Transitional Dynamics and Business Cycle Phases in Poland

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Summary

Hamilton's (1989) Markov switching model assumes the transition probabilities between business cycle phases and expected duration of each phase are constant over time. Filardo (1994) extended Hamilton's model by time-varying state transition probabilities. He allowed these probabilities to evolve as logistic functions of observable economic fundamentals. Durland, McCurdy (1994) assumed the transition probabilities can be duration dependent.

The aim of the analysis is modeling of business cycle in Poland since the beginning of 1995 to September 2011 on the basis of quarterly real GDP and monthly production in manufacturing using time-varying transition probabilities (TVTP) Markov switching model. It was checked if the state transition probabilities vary over time together with the evolution of Composite Leading Indicator published by OECD and if business cycle phases in Poland are duration dependent.

As a benchmark there were firstly estimated Markov switching autoregressive models with fixed transition probabilities (FTP) with two states: upturn and downturn of economic growth. The best performance was revealed for FTP AR(1) and AR(2) on the basis of first differencies of natural logarithm for real GDP and production in manufacturing respectively. Afterward the business cycle dating was conducted. The moment in time was assigned to the slowdown phase if the probability of being in a slowdown were greater than 0,1. On the contrary it was assigned to be in expansion. What is more it was assumed every cycle phase should last more than two quarters.

On the basis of these results the duration variable was constructed and TVTP model was estimated. The duration variable took for example the value 1 if the peak/trough was last period, while if the peak/trough was 5 periods ago, the duration variable would take the value 5. To improve estimation the values of duration variable were arbitrarily restricted to some maximal value D*. The likelihood–ratio test with the null hypothesis of no time variation in the transition probabilities did not accept the FTP model for both GPD and production in manufacturing, but the parameters by the duration variable were statistically insignificant. It

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means that both for GDP and production in manufacturing the phase duration is not important in predicting the end of downturn and upturn as well.

The TVTP model was also estimated under the assumption the state transition probabilities change over time together with the evolution of economic fundamentals represented by composite leading indicator. Likelihood-ratio test supported the importance of time-varying state transition probabilities for GDP and production in manufacturing. Signs of two coefficients of interest should be opposite (negative for downturn and positive for upturn), only then the interpretation that the state transition probabilities change together with fluctuations of composite leading indicator is obvious. For example when the leading indicator grows the probability of being in the upturn increases. For GDP the coefficients were not of opposite signs, that made the results difficult to interpret. In TVTP model for production in manufacturing coefficient had opposite signs, but the parameter for downturn were not significant.

References:

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