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News release

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The race to zero - Speech by Andrew Haldane

In a speech at the International Economic Association Sixteenth World Congress in Beijing, Andrew Haldane - Executive Director for Financial Stability and member of the interim Financial Policy Committee - outlines how dramatic shifts in the structure and speed of trading have increased abnormalities in the pricing of securities. This new topology of trading has potentially increased systemic risk. He then discusses several policy options to manage the impact of these developments on market dynamics.

The driving forces of change have been trading structure and trading speed. Changes in the structure of trading lay in two key regulatory changes: the 2005 Regulation NMS (National Market System) in the US and the European MiFID (Markets in Financial Instruments Directive) in 2004. These aimed to increase competition in, and attract new entrants to, the trading landscape. They effectively ended the central trading exchanges' 300-year monopoly over trading activity, ushering in ".a diverse and distributed patchwork of exchanges and multilateral trading platforms." with a diverse range of execution characteristics.

As regards speed, High Frequency Trading (HFT) has become a dominant force in a number of financial markets. This has partly been a response to exchange fragmentation. HFT has increased dramatically turnover in, and lowered dramatically the duration of, security holdings. New trade technologies have progressively raised the speed limit for trading. Today, this is measured in micro-seconds - millionths of a second. Tomorrow, it may be measured in nano-seconds - billionths of a second. There is effectively a 'race to zero' among trading technologists, as market advantage lies in being the fastest.

The effects of these developments on market dynamics are in some respects positive. Increased competition and HFT liquidity provision have lowered bid-ask spreads in markets, in some cases by an order of magnitude. But these effects are not entirely benign. There is evidence of increased volatility and correlation across markets since 2005. And fatter tails and greater persistence in prices than the efficient market hypothesis would imply. Moreover, these market abnormalities are occurring at ever-higher frequencies.

Andrew Haldane develops a framework to understand these effects. This uses a line of thinking owing to Benoît Mandelbrot, architect of fractal geometry. Mandelbrot posited that stock price changes are better understood when looked at in volume time rather than in clock time. As ever-larger volumes have been

crammed into ever-smaller time parcels, the result may have been increasing abnormalities in prices when measured in clock time.

The cause of dislocations in price may be the disappearance of liquidity in situations of stress. Andrew Haldane argues that the advent of HFT and fragmentation may have made this more likely, with HFT firms more inclined to withdraw liquidity. Meanwhile, longer-term investors may be either unable or unwilling to fill the liquidity gap because HFT activity makes this unprofitable or risky. The result is a potential double liquidity void and a greater dislocation of prices at times of stress. Many of these features were evident during the so called "Flash Crash" of 6 May 2010 with HFT ".adding liquidity during a monsoon and absorbing it during a drought".

Andrew Haldane states that the new topology of trading makes it more likely such price dislocations will be transmitted between cash and futures markets, between different exchanges and trading platforms and across stocks. In other words, high-frequency, localised price disturbances could be magnified across time, markets and assets - as Mandelbrot, too, would have predicted. The upshot, he argues, is a latter-day "tragedy of the commons": the competitive race to zero risks amplifying pricing abnormalities in a way which benefits no-one.

The rapidly adapting topology of trading poses a challenging set of questions for policymakers. One task is to try to better understand, and potentially predict, systemic fault-lines in the trading infrastructure. New data will soon come on stream to better enable that risk-mapping. Many of the techniques for analysing those data already exist in other large-scale complex systems, such as weather and satellite systems.

A second task is to rethink the design of trading infrastructures. Regulators in the US and Europe are in the process of doing that. One proposal is to require a commitment by market-makers to provide liquidity, whatever the state of the market. The difficulty appears to be in specifying these commitments in a precise enough fashion to make them credible.

Circuit-breakers are a second potential solution. They already exist on US and European exchanges. By calling a halt to trading, circuit-breakers provide a means of establishing a level informational playing field for all traders. The changing landscape of trading, both in speed and structure, has strengthened the case for such circuit-breakers. To be effective, however, they need to span all trading exchanges and platforms, as has recently been done in the US.

A more ambitious proposal still would be to impose a speed limit on trades at all times - so-called minimum resting periods. This would forestall the race to zero. It would do so by raising bid-ask spreads on average. But it would also potentially make them less variable, especially in situations of stress, improving the resilience of liquidity. In other words, there is a potential trade-off between market efficiency and stability. Historically, the regulatory skew has perhaps been towards the former objective. The new topology of trading

means it may be time for that to change. As Andrew Haldane concludes: "Grit in the wheels, like grit on the roads, could help forestall the next crash".

Key Resources

The race to zero – Full speech