The Bank of England's supervision of financial market infrastructures — Annual Report

(For the period 5 March 2016 — 22 February 2017)

BANK OF ENGLAND

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Presented to Parliament pursuant to section 203B of the Banking Act 2009 and paragraph 33 of Schedule 17A to the Financial Services and Markets Act 2000 (FSMA).

22 February 2017

(1) Please note, references to '2016' in this *Report* should be taken as referring to this reporting period.

Foreword

Jon Cunliffe
Deputy Governor, Financial Stability

The United Kingdom's financial market infrastructure is critically important, providing functions that are relied upon by the financial system and general public every single day. Over the past year, the Bank's supervision of this infrastructure has contributed significantly to meeting its financial stability objective. As the financial, economic, and regulatory landscape within which such infrastructure operates continues to evolve, so will the Bank's supervisory approach.

The United Kingdom's financial market infrastructure is critical to the smooth functioning of the financial system.

This includes facilitating day to day payments through various payment systems, settling trades in the bond and equity markets over securities settlement systems, and protecting participants in a range of wholesale markets from the effects of counterparty defaults through central counterparties (CCPs). The firms that carry out these functions are collectively referred to as financial market infrastructures (FMIs).

The general public, UK financial centre, and global financial markets rely on the UK financial system on a daily basis. The smooth and stable functioning of FMIs is therefore critical to the Bank's broader objective to protect and enhance financial stability in the United Kingdom, and its role in helping to support global financial stability. Over the past year, the markets served by FMIs have faced periods of uncertainty and volatility. The Bank's supervision of FMIs has helped to ensure their ability to meet the challenges posed over the course of the year. More detail on the Bank's supervisory activity and how this has contributed to achieving its wider financial stability objective can be found in Section 3 of this *Report*.

To ensure the Bank's supervision continues to assist in delivering smoothly functioning FMIs, the Bank has been embedding the changes to its supervisory approach set out in the previous *Report*. In 2016, the Bank was independently reviewed by both the IMF's Financial Sector Assessment Programme and the Bank's own Independent Evaluation Office (IEO). The IMF review found that: 'supervision of financial market infrastructures (FMIs) in the UK has significantly strengthened in recent years; the Bank of England (BoE) is one of the leaders worldwide in shaping reforms in this area'.[1] The IEO review recognised that: 'the Bank is an acknowledged world leader in the field of FMIs and the framework put in place for supervision has dealt effectively with the risks of the past few years'. Both reviews also led to recommendations for further enhancements to our supervisory approach, which the Bank accepts. The programme of actions to deliver these enhancements is outlined in Box 2 of this *Report* and further detail can be found in the Bank's management response to the IEO report.[2] Both reviews are evidence that the changes set out in the previous *Report* are delivering the expected enhancements to the Bank's FMI supervision. These reviews provide assurance that the Bank is meeting its regulatory responsibilities for the supervision of both domestic and globally active FMIs.

Looking ahead, the stability of FMIs' operations is likely to remain a key area of focus for regulators globally. As set out in Section 4 of this *Report*, the Bank is at the forefront of both domestic and international work to strengthen both regulatory standards and supervisory frameworks for the supervision of FMIs. This includes enhancing the resilience, recovery planning, and resolvability of CCPs, as well as testing the default procedures of several CCPs across multiple jurisdictions simultaneously.

Good progress continues to be made with the international programme of reforms to concentrate more risk in CCPs, to better and more transparently manage the risk. The Bank will also maintain capability and capacity to analyse wider developments in the financial markets. These developments include the opportunity for innovation by financial technology (FinTech) companies, and the potential impact on FMIs of the United Kingdom's withdrawal from the European Union. The Bank will continue to monitor these and other developments, and will actively seek to mitigate risks arising from them to support the smooth functioning of FMIs for both UK and global markets.

February 2017

(1) Page 4; www.imf.org/external/pubs/ft/scr/2016/cr16156.pdf.
(2) www.bankofengland.co.uk/about/Documents/ieo/fmidresponse0217.

Contents

Chapter 1: Financial market infrastructures in context

A small number of regulated firms and systems manage the financial infrastructure underlying most of the financial transactions in the United Kingdom and many transactions internationally. These include the central counterparties, central securities depository, and payment systems supervised by the Bank of England (the Bank) in pursuit of its objective to protect and enhance stability of the UK financial system.

1.1 The role of financial market infrastructures

Financial market infrastructures (FMIs) sit at the heart of global financial markets and the UK economy. The proportion of transactions in key markets that are reliant on FMIs — for instance, over the counter (OTC) derivatives — has steadily increased following post-crisis international reforms. When an increasing proportion of financial activity is reliant on FMIs, their systemic importance increases accordingly.

The dependence on FMIs is due to the critical role they play in allowing market participants in a wide range of different markets to clear[(1)] and settle[(2)] transactions they enter into. Without the functionality provided by FMIs it is likely that the functioning of many markets would be severely curtailed and any activity that did take place would be conducted at a far higher level of risk and cost.

Given the financial system's dependence on FMIs, the Bank supervises eleven FMIs which carry out a wide range of activities. These FMIs, and a sample of the markets they serve and functions they provide, are set out in **Table A**. Further details on each FMI and the legislation the Bank supervises them under can be found in Annex 1.

Table A The FMIs supervised by the Bank and a non-exhaustive selection of their functions

Central counterparties (CCPs)	Central securities depository (CSD)	Payment systems
CME Clearing Europe (CMECE) (OTC and exchange traded derivatives and spot commodities contracts)	Euroclear UK & Ireland (EUI) (Securities transactions) (Collateral management)	Bacs (Paying bills) (Receiving benefits/ pensions/salaries)
Ice Clear Europe (Listed derivatives and OTC credit default swaps)		CHAPS (High-value sterling payments) (Cross-border sterling payments) (House purchases)
LCH (Listed and OTC derivatives and securities)		CLS (High-value FX transactions)
LME Clear (Listed and OTC metals contracts)		FPS (Paying bills) (Internet, mobile, and telephone banking payments)
		LINK (Withdrawing cash)
		Visa Europe (Paying for goods/ services)

1.2 The growing systemic importance of FMIs

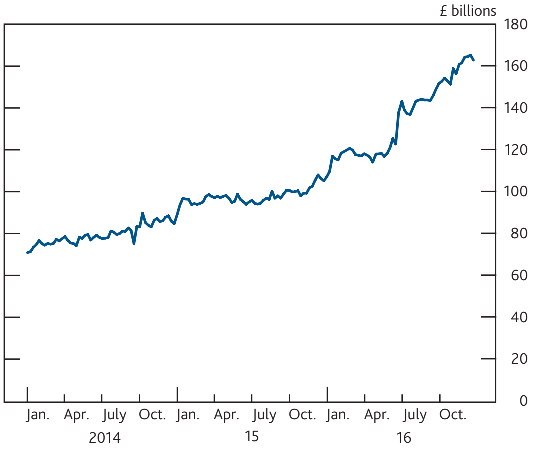
Over the past five years, the value of transactions processed by FMIs has increased. This shows that an increasing level of financial activity is reliant on FMIs, and that, correspondingly, the systemic importance of FMIs is increasing. For CCPs, this is in part due to the G20 mandate, agreed at its Pittsburgh summit in 2009, for standardised OTC derivatives to be centrally cleared.

Chart 1 shows one example of the increasing importance of FMIs to wholesale transactions. It shows that CCPs are collecting an increasing value of initial margin, which demonstrates the increasing level of activity and risk associated with transactions being cleared through them.

Similarly, **Chart 2** sets out the increasing proportion (by volume) of payments being settled through retail payment systems compared to cash.

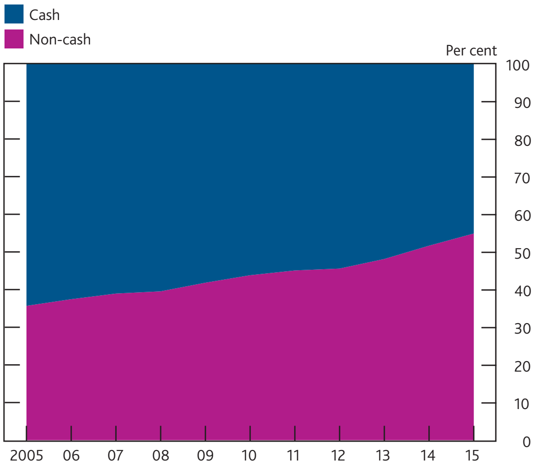
(1) The process of transmitting, reconciling and, in some cases, confirming transactions prior to settlement, potentially including the netting of transactions and the establishment of final positions for settlement. Sometimes this term is also used (imprecisely) to cover settlement. For the clearing of futures and options, this term also refers to the daily balancing of profits and losses and the daily calculation of collateral requirements.
(2) The discharge of an obligation in accordance with the terms of the underlying contract.

Chart 1 The total value of initial margin collected across all UK CCPs



Sources: Regulatory reporting from UK CCPs and Bank calculations.

Chart 2 The proportion of payments being processed by payment systems against cash



Sources: Payments UK 2016 *Annual Report* and Bank calculations.

Taken together, these charts are examples of how both the broader financial system and individual households are increasingly making use of FMIs to conduct their day-to-day business. Annex 3 provides a breakdown of the values and volumes of transactions processed by the FMIs supervised by the Bank.

1.3 FMIs' position in the Bank's wider financial stability objectives

As FMIs sit at the centre of the UK financial system, ensuring FMIs carry out their operations in a robust and resilient manner is central to the Bank's wider objective of ensuring financial stability.

The Bank's Financial Market Infrastructure Directorate is responsible for carrying out the supervision of FMIs. The directorate reports to the Bank's FMI Board, which is an executive committee constituted by the Governor and chaired by the Bank's Deputy Governor for Financial Stability. FMI Board exercises the Bank's powers in relation to FMIs and it in turn escalates issues to the Bank's Governors when appropriate.

The FMI Board's performance is also kept under review by the Court of the Bank; Court receives minutes of FMI Board meetings and Court members periodically attend FMI Board meetings. Court is also able to commission reviews into the Bank's supervision of FMIs, and Box 2 provides more detail on a report from the Bank's IEO, commissioned by Court and conducted during 2016.

The Bank is committed to being open and accountable in the performance of its responsibilities and in the use of its powers. The publication of this *Report* is intended to help achieve this with respect to supervision of FMIs.

Chapter 2: The Bank's supervisory approach

The Bank's role as supervisor is to ensure that FMIs are managed in a manner that contributes to the delivery of the Bank's financial stability objective, including by reducing systemic risk. The Bank's supervision takes place within a framework of applicable legal regimes and internationally agreed regulatory standards. It is risk based and incorporates both a forward-looking judgment of potential risks and a structured range of reviews to gain assurance that FMIs are appropriately mitigating risks they face.

2.1 The regulatory regime for and supervisory approach to FMIs

The regulatory regimes for FMIs supervised by the Bank are framed by the Principles for Financial Market Infrastructures (PFMIs).(1) The PFMIs are issued by the Bank for International Settlements' Committee on Payments and Market Infrastructures (CPMI) and the International Organization of Securities Commissions (IOSCO), and are internationally agreed and recognised standards. The Bank supervises FMIs under a range of legislation, and applies the PFMI framework to UK-recognised payment systems, securities settlement systems (the UK system is operated by its Central Securities Depository (CSD),(2) EUI), and CCPs.(3) Supervised FMIs themselves have primary responsibility for ensuring they operate in line with the standards set out in the PFMIs, and all applicable regulatory requirements.

The Bank's supervisory approach is designed to ensure that FMIs' rules, policies and practices are in line with the PFMIs and compliant with all applicable regulatory requirements. For example, the Bank assesses CCPs against their compliance with the requirements of the European Market Infrastructure Regulation (EMIR),(4) and in future will assess CSDs against the Central Securities Depository Regulation (CSDR).(5)

The supervisory approach requires supervisors to make forward-looking judgments on the risks posed by FMIs to financial stability. Where the Bank judges risks to be unacceptably high it expects the FMI to take action to reduce them.

The Bank's supervisory work is structured according to its FMI supervisory risk assessment model, which is set out in *The Bank of England's approach to the supervision of financial market infrastructures* (the Bank's *Approach*).(6)

2.2 Balancing observed risk mitigation with ongoing assurance work

The Bank is in the process of embedding a strengthened supervisory regime, as set out in the previous *Report*. The purpose of strengthening the supervisory regime is to ensure the Bank continues to develop its approach to address risks emanating from the changing market landscape and to ensure the Bank's supervision is of the highest standard.

