Estimating output gap in multivariate state space models Super-hysteresis and further empirical evidence

Tamás Mellár and Kristóf Németh

Reliable estimates of the cyclic component of real GDP, i.e. the output gap, are of particular importance for macroeconomic policy. Yet it should be remembered that different output estimates sometimes show significantly different or even opposing pictures of the business cycle. Moreover, estimates are typically revised by changing or expanding the sample range. This paper presents several possible ways to estimate the output gap, highlighting the role of multivariate approaches. The authors examine how different estimates derived from multivariate state space models can be used to assess the cyclical position of the Hungarian economy. As expected, estimation results may sometimes show marked differences in the state of the business cycle. As the complex, multivariate nature of the macroeconomic equilibrium is interpreted differently in each model, comparing different output gap estimates may move towards a broader understanding of which factors support or hamper the potential growth in the Hungarian economy. The results presented in the study allow for three main conclusions: (i) The positive gap did not build up primarily in the years just before the Great Recession, but in the period early 2004 to the end of 2006. (ii) By the end of 2016, the negative output gap had probably closed. (iii) After the Great Recession, potential growth in the Hungarian economy was permanently and significantly reduced and the earlier annual growth rate of 4 per cent almost halved.

Wage forecasts – predictors and lessons

Olga Takács and János Vincze

The paper investigates the Hungarian "wage equation" using data-mining techniques. The first is CART (Classification and Regression Trees) methodology, which usually yields clearly interpretable results. Though the technique is fundamentally "predictive", the authors formulate certain substantive guesses about wage formation in Hungary in 2015. They then check the robustness of their findings with the "random forest" algorithm, which is seen as superior to CART as a predictive device, but is less amenable to separation of the effects of individual variables.

Pál Pató-style modelling. Irrationality in inter-temporal decision-making

Helga Habis and Laura Perge

Many people sit on their hands like the politician in a satirical 1847 poem by Sándor Petőfi, but *Homo economicus* is rational. This study describes how irrationality, in

terms of classical economic theory, can be modelled by agents' non-standard time preferences. It shows how agents who follow self-interest and maximize utility after time has passed may in the interval change their minds. This is also referred to as time inconsistency in decision-making. A naive decision-maker is introduced: such agents re-optimize in every period, which may bring about procrastination. On the alternative side, the authors describe sophisticated decision-makers who realize the possibilities for procrastination and the consequences of doing so, and try to avoid such behaviour, for instance by finishing way before the deadline. It is shown that both behavioural paths can be modelled by incorporating the same hyperbolic discounting formula, although the naive only proceed in a forward-thinking way, while the sophisticated apply a kind of reverse induction.

Some ideas on ranking rules in association football in the light of the European qualifiers for the 2018 world championship

László Csató and Dóra Gréta Petróczy

We discuss the ranking rules applied in association football. It is shown that the European qualifiers to the 2018 FIFA World Cup can be manipulated: it was possible even in October 2017, after four-fifths of all matches have already been played, that a team would be eliminated if it would win in the last matchday of group stage, but it would advance to play-offs by playing a draw, provided that all other results do not change. Eight further incentive incompatible qualifiers to recent UEFA European Championships and FIFA World Cups are identified and a strategy-proof mechanism is suggested for the design of similar qualifications. Another incentive incompatible rule and some controversial matches are also presented. This way we want to persuade sport governing bodies that an axiomatic analysis of ranking rules is essential in order to avoid possible scandals.

Uber and taxi firms side by side. The "Ublyft" business model with traditional price discrimination

Éva Berde

The paper offers an overview of the business-model concept used by Uber, Lyft and similar technology platforms that allow customers to arrange and schedule their transportation. It presents the causes that resulted ultimately in this business model. Such "Ublyft" technology platforms refer to similar features in the companies working in this field. The author shows how different actors maintain different views on the new entrants into the transportation market. The new multi-tiered commission structure is analysed as a type of second-degree price discrimination, allowing "Ublyft" to make more profit. It is shown how the Court of Justice of the European Union ruled out the "non-regulatory situation" for Uber and changed it exactly to the terms on which traditional taxi firms are regulated. Finally there is discussion of the possible future paths for the ride-hailing transportation industry.