GLOBAL CORRESPONDENT BANKING 1870–2000
WORKING PAPER SERIES

THE DEVELOPMENT OF INTERNATIONAL CORRESPONDENT BANKING IN THE USA 1970–89

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Series available at:

https://glocobank.web.ox.ac.uk/working-papers

Vol. 1, No. 1

December 2021

ISSN 2752-7859

Reference

Schenk, Catherine R. (2021) 'The Development of International Correspondent Banking in the USA 1970–89', Global Correspondent Banking 1870–2000 Working Paper Series Vol, 1, No. 1, University of Oxford.

Foreword

The *GloCoBank 1870–2000 Working Papers* series reflects the work in progress of the researchers associated with the ERC Horizon 2020 funded project Global Correspondent Banking 1870–2000 (GloCoBank) and of others whose papers directly address GloCoBank research themes. The papers are peer reviewed by GloCoBank and associated researchers and seek to identify and analyse the international network of correspondent banking relationships across the 20th century.

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Abstract

How did the global payments system cope with the surge of internationalisation of banking in the 1960s–1980s? Using archival evidence and other contemporary sources, this paper addresses the innovations in the trans-Atlantic payments system that supported liberalised payments in the 1970s and 1980s. The specific focus is the system's early development in the midst of innovation in ICT, disruption to the international monetary system and a series of high-profile bank failures that challenged the foundations of cross-border inter-bank relations. We find that, although the New York Clearing House developed a private sector solution to the rising number of cross-border payments in the early 1970s, pressure from the Federal Reserve after a payments crisis in 1974 encouraged further reform. The pace of growth of cross-border payments outstripped technological solutions and the private sector system was left with important vulnerabilities until the late 1980s. This emphasised the importance of reinforcing trust in the system through regulation as it grew more complex.

Keywords

Correspondent banking, New York financial centre, payments system, CHIPS, New York Clearing House, Herstatt Risk, international banking

Introduction

'Cross-border payment systems have been neglected for too long'

> Sir John Cunliffe, Chair of the Committee on Payments and Market Infrastructures, Bank of England Deputy Governor for Financial Stability (July 2020)

International commerce has always relied on the ability to transfer funds across space and time (Goetzmann 2016). Since the 18th century, in order to transfer payments across borders banks have established correspondent relationships with institutions in foreign financial centres and/or in countries where their customers (or their customers' customers) are located. These contractual or client relationships are much more frequent and cheaper than many alternatives, such as branches and subsidiaries. This framework of correspondent banking has survived the move in technology from paper to telegraph to electronic payments systems and persists into the digital era. Since 2008 the extent of the correspondent banking network has shrunk due to a variety of factors including costs of Know Your Customer and Anti-Money Laundering/Anti-Finance of Terrorism regulations. This changing pattern has prompted recent research on the dynamics of the global correspondent banking network at the Bank for International Settlements (Rice, von Peter and Boar 2020) and the International Monetary Fund (Erbenova et al 2016). To date the historical research on this critical infrastructure is limited. But studies of particular countries or financial centres demonstrate the potential to use the combination of archival and quantitative research to explain the shape of the network and how it was affected by regulation, technological change, financial crisis and politics (Merrett 1995, Panza and Merrett 2018, Mollan 2012). This paper examines how these factors influenced the correspondent banking system in New York in the post-Bretton Woods era.

The second era of globalisation is usually dated from the end of the Cold War in 1989, when there was a burst of ICT innovation and the volume of financial flows swept ahead of the growth of international trade or production, but the basis for the great financialisation of the international economy was set in the decades that preceded it. The 1960s and 1970s marked a new departure in global banking and raised fresh challenges for international payments. The innovation of the Eurodollar market from the end of the 1950s led to exponential growth in international dollar balances in the later part of the 1960s (Aliber 1973, Einzig and Quinn

1977). The opportunities presented by this innovation (along with the acceleration of US multinational companies (MNCs) moving abroad and the prospect of European integration) encouraged banks into a new phase of internationalisation (Battilossi 2002). One of the most marked characteristics was the surge of US banks into the City of London to take advantage of the dollar money markets there, outside the jurisdiction of their home regulators (Sylla 2002). As British and European banks confronted this competitive challenge for their staff and customers, they also sought to maintain their market share by expanding abroad, especially into Continental Europe, but also into the newly rich oil-producing states of the Middle East and markets in Africa and South America. The float of the pound sterling exchange rate in June 1972, followed by the dollar in March 1973 created new foreign exchange trading business for banks, but also new market risk from less predictable currency rates.

The rise of the Eurodollar and the internationalisation of banking has generated a significant historiography (e.g. Schenk 1998, Burn 2006, Battilossi 2010, Altamura 2016) and there is a growing literature on the history of changing technologies in national payments systems (e.g. Richardson 2007, Batiz-Lazo 2018, Maixe-Altes 2020) but the underlying revolution in the international architecture in the 1970s and 1980s has attracted little academic attention.[1] Using archival evidence and other contemporary sources, this paper addresses the innovations in the trans-Atlantic payments system that supported bank internationalisation in the 1970s and 1980s. The specific focus is the system's early development in the midst of innovation in ICT, disruption to the international monetary system and a series of high-profile bank failures that challenged the foundations of cross-border inter-bank relations. The first two sections explain the rationale for a new payments system in New York and its implementation. The new international payments system did not resolve the risk associated with time lags, which is addressed in the third section with a specific focus on the lasting effects of the Herstatt Bank collapse in 1974. The last section discusses the gradual reforms in the 1980s designed to reduce risk and enhance trust. This survey ends with the formalisation of multilateral efforts to coordinate cross-border payments at the Bank for International Settlements in 1990.

[1] One important exception is the recent history of SWIFT, which was launched as an international initiative in Europe in 1977, and operated alongside the US CHIPS system, which is the focus of this paper. Scott and Zachariadis (2014).

Outgrowing Paper Settlements

In the 1960s, the USD cemented its leadership as the leading international commercial currency as sterling continued its decline and fresh controls were imposed on the third party use of sterling for trade (Schenk 2010). The great success of the Eurodollar market in London emphasised the dollar's unrivalled attractions with respect to liquidity, while the denomination of trade in commodities such as oil in USD enhanced its network externalities. New York was the main international centre for ultimate dollar settlement and the surge in cross-border USD transactions and the increase in the activity of New York banks acting as correspondents for dollar payments across the world created a demand for efficiency in the settlement system in New York. To meet this need, the Clearing House Interbank Payments System (CHIPS) went on-line in April 1970 (with nine member banks and 40 or so affiliated banks) to settle international USD transactions. This marked an important additional service offered through the New York Clearing House Association, which had been set up among US banks in 1853 to simplify cheque exchanges among banks in New York.[2] In 2021 CHIPS remained the largest privately-owned USD clearing system with about 50 direct participant banks based mainly in New York. It thus still forms the hub of American correspondent banking.

Domestically, New York banks had long operated a network of interbank balances known as correspondent banking for clearing across the country through the Clearing House (Das et al 2018, Calomiris et al 2019, Jaremelski and Wheelock 2020). From 1918, the Federal Reserve Bank also provided a system called FedWire for settling same-day payments electronically by telegraph (for free until 1981), but only for banks that were members of the Federal Reserve system. This left a gap for cross-border payments and settlement, especially for foreign banks and the subsidiaries of US banks that were set up specifically to undertake international business (called Edge Act Banks, of which there were 68 by mid-1968) (Schenk 2020).

[2] The Association was reorganised into New York Clearing House Association LLC in 1998 and then changed to The Clearing House Association LLC in June 2004. Currently, CHIPS and other payments systems are operated by an affiliate, The Clearing House Payments Company LLC. Payments Co, which also runs EPN (an automated clearing house – Electronic Payments Network), check-image clearing house (Small Value Payments Company or SVP Co) and a low value, real-time payments system RTP. Since 2012 it has also experimented with an open tokenization standard called Secure Token Exchange. *2020 CHIPS Report*.

