



BANK OF ENGLAND

Speech

Where next for fixed income markets: Thriving in a world of change

Speech given by
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Centuries of innovation

The United Kingdom is home to one of the oldest financial centres in the world. Starting from within the confines of London's square mile – The Square Mile – but now spread widely around the country, the United Kingdom has also become one of the world's leading financial centres. In doing so it has been central to centuries of innovation and evolution in the financial system.

The Bank of England's first foray into fixed income markets came at its inception, in 1694, when it raised £1.2m over 12 days, in order to lend to the government. This was an innovative way for the government of the time to fund a war effort. But the original Royal Charter explained that the Bank was founded to 'promote the public Good and Benefit of our People'. That aspect of the Bank's mission has remained timeless, even as the financial system has radically changed. That the Bank today can deliver its mission is testament to how it has also innovated and evolved alongside financial markets and their participants.

If it feels like financial market participants must constantly adapt in order to thrive, then it would be helpful to know we are not alone in this experience. It brings to mind the 'Red Queen hypothesis', which arose as the academic field of evolutionary biology drew on the literature of Lewis Carroll. This idea was originally proposed by US academic Leigh Van Valen. It posits that organisms that survive in a constantly changing environment have themselves adapted and evolved. In Lewis Carroll's book 'Through the Looking Glass', the Red Queen warns Alice that it "takes all the running you can do, to keep in the same place. If you want to get somewhere else, you must run at least twice as fast as that." No doubt some of you can identify with that as you consider how the City has changed over your careers, arguably innovating more rapidly than ever before.

The Bank of England innovated in 1725 with the introduction of printed bank notes – moving away from the handwritten ones.¹ In the 19th century its lender-of-last-resort operations were novel and groundbreaking. More recently, operational independence to set monetary policy and the new responsibilities for macro-prudential regulation have significantly changed the shape of the Bank.

As we meet today at the London Stock Exchange (LSE) it is worth reflecting on how exchanges have evolved. Not least because the LSE now has 14,500 listed debt securities and is hosting a fixed income forum! When the Bank was founded in the 17th century stockbrokers would meet in the coffee houses of Change Alley in order to exchange information and strike trades. Prices were first transmitted via the electric telegraph in 1830. Today, in many markets algorithms 'meet' in a server centre to trade within fractions of a second. Despite this, coffee shops are thriving.

¹ Partly printed notes probably came into use between 1696 and 1699, but the notes issued after 1725 were in mainly printed form, and began to appear in fixed denominations; the first was for £20.

Recent innovations towards 'fast markets'

Indeed, there has been a remarkable evolution in many financial markets in the last few decades, defined by speed. Equity markets have been at the centre of this, sparked by the migration of trading from physical exchanges, to voice trading by telephone, to various types of electronic trading – where the venue is virtual and the communication electronic. This is one example of innovation in the physical infrastructure for trading, so called 'hard infrastructure', speeding up markets and lowering costs.

At the same time, the impact of technology has vastly expanded access to data. The combination of data availability and electronic venues has led to the growth of automated trading, where a program is making the decision to execute a trade. A subset of automated trading is high frequency algorithmic trading, seeking to gain an advantage from speed. But algorithms are also commonly used for other purposes, such as minimising the price impact of a transaction by breaking it down into smaller trades across time. Today, it is estimated that at least 70% of equity trading on the LSE electronic orderbook is done by algorithms.²

This development hasn't been exclusive to equity markets. Foreign exchange markets are critical in my role managing the Bank of England and HM Treasury's Foreign Exchange reserves. And the FX market has been participating in this change, particularly trading of spot exchange rates in the major global currencies. For example, an estimated 70% of orders on EBS, one of the primary spot FX platforms, are now submitted by algorithms.³ And much spot FX market trading, one might be surprised to find, has migrated away from the Square Mile and Canary Wharf to server centres in Slough.

But at their core, FX and equities markets are based on homogenous instruments. As one moves towards related but potentially bespoke products, such as FX and equity options, trading is far less automated. The logic applies to fixed income markets, where bespoke aspects to bonds are often a central feature. A typical large bank may have more than one thousand unique debt instruments associated with it, varying across currency, coupons, maturity dates, optionality, and seniority, to name some dimensions. This compares to ultimately only one equity claim.

