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Corporate Bond Purchase Scheme: design, operation and impact

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Corporate Bond Purchase Scheme: design, operation and impact

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- In August 2016 the Bank of England's Monetary Policy Committee voted for a package of measures to support growth and return inflation to target. The measures included the purchase, via the Corporate Bond Purchase Scheme (CBPS), of up to £10 billion of sterling-denominated corporate bonds.
- The design of the CBPS was driven by considerations of market structure and the ultimate aim of imparting broad macroeconomic stimulus. The CBPS departed from past asset purchase programmes along a number of key dimensions, including the size of allocations and auction pricing.
- The Scheme appears to have had a positive impact on the sterling corporate bond market, prompting a sharp decline in corporate bond spreads on the day of the announcement and a rise in issuance in the months that followed.

Overview

On 4 August 2016, following the United Kingdom's vote to leave the European Union, the Bank of England's Monetary Policy Committee (MPC) announced a package of measures designed to provide additional support to growth and to achieve a sustainable return of inflation to the MPC's 2% target. The announced set of measures included the purchase, via the Corporate Bond Purchase Scheme (CBPS), of up to £10 billion of sterling-denominated corporate bonds over an 18-month period.

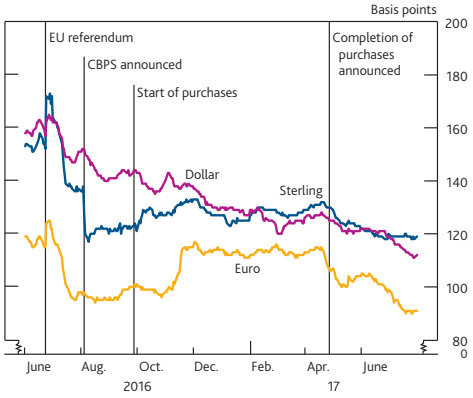
The purpose of the Scheme was to impart monetary stimulus by lowering the yields on corporate bonds, thereby reducing the cost of borrowing for companies directly. It was also expected to induce the sellers of corporate bonds to replace those assets with other risky assets, and ultimately lead to a general rebalancing of investors' portfolios. And it was expected to stimulate new issuance of sterling corporate bonds.

The design of the CBPS, in terms of the size and pace of the programme, as well as the approach to auctions and the degree of disclosure, was shaped in large part by the particular characteristics of the sterling investment-grade corporate bond market. Careful consideration was also given to the particular businesses that should be eligible for the Scheme, with the Bank seeking to purchase only bonds issued by firms that make a material contribution to economic activity in the United Kingdom. And purchases were allocated across industries in a way that was intended to avoid creating any distortions in the relative borrowing costs faced by companies in different sectors.

Sterling-denominated investment-grade private non-financial corporate (PNFC) bond spreads fell 10 basis points on the day of the announcement of the CBPS, and around a further 10 basis points in the days that followed. Issuance in sterling by UK PNFCs picked up sharply after the announcement, with the highest recorded monthly issuance of sterling-denominated investment-grade bonds in September of that year. Market intelligence also suggests that there was an improvement in liquidity in the sterling corporate bond market.

There is uncertainty about the size of each of these effects, but the available evidence suggests that the CBPS has had a positive impact on the sterling corporate bond market and reduced the cost of borrowing for UK PNFCs. However, it is still too early to assess fully the transmission of the CBPS to the real economy.

Summary chart Sterling, dollar and euro-denominated investment-grade PNFC bond spreads



Source: Bank of America Merrill Lynch.

(1) The authors would like to thank Charlotte Barton, Amber Evans, Richard Gordon, Nick Govier, Ryan Murphy and Srdan Tatomir for their help in producing this article.

On 4 August 2016, following the United Kingdom's vote to leave the European Union, the Bank of England's Monetary Policy Committee (MPC) announced a package of measures designed to provide additional support to growth and to achieve a sustainable return of inflation to the MPC's 2% target. The announced set of measures comprised a 25 basis point cut in Bank Rate to 0.25%; a new Term Funding Scheme to reinforce the pass-through of the cut in Bank Rate; an expansion of the asset purchase scheme for UK government bonds of £60 billion; and the purchase of up to £10 billion of sterling-denominated corporate bonds over an 18-month period.(1)

This article looks at that latter policy — the Corporate Bond Purchase Scheme (CBPS). The CBPS was intended to work by imparting broad monetary stimulus. That is in contrast to the Corporate Bond Secondary Market Scheme (CBSMS) announced in 2009, which was primarily intended to ease credit conditions in the corporate bond market by acting as a 'market maker of last resort' — providing liquidity by buying assets in the event that private investors became unwilling to transact.(2)

The first section below summarises how corporate bond purchases were expected to influence financial markets — and ultimately feed through to the real economy. The bulk of the article then looks in detail at the design of the CBPS, and considers how the structure of the corporate bond market influenced the operational approach to purchases (Section 2). The final section examines the evidence for how the Scheme has affected financial markets since its announcement and implementation.

Section 1: Transmission of corporate bond purchases to financial markets

Corporate bond purchase schemes are a relatively new innovation, with those of both the Bank of England, and the European Central Bank, introduced in 2016. As such, there is not yet an extensive literature on how they work. But corporate bond purchases are likely to operate through many of the same channels as gilt purchases, and so represent a complement to such programmes. These channels are summarised briefly below.(3)

The first channel is via **signalling** about the future stance of policy. The announcement of any form of stimulus reveals information to economic agents about the likely path of monetary policy. The addition of a new policy tool might also provide information about the range of measures available to the policymaker. Second, policy action taken via asset purchases, as with any policy measure, helps support **confidence** among agents in the wider economy. Third, **portfolio rebalancing** by investors that have sold assets to the central bank — and which, in turn, invest the money received in similar, alternative assets — will push up the prices of a broad range of financial instruments.

In this way, it was expected that purchases of corporate bonds would cause an increase in the prices (and so a fall in corporate borrowing costs) of both eligible and ineligible bonds. As such, it was expected ultimately to benefit sterling corporate bond issuers in general, rather than only those eligible for the Scheme (discussion of the eligibility criteria follows in Section 2).

Moreover, in the August 2016 Monetary Policy Summary and Minutes, the MPC stated that 'purchases of corporate bonds could provide somewhat more stimulus than the same amount of gilt purchases'. That view reflected three main factors.

