

# **Business Cycle Coherence between the Euro Area and the EU New Member States: a Time-Frequency Analysis**

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## NON-TECHNICAL SUMMARY

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Most economic time series exhibit non-regular cyclical patterns. This bears important consequences for economic environment people are faced with (for example due to changing employment opportunities) and therefore also for economic policy (such as fiscal and monetary policies). It is therefore by no means surprising that study on the characteristics of the business cycles has been at the core of macroeconomic research for many decades now.

Not only is cyclicity of economic environment within a particular country important, but the linkages between the cycles in different countries and regions also have consequences for economic policies and wellbeing of populations. This issue becomes particularly topical in integrated economic blocks such as the European Union and in particular the euro area. In case of the latter, the single monetary policy for the whole block implies that non-synchronicity of economic conditions in the member states would result in suboptimal impact of joint monetary policy on particular countries. Since the new EU member states are legally obliged to join the euro area at some point (indeed one country – Slovenia has already done that) it is important to know how synchronised the businesses cycles in the NMS and the euro area are.

There exists large literature looking at these issues using a variety of techniques, usually from the time-domain. Another strand of literature looks at similar questions using the frequency domain analysis and yet another group of papers – less numerous – applies the time-frequency domain approach. This is what we do in our paper. The time-varying spectral analysis of economic series

provides an interesting perspective on some of the well established topics such as business cycles co-movement studied in our paper, despite limitations that are a natural feature of any possible approach.

The data we use are quarterly GDP growth rates for the euro area and a number of NMS. We are then using statistical techniques (applying Kalman filter to fit a time-varying autoregressive (AR) model to GDP growth series) to obtain estimates of momentary spectra.

The evolution of spectral shapes of economic growth series in NMS do exhibit similar dynamics and diversity as observed in the other EU countries and the US. Cycles lasting between 3 and 8 years as well as yet longer cycles are dominant driving forces in the dynamics of GDP growth, although there is substantial heterogeneity between countries.

The estimated coherences between GDP growth series in the euro and NMS economies enable observing the structure of the relationship between the series, i.e. frequencies at which the relationship is the strongest and frequencies characterized by a weak linkages and evolution of these relationships over time. The results suggest a relatively weak relationship as far as longer cycles (lasting 3 years and more) are concerned. In almost all analysed countries the maximum strength of the relationship was identified for economic cycles lasting between 4 and 7 quarters. Importantly, this range broadly coincides with the typical horizon of monetary policy. In other words, the results could be seen as providing some support to the view that NMS economies have already achieved substantial convergence with the euro area in the sphere which is most important from the perspective of effects of a common monetary policy on the economies of the (future enlarged) euro area.