Until April 1970, international payments in New York (NY) were settled by official cheques issued by correspondent banks – a paper-based system. Foreign banks did not keep large balances with their New York correspondents, but did maintain balances at an agreed level while they moved money in and out of their accounts with their NY correspondents during the day to meet their needs. [3] The turnover each day was many times the capital of the banks themselves so it created risks. First, the process involved several steps, each of which introduced the risk of clerical error. Foreign banks cabled or telexed their New York correspondents to debit their account to make payments on behalf of customers.[4] This required careful checking of the messages and balances available and then printing, typing and delivering official bank cheques physically through the Clearing House in New York. The use of bank cheques (not corporate cheques drawn directly on the customer) meant that settlement was an obligation of a bank, not of the individual customer, so the NY correspondent had to make sure of the creditworthiness of its counterparty, ensure the telex was authentic, that either the foreign bank had sufficient balances in its account or that the correspondent NY bank was willing to extend credit for the amount of the payment, and that the official cheque was filled out correctly and properly delivered to the Clearing House by the army of bank messengers. Bankers tended to wait until the last of the five daily clearings to submit most of their official cheques to try to ensure that funds had already arrived to cover them, and this caused congestion at the end of the day. [5]

With the growth of the international use of the dollar, the volume of transactions rapidly made this system excessively cumbersome. Large numbers of staff had to be employed to undertake the clerical tasks, mainly young and with minimal training. In 1974 Robert J. Crowley, Vice President at the New York Federal Reserve Bank, reported that 'one New York bank had its payments staff drop from an average of 22 years in the bank to an average of 8 months in a two-year span'. [6] So back-office operations became prone to failure and error as

[3] Memo by Robert J. Crowley to Governor Wallich, 'CHIPS/PEPS System', 5 July 1974. Archives of the Federal Reserve Bank of New York [hereafter FRBNY] 555225 Box 1, Central Records 1. Franklin-Herstatt Failure 1963-75 Coombs.
[4] Telex machines securely linked registered users and were used to send encrypted messages between banks across dedicated telephone lines. They were widespread after 1945, before being replaced by Fax in the 1990s.
[5] *CHIPS; the computerized communications network used by the New York Clearing House Association for interbank payments*, revised June 1976. Included in evidence to Senate Committee 1976.
[6] Memo by Robert J. Crowley to Governor Wallich, 'CHIPS/PEPS System', 5 July 1974. FRBNY 555225 Box 1, Central Records 1. Franklin-Herstatt Failure 1963-75 Coombs.

well as more expensive. There were also concerns about the large number of messengers ferrying bank cheques around New York.[7] Cost was another issue: Crowley observed that 'Two banks told me they estimated their processing cost per official check to be between $5 and $7'.[8] The size of the business challenged the back-office resources even of large banks.

This phenomenon echoed the so-called *Paper Crunch* of back-office operations in 1967–70 when securities companies (especially broker-dealer partnerships) were overwhelmed by the flow of paper to settle transactions in the OTC market, leading to large numbers of failed or uncompleted transactions (Benn 2000). The Securities and Exchange Commission (SEC) tried shortening the trading day to leave more time for paperwork, but the volume still outstripped the ability of small brokers with limited staff and resources, particularly as the market turned down in 1969–1970 and their profits were squeezed even further (Ledrut and Upper 2007). By 1973, an SEC survey found that about a third of investors had suffered from late-delivered or even lost securities. A large number of small firms were pushed out of business during the downturn while others turned to expensive computerised solutions. But the new technology was not successful. In 1971 the SEC found that:

> Even those broker-dealers who attempted belatedly to stem the tide by computerizing their operations or augmenting their back-office personnel could not keep pace with the volume; in fact, they were caught on a worse treadmill in that, by the time they were able to research their errors of a given date, they were confronted with a greater number of errors to contend with. The expensive computerized hardware which was thrown into the breach malfunctioned; and, since parallel manual records were often not maintained during a reasonable trial period, the use of the computer increased the already existing confusion. Moreover, the employment of newly recruited and untrained or inadequately trained individuals who were put to work in the back offices resulted in a further increase in the number of errors.[9]

The Wall Street Paper Crunch was analogous to the developments in inter-bank settlement, although the latter was mainly among large institutions, which amplified the network and operational risks. Moreover, the eventual computerisation was centralised for international bank settlements in the New York Clearing House, which reduced the relative cost for

[7] *CHIPS; the computerized communications network used by the New York Clearing House Association for interbank payments*, revised June 1976. Included in evidence to Senate Committee 1976.
[8] Memo by Robert J. Crowley to Governor Wallich, 'CHIPS/PEPS System', 5 July 1974. FRBNY 555225 Box 1, Central Records 1. Franklin-Herstatt Failure 1963-75 Coombs.
[9] SEC, *Study of Unsafe and Unsound Practices of Brokers and Dealers*, Report and Recommendations of the SEC, House of Representatives 92nd Congress, Washington DC, 1971, p. 13–14.

participants who only had to invest in terminals. Still, the failure of one sixth of broker-trader firms at the end of the 1960s must have been a stark warning for the banking industry that also faced a growth in transactions that challenged existing paper systems.

Developing the Clearing House International Payments System - CHIPS

The NY Clearing House began to design a computerised payments system for domestic interbank payments in New York in 1966, but this effort was redirected to international payments 'as the foreign exchange and Eurodollar markets expanded rapidly'. [10] After several months of deliberation, a Burroughs B-3500 computer was installed in the Clearing House building and connected to 42 terminals in the offices of member banks across the city (Lee 1976).[11] After incoming cables/telex messages were checked, bank operators entered details of payments into their local terminal along with the 4 or 6-digit codes for the receiving bank. This standardised coding saved the typing of complicated foreign bank names where error could creep in.[12] The entries were then held pending processing and credit approval. Once the sending bank approved the details, they released the payment on their terminal and the amount and information appeared on the receiving bank's terminal. At the end of the day, the central Burroughs computer generated a list of all transactions for each bank and the net position, which was settled the following day either through a Clearing House bank's account or through Clearing House members. Despite speeding up the process, the system still required that participants release funds before they knew that cover had been achieved – so-called daylight overdrafts – in the expectation that the funds would be received by the end of the day. In the words of Crowley 'it is a business in which trust and confidence is essential'. [13]

As in the case of the securities market, the computer solution to the paper crunch was very quickly too small. In order to accommodate non-Clearing House banks, a Committee of the

[10] 'Same-day settlement for Eurodollars', R.J. Crowley, *Euromoney*, May 1973, p. 25. See also Lee (1976).
[11] John F. Lee was Executive Vice President of the NY Clearing House Association. By 1975, the ten Clearing House members were: The Bank of New York, The Chase Manhattan Bank (NA), First National City Bank, Chemical Bank, Morgan Guaranty Trust Company of New York, Manufacturers Hanover Trust Company, Irving Trust Company, Banker Trust Company, Marine Midland Bank - New York and National Bank of North America.
[12] *CHIPS; the computerized communications network used by the New York Clearing House Association for interbank payments*, revised June 1976. Included in testimony by John Lee of NYCHA in evidence to Senate Committee on Banking, Housing and Urban Affairs, Oversight on the Payments Mechanism, the Federal Reserve's Role in Providing Payments Services, and the Pricing of Those Services, October 10-11, 1977.
[13] Memo by Robert J. Crowley to Governor Wallich, 'CHIPS/PEPS System', 5 July 1974. FRBNY 555225 Box 1, Central Records 1. Franklin-Herstatt Failure 1963-75 Coombs.

Clearing House developed a manual process called the PEPS (Payment Exchange Paper System) whereby banks that were not members of the Clearing House continued to exchange paper advices of credit five times each day at the NY Clearing House. PEPS mainly served branches of foreign banks in New York and Edge Act subsidiaries of US banks that were primarily engaged in international banking. The items released by a CHIPS member to a PEPS bank were recorded on magnetic tape at the Clearing House and then the computer printed the payments out on a standard form sent to the PEPS bank.[14] The PEPS totals were then entered into the CHIPS computer at the end of the day. Similar to direct CHIPS members, any outstanding balance was settled the next day through one of the clearers. There were about 40 PEPS and 15 direct CHIPS members by 1973.

