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Financial crisis of 1931? British banking stability and the role of open-market operations

Matthias Römer

Freie Universität Berlin

Correspondence
Matthias Römer
Email: matthias.roemer@fu-berlin.de

Abstract

To what extent was the summer of 1931 a financial crisis in Britain? Previous research has shown how London merchant banks were affected, but it remains unclear to what extent the largest commercial banks of London – the clearing banks – were under threat. Monthly balance sheets reported by clearing banks do not fully reflect the day-to-day liquidity in financial crisis, possibly overstating available liquidity. This article does not rely on what clearing banks reported, but what the largest five London clearing banks actually did on a daily basis during the summer of 1931. I find that the London clearing banks were not seriously under threat. This is because large-scale asset purchases by the Bank of England stabilized the liquidity of the London clearing banks. This intervention is consistent with previous crisis situations during the nineteenth century and at the outset of the First World War.

KEYWORDS

Bank of England, financial crisis 1931, open market operations, financial stability

In 1931 Germany, Austria, and Hungary experienced severe financial crises.[1] Banks failed, capital controls were introduced, and borrowers defaulted on their debt. The continental crises then

[1] For the origins of the continental crisis, interwar capital flows, and their sudden reversal, see Accominotti and Eichengreen, 'Mother of all sudden stops'. In the German crisis, domestic risk-taking of banks was linked to such capital inflows. Postel-Vinay and Collet, 'Hot money and inflows'. For the preceding banking and currency crises in Austria, see Macher, 'Austrian banking crisis'. See Macher, 'Hungarian twin crisis', on the contagion to Hungary.

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spread to the City of London.[2] To what extent was the British banking system under threat in 1931? The exposure to the crises on the continent differed by type of banking institution. Some merchant banks (or acceptance houses) had guaranteed credits to continental – primarily German – borrowers and thus were directly exposed to the crises.[3] The exposure of the largest commercial banks (or clearing banks), however, was limited.[4] A failure of one of the clearing banks would have most likely affected the London money market tremendously. To what degree the London clearing banks were at risk is subject to debate.

There are two opposing views in the literature. While James argues that the London clearing banks were under threat due to heavy losses in deposits, Billings and Capie conclude that the London clearing banks did not face a run and were not seriously under threat.[5] I will present new evidence that the five largest London clearing banks were not seriously at risk of failing during the summer of 1931. However, I will argue that the liquidity of the London clearing banks was at risk during the peak period of gold outflows, and only large-scale purchases of Treasury bills stabilized the liquidity of the London clearing banks.

The remainder of this article is structured as follows: section I describes the role of clearing banks in the London money market and their relationships to both discount houses and the Bank of England. Furthermore, this section outlines the two opposing views brought forward in the literature. Section II presents two new datasets drawn from Bank of England records. Firstly, I present data on the London clearing banks' liquidity during the summer of 1931 on the basis of the discount office diary. Secondly, new data on open-market operations by the Bank of England during the interwar gold standard period are presented. I define open-market operations as the bilateral outright (i.e. not reverse) purchase or sale of Treasury bills by the Bank of England in the London money market. Section III presents the results of the empirical analysis. I show how the response of the Bank to the mounting reserve losses was unprecedented, at least during the interwar gold-standard period, but not unusual given past interventions during the nineteenth century and at the outset of the Second World War. Section IV concludes.

I | THE INSTITUTIONAL FRAMEWORK

Clearing banks were the main commercial banks in Britain. They held the majority of deposits and were the main lender to domestic industry and trade.[6] Clearing banks created deposits against mere promise, or as Reginald McKenna, chairman of the Midland Bank, one the five largest clearing banks, put it: '[…] to a very large extent, loans make deposits'.[7] In other words, clearing banks were no intermediaries who not only lend deposits, but also create them by offering credit. The liabilities of clearing banks were mainly deposits. Their assets were more varied. Clearing banks' investments and advances made up 68 per cent of deposits between 1925 and 1931.[8] The investments included 'bills of exchange and approved export credits within 18

[2] Truptil, *British banks*, p. 290; Accominotti, 'Transmission'. For evidence on the transmission of the German crisis in 1931, see also Straumann et al., 'German crisis'.

[3] Accominotti, 'Merchant banks'.

[4] Ibid.

[5] James, *End of globalization*, p. 72; Billings and Capie, 'Financial crisis'.

[6] Sayers, *Modern banking*, (7th edn.), pp. 18–9.

[7] Truptil, *British banks*, p. 208.

[8] Truptil, *British banks*. See app. II on annual averages of weekly positions. Average weekly balances are compiled from monthly statements.

months of maturity'.[9] The more liquid assets are cash (this includes any balances – bankers' deposits – at the Bank of England), loans at call (i.e. 'money at call' or 'call money'), and loans at short notice (up to a week), as well as bills discounted. Such liquid assets made up 32 per cent of deposits.[10] Bankers' deposits were the first line of defence given a liquidity shock.[11] Following a loss in deposits, clearing banks could improve their liquidity by allowing some of their bill holdings to mature without taking up any replacements.

However, if this did not suffice, the second line of defence was 'call money'. Clearing banks could recall their funds from the discount houses. 'Call money' linked the clearing banks to other assets in the London money market: '[I]n a sense, money at call in the balance—sheets of the clearing banks represents bills of exchange and short government paper held indirectly by the banks'.[12] Hence, 'call money' linked the clearing banks not only to other assets, but also to other financial institutions, most notably, the discount houses. Discount houses, in turn, were linked to merchant banks who guaranteed payment of bills at maturity. Such bills were sold to discount houses, which were funded by short-term, often overnight, deposits from clearing banks. Discount houses were fragile institutions in the sense that they relied almost exclusively on borrowed funds and did not hold any considerable reserves.[13]

The Bank of England closely monitored the state of the London clearing banks: '[t]he most important institutions for which the Bank accepts responsibility of this kind are the London clearing banks, for on their ability to meet instantly the demands of their depositors the business of the nation depends'.[14] A key indicator was the cash–deposit ratio. It was not legally fixed, but the clearing banks 'voluntarily' imposed a certain ratio of liquid assets to deposits.[15] Since a large fraction of liquid assets were bankers' deposits at the Bank of England, any changes in bankers' deposits would change the ratio. This gave the Bank of England an opportunity for control as clearing banks tried to avoid any excess reserves:

> As the banks, striving to keep their cash-ratio fixed at eight per cent, sense the changes in reserves, they try to adjust their position by buying less or more bills and by calling more or less money from the discount houses. These, having and wanting no margin, look to the Bank of England to enable them to meet the situation, and this gives the Bank important opportunities.[16]

In times of stringency, the Bank of England could support the banking system by lending to the discount houses or purchasing Treasury bills.[17] The transmission mechanism of a Treasury bill purchase was the following: The Bank of England purchased a Treasury bill from a discount

[9] Sayers, *Modern banking*, (7th edn.), p. 39.

[10] Truptil, *British banks*. See app. II.

[11] Ibid., pp. 220–1.

[12] Sayers, *Modern banking*, (7th edn.), p. 39.

[13] King, *Discount market*, p. 183.

[14] Sayers, *Bank of England: 1891–1944*, p. 528.

[15] Truptil, *British banks*, pp. 209–10.

[16] Sayers, 'Open-market operations', p. 390.

