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GENERAL INDICATORS OF BUSINESS ACTIVITY FOR POLAND BASED ON QUALITATIVE AND QUANTITATIVE DATA*

1. Introduction

A composite indicator of general business activity for Poland based on the RIED survey data, covering the period from October 1992 to March 1996, has been confronted with the composite indicator of general business activity based on statistical data. Both indicators are available on a monthly basis. The quantitative index covers a much longer period since January 1975 until now and it was compiled separately by this author in the research project on composite indicators of business activity for Poland. The aim of the exercise presented here was to check to what extent the RIED general indicator was correlated with the reference series showing the actual movement of aggregate economic activity and whether or not it revealed any leads which might justify its use for signalling future changes in general business activity.

2. Qualitative Indicator

The RIED composite indicator of general business, denoted here GSI (general survey indicator), was originally calculated by Krzysztof Stanek and for this presentation it has been slightly revised and updated by this author. This is a weighted average of „general business indicators" compiled from the 6 surveys run by the institute in the following sectors: 1) public industry, 2) private industry, 3) agriculture, 4) construction, 5) trade (retail & wholesale), 6) households.

The formula adopted by K. Stanek in compiling this indicator is as follows:

GSI = 2/7 IND + 2/7 CONS + 1/7 AGR + 1/7 CONSTR + 1/7 TRADE

where:

GSI - general business (survey) indicator
IND - business indicator for industry
CONS - consumer sentiment indicator
AGR - business indicator for agriculture

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CONSTR - business indicator for construction
TRADE - business indicator for trade

Formally, this formula resembles the concept of economic sentiment indicator as recommended by the CEU and it even applies similar weights. The inclusion of agriculture is fully justified by the role this sector still plays in the Polish economy, and the omission of the stock exchange index is due to the fact that the latter is not yet comprehensive enough and it displays merely speculative movements unrelated to the real state of business. However, the informative content of the indicator is somewhat different from CEU standards since sectoral business indicators entering the composite index are not exactly the same.

For industry (both public and private) the RIED business indicator is a simple arithmetic mean of current and future production tendencies. A separate indicator based on CEU approach is also compiled but not included in the published reports. General business indicator for industry is compiled as a weighted average from separate surveys covering the public and private industries (with weights 0.75 and 0.25 respectively).

For agriculture, business indicator is calculated as the average of the reported change in farmers' monetary income and their confidence in the future.

In case of construction, business indicator is a simple average of the current change in order books and the expected change of employment levels.

For trade (retail & wholesale altogether), business indicator is calculated as the average of the current tendency of sales, the expected change in own orders and the current level of stocks (with adverse sign).

As regards households, the RIED survey is confined to a specific group of respondents representing the readers of two popular women weekly magazines. For this reason alone, it is not directly comparable with the remaining RIED surveys. Until recently, general indicator of households' economic condition was calculated as an average of answers concerning the change in households' income and savings and consumer's confidence in the future. In 1995 a new formula of general household condition was introduced, including the following elements: assessment of current and future state of national economy, current and future financial condition of the household and the advisability of buying consumer durables.

It should be noted that weights used in the RIED composite indicator do not precisely reflect the shares of individual sectors in GDP. For instance, the actual share of industry in Poland's GDP amounts to 1/3 which is slightly more than the assumed 2/7 while the share of agriculture is just about 7 percent, or roughly

a half of 1/7. The same applies to the relative share of private sector in industry which now constitutes about 40 percent of the total (rather than 25 percent). Another controversial issue is the arbitrary weight and the vagueness of the consumer sentiment index.

The original formula of GSI, presented in May 1993, included industry, agriculture and households, the only three sectors then covered by the RIED surveys.[1)] Construction and trade were included later, after starting the respective surveys.

In June 1993, during the OECD and EEC workshop on qualitative business surveys in Poznań, this author presented some alternative concepts of an economic sentiment indicator for Poland based on the RIED survey data.[2)] This did not however affect the practice by which general qualitative indicator was calculated by the RIED.

The RIED GSI has been compiled since October 1992 though for the first year it covered industry, agriculture and households only. All the sectoral surveys, except for industry, yield quarterly data which are interpolated in order to calculate a monthly GSI estimate. As the result of interpolation and some deliberate smoothing made on the sectoral survey data, the GSI curve looks pretty smooth.

For the needs of this research, the original RIED general business indicator series compiled by K. Stanek[3)] was updated and slightly revised by this author. To facilitate visual comparison with our quantitative indicator, the original RIED data (in terms of net reply balance) have been transformed into an index by adding 100 to any figure and taking last quarter of 1992 average = 100. In our database this series was denoted GSI2 and coded as variable 098. So it appears on graphs.

