

ABSTRACT

Building and evaluating the Probabilistic Inflation Forecasting Expert System (PIFES)

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The focal point of this thesis is the creation and evaluation of a Probabilistic Inflation Forecasting Expert System, which is abbreviated as PIFES. This expert system uses the method of Maximum Entropy to estimate the probabilities of inflation scenarios. PIFES is inspired by a medical expert system (LEXMED), which successfully assists physicians to predict the likelihood of acute appendicitis. Two hypotheses are put forward in the work. The first hypothesis claims that PIFES can be created by analogy to LEXMED, whereas the second hypothesis claims that PIFES will allow to analyse new insights between economic variables. Economics and medicine differ in various senses, which makes it impossible to transfer LEXMED's approach one-to-one. Therefore, this thesis will initially examine the differences between economics and medicine. Based on this, a procedure is proposed to create probabilistic expert systems for economic applications. This is subsequently used as a blueprint to create PIFES. Once the probabilistic expert system is functional, PIFES' ability to forecast inflation is evaluated. Over 40 different versions of PIFES are created for this, and the predictions are tested on the period 1976 to 2018 during a (pseudo) out of sample forecast scenario. PIFES' forecasts are benchmarked against forecasts obtained from ordinary least square regression techniques as well as neural networks. PIFES displays robust and comparable results. The ability to construct PIFES in itself justifies the first hypothesis. Furthermore, the means by which the probabilistic expert system generated by PIFES can be used to analyse inflation scenarios is effectively demonstrated. This is tantamount to the possibility of analysing the interrelationships of economic variables. Therefore, the second hypothesis is also accepted. There are several ways to improve PIFES. Further research possibilities in this field will be presented in a structured way at the end of the thesis.

Keywords: inflation, expert system, principle of Maximum Entropy