[17] Treasury bills are 'a short-term government promissory note financing short-term deficits between government receipts and expenditure'. (Capie and Webber, *Monetary history*, p. 307) During the interwar years, Treasury bills, the most important instrument for financing government deficit, were issued either by tender each Friday or by tap, that is, anytime at a fixed discount rate set by the Treasury (ibid., p. 308). The bulk of Treasury bills at the time had a maturity of 3 months (Sayers, 'Open-market operations').

house.[18] It paid for the bill with a cheque on itself. The discount house took the cheque to one of the clearing banks and the discount house's deposit rose by the amount of the cheque. In turn, the clearing bank took the cheque to the clearing house. As a result, the Bank of England owed the clearing bank the amount of the cheque. The Bank of England would settle the claim by adding the amount of the cheque to the clearing bank's balances with itself. Consequently, bankers' deposits rose and the clearing bank's ratio of cash to deposits increased as well, since cash included bankers' deposits. The reverse occurred if the Bank of England sold a Treasury bill to a discount house. The latter paid the Bank of England with a cheque drawn on their deposit at a clearing bank. The amount was deducted from the clearing bank's deposit at the Bank of England. Hence, bankers' deposits decreased after a sale of a Treasury bill and the ratio of cash to deposits decreased.[19] If the cash ratio declined, clearing banks could always recall their loans to the discount houses on short notice. This was traditionally a crucial 'buffer' between the banking system and the Bank of England.[20] On this matter, the Deputy Governor testified in front of the Committee on Finance and Industry in 1929:

> '[Clearing banks have] the means of forcing the Bank of England to create additional credit, as they do now. [...] By calling in their short money funds from those who employ them they compel those persons to have a recourse to the Bank of England, and thus to create credit which has been called in.' *Reginald McKenna – a member of the committee – further inquires*: 'It would be a very limited power that they could exercise? – It is *not* very limited at times' responded Harvey [*own emphasis*].[21]

The discount houses would turn to the Bank of England to discount bills or obtain an advance to repay the borrowed funds to the clearing banks. By noon each day the money position of each discount house was established, resulting in deficit or surplus. Usually, a deficit was established as clearing banks would recall funds already in the morning, but would give back only later in the day between 12 p.m. and 1 p.m. Then Seccombe, Marshall, and Campion, the special agents of the Bank of England, who would purchase and sell bills on behalf of the Bank of England, 'would telephone to establish the money position in the market as a whole'.[22] The Discount office closed at 2:30 p.m. and discount houses would have to decide whether to borrow from the Bank of England. Funds from banks could arrive until 3 p.m. 'Indications given by the special buyer of the attitude of the Bank and knowledge of privilege money available would influence the decision'.[23] However, this came at a price. Bank rate was the rate set by the Bank of England for lending to the discount houses, and changes in the Bank Rate would be transmitted to the wider money market through the rates at which discount houses would discount bills presented to them.[24]

[18] Sayers, *Modern banking* (1st edn), pp. 104–8. From 1938 on, the Bank of England would purchase bills directly from clearing banks as well.
Sayers, 'Open-market operations'.

[19] Sayers, *Modern banking* (1st edn.), p. 108.

[20] Capie, *Future of central banking*, p. 66.

[21] Committee on Finance and Industry, *Minutes*, Qn 55 – 57.

[22] Fletcher, *Discount houses*, pp. 88–90. While Fletcher's account refers to 1951, it seems to resemble earlier periods. See Haase, *Lombardpolitik*, p. 96, who describes an only slightly different schedule. If the discount houses were unable to borrow sufficiently to cover their needs until 1:25 p.m., they would have to turn to the Bank of England or retrieve overnight money from the Bank by 2 p.m.

[23] Fletcher, *Discount houses*, p. 90.

[24] Sayers, *Modern banking* (1st edn.), p. 116.

The purchase (and sale) of Treasury bills by the Bank of England became a tool to control short-term market rates during the interwar period.[25] Although open-market operations were just one tool among a variety of tools to control short-term market rates, by the late 1920s open-market operations in the form of purchases and sales of Treasury bills were the primary tool.[26] Although the origins of open-market operations by the Bank of England go back as far as 1834,[27] only the interwar period saw the increasing use and sophistication as the 'technical conditions were more favourable to open-market operations' due to the much larger availability of Treasury bills after the First World War.[28] The response of the Deputy Governor of the Bank of England Sir Ernest Harvey during the Committee on Finance and Industry on that matter:

> Do you generally, when you operate in the open market, operate through bills or through Government securities?' – (Sir Ernest Harvey)' Generally through bills. When I say 'generally' I do not wish it to be thought that we do not operate in Government securities. We may operate through Government securities, but, of course, at a time like this when the volume of bills is so much larger than in, let us say, pre-war times, owing largely to the great volume of Treasury bills, the proportion of operations in bills is larger in comparison with securities than used to be the case.[29]

The interwar market for Treasury bills was quite active during the interwar gold standard period. Each week on average £37 million were issued and 'total maturities each day were of the order £10 million'.[30] The difference between the amount of newly issued bills and maturing bills was subject to seasonal variations. During the tax seasons (January–April) for instance, the amount of bills maturing exceeded the newly issued amount of bills, that is, adding liquidity to the market. The total amount of bills allotted to the London money market was on average £500 million on the basis of the weekly tender. This amount was less than the total amount of Treasury bills outstanding. The difference between the two numbers is held by the Bank of England and other public institutions. The Bank of England held on average £160 million Treasury bills in the Issue department (starting in November 1928 to September 1931) and £13 million Treasury bills in the Banking department (April 1925 to September 1931).[31] The rest of the Treasury bills were held by London clearing banks, discount houses, and other banks. The London clearing banks held 17 per cent of total resources in bills and Treasury bills.[32] In March 1931 the London clearing banks held

[25] The main purpose of open-market operations was the control of short-term market rates, not some monetary quantity.

[26] See ch. 13 in Sayers, *Bank of England 1891–1944*. Other tools include 'not matching tenders to maturities'. By not matching tenders in Treasury bills to maturities, the Bank of England could aim at firmer rates. Not matching tenders was largely seasonal. During the tax season (January through April) when liquidity was drained from the market due to tax payments to the Treasury, the amount of maturing Treasury bills would exceed the amount of newly issued Treasury bills, that is, additional liquidity offsetting the drain of liquidity caused by tax payments. Yet another tool was borrowing directly from banks (ibid. p. 303).

[27] For an overview see Bindseil, *Implementation*, pp.145–6. See also Ugolini, 'Liquidity management', for empirical evidence on repurchase agreements by the Bank of England before the First World War.

[28] Sayers, 'Open-market operations', p. 391.

[29] Cited from ibid, p. 392.

[30] Sayers, *Bank of England 1891–1944*, p. 308.

[31] The size of Treasury bill portfolio fluctuated widely. For the Banking department the minimum value was £25 000 and the maximum value £59 million. For Issue department the minimum value was £65 million and the maximum value was £212 million. Bank of England Archive (hereafter BoE Archive), Reference 9A155 6/7 and ADM17/ 56.

[32] Truptil, *British banks*, p. 85. Data refer to December 1930.

£129 million worth of Treasury bills.[33] Overall this points to a large availability of differing maturities, which helped the Bank of England to choose suitable maturities. This mattered since the maturity chosen would determine for how long liquidity was drained or added to the market.[34]

Why should the financial stability of London clearing banks have been under threat after all in the summer of 1931? *The Economist*, in its banking supplement, estimated that between the end of June 1931 and the abandonment of the gold standard, £200 million of funds left the country.[35] The 'abnormal' decline in banking deposits is explained by the withdrawals of foreign funds, gold losses, and 'the consequent contraction of credit'.[36] However, it is not clear what constituted the withdrawals and who took it.[37] The outflow was probably mainly the re-call of deposits, conversion of short-term credits, and sales of securities.[38] However, irrespective of the source of the funds withdrawn: '[a]ll movements in the gold holding of the Bank of England (unless these are for account of the Treasury) will have an immediate effect upon the 'bankers deposits' and through them, in the total of bank credit'.[39] As outlined before, bankers' deposits were a crucial source of the liquidity of London clearing banks.