This feature of fixed income markets is not a bug. It reflects product innovation that allows debt instruments to suit the preferences and constraints of the investor, which ultimately lowers costs for the borrower. But it does reduce liquidity. Most obviously, for any given amount of debt, more debt instruments means smaller sized individual issues available to trade in the market. The bespoke characteristics also lead to market segmentation as any individual investor may only be willing to buy a subset of bonds from a given issuer. And from a practical perspective, investing in automated trading, with potentially bespoke programming, is less likely to be worth it for small and unique issues with non-standard characteristics.

² Source LSE. Equity is defined using MiFIR identifiers of SHRS and DPRS.

³ See <https://www.bis.org/publ/mktc10.pdf>

This means that fixed income markets remain somewhat slower.

Saying that, electronic trading is now a very standard part of fixed income markets. Automated trading has also increased markedly, in particular in standardised or liquid instruments such as government bond futures or on-the-run US treasuries.

Electronic trading is also increasing for corporate bonds. Our market intelligence suggests that around 50% of all gross notional in the European corporate bond market is now being traded electronically. This has been helped by the electronification of the corporate bond ecosystem, including the pre-trade, execution and the post-trade phase of the trade lifecycle. And we have also seen growth of electronic trading platforms, serving the dealer-to-dealer, dealer-to-client, and all-to-all segments.

But the degree of automated trading in corporate bonds is far less prevalent, as much of the electronic trading is electronic closing of trades negotiated by voice. Our market intelligence suggests that only about 10% of the electronically traded corporate bond volumes are automated. And in sterling corporate bonds, while 60% of the traded volumes reported to the FCA in 2018 were via electronic means, little is automated in any way.

At least not yet.

Product innovation in fixed income markets

This lower level of speed should not be taken to mean fixed income markets have not been innovating, or have been less innovative. Adaption can take many forms and each asset class will evolve in its own unique way. Let me mention four current examples.

First, there has been significant growth in fixed income exchange-traded funds (ETFs) in recent years. Such ETFs allow investors to buy and sell a fund that tracks an index of underlying bond securities intraday, as if it were a share. And this has met a demand amongst market participants. The value of fixed income ETFs globally has grown over 400% since 2009.⁴ They now make up around 18% of the total assets under management in ETFs globally, growing 13% in 2018, compared to a fall of 2% in the currently much larger universe of equity ETFs. And by aggregating many bonds in one transparently listed structure, it allows investors to trade them using more of the hard infrastructure of 'fast markets'. This leads to the possibility of positions being shifted much more rapidly and in a more automated manner, than by trading individual bonds.

⁴ See <https://www.ishares.com/ch/individual/en/literature/etp-landscape-report/monthly-industry-highlights-december-2018-en-emea-pc-etp-landscape-report.pdf>

Second, we have seen rapid growth in the issuance of so-called ‘green bonds’ – bonds where the proceeds will be directed to projects and activities that should improve the quality of natural capital, or that support environmentally friendly objectives – with London as one of the main hubs. In 2018, global green bond issuance was around \$170 billion⁵, with outstanding volumes around \$480 billion⁶. And if we include so-called ‘climate-aligned’ bonds, which are issued by firms that derive at least 75% of their revenues from ‘green’ business lines, the outstanding volume stands at \$1.2 trillion.^{7,8}

Third, sterling markets have been responding to the need to transition away from LIBOR, with a significant increase in issuance related to SONIA. In 2019 we have already seen 15 sterling bond issues that have referenced SONIA, with a total notional value of £9.5bn.⁹ This exceeds the value of all of the SONIA-linked issuance ever seen prior to 2019.

Fourth, we have seen a dramatic opening up of Chinese markets to the rest of the world. This includes the issuance of so-called ‘dim sum’ bonds – renminbi-denominated bonds issued outside of China.¹⁰ In fact, there are 112 such bonds listed here on London Stock Exchange, with a total notional value equivalent to £3.7bn. And outstanding RMB loans and deposits in London both stand at around £6bn equivalent.

London is also the leading centre for trading in China’s foreign exchange outside of greater China. According to the most recent semi-annual London Foreign Exchange Joint Standing Committee survey¹¹, turnover in dollar-renminbi has increased to \$73 billion per day, its highest to date, and a more than 25-fold increase over ten years.

Evolution at the Bank of England

Markets are in a constant state of innovation and change. As they develop in speed, complexity, and diversity, so the authorities also need to move with the times. Central banks must adapt. Let me give you three examples of areas where we in the Bank are running fast right now.

