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Price Jump Prediction in Limit Order Book

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A limit order book provides information on available limit order prices and their volumes. Based on these quantities, we give an empirical result on the relationship between the bid-ask liquidity balance and trade sign and we show that liquidity balance on best bid/best ask is quite informative for predicting the future market order's direction. Moreover, we define price jump as a sell (buy) market order arrival which is executed at a price which is smaller (larger) than the best bid (best ask) price at the moment just after the precedent market order arrival. Features are then extracted related to limit order volumes, limit order price gaps, market order information and limit order event information. Logistic regression is applied to predict the price jump from the limit order book's feature. LASSO logistic regression is introduced to help us make variable selection from which we are capable to highlight the importance of different features in predicting the future price jump. In order to get rid of the intraday data seasonality, the analysis is based on two separated datasets: morning dataset and afternoon dataset. Based on an analysis on forty largest French stocks of CAC40, we find that trade sign and market order size as well as the liquidity on the best bid (best ask) are consistently informative for predicting the incoming price jump.

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