James argues that the stability of the London clearing banks was seriously under threat in 1931 and cites the decline in the aggregate monthly average of deposits of nine clearing banks.[40] According to James, it fell from £1.836 billion in January 1931 to £1.688 billion in October 1931. The losses in deposits varied across clearing banks: 'Barclays lost 3.9 per cent of deposits and current accounts, the Westminster 6.6 per cent, Lloyds 8.5 per cent, the National Provincial 10.4 per cent, and the Midland (the largest English bank) 9.8 per cent'.[41] Large, sudden losses of deposits threaten the stability of banks when they have to liquidate assets to finance the loss of deposits. This could be particularly problematic when the price of assets is currently low. James argues that the financial stability of the banking systems was in fact under threat and only devaluation could relieve the largest banks from such pressure. A devaluation and subsequent stabilization of the exchange rate would halt further deposit losses as it would halt further devaluation expectations.

However, there is an opposing view. Billings and Capie agree with James that indeed aggregate deposits at the London clearing banks fell in 1931 by about £125 million, but the authors add that aggregate deposits fell only by 4 per cent from June to September 1931.[42] Billings and Capie compare the years 1926–36 and state that the variation in 1931 was 'wider' and deposit levels in August and September a little lower, but not dramatically so. In addition, Billings and Capie argue that both Barclays Bank and Lloyds Bank continued to make advances before and after the German

[33] Committee on Finance and Industry, *Report*. Appendices, tab. 1, p. 289.

[34] Sayers, 'Open-market operations', p. 395.

[35] *The Economist*, 14 May 1932, Banking supplement, p. 6.

[36] 'The outflow of funds was met by £30 million of gold shipments, £50 million by the Bank of England's Paris and New York credits. Another £80 million were met by the Treasury's Paris and New York credits. The remaining £40 million were met by 'the disposal of devisen held in official or private hands' (ibid., pp. 5–6).

[37] Hurst, 'Gold crisis'. I thank one of the reviewers for bringing Hurst to my attention and the unclear sources of withdrawals.

[38] Ibid. Hurst cites the large amount of foreign deposits held on foreign account. See also Committee on Finance and Industry, *Report*, Appendices, tab. 9, p. 299.

[39] Truptil, *British banks*, p. 211.

[40] James, *End of globalization*, p. 72.

[41] Ibid.

[42] Billing and Capie, 'Financial crisis'. Slightly different than James' estimate as they focus on the entire calendar year, not just January through October 1931.

standstill/devaluation.[43] Furthermore, provisions for bad debts did not markedly increase in the 1930s.[44] Overall, Billings and Capie conclude that 'evidence of a run on British banks is lacking, the system emerged intact, and we argue was not under serious threat [...]'.[45] The authors argue that the Bank of England did not support any particular financial institutions 'at the expense of abandoning the gold standard'.[46]

How to reconcile these two accounts? This paper presents new evidence on the daily liquidity of the five largest London clearing banks throughout the crisis of 1931. The data show that the largest clearing banks did not come under severe threat during the financial crisis in 1931, but during the peak period of reserve outflows the London clearing banks re-called funds and did not return them. After a large-scale intervention by the Bank of England, which stabilized a key liquidity source (bankers' deposits) of the London clearing banks, the London money market resumed its normal operations.

II | DATA AND SOURCES

How to measure the liquidity of London clearing banks? Monthly balance sheets published by the clearing banks are one possible source. Such balance sheets showed that the most liquid items – 'call money', 'cash', and 'deposits at the Bank of England' – made up about 20 per cent of all assets.[47] However, the clearing banks '[i]n actual fact they do not keep quite as much'.[48] This is due to a well-known practice called 'window-dressing'. The Committee on Finance and Industry on window-dressing:

> The monthly figures published by the clearing banks are not true daily averages but are averages of one selected day in each week of the month. It seems that, in order to present a better appearance, most of the banks concerned are at pains to manipulate their balances with the Bank of England on the selected day of the week so that they stand at a higher figure than usual.[49]

Hence, 'the cash-ratio by the monthly statements is therefore a fictious ratio'.[50] An alternative measure of London clearing banks' liquidity are the deposits held by London clearing banks at the Bank of England. Data on such deposits are available on a daily basis. However, such deposits were subject to 'window-dressing' as well. Both the published monthly balance sheets and the daily bankers' deposits offer a possibly misleading or incomplete picture of the liquidity of London clearing banks. A more reliable indicator of liquidity is necessary to judge the financial state of the London clearing banks during the crisis of 1931. A more complete picture includes a crucial second source of liquidity – 'money at call' or 'call money'. Hence, the following analysis does

[43] Billings and Capie, 'Financial crisis', p. 203.

[44] Ibid., p. 208.

[45] Ibid., p. 211.

[46] Billings and Capie go on to argue that 'circumstances meant that the exchange rate was no longer sustainable' (ibid., p. 211).

[47] Truptil, *British banks*, p. 85.

[48] Ibid., p. 93.

[49] Cited from Sayers, *Modern banking* (1st edn.), p. 38.

[50] Ibid, p. 39.

not rely on the published monthly statements or bankers' deposits only, but analyses new data on daily actions of the five largest London clearing banks in the London money market.

The paper uses the daily entries in the discount office diary at the Bank of England.[51] They are a testament to the close attention the Bank of England paid to the daily state of London clearing banks. The diaries contain details on what the largest five clearing banks (Barclays Bank, Lloyds Bank, Midland Bank, Westminster Bank, and National Provincial Bank) were doing each day according to the following categories:[52]

(1) Who re-calls short-term lending ('call-money')
(2) Who gives back call money
(3) Who buys bills

The provision of 'call money', or the purchase of bills, indicates the availability of liquidity, whereas the recall of 'call money' is indicative of a deficit in liquidity. These observations are used to construct a daily liquidity indicator on the basis of the daily actions of the five clearing banks. A severe lack of liquidity would be, for instance, if all five clearing banks recalled 'call money' on the same day. I employ the following coding scheme: If a particular clearing bank recalled funds, it was coded minus one. Giving back or purchasing bills was coded plus one. Doing nothing is coded zero. Such coding is admittedly rather simplistic and does not tell anything about the magnitude of sums involved, but such information is unfortunately not consistently available in the discount diary. The recurring recall of funds for balance sheet purposes are left out. These were known in advance and each clearing bank had a particular day when to call and do not necessarily indicate a lack of liquidity. Barclays Bank regularly called on Mondays, Lloyds Bank on Tuesdays, Midland Bank on Wednesdays, and National Provincial Bank and Westminster Bank on Thursdays.[53] The only exception to this schedule was the preparation for the half-year balance sheet, when all clearing banks could call on the same day.

Figure 1 shows the daily use of short-term funds by the largest five London clearing banks between 15 June 1931 and 19 September 1931. The left axis shows the daily liquidity indicator on the basis of the diary of the discount office. A negative value indicates a recall of funds. A positive value signals a return of funds to the London money market. The right axis the shows the difference between the Bank Rate and the short-term market rate. The shaded area represents the period between 6 July and 16 July 1931. Overall, Figure 1 shows the following: the London clearing banks re-called funds (and/or withheld funds) as news of continental trouble started to emerge in early July 1931, and as a result, the difference between bank rate and market rate declined, indicating a lack of liquidity in the London money market.[54]

However, the overall liquidity of the 'Big Five' London clearing banks does not seem to have been severely threatened.[55] Funds were returned and bills were purchased from 16 July onwards.

[51] Discount office diary, BoE Archive C55, see app. for entries in the diary from 1 July to 19 September 1931.

[52] In addition, an overall assessment of the situation in the London money market is provided, for example, money short, patchy, usable, comfortable, easy. However, this information was not used in the time series shown.

[53] Truptil, *British banks*, p. 93. The description by Truptil is confirmed by the entries in the Discount Diary. The only exception is the National Provincial Bank. At least in 1931, the latter called regularly on Wednesdays, not Thursdays.

[54] An exception is Westminster Bank. On 10 July 1931, Westminster Bank was a 'small' buyer of bills, according to the diary of the Discount Office. However, similar to all other clearing banks, Westminster Bank recalled funds on 6 July, 7 July, and on 15 July.

[55] See app. for data used in fig. 1 in tabular form.