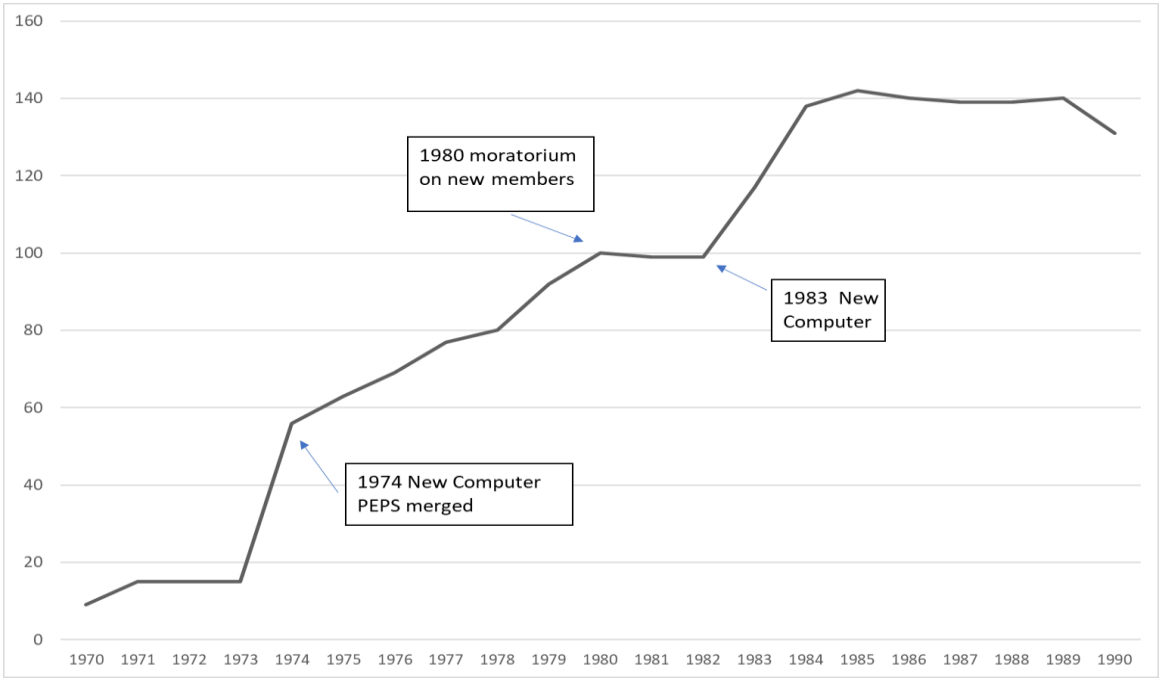
Clearly the entire system was still very cumbersome and time consuming. Although CHIPS stopped accepting instructions at 3:30pm (7:30pm UK time, 8:30pm CET) there was considerable clerical work to print out and distribute the transactions for each PEPS bank. When there was a day with a large amount of business (such as after a US bank holiday weekend) there could also be payments queued in the computer pending the availability of a terminal at a receiving bank to accept the details of a payment after the 3:30pm close. Finally, the PEPS details then had to be typed in and netted out. This meant that banks didn't know their final balance until up to two hours later, after the Fed Funds market and Fedwire had closed, so they couldn't move funds within NY or to other centres – the Clearing House funds delay of one day provided the leeway for this settlement to happen.

With the arrival and installation of a larger computer in 1974 (a Burroughs 6700) all participating banks could have terminals connected directly to the CHIPS system thus eliminating PEPS (Lee 1976). The major benefits were better record keeping (so that each bank knew its position in real time) and that, as John F. Lee of the Clearing House stated 'countless hours of difficult typing, especially typing involving unfamiliar foreign account names, has been eliminated' by the agreement of codes for 9,500 bank accounts across the world (Lee 1976). Figure 1 shows the rapid increase in the number of CHIPS participant banks after the new computer was installed. In 1980 the system again hit a technical threshold,

[14] *CHIPS; the computerized communications network used by the New York Clearing House Association for interbank payments*, revised June 1976.

prompting a moratorium on new members while a still larger capacity computer was ordered and installed during 1983. The number of individual member banks hit its peak in 1985 before a wave of mergers and acquisitions among US banks.

Figure 1: Number of CHIPS Members, 1970–1990



Source: The Clearing House.

https://www.theclearinghouse.org/-/media/new/tch/documents/payment-systems/chips-volume-and-value.pdf

Because CHIPS was founded within the New York Clearing house, an important and enduring issue for the settlement of international payments during the 1970s and 1980s was not resolved. As noted above, by design, Clearing House Funds were only freely available to payees on the business day after payment. Thus, dollars deposited at correspondent banks in exchange for foreign currency were only available for use the following day, but the foreign exchange could be used immediately. This delay was even longer for dollars purchased for Friday delivery that were only finally settled on Monday.

In 1967, three years before CHIPS was launched, the Federal Reserve Bank of New York (FRBNY) tried to develop a proposal for New York banks to move to an immediately available

funds basis but the banks were opposed.[15] They were comfortable with the existing system despite its drawbacks; the day's delay allowed banks time to track down the reasons for the shortfall in receipts and get them cleared the next day through a Federal Funds payment. According to the FRBNY, the one-day float also 'gave the New York banks larger balance sheet totals', which they valued at the time.[16] Operationally, bank staff claimed that they would need a computerised system to find out their position early enough in the day 'to handle their reserve position'. Although the industry found the delay useful, the Clearing House agreed to continue to study the possibilities with the FRBNY. In 1969 they agreed that they would be willing to move to a one funds system, 'once CHIPS proved itself and the operational details had been resolved'. The change of heart arose from the complexity of back-office functions involved in the Clearing House Funds system 'and the difficulty in monitoring accounts with collected or Federal Funds, Clearing House funds, and deferred availability funds'. [17]

The Clearing House set up a committee to devise a way to move to a one funds system but it quickly faced practical obstacles. From the Fed's point of view a critical problem was one of timing: when to stop the receipt of cables from Europe, Canada and other time zones for value that day, and how to coordinate with the Federal Reserve Communications network 'since the international payments could significantly affect reserve positions and the banks would have to be able to adjust before the close of business'. [18] Any change to the Fedwire system would have knock-on effects on the entire money market, securities market and overall domestic financial system. This led to ongoing discussion within the Fed and the System's Steering Committee on Improving the Payments Mechanism.

Before these operational issues could be resolved, the acceleration in transactions going through CHIPS made the problem more important but also difficult to progress. The challenge of clearing an unexpectedly large volume of transactions meant that the banks were not getting their overall balances reported until late in the day, usually 5:30pm or later. From the Fed's point of view, extending the timing of the Fedwire to allow banks to settle would 'create

[15] Memo by Robert J. Crowley to Governor Wallich, 'CHIPS/PEPS System', 5 July 1974. FRBNY 555225 Box 1, Central Records 1. Franklin-Herstatt Failure 1963-75 Coombs.
[16] Ibid.
[17] Ibid.
[18] Ibid.

more problems than one funds settlement would solve'. [19] Nevertheless, in the spring of 1971, Robert J. Crowley (Assistant Vice-President of the FRBNY) toured Europe and the US informing banks that 'the NY Clearing House banks had agreed to move to a one funds settlement basis once the necessary details had been worked out'. [20] He was overly optimistic.

Two years later, Crowley wrote an article for the trade magazine, *Euromoney,* on the Eurodollar settlement system, concluding that 'I remain convinced that the move to one funds settlement is in the best interests of all participants in international payments and look forward to overcoming these 'nuts and bolts' types of problem so that this major step forward can be accomplished'.[21] In the end, same-day settlement was not achieved until eight years later, on October 1 1981 as is discussed below. In the meantime, the risks to the system of delays between settlement and receipts were starkly revealed by the collapse of a medium-sized German bank.