Monitoring market developments with expanded datasets

The first is to adapt the way we monitor market developments. Sitting as we do at the heart of one of the world’s most important financial centres, it is vital that we maintain a good understanding of what is

⁵ See <https://www.climatebonds.net/files/files/2018%20green%20bond%20market%20highlights.pdf>

⁶ See https://www.climatebonds.net/files/reports/cbi_sotm_2018_final_01k-web.pdf

⁷ Including issuance from so-called ‘fully-aligned’ US Municipal issuers, the outstanding volume is \$1.45 trillion.

⁸ ‘Green’ business lines include “clean energy, low-carbon transport, water management, low-carbon buildings, waste management and sustainable land use”, according to the Climate Bonds Initiative.

⁹ Data collated by Bank of England staff from Bloomberg, as of 27th February 2019.

¹⁰ In 2014, the UK Government became the first non-Chinese issuer of sovereign Renminbi denominated debt, issuing the then largest ever bond by a non-Chinese issuer. The bond had a maturity of 3 years, a coupon of 2.70% and a notional of RMB 3 billion, equivalent to approximately £300 million at the time.

¹¹ See <https://www.bankofengland.co.uk/markets/london-foreign-exchange-joint-standing-committee/results-of-the-semi-annual-fx-turnover-survey-october-2018>

happening in financial markets, in order to support policymakers such as Monetary Policy Committee (MPC) and Financial Policy Committee (FPC) members in their decision making. Within the Markets area of the Bank we maintain very frequent contact with market participants about developments, aggregating and synthesising your views, in order to keep our policy makers as informed as possible. This is part of the Bank's highly valued Market Intelligence activity.

One form of adaption is old. As the market structure changes we have to change who we talk to. Our contacts today are not just banks and insurers, but an increasingly diverse range of players to understand the services they offer, their trading strategies and expectations about future developments.

But another form of adaption is newer. Increasingly we need to complement this market intelligence with analysis of vastly expanded datasets. This might include running code on transaction level datasets to inform us about market developments. One example can be found in our most recent Financial Stability Report, where analysis of transaction-level data in derivatives and repo markets, alongside market intelligence, helped the Financial Policy Committee assess the risks to the resilience of financial markets from leverage in the non-bank financial system.¹²

Updating codes of conduct for automated trading

As a central bank, we have a role in supporting and promoting fair and effective financial markets. In particular, the Markets area of the Bank was heavily engaged in the Fair and Effective Markets Review. That review included recommendations to raise standards of professionalism and accountability of individuals in financial markets. Following on from that, the Bank has supported the establishment of market codes of conduct, such as the UK Money Market Code and FX Global Code.

Market practices and codes of conduct are examples of so called soft infrastructure. A key part of our mission is ensuring that soft infrastructure keeps up with technology and other hard infrastructure. With London the preeminent centre of global FX trading the FX Global Code is of particular relevance and importance.

Those involved in developing and maintaining codes of conduct¹³ have had to consider what it means when it is machines, and not just humans, doing the trading. For example, Principle 17 of the FX Global Code, on 'last look', was updated at the end of 2017. Last look is a practice utilised in electronic trading activities. The last look window is a period of time within which the price-maker can confirm or reject a trade. The update to

¹² Another example is the BIS Markets Committee's report on the 2016 sterling flash event, co-led by the Bank of England, which combined market intelligence and analysis of high-frequency data to understand the drivers of the event.

¹³ In the case of the Global FX code it is the responsibility of the Global FX Committee. One of its three objectives is to promote, maintain and update on a regular basis the FX Global Code (the Code) and to consider good practices regarding effective mechanisms to support adherence.

Principle 17 made clear that the price-makers shouldn't also be using the information from the trade request to trade within the last look window. Subsequent analysis by NEX Markets suggests that last look-times are down from an average of 93 milliseconds to 37 milliseconds¹⁴, which is both a positive development in itself, but also because of the increased awareness and conversations it provokes.

More broadly, continual innovation in financial markets can shift where responsibilities and liabilities (ultimately) reside. We need to consider what it means when algorithms quote and read prices, make and accept orders, select collateral and send confirmation tickets. Market participants should be clear about the capacities in which they act in order for markets to function fairly and effectively.

One interesting parallel of this outside of financial markets is the potential growth of driverless cars. Cars driven by humans are far from accident proof, and driverless cars may ultimately be safer and collectively superior. However the liability for car accidents caused by human error lies with the driver. With driverless cars, the liability for accidents could shift to car manufacturers, as their machines and software are behind the wheel.

Understanding the impact of product innovation on the resilience of market-based finance

My final example is understanding how product innovation could affect the resilience of the financial system, given the FPC's macroprudential responsibilities.