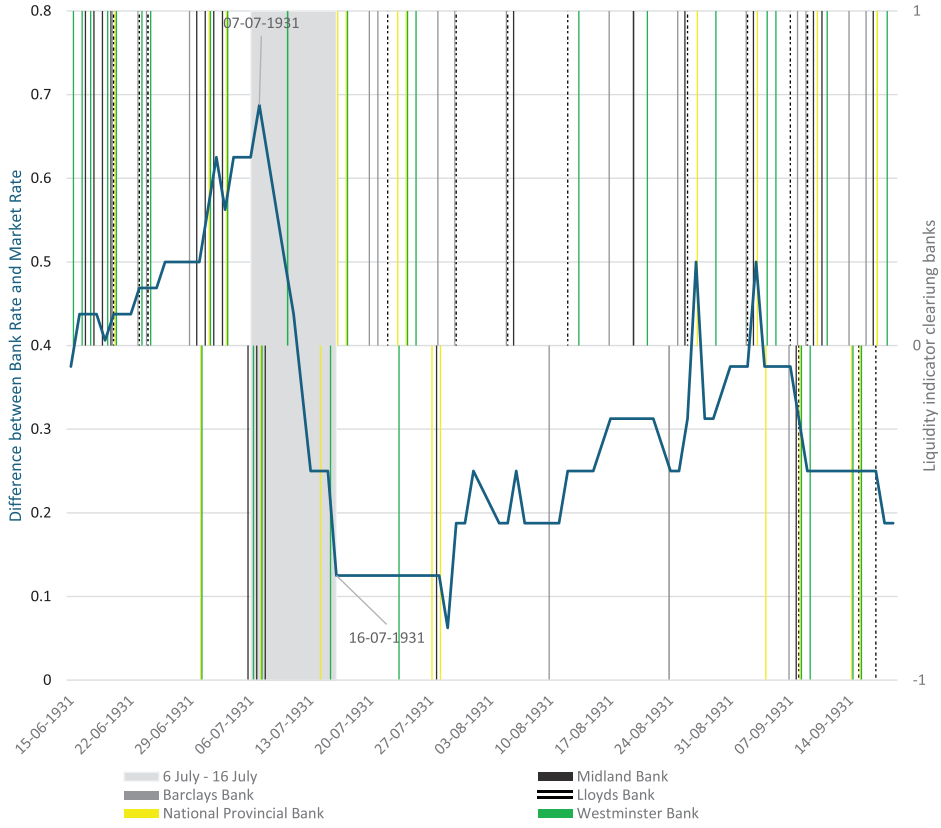

FIGURE 1 Liquidity of London clearing banks (15 June–19 September 1931). *Note*: For coding description, see text. *Sources*: Data from BoE Archive C55. Bank Rate and three month's bankers' draft from *The Economist* (various issues).

The smaller clearing banks (Westminster Bank and National Provincial Bank) returned funds earlier compared with the larger clearing banks (Barclays Bank, Lloyds Bank, and Midland Bank). Overall, this seems to confirm the conclusion by Billings and Capie, who argue that the liquidity of London clearing banks was not severely threatened throughout the crisis.[56] The clearing banks were even able to lend money to the discount houses or purchase bills and make longer-term commitments between July and September 1931. However, Midland Bank, Barclays Bank, Lloyds Bank, and National Provincial Bank halted any purchases of bills and return of funds at the beginning of July 1931, and Midland Bank refrained from returning funds to the market until early August, for instance. This coincided with the peak period of reserve withdrawals between 15 July 1931 and 5 August 1931. During the same time period a large-scale intervention in the London money market by the Bank of England via open-market operations occurred. The hypothesis is that clearing banks' liquidity would have been severely strained without the support extended by the Bank of England.

A second newly collected dataset covers daily open-market operations by the Bank of England during the interwar gold standard. Open-market operations by the Bank of England during the interwar gold standard have so far received little attention in the literature, especially in empirical

[56] Billings and Capie, 'Financial crisis'.

analysis.[57] I define open-market operations as the bilateral outright (i.e. not reverse) purchase or sale of 3 months of UK Treasury bills by the Bank of England in the London money market.[58] Such open-market operations do not occur on a known regular basis, that is, such operations cannot be anticipated by market participants.[59]

This section details the archival sources of a new more granular dataset on daily interwar open-market operations by the Bank of England. The dataset is based on balance-sheet data available at the Bank of England archive. The amount of Treasury bills purchased and sold are not readily available in the weekly summary balance sheet known as the 'bank return'. The bank return is divided in two broad sections: Banking Department and Issue Department. Before the amalgamation of the note issue on 22 November 1928, the only relevant section was the Banking Department.

It is important to acknowledge that the different items included in the Bank's return pertain to the way the Bank of England came into possession of specific assets, rather than the quantity of assets currently held by the Bank of England. According to Deputy Governor Harvey on the Committee on Finance and Industry: 'I ought to make this point clear, that "Government Securities" includes Treasury Bills, that is Treasury Bills bought by the Bank where the Bank initiates a transaction. If a Treasury Bills is brought in by anybody for discount at the Bank it is treated as a discount and goes into "Discounts and Advances"'.[60]

For the Banking department, the relevant item within 'Government Securities' is the Treasury bill portfolio.[61] The items 'Government Securities' and 'Other Securities' of the Banking Department contained many different types of assets, and their composition changed over time. The Issue Department had a separate Treasury bill portfolio.[62] The size (or even changes in size) of the two Treasury Bill portfolios of the Banking and Issue Department did not necessarily reflect open-market operations. To identify sales and purchases of Treasury bills in the London money market, I consider various transfers of Treasury bills within the Bank of England. Figure 2 illustrates movements of Treasury bills within the Bank of England and between the Bank and market participants and identifies relevant sources in the Bank's archive.

Figure 3 shows the monthly sum of Treasury bill purchases and sales by the Bank of England in the London money market while being on the interwar gold standard. The data contain all purchases and sales of 3 months of Treasury bills by the Bank of England in the London money market between 28 April 1925 and 19 September 1931 as recorded in the Bank of England Banking Department and Issue Department. During the 2335 days, there were 287 days with sales and 211 days with purchases. The months with the highest amount of Treasury bills purchased are July and August 1931 (see figure 3).

To cross-check the sale and purchases, secondary sources were consulted. Internal records from the Bank of England are 'fragmentary'.[63] Nevertheless, the available documents permit the corroboration of at least some elements of the dataset. For the years 1929 and 1931, an internal

[57] An exception is Garrett, 'Monetary policy'. However, Garrett's analysis relies on the reserve–deposit ratio of London clearing banks as a proxy for open-market operations, which is potentially subject to window-dressing, as acknowledged by Garrett (p. 614).

[58] This is consistent with the description of interwar open-market operations by Sayers, 'Open-market operations'.

[59] Such open-market operations are hence close to the definition of an 'ideal' open-market operation by Bindseil, *Implementation*, p. 145.

[60] Committee on Finance and Industry, *Minutes*, Qn 298.

[61] BoE Archive Reference 9A155 6/7.

[62] BoE Archive Reference ADM17/ 56.

[63] Sayers, *Bank of England 1891–1944*, p. 308.