The Bank therefore undertakes two complementary sets of activities as part of its supervisory approach.

2.2.1 Forward-looking assessment of the risks FMIs face

On an annual basis, the Bank undertakes an assessment of each firm it supervises, which culminates in a number of risk mitigating actions it expects the firm to take ('Priorities'). The Priorities set by the Bank reflect the areas where current practice at an FMI is likely to result in the greatest risk to financial stability.

This assessment is informed by a continuous cycle of supervisory engagement with the firm, intended to identify emerging risks to the firm, and taking into account each of the elements of the risk model set out in the Bank's *Approach*. However, it also focusses on specific risks faced by individual FMIs. For example, the Bank's assessment of the financial risk management of CCPs will typically focus on margin and default fund requirements, given the centrality of these to CCPs' risk management. The Bank's assessment also focusses on the areas of FMIs' operations which are likely to result in the largest risk to financial stability if not managed appropriately.

2.2.2 The core assurance programme

The Bank also carries out a programme of 'core assurance' which entails a broad and structured set of reviews into FMIs' operations. These reviews are in more depth than other supervisory activity and typically involve on-site inspections, as well as sometimes including review of multiple FMIs

(1) www.bis.org/cpmi/publ/d101a.pdf.
(2) Hereafter, the term CSD is generally used throughout this *Report* to denote either a CSD or a Securities Settlement System.
(3) Annex 1 sets out the specific legislation which applies to different types of FMI.
(4) http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32012R0648&from=EN.
(5) http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014R0909&from=EN.
(6) www.bankofengland.co.uk/financialstability/Documents/fmi/fmisupervision.pdf.

simultaneously in their scope. This allows the Bank to draw on in-depth reviews of individual FMIs to identify best practice and promote its adoption across the range of supervised FMIs.

These reviews are intended to gain assurance that FMIs are suitably mitigating risks across the broad range of their operations, rather than focussing on the narrower key risk areas identified during the Bank's continuous assessment. The reviews also ensure the Bank has assessed FMIs' compliance with the relevant principles set out in the PFMIs on a regular basis.

The core assurance programme consists of a number of different modules which specify the areas reviewed by the Bank. These modules are linked back to the risks and mitigants which are set out in the Bank's FMI supervisory risk assessment model(1) and ultimately, the principles set out in the PFMIs.

The broad scope of the core assurance programme means that the Bank conducts a structured review of all FMIs' critical areas of operation over a multi-year period. The different modules of the core assurance programme each correspond to an element of the risk model set out in the Bank's *Approach*. For instance, reviews of cyber resilience and outsourcing are two of the five modules that correspond to the risk management and controls element of the risk model. A full mapping between modules and risk model elements is provided in Annex 2.

Assessing FMIs against these modules is assuming an increasingly central role in the Bank's approach to FMI supervision. Significant findings and remediation points from these assessments can inform both the Bank's continuous risk assessment and the supervisory Priority setting process.

By combining forward-looking risk assessments with the core assurance programme, the Bank is able to base its supervisory judgement on its view of how FMIs are mitigating the risks they currently face and their preparedness to mitigate upcoming key risks that have been identified.

Additionally, the Bank is making more frequent use of its power to require FMIs to undergo reviews carried out by independent third party experts.(2) During 2016, three reports of this nature were commissioned, costing approximately £780,000.

2.2.3 FMI-related policy and research

The Bank's supervision of FMIs takes place in the context of a wider programme of FMI-related policy work at both the domestic and international level. The Bank's FMI-related policy work contributes to the further development of the FMI supervision regime, as well as informing supervisory best practice.

In addition to FMI-related policy, the Bank also conducts a programme of FMI-related research. Box 1 gives an overview of the objectives and recent outcomes of this programme. The box also shows the role played by the programme in supporting both supervision and the Bank's wider financial stability objective.

2.2.4 Independent reviews of the Bank's approach to FMI supervision

The Bank has recently undergone three independent reviews of its approach to FMI supervision.

In 2015 the CPMI-IOSCO carried out a review of the United Kingdom's compliance with its responsibilities under the PFMIs, and concluded that the United Kingdom fully observed all of these. In 2016 the International Monetary Fund (IMF) carried out a Financial Sector Assessment Programme (FSAP),(3) which noted 'Supervision of financial market infrastructures (FMIs) in the UK has significantly strengthened in recent years; the Bank of England (BoE) is one of the leaders worldwide in shaping reforms in this area.' The Bank's IEO also carried out a review of the Bank's FMI supervision in 2016. This review recognised that 'the Bank is an acknowledged world leader in the field of FMIs and the framework put in place for supervision has dealt effectively with the risks of the past few years' and that 'international engagement is strong, with the Bank making effective use of the various arrangements it has in place for cross-border collaboration'.(4)

These reviews have all provided positive independent assurances about the strength of the Bank's FMI supervision, and Box 2 provides further detail on the reviews, alongside the Bank's plans to address any recommendations arising from them. As reviews of the Bank's approach to fulfilling its supervisory responsibilities, they provide a valuable backdrop to (and assurance on the effectiveness of) the summary of supervisory activities that follows.

2.3 Supporting co-operative supervision

The Bank views co-operation with other authorities as an essential part of its supervision of FMIs, as it benefits from a broader range of expertise and perspectives, fosters external challenge, and increases transparency around risks to UK FMIs emanating from the wider financial system.

This approach is supported by the PFMIs, which require central banks, market regulators, and other relevant authorities, including prudential regulators, to 'co-operate…domestically and internationally…in promoting the safety and efficiency of FMIs'.(5)

(1) Page 5; www.bankofengland.co.uk/publications/Documents/news/2012/nr161.pdf.
(2) Paragraph 12 of Schedule 17A to the Financial Services and Markets Act 2000 and section 195 of the Banking Act 2009.
(3) www.imf.org/external/pubs/ft/scr/2016/cr16156.pdf.
(4) www.bankofengland.co.uk/about/Documents/ieo/evaluation0217.pdf.
(5) Key Consideration 1, Responsibility E of the PFMIs: http://www.bis.org/cpmi/publ/d101a.pdf.

Box 1
How the Bank's FMI research programme helps achieve its supervisory and wider financial stability objective

As noted in Section 2.2.3, the Bank conducts targeted research on FMI-related issues, with the overall objective of informing supervisory and policy work and providing thought leadership on the design and operation of FMIs. In particular, the research aims to:

(a) help inform decisions about new regulatory or supervisory policies relevant to FMIs;
(b) evaluate the performance, and any unintended consequences, of existing regulatory or supervisory policies relevant to FMIs;
(c) analyse the implications for FMIs of broader developments in financial markets, or at financial institutions; and
(d) demonstrate how data on derivatives transactions held in Trade Repositories (TRs) can be used to identify and analyse potential sources of systemic risk.

Annex 8 to this *Report* includes a full list of FMI-related research papers published by the Bank over the past year. These papers cover research in different areas, for example:

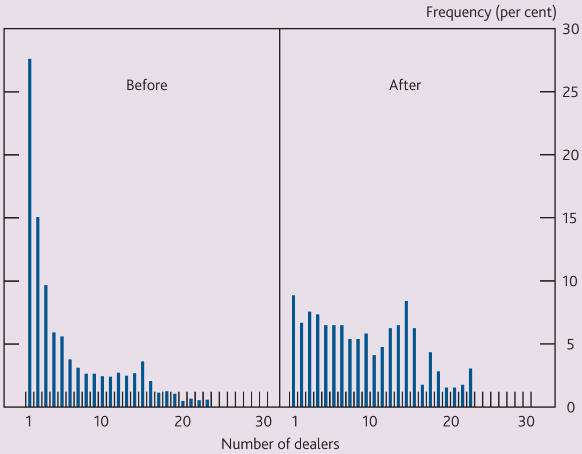
- **CCP collateral management**: Motivated by the rapid growth of collateralisation as a risk-mitigation tool since the crisis, the work analyses the idiosyncratic and systemic risks a CCP must manage when accepting large amounts of non-cash collateral from its members. This work has helped to provide a benchmark for supervisory assessments of UK CCPs' approach to managing collateral risks.

- **CCP default management process**: Bank staff have collaborated with academics from the London School of Economics to examine relevant legal considerations in the design of a CCP's arrangements for the management of participant defaults. Other related research on CCPs' closeout strategies reveals how different choices in the design and execution of a default management strategy could expose a CCP to different risk and costs and, as a consequence, could impact the sufficiency of financial resources to cover its risk exposure in the event of a default.

- **Margin procyclicality**: Bank staff have extended their previous work on margin procyclicality to evaluate alternative approaches to the management of procyclicality in CCPs' margin requirements. Staff research on procyclicality has helped inform its contribution to CPMI-IOSCO work on additional guidance on CCP resilience, discussed in Section 3.3.3.

- **The impact of regulation**: Bank staff have examined the impact on market transparency, liquidity, and execution costs from the implementation in 2013/2014 of CFTC regulations requiring that certain interest rate swaps (IRS) contracts be executed on multilateral platforms known as Swap Execution Facilities (SEFs). The research indicates that the platform-trading requirements have reduced market participants' aggregate execution costs by US$7 million–US$13 million per day, and that the number of dealers per client increased (**Chart A**), suggesting that transparency improves competition among dealers for the provision of liquidity in OTC derivatives markets.

Chart A Frequency distribution of the number of dealers with whom clients trade in plain vanilla IRS contracts before and after the implementation of the trade mandate (February 2014)



Sources: LCH data and Bank calculations.

- **Analysis of TR data**: The Bank is also at the forefront of analysis that exploits transactional data obtained from TRs (see Box 6). In January 2017, the Bank published one of the first detailed studies using TR data to analyse the market response to an unexpected policy shock. The analysis studies, in granular detail, trading activity in FX forwards and options in the minutes immediately after the Swiss National Bank unexpectedly changed its exchange rate regime in favour of allowing the Swiss franc to float freely. This work demonstrates that the large intraday moves in the Swiss franc exchange rate observed in the first hour after the policy announcement could be traced to poor market liquidity as interbank dealers temporarily withdrew from the market.

The Bank will continue its research programme in 2017, in pursuit of the four aims described above. The upcoming programme includes, among other topics, the determinants and characteristics of centrally cleared and non-centrally cleared transactions; to explore the pricing differential on equivalent trades cleared on different CCPs; and to map the different layers of the OTC derivatives network.

Box 2
Assurance and accountability — findings and actions from independent reviews of the Bank's supervision of FMIs

As part of the Bank's commitment to carry out its supervision of FMIs in an open and transparent manner, it welcomes the opportunity to undergo independent review of its supervision both to ensure accountability and improve its approach by learning from other supervisory best practice. The Bank has recently undergone three independent reviews of its FMI supervision, all of which reported a number of positive findings about the Bank's FMI supervision. These reviews were:

- the CPMI-IOSCO review of jurisdictions' application of the responsibilities set out in the PFMIs;
- the International Monetary Fund (IMF) Financial Sector Assessment Programme (FSAP); and
- the Bank's IEO.

The CPMI-IOSCO undertook an assessment and peer review of 28 jurisdictions' application of the five responsibilities included in the PFMIs. A report with the findings of this was published in 2015, in which it was concluded that the United Kingdom fully observed all of its responsibilities.[1]

The IMF reviewed the Bank's approach to FMI supervision as part of its UK FSAP. The IMF's review found that: 'Supervision of financial market infrastructures (FMIs) in the UK has significantly strengthened in recent years; the Bank of England (BoE) is one of the leaders worldwide in shaping reforms in this area. [...] Supervisory practices have become more formalized, disciplined, and standardized. In addition, the number of supervisory staff has increased. This combination under the one roof of FMI supervision, along with PRA's prudential supervision of FMI participants and central bank services allows for an approach that focusses on the resilience of FMIs in a broader context. As a result, the risk management of UK FMIs has improved in line with international standards, which contributes to their greater safety and soundness.' The review also led to a number of recommendations in three broad categories: supervision and oversight of FMIs; reduction of system-wide risks; recovery and resolution. (The complete list of recommendations is available in the published report.)[2] The Bank has developed a programme of actions in response to these recommendations, with significant progress already made.