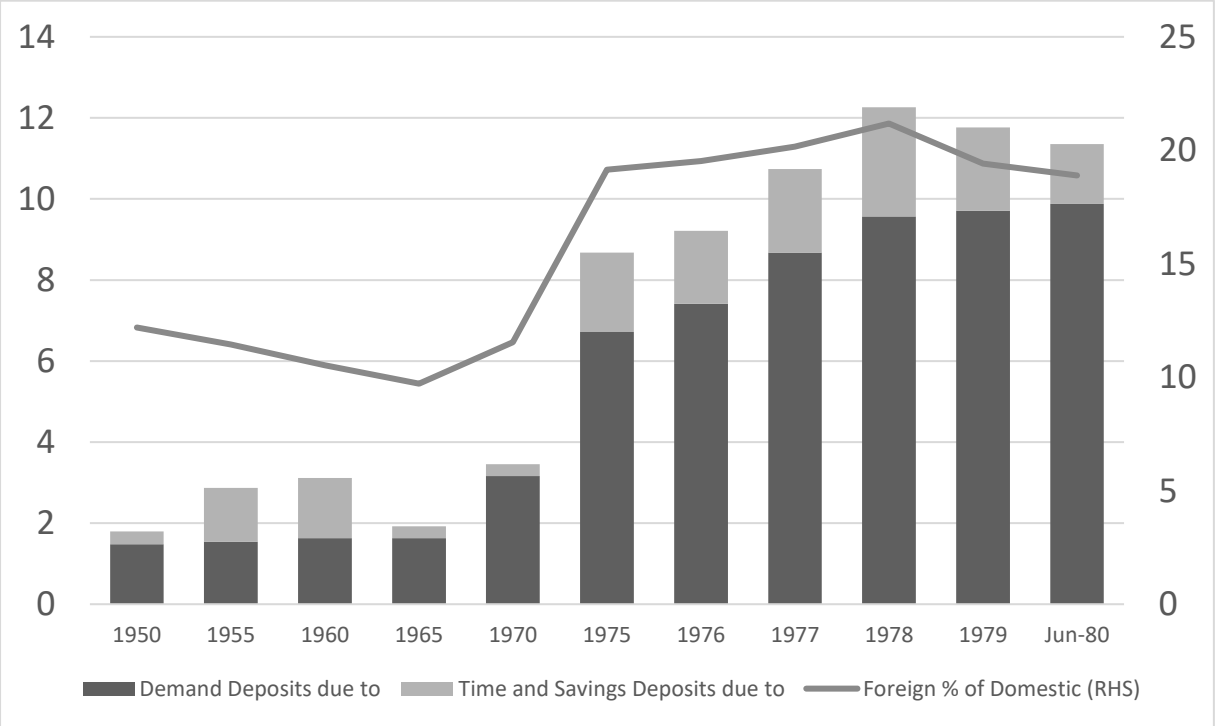
Payments in Crisis: Herstatt Risk 1974

By the time the dollar floated in March 1973, it had been 34 years since there had been a floating exchange rate regime in the US or the UK. No foreign exchange trader or banker under the age of 60 was likely to have had any experience with such a regime. At the same time, operational risk was increased by the rapid international expansion of many European and American banks into new markets to follow their corporate clients and to build their balance sheets as exchange controls were relaxed (Schenk 2014, Schenk 2017).

The amount of foreign banks' deposits held in correspondent banks in New York gives an indication of the growth in the amount of correspondent banking undertaken there. Figure 2 shows that the deposits of foreign banks in NY banks increased sharply from the early 1970s both in terms of value and also relative to the domestic correspondent bank deposits for clearing within the United States.

[19] Ibid.
[20] 'Same-day settlement for Eurodollars', R.J. Crowley, *Euromoney*, May 1973, p. 25. A notice at the bottom of the page broke the news that international banks were preparing to launch SWIFT. Although agreed among its founding banks in 1973, SWIFT only went live in 1977. It is a messaging system for international bank transfers covering a wide range of countries (22 in 1977) that complemented CHIPS, which is a USD settlement system. Scott and Zachariadis (2014).
[21] 'Same-day settlement for Eurodollars', R.J. Crowley, Euromoney, May 1973, p. 25.

Figure 2: Correspondent Bank Deposits of US Banks: due to Foreign Banks (USD billion)



Source: *American Banker*, various issues. The data excludes Edge Act Banks which are subsidiaries of US banks focused specifically on international banking business and so understate the amount of correspondent bank deposits. Also excluded are deposits of branches of foreign banks in the USA. See below for a reconciliation when further data are available from 1981. Demand deposits from foreign banks were assumed to be mainly related to correspondent banking business.

The first major challenge to CHIPS came in the summer of 1974. At the time CHIPS handled the bulk of international payments in New York (and 85–95% of international dollar payments went through New York). [22] Exchange rate volatility in May and June caught out several European and British banks who found that their inexperienced staff had over-traded or taken on excessive risk (Schenk 2017). There were also instances of outright fraud in the US banking system with the failure of Franklin National Bank and US National Bank of San Diego (Spero 1980). In this febrile atmosphere the cross-border payment system was brought to a standstill by the collapse of a medium-sized and relatively obscure German bank. Mourlon-Druol (2015) emphasises that there were rumours about Herstatt Bank's over-trading and its large open

[22] Memo by Robert J. Crowley to Governor Wallich, 'CHIPS/PEPS System', 5 July 1974. FRBNY 555225 Box 1, Central Records 1. Franklin-Herstatt Failure 1963-75 Coombs.

foreign exchange positions, and the German authorities investigated the bank in the years running up to the bank's collapse in June 1974. Like other banks, Herstatt was using a computer (Nixdorf-Kleincomputeranlage) to register the FX operations of its team of seven traders thinking that this reduced operational risk, but the list of transactions was only produced on a daily basis and could be manipulated through a cancel button (Abbruchtaste) so that some transactions did not appear on the daily printout. As a result, traders could exceed daily limits on open positions and disguise them (Mourlon-Druol 2015, p. 319). In June 1974 losses of about DM470 million were revealed.

After several days of investigation and efforts to find a rescuer, the German authorities closed the bank at 3pm German time, which was 10am in New York. The ensuing disruption led to the coining of a new phrase: Herstatt Risk, to denote the effects of time zones on settlement. US (and other international banks) had made DM payments to (or on behalf of) Herstatt but had not received the USD cover for those payments before the bank was closed by the German authorities. For example, on 26 June Morgan Guaranty delivered DM33.1835 million to Herstatt through the Frankfurt clearing in settlement of spot foreign exchange transactions entered into the previous day, and had a contract to receive $13 million from Herstatt through their correspondent in New York, Chase Manhattan. The second leg of the transaction through Chase Manhattan was interrupted by the withdrawal of Herstatt's banking licence in Frankfurt and Morgan Guaranty was out of pocket by the total amount.[23]

As Herstatt's main correspondent in New York, Chase Manhattan was at the centre of the scandal. On 26 June Herstatt told Chase to expect payments from a range of 13 banks to cover about $352 million of payments that it was asking Chase to make on its behalf that day.[24] In the end, Chase deleted or recalled all Herstatt's payments but also did not get the cover it was expecting except for one payment of $64 million from Commerzbank Duesseldorf. This meant that banks that were expecting dollars from Chase on behalf of Herstatt, like Morgan Guaranty, did not receive them. Some of the banks were on two sides of the payments. For example, Banco do Brasil was to pay Chase $5 million that day but was also due to receive

[23] Cable from Elmore C. Patterson, Chairman of the Board of Morgan Guaranty Trust Company to Dr. Klassen, President Deutsche Bundesbank, 2 July 1974. FRBNY 555225 Box 1, Central Records 1. Franklin-Herstatt Failure 1963-75 Coombs.
[24] Memo Robert J. Crowley to Coombs, 11 July 1974. FRBNY 555225 Box 1, Central Records 1. Franklin-Herstatt Failure 1963-75 Coombs.

$20 million from Chase on behalf of Herstatt. Swiss Bank Corp was to pay $500,000 and receive $3 million. This demonstrates the complex network of payments that were netted out through Chase Manhattan as Herstatt's correspondent bank.