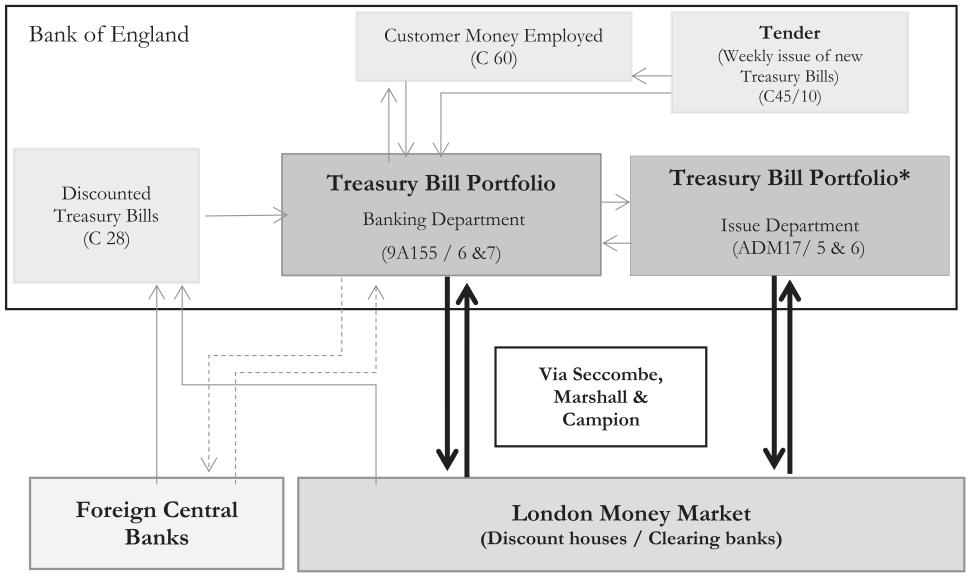

FIGURE 2 Transfers of Treasury bills within the Bank of England and from/to the London money market and foreign central banks. *Source*: Author creation.

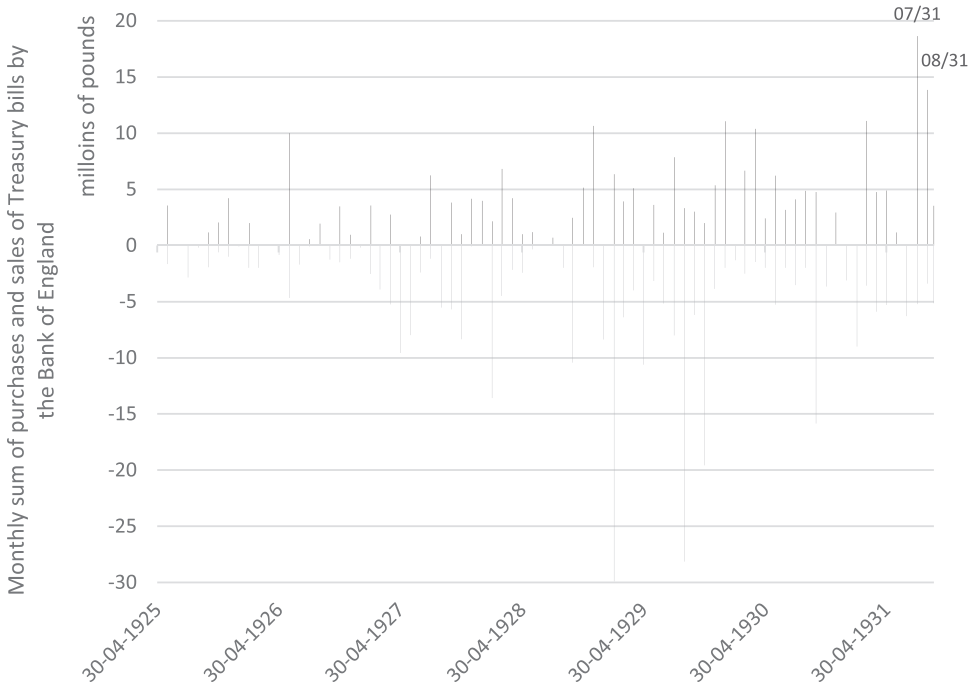

FIGURE 3 Open-market operations by the Bank of England in the London money market. *Note*: The figure shows the monthly sum of purchases and sales of UK Treasury bills between April 1925 and September 1931. *Sources*: See section II.

TABLE 1 Validity of new dataset.

Time	Internal memo	New dataset
Three weeks of February 1931	+11.000	+11.080
Fifth week of 1931	−7.000	−7.685
Nine days of March 1931	−5.000	−5.490
Reversed later in March 1931	+5.000	+4.770
First half of June 1931	−6.000	−5.855

Note: Sales and purchases of Treasury bills in millions of £. New dataset combines sales (−) and purchases (+) of Treasury bills in the London money market as recorded in the Issue and Banking Department.
Sources: For sources of new dataset, see section II. Internal Memo cited in Sayers, *Bank of England 1891–1944*, p. 308.

TABLE 2 Descriptive statistics of daily open-market operations, 1925–31.

Variable	Min	25%	Median	Mean	75%	Max
Purchases and sales of T.bills	−15.50	−1.00	−0.20	−0.18	0.70	5.04
Purchases of T.bills	0.01	0.46	0.87	1.18	0.70	5.04
Sales of T.bills	−15.50	−1.50	−0.85	−1.16	−0.35	−0.02

Note: Daily sales and purchases of Treasury bills by the Bank of England in millions of £ between 28 April 1925 and 19 September 1931.
Sources: See section II.

memo from 1932 provides little information about open-market operations by the Bank of England.[64] Table 1 compares the cited figures from the memo of sales and purchases of Treasury bills with the newly compiled dataset: the comparison of the newly collected dataset with internal sources suggests that it captures the purchases and sales of Treasury bills by the Bank of England in the London money market well.

The size of the open-market operations in the London money market is subject to debate. During the hearings in the Committee on Finance and Industry, it was suggested that the actual amount required was small. The Deputy Governor Harvey of the Bank of England on that matter:

> To these operations the market was highly sensitive, very little swing in market resources being sufficient to influence the market rate of discount. After all, you must remember this, that is takes very little, really to swing over from a shortage of cash in the market to a tightness of cash.[65]

The ensuing discussion suggests that £250 000 would suffice, but in fact, the actual amount usually purchased or sold was considerably higher, as the newly collected data will show. An average operation was more than £1 million with purchases up to £5 million (see table 2 for descriptive statistics). This is more in line with an internal memo which states: 'that at that time the current assumption in the Bank was that £5 million will generally do the trick'.[66] In sum, the large market for Treasury bills after the First World War and the Bank's own substantial holdings, particularly after the note amalgamation in November 1928 and access to the Issuing Department's holdings of

[64] ibid.

[65] Committee on Finance and Industry, *Minutes*, Qn 353.

[66] Cited from Sayers, *Bank of England 1891–1944*, p. 309.

Treasury bills, allowed the Bank to choose from a wide variety of maturities among its substantial holdings of Treasury bills.

III | ANALYSES

The crisis in 1931 originated with the merchant banks and their sudden illiquidity due to acceptances linked to German importers. The merchant banks were closely intertwined with other institutions in the London money market. In December 1930, 10 London clearing banks held £126 million in acceptances and £113 million at call or short-notice lent to the money market, while capital and reserves amounted to £135 million.[67] The three largest discount houses held £40 million of acceptances, while capital and reserves amounted to £7.47 million in December 1930, that is, the discount houses were highly leveraged.[68] In mid-July 1931, the overall exposure to German bills accepted by both clearing and banks and acceptance houses was £53.45 million.[69]

At the outset of the crisis, the liquidity of the London clearing banks was the following: in mid-July 1931 immediately before the large-scale reserve losses began, bankers' deposits at the Bank of England stood at £68 million.[70] Data on the second main source of liquidity – 'money at call' – are not available on a daily basis, but monthly data are provided by the Bank of England Statistical Summary 1931. In June 1931 the London clearing banks held £133.2 million worth of 'money at call' and at short-notice.[71] The Committee on Finance and Industry differentiates further between 'money at call' and loans at short-notice. In March 1931 the London clearing banks held £25 million of 'call money'. Loans at short-notice in March 1931 were £67 million, and £22 million were lent to the Stock-Exchange.[72]

In early July the difference between bank rate and short-term market rate (here: 3 months of bankers' draft) narrowed considerably, indicating a shortage of liquidity in the London money market. This is in line with the evidence of the largest five clearing banks. On 6 July, Midland Bank started calling 'heavily'.[73] Midland Bank, Westminster Bank, and National Provincial Bank called again the next day. As a result, the spread between the bank rate and the short-term market rate started to narrow. On 8 July, Midland Bank was still re-calling funds. Afterwards, Barclays Bank, Lloyds Bank, Midland Bank, and National Provincial Bank stopped returning funds to the London money market. On 14 July, the Bank of England signalled that it was open to assistance, although the Governor was initially reluctant.[74] The Bank of England started to suffer sustained reserve losses beginning on 15 July (see figure 4).

