High-frequency trading and regulatory policies. A tale of market stability vs. market resilience

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Over the past decades, high-frequency trading (HFT) has sharply increased in US and European markets. HFT represents a major challenge for regulatory authorities, partly because it encompasses a wide array of trading strategies (AFM (2010); SEC, 2010), and partly because of the big uncertainty yet surrounding the net benefits it has for financial markets (Lattemann *and al*. (2012); ESMA (2014); Aguilar, 2015). Furthermore, although HFT has been indicated as one potential cause of extreme events like flash crashes, no consensus has yet emerged about the fundamental causes of these extreme events. Some countries' regulations have already accounted for HFT,[1] but, so far, this has led to divergent approaches across markets and regions.

Overall, the above-mentioned open issues call for a careful design of regulatory policies that could be effective in mitigating the negative effects of HFT and in hindering flash crashes and/or dampening their impact on markets. On these grounds, in a new research paper published in the *Journal of Economic Behavior* and Organization we contribute to the debate about the regulatory responses to flash crashes and to the potential negative externalities of HFT by studying the impact of a set of policy measures in an agent-based model (ABM) where flash crashes emerge endogenously. To this end, we extend the ABM developed in Jacob Leal *et al*. (2016) to allow for endogenous orders' cancellation by high-frequency (HF) traders, and we then use the model as a test-bed for a number of policy interventions directed towards HFT. This model is particularly well-suited and relevant in this case because, differently from existing works (*e.g.,* Brewer *et al*, 2013), it is able to endogenously generate flash crashes as the result of the interactions between low- and high-frequency traders. Moreover, compared to the existing literature, we consider a broader set of policies, also of various natures. The list includes market design policies (circuit breakers) as well as command-and-control (minimum-resting times) and market-based (cancellation fees, financial transaction tax) measures.

After checking the ability of the model to reproduce the main stylized facts of financial markets, we run extensive Monte-Carlo experiments to test the effectiveness of the above set of policies which have been proposed and implemented both in Europe and in the US to curb HFT and to prevent flash crashes.

Computer simulations show that slowing down high-frequency traders, by preventing them from frequently and rapidly cancelling their orders, with the introduction of either minimum resting times or cancellation fees, has beneficial effects on market volatility and on the occurrence of flash crashes. Also discouraging HFT via the introduction of a financial transaction tax produces similar outcomes (although the magnitude of the effects is smaller). All these policies impose a speed limit on trading and are valid tools to cope with volatility and the occurrence of flash crashes. This finding confirms the conjectures in Haldane (2011) about the need of tackling the “race to zero” of HF traders in order to improve financial stability. At the same time, we find that all these policies imply a longer duration of flash crashes, and thus a slower price recovery to normal levels. Furthermore, the results regarding the implementation of circuit breakers are mixed. On the one hand, the introduction of an ex-ante circuit breaker markedly reduces price volatility and completely removes flash crashes. This is merely explained by the fact that this type of regulatory design precludes the huge price drop, source of the flash crash. On the other hand, ex-post circuit breakers do not have any particular effect on market volatility, nor on the number of flash crashes. Moreover, they increase the duration of flash crashes.

To sum up, our results indicate the presence of a fundamental trade-off characterizing HFT-targeted policies, namely one between market stability and market resilience. Policies that improve market stability – in terms of lower volatility and incidence of flash crashes – also imply a deterioration of market resilience – in terms of lower ability of the market price to quickly recover after a crash. This trade-off is explained by the dual role that HFT plays in the flash crash dynamics of our model. On the one hand, HFT is the source of flash crashes by occasionally creating large bid-ask spreads and concentrating orders on the sell side of the book. On the other hand, HFT plays a positive role in the recovery from the crash by contributing to quickly restore liquidity.

[1] Some unprecedented actions and investigations by local regulators were widely reported in the press (Le Figaro, 2011; Les Echos, 2011; 2014; Le Monde, 2013; Le Point, 2015).