3. Quantitative Indicator

The actual movement of the aggregate national product is represented here by GCI, a synthetic indicator of total output based on available statistical data. Unlike the RIED qualitative indicator, this index relies entirely on quantitative data compiled (not interpolated) on a monthly basis. The index has been developed by this author as the reference series for the construction of composite leading indicators for Poland, based on both quantitative and qualitative data. The concept of GCI and the way it was compiled have been widely discussed in another publication.[4)]

GCI is a weighted average of indices showing the output volumes in 5 major sectors of economy: 1) industry, 2) construction, 3) agriculture, 4)

transport, 5) trade. For industry and construction, activity levels are represented by the production volume. For transport, the index is based on the volume of freight transports. For trade, it is the volume index of retail sales. For agriculture, we developed a synthetic index of market production based on the procurement volume of basic agricultural products: cereal grains, slaughter animals, and cow milk (one of the versions also includes procurement of potatoes).

Sectoral indicators entering the GCI formula have been normalized as volume indices 1992 = 100. In the GCI version used here they were weighted by the yearly shares of the respective sectors in GDP (by 1989, in gross material product). The resulting GCI index provides quite a representative picture of the month-by-month movement of gross material product until 1989, the last year for which the material product system was applied in the national accounts of Poland; for the period 1975-1989 it covered 80-85% of gross material product. Since 1990 Poland's national accounts (still available on a yearly base only) are calculated in accordance with the SNA standards and the basic figure is GDP which includes non-material services. Due to the lack of monthly data our GCI does not include the service sector except for transport and trade. With the rapid rise of the service sector its representativeness has been considerably reduced. Nevertheless, it still covers about 60% of GDP, so it may be accepted as a good approximation to the movement in total national output.

In order to improve the quality of this indicator, we developed a set of 25 versions of GCI differing in coverage an in some technical details. The version used here has been coded as GCI2DU and it is represented in our database by the variable 090U. For the period 1975-1982 it covered industry, construction, agriculture and transport and since 1983 it also covers domestic trade.

In order to identify the cyclical movement of the economy, all the experimental versions of GCI time series have been decomposed into four components of dynamics: (a) seasonal movements, (b) irregular movements, (c) cyclical change, (d) trend. The split into (a), (b) and (c) + (d) was made by means of X11-ARIMA and the split between (c) and (d) with the OECD PAT program. Statistical properties of our GCI ARIMA model are good enough (R^2 =0.91, and QCS = 0.60 as compared to the critical value of 1.00) to use it both in historical analysis and for 1-year extrapolative forecasts. These procedures allowed us to reconstruct cyclical development of the Polish economy in the period since 1975 till now. All our GCI's reveal very well pronounced business cycles which had already been present at times of the centrally planned economic system and which grew in intensity with the transformation into an

open market economy. The analysis of those cycles has been presented in the quoted publication.

The ARIMA models applied to our GSI's also provided us with the capacity to generate one-year forecasts for the Polish economy month by month. For the last 3 years our historical forecasts proved quite plausible, with mean error below 5 percent.

4. The results

RIED's general business indicator GSI2 for the period October 1992 - March 1996 based on survey data has been confronted with our own composite indicator GCI2DU based on statistical data.

Graphs 1, 2 and 3 show the qualitative index GSI2 confronted with our quantitative reference index GCI2DU. The latter was filled with: (a) rough data, (b) seasonally adjusted data, (c) MCD (5-month moving average) smoothed data. Both indicators move more or less together, though they do not seem to be correlated very perfectly.

This impression is supported by the results of cross-correlation. For rough data, cross-correlation function is quite flat, reaching its maximum of 0.419 at lag 13 (GSI leading). For deseasonalized GCI the lead is reduced to 9 months but the correlation coefficient 0.429 remains rather low. With GCI smoothed by the MCD moving average (which removes irregular movements), the lead practically disappears with the maximum correlation coefficient of 0.429.

Table 1

Cross correlation results

1st Variable	2nd Variable	Lead (-) Lag (+)	Correlation Coefficient	Standard Error
GSI	GCI rough data	-13	0.419	0.186
GSI	GCI seas. adj.	-9	0.429	0.174
GSI	GCI MCD smoothed	0	0.429	0.154

FIG. 1
GSI2 AND GCI2DU

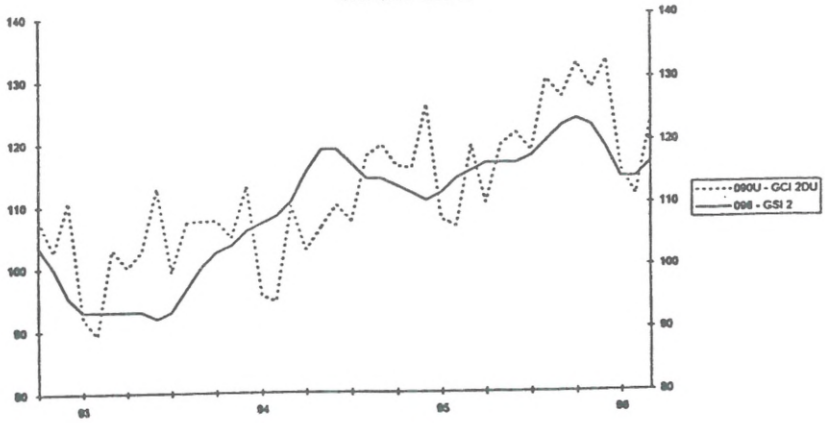


FIG. 2
GSI2 AND GCI2DU SAS (SEAS ADJ.)