The outflow of gold directly affects the liquidity of the London clearing banks. According to the contemporary coverage by *The Economist*:

[67] Accominotti, 'Merchant banks', p. 26. Total resources ('Capital, reserves, deposits and notes') of the Big Five London Clearing banks ranges between £315 and £446 million. (Truptil, *British banks*, p. 69) Data from 31 December 1934.

[68] Accominotti, 'Merchant banks'.

[69] ibid., p.31. See also Sayers, *Bank of England 1891–1944*, p. 504.

[70] 10 July 1931, BoE Archive C1/79. On average during the gold standard period £57 million (median: £55 million). This is lower than Truptil 1936, p. 94, who cites 'other deposits' which include Bankers' deposits.

[71] As a comparison, the clearing banks held in July 1931 £130.5 million, in August 1931 £113.2 million, and in September 1931 £106.9 million of 'money at call' or at short-notice. Bank of England Statistical Summary 1931.

[72] Committee on Finance and Industry, 'Report'. Appendices, tab. 1, p. 289.

[73] Discount Diary, BoE Archive C55

[74] Accominotti, 'Merchant banks', p. 28 and p. 31.

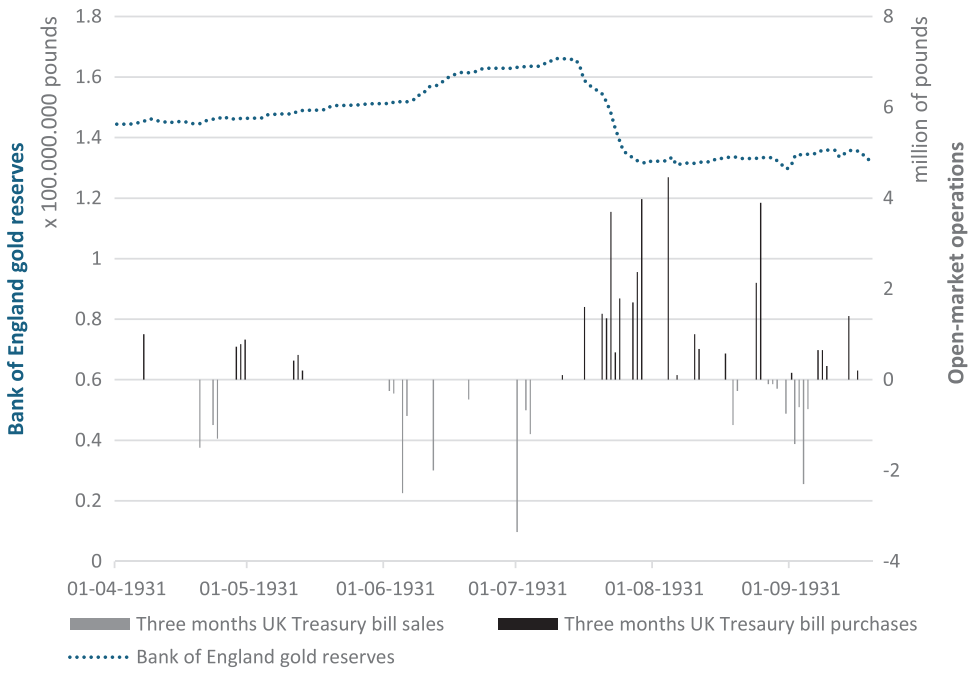

FIGURE 4 Gold reserves at the Bank of England and purchases and sales of treasury bills, 1 April–19 September 1931. *Sources*: Data from the Bank of England Archive. Gold reserves (C1/79). For sources of open-market operations, see section II.

> [. . .] and on the other side [. . .] the rapid withdrawal of foreign balances. Evidence of this was found in the shrinkage in banker's deposits from m64,5 on July 8th to m55,8 a fortnight later. This would have created considerable stringency in the money market had not the Bank of England bought bills heavily.[75]

The contemporary quote highlights two crucial aspects. First, clearing banks' liquidity was affected by the sudden withdrawal of funds, and second, the possible interventions by the Bank of England made a difference to a crucial source of the liquidity of the London clearing banks. On 15 July 1931, the German moratorium was declared, and a day later the diary at the Bank of England discount office states: 'Market rather more inclined to reduce their books but can't find buyers'.[76] On 16 July, large-scale purchases of Treasury bills started. Figure 4 shows that amount of Treasury bills bought picked up considerably as gold reserves declined.[77] As a result, the difference between Bank Rate and market rate stabilized (see figure 5). Large-scale buying continued on 20 July through to 29 July. Overall, the purchases of Treasury bills in the London money market amounted to about £25 million worth of Treasury bills until 4 August 1931.[78]

[75] *Economist*, 1 August 1931, p. 206.

[76] BoE Archive C55.

[77] See the app. for a tabular presentation of the date used in figs. 4 and 5.

[78] In total, the Bank of England bought £35 million between mid-July and the suspension of the gold standard. However, outside the peak period of reserve losses at the end of August 1931, the Bank of England sold £8 million of Treasury bills, as the difference between bank rate and short-term market rate again increased.

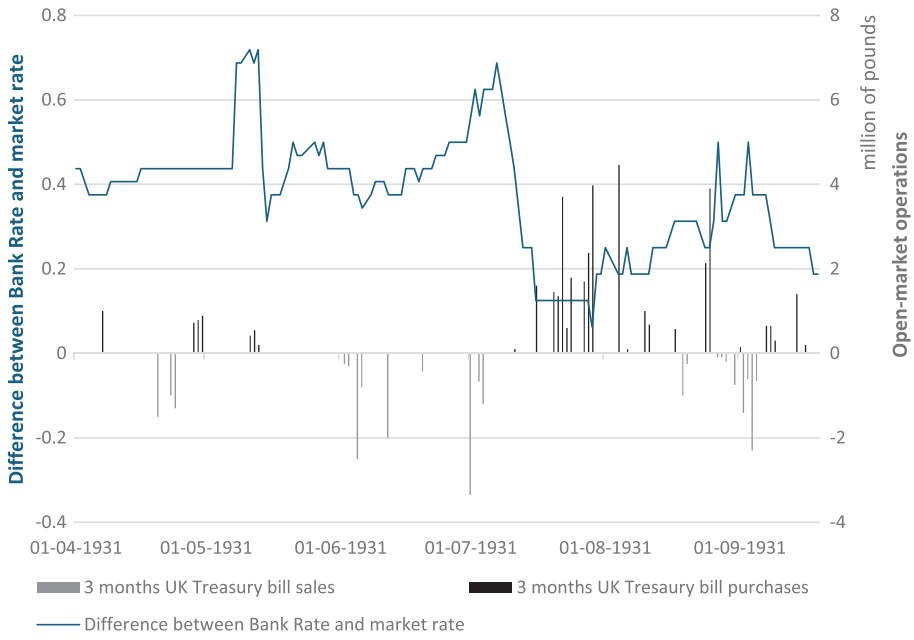

FIGURE 5 Liquidity in the London money market and daily open-market operations (1 April–19 September 1931). *Sources*: Bank Rate and 3 Months Bankers' draft from *The Economist* (various issues). For sources of open-market operations, see section II.