As fixed income infrastructure has evolved to capture some of the efficiency gains enjoyed in equity and FX markets, these markets can become exposed to new risks.

For example, the creation of focal points for liquidity such as ETFs and futures that can be traded in an automated high frequency way leave fixed income markets vulnerable to the sort of 'flash-crash' disruption sometimes experienced in other established 'fast markets'.¹⁵

A second risk is that the perceived depth of liquidity in such products can be at odds with the actual ability to trade in the underlying asset. Such a gap has the potential to test the functioning of some markets where demand for liquidity may be high in times of stress. In relatively illiquid markets – where forced sales have larger impacts on prices – procyclical behaviour by fund investors could create a feedback loop, between price falls, redemptions and asset sales.

¹⁴ <https://newsroom.nex.com/news/04092018/nex-markets-experiences-a-reduction-in-hold-times-and-reject-rates-as-a-result-of-the-fx-code-of-conduct>

¹⁵ Perhaps the highest profile example was the US Treasury flash rally on 15 October 2014 when the market for US Treasury securities, futures and other closely related financial markets experienced an unusually high level of volatility and a very rapid round-trip in prices. For instance, 10-year US Treasury yields experienced a 16-basis-point drop and rebound in less than 15 minutes.

This type of risk existed before electronification and automation. But as product innovation occurs in the ETF market, the Bank's job is to ask the question where the underlying instruments are less liquid, such as corporate bonds. The FPC has committed to monitoring exchange-traded funds closely, amongst other fast-growing or evolving areas.

Conclusion

To conclude.

Attendees of this forum are no strangers to innovation and technological improvement. The agenda for today suggests no sign of that slowing. In order to thrive and succeed, we need to constantly evolve.

Where does that leave fixed income markets? I won't try to pre-judge today's discussions. But you can be assured that the Bank will be an interested observer and participant, as we continue to adapt our activities to carry out our timeless mission: to promote the good of the people of the United Kingdom.

References

Anderson, N, Webber, L, Noss, J, Beale, D and Crowley-Reidy, L (2015), 'The resilience of financial market liquidity', Bank of England Financial Stability Paper No. 34, available at <https://www.bankofengland.co.uk/-/media/boe/files/financial-stability-paper/2015/the-resilience-of-financial-market-liquidity>

Anson, M, Bholat, D, Kang, M, Thomas, R (2017), 'The Bank of England as lender of last resort: new historical evidence from daily transactional data', Bank of England Staff Working Paper No. 691, available at <https://www.bankofengland.co.uk/-/media/boe/files/working-paper/2017/the-bank-of-england-as-lender-of-last-resort-a-new-historical-evidence-from-daily-transactional-data>

Bank for International Settlements (2016), 'Electronic trading in fixed income markets', available at <https://www.bis.org/publ/mkctc07.pdf>

Bank for International Settlements (2018), 'Monitoring of fast-paced electronic markets', available at <https://www.bis.org/publ/mkctc10.pdf>

Bank for International Settlements (2018), 'Triennial Survey of foreign exchange and OTC derivatives trading', available at <https://www.bis.org/statistics/derstats3y.htm>

Bank of England, 'Our History', <https://www.bankofengland.co.uk/about/history>

Bank of England (1969), 'The Bank of England note: a short history', Quarterly Bulletin, available at <https://www.bankofengland.co.uk/-/media/boe/files/quarterly-bulletin/1969/the-boe-note-a-short-history>

Bank of England (2015), 'Fair and Effective Markets Review – Final Report', available at <https://www.bankofengland.co.uk/report/2015/fair-and-effective-markets-review---final-report>

Bank of England (2017), 'The UK Money Markets Code', available at <https://www.bankofengland.co.uk/-/media/boe/files/markets/money-markets-committee/uk-money-markets-code>

Bank of England (2018), 'Financial Stability Report', Issue No. 44

Bank of England (2018), 'Record of the Financial Policy Committee Meetings on 20 and 27 November 2018', available at <https://www.bankofengland.co.uk/-/media/boe/files/record/2018/financial-policy-committee-meeting-november-2018>

Baranova, Y, Coen, J, Lowe, P, Noss, J, Silvestri, L (2017), 'Simulating stress across the financial system: the resilience of corporate bond markets and the role of investment funds', Bank of England Financial Stability Paper No. 42, available at <https://www.bankofengland.co.uk/-/media/boe/files/financial-stability-paper/2017/simulating-stress-across-the-financial-system-resilience-of-corporate-bond-markets>

