STABILITY OF MARKOVIAN STRUCTURE OBSERVED IN HIGH FREQUENCY FOREIGN EXCHANGE DATA

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Abstract. Contrary to the common sense in economics and financial engineering, price fluctuations at very fine level of motion exhibit various evidences against the efficient market hypothesis. We attempt to investigate this issue by studying extensive amount of foreign currency exchange data for over five years at the finest level of resolution. We specifically focus on the proposed stability in binomial conditional probabilities originally found in much smaller examples of financial time series. In order to handle very large data, we have written an efficient program in C that automatically generates those conditional probabilities. It is found that the stability is maintained for extremely large time duration that covers almost the entire period. Based on the length of conditions for which the conditional probabilities are distinguishable each other, we identify the length of memory being less than 3 movements.

Key words and phrases: Markovian structure, memory length, conditional probability, high frequency data in finance, tick data, foreign exchange rates, prediction.