Finally, the IEO review was requested by the Bank's Court of Directors to assess the Bank's approach to FMI supervision, and to give the Court assurance about the Bank's approach to its statutory responsibilities. The review also assessed whether recent investments in FMI supervision are on track to deliver the enhancements that were intended. The review specifically evaluated whether: the Bank has articulated its strategy and objectives clearly; there are clearly-defined success criteria for the supervisory approach; staff and resources are appropriately and effectively organised; governance arrangements are effective; there is an appropriately agile and forward-looking approach.

The IEO evaluation concluded: 'Investments made by the Bank in recent years have had the desired effect.'[3] And that 'the Bank is delivering effective, risk-based and forward-looking supervision in respect of FMIs. Our work found that FMI supervisors had adapted effectively the approach used by their counterparts in the PRA, and had appropriate processes in place to scan for emerging risks. We also noted the significant commitment that the Bank has made to cross-border collaboration, as well as the positive feedback that it has received in this regard.'[4] It added: 'We found no evidence of material shortcomings in the supervisory approach and numerous examples of good practice. For example, the quality of the FMI Directorate's technical analysis was widely praised, both by internal stakeholders and by international contacts. And there was evidence that policy analysis and research originating in the FMI Directorate had made material contributions to the Bank's international policy agenda.'[5]

Looking forward, the IEO review identified three broad areas in which it believes the Bank could further strengthen its approach to the supervision of FMIs to match their increasing importance:

- clarify objectives and responsibilities of FMI supervision at the Bank more fully;
- support the specialist unit that is the FMI Directorate by leveraging the wider Bank as effectively as possible; and
- continue to strengthen governance, including by revisiting the question of third-party challenge.

The complete list of recommendations is available in the published report. The Bank accepts these recommendations, and has published a response setting out how it intends to implement them.[6] These actions include:

- a re-articulation of the Bank's strategy, objectives and risk tolerance in its supervision of FMIs;

(1) www.bis.org/cpmi/publ/d139.pdf.
(2) http://www.imf.org/external/pubs/ft/scr/2016/cr16156.pdf.
(3) Page 5; www.bankofengland.co.uk/about/Documents/ieo/evaluation0217.pdf.
(4) Page 6; www.bankofengland.co.uk/about/Documents/ieo/evaluation0217.pdf.
(5) Page 28; www.bankofengland.co.uk/about/Documents/ieo/evaluation0217.pdf.
(6) www.bankofengland.co.uk/about/Documents/ieo/fmidresponse0217.pdf.

- the PRA and FMID agreeing a more formal approach to use of PRA specialist resources;
- increasing the level of specialist expertise available to FMID in operational risk and resilience;
- reviewing the responsibilities of internal committees for FMI supervision and the membership of FMI Board, as well as adding independent members to FMI Board during 2017; and
- consulting in 2017 on levying fees for FMI supervision with a view to any changes commencing in 2018 when the Cash Ratio Deposit is renewed.

The Bank welcomes the IEO's thorough and independent assessment, which recognises that the Bank has proactively made major enhancements to its supervision of FMIs in recent years and observes that the Bank is an acknowledged world leader in the field of FMIs. The Bank also welcomes the constructive recommendations of the report, and is committed to implementing them, as they represent pragmatic ways in which the Bank can further enhance its supervision of FMIs. This will ensure the Bank continues to deliver rigorously on its supervisory objective to ensure the resilience of services provided by UK FMIs, as well as serving to protect and enhance the stability of the financial system within the United Kingdom and internationally.

Domestically, the Bank co-operates with both the Financial Conduct Authority (FCA) and Payment Systems Regulator (PSR) in relation to supervising market infrastructure and payment systems respectively.[1] The frameworks for co-operation with these authorities are set out in memoranda of understanding which the signatories are required to review annually.[2]

The Bank and FCA also reviewed their co-operation regarding supervision of market infrastructure in 2016 and concluded that the MoU's arrangements for co-operation remain effective, with appropriate co-ordination and no material duplication. Industry respondents acknowledged the efforts made on co-operation and emphasised its importance for product approvals and policy initiatives. The authorities remain committed to effective co-operation and staff will work together to take forward those suggested improvements identified by industry to enhance co-ordination between the authorities where a new product or project encompasses trading platforms and clearing houses in the same group.

A review of the first year of co-operation between the Bank, PSR, FCA and PRA was published in July 2016[3] and concluded that co-operation and co-ordination under the MoU is working well. Some minor changes to the MoU were agreed to reflect the expansion of the PSR's remit since the MoU was first signed in 2015.

Many of the FMIs supervised by the Bank are used by market participants internationally. CCPs, in particular, can be systemically important in multiple jurisdictions. Therefore, the Bank is at the forefront of international co-operation with respect to the supervision of FMIs through creating global supervisory colleges for the most internationally significant UK CCPs. The Bank also participates in colleges of non-UK CCPs and other FMIs that are critical to the UK financial system, but are supervised by other regulators.

Although the organisation of and legal basis for such colleges varies, they are an avenue for regulators from jurisdictions where supervised FMIs operate to provide their views and challenge the supervisory approach to the FMI in question.

In 2016, the Bank chaired global colleges for LCH and ICE Clear Europe bringing together supervisory authorities from 15 different countries in total, to enable them to contribute to and have confidence in the Bank's supervision of the globally systemically important FMIs within its remit.

EMIR requires the Bank to consult a college of EU authorities on decisions related to CCP authorisation, significant changes to risk models, and the introduction of new products. In 2016, the Bank reviewed the effectiveness of each of the four EMIR colleges for UK CCPs, and, based on feedback from college members, concluded that the colleges worked effectively in discharging their responsibilities.

In addition to CCP college arrangements, the Bank also co-operates bilaterally with other international authorities with respect to the UK FMIs it supervises, notably with the Commodity Futures Trading Commission (CFTC) and the Securities Exchange Commission (SEC) in the United States in relation to UK CCPs registered with those authorities. Additionally the Bank and ECB have agreed enhanced arrangements for information exchange and cooperation regarding UK CCPs with significant euro-denominated business.

The Bank also continues to participate in the oversight arrangements for CLS, chaired by the New York Federal Reserve Bank, and the co-operative oversight arrangements for SWIFT, organised by the National Bank of Belgium.

(1) A review of the first year of co-operation between the Bank, PSR, FCA and PRA was published in July 2016 and concluded that co-operation and co-ordination under the MoU is working well. Some minor changes to the MoU were agreed to reflect the expansion of the PSR's remit since the MoU was first signed in 2015.
(2) Memoranda of Understanding: www.bankofengland.co.uk/about/Documents/mous/statutory/moumarket.pdf; www.bankofengland.co.uk/about/Documents/mous/statutory/moupsr.pdf.
(3) www.bankofengland.co.uk/publications/Pages/news/2016/059.aspx.

Chapter 3: Report on the Bank's supervision of FMIs over the past year

Over the past year, the Bank's supervision of FMIs has contributed significantly to delivering its statutory objective to protect and enhance the stability of the financial system of the United Kingdom. The Bank has done so by both requiring FMIs to mitigate the key risks they face and also gaining assurance that they are operating in a robust and resilient manner. The Bank's key areas of focus in 2016 included FMIs' governance, ability to recover from an operational outage, and continuity of services to participants during a resolution scenario.

3.1 FMIs' performance and resilience during 2016

A number of events tested the resilience and robustness of FMIs in 2016. These included the potential for market disruption following the referendum on the United Kingdom's membership of the European Union and the US presidential election, cyber fraud incidents involving users of the SWIFT network, as well as idiosyncratic challenges such as physical damage to LME Clear's main premises (as outlined in 3.2.4). Despite such challenges, FMIs maintained a high level of operational availability, and also made a number of improvements to further enhance their resilience as a result of the Bank's supervisory review work.

3.2 Review of supervisory activity during 2016

Over the course of 2016, the Bank's supervision of FMIs included focus on the following priority areas:

- FMIs' operational resilience (3.2.1, 3.2.4);
- Board effectiveness and governance (3.2.2);
- CCP recovery and resolution (3.2.8); and
- continuing to work with EUI to further its application for authorisation under CSDR (3.5).

The Bank also focussed on addressing any additional issues uncovered in the course of its supervisory reviews, as well as carrying out its programme of core assurance reviews. Finally, the Bank also conducts a programme of cross-FMI thematic work and analysis, some undertaken as part of the core assurance programme, but also others independently of it. **Table B** provides a summary of the principal thematic reviews undertaken during 2016; many of these are outlined in greater detail in the sections that follow.

Table B Cross-FMI thematic reviews in progress during 2016[(a)]

FMI Type	Thematic review
Multiple FMIs	Cyber risk and resilience (3.2.3)
Multiple FMIs	Outsourcing and oversight of critical service providers (3.2.3)
CCPs	Default management (3.2.3)
CCPs	Margin add-ons for concentration risk (3.2.5)
CCPs	Client porting (3.2.3)
CCPs	Procyclicality of credit rating deterioration
CCPs	Contingency planning for extended operational outages (3.2.4)
Payment systems	Participant requirements and incident management (3.2.1)
Payment systems	Tiering (3.2.1)
Payments systems	Governance (3.2.2)
Payments systems	Financial risk management (3.2.6)

(a) This table contains reviews started in 2016, as well as those which started in 2015 but a material proportion of the review was carried out in 2016.

The following sections set out the various areas of supervisory focus and risk mitigation over the course of 2016, structured according to the Bank's supervision risk model for FMIs (as set out in the Bank's *Approach*). These sections capture the priorities, thematic assessments, and core assurance modules set out above, as well as supervisory work which may not fall into these categories.

3.2.1 Promotion and maintenance of standards

In H1 2016 the Bank concluded a review of how the **recognised payment systems manage risks emanating from participants and participants' compliance with their standards**. The review highlighted some areas where payment systems could improve their frameworks for ensuring participants comply with their requirements, as well as how payment systems make use of appropriate management information during their incident management processes. The relevant payment systems are implementing improvements to these practices as a result.

Box 3
FMIs' performance during the EU referendum period

With the approach of the date of the referendum on the United Kingdom's membership of the European Union (June 23), the Bank recognised at an early stage that the period before and after the referendum (the referendum period) could pose a number of potential challenges to the FMIs it supervises. These included:

- Potential capacity constraints across FMIs, arising from an increased volume of transactions undertaken during a period of uncertainty, and the potential signalling effect as well as impact on financial stability if operational issues meant FMIs were unavailable during this particular period.
- In the event of increased market volatility, potential risks arising from fluctuations in the value of exposures and the collateral securing these.

Consequently, FMI related issues formed a key part of Bank-wide contingency work on mitigating the potential risks around the referendum period. In the period leading up to the referendum, the Bank was in regular contact with supervised FMIs, which provided the Bank with regular updates including Key Risk Indicators related to the event. On the day itself, and in the days that followed, the Bank continued to receive such updates, and also closely monitored the FMIs for signs of operational disruption or financial strain (for those FMIs exposed to credit or liquidity risk arising from their participants). Where relevant, the Bank updated other regulators on market developments concerning the referendum over the period.

Global financial markets did indeed experience significant volatility, with a substantial element of these moves occurring immediately after the referendum.[1] Equity indices fell substantially in some markets, sterling and euro-denominated investment-grade corporate bond spreads rose, and ten-year government bond yields fell by between 50 and 90 basis points. Sterling experienced its largest two-day fall against the dollar in the post Bretton Woods era (**Chart 4**). However, in general the impact of the referendum on supervised FMIs was limited and well-contained. Where appropriate, FMIs took action to ensure market volatility did not impinge on either their risk management practices, or operational capacity to process transactions. Generally, FMIs operated their systems without disruption during the referendum period.

Chart A Depreciation in sterling as referendum result became clear

Source: Bloomberg.

Nonetheless, the Bank's supervisory responsibility to ensure that FMIs place appropriate focus on systemic risk management can always benefit from the experience of events such as this, and the Bank's areas of focus can be refined accordingly. Consequently, where lessons learnt on the day can be leveraged to further improve risk management practices, the Bank has followed up with individual FMIs accordingly.

(1) As outlined in greater detail in the *Financial Stability Report* of July 2016; www.bankofengland.co.uk/publications/Documents/fsr/2016/fsrjul16.pdf.

In February 2016 fraudulent payment instructions were maliciously sent to the value of $81 million from accounts belonging to the central bank of Bangladesh using connections to the SWIFT network. This highlighted the importance of FMIs considering vulnerabilities among their participants and other relevant stakeholders. Therefore while this, and other, recent cyber attacks against participants of SWIFT's financial messaging network did not directly compromise the SWIFT network, oversight activity has included ongoing monitoring of the development and implementation of SWIFT's Customer Security Programme through the international cooperative oversight arrangements.

