Semantic Analysis of the Central Bank of the Republic of Turkey Communication Reports and Forecasting Model with LSTM

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Abstract:

In this research, a statistical system is designed to understand, interpret, and quantify the reports issued by the Central Bank of the Republic of Turkey (CBRT), an institution that drives expectations and shapes the market to all agents are related to them. The corpora constituted with these reports are CBRT's summaries of monetary policy committee meetings (SMPCM hereafter) published as official press releases. Except for the period after 2017, SMPCMs are published by the CBRT monthly in both Turkish and English; the latter is the language preferred to be utilized in this article. SMPCMs have three parts: inflation developments (IFD), factors affecting inflation (FAI), monetary policy, and risks (MPR). The graphical representation of items counted and words used as descriptives shows the CBRT rippled together with business cycles; the CBRT uses more words, uses more items during the periods of business cycles. Later, the corpora under these three categories are evaluated according to their semantic scores. By using WordNet, the lemmas in each sentence in corpora are tagged semantically to estimate the tone of the CBRT and the whole meanings of reports. Owing to SNLP tools, sentences are scored in between -1, meaning entirely negative, and +1, meaning completely positive; later, chapter-based generalized semantic score vectors (SSV) are estimated. As results proved, semantics in chapters FAI and MPR are more sensible and accurately reflect the economic situation, in overall, it has been revealed that the CBRT communicates with the market in a tone parallel to the business cycles. In the period of recession, the CBRT preferred communication in a relatively more pessimistic tone. After obtaining semantic scores as a time series within these three categories, a Long-Short Term Memory Network is established to derive a quantitative model in order to forecast the semantic score of each SMPCM which will be issued in the near future. The LSTM model provides 93% accuracy to estimate semantic scores of SMPCMs.

Keywords: Central Banks, Semantic Analysis, LSTM Networks

JEL Codes: E58, E31, C53, C45