On Thursday 27 June, the day after Herstatt was closed, many banks instructed their New York correspondents not to make any payments until they had received firm confirmation that the counter-value had been received abroad. Trust had evaporated and this led to large balances being held in accounts in New York banks pending confirmations. Since some payments were not made, this disrupted the CHIPS system and 'resulted in a chain reaction of other payments not being made'.[25] The situation was not resolved over the weekend and by Monday virtually no payments were being made and the multi-billion-dollar international dollar settlements system had ground to a halt. At this point John Lee, Executive Vice President of the Clearing House, consulted with member banks and told both CHIPS and PEPS banks 'that all payment instructions they had stored in the computer would be deemed released' unilaterally, but the banks would have the right to recall individual items at 10am on Tuesday. [26] He thus wrote to all CHIPS and PEPS members and instructed them 'to put all of their payment orders into the System immediately, and to release them'.[27] Lee was in touch with Crowley at the FRBNY to reassure him that this strategy seemed to be successful in releasing the stored up payments from Monday 1 July to get the system moving again.[28] The ability to recall payments was extended for a further three days to the 4 July Independence Day holiday. The effect was that the volume and value of payments dropped precipitously because European banks were no longer being extended daylight overdrafts. From a daily average of about $60 billion before the collapse, daily clearings fell to about $36 billion.[29] The counterparty risk on foreign exchange business had suddenly become apparent to New York bankers, who had previously worried more about market risk from exchange rate movements.

[25] Memo by Robert J. Crowley for Files, 2 July 1974. FRBNY 555225 Box 1, Central Records 1. Franklin-Herstatt Failure 1963-75 Coombs.
[26] Ibid.
[27] Letter from John Lee to CHIPS/PEPS banks 1 July 1974. FRBNY 555225 Box 1, Central Records 1. Franklin-Herstatt Failure 1963-75 Coombs.
[28] Memo by Robert J. Crowley for Files, 2 July 1974. FRBNY 555225 Box 1, Central Records 1. Franklin-Herstatt Failure 1963-75 Coombs.
[29] Memo by Scott E. Pardee for Files, 'Recent difficulties in payments mechanisms', 3 July 1974. FRBNY 555225 Box 1, Central Records 1. Franklin-Herstatt Failure 1963-75 Coombs.

This solution was time consuming. Banks had until 10am to alert the Clearing House to any payments from the previous day that they wanted to recall, and Clearing House staff then reviewed each case to see if there were related payments that would also need to be recalled. They then brought the relevant parties together to talk it through and final decisions were made by about noon New York time – or just at the close of the day in Europe – so European banks didn't know if their receipts from the day before were final before close of business for them. At the same time, the reluctance of banks to make payments without cover had resulted in a substantial increase in demand deposits by European and other foreign banks in New York: 'Ordinarily they have small deposits and move funds out as soon as they are good'.[30] The Fed worried that this might affect prudential reserve ratios for NY banks.

In the end, only two payments were recalled on Tuesday: a small payment by Bank of America and a much larger payment by Chase Manhattan. Chase recalled $16 million paid on behalf of Banca Privata Finanziaria (a Sindona Bank in Milan) because they were not convinced that funds were likely to be forthcoming to cover the payment. Of this amount $13 million was to go to Swiss Bank Corporation for the account of Privat Kredit Bank of Zurich.[31] The three main Swiss banks were irate. They met together and agreed not to transact at all with their NY correspondents, essentially starting a boycott.[32] The Swiss National Bank then took up their complaint with the FRBNY. The crisis and the response were threatening to dislocate the links in the trans-Atlantic payments system.

A few days later, on 5 July 1974, Robert Crowley set out the risks for his Governor, Henry C. Wallich:

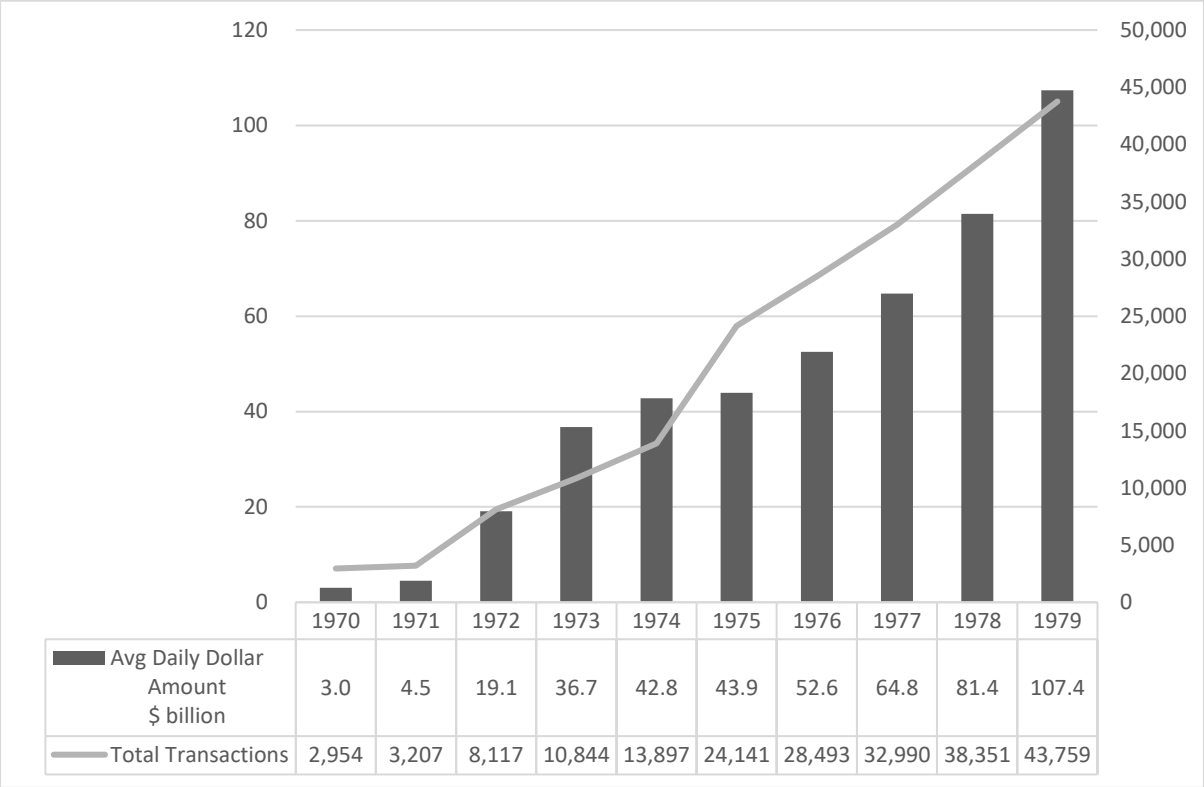
[30] Memo by Robert J. Crowley for Governor Wallich, 5 July 1974. FRBNY 555225 Box 1, Central Records 1. Franklin-Herstatt Failure 1963-75 Coombs.
[31] Memo by Scott E. Pardee for Files, 'Recent difficulties in payments mechanisms', 3 July 1974. Three payments were notified the following day, but this was resolved as the issues were all in New York. Memo by Robert J. Crowley, 3 July 1974. FRBNY 555225 Box 1, Central Records 1. Franklin-Herstatt Failure 1963-75 Coombs. Michael Sindona headed the Franklin National Bank in the US, which collapsed on 8 October 1974 and was bailed out by the Fed and FDIC. He reportedly had mafia connections in Milan and was subsequently convicted of fraud in the USA and in Italy. He died in 1986 of cyanide poisoning after being convicted of paying for the murder of Giorgio Ambrosoli, the lawyer who investigated his fraud at the Banca Privata Italiana in Milan (Banca Privata Italiana resulted from the merger of Banca Privata Finanziaria and Banca Unione). Wolfgang Saxon, 'Michele Sindona, jailed Italian financier, dies of cyanide poisoning at 65; At the center of scandals', *New York Times*, 23 March 1986, Section 1, Page 44. Joan E. Spero, *The Failure of the Franklin National Bank; challenge to the international banking system*, Columbia University Press, 1980.
[32] Memo for files, Robert J. Crowley, 3 July 1974. FRBNY 555225 Box 1, Central Records 1. Franklin-Herstatt Failure 1963-75 Coombs.