First, corporate bonds are higher-yielding instruments than government bonds, and so are less close substitutes for money. As a result, it is arguably the case that investors selling corporate bonds to the central bank should be more likely to invest the money received in exchange for those bonds into other corporate assets, compared with investors that sell gilts to the central bank. This tends to imply a larger portfolio rebalancing effect from purchases of corporate bonds, compared with purchases of gilts, and so a larger boost to the prices of riskier financial assets — and associated wealth effects.

Second, the sterling corporate bond market is rather less liquid than the market for gilts. The presence of the central bank in the sterling corporate bond market will provide confidence to dealers regarding their ability to exit trades in future without unduly affecting the prevailing market price, thereby improving the market's functioning. Central bank purchases will also tend to stimulate activity in the secondary market, by inducing portfolio rebalancing flows. By improving liquidity, central bank purchases should push down on the premium that investors demand for holding sterling-denominated corporate bonds, over and above the compensation needed to cover credit risk.

And third, purchases were expected to stimulate issuance in the sterling corporate bond markets and support investment. To the extent that corporate bonds are typically issued by larger companies, it was also thought that a shift towards issuance of corporate bonds and away from bank lending by such companies had the potential to increase the amount of bank funding available to smaller ones.

(1) See www.bankofengland.co.uk/publications/Documents/inflationreport/2016/aug.pdf.
(2) For further information on the CBSMS see www.bankofengland.co.uk/markets/Pages/apf/corporatebond/default.aspx.
(3) A full description of the transmission of central bank asset purchases can be found in Joyce, Tong and Woods (2011).

Of course, firms might use the additional borrowings arising as a result of the CBPS for reasons other than investment. But many of these uses will also help to support economic activity. For example, firms might choose to use an improvement in funding conditions as an opportunity to refinance existing debt at lower interest rates. This would increase corporate profitability, and might encourage investment indirectly. Or, businesses might choose to return money to shareholders through share buybacks or dividends, and so provide a boost to household spending.

Section 2: Design and operation of the CBPS

The CBPS was designed to impart broad stimulus to the macroeconomy while also ensuring that it did not distort the sterling corporate bond market, or create any unfair bias towards particular issuers or sectors. Here we explain how these considerations, and the nature of the sterling corporate bond market, influenced operational decisions regarding eligibility criteria, the size and pace of purchases, auction design, sector allocations and the degree of transparency.

We also describe how the design of the CBPS auction process differed from the Bank's gilt purchase programme. Appropriate auction design depends on the nature of the goods being purchased and the structure of the market. In both of these respects, the CBPS differed from purchases of gilts, given that the sterling investment-grade corporate bond market is both more heterogeneous and less liquid than the gilt market.

Corporate bond eligibility

The CBPS was intended to lower the borrowing costs and support bond issuance of firms that make a material contribution to the UK economy. An evidence-based approach was taken to determining whether issuers made a material contribution to the UK economy, with a range of factors taken into account. These included whether companies employed significant numbers of people in the United Kingdom; whether they generated significant revenues in the United Kingdom; whether businesses were headquartered, or had a number of operating sites, in the United Kingdom; or if they served a significant number of customers in the United Kingdom. The assessment of the materiality of the contribution to the economy made by individual businesses is conducted by the Bank's risk management area.

The risk management area is also responsible for credit risk assessment. When making a judgement about credit risk, a range of factors are taken into account, including the rating given to borrowers by the credit rating agencies, with only investment-grade corporations considered for the Scheme. Investment-grade firms are those that are judged to be of at least a certain minimum credit quality by independent rating agencies. This helped to minimise the risk of material losses due to default.(1) Corporate bonds issued by banks, building societies, insurance companies and other financial sector entities regulated by the Bank of England or the Financial Conduct Authority were not eligible.(2) Market participants were encouraged to submit suggestions for inclusion on the eligible bond list, which was reviewed on an ongoing basis while purchases were under way.

Size and pace of purchases

There is around £500 billion worth of outstanding sterling-denominated investment-grade private non-financial corporate (PNFC) bonds in issue, compared with outstanding gilt issuance of around £2,000 billion (**Figure 1**). The smaller size of the corporate bond market, as well as the relatively infrequently traded nature of those instruments, meant that there was rather more uncertainty regarding the size and pace of purchases than in the case of gilt purchases.

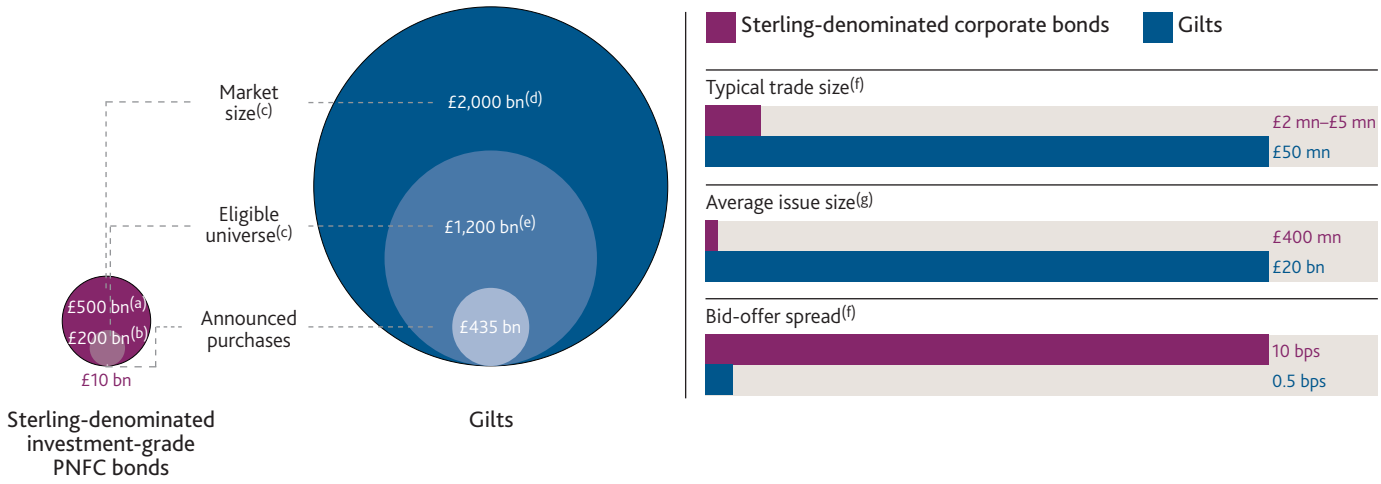
Therefore, the MPC took the decision to buy 'up to £10 billion'(3) of corporate bonds, which equates to around 5% of the eligible stock of bonds (**Figure 1**). For comparison, the MPC's announced gilt purchases of £435 billion are equivalent to around one third of the eligible universe of government bonds. The MPC also determined that purchases could take place if necessary over a relatively extended period, of up to 18 months.