More generally the CPMI has established a task force[1] to look into the security of wholesale payments that involve banks, FMIs and other financial institutions. The first phase of this work seeks to review current practices and will proceed based on its findings. It is building on previous work by the CPMI on cyber security and operational risk, and existing procedures to continuously test and strengthen infrastructure.

The Bank has been considering the tiering arrangements across FMIs. Tiering refers to arrangements whereby a small number of direct participants provide operational access to a larger number of indirect participants. Tiering increases exposures between direct participants and the indirect participants whose access to FMIs they facilitate, as well as creating operational dependencies between indirect and direct participants.

(1) www.bis.org/press/p160916.htm.

The Bank has worked with CCPs to identify the risks associated with tiered arrangements and has also been developing action plans to better monitor and manage these risks. The Bank has also carried out a cost benefit analysis of additional de-tiering in payment systems, with specific focus on how the balance between the liquidity efficiency inherent in a tiered system compares to the risks of depending on a small number of settlement banks.

FMIs have continued to increase their direct participant base, with two new CHAPS direct participants, three new FPS participants, and two new CREST settlement banks. The additional participants in the latter case will help reduce intra-day exposures building up between participants as well as reduce operational dependencies on a small number of participants.

Ensuring participants' connections to FMIs are robust is an important component of mitigating operational risk. **Therefore, EUI has been progressing the CREST dual connectivity initiative**. Dual connectivity is an initiative to ensure key CREST participants have a backup method of connecting to CREST in the event their primary connection is unavailable. The majority of targeted settlement banks are now able to connect to CREST over two networks, improving operational resilience. The Bank will continue to monitor the further development of this programme and how the participants' ability to connect to CREST is tested.

3.2.2 Management and governance

Ensuring FMIs' Boards are able to carry out their roles overseeing the regulatory responsibilities of their FMIs is a key priority for the Bank. Therefore, the Bank has reviewed governance arrangements across a selection of CCPs and payment systems. The review focussed on the structure and composition of the FMIs' Boards, and whether the FMIs' Boards maintained effective oversight of how the executive operates. The outcome of this review has included in some cases increasing the proportion of independent directors on the relevant Board.

Visa Inc's acquisition of Visa Europe concluded in June, uniting the Visa brand while retaining the UK legal entity as a subsidiary of Visa Inc. The Bank assessed how the transaction could impact on its supervisory objectives, including whether it would present any impediments to Visa Europe being able to meet the Bank's regulatory requirements.

In the previous *Report*, The Bank committed to review whether any changes are necessary to the supervision of the United Kingdom's high-value payment system. As part of the Bank's consultation on proposals to design a new RTGS service,[1] the Bank set out that it is looking at its own role in delivering payment and settlement services, including the model for the delivery of the high-value payment system. This review includes assessing how the Bank supervises the high-value payment system. The Bank will announce the findings from this review in due course.

3.2.3 Risk management and controls

The Bank has carried out reviews of enterprise-wide risk management, as well as a more specific **review of cyber risk management, across a range of FMIs**. These reviews were intended to ensure FMIs' risk management functions were operating effectively, and were adequately focussed on the increasing risk of cyber threats. The reviews have now moved on from the stage of assessing the cyber resilience capabilities of FMIs to communicating next steps (including any points for remediation) to them.

CCPs have carried out tests of their default management procedures, known as 'fire drills'. As set out in the previous *Report*, the Bank also developed, jointly with BaFin and Deutsche Bundesbank, an exercise for LCH and Eurex Clearing AG to carry out **'parallel' default management fire drills**. The aims of this exercise were to assess: clearing members' ability to second staff to default management groups of more than one CCP; the operational capacity of clearing members and CCPs to hedge in a scenario of parallel default across CCPs; and clearing members' ability to receive and process multiple auction files. These drills took place during February 2016. Along with colleagues from BaFin and the Bundesbank, the Bank observed the fire drills; carried out post-drill bilateral meetings with the two CCPs and seven of the largest clearing members participating in the drill; and also reviewed relevant procedural documentation.[2] This exercise was complemented by broader work that identified valuable findings, which the Bank has used to identify best practice, and required CCPs to assess their own default management procedures against.

As part of the wider focus on default management, the Bank has also carried out a cross-CCP review of the arrangements to transfer the clients of defaulting clearing members across to non-defaulting members (known as 'porting'). Section 4.1.2 outlines one avenue via which the Bank intends to carry the findings of this work forward in 2017.

Finally, the Bank has also carried out a review of how BPSL and FPSL (the operators of Bacs and FPS respectively)[3] manage debit caps. Debit caps control the maximum value of payments participants are able to send into the system without receiving offsetting payments. Caps that have been set incorrectly could result in participants being unable to process customers' payments and significantly reduce confidence in the participants' ability to make payments as they fall due.

(1) www.bankofengland.co.uk/markets/Documents/paymentsystem/cp160916.pdf.
(2) Summarised in www.bankofengland.co.uk/publications/Documents/speeches/2016/speech939.pdf.
(3) See Annex 1 for further detail on the various UK payment systems and their operators.

Box 4
The Bank's approach to reviewing CCPs' applications for new products and risk model changes

The four CCPs supervised by the Bank regularly seek to expand the set of products they clear. They also propose changes to their risk management arrangements, for example to introduce a new or revised margin model or a new set of stress-testing scenarios, sometimes in connection with a new product launch. The Bank asks each CCP to submit details of its forward 'pipeline' of change proposals every three to four months in order to inform a prioritisation exercise designed to ensure that supervisory resources are appropriately allocated. This exercise involves determining the significance of each proposal, such that more substantial changes are reviewed more closely than incremental changes that have only a modest impact on the risk profile of the CCP. The Bank prioritises proposals that help to reduce systemic risk, and also takes into account the quality of the submissions from CCPs in determining which proposals to prioritise.

The review process involves supervisors and quantitative risk specialists challenging the CCP to justify its proposed approach to risk managing new products or the case for adopting new or revised risk management arrangements. This includes assessing the conceptual soundness and internal coherence of the risk modelling framework; analysing the empirical evidence provided by the CCP to demonstrate that the framework is reliable and robust in a range of market conditions; verifying compliance with all applicable regulatory requirements; and assessing the quality and findings of the independent validation undertaken and submitted alongside the proposal. The ultimate aim of the process is to ensure that, once launched, the new products or risk management arrangements do not undermine the resilience of the CCP. The Bank will not allow a CCP to proceed with a specific change proposal until it is confident that the proposal is both prudent and in line with relevant regulatory standards.

Under European law, additional services and activities not covered by the existing authorisation and significant changes to risk management arrangements must also be reviewed by the EMIR college and (in the latter case only) validated by ESMA before final approval to proceed can be granted. The Bank routinely liaises with members of EMIR colleges for UK CCPs when it is notified about change in relation to new products or significant risk management changes, but retains ultimate discretion to determine the appropriate regulatory approval process. The Bank also shares the findings of its own reviews with college members and ESMA, in order to help form their own assessment of proposals put forward by UK CCPs as well as provide valuable challenge to the Bank's analysis. Through this mechanism, the college review process can provide additional assurance that risks are appropriately managed.

3.2.4 Disaster recovery plans

Given the systemic nature of FMIs, **the Bank views FMIs' ability to recover quickly from operational outages as a key area of focus**. The Bank therefore set a number of FMIs Priorities around ensuring their business continuity planning is sufficiently robust. As a result of these Priorities these FMIs have made improvements to their business continuity plans. In some cases, the Bank has required FMIs to appoint an independent expert to review their business continuity plans to gain additional assurance.

Additionally, **ensuring participants entering into resolution are not excluded from the services offered by FMIs is a priority for the Bank**. Excluding participants in resolution from accessing FMIs' services could result in a disorderly resolution. Some payment systems have therefore made changes to their rules which mean participants are no longer automatically excluded from the system when they enter into resolution. This provides additional certainty to other participants during a resolution scenario and should make the process of resolving FMI participants more orderly.

A key part of acting as a systemic risk manager is to maintain adequate oversight of third party providers of outsourced services when they are responsible for delivering key components of an FMI's operations. The Bank has therefore started a review to determine how FMIs maintain oversight of third-party providers as part of its core assurance work. The Bank anticipates this review will be concluded in 2017.

Finally, the adequacy of LME Clear's contingency arrangements was tested when an issue with its primary site meant that it needed to conduct operations from its secondary site for an extended period of time. LME Clear was able to continue operating with no disruption to its provision of service.

3.2.5 Collateral margin and default funds

As set out in Box 4, CCPs regularly seek to extend the range of products they clear and make changes to their methodology for calculating margin and default fund requirements. The Bank requires CCPs to demonstrate that the risks associated with these changes will be managed prudently and the CCPs' approaches remain in line with the relevant regulations. The Bank therefore **reviews material applications from CCPs relating to new products, services, or changes to their risk methodologies**. The Bank, alongside the relevant supervisory colleges (Section 2.3), received and processed 68 applications in 2016.

The Bank also carried out wide ranging reviews of CCPs' intraday margining practices, margin model governance, collateral policies, and the level of concentration margin they hold to cover large positions that may be more difficult to manage in a default scenario. The reviews showed that CCPs are compliant with the requirements set out in EMIR and identified areas of best practice which the CCPs are implementing as part of their 2017 supervisory workplans.

3.2.6 Capital

To ensure payment systems are able to meet their obligations as they fall due, the Bank has started a review into the design and resilience of the payment systems' sources of capital and processes for raising it for funding purposes. The review will also cover how payment systems manage financial risks to their operations. This review will conclude in 2017.

As part of its broader work to assess EUI's compliance with the requirements of the forthcoming CSDR, the Bank has been working with EUI to consider its capital requirements and resources in light of this regulation.

3.2.7 Liquid resources

The Bank has carried out reviews of liquidity frameworks across a number of FMIs. These reviews focussed on (among other things) how FMIs assess the liquidity risks they face and how they secure cash collateral. The outcome of these reviews confirmed the adequacy of the FMIs' liquidity frameworks, albeit with potential improvements in practice that were communicated and will be addressed. Work is also underway with some CCPs to assess how they could further mitigate risks associated with investment of margin, for instance by increasing the number of investment counterparties they face and also how they engage with investment agents.

3.2.8 Recovery and resolvability

CCPs have been iteratively updating their recovery plans over the course of the year, with the Bank providing review and input (and involving college members also in its review). The Bank's involvement of both global and EMIR college members in this review sets a precedent in leveraging their skills and expertise.

Should recovery measures prove inadequate, resolution of an FMI cannot be ruled out. Crisis Management Groups (CMGs) are designed to provide a framework for authorities to plan the orderly resolution of FMIs that are judged to be systemically important in more than one jurisdiction. The Bank in its capacity as resolution authority established in 2016 a CMG for ICEU. This follows on from the Bank establishing the first CMG for LCH in 2015.

3.3 Shaping domestic and international policy development

The Bank plays an active role in shaping both the domestic and (given the number of large, internationally active FMIs operating in the United Kingdom) international policy landscape within which FMIs operate. This section sets out key areas where the Bank has either led or actively contributed to policy development.

3.3.1 Consultation on payment systems code of practice

In September, the Bank consulted on the governance section of a new code of practice for operators of recognised payment systems. When published, the code will set out more detailed requirements which all operators of recognised payment systems[(1)] will be required to follow. Alongside this consultation, the Bank also published a draft supervisory statement which, when finalised, will provide additional guidance around applying the expectations contained in the code. The code will set out the Bank's expectations around how the operators of recognised payment systems should discharge their responsibilities as systemic risk managers in respect of their governance (Box 5).

As with other regulatory regimes (such as EMIR and CSDR) the PFMIs form the basis for the code. As the code is intended to provide clarity on the requirements set out in the PFMIs, in some areas it will provide more detailed guidance and specific requirements than the PFMIs.

3.3.2 FSB Workplan on CCPs

The FSB, together with CPMI, IOSCO, and BCBS, developed a workplan in 2015 which set out actions aimed at enhancing CCPs' resilience to, and ability to recover from, financial shocks, and the further development of resolution tools in case recovery is not possible. A joint study group was also established to analyse and quantify the interdependencies between CCPs and other financial institutions.