On 23 July, the bank rate was raised from 2.5 per cent to 3.5 per cent and again on 30 July to 4.5 per cent. It remained at 4.5 per cent until the suspension of the gold standard. A further rise was discouraged by the Committee of the Treasury at the Bank of England. From the minutes of the Committee of Treasury on 6 August 1931:

> After discussion the Committee agreed: [...] That the increased loss of confidence abroad which might follow an immediate rise in the Bank Rate outweighed all other considerations and that it would therefore be advisable to recommend to the Court that no alterations be made today in the Bank Rate.[79]

This internal reluctance to raise the bank rate further was shared abroad: 'Equally advice from Paris, New York and Zurich had put an end to the use of the Bank Rate: after the negative decision taken in[*sic*] Committee of Treasury on the 6th, the question was not raised again that month'.[80] Both the Bank of France and the Federal Reserve Bank of New York thought that a further rise in the bank rate would frighten holders of sterling even further.[81]

It is worth noting that the Bank of England not only purchased Treasury bills on a large scale during the crisis in the London money market, but commercial bills as well. However, these purchases are distinct from the Treasury bill purchases. The Bank of England obtained loans from the Bank of France and the Federal Reserve Bank of New York. More specifically, the Bank of England obtained two re-discount credits to purchase sterling in the foreign exchange market

[79] BoE Archive, C8/60.

[80] Sayers, *Bank of England 1891–1944*, p. 396.

[81] ibid., pp. 405–9.

and thereby defend the exchange rate. The Bank of England would obtain dollars and francs. For each draw, the Bank of England had to deposit prime sterling commercial bills of not more than 90 days' maturity.[82]

The purchases of commercial bills in the London money market started on 10 August and 12 August 1931 on behalf of the Federal Reserve Credit and Bank of France Credit, respectively.[83] The Bank of England bought 18 million of commercial bills between 10 August and 3 September in the London money market on behalf of the Federal Reserve credit and 10 million of commercial bills on behalf of the French Credit between 12 August and 16 September 1931.[84] Hence, these purchases fell outside the peak weeks of reserve losses between 15 July and 5 August 1931 when the liquidity of the London clearing banks might have been most at risk. Furthermore, the primary objective of these commercial bill purchases could not have been liquidity provision. Internal records show that at least for the Bank of France credit, Midland Bank received Treasury bills in exchange for the commercial bills.[85] Hence, these transactions did not any have additional liquidity effect.[86] In sum, the purchase of commercial bills are distinct from the Treasury Bill purchases made in July and early August 1931, when the liquidity of the Big Five London clearing banks, as I argue, was in question.[87] On 5 August 1931 the fiduciary issue was raised by £15 million to £275 million to facilitate large asset purchases. Unlike other countries, Britain did not have an 'escape clause' which allowed reserves to fall below a certain minimum in times of crisis, but raising the fiduciary issues amounted to the same thing. Doing so relaxed the constraint imposed by the gold standard and increased the room for open-market operations.

Were clearing banks at risk during the peak month of reserve withdrawal? I argue they were probably not at risk of failing, but their two sources of liquidity – bankers' deposits and 'call-money' – showed strains and imperilled the normal working of the London money market as the recall of funds and the subsequent lack of return of funds showed. The result was a narrowing difference between bank rate and short-term market rates. The threat to the London clearing banks was threefold: deposit losses, funds invested in acceptances and short-term funds lent to highly leveraged discount houses, which were heavily invested in acceptances and could not return borrowed funds, as they were tied up in acceptances. Funds invested in acceptances were frozen, but the Bank of England allowed for a re-discount. In addition, the purchase of Treasury bills by the Bank of England from the discount houses would stabilize Bankers' deposits as outlined above. Such purchases would offset the losses caused by the gold outflows. The sum of £25 million worth of Treasury bills purchased between 16 July and 4 August seems small relative to the combined balance sheets of the London clearing bank, but less small to the immediate source of London clearing banks liquidity – bankers' deposits and money at call. Overall, it proved sufficient to stabilize and increase the spread between bank rate and short-term market rates. This is an indication that a lack of liquidity was alleviated. After the intervention, normal business in the call-money market resumed.

[82] Clarke, *Cooperation*, p. 206.

[83] BoE Archive C25/7

[84] ibid.

[85] See BoE Archive 9A155/ 6&7. No similar entries were found for the Federal Reserve credit.

[86] The exchange of Treasury bills for commercial bills would not have a led to additional Treasury bill purchases as the holdings of the Banking and Issue department seem large enough to facilitate the exchange. On 10 August 1931 the Banking department held 26 million of Treasury bills and 110 million in the Issue department, for instance. I argue this would suffice for any exchange for commercial bills. (BoE Archive 9A155/ 6&7 and ADM17/ 5&6)

[87] I thank one of the reviewers for pointing out the exchange of Treasury bills for commercial bills.

Figure 4 shows that the Bank of England purchased a large amount of Treasury bills when gold started to flow abroad. However, the Bank of England had offset gold flows previously. I will argue that the response to the reserve losses was in fact unprecedented, at least during the interwar gold standard period. The model proposed by Cairncross and Eichengreen allows to estimate what offset of reserve flows affecting the domestic credit were to be expected in 1931, given past offsets during the interwar gold standard.[88] The model starts out by equating real balances to output and the short-term market rate:

$$\frac{M}{P} = y^{a_1} e^{a_2 I} \tag{1}$$

The money supply is determined by the product of the money multiplier (V) times the monetary base

$$M = VH = V(R + C) \tag{2}$$

The monetary base (H) is made up of reserves (R) (both gold and foreign exchange) and domestic credit (C), that is, the share of the monetary base not backed by reserves is understood as domestic credit.[89] The monetary base (H) is measured as the sum of bankers' deposits and other private deposits at the Bank of England and currency held outside of banks. Reserves are both gold and foreign exchange held by the Bank of England. The equilibrium condition of money supply equal money demand can be rewritten as:

$$\frac{V(R + C)}{P} = y^{a_1} e^{a_2 I} \tag{3}$$

As outlined in Cairncross and Eichengreen by taking the logarithm of the equilibrium condition, differentiating with respect to time and solving for the percentage change in reserves, the equilibrium condition can be rewritten as:

$$\hat{R}\frac{R}{H} = \hat{P} + a_1 \hat{Y} + a_2 \Delta I - \hat{V} - \frac{C}{H}\hat{C} + seasonal \tag{4}$$

where $\hat{R}$ and $\hat{C}$ are defined as the percentage change in reserves and domestic credit weighted by the ratio of reserve or domestic credit to monetary base. In other words, the change in reserves weighted by the reserve to monetary base ratio is a function of the change in prices, output, the first difference in interest rates, the money multiplier, and the change in domestic credit weighted by the ratio of domestic credit to monetary base. The money multiplier is $V = M/H$. Taking the logarithm yields:

$$v = m - h = a_3 (I - J) \tag{5}$$

[88] Cairncross and Eichengreen, *Sterling in decline*, pp. 77–9.

[89] The definition of the variables follows Cairncross and Eichengreen, *Sterling in decline*, pp. 77–9.

I is the short-term market rate and J is the bank rate of the Bank of England. Differentiating with respect to time:

$$\hat{V} = a_3 (\Delta I - \Delta J) \tag{6}$$

The Bank of England can intervene in the London money market via open-market operations by mitigating the effect of reserve flows on domestic credit:

$$\Delta C = a_4 \Delta R \tag{7}$$

If the Bank of England had played by the 'rules of the game', any changes in reserves would affect domestic credit as well, that is, $a_4 > 0$. In contrast, partly offsetting the effect of changes in reserves would imply $a_4 < 0$. Similarly to the previous equation on the percentage change in reserves, the reaction function can be written as:

$$\frac{C}{H}\hat{C} = a_4 \frac{R}{H}\hat{R} + seasonal \tag{8}$$

In other words, the dependent variable is the percentage change in domestic credit weighted by the domestic credit to monetary base ratio. The independent variable of interest is the percentage change in reserves weighted by reserves to monetary base ratio $\frac{R}{H}\hat{R}$. Seasonal controls include the recurring tax season in the first quarter of each year, window-dressing in June and December of each year, and a dummy for the miner's strike in the first quarter of 1926. The reserve flow equation (4) and the reaction function (8) form a simultaneous equation system with $\frac{R}{H}\hat{R}$ not being exogenous. Hence, following Cairncross and Eichengreen, I use two-stage least squares (2SLS) to estimate the reaction function.[90]

Table 3 presents the results of the estimation of the reaction function (8). The negative and significant coefficient of $\frac{R}{H}\hat{R}$ shows that the Bank of England did in fact offset the effect of reserve flows on domestic credit, that is, reserve changes did not fully affect domestic credit. The effect of reserves on domestic credit was partly offset by open-market operations. On the basis of the 2SLS estimation, figure 6 shows that the estimated reaction function tracks the actual values of the change in domestic credit quite well until the second quarter of 1931. However, the out-of-sample simulation based on the estimated coefficients and the actual reserve losses does not simulate the change in domestic credit well. The actual change in domestic credit by far exceeds the simulated value in the third quarter of 1931. This implies that the Bank of England's reaction to reserve losses was markedly different in the third quarter before leaving the gold standard. While some neutralization of reserve losses was expected given the history of offsetting reserve flows, the actual expansion of domestic credit before leaving the gold standard was in fact unusually large.