In addition, the size of individual purchase operations was designed to be flexible, adjusting automatically to reflect the quantity and quality of the offers received. This meant that the purchase pace could fluctuate to account for seasonality and market conditions. For context, in the sterling corporate bond market the typical trade size is between £2 million and £5 million and there tends to be a fairly wide range between the prices that market participants quote for buying and selling a given bond. In the gilt market typical trade sizes are around £50 million and the spread between buying and selling prices is around a twentieth of that in the sterling corporate bond market.

The flexible auction design was in contrast to the approach used for gilt purchases, in which allocations are fixed in size and announced in advance. Variation in auction size is evident in the weekly holdings data.(4) Weekly purchases varied from £165 million (excluding purchases in the final week, in which the quantity of purchases was constrained by the close

(1) The CBPS forms part of the Asset Purchase Facility and as such it is indemnified by HM Treasury. For further information on the Asset Purchase Facility see www.bankofengland.co.uk/markets/Pages/apf/default.aspx.
(2) At the same time that the CBPS was announced, the Term Funding Scheme (TFS) was introduced. This programme was directed at banks and building societies. For further information on the TFS see www.bankofengland.co.uk/markets/Pages/apf/termfunding/default.aspx.
(3) The £10 billion target is in terms of the amounts spent, rather than the current market value.
(4) Note, holdings data were published on a weekly basis and therefore do not show the variation per auction, but rather per week.

Figure 1 Key features of the sterling corporate bond and gilt markets and associated purchase programmes



Sources: Bank of England, Bloomberg, Debt Management Office, TradeWeb and Bank calculations.

(a) Market size defined as the market value of all sterling-denominated investment-grade PNFC bonds in issue, as at 11 September 2017.
(b) Eligible universe size defined as the market value of all outstanding eligible bonds, as at 31 August 2017.
(c) Market size and eligible universe are rounded to the nearest £100 billion.
(d) Market size defined as the market value of all conventional and index-linked gilts in issue, as at 31 August 2017.
(e) Eligible universe size defined as the market value of all outstanding conventional gilts with a maturity greater than three years, as at 31 August 2017.
(f) See Salmon (2017).
(g) Average issue size for gilts defined as average nominal amount outstanding per gilt for all conventional and index-linked gilts in issue as at 30 August 2017. Average issue size for sterling-denominated investment-grade PNFC bonds defined as average nominal amount outstanding per bond as at 11 September 2017.

proximity to the £10 billion limit) to £535 million, with average weekly purchases of £357 million.

Auction design

Purchases of corporate bonds were made via reverse auctions, the same approach as is used for purchases of gilts.(1) Auctions facilitate wide participation among market participants. And by determining allocations according solely to the most competitive price, across a range of securities, auctions help to avoid the need for the Bank to discriminate between counterparties or instruments.

The price paid for each security was determined using a 'uniform' pricing mechanism. Under uniform pricing, all successful offers for a bond are allocated at a single 'clearing price', which is equal to the highest accepted price for that bond. The Bank's view was that this approach was appropriate for corporate bonds, given the heterogeneous, illiquid nature of the instruments, and associated challenges in gauging the market price for less-informed market participants. By allowing investors to focus on only the price that they would accept, it was hoped that uniform pricing would encourage participation.(2)

In contrast, for gilt purchases, the Bank employs a 'discriminatory' pricing mechanism. Under discriminatory pricing, each successful seller is paid their own offer price. This is considered appropriate for gilt purchases, given the homogeneous, liquid nature of these instruments, which makes it relatively straightforward for market participants to judge the market price.

Finally, to try to ensure that the Bank did not pay any more than was necessary to meet its objective of purchasing £10 billion of corporate bonds, the CBPS set a maximum price, above which each specific bond would not be bought. A range of sources of information — including various market-based indicators and internal models — were used to determine the maximum price. And this could be used to control the composition of the portfolio, as described below.

The sector key

A key consideration for the MPC was how to ensure that the Scheme would be 'market neutral' — avoiding favouring some firms more than others. The 'sector key' was the mechanism used to achieve this. The sector key shows the proportion of total outstanding eligible issuance accounted for by each sector in the UK economy. Purchases were targeted to match those proportions by sector. For example, if the electricity sector accounted for 19% of total eligible bonds in issue, the CBPS aimed to have 19% of its final portfolio allocation in the electricity sector.

Reflecting the flexibility of the auctions, there were deviations from the sector key over time. In response to those deviations, the Bank adjusted the prices it was prepared to pay for a given bond to slow the pace of purchases in some sectors, while speeding it up in others, and so move the sector

(1) In a 'reverse auction' participants submit offers at which they would be prepared to sell specific assets, rather than submit bids to buy specific assets, as happens in a typical auction. The offers that are accepted are the ones submitted at the lowest price (highest yield, in the context of bond pricing).
(2) Auction theory suggests that uniform and discriminatory pricing are equivalent in revenue terms subject to certain conditions. For example, see Archibald, Flynn and Malvey (1995).

allocations back toward the sector key. Maximum prices were used to help the CBPS remain within risk limits set on holdings of specific bonds, issuers and sectors. If the Bank's holdings were approaching its tolerances regarding exposure to a particular bond or issuer, or deviation from the sector key, the maximum price for the relevant bonds would be reduced to make it less likely that the Bank would purchase those bonds.

Transparency

For gilt purchases, the Bank publishes details of the individual gilts purchased, including total offers received and accepted, as well as the highest and lowest accepted prices. In contrast, for the CBPS, the Bank published weekly data on total corporate bond holdings, with a one-week lag, and a monthly update of sector allocations relative to the sector key. As of 3 August 2017, the Bank publishes updated data on the aggregate total stock of purchased corporate bonds on a monthly basis.(1)

The decision on the degree of disclosure was finely balanced. Ultimately, it was thought that by disclosing less information, the Bank would reduce market distortions that might have arisen as a result of the publication of information on individual bond pricing and allocations. Moreover, it was thought possible that the publication of the prices paid in auctions might effectively render the Bank a price *setter*. This would have run counter to the intention that the CBPS respond to market conditions, acting as a price *taker*. It was, however, recognised at the design stage that the lower level of transparency also carried a risk of reducing participation in the Scheme.