In August 2016 the FSB published a discussion note on CCP resolution planning[(2)] and a progress report setting out CCPs' progress on implementing OTC derivative market reforms.[(3)] The discussion note on resolution planning identified a number of issues for consideration for the effective development of resolution plans for CCPs. These included the point of entry to resolution, the tools available to a resolution authority, and the adequacy of financial resources in resolution.

Alongside the FSB's work, CPMI-IOSCO published a report summarising how selected CCPs manage financial risk and recovery planning,[(4)] and a consultation on the resilience and recovery planning of CCPs.[(5)] The former report included a UK CCP and overall concluded that the ten CCPs reviewed have made important and meaningful progress in implementing arrangements consistent with the PFMIs. However, some gaps and shortcomings were identified across a subset of CCPs,

(1) Excluding operators of payment systems embedded within other FMIs.
(2) www.fsb.org/wp-content/uploads/Essential-Aspects-of-CCP-Resolution-Planning.pdf.
(3) www.fsb.org/wp-content/uploads/OTC-Derivatives-Market-Reforms-Eleventh-Progress-Report.pdf.
(4) www.bis.org/cpmi/publ/d148.pdf.
(5) www.bis.org/cpmi/publ/d149.pdf.

particularly in recovery planning. UK CCPs are already required by domestic legislation to have recovery plans in place that are consistent with international guidance on FMI recovery.

The latter report is a consultation paper which proposed more granular guidance around how CCPs should implement a number of key aspects of the PFMIs including the credit and liquidity risk management principles (for example how CCPs should mitigate procyclicality in their margin models). The guidance also proposes requirements for CCPs to disclose key elements of their risk management arrangements, for example to disclose the scenarios they use in their stress testing to clearing members and wider stakeholders.

Collectively these published documents represent significant milestones towards further strengthening CCPs' resilience, recovery planning, and resolvability. The Bank contributed to the development of these documents, and also hosted roundtables with UK CCPs and financial institutions to allow these stakeholders to share their views on the consultation papers. The FSB has committed to consult on and finalise more detailed guidance around CCP resolution by July 2017.

3.3.3 Multi-CCP stress testing

In early 2016, ESMA completed its first multi-jurisdiction supervisory stress test of CCPs. Encompassing 17 EU CCPs, including all four UK CCPs, it concluded that European CCPs would be resilient to extreme but plausible market conditions. The Bank will continue to engage with ESMA as required, as well as with the CPMI-IOSCO on work to develop an international CCP stress testing framework (Section 4.2.1).

The CFTC has also conducted an exercise applying internally developed supervisory stress tests to five derivatives CCPs registered with them, including two supervised by the Bank (LCH and ICE Clear Europe). The results of this exercise were published[1] in November 2016. It was found that the CCPs — including those supervised by the Bank — met or exceeded required resiliency levels, and had the financial resources to withstand a variety of extreme market price changes across a wide range of products and instruments.

3.3.4 The Payments Strategy Forum

The Payments Strategy Forum (PSF) was set up by the Payment Systems Regulator (PSR) in 2015 to identify and help deliver initiatives where the payments industry can work collaboratively to promote innovation. The PSF is led by an independent Chair, and comprises 22 members drawn from industry, including advocates for consumers, retailers, government, and banks. The Bank attends Forum meetings as an observer, along with the FCA and PSR.

The PSF's Final Strategy[2] was published in November 2016, and outlined its proposals to ensure the payment systems remain fit for purpose in the face of (among others) changing consumer demand and technological innovation. These include initiatives aimed at tackling financial crime and simplifying access to payment systems. The strategy also proposed a 'new architecture' for UK payments, with further design work for this proposal continuing throughout 2017, and the consolidation of the operators of Bacs, FPS and Cheque & Credit Clearing.

3.4 Authorisation and recognition of FMIs

The statutory frameworks underpinning FMI supervision often include either an authorisation or recognition regime. For example, UK domiciled CCPs must be authorised under EMIR, and a similar authorisation regime is expected to apply to CSDs under the CSDR from 2017. By contrast, payment systems operate under a separate 'recognition' regime whereby HM Treasury recognises payment systems which are systemically important to the UK financial system, which brings them into scope of Bank supervision.[3] Payment systems do not require recognition to operate.

3.4.1 ICEU authorisation under EMIR

ICEU was authorised under EMIR on 19 September 2016, meaning that all UK CCPs are now authorised under EMIR. The authorisation means that ICEU can offer its clearing services throughout the European Union and members of ICEU can satisfy the European clearing mandate for credit default swaps (CDS), which enters into force in February 2017, by clearing these products at ICEU.

3.4.2 Recognition of LINK

On 23 May 2016 HM Treasury used its powers contained in the Banking Act (2009) to recognise the LINK ATM network as the sixth systemically important payment system in the United Kingdom. As a result the network was brought under the Bank's supervisory remit from the point of recognition.

Cash continues to be one of the primary methods of payment in the United Kingdom and comprised 45% of the total volume of payments made in 2015.[4] The LINK network processes the vast majority of interbank cash withdrawals in the United Kingdom and therefore it is of systemic importance to the stable operation of the UK economy. Falling under the Bank's supervisory remit will require LINK to maintain the Bank's standards for systemically important payment systems, enhancing the resilience of the LINK network as a critical component of the UK financial sector.

(1) www.cftc.gov/idc/groups/public/@newsroom/documents/file/cftcstresstest111516.pdf.
(2) https://www.paymentsforum.uk/sites/default/files/documents/A%20Payments%20Strategy%20for%20the%2021st%20Century%20-%20Putting%20the%20needs%20of%20users%20first_0.pdf.
(3) In addition to authorisation under EMIR and CSDR, there is also a recognition regime for CCPs and CSDs under FSMA, on which see Annex 7.
(4) www.link.co.uk/media/1227/uk-cash-cash-machines-2016-summary.pdf.

Box 5
Defining the role of a systemic risk manager

A key cornerstone of the Bank's supervisory approach is that FMIs are required to act as systemic risk managers. The concept of and requirement for FMIs to act as systemic risk managers has been set out at a high level in the Bank's *Approach*, and is also outlined at a high level in the *PFMIs*. But the Bank has identified a need for further clarity on what such expectations mean in practice.

The Bank has provided greater clarity around its requirements for the governance of payment systems through a consultation on a draft code of practice and supervisory statement relating to the governance of recognised payment systems.[1] The supervisory statement accompanying the consultation sets out the Bank's expectations as to how operators of payment systems recognised under the Banking Act (2009) should act as systemic risk managers.

The consultation noted that operators of recognised payment systems are responsible for promoting the safety and efficiency of the payment system and support the stability of the broader financial system. The supervisory statement sets out in more detail what the Bank expects a systemic risk manager to deliver. For example, systemic risk managers should consider (among other risks):

- the financial risks that can build up between the payment system and participants, or between different participants;
- undertaking testing of the payment system, including simulating its operation in extreme scenarios; and
- the risks posed by the recognised payment system to other FMIs.

The Bank recognises there may be a need for more clarity with respect to its expectations for CCPs and CSDs. Consequently, as part of its actions to address the findings from the IEO review of FMI supervision (Box 2), the Bank has commenced an assessment of supervisors' and FMIs' understanding of their systemic risk management responsibilities. This review aims to ensure that this is framed with equal clarity (publicly, if necessary) for CCPs, CSDs and payment systems.

(1) *Code of Practice and Supervisory Statement relating to governance in recognised payment system operators*; www.bankofengland.co.uk/financialstability/Documents/fmi/governance_rps.pdf.

3.5 The Bank's performance against its statutory objectives and prior commitments

As set out in Section 3.2, the Bank's ongoing supervision of FMIs and its pursuit of FMI-related policy objectives are driving improvements in FMIs' resilience in a number of areas. Given the central role played by FMIs in the wider UK financial system, improvements in FMIs' resilience also improves the resilience of the wider financial system. Thus, the Bank believes its ongoing supervision of FMIs has played a vital role in delivering the Bank's wider financial stability objective.

Although not statutory requirements, the Bank notes it met all but two of the commitments set out in the previous *Report* (and recapped in Annex 4). Regarding commitment 4.2.5, due to delays in publication of the CSDR Technical Standards, the requirement for EUI to submit an application for CSDR authorisation has not yet commenced. The Bank was therefore not in a position to assess EUI's application. Regarding commitment 4.3.4, the Bank did not undertake a cross-firm analysis of CCPs' business models, due to competing priorities. The first such review is scheduled to commence in H1 2017.

Chapter 4: Future developments and priorities for 2017

FMIs operate in a financial, economic, regulatory, and risk landscape which continues to evolve, including the implementation of post-crisis international reforms. The Bank will therefore be flexible in its approach to supervision and maintain a focus on key risks faced by FMIs. The Bank will continue to shape the policy landscape in key areas including working with the FSB and CPMI-IOSCO to develop frameworks for CCP resilience, recovery, resolution and supervisory stress testing respectively. The Bank will also assess, and where necessary, take action to address the impact of broader developments on supervised FMIs, for example any adjustments related to the United Kingdom's new relationship with the European Union and the potential for financial technology to develop the services currently provided by FMIs. Where necessary, the Bank will take action to ensure any risks to FMIs emanating from these developments are effectively mitigated.

4.1 Supervisory priorities for 2017

This section sets out the Bank's current supervisory priorities for 2017. These priorities include: further enhancing the Bank's approach to ensuring operational resilience of FMIs (4.4.1); continuing to work with international regulators to develop the framework for CCP resolution (4.2.1); assessing the impact of the proposed merger between Deutsche Börse and the LSE Group (4.1.5a); and ensuring FMIs identify and mitigate risks to their operations resulting from the United Kingdom's withdrawal from the European Union (4.1.5b). As FMIs operate in an evolving environment, these priorities are subject to change.

4.1.1 EUI CSDR authorisation

As noted in Section 3.5, delays to the CSDR technical standards' timeline meant that the requirement for EUI to provide an application for CSDR authorisation has not yet commenced. The Bank will continue to work with EUI over the coming year in respect of its compliance with the requirements of the CSDR ahead of EUI providing an application for authorisation under it. The requirement for CSDs to submit an application for authorisation will come into force six months after the publication of the CSDR Technical Standards, which the Bank envisages will take place in 2017.

4.1.2 Multi-CCP fire drill

Building on the 2016 multi-CCP default management fire drill, the Bank has agreed with BaFin, Bundesbank and the CFTC to extend the 2017 exercise further to run across three CCPs — CME Inc has agreed to join LCH and Eurex Clearing in a coordinated fire drill. The scenario and objectives of the 2017 exercise are being defined and aim to be more stretching than those of the 2016 exercise. These will include testing hedging and auctioning procedures at CCPs and at members in stressed market conditions. The authorities are also considering testing the capacity of client porting arrangements, given the importance of porting to ensuring an orderly clearing member default.

4.1.3 Project to enhance CCP supervisory data returns

As noted in Box 6, the Bank makes use of a wide range of data to inform its supervisory judgements, policy development and FMI related research, as well as helping to achieve its wider financial stability objective. The project to enhance the CCPs' supervisory data returns will result in a more regular and consistent set of supervisory data from CCPs to help support these goals.

4.1.4 Supervisory assurance work

In addition to the priorities set out above, supervisory work is also planned for 2017 to assess operational resilience, tiering, and recovery and resolution. This work is intended to give supervisory assurance to the Bank and serve as the basis for future policy development.

4.1.4(a) Operational resilience

The Bank views the operational resilience of FMIs as a key area of focus. The Bank will therefore extend the scope of its reviews of FMIs' operational resilience to cover certain FMIs not in scope for review in 2016, and to cover additional aspects of resilience (such as business continuity planning and disaster recovery). These reviews are intended to test whether FMIs' processes and operations are able to quickly resume providing their services to the market in the event of an operational outage.

In addition, the Bank also intends to carry out a review of certain FMIs' IT infrastructure resilience, to gain assurance that their infrastructure is sufficiently resilient to reduce the chances of operational outages.

4.1.4(b) Tiering

While the Bank has already carried out a significant amount of work on reducing the risks associated with tiering (Section 3.2.1), a key part of the Bank's planned supervisory assurance work in 2017 will be to review how FMIs are implementing relevant risk-reducing actions.

4.1.4(c) Recovery and resolution

As set out in Section 3.2.8, the ability for FMIs to recover from financial distress and, in extremis, continue providing their services to the market while in resolution is critical to financial stability. The Bank will therefore carry out a review into certain FMIs' recovery plans in 2017. The Bank also intends to review payment systems' plans in light of the upcoming extension of the Special Administration Regime (Section 4.2.4).

