LEADING INDICATORS OF AGGREGATE ECONOMIC ACTIVITY OF SLOVENIA

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NON-TECHNICAL SUMMARY

Since the beginning of 2002, when we started off with the research project on the topic of leading indicators for Slovene aggregate economic activity, we have analyzed the business cycle theory, selected the appropriate forecasting model and developed a database. These were the characteristics of the first phase of the project.

The appropriate forecasting model proved to be NBER method with elements of Stock-Watson approach. Neither the original NBER method nor the original Stock-Watson approach could be used due to the specific characteristics of the Slovene economy during the transition. That is why we have decided to modify NBER methodology by using econometric techniques, which are utilized in the Stock-Watson method. Using this methodology, the composite index is constructed producing satisfactory forecast of the aggregate economic activity.

During the first phase of the project we started to construct an extensive database, which covers all main areas of economic activity in Slovenia in the selected time period, which is from January 1992 (where available) until August 2000. At the end of the first phase of the project the database consisted of 16 categories covering different fields of economic activity. There were 213 time series included, which corresponded to more than 20.000 observations. In the second phase of the project the existing database was extended to 24 categories including 365 time series with more than 40.000 observations. Time series were chosen on the basis of business cycle theory. Thus, special attention was paid on the topics of external and internal demand. In addition to time series of Slovene economic activity, there are also included time series regarding the economic activity abroad. These are leading indicators of various EU countries, imports, exports and prices of raw materials.

Since there was no such a database before, there is also no single source for it. The sources are: Statistical Office of the Republic of Slovenia, Central database of the Bank of Slovenia, Agency of payments of the Republic of Slovenia, Ministry of finance of the Republic of Slovenia and the Employment office of the Republic of Slovenia. Most of the series are to be used for the internal purposes of the institutions of origin. Regarding this fact there are no individual time series detected in the forecast itself.

For such an extensive database information and software support is needed. The database is being accessible on a server and there is a software application, which enables an easier management of the time series. Due to all the above characteristics this database is constructed solely for the purposes of this model.

However, the database consists of base indices, where the base is the average of the year of 1999. Nominal data was transformed into real data using different price deflators. The series were than seasonally adjusted using X11ARIMA, developed by Statistics Canada. Here the first scoring criterion was obtained: MCD-months of cyclical dominance measuring the smoothness of the time series.

The second phase of the project deals with econometric analysis. In order to obtain the most appropriate time series to represent current business activity on monthly level we have chosen multivariate spectral analysis to study the relationship between industrial production and current business activity. The selected method is used to estimate the strength of wavelength relationship between industrial production and gross domestic product. The details of analytical framework and the results of the spectral analysis are presented in the final report. Briefly, the results provide strong support for the industrial production in Slovenia to be a good coincident indicator of current business activity.

The results of spectral analysis also suggest that the data for the Slovene economy support the classical prediction of business cycle. That is, in the aggregate economic activity, measured by industrial production, exists significant cyclical component with the frequency between 1 to 12 years.

Using X11ARIMA and spectral analysis, turning points in the reference series were determined. In addition, spectral analysis was also used for testing the synchronization of Slovene business cycle with the German cycle. The results of cross-spectral analysis show strong support for the synchronization of the two business cycles.

The scoring of the time series was one of the main targets of the second phase of the project within the estimation of the developed econometric model. The scoring plan includes five major elements: economic significance, statistical adequacy, promptness of the publication, smoothness and Granger causality. Due to the scoring plan a database of statistical dominance was constructed including scoring about: time length, structural breaks, time unit coverage and quality of methodological explanation. Besides the above described statistical adequacy also promptness of the publication or availability of each time series was one of the most important criteria due to the fact that the model deals with monthly forecast, which is suppose to be current. Granger causality test was used to detect the conformity of an indicator to past business cycles and timing points relative to those in aggregate economic activity. The original NBER approach applies probability test for the same purpose. As the database covers a relatively short time period the original NBER probability test was not feasible and the Granger causality was used instead.

According to the assigned scores for each of the time series, a list of potential leading indicators comprises 39 time series. Taking into account Granger causality test presenting the average lead time, graphical analysis and trend-cycle component measured by X11ARIMA the list was shortened to 10 selected indicators. The chosen time series cover different fields of economic activity, such as business and consumer confidence, construction, labour market, monetary sector, foreign economic activity and the payments system.

The forecast of economic activity is based on calculation of SLOLEI composite and diffuse index. The results show that the composite index successfully forecasted all turning points in the movement of the reference series. As for the diffuse index, the results show that its values are highly volatile and we use a three-month average diffuse index.

In order to get additional opinion on our research and the results we visited WIIW in Vienna and Ludwig-Maximilians University Munich Department of Economics. Our temporary results were also discussed in the Workshop at CERGE-EI in Prague.