To provide further transparency on the Bank's holdings, each month the Bank published the deviation of its holdings from the sector key.(2) This was intended to guide investors' expectations about the sectors in which future purchases were likely to be concentrated. In sectors where the Bank was overweight, it could be assumed that purchases would need to slow, while the purchase pace in underweight sectors would need to increase. In turn, it was hoped that this would induce investors to submit relatively more bonds to auctions for sectors in which the CBPS was underweight, thereby enabling the Bank to move back toward the sector key.

CBPS reinvestment

CBPS purchases reached the £10 billion target in April 2017. Since then, at each of its policy meetings the MPC has voted, and will continue to vote, on whether to maintain the stock of purchases at £10 billion. At its meeting ending 2 August 2017, the MPC voted to maintain the stock of corporate bond purchases at £10 billion and agreed that it would reinvest cash flows from maturing assets held under the CBPS back into eligible corporate bonds.

Such reinvestments are expected to begin once the funds from redemptions reach sufficient size to allow an auction programme to be conducted. Based on the current profile of the portfolio, it is anticipated that the first such auction will take place in the second half of 2019.(3) Thereafter, the precise timings of the reinvestment schedule will be governed by the maturity profile and composition of the portfolio. The box on page 175 provides further details on the composition of the CBPS portfolio and the implications for reinvestment operations.

Section 3: Impact of the CBPS

It is not straightforward to separate the impact of the CBPS on financial markets from the overall effect of the package of measures announced on 4 August 2016. But the inclusion of a corporate bond purchase programme within the package did come as a surprise to most market participants. So it seems reasonable to suppose that much of the reaction in the corporate bond market reflected the announcement of the CBPS in particular.

In the following section we look at the impact of the policy announcement on spreads, along with several other events associated with the implementation of the CBPS, that allows some tentative inferences to be drawn about its transmission. We then attempt to identify how much of the change in corporate bond spreads following the announcement can be explained by the CBPS alone. We also consider the impact of the Scheme on corporate bond issuance and market functioning. It is still too early to assess fully the transmission of the CBPS to the real economy.

Event studies

Announcement effect

There are a number of events that we can look at to assess the financial market impact of the CBPS. To gauge the initial announcement effect, we first look at the fall in the standard Bank of America Merrill Lynch (BoAML) index of sterling-denominated investment-grade PNFC bond spreads. The standard BoAML index fell by 10 basis points on the day of the announcement of the CBPS, with a further drop of around another 10 basis points in the few days that followed (**Chart 1**). Equivalent dollar and euro spreads were broadly unchanged over the same period. That tends to point to a significant role for the August policy announcement. Since then, sterling-denominated investment-grade PNFC bond spreads have been relatively stable.

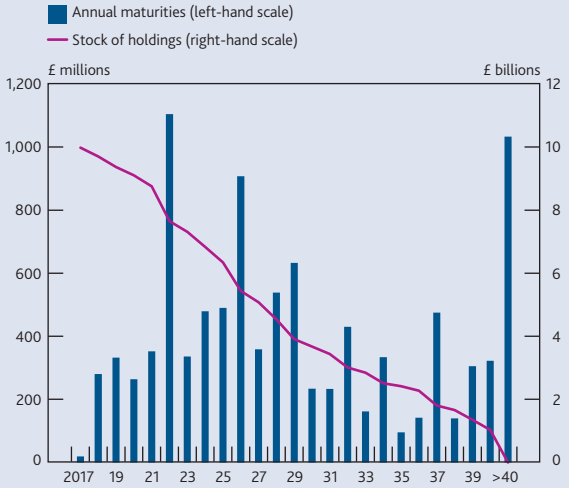
(1) Market notice of 3 August 2017; www.bankofengland.co.uk/markets/Documents/marketnotice170803cbps.pdf.
(2) See www.bankofengland.co.uk/markets/Pages/apf/corporatebondpurchases/results.aspx.
(3) Monetary Policy Summary and Minutes of the Monetary Policy Committee meeting ending on 2 August 2017 available at www.bankofengland.co.uk/publications/minutes/Documents/mpc/pdf/2017/aug.pdf. Market notice of 3 August 2017 available at www.bankofengland.co.uk/markets/Documents/marketnotice170803cbps.pdf.

The Bank's CBPS portfolio

Maturity profile

Only a relatively small amount of the Bank's portfolio will mature in the next few years (**Chart A**). Because of the small size of redemptions as bonds mature, the proceeds from a number of redemptions will be accumulated, and reinvested on a periodic basis via auctions. The maturity profile of existing bond holdings suggests that from 2019, auctions will be conducted at least annually. During periods when there are large amounts of maturing bonds — for example in 2022 — the Bank will hold more frequent auctions. It is anticipated that typically auctions will be conducted once the proceeds from redemptions reach between £250 million–£400 million.

Chart A Maturity profile of the portfolio in aggregate



Sources: Bank of England, Bloomberg and Bank calculations.

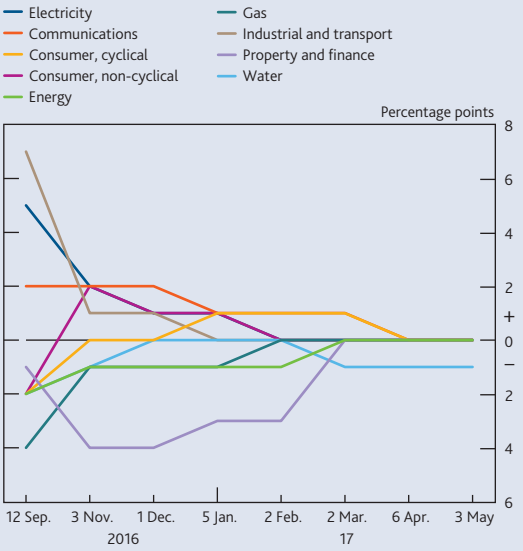
The maturity profile of the Bank's portfolio was not targeted by the auction design, but it is broadly representative of that of the eligible universe of bonds. The Bank's portfolio has a slightly larger concentration of holdings in the 5–10 year maturity than the eligible list of bonds, and a slightly lower concentration of longer-maturity bonds.

The maturity profile of the Bank's portfolio will change over time, with each reinvestment. It might also be influenced by corporate actions that result in the repurchase of bonds by issuers. Some bonds might also become ineligible for the CBPS due to credit rating downgrades, which could result in those instruments being sold for risk management purposes.

