

Structural Change in the European Agricultural Sector – A Markov Chain Analysis

Objective

General economic developments as well as recent fundamental changes in the Common Agricultural Policy will likely impact significantly on the European farm structure. Although a decline of total farm numbers continues to be the general observation, important differences occur across regions and farm types. These differentiated developments and their determinants are of high relevance for policy impact assessment at the regional level.

The main objectives of the work are to forecast future farm numbers in certain typologies (stratification criteria: economic size and specialisation) at regional level for the EU-15 Member States and to identify the drivers of structural change within these regions as well as the determinants which contribute to different structural developments between regions.

Theoretical Background and Methodology

As methodological approach a Markov chain analysis is chosen where the development of farm numbers in certain typologies in the past is used to derive a transition pattern which is then used to predict future farm numbers in these typologies. Transition probabilities which represent the likelihood for a farm to move to another farm type within a given time period are calculated for each farm type and region. In the envisaged non-stationary Markov chain analysis further explanatory variables in addition to the number of farms in past time periods can be incorporated. Variables which are supposed to affect the process under study are macro- and microeconomic factors like the unemployment rate of a region, prices, farm profits etc.

Research progress

1. Thorough literature review where among other methodologies the Markov chain concept and its application in the agricultural economics literature is described in detail and an overview is given of potential factors contributing to structural change.¹
2. Descriptive analysis of farm number developments in European regions.
3. Least-squares estimations of stationary Markov chains allowing for transitions between size classes within the different specialisation classes.²
4. Cross-entropy estimations of stationary Markov chains comprising transitions between all 31 farm types (3 size x 10 specialisation classes plus entry/exit) for EU15 FADN regions.
5. Cross-regional non-stationary Markov chain analysis for German FADN farms using a combination of a cross-entropy and multinomial logit estimation procedure.

Further work is devoted to methodological refinements and the incorporation of more advanced explanatory variables.

¹ Zimmermann, A., Heckeley, T., Pérez, I. (2006): Working Paper - Literature Review of Approaches to Estimate Structural Change. SEAMLESS Report No. 16, SEAMLESS Integrated Project, EU 6th Framework Programme, Contract No. 010036-2. http://www.seamless-ip.org/Reports/Report_16_PD3.6.6.pdf

² Zimmermann, A., Heckeley, T., Adenäuer, M. (2007): Report and Code to Simulate Structural Change. SEAMLESS Report No. 31, SEAMLESS Integrated Project, EU 6th Framework Programme, Contract No. 010036-2. http://www.seamless-ip.org/Reports/Report_31_PD3.6.10.pdf