The cyclical processes of Polish economic activity

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Summary

The business cycle refers to fluctuations of economic activity occurring around a long-term trend, that recur every 1.5-10 years and are irregular in length and amplitude.

The aim of the conducted analysis is a description of the business cycle in Poland on the basis of sectoral indicators of economic activity using Christiano – Fitzgerald band pass filter and unobserved components model. The database included quarterly time series: gross value added, construction, transportation and storage, trade and repair of motor vehicles and monthly indicators: sold production of industry, manufacturing, durable consumer goods, non-durable consumer goods, capital goods, intermediate goods, energy and production of electric power. The quarterly data ranged from IQ 1995 to IVQ 2011, excluding transportation and storage and trade and repair of motor vehicles – the last observation was IIIQ 2011. The sample of monthly data included the period from January 1995 to January 2012.

The cycles of gross value added and industrial production were the reference series to the cycles of other economic activity indicators. The graph analysis showed that the cyclical fluctuations of gross value added and industrial production measured within two mentioned methods are quite similar.

Within the years 1995-2012 there were revealed 4 cycles of value added and industrial production fluctuations lasting approximately 3-4 years. In the industry the cycles of 6-7 years play also a crucial role (see Skrzypczyński 2008, Gradzewicz *et al.* 2010). During 1995 to 1999 there occurred two economic activity slowdowns compared to one in the industry. In 1993- 2003 the downturn of industrial production was shorter. Between 2008 to 2012 there was one extra cycle in the industry in 2009. Industrial production turning points are similar to earlier research (see Adamowicz *et al*. 2008, Gradzewicz i in. 2010, Skrzypczyńska 2011). In the industry the slowdown lasted shorter than expansion conversely to value added. The downturn in the industry lasted on average 1.5 years in comparison with about 2 years for the value added.

A comprehensive view of business cycle gave the analysis of cyclical components within sectors of the economy. From the sectoral perspective, similarly to value added and

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industrial production, the business cycle measures estimated from CF filter and unobserved components model are alike.

Taking into account the determined turning points and the other characteristic of cyclical components, it can be concluded, that construction, transportation and trade exibit different cyclical pattern compared to gross value added. Construction is the sector of the lowest periodicity of cycles. During 1995-2011 there were three cycles, that lasted about 5 years. Transportation is asymmetric both in length and amplitude of cycle phases. Fluctuations of trade are the most similar to gross value added deviations, whereas the amplitudes in construction and transportation are larger. The economic activity of these sectors seems to be invulnerable to external shocks – the Russian crisis and the UE accession. It seems that cyclical fluctuations of value added are determined by industry, which activity is driven by manufacturing. The volatility of non-durable consumer goods, energy and production of electric power differs from fluctuations in the industry. Among sectors being analysed compared to economic activity in the industry, the non-durable consumer goods have the lowest periodicity, whereas energy and the production of electric power have the highest. Moreover, capital goods have the highest amplitude, whereas production of electric power has the lowest. Production of electric power is symmetric both in length and amplitude of cycle phase.

The additional source of knowledge about volatility of cycles among sectors is the identification of dominating cycles, that can be conducted on the basis on periodogram of cyclical components. Construction, transportation, non-durable consumer goods, capital goods, energy and production of electric power exibit different cyclical pattern in comparison with other sectors – among dominating cycles are these lasting about 2.5 years and energy has also additional cycle of 5.5 years. Variability of gross value added, construction, trade, transportation, non-durable consumer goods, capital goods and production of electric power is foremost driven by longer cycles of 8.5 years, especially construction by cycles over 10 years, subsequently medium length cycles (3-4 years). For all sectors also the short-term fluctuations play a significant role.

To formulate the lead and lag structure of sectoral cyclical components and its equivalent to gross value added the cross-correlations were calculated. The results are vulnerable to the method of measurement of cyclical component. It can be concluded cautiously that the economic activity in transportation leads the fluctuations of gross value added and the production of electric power leads industrial production. The highest cross-correlation with the industrial production is revealed for manufacturing, intermediate and

capital goods, whereas the lowest relation is with non-durable consumer goods, energy and production of electric power.

To sum up, economic activity indicators for Polish economy exibit various cyclical patterns – their fluctuations are different in the amplitude, length of cycle and turning points. It seems the industry fluctuations are responsible for the variation of gross value added. The production of non-durable consumer goods, energy and production of electric power are relatively the most desynchronized compared to industry. However the cyclical processes of Polish economic activity are determined by overlapping higher frequency fluctuations (3-4 years), longer cycles of 8.5 years and fluctuations over 10 years specific to construction. In 1995-2011 occurred 4 cycles.

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