Sector allocation

Chart B shows monthly data on actual sector holdings and compares them with the sector key. As might be expected, there was a notable divergence between the Bank's portfolio holdings and the sector key at the start of the Scheme. This was particularly evident in the property and finance sector, which was underrepresented in the portfolio during most of the Scheme. But as the Scheme progressed and the proportion of purchases by sector was adjusted via the setting of maximum prices, the CBPS portfolio returned towards the sector key. When CBPS purchases reached £10 billion, the portfolio allocation exactly matched the sector key in eight of the nine broad sectors and was just 1 percentage point below the sector key in the remaining sector (water).

Chart B Percentage point difference between sector share of portfolio and sector share of eligible universe

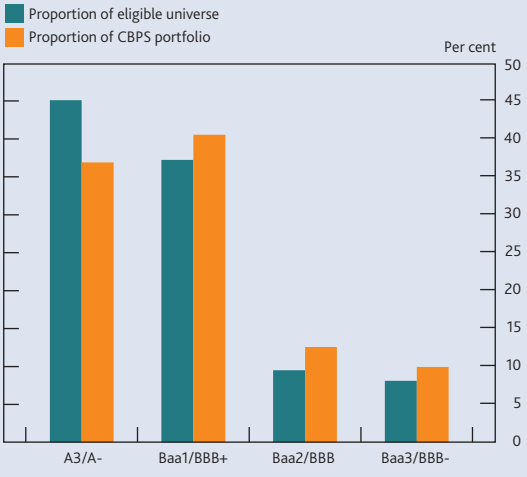


Sources: Bank of England, Bloomberg and Bank calculations.

Credit rating

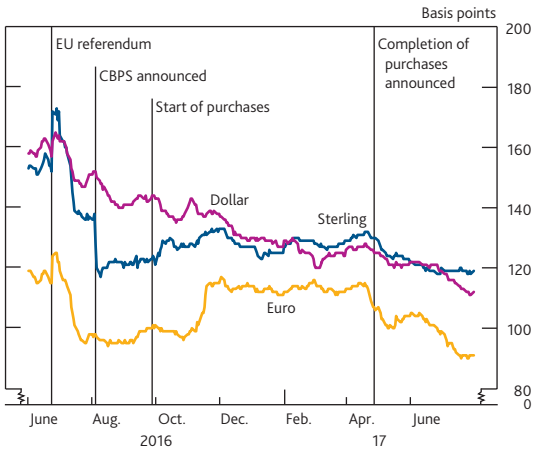
In addition to maturity, the credit rating of the Bank's portfolio has been monitored since the CBPS began. **Chart C** shows that, compared with the eligible universe of corporate bonds, the Bank's portfolio is marginally overweight bonds rated BBB+ to BBB-, and is underweight AAA to A.

Chart C Credit rating across the portfolio



Sources: Bank of England, Bloomberg and Bank calculations.

Chart 1 Sterling, dollar and euro-denominated investment-grade PNFC bond spreads



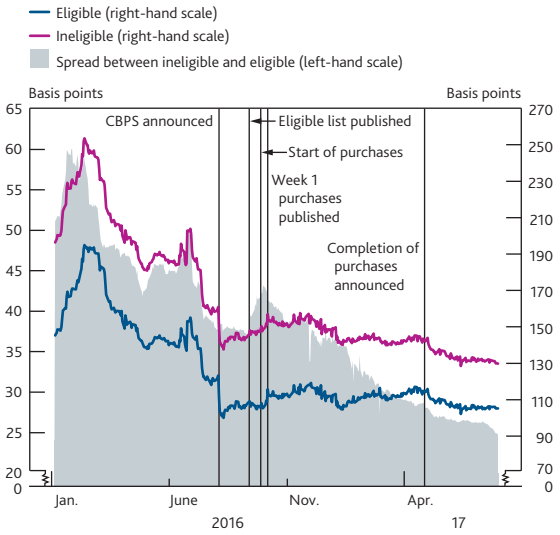
Source: Bank of America Merrill Lynch.

Factoring in the fall in government bond yields over that period, the overall fall in sterling borrowing costs for PNFCs following the announcement of the package was around 30 basis points.

Impact on eligible and ineligible bonds

We can split the sterling investment-grade universe of bonds into those eligible for purchase, and those that are ineligible, to look for evidence of portfolio rebalancing effects within the sterling corporate bond market. If portfolio rebalancing is in evidence, one would expect any fall in spreads to be broad-based across all sterling-denominated investment-grade bonds. And, indeed, this is what was observed in the days following the announcement, with a fall in both eligible and ineligible bond spreads occurring very quickly after the event (**Chart 2**). Consistent with that, there was subsequently relatively little further reaction to the announcement of the specific bonds that would be eligible for purchase (**Chart 2**).

Chart 2 Eligible and ineligible sterling-denominated investment-grade corporate bond spreads



Sources: Bloomberg and Bank calculations.

Evidence of portfolio rebalancing into ineligible corporate assets is consistent with the view that corporate bond purchases might be more effective, pound for pound, than an equivalent amount of purchases of gilts. That said, it is too early to identify fully any differential real-economy effects from this channel.

Reaction to the start of actual purchases

There was limited reaction to the start of purchases, with no clear difference in the responses of eligible versus ineligible bond spreads (**Chart 2**). That suggests little role for purchases themselves in pushing spreads down further either directly or via portfolio rebalancing.

There was also no obvious difference in the behaviour of eligible and ineligible spreads in response to the publication on 6 October 2016 of the amount of purchases conducted during the first week of operation (**Chart 2**). These data showed that the Bank had been buying assets three times faster than implied by the average rate of purchases required to hit the target of up to £10 billion over 18 months, and might have been expected to cause spreads to fall.

That said, market intelligence gathered at the time suggested that some investors interpreted the news on the pace of purchases as information about the responsiveness of the supply of bonds to the Scheme, with the implication that investors were more willing to sell assets to the central bank than had been thought. This would tend to push up spreads, offsetting the possible effect that the news on pace might otherwise have had.

Since then the spread between eligible and ineligible bonds has narrowed gradually (**Chart 2**). That could be tentative evidence of a 'flow' effect from actual purchases, pushing down ineligible bond spreads as sellers of eligible bonds reallocate funds to similar ineligible bonds. But the start of the trend appears to predate the start of the Scheme, so some other, longer-run, driver might be the cause.

There was little reaction in spreads following completion of purchases (**Chart 2**), as the weekly publication of the stock of purchases allowed the Scheme's anticipated completion to be captured in prices ahead of time. That is consistent with how quickly the effects of the purchases were first priced in following the announcement of the Scheme.