4.1.5 Other areas of supervisory focus

This section sets out other developments which the Bank has noted could potentially impact on supervised FMIs and will focus supervisory attention on monitoring potential risks arising from them.

4.1.5(a) London Stock Exchange Group/Deutsche Börse AG merger

LSE and Deutsche Börse announced in March 2016 an intention to merge the two companies, which was approved by both sets of shareholders in July. Completion of the merger is subject to merger control clearance from the European Commission and regulatory approvals from a number of authorities, including the Bank of England.

LSE Group is the majority shareholder of LCH, and the creation of a new holding company above LSE Group would therefore result in a change of control of LCH. Under EMIR, the Bank has a responsibility to appraise the suitability of the proposed acquirer and the financial soundness of the proposed acquisition, and to cooperate closely with relevant competent authorities for other regulated entities within the merged group in relation to this assessment.

4.1.5(b) EU withdrawal

The United Kingdom's withdrawal from the European Union could pose challenges for FMIs, including potential changes in the arrangements for providing cross-border services and the potential for further significant market moves. The Bank will seek to ensure through its supervision that FMIs are able to identify, manage, and mitigate any such risks.

4.1.5(c) Implementing the work plan of the Payments Strategy Forum

The PSF's final strategy (Section 3.3.5) sets out a number of actions which will require the Bank's input. For example, the Bank will engage with the work to design a 'new architecture' for UK payments, and the PSF has asked the Bank and PSR to work together with it on a plan to implement the consolidation of BPSL, FPSL, and Cheque & Credit Clearing.

The Bank and PSR have jointly set up the Payment System Operator Delivery Group. The group is comprised of an independent Chair, the Chairs of the entities that are proposed to be merged, and representatives from the PSF. The group will set out its proposals which will need to be endorsed by the Bank, PSR, and the Boards and shareholders of the merging entities. The process of consolidation should be underway during 2017.

4.2 Shaping the policy landscape

This section sets out the key areas of policy that the Bank will seek to shape over the forthcoming period. These include a number of changes to FMI related legislation, active participation in the FSB and CPMI work plans on CCP resilience, recovery, resolution, and stress testing, and implementing the CSDR settlement discipline regime.

4.2.1 FSB CCP Work plan

As noted in Section 3.3.3, the FSB has committed to consulting on and finalising guidelines on CCP resolution and the Bank will continue to participate in this workstream. CPMI-IOSCO has published draft guidance on CCP resilience and recovery; the Bank strongly supports the draft guidance and anticipates it will be finalised in 2017. When the guidance is finalised, the Bank will expect UK CCPs to make any enhancements necessary in order to implement it.

In addition, CPMI and IOSCO are developing a framework by mid-2017 for conducting supervisory stress tests of CCPs. The Bank is co-leading this work, which aims to provide the basis for authorities to conduct stress tests that analyse, from a financial stability perspective, the collective response of multiple CCPs to a common stress event. In this way, supervisory stress tests are expected to complement CCPs' own internal stress tests (conducted in accordance with the additional guidance described above), which focus on the financial resilience of each CCP individually.

Some international authorities, notably ESMA and the CFTC (Section 3.3.4), have already conducted and published the results of supervisory stress tests covering a range of EU and US CCPs, and experience from these exercises is helping to inform the CPMI-IOSCO initiative. One important element of the work is to develop a simple yet flexible methodology for constructing stress scenario that is both extreme and plausible, for example by respecting historical relationships between market prices, anchored around a single narrative. The CPMI and IOSCO are also considering the governance and data-sharing arrangements that would be needed to support an exercise involving multiple authorities and/or jurisdictions. Using the framework set out above, the Bank intends to conduct a supervisory stress test of UK CCPs in due course.

Box 6
The Bank's use of data to enhance its supervision of FMIs

Data plays an essential role in helping to shape the Bank's supervisory judgments, both by helping to inform the Bank's response to known risks and helping to identify potential new risks and mitigate them before they crystallise. The Bank therefore requests a range of data from the population of supervised FMIs that it considers proportionate to collect. This includes such information as the value and volume of transactions processed by the FMIs, as well as metrics on operational capacity, uptime, and outages. The Bank will also receive new transaction level data sets which will increase its use of data to both inform its supervision of FMIs and help achieve its wider financial stability objectives. The Bank is investing in technology to maximise the benefits it gains from these data sources.

In addition to data received from supervised FMIs, since 2014 the Bank has been entitled under EMIR to receive transaction-level data from TRs on derivatives transactions that are conducted within the European Union and are either: (1) denominated in sterling, (2) cleared through a UK CCP, (3) where a UK firm is counterparty, or (in the case of CDS), (4) the derivative is based on a UK underlying.

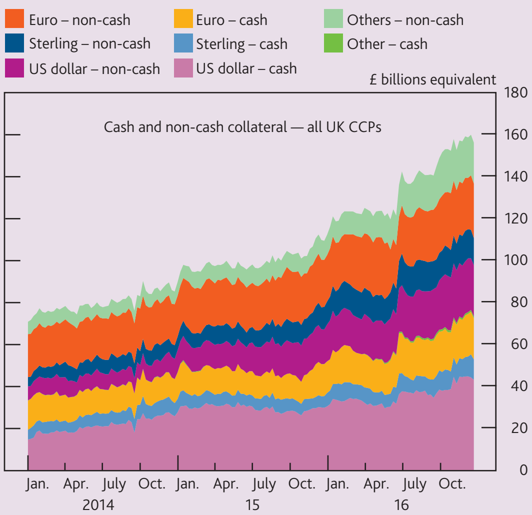
The Bank makes use of this data to inform its supervision, for example:

(I) The Bank monitors a number of Key Risk Indicators (KRIs) which are derived from the data received from FMIs. These KRIs span areas including the level of margin held by CCPs, value and volume of transactions settled across CREST, and operational uptime for payment and securities settlement systems (set out in **Charts A**, **B** and **C** respectively). These KRIs play a key role in revealing emerging trends and risks, and allow the Bank to take pre-emptive action before emerging risks crystallise.

(II) The Bank makes use of FMI data returns to inform specific supervisory reviews and priorities. For example, the Bank used CCP data returns to analyse the collateral held across the four UK CCPs and assess liquidity risks arising from the types of collateral held by such CCPs. This formed a key part of the Bank's review of CCPs' collateral management processes and practices. The Bank's project to enhance further such CCP supervisory data returns is outlined in more detail in Section 4.1.3.

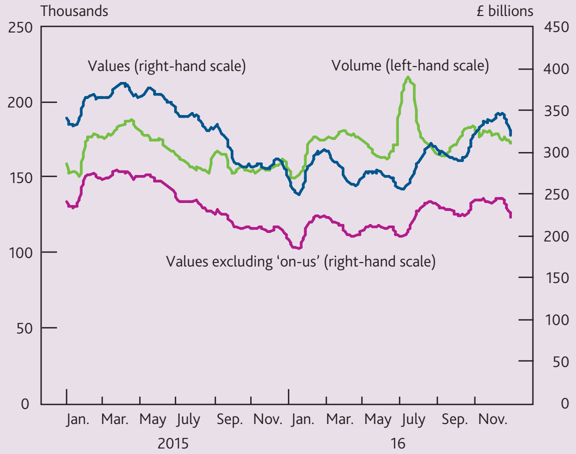
(III) The Bank uses TR data in its supervisory decision making. For example, it used this data to inform its understanding of a new market which a CCP had applied to clear.

Chart A CCPs' margin collateral split by currency and cash/non-cash



Sources: CCP regulatory reporting and Bank calculations.

Chart B Sterling DvP volume and values settled in CREST[(a)]



Source: Euroclear UK & Ireland.

(a) Ten-day moving average.

Chart C Operational availability of payment and securities settlement systems

Sources: EUI and payment systems regulatory reporting and Bank calculations.

(IV) The Bank shares a selection of data with CCP colleges to support co-operative oversight (Section 2.3) and allow college members to effectively monitor exposures and risk controls with a potential impact on their jurisdiction.

The Bank also makes use of FMI data to help achieve its wider financial stability objectives. This has been greatly facilitated by the data received from TRs. The Bank has made wide use of the TR data, including:

(I) monitoring activity and positioning in derivatives markets around significant market events;

(II) gaining a better understanding of derivatives market topology and dynamics (for example data from TRs is a component of the Financial Policy Committee's forthcoming review of risks in derivatives markets); and[1]

(III) informing the Bank's policy making committees by examining market dynamics and how they are impacted by monetary policy.

To enhance its ability to make use of the data received from TRs, the Bank is in the process of implementing a new strategic approach to collecting, processing, and storing the data. This new approach is intended to improve the Bank's ability to query and analyse such data.

The experience gained making use of TR data has served to guide the Bank's use of other transaction level data sets. This is particularly timely because the in future the Bank will have access to two additional transaction level data sets, one under the CSDR (which includes details of every transaction which has settled through CREST), and one under the Securities Financing Transactions Regulation (SFTR)[2] (which sets out details of all repo, buy/sell backs, securities lending, and margin lending trades). The Bank is developing its ability to analyse transaction level FMI data ahead of receiving these extensive new data sets.

(1) Page 52; www.bankofengland.co.uk/Pages/reader/index.aspx?pub=fsrnov16&page=1.
(2) http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32015R2365&from=EN.

4.2.2 Payment systems code of practice consultation

As noted in Section 3.3.1 the Bank will publish the governance section of its code of practice for operators of recognised payment systems. The Bank will allow a twelve month transition period from the publication date before the code enters into force. Once it enters into force, the code will be legally enforceable and the Bank will be in a position to pursue enforcement action against operators of recognised payment systems that do not comply with the provisions of the code.

4.2.3 CSDR settlement discipline regime

Alongside the authorisation requirements set out in Section 4.1.1, the CSDR also introduces a harmonised and strengthened regime to penalise counterparties for failing to settle their securities transactions. The regime will introduce stringent fines for fails, and transactions which persistently fail to settle may also be subject to mandatory buy-in requirements.

As the new regime is a step change from current practice, the Bank, FCA, and Central Bank of Ireland have jointly convened a standing group consisting of representatives from financial institutions, clearing houses, and EUI to identify and overcome any practical issues associated with implementing the regime. The regime is expected to enter into force in 2019.

4.2.4 Changes to key FMI related legislation

There are key legislative changes related to FMIs planned for 2017. These changes will, for instance, assist in the orderly resolution of a failing FMI and help to widen access to payment systems for non-bank payment institutions. The Bank will engage closely with all proposed changes to FMI related legislation.

HM Treasury has consulted on the implementation of the Special Administration Regime (SAR).[1] The SAR will provide the Bank with a wider range of tools to ensure failed payment systems continue to provide their critical functions. For example, the Bank will be able to transfer the operations of a failed system to a different entity that remains a going concern.

The Settlement Finality Regulations (SFR) ensure that payments settled in SFR designated systems are irrevocable. At present, SFR protections do not apply to 'non-bank' payment institutions (meaning 'authorised payment institutions' and 'small payment institutions' under the Payment Services Regulations 2009 (which implement the Payment Services Directive (2007/64/EC)), and equivalent overseas firms. To widen access to the payment systems, the

(1) www.gov.uk/government/consultations/rules-on-ensuring-the-effective-functioning-of-a-financial-market-infrastructure-special-administration-regime/rules-on-ensuring-the-effective-functioning-of-a-financial-market-infrastructure-special-administration-regime.

SFR protections are being extended to enable non-bank payment institutions which provide payment services to benefit from the preferential treatment afforded to banks concerning settlement finality.

The European Commission put forward a proposal for EU legislation on CCP recovery and resolution in November 2016.(1) This legislation, once in effect, is intended to establish an EU resolution regime for CCPs and place a statutory requirement on CCPs to have comprehensive recovery plans and develop an EU resolution regime for CCPs.

Finally in November 2016 the European Commission published a report on its review of EMIR.(2) Overall the Commission outlined that it does not see a need for fundamental changes to the core requirements of EMIR, however it does suggest that improvements/actions should be considered with a view to simplifying and increasing the efficiency of some requirements, and reducing disproportionate burdens. These include a mechanism to suspend the clearing obligation, assessment of the scope of firms and transactions captured by EMIR, and the process of trade reporting. The commission stated it will propose a legislative review in 2017.

