy that emphasizes monetary analysis.

Being a non-euro country, the central bank of Sweden, Sveriges Riksbank, executes an independent monetary policy strategy of flexible inflation targeting, entailing stabilisation of both inflation around its target and the real economy.

Please Turn Over

Every central bank, however, conducts monetary policy under conditions of considerable uncertainty. The knowledge of the economic situation is not complete, and neither is the knowledge of the so-called transmission mechanism of monetary policy, that is how monetary policy affects the real economy, inflation and possibly also asset prices. Moreover, there is a considerable and varying time lag before monetary policy measures have an impact on inflation. Therefore, monetary policy is most effective if it is based on forecasts."

What are your recommendations with regard to the forecasting models you studied?

"Since monetary policy can be a function of the forecasts, the choice of the forecasting model is an important one. In practice, central banks and policy institutions employ dynamic stochastic general equilibrium models and macroeconomic structural models, or hybrids of the two, which incorporate a rich economic structure, and more statistical oriented time series models. The key objective of this thesis is to develop and compare short- and medium term statistical forecasting models based on small and large collections of leading indicator variables aimed at, particularly Dutch, key macroeconomic variables such as inflation, the business cycle and the real economy as represented by the aggregate of all economic activity, i.e. Gross Domestic Product (GDP). By comparing statistical models based on small and large collections of data, this thesis investigates the notion that the available leading indicator variables at a disaggregate micro level contain more information than each available economic key variable at an aggregate macro level. A data-rich environment is characterized by the explosion in quantity and quality of potential available data due to progress in recording and storage technology. The thesis employs data sets of the National Accounts disaggregated by sector and geographical regions, prices for different products, assets and services and turnover data of the flexible labour market. The idea is to identify and exploit leading indicators that either cause fluctuation in an economy or quickly react to it. For example, fluctuations in flexible employment are known to be timely indicators of economy-wide developments. From the perspective of the firm, flexible labour constitutes a mere variable factor of production that can be instantaneously adjusted to expected changes in market demand."

Can you give an example of a forecasting model and the way it works?

"As the aim is a short- to medium term forecast horizon, this thesis focuses on the business cycle dynamics of the economy. Business cycles can broadly be defined as oscillating motions of economic activity, which are visible as patterns of fluctuations within macroeconomic variables such as output, production, interest rates, financial markets, consumption, unemployment and prices. The term 'cycle' is misleading as it suggests a regular periodicity. Each single business cycle is unique and can be characterized by its depth, duration and diffusion. The depth of the cycle represents the cumulative rise (fall) of economic activity during the expansion (recession) phase. The duration of the cycle is the elapsed time between two peaks or troughs and varies from more than one year to ten or twelve years. The diffusion of the cycle represents the extent to which the business cycle is visible across different sectors and regions.

The DNB business cycle indicator, which is developed in chapter 3, is being updated and published on the website www.dnb.nl. The DNB business cycle indicator presents the cyclical outlook in two single indices.

The coincident index summarizes the factual stance of the business cycle on the basis of industrial production, household consumption and flexible employment. The American and European business cycle dating committees closely monitor the equivalents of these three variables. The composite leading indicator aims to replicate the coincident index and, moreover, extend it up to six months ahead into the future. The composite leading index consists of three financial series, four business and consumer survey results and four real activity variables, of which two supply and two demand related.

The DNB business cycle indicator describes the cycle as the deviation of economic activity from its trend level. Following the peak in the business cycle, four subsequent phases can be distinguished as: i) slow-down, the cycle is positive, but downward sloping; ii) recession: the cycle is negative and downward sloping, which ends in a business cycle trough; iii) recovery: the cycle is negative, but upward sloping; iv) boom: the cycle is positive and upward sloping.

According to the most recent update of the DNB business cycle indicator, the current recession will end as the Dutch economy enters the recovery phase in June 2010."



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