Identifying the specific impact of the CBPS

As noted above, the CBPS was announced alongside several other policy measures, so it is unclear how much of the 'announcement effect' of 10–20 basis points should be attributed to the CBPS specifically. To try to get a sense of the

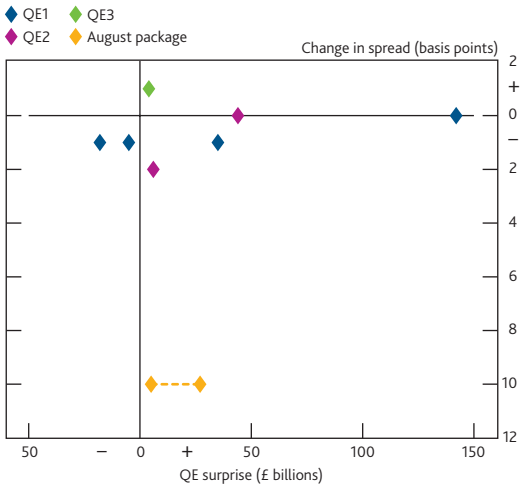
specific impact of the CBPS on sterling-denominated investment-grade PNFC bond spreads, here we take two approaches. First, we conduct a simple event study that compares the one-day move in the sterling-denominated investment-grade PNFC bond spreads on all past gilt purchase announcement days. Second, we employ a more sophisticated econometric approach, using a panel of sterling-denominated corporate bonds, to isolate the particular effect of the CBPS.

Controlling for the size of the surprise in gilt purchases

Starting with the event study, we can obtain an estimate of how corporate bond spreads might have been expected to move in response to the August 2016 announcement of additional gilt purchases, by looking at changes in spreads following past gilt purchase announcements. Here we look at the one-day change in sterling-denominated investment-grade PNFC bond spreads following announcements about gilt purchases. Because some of these announcements were anticipated, we control for this by factoring in what was expected by analysts ahead of those announcements. This gives us a better measure of the actual policy news, or 'surprise', on the day of the announcement in each episode.(1)

Chart 3 shows the moves in sterling-denominated investment-grade PNFC bond spreads against the size of the surprise. Interestingly, we find that corporate bond spreads have generally not reacted to news about gilt purchases in the past, whether we control for the size of the surprise or not. In light of that, this simple approach suggests that it might be reasonable to attribute much, if not all, of the 10 basis point fall in spreads on 4 August 2016 to the CBPS.

Chart 3 One-day change in sterling-denominated investment-grade PNFC bond spreads versus size of quantitative easing (QE) surprise(a)(b)



Sources: Bank of America Merrill Lynch, Thomson Reuters and Bank calculations.

(a) A surprise here is defined by the difference between the announced size of asset purchases and the expectation of those surveyed by Reuters ahead of the policy meeting, as in Joyce, Lasaosa, Stevens and Tong (2011).
(b) A range is given for the surprise on 4 August 2016 because the poll-based expectation was for £33 billion of additional purchases to be announced at that policy meeting, with an addition to the total stock of £65 billion by end-2017. That compares with an actual announcement in August 2016 of £60 billion–£70 billion.

Estimating changes in the excess bond premium

Taking a more sophisticated approach, we follow the work of Gilchrist and Zakrajšek (2012) and De Santis (2016). First, we estimate the 'excess bond premium'. This can be thought of as that part of the spread that is in excess of what is strictly required to cover expected losses from default. It is comprised of two parts. The first is the compensation required by investors because they are typically 'risk averse'; they would prefer a certain outcome instead of a gamble with the same probability-weighted average pay-off.(2) The second is the compensation required to cover the possibility that the investor will not be able to realise the fair value of the asset because the market is illiquid.

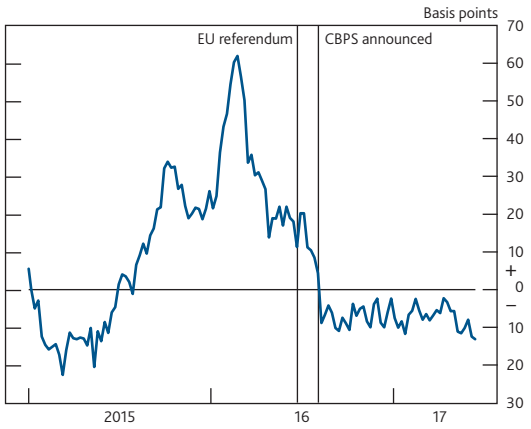
One might expect the impact of the CBPS to be evident in the excess bond premium for two reasons. First, as highlighted in Section 1, a key transmission channel for the CBPS was the support to confidence given to both participants in the sterling corporate bond market and agents in the wider economy. That is likely to be reflected in a fall in risk aversion, and so a lower excess bond premium. And second, the CBPS aimed to improve the liquidity of the sterling corporate bond market, also pushing down on the excess bond premium.

We estimate the excess bond premium on a weekly basis, based on a large panel of sterling-denominated investment-grade PNFC bonds. By looking across a large panel of bonds, we can separate out the components of the spread that are due to differences in credit risk (the compensation required to cover expected losses from default, which is identified using the credit rating and the variability of the share price) and the rest — which we define as the excess bond premium.(3) And we find that the excess bond premium fell materially following the announcement of the August policy package (**Chart 4**).

In order to identify how much of the decline in the excess bond premium might be attributable to the CBPS, we then regress it on a set of financial variables (including the oil price, equity prices, and changes in expected interest rates) that proxy macroeconomic conditions, to determine how much of the fall in the premium was due to those factors, and how much due to other, unexplained, factors. We attribute the latter to the CBPS. Using this approach, we find that the CBPS accounts for most of the decline in spreads observed in the week following the announcement (**Chart 5**). The European Central Bank found a similar result in the case of the Corporate Sector Purchase Programme.(4)

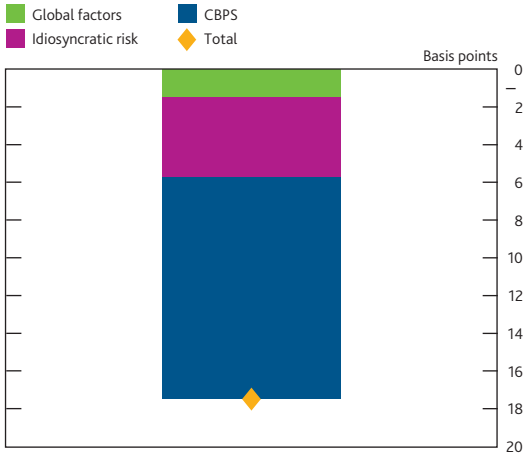
(1) A surprise here is defined by the difference between the announced size of asset purchases and the expectation of those surveyed by Reuters ahead of the policy meeting, as in Joyce, Lasaosa, Stevens and Tong (2011).
(2) To give an example, a risk-averse investor would prefer £10 for certain rather than a coin toss that wins either zero or £20 (which has a probability-weighted average, or 'expected', pay-off of £10 — the same as the certain option).
(3) As in De Santis (2016), we use realised volatility in stock market returns for the sector of issuer as a proxy for expected default risk.
(4) See European Central Bank (2016).