4.3 Remaining vigilant to broader developments

As FMIs operate in an evolving environment, the Bank will ensure it actively monitors key developments which could impact on the stability of the supervised FMIs. These include the period of adjustment related to the United Kingdom's new trading relationship with the European Union, upcoming changes to the payment systems landscape, and potential innovations arising from financial technology.

4.3.1 Changes to ownership of payment systems infrastructure

In July 2016 MasterCard announced its intention to acquire the majority of VocaLink, significantly reshaping the UK payments landscape. MasterCard is one of the two major card schemes in the UK and VocaLink is an integral outsourced infrastructure provider of three recognised payment systems (Bacs, FPS and LINK), and these payment systems are currently operationally dependent upon VocaLink. Therefore although neither entity is an operator of a recognised payment system in the United Kingdom, both have a significant impact on the payment landscape as a whole.

Given the importance of the services provided by VocaLink to recognised payment systems the Bank will actively monitor this acquisition and will act to ensure any risks to the recognised payment systems arising from it are effectively mitigated.

4.3.2 Financial technology

As noted in a speech by the Bank's Governor(3) prepared for the Lord Mayor's Banquet for Bankers and Merchants, the continued development of financial technology offers the opportunity for large scale changes to how the financial markets conduct their business. This includes potential innovation in the services currently provided by FMIs. The Bank will maintain an active role monitoring how financial technology develops and will act to ensure any risks emanating from new developments are adequately mitigated.

For example, given that the existing power of HM Treasury to recognise payment systems which the Bank may supervise only applies to payment systems involving banks and building societies, the Bank has worked with HM Treasury to broaden the definition of a payment system in the Digital Economy Bill (2016).(4) This will allow HM Treasury to bring new non-bank payment systems under the Bank's regulatory perimeter, if they become systemically important to the UK financial system. As part of this horizon-scanning role, the Bank is also active on the CPMI-IOSCO joint working group on digital innovations.

4.3.3 RTGS Strategy Review

In January 2016 the Bank established the RTGS Strategy Review (the Review) in order to agree a blueprint for the next generation of the Bank of England's Real-Time Gross Settlement (RTGS) system. RTGS, which was established in 1996, is the heart of the United Kingdom's payments infrastructure as well as the vehicle via which the Bank implements monetary policy. It settles around £500 billion each day between accounts held at the Bank by financial institutions.

The Review(5) has a broad remit and covers a number of operational and policy matters. During the first half of the year the Bank sought input from a wide range of stakeholders. It then developed a set of proposed enhancements for the next generation of RTGS and ran a formal consultation on these during the Autumn. The intention is that in early 2017 the Bank will publish a blueprint setting out its overarching vision for high-value sterling settlement in the years ahead, with technological development of a renewed infrastructure to support this to commence shortly afterwards.

All supervised FMIs interact either directly or indirectly with RTGS (due to its role settling cash obligations across the Bank's books). Therefore the Bank expects supervised FMIs to be

(1) https://ec.europa.eu/transparency/regdoc/rep/1/2016/EN/COM-2016-856-F1-EN-MAIN.PDF.
(2) http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1481550801748&uri=CELEX:52016DC0857.
(3) www.bankofengland.co.uk/publications/Documents/speeches/2016/speech914.pdf.
(4) The progress of the bill can be tracked at: https://services.parliament.uk/bills/2016-17/digitaleconomy.html.
(5) www.bankofengland.co.uk/markets/Pages/paymentsystem/strategy.aspx.

prepared for the changes to RTGS. This includes identifying and mitigating any potential risks to their operations associated with such a large scale change in technology.

4.4 Embedding enhancements to the Bank's approach to the supervision of FMIs

To ensure its supervisory approach keeps pace with developments in the markets in which FMIs operate, the Bank will continue to enhance its supervisory approach. For example, the Bank will continue to embed the enhancements to its supervisory approach that were set out in the previous *Report*(1) and are summarised above (Section 2.2). The reviews undertaken in the course of 2016 on key risks facing specific FMIs (Section 3.2) have already provided benefits to the Bank's supervision of FMIs by identifying best practice and seeking its implementation across the range of supervised FMIs.

4.4.1 Supervisory approach to operational resilience

Ensuring continuity of access to the services provided by FMIs is a key element of the Bank's supervisory approach. FMIs' approaches to managing the many risks that could threaten their operational resilience, including their defences against cyber attacks, are consequently a supervisory priority. The Bank has previously taken steps to enhance how it assess FMIs' resilience, including introducing the CBEST programme for testing cyber resilience. The Bank will continually refine its approach, and as part of this the Bank's FMI and banking supervisors are jointly developing an enhanced micro-supervisory approach to operational resilience.

4.4.2 Completing further core assurance modules

A key part of embedding the Bank's enhanced approach is undertaking reviews under the various modules of the core assurance programme (Section 2.2). The Bank will continue to deliver core assurance modules alongside its forward-looking risk assessments. While the priority areas of focus have been set out in Section 4.1.4, the selection and timing of individual modules will be informed by the specific circumstances and risk profiles facing the individual FMIs.

4.4.3 Consultation on levying fees for FMI supervision

As noted in Box 2, the Bank will consult on levying fees for its supervision of FMIs with a view to any changes commencing in 2018 when the Cash Ratio Deposit is renewed.

4.4.4 Consultation on Enforcement Decision Making Committee

As part of its commitment to increase openness and transparency, the Bank has consulted on introducing an independent Enforcement Decision Making Committee (EDMC) to review cases where the Bank's enforcement decisions have been contested.(2) The EDMC's remit includes enforcement decisions taken in relation to FMIs.

(1) www.bankofengland.co.uk/publications/Pages/fmi/annualreport2016.aspx.
(2) www.bankofengland.co.uk/publications/Documents/other/edmc/cpedmc2016.pdf.

Annex 1: FMIs supervised by the Bank and the key supervisory legislation to which they are subject[1]

Central counterparties (CCPs) are regulated under **FSMA** as recognised clearing houses (**RCHs**) and under EMIR. The embedded payment systems of LCH.Clearnet Ltd and ICE Clear Europe are also both recognised interbank payment systems under the **Banking Act 2009**.

CME Clearing Europe Limited	Clears a range of OTC and exchange-traded derivatives and spot commodities contracts.
ICE Clear Europe Limited	Clears a range of exchange-traded derivatives and OTC credit default swaps.
LCH Limited	Clears a range of exchange-traded and OTC securities and derivatives.
LME Clear Limited	Clears a range of metal derivatives traded on the London Metal Exchange, and OTC metal contracts.

Payment systems meeting defined criteria may be recognised by HM Treasury. Recognised payment systems are supervised by the Bank under the **Banking Act 2009**.

Bacs	Operated by Bacs Payment Schemes Limited (BPSL), processes higher volume and lower value payments, such as salary, benefit, Direct Credit and Direct Debit payments.
CHAPS	Operated by CHAPS Clearing Company Limited (CHAPS Co), is the United Kingdom's high-value payment system, providing real-time gross settlement of sterling transfers between participants.
CLS	Operates the world's largest multi-currency cash settlement system for foreign exchange transactions in 18 currencies, including sterling.
Faster Payments Service (FPS)	Operated by Faster Payments Scheme Limited (FPSL), processes standing orders and electronic retail transactions, including transactions generated in internet, mobile and telephone banking.
LINK	LINK is a network of card issuers and ATM deployers which allows cardholders to use their cards to withdraw cash at any ATM connected to LINK where the ATM deployer is not the same institution as the cardholder's issuing bank.
Visa Europe	A four party card scheme and cards payments processor operating in the EEA, Israel, Turkey and Switzerland, offering debit, credit, deferred debit and prepaid card products.

Securities settlement systems may be regulated under **FSMA** as RCHs and are subject to the **Uncertificated Securities Regulations 2001** in the United Kingdom. Euroclear UK and Ireland Limited operates the CREST system, which is also a recognised interbank payment system under the **Banking Act 2009**.

Euroclear UK & Ireland Limited (EUI) CREST	EUI operates the CREST system — the securities settlement system for UK gilts and money market instruments, as well as UK equities — which settles on a gross delivery versus payment basis (EUI also operates CREST for the purposes of settling Irish equities).

(1) This Annex sets out the FMIs that are the main focus of the Bank's supervision. The Bank also has other responsibilities, such as those under the Settlement Finality Directive (see Annex 7). With the authorisation of ICE under EMIR, the status of Recognised Overseas Clearing House is no longer applicable.

Annex 2: The core assurance modules and the risk model elements they relate to

Supervisory risk assessment model	Core assurance components for FMIs		
	CCPs	**Payment systems**	**SSSs**
Promotion and maintenance of standards	• Tiering • Member requirements		
Management and governance	• Governance		
Risk management and controls	• Enterprise-wide risk management • IT Infrastructure resilience • Cyber resilience • Outsourcing • Internal audit		
Disaster recovery plans	• Business continuity/disaster recovery (including member incident management) • Member failure		
Collateral/margin and default fund	• Risk models and margin • Stress testing and default fund • Collateral risk management		
Liquid resources	• Liquidity management		
Capital	• Capital		
Recovery	• Recovery plans		
		• Continuity (SAR) planning	

Annex 3: FMI data

Recognised payment systems and securities settlement system[(a)]

		Volume 2016	Volume 2015	Value (£ millions) 2016	Value (£ millions) 2015	Number of settlement bank participants Dec. 2016	Operational availability 2016	Important payment types
Bacs		24,580,024	24,031,791	18,880	18,143	16	99.97%	Higher volume and lower value payments, such as salary, benefit, Direct Credit and Direct Debit payments.
CHAPS		154,008	148,411	298,710	270,400	24	100%	Settlement of financial market transactions including CLS sterling pay-ins and pay-outs and house purchases.
CLS	All currencies	805,587	846,044	3,587,377	3,171,521	66	99.97%	Settlement of foreign exchange transactions in 17 currencies, including sterling.
	Sterling	61,236	56,552	279,334	236,003			
CREST	Sterling	187,681	174,435	534,799	578,689	17	99.76%	Settlement of gilts, equities and money market instruments (including in respect of the Bank's Open Market Operations and repo markets transactions more generally).
	US dollar	7,253	6,202	1,755	1,470			
	Euro	4,852	4,767	912	852			
	Total CREST	199,786	185,404	537,466	581,011			
Faster Payments Service		5,636,731	4,928,992	4,700	4,114	12	100%	Standing orders and electronic retail transactions, including transactions generated in internet, mobile and telephone banking.
LINK[(b)]		3,170,800,000	3,162,650,000	129,665	127,832	39	100%	Withdrawing cash from ATMs deployed by entities other than the withdrawer's card issuer.
Visa Europe[(c)]	All issuance	58,239,926	53,433,201	2,362	2,250	478	100%[(d)]	Card payments.

(a) All value and volume data represent daily averages unless otherwise stated.
(b) Value and volume represent yearly total.
(c) Figures represent average daily volume for the year of 2016 based on processed transaction volume.
(d) All Visa Europe principal members including UK members.

CCPs (by default waterfall)

		Total initial margin requirement (£ equivalent, millions)[(a)] 2016	Total initial margin requirement (£ equivalent, millions)[(a)] 2015	Default fund (£ equivalent, millions)[(b)] 2016	Default fund (£ equivalent, millions)[(b)] 2015	Number of clearing members As at 31 Dec. 2016	Operational availability of core systems As at 31 Dec. 2016	Products cleared
CME Clearing Europe[(c)]		107	26	157	131	18	100%	Clears a range of OTC and exchange-traded derivatives and spot commodities contracts.
ICE Clear Europe	Credit default swaps	5,276	4, 524	824	798	22	99.96%	Clears a range of exchange-traded derivatives and OTC credit default swaps.
	Futures and options	30,449	21,648	1,293	1,290	74		
LCH.Clearnet Ltd[(d)]	Commodities	78	312	11	79	19	99.97%	Clears OTC and exchange-traded interest rate derivatives, OTC FX derivatives, cash equities and equity derivatives, cash bonds and repos, and commodity futures.
	Equities	1,414	983	176	180	38		
	ForexClear	874	292	352	261	25		
	RepoClear	9,630	9,091	815	806	78		
	SwapClear[(e)]	67,853	41,440	3,947	2,739	111		
LME Clear		6,248	5,684	313	363	44	100%	Clears a range of metal derivatives traded on the London Metal Exchange, and OTC metal contracts.