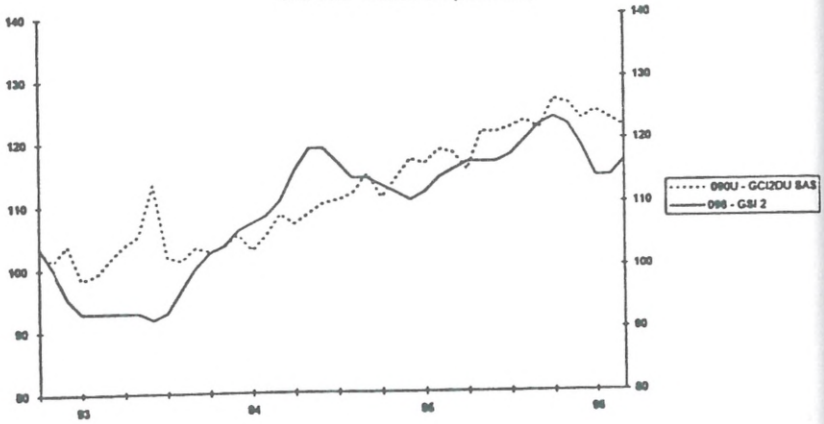
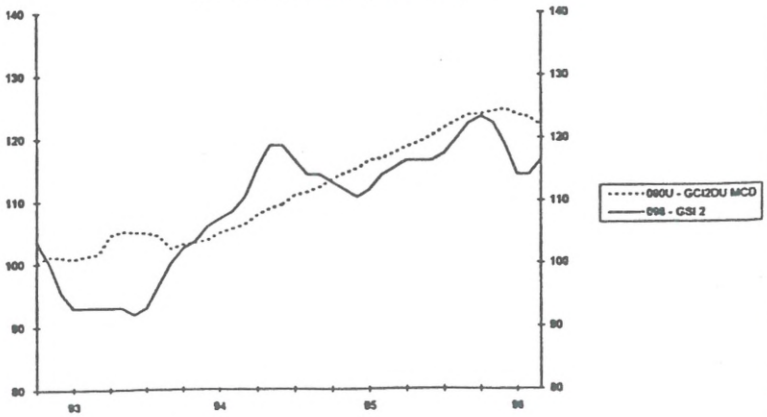


FIG. 3
GSI2 AND GCI2DU MCD (5-MONTH M.A.)



Conclusion

Assuming that our GCI correctly represents the actual movement of the aggregate economic activity in Poland, the RIED general qualitative indicator does not perform very well in monitoring real changes in the economy. The divergence between both indicators is quite large and the observed leads are not persistent, depending on forms in which the reference data are expressed. The examination will be repeated with detrended series as to assure that cross-correlation is not biased by any trend. Long leads ranging between 9 and 13 months are not much reliable and they cannot be justified by the contents of the underlaying survey data. All in all, the existing RIED's general indicator based on survey data does not seem to be of immediate use in our search for a general leading indicator.

This however does not preclude the chance that we arrive at a better fit with a stable and shorter lead by experimenting with some modified GSI formulas based on the same source of data. On the other hand, the period covered by the RIED general indicator is too short to pass any definite judgements on its usefulness and quality in monitoring and forecasting the actual developments in general business activity.

Though direct comparison of two composite indicators of general business activity based on qualitative and quantative data does not as yet prove their univocal conformity, some partial qualitative indicators available from the RIED survey data are very well correlated with our general quantitative index and some of them do even reveal certain leading properties. This is, for instance, the case of industrial production appraisal, future industrial tendency and general business indicator for industry taken from the RIED surveys. In particular, we have obtained very high cross-correlation between our GCI2 and RIED's industrial production appraisal with 4-month lag (the latter leading) on the MCD-smoothed and detrended time series beginning in September 1986. Some of the RIED's series will surely be included in our composite leading indicator based on qualitative and quantitative data.

Bibliography

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[4]Z. Matkowski, *Ogólny wskaźnik koniunktury dla gospodarki polskiej* (General Indicator of Business Activity for Poland), „Ekonomista" 1996, No. 1.