Chart 4 Excess bond premium in sterling-denominated investment-grade PNFC bond spreads



Sources: Bank of America Merrill Lynch, Thomson Reuters Datastream and Bank calculations.

Chart 5 Decomposition of changes in sterling-denominated investment-grade PNFC bond spreads between 3 and 10 August



Sources: Bank of America Merrill Lynch, Bloomberg and Bank calculations.

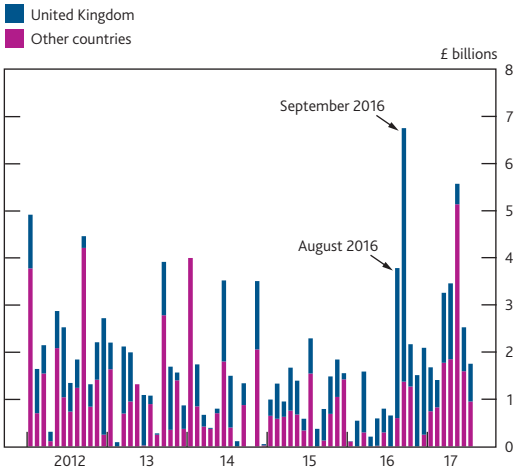
It is difficult to judge the long-run impact on spreads arising from the Scheme, given changes in other factors which have an influence on the price of bonds. Abstracting from those influences, it seems reasonable to suppose that any increase in bond prices arising from central bank purchases should remain in the price level for as long as those assets are held. However, lower spreads, and improvements in market functioning, will tend to cause an endogenous response in the supply of bonds (issuance). And that will push down on bond prices.

Impact on corporate bond issuance

Prior to the August 2016 MPC announcement, it was uncertain how responsive issuance would be to the CBPS. Some market participants suggested that the impact might be limited, due to the perceived structural decline of the sterling bond market.(1) In the event, however, sterling issuance rose sharply following the announcement (**Chart 6**).

Total sterling investment-grade issuance by PNFCs was £10.5 billion in August and September 2016. The vast majority

Chart 6 Sterling-denominated investment-grade bond issuance by PNFCs split by domicile(a)

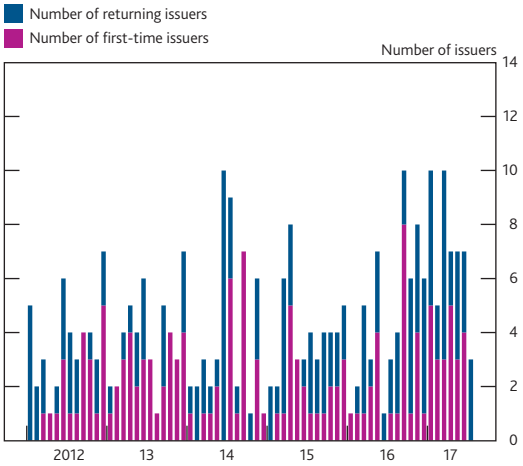


Sources: Thomson Reuters DBI and Bank calculations.

(a) Monthly data.

of that came from UK-domiciled PNFCs, which issued around £8.6 billion of sterling investment-grade debt in that time (**Chart 6**). And September saw record monthly sterling investment-grade issuance for UK PNFCs (£5.4 billion). So far, there is little evidence to suggest that there has been an increase in the number of first-time sterling issuers due to the Scheme. **Chart 7** shows that the number of such firms looks broadly in line with recent norms.

Chart 7 Total number of UK-domiciled PNFC issuers raising funds in the sterling market and the number of first-time UK PNFC issuers(a)



Sources: Thomson Reuters DBI and Bank calculations.

(a) Monthly data.

The overall rise in issuance is likely to have been at least in part due to the improvement in competitiveness of the sterling market resulting from the relative decline in sterling spreads compared with those in euro and dollar (after accounting for the cost of hedging exchange rate risk), as well

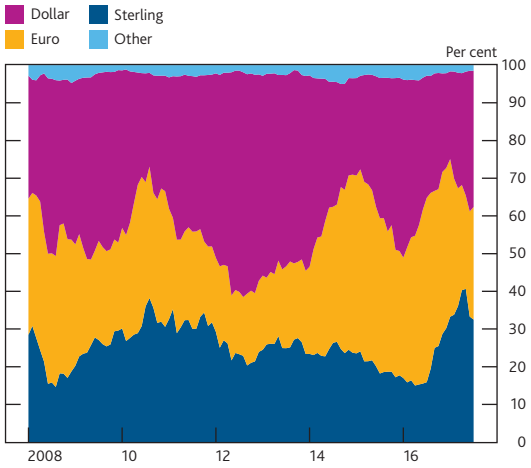
(1) For further discussion of changes in the sterling corporate bond market see Elliott and Middeldorp (2016).

as improved liquidity. That said, some contacts also suggest that the surge in issuance following the announcement might be due to catch-up for low levels of issuance earlier in the year, with issuance having been subdued in the months preceding the UK referendum on membership of the European Union.

Notwithstanding pent-up supply, contacts also reported that there were sterling deals that could not have been done — at the maturity or size that was achieved — were it not for the Scheme. And contacts of the Bank's Agents reported that a small number of larger corporates had become more inclined to borrow in the sterling market than elsewhere, at the margin, as a result of the improved liquidity and competitiveness of the sterling market. This would suggest that the pickup in sterling issuance was not just due to catch-up.

While the pickup was particularly sharp initially, it is noteworthy that sterling issuance by UK-domiciled investment-grade PNFCs remains robust. Indeed, among UK PNFCs, there appears to have been a renewed preference for issuing in sterling, rather than other currencies, since the announcement of the Scheme. As a proportion of UK PNFCs' total bond issuance, the share of sterling rose from around 15% in early 2016 to around 40% in April 2017 — representing the highest proportion of issuance since 2007 (**Chart 8**). Part of this reflects a fall in the share of euro issuance, which had increased similarly sharply following the announcement of the European Central Bank's Corporate Sector Purchase Programme in March 2016.

