

# Cyclical processes in the Polish economy

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## Summary

The research concerns the analysis of the economic activity in Poland using three methods: structural time series models, a band-pass filter and Markov-switching models with fixed and time-varying transition probabilities of business cycle phases.

Various econometric tools together with accurately chosen economic activity indicators were used to conduct a complete analysis of business cycle in Poland. The empirical investigation covers the extraction of the business cycle components, turning points dating and identification of the stylized facts of business cycle in Poland since 1995 and can be concluded, that the business cycle characteristics are similar to their counterparts in the developed economies.

Economic activity indicators for Polish economy exhibit various cyclical patterns – their fluctuations are varied in amplitude, length and turning points of the cycle. The cyclical fluctuations of construction, transportation and trade are dissimilar to those of gross value added. The economic activity in transportation appears to be leading the fluctuations of gross value added, whereas the activity in construction appears to be lagging those fluctuations. It seems the industry and construction fluctuations are responsible for the variation of gross value added. Manufacturing fluctuations, especially of capital and intermediate goods, are responsible for the variation of industry.

Capital goods, intermediate goods and energy cycle phases are asymmetric – the slowdown lasts shorter and has higher amplitude than expansion. The production of non-durable consumer goods, energy and production of electric power are the most desynchronized with the industry fluctuations. Production of electric power leads industrial production and it may be treated as an early warning indicator of economic activity, albeit with some caution.

It appears that early signals of economic contraction are reflected first by the production of electric power, then by the slowdown in transportation, followed by weakening

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in industrial production, especially in enterprise demand for capital and intermediate goods. Finally, a contraction in construction may occur.

The cyclical processes of Polish economic activity are determined by overlapping higher frequency fluctuations (3-4 years), longer cycles of 8.5 years and the longest cycles (even 10 years) in construction. The shortest fluctuations of 1.5-2 years also play a significant role. Four cycles occurred between 1996 and 2011. The economic activity in Poland did not resist the 2008 financial crisis. The biggest changes occurred in economic activity of construction, capital and intermediate goods and for most sectors were reflected in the longest cycles. After the crisis, the correlation between almost all sectors and reference series fell, reflecting the growth in amplitudes.

In the course of the analysis, conclusions about econometric tools were also drawn. The CF filter and UC model are applied to deviation cycles, whereas the Markov-switching model is applied to growth rate cycles. Although the methods concerning the deviation cycles can be treated as substitutable, finding the starting values for optimizing the UC model is far more demanding than using the CF filter. The conclusions about the business cycle drawn on the basis of the Markov-switching model are mostly the same as for the deviation cycles, although the measures of economic indicators are different (the growth rates). The benefits of the Markov-switching models are the probabilities of being in a specific cycle phase, making these models a useful econometric tool for analyzing current economic activity. In the TVTP model it is assumed that the transition probabilities could be duration-dependent or could vary over time along with a composite leading indicator. In the first case, business cycle in Poland does not exhibit duration dependence. In the second case, the composite leading indicator is statistically significant in explaining the changes of transition probabilities and can be useful for forecasting the end of slowdown of intermediate goods production and end of expansion of electric power production.

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