(a) The end of day total margin requirement (including add-ons) per default waterfall, averaged over all business days in the period.
(b) The size of the clearing member prefunded default fund, averaged over all business days in the period.
(c) For CME, the Initial Margin and Default Fund figures represent the average over Q4, and include both default waterfalls.
(d) The Initial Margin includes default fund additional margin (DFAM).
(e) The SwapClear line above covers SwapClear and Listed Rates.

Annex 4: 2016 *Annual Report* commitments

For a summary of the Bank's progress against its commitments in the 2016 *Report*, see Section 3.5. Further detail can be found in the relevant section of this *Annual Report*.

2016 *Annual Report* section	2016 *Annual Report* commitment	2017 *Annual Report* section
2.4 Co-operative supervision		
The Payment Systems Regulator		
Box 1	The Bank will continue working closely with the PSR, supporting it while ensuring [the four criteria set out to ensure changes to the payment systems landscape do not threaten financial stability] are met.	2.3
4.1 Future developments and priorities for 2016		
Payment systems landscape		
4.1.2	…the Bank will review whether any changes are necessary to the supervision model for the high-value sterling payment system.	3.2.2
4.2 Priorities for 2016		
Operational and cyber resilience		
4.2.1	The Bank will assess the appropriateness of the operational requirements that payment systems place on their participants….	3.2.1
CCP recovery		
4.2.2	The Bank will continue to assess the adequacy of recovery plans….	3.2.8
Board effectiveness		
4.2.3	The Bank will continue to emphasise the importance of capable, robust governance at regulated FMIs….	3.2.2
4.2.3	The Bank will follow up on its 2015 work on the effectiveness of CCP margin model governance….	3.2.5
Supervision under CSDR		
4.2.5	The Bank will then assess whether [EUI's] application is sufficient for authorisation.	3.5
4.3 Supervisory assurance work in 2016		
Prefunding		
4.3.1	The Bank will assess how effectively both schemes [BPSL and FPSL] are managing [the risks associated with setting debit caps incorrectly].	3.2.3
Outsourcing		
4.3.2	In 2016 supervisors plan to carry out assurance work to determine the extent to which FMIs' controls over outsourcing and group-sourcing are adequately designed and operating effectively.	3.2.4
CCP business models		
4.3.4	A cross-firm analysis of CCPs' business models is planned for 2016.	3.5
Payment systems financial risk management		
4.3.5	The Bank will conduct a cross-firm review into the adequacy of recognised payments systems' financial risk management.	3.2.6
CCP Clearing member default management fire drills		
4.3.6	Work on 'parallel' fire drills will continue, involving CCPs, regulators, and CCP clearing members to plan and execute a second 'parallel' CCP fire drill… Objectives will be more stretching….	3.2.3

Annex 5: Glossary of terms

Central counterparty
An entity that interposes itself between counterparties to contracts traded in one or more financial markets, becoming the buyer to every seller and the seller to every buyer.

Central securities depository
An entity that provides securities accounts, central safekeeping services, and asset services, which may include the administration of corporate actions and redemptions, and plays an important role in helping to ensure the integrity of securities issues (that is, ensure that securities are not accidentally or fraudulently created, destroyed, or their details changed).

Collateral
An asset or third-party commitment used by a collateral provider to secure an obligation *vis-à-vis* a collateral taker.

Credit risk
The risk of loss due to the failure of a counterparty to perform on a contractual obligation on time and in full. Credit risk arises whenever future cash flows are due from parties who may not provide them.

Default fund
A fund consisting of assets contributed by members of a system that would be used to pay liabilities of defaulting members.

Deferred net settlement
A net settlement mechanism which settles on a net basis at the end of a predefined settlement cycle.

Exposure
The maximum loss that might be incurred if assets or off balance sheet positions are realised, or if a counterparty (or group of connected counterparties) fail to meet their financial obligations.

G20
The G20 group comprises 19 countries and the European Union, representing the world's largest economies, whose finance ministers and central bank governors have met periodically since 1999.

Interoperability
An arrangement in which two or more CCPs operate a clearing link which enables clearing members of one CCP to clear trades matched with clearing members of the other interoperable CCP(s).

Liquidity risk
The risk that a party does not have sufficient funds to meet an obligation when it becomes due, or can only obtain those funds at an unexpectedly high cost.

Loss allocation
Rules specifying how losses in excess of a CCP's pre-funded resources are allocated.

Operational risk
The risk that deficiencies in information systems or internal processes, human errors, management failures, or disruptions from external events will result in the reduction, deterioration, or breakdown of services provided by an FMI, or that losses arising from these will threaten the solvency of an FMI.

Payment system
An entity enabling payments to be transferred and settled across an infrastructure according to a set of predetermined multilateral rules.

Securities settlement system
An entity enabling securities to be transferred and settled by book entry according to a set of predetermined multilateral rules. Such systems allow transfers of securities either free of payment or against payment.

Settlement risk
The general term used to designate the risk that settlement in a funds or securities transfer system will not take place as expected. This risk may comprise both credit and liquidity risk.

Annex 6: Abbreviations used in this *Report*

BCBS	Basel Committee on Banking Supervision
BPSL	Bacs Payment Schemes Limited
CCP	Central Counterparty
CFTC	Commodity Futures Trading Commission
CHAPS	Clearing House Automated Payment System
CHAPS Co	CHAPS Clearing Company Limited
CLS	Continuous Linked Settlement
CME	Chicago Mercantile Exchange
CMG	Crisis Management Group
CPMI	Committee on Payments and Market Infrastructures
CSD	Central Securities Depositories
CSDR	Central Securities Depositories Regulation
EBA	European Banking Authority
ECB	European Central Bank
EEA	European Economic Area
EMIR	European Market Infrastructure Regulation
ESMA	European Securities and Markets Authority
EUI	Euroclear UK & Ireland Limited
FCA	Financial Conduct Authority
FMI	Financial Market Infrastructure
FPS	Faster Payments Service
FPSL	Faster Payments Scheme Limited
FSB	Financial Stability Board
FSMA	Financial Services and Markets Act 2000
ICE	Intercontinental Exchange
IEO	Independent Evaluation Office
IM	Initial Margin
IOSCO	International Organization of Securities Commissions
IRS	Interest rate swap
LCH	London Clearing House
MoU	Memorandum of Understanding
OTC	Over the Counter
PFMIs	Principles for financial market infrastructures
PRA	Prudential Regulation Authority
PSF	Payment Strategy Forum
PSR	Payment Systems Regulator
RCH	Recognised Clearing House
RTGS	Real-Time Gross Settlement
SEC	Securities and Exchange Commission
SEF	Swap Execution Facility
SFTR	Securities Financing Transactions Regulation
SSS	Securities Settlement Systems
SWIFT	Society for Worldwide Interbank Financial Telecommunication
TR	Trade repository

Annex 7: Legislation, regulation, and standards

The Bank's supervision of FMIs is shaped by different pieces of legislation, regulation and standards at UK, EU and international level.

UK legislation

The principal pieces of UK legislation that shape the Bank's supervision of FMIs are:

- Part 5 of the Banking Act 2009, which established the statutory oversight regime for interbank payment systems;
- FSMA, which set out responsibilities and powers in respect of the supervision of RCHs; and
- the Uncertificated Securities Regulations 2001, to which operators of securities settlement systems are subject.

EU regulation

The activities of CCPs in the United Kingdom are subject to regulation by the Bank under EU law, namely the European Regulation on OTC derivatives, central counterparties and trade repositories of July 2012, commonly known as the European Market Infrastructure Regulation (EMIR). EMIR came into force in August 2012 and many of the main associated technical standards to support it came into force in March 2013. EMIR and the technical standards are directly applicable in the United Kingdom. Therefore, UK-incorporated CCPs need to satisfy the provisions of the Regulation and standards, together with any additional domestic requirements, in order to achieve and maintain authorisation under EMIR.

The Central Securities Depositories Regulation (CSDR), came into force in September 2014, and establishes common EU laws for Central Securities Depositories (CSDs). During 2014, the Bank, along with other EU authorities, assisted the European Securities and Markets Authority (ESMA) and the European Banking Authority (EBA) in developing the draft technical standards mandated by the CSDR which will set more detailed rules in many areas. ESMA's draft standards were published for consultation in December 2014, while the EBA published theirs for consultation in February 2015. As with EMIR, the United Kingdom's existing regime will continue to apply to CSDs until a decision on an authorisation or recognition under the new regime has been reached.

The Securities Financing Transactions Regulation (SFTR) came into force in January 2016. It mandates the daily reporting of all securities financing transactions to trade repositories.

International standards

As part of the Bank's supervisory approach, each supervised UK FMI is assessed annually against international standards, as set out in the Principles for financial market infrastructures (PFMIs) published by the Bank for International Settlements' Committee on Payments and Market Infrastructures and the International Organization of Securities Commissions (CPMI-IOSCO) in April 2012. The Bank expects supervised FMIs to perform an annual self-assessment against these standards as an input into the Bank's own assessment. Since both EMIR and the CSDR draw on the PFMIs for much of their content, there is overlap between these international standards and the EU regulations for CCPs and CSDs. For recognised payment systems, the Bank has adopted the PFMIs without amendment as the principles to which, under the Banking Act 2009, operators of recognised payment systems must have regard when operating their systems.

Settlement Finality Directive

The EU Directive on Settlement Finality in Payment and Securities Settlement Systems (Directive 98/26/EC) was implemented into UK law by the Financial Markets and Insolvency (Settlement Finality) Regulations 1999.[1] The Bank is the United Kingdom's designating authority.[2] Designated systems receive protections against the operation of normal insolvency law in order to ensure that transactions that have been submitted in the system are irrevocable, to reduce the likelihood of legal challenge to the finality of settlement and to ensure the enforceability of collateral security. The Bank maintains a list of UK designated systems on its website.[3]

Companies Act 1989

Under the Companies Act 1989, the Bank has various powers regarding CCP default rules. These include reviewing CCPs' default rules and giving directions concerning action taken under those default rules. The Bank can also make an Order recognising that the relevant provisions of the default rules of an EEA CCP or third country CCP satisfy relevant requirements. The Bank must maintain and publish a register of Orders made.

(1) SI 1999/2979 (as amended from time to time).
(2) The FCA is the designating authority in respect of recognised investment exchanges.
(3) www.bankofengland.co.uk/financialstability/Pages/fmis/supervised_sys/systems.aspx.

Annex 8: List of Bank research papers on FMI topics published or accepted for publication

Title	Authors	Publication	Publication Date
Centralising trading in interest rate swap markets: The impact of Dodd-Frank	Evangelos Benos, Richard Payne and Michalis Vasios	*VoX*	February 2016
The Dodd-Frank Trade Mandate: Evidence Following its Implementation	Evangelos Benos, Richard Payne and Michalis Vasios	*The Columbia School Blog on Corporations and Capital Markets*	March 2016
Price discovery and the cross-section of high-frequency trading	Evangelos Benos and Satchit Sagade	*Journal of Financial Markets 30*	March 2016
A comparative analysis of tools to limit the procyclicality of initial margin requirements	David Murphy, Michalis Vasios and Nicholas Vause	*Bank of England Staff Working Paper No. 597*	April 2016
Got to be certain: The legal framework for CCP default management processes	Jo Braithwaite and David Murphy	*Financial Stability Paper No. 37*	May 2016
Recycling is good for the liquidity environment: Why ending QE shouldn't stop banks from being able to make CHAPS payments	Evangelos Benos and Gary Harper	*Bank Underground*	May 2016
Gauging market dynamics using trade repository data: the case of the Swiss franc de-pegging	Olga Cielinska, Andreas Joseph, Ujwal Shreyas, John Tanner and Michalis Vasios	*Financial Stability Paper No. 41*	January 2017
Identifying contagion in a banking network	Alan Morrison, Michalis Vasios, Mungo Wilson and Filip Zikes	*Staff Working Paper*	January 2017
Central Counterparties (CCPs) and the Law of Default Management	Jo Braithwaite and David Murphy	*Journal of Corporate Law Studies*	January 2017
Market Liquidity, closeout procedures, and initial margin for CCPs	Fernando Cerezetti, Emmanouil Karimalis, Ujwal Shreyas and Annanit Sumawong	*Staff Working Paper*	February 2017
Interactions among high-frequency traders	Evangelos Benos, James Brugler, Erik Hjalmarsson and Filip Zikes	*Journal of Financial Quantitative Analysis*	Forthcoming
Of goosebumps and CCP default funds	Fernando Cerezetti and Luis Antonio Barron G. Vicente	*Bank Underground*	Forthcoming