However, the response during the summer of 1931 does not seem unprecedented when compared with other crises. The Bank of England lent during the crises of 1847, 1857, and 1866 by granting discounts and advances.[91] Furthermore, the response in 1931 is similar to the crisis in 1914 in the sense that the Bank of England purchased large amounts of bills from both acceptances houses and banks.[92] However, the amounts purchased from discount houses were smaller

[90] The money multiplier equation is not part of the simultaneous equation system and can be estimated by OLS.

[91] Anson et al., 'Lender of last resort'.

[92] Roberts, *Saving the city*.

TABLE 3 Results dependent variable: $\frac{C}{H}\hat{C}$.

Variable	2SLS
Intercept	0.014*
	(0.007)
$\frac{R}{H}\hat{R}$	−0.776***
	(0.152)
$\frac{R}{H}\hat{R}_{t-1}$	−0.410**
	(0.186)
$\frac{C}{H}\hat{C}_{t-1}$	−0.575***
	(0.180)
Strike	−0.007
	(0.009)
Seasonal – Tax	−0.050***
	(0.009)
Seasonal – Window dressing	−0.013
	(0.009)
Observations	21
R^2	0.872

Note: 1926 first quarter to 1931 first quarter.
Sources: The data on gold bullion held in the Issue Department, foreign exchange, bankers' deposits, and 'Other Deposits and Accounts' at Bank of England are from the Bank of England Archive (C1/79). Money supply and currency in the hands of the non-bank public is from Moggridge, 'British monetary policy', pp. 148f. Business activity is from Mitchell et al., 'Interwar GDP' p. 551. Price data are from Albers, 'Great Depression'. The day-to-day rate is from Tinbergen, 'Economic Statistics', p. 106.
***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

in 1931, and the intervention seems less a matter of solvency but rather of liquidity when it comes to the London clearing banks. Sensing illiquidity during the peak period of reserve losses the Bank of England injected liquidity via the purchase of Treasury bills. Overall, the day-to-day response shown during the summer of 1931 is consistent with previous intervention by the Bank of England facing (potential) crises in the London money market.

IV | CONCLUSION

Recently it has been shown how the continental crisis in 1931 affected the London merchant banks. Did such trouble extend to the largest commercial banks in London – the clearing banks? There are two opposing views. While James argued that the London clearing banks were under threat due to heavy losses in deposits, Billings and Capie concluded that the London clearing banks were not seriously threatened during the summer of 1931.[93] This article aims to bridge the two opposing views. First, new archival data on the day-to-day liquidity of London clearing banks were presented. Liquidity was measured by the daily lending or recall of short-term funds by the five largest London clearing banks (Midland Bank, Barclays Bank, Lloyds Bank, Westminster Bank, and National Provincial Bank). These previously unpublished daily data are not subject to potential window-dressing, unlike the monthly balance sheet data previously used. The recall

[93] Billings and Capie, 'Financial crisis'; James, *End of globalization*, p. 72.

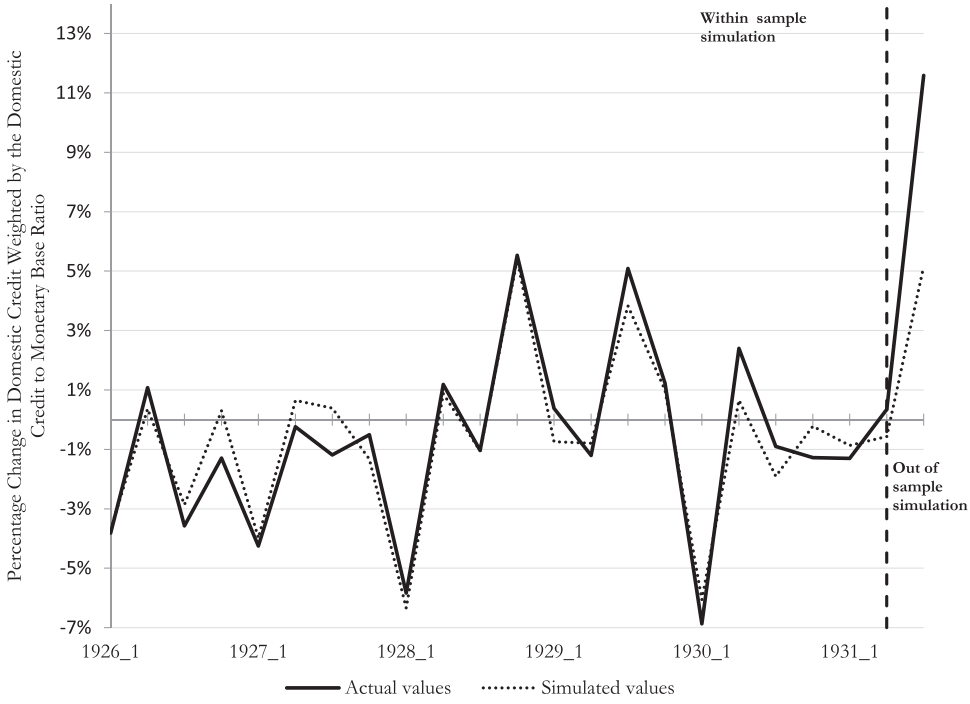

FIGURE 6 Percentage change in domestic credit 1926–31. *Note*: The dotted line is the estimated percentage change in domestic credit weighted by the domestic monetary base. The black line is the actual value. *Sources*: See table 3.

of funds from the London money market is the second line of defence after bankers' deposits. I proposed that the recall (or return) of short-term funds describes the overall liquidity position of the London clearing banks during the 1931 crisis. The data show that the London clearing banks were able to return funds to the London money market throughout the crisis between July and September 1931. This evidence suggests that the London clearing banks were not seriously threatened. However, at the same time, newly collected archival data show that the Bank of England purchased large amounts of Treasury bills during the same period, transactions which were distinct from the purchase of commercial bills starting in August 1931 in support of the credits by the Federal Reserve and the Bank of France. The purchase of Treasury bills raises the question of whether the Bank's large scale liquidity injection did in fact save the London clearing banks from severe harm. Although not at the risk of failure, I argue that the evidence presented shows that open-market operations stabilized the liquidity of London clearing banks during the period of large-scale reserve losses. In sum, in this paper I argue that, yes, London clearing banks were not particularly hard hit during the crisis of 1931, but this was also possibly due to the support by the Bank of England via open-market operations. The response is consistent with previous responses by the Bank of England during the nineteenth century and at the outset of the First World War in 1914.

In 1931, the Bank of England was confronted with a dilemma between maintaining the exchange rate and ensuring banking stability. Pursuing both objectives may have been mutually exclusive.[94] The evidence presented here indicates that the Bank of England selected banking

[94] Krugman, 'Balance of payment crises'.

stability over a fixed exchange rate by raising the fiduciary issue and undertaking large-scale purchases, which were contrary to the orthodoxy of the gold standard.

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ORCID

Matthias Römer https://orcid.org/0009-0002-6312-0846

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