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Study of a new market model: AHEAD

The AMF has published an academic research study conducted jointly by Mathieu Rosenbaum (professor and holder of the "Analytics and Models for Regulation" Chair at Ecole Polytechnique), Thibaut Mastrolia (Ecole Polytechnique), Joffrey Derchu (Ecole Polytechnique) and Philippe Guillot (AMF Markets Directorate) on an innovative model for order matching on electronic markets.

As part of its forward-looking approach, the AMF promotes research on topics involving regulation and financial markets. This study is being published in order to contribute to the debate on how price formation mechanisms of financial instruments could evolve on trading venues.

The authors' starting point stemmed from the observation that, since the process of digitalisation began almost forty years ago, technological developments have made markets increasingly complex. Speed of action has become the deciding factor for market participants. This development has gone hand in hand with the transformation of the role of market makers, who have now mainly become high-frequency trading participants. Their behaviour is highly dependent on the volatility of financial markets, as illustrated in a previous study by the AMF. In this context, alternatives to the order-driven market model have been proposed, with in particular, the organisation of periodic auctions that may be held at regular intervals or not.

The market model proposed by the authors, called Ad Hoc Electronic Auction Design (AHEAD), aims at combining the advantages of continuous limit order book electronic

markets and of periodic auctions, while being compatible with the current regulatory framework.

AHEAD's functioning can be summed up by a two-phase alternation mechanism, used as often as necessary during the trading day:

- a continuous market phase during which participants can position orders in the order book and process them at the last auction price,
- an auction phase, triggered when an order is large enough, when a market participant considers that the last auction price no longer reflects the value of the financial instrument, for instance because there is no counterparty at this price.

The key information that "there could be a price change" is thus transmitted to the market and the new price is thus the result of an auction mechanism in which all participants may decide to take part, rather than just the result of the decision to act by the fastest participant.

The study aims to establish the fundamental mathematical basis of the model and highlights a stable Nash equilibrium. By comparing AHEAD with other market models, the study also demonstrates that AHEAD is, on the whole, superior to current market models.


This new type of trading venue could be particularly attractive for small and mid-caps for which the accumulation of liquidity and the price formation process are more challenging.

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Head of publications: The Executive Director of AMF Communication Directorate. Contact: Communication Directorate – Autorité des marchés financiers 17 place de la Bourse – 75082 Paris cedex 02