BlackRock (2018), 'BlackRock Global ETP Landscape', available at <https://www.ishares.com/ch/individual/en/literature/etp-landscape-report/monthly-industry-highlights-december-2018-en-emea-pc-etp-landscape-report.pdf?switchLocale=y&siteEntryPassthrough=true>

Butler, M (2019), 'Ending reliance on LIBOR: Overview of progress made on transition to overnight risk-free rates and what remains to be done', available at <https://www.fca.org.uk/news/speeches/ending-reliance-libor-overview-progress-made-transition-overnight-risk-free-rates-and-what-remains>

Carney, M (2018), 'Staying Connected', speech available at <https://www.bankofengland.co.uk/-/media/boe/files/speech/2018/staying-connected-speech-by-mark-carney>

Carroll, Lewis (1871), 'Through the Looking-Glass'

City of London, 'City History', available at <https://www.cityoflondon.gov.uk/things-to-do/visit-the-city/our-history/Pages/city-history.aspx>

Climate Bonds Initiative, 'Bonds and Climate Change: The State of the Market 2018', available at <https://www.climatebonds.net/resources/reports/bonds-and-climate-change-state-market-2018>

Climate Bonds Initiative, '2018 Green Bond Market Highlights', available at <https://www.climatebonds.net/resources/reports/2018-green-bond-market-highlights>

Equinix, 'London-Slough. The World's New Financial Centre', available at <http://info.equinix.co.uk/rs/equinixinc/images/London-CapitalMarkets.pdf>

Global Foreign Exchange Committee (2018), 'FX Global Code August 2018', available at https://www.globalfx.org/docs/fx_global.pdf

Global Foreign Exchange Committee (2019), 'Global Foreign Exchange Committee Report: The Role of Disclosure and Transparency in the Global FX Market', available at https://www.globalfx.org/docs/the_role_of_disclosure_and_transparency.pdf

Green Finance Initiative, [greenfinanceinitiative.org](https://www.greenfinanceinitiative.org)

Guisseppi, J (1966), 'The Bank of England: A history from its foundation in 1694', Evans Brothers Limited

The Government Office for Science (2012), 'Foresight: The Future of Computer Trading in Financial Markets', Final Project Report, available at

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/289431/12-1086-future-of-computer-trading-in-financial-markets-report.pdf

HM Treasury (2014), 'Britain issues western world's first sovereign RMB bond, largest ever RMB bond by non-Chinese issuer', available at <https://www.gov.uk/government/news/britain-issues-western-worlds-first-sovereign-rmb-bond-largest-ever-rmb-bond-by-non-chinese-issuer>

HM Treasury (2018), 'Remit and recommendations for the Financial Policy Committee', available at <https://www.bankofengland.co.uk/-/media/boe/files/letter/2018/chancellor-letter-291018>

Jain, N, O'Reilly, J & Silk, N (2015), 'Driverless Cars: Insurers Cannot be Asleep at the Wheel', Bank Underground, available at <https://bankunderground.co.uk/2015/06/19/driverless-cars-insurers-cannot-be-asleep-at-the-wheel/>

Jeffery, R, Lindstrom, R, Pattie, T, Zerzan, N (2017), 'The Bank's Market Intelligence function', Bank of England Quarterly Bulletin 2017 Q1, available at <https://www.bankofengland.co.uk/quarterly-bulletin/2017/q1/the-boe-market-intelligence-function>

Joint Staff Report (2015), 'The U.S. Treasury Market on October 15, 2014', available at https://www.treasury.gov/press-center/press-releases/Documents/Joint_Staff_Report_Treasury_10-15-2014.pdf

The London Foreign Exchange Joint Standing Committee (FXJSC), 'Results of the Semi-Annual FX Turnover Surveys in October 2018', available at <https://www.bankofengland.co.uk/markets/london-foreign-exchange-joint-standing-committee/results-of-the-semi-annual-fx-turnover-survey-october-2018>

NEX Markets (2018), 'NEX Markets experiences a reduction in hold times and reject rates as a result of the FX Code of Conduct', <https://newsroom.nex.com/news/04092018/nex-markets-experiences-a-reduction-in-hold-times-and-reject-rates-as-a-result-of-the-fx-code-of-conduct>

Salmon, Chris (2017), 'Keeping up with fast markets', speech available at <https://www.bankofengland.co.uk/speech/2017/keeping-up-with-fast-markets>

Van Valen, Leigh (1973), 'A new evolutionary law', *Evolutionary Theory*, Vol 1, pp 1-30