Chart 8 Rolling twelve-month sum of total bond issuance by UK-domiciled PNFCs by currency share



Sources: Thomson Reuters DBI and Bank calculations.

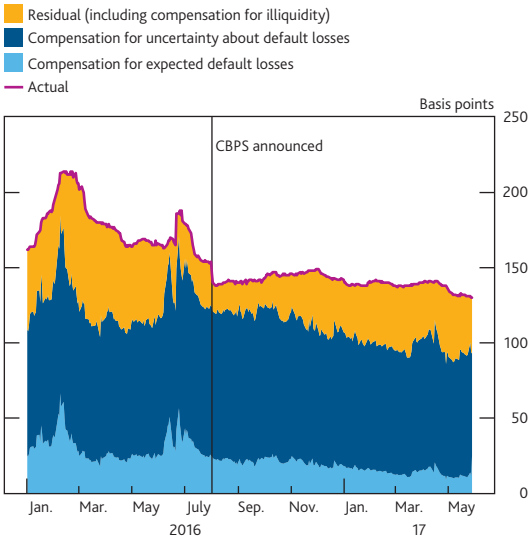
Taken together, the sharp pickup following the announcement, robust issuance since, and the associated market intelligence, are consistent with the view that corporate bond purchases might, pound for pound, have a greater impact on activity than gilt purchases.

Impact on liquidity

Market intelligence gathered shortly after the announcement of the August 2016 policy package indicated that there had been a notable improvement in liquidity in the sterling corporate bond market. Soon after the announcement of the Scheme, dealers reported that the presence of the central bank had given them greater confidence in their ability to sell bonds — making them more willing to intermediate flows from clients. There were also reports of the entry of new, sometimes foreign, buyers into the market.

The decline in the excess bond premium, which reflects compensation for risk aversion and illiquidity, immediately following the announcement of the Scheme suggests that there might be a role for improved liquidity in driving the observed fall in bond spreads. To try to separate out the particular influence of liquidity, we use another model of the corporate bond spread to try to estimate just the component of the spread that compensates investors for illiquidity.(1) While the set of firms underlying this measure includes financials, so is not directly comparable to the earlier exercise, it is nevertheless instructive to note the sharp fall in the liquidity premium following the announcement of the CBPS, and that this accounts for most of the decline in the spread observed in the few days that followed (**Chart 9**).

Chart 9 Decomposition of financial and non-financial sterling-denominated investment-grade corporate bond spreads(a)(b)



Sources: Bank of America Merrill Lynch Global Research, Bloomberg, Thomson Reuters Datastream and Bank calculations.

(a) Implied liquidity premia are estimated using a Merton model as in Leland and Toft (1996) to decompose corporate bond spreads.
(b) Data as at 31 May 2017.

The fall in the excess bond premium and, within that, the liquidity premium, provides support for the view that, pound for pound, purchases of corporate bonds might have a relatively bigger impact on activity than gilt purchases.

(1) For a discussion of the model see Churm and Webber (2007).

Conclusion

This article provides an overview of the design, operation and financial market impact of the Bank's Corporate Bond Purchase Scheme. The design of the Scheme took into account the broad purpose of corporate bond purchases — to impart monetary stimulus by lowering the yields on corporate bonds, pushing up on risky asset prices in general, and stimulating new issuance of corporate bonds — as well as the particular features of the sterling corporate bond market.

Based on a range of metrics, we find that the CBPS had a discernible positive impact on the sterling corporate bond market. Sterling-denominated investment-grade PNFC bond spreads fell by around 20 basis points in the days following the announcement of the Scheme. Issuance in sterling by UK-domiciled PNFCs picked up sharply following the announcement, and remains robust. And there has been an improvement in market functioning and liquidity. This provides some support for the view that corporate bond purchases are likely to provide a greater boost to activity, pound for pound, than an equivalent amount of gilt purchases.

While the direct impact on the corporate bond market is encouraging, it is still too early to assess fully the transmission of the CBPS to the real economy. For now, the MPC has decided to maintain the stock of corporate bond purchases at £10 billion. Future decisions regarding whether to increase or reduce the stock of corporate bonds will be governed by the economic and financial circumstances at the time.

References

Archibald, C, Flynn, S and Malvey, P (1995), 'Uniform-price auctions: evaluation of the Treasury experience', US Department of the Treasury, Office of Market Finance.

Churm, R and Webber, L (2007), 'Decomposing corporate bond spreads', *Bank of England Quarterly Bulletin*, Vol. 47, No. 4, pages 533–41, available at www.bankofengland.co.uk/publications/Documents/quarterlybulletin/qb070403.pdf.

De Santis, R (2016), 'Credit spreads, economic activity and fragmentation', *European Central Bank Working Paper No. 1930*.

Elliott, D and Middeldorp, M (2016), 'What explains the fall in sterling corporate bond issuance?', available at https://bankunderground.co.uk/2016/04/01/what-explains-the-fall-in-sterling-corporate-bond-issuance/.

European Central Bank (2016), *Economic Bulletin*, Issue 5, available at https://www.ecb.europa.eu/pub/pdf/ecbu/eb201605.en.pdf.

Gilchrist, S and Zakrajšek, E (2012), 'Credit spreads and business cycle fluctuations', *The American Economic Review*, Vol. 102, No. 4, pages 1,692–720.

Joyce, M, Lasaosa, A, Stevens, I and Tong, M (2011), 'The financial market impact of quantitative easing in the United Kingdom', *International Journal of Central Banking*, Vol. 7, No. 3, pages 113–61.

Joyce, M, Tong, M and Woods, R (2011), 'The United Kingdom's quantitative easing policy: design, operation and impact', *Bank of England Quarterly Bulletin*, Vol. 51, No. 3, pages 200–12, available at www.bankofengland.co.uk/publications/Documents/quarterlybulletin/qb110301.pdf.

Leland, H and Toft, K (1996), 'Optimal capital structure, endogenous bankruptcy, and the term structure of credit spreads', *Journal of Finance*, Vol. 51, No. 3, pages 987–1,019.

Salmon, C (2017), 'Market functioning', available at www.bankofengland.co.uk/publications/Documents/speeches/2017/speech955.pdf.