> 'In the morning when the New York banks come into work, they are faced with reams of cables instructing them to pay out large amounts for their foreign correspondents. In some cases, they are advised of from whom the cover will be received, but in the majority of cases they are not advised. In any event, they are not sure of whether it will be received since clerical errors on either side of the Atlantic, fails, mis-deliveries, a bank deliberately going into overdraft, or other reasons may result in their not receiving cover. Accordingly, when they make a payment, they are extending credit. On the other hand, they are aware that the market is highly linked and if they don't make payments, they may not get receipts. In most cases, the payments are usually made – so-called "daylight overdrafts" – in the expectation of obtaining cover later in the day. It is a business in which trust and confidence is essential'.[33]

The Herstatt Bank collapse and other banking scandals in 1974 prompted the governors of the G10 central banks to call for a special international committee to discuss the governance of foreign exchange markets and to share information on international banking supervision among national authorities (Goodhart 2011). The Basel Committee on Banking Supervision convened for the first time in June 1975 with representation from each member's foreign exchange and supervisory offices. The minutes of the early meetings of the Basel Committee show that it paid little attention to the payments problems caused by the Herstatt collapse, while the focus was on sharing best practice in the governance of foreign exchange markets and trying to establish the supervisory jurisdiction or oversight of branches and subsidiaries of transnational banks (Schenk 2014). This may have been because the payments were the subject of a set of ongoing legal cases as banks sought to retrieve their losses from Herstatt's correspondent in New York, Chase Manhattan. In addition, confidence returned to CHIPS and payments began to flow more smoothly so that the 10am extension of settlement was lifted after only a few days. Figure 3 shows how the turnover of CHIPS stumbled in the wake of the crisis. After growing quickly in the first four years, the daily value of transactions stalled for a year, only recovering in 1976. The volume of transactions on the other hand stayed on the same trajectory as it had been since 1971.

[33] Memo by Robert J. Crowley for Governor Wallich, 5 July 1974. FRBNY 555225 Box 1, Central Records 1. Franklin-Herstatt Failure 1963-75 Coombs.

Figure 3: CHIPS Average Daily Transactions (amount and value) 1970-1979



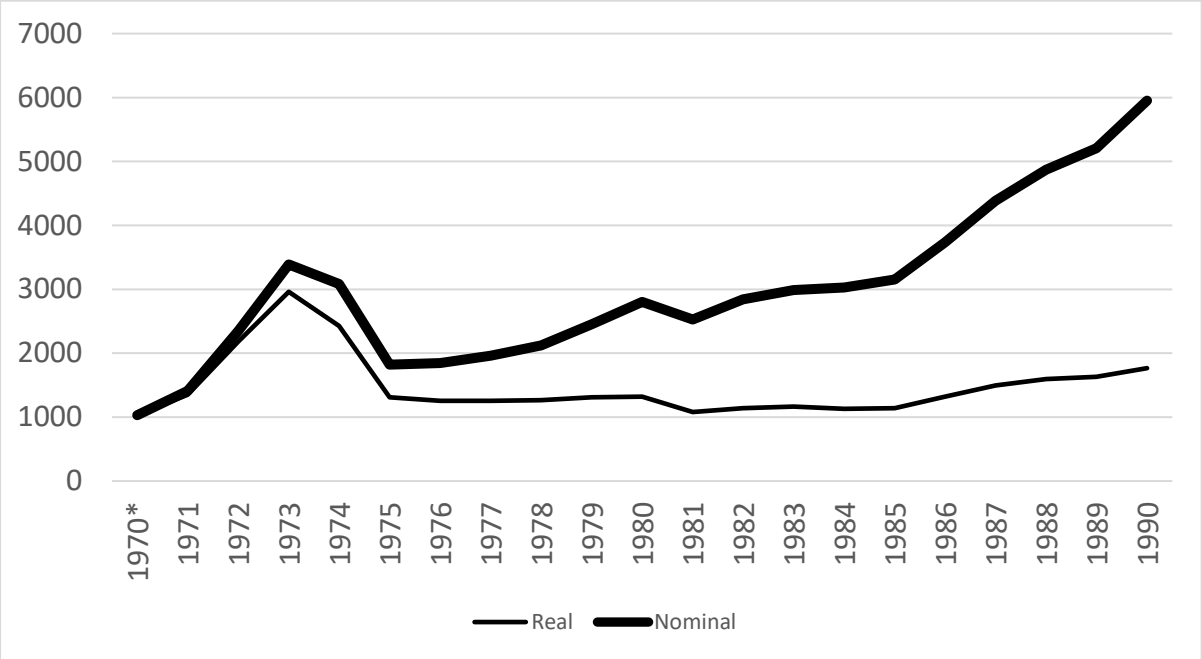
	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
Avg Daily Dollar Amount $ billion	3.0	4.5	19.1	36.7	42.8	43.9	52.6	64.8	81.4	107.4
Total Transactions	2,954	3,207	8,117	10,844	13,897	24,141	28,493	32,990	38,351	43,759

Source: The Clearing House.

https://www.theclearinghouse.org/-/media/new/tch/documents/payment-systems/chips-volume-and-value.pdf

Despite what seemed a rapid return to normal functioning, Figure 4 shows that the average size of transactions through CHIPS fell sharply in 1975 and did not recover in nominal terms until 1986. Of course, this was a time of inflation with the OPEC oil crisis and monetary expansion so Figure 4 also shows that the real value of the average size of payment did not recover in the 15 years after the Herstatt risk shock.

Figure 4: Average Size of Payment USD '000s 1970–1990



Source: The Clearing House.

https://www.theclearinghouse.org/-/media/new/tch/documents/payment-systems/chips-volume-and-value.pdf Real value calculated using annual average CPI, Federal Reserve Economic Data. *1970 data only from 9 April 1970.

There were other issues going on for CHIPS as discussed below, but it seems that the loss of trust in the system may have increased the caution of participant banks and induced them to engage with smaller average transactions. It is difficult to compare CHIPS with other payments systems like FedWire, which were dominated by the domestic market. Certainly, credit risk continued to be a problem throughout the 1980s as discussed below.

On an international level, the systemic risks from payments systems were recognised at the Bank for International Settlements (BIS). In February 1980, the G10 Group of Computer Experts of the Central Banks of the G10 Countries and Switzerland published a review of payments systems in 11 developed countries.[34] Although mainly focused on domestic systems the report drew attention to the need for greater cross-border cooperation given apparent systemic risks. In response, the BIS launched a Group of Experts on Payments Systems in 1980,

[34] https://www.bis.org/cpmi/publ/d01a.pdf

chaired by George Blunden from the Bank of England (who had been the first Chair of the Basel Committee on Banking Supervision). It initially focused on collecting data on cross-border banking from 1985 as a basis for further study.

Reducing Risk: Overnight and Same-Day Credit 1981-1984

The risks introduced by the next-day settlement of incoming Clearing House dollar payments compared to the same-day settlement of released outward transactions had been identified in the late 1960s by Crowley at the Fed. He also identified the technical difficulties of completing in the same day because of the knock-on to other domestic money markets associated with the Fed. But banks were able to take advantage of being overdrawn, particularly over the weekend when funds due on Friday could be held over until Monday, making gains on money markets. [35] There were pressures both for change and for the status quo, but other solutions were developed in the meantime.

At the end of August 1979, the Fed approved a proposal by CHIPS members to require banks with less than $250 million to have a letter of support from their parent bank to cover their clearings and expenses in the event that smaller banks could not meet their obligations. This rule mainly affected subsidiaries and Edge Act banks that accessed CHIPS indirectly through clearing house member banks and they complained that it created a two-tiered system inhibiting competition.[36] At the same time, the Fed Board of Governors warned that they were

> 'aware that the large clearing exposures of CHIPS participants can be a matter of supervisory concern. Therefore, the Board will continue to review the risk exposure of CHIPS participants and of parent banks supplying letters of support, and may take such supervisory action as may be necessary at a later date.' [37]

Self-regulation was under threat from the authorities unless the Clearing House tightened its operations. In October 1980 CHIPS finally announced that it would introduce same-day

[35] Jeffrey Kutler, 'CHIPS all set on same-day settlement', *American Banker*, 1 October 1980. The Federal Financial Institutions Examination Council adapted its examination guidelines to reduce the Friday-Monday practice. Another issue was when the final settlement time should be given the three time zones across the USA. FedWire had already moved to same-day funds.
[36] Jeffrey Kutler 'NYCHA generally welcomes Fed study of CHIPS network', *American Banker*, 31 August 1979. Allied Bank International and Continental Illinois complained the new requirement was anti-competitive.
[37] Ibid. Quotation from a letter from the Fed Board of Governors to Donald C. Miller, Vice Chair of Continental Illinois National Bank and Trust Co.

settlement in 12 months' time.[38] This coincided with reform of Fedwire, the payments system run by the Federal Reserve, which was extended to banks that were not Federal Reserve members. At the same time Fedwire introduced fees to bring it more into line with private sector competitors like CHIPS.[39] Fedwire remained more expensive than CHIPS, but clearly there was some competition between public and private sector providers.

After much study and negotiation, same-day settlement was finally introduced to CHIPS without disruption on 1 October 1981, but it didn't resolve the credit risk from daylight (intra-day) overdrafts. On the other hand, this change did have a profound effect on the balance sheets of the New York clearing banks: foreign banks quickly reduced the size of their deposits at their New York correspondents. The reduction in the 'float' required for clearing led to a total fall of 54% in the deposits held at correspondent banks from June 1981 to June 1982 or from $24.5 billion to $11.4 billion.[40]

Before 1980, the data on correspondent deposits held at Edge Act banks were not publicly available. Thereafter, *The American Banker* collected new data from the Fed, which revealed that a large proportion of correspondent balances due to foreign banks were held in US Edge Act banking offices that had been excluded (70% for Bank of America, 84% for Wells Fargo, 46% for Security Pacific National Bank, 62% for Continental Illinois and 30% for First National Bank of Chicago). After same-day settlement, Morgan Guaranty Trust Co. had the largest reduction in liabilities: it was the largest holder of correspondent balances due to foreign banks in 1981 but reduced its balances by 78% by the following year, falling to sixth place with

[38] Jeffrey Kutler, 'CHIPS all set on same-day settlement', *American Banker*, 1 October 1980.

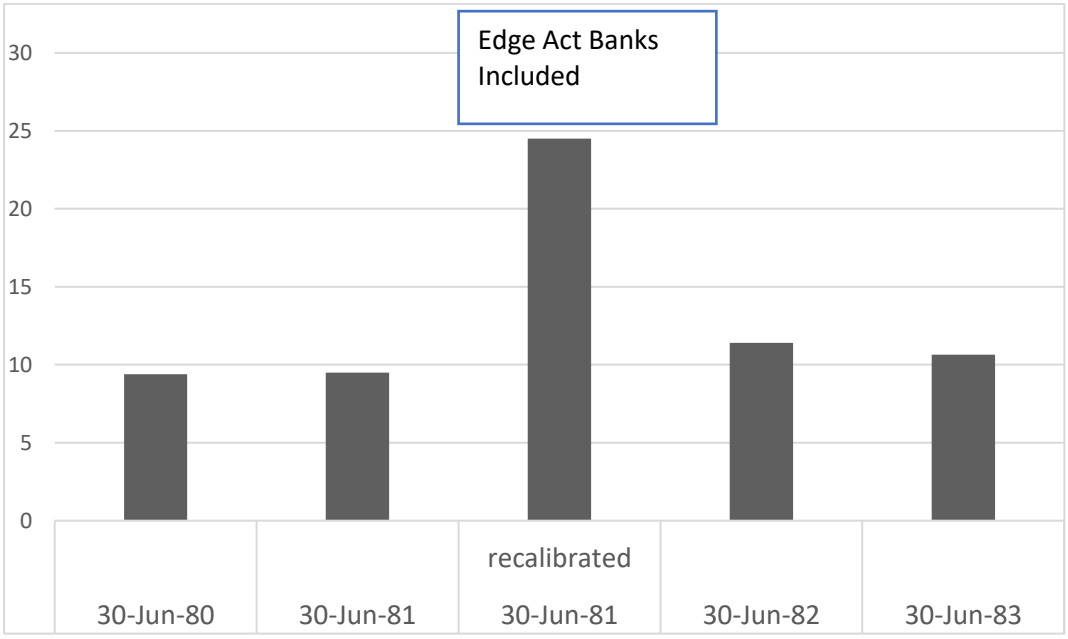
[39] Fees were required by the Depository Institutions Deregulation and Monetary Control Act of 1980.

[40] From 1982 the *American Banker* ranking of correspondent balances of banks in the US included balances held in Edge Act banking offices as well as 'demand deposits due to US branches and agencies of the foreign banks'. In their analysis, 'Foreign correspondent balances are the sum of demand deposits due foreign governments and official institutions, demand deposits due the U.S. branches and agencies of foreign banks, and demand deposits due banks in foreign countries. These deposits in the bank and its domestic subsidiaries plus its U.S. Edge Act banking offices are included'. Deposits due to foreign governments and official institutions were included because 'the bulk of these deposits are placed by institutions for other institutions conducting a commercial banking business and receiving correspondent services'. L. Michael Cacace, 'Chase leads in US correspondent funds: foreigners put $11.4 billion in banks here', *The American Banker*, 19 November 1982. Before 1982, the Edge Act banks were not included (especially important for Edge Act banks outside NYC) and *American Banker* put demand deposits due to US branches and agencies of the foreign banks into domestic correspondent balances. The data came from call sheets submitted to the Fed Schedule F – Deposits and Schedule E – Deposits for the Edge Act banks. Until the end of 1978 deposits due to the US branches and agencies of foreign banks were not recorded separately, but were included in 'deposits due to other US commercial banks'.

a mere $874 million. The huge decline in the value of liabilities was welcomed by the clearing banks since it increased Return on Equity and other equity ratios, as well as releasing resources for the responding banks. One exception was European American Bank and Trust, which had not included its overnight positions in its deposits from 1976 to 1981 and was subsequently sued by the FDIC for $2.2 million in insurance assessments based on this under-reporting of its balance sheet.[41]

Figure 5 shows the impact of including Edge Act and foreign bank branches in the total correspondent bank deposits in June 1981. This Figure also demonstrates the huge impact of the move to same-day final settlement, which reduced the risk of recalled payments and therefore the need for respondent banks to keep liquid liabilities with their NY bankers.

Figure 5: Correspondent Banking Deposits of US Banks, 1980–1983 (USD billion)



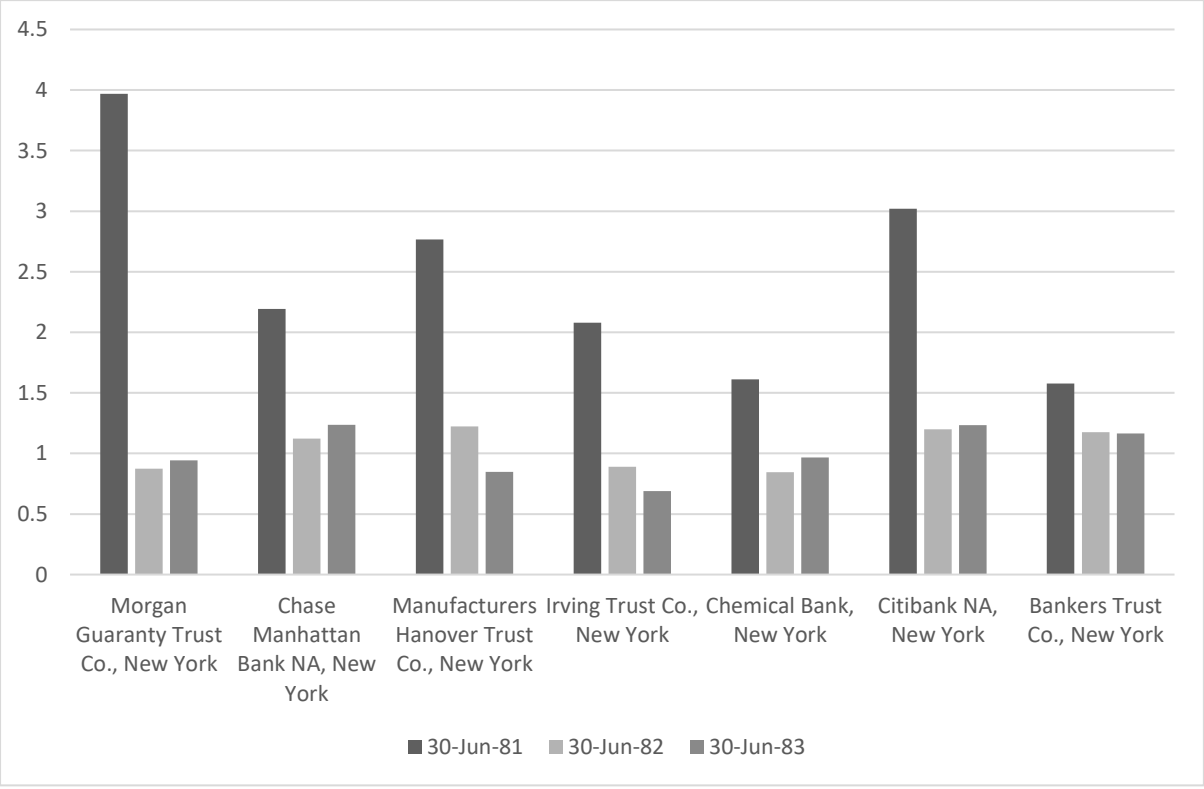
Source: *For 1980 and 1981:* L. Michael Cacace, 'Chase leads in US correspondent funds', *The American Banker*, 19 November 1982. Total (USD billion) for 67 banks with $10 million or more in deposits due to foreign banks on 30 June. *For 1982 and 1983: Deposits due* to *foreign banks* are the sum of the following items from Schedule F - *Deposits*, of the Report of Condition, or Call Report, submitted by the large *banks* to the federal regulatory agencies: *deposits due* to *foreign* governments and official institutions (item 4) plus *deposits due to the U.S. branches and agencies of foreign banks* (item 5.a) plus *deposits due* to *banks* in *foreign* countries (6.b). In addition, for *banks* with Edge Act *banking* subsidiaries, the following

[41] Gordon Matthews, 'European American ordered to pay overdue assessments', *American Banker*, 5 December 1983.

combined *deposits* for the Edge *bank* and its domestic branches are included from Schedule C - *Deposits* of the Report of Condition submitted by the domestic offices (head offices and branches) of the Edge *banks* to the Federal Reserve Board: *deposits due* to *foreign* governments and official institutions (items 1.B - *demand deposits* and 2.B - time and savings *deposits* respectively); *deposits due* to commercial *banks* in the U.S. (items 1.C and 2.C); and *deposits due* to *banks* in *foreign* countries (items 1.D and 2.D).

The change in correspondent deposits was not evenly distributed. Three quarters of the decline was in eight of the largest New York clearing house banks where deposits from foreign banks fell 88%. Figure 6 shows the changes in correspondent deposits for the banks that made up the top five in June 1981. All show a dramatic fall in deposits, but also a convergence, while the reduction for Bankers Trust was less than for the others. Clearly, given the large volume of cross-border payments that represented a risk to correspondent banks, the shift to same-day settlement had an important operational impact on correspondent banking relationships.

Figure 6: Correspondent Bank Deposits of Five Leading New York Banks (USD billion)



Source: L. Michael Cacace, 'Chase leads in US correspondent funds', *The American Banker*, 19 November 1982.

Despite the removal of the overnight risk, as the value and volume of transactions accelerated and the number of participant banks increased, there were continuing concerns about the amount of daylight credit in the system. After considerable debate, and some pressure from the Federal Reserve, from 1 October 1984 CHIPS required each of the 133 participating banks to set bilateral net-credit limits to control their exposure during the day. The limits were based on the creditworthiness and size of usual transactions of each counterparty bank, and meant that some payments could be refused or delayed if the limits were exceeded. The limits began to be introduced in a pilot in June 1984 before being rolled out across the system four months later.

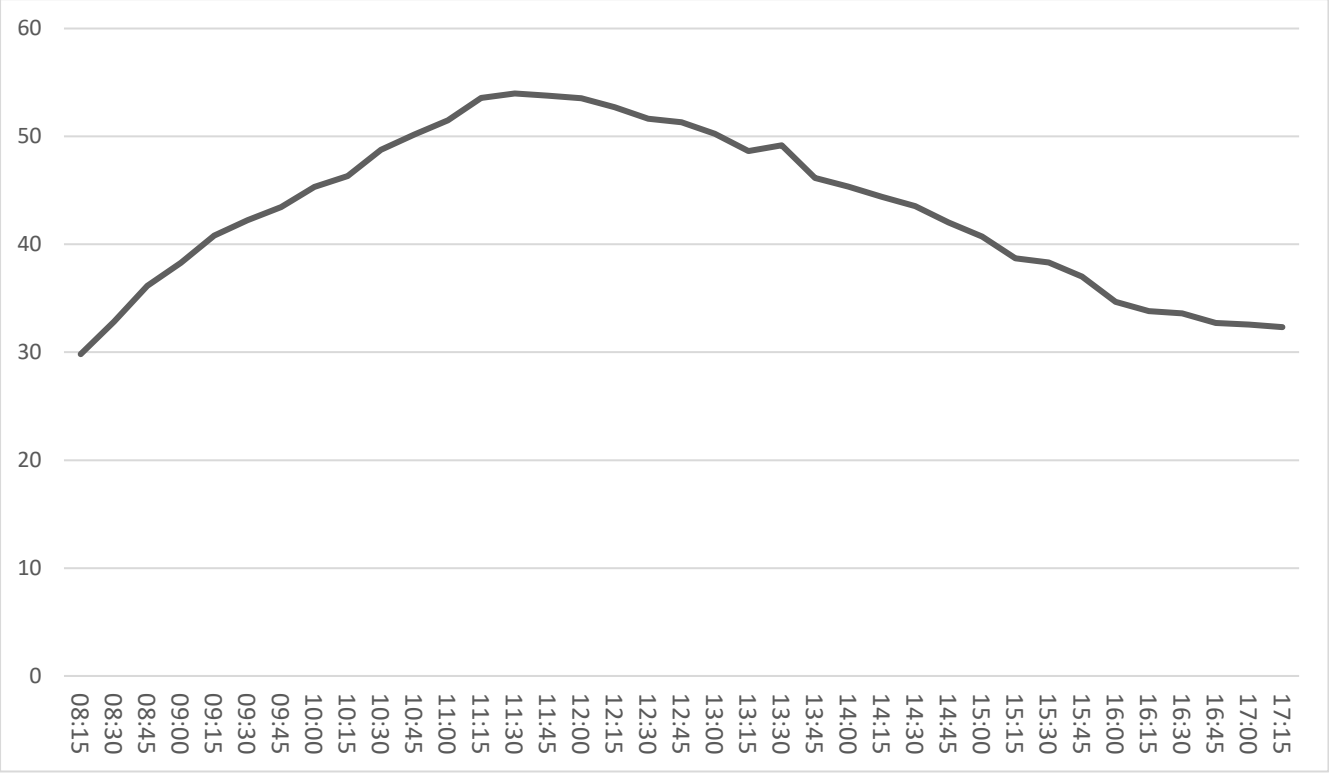
During the first five days of October 1984, on average 145 transactions worth $3.8 billion were delayed due to the credit limits, but this was only a small share of the 86,734 daily payments.[42] Only 22 were rejected (value of $426 million). In the last five days of that month the daily number of transactions had increased to 97,161 and an average of 126 per day were delayed totalling $3.1 billion, but in the end, only 18 payments were rejected ($609 million). On the basis of this evidence, the transition was deemed a success at not curbing the market while increasing its potential to stop banks abusing the system through over-trading.

Some other details on the functioning of the system are also available for this time: CHIPS undertook a survey in the first half of 1984 that showed that 94.4% of transactions were completed by 4pm, which was half an hour before the cut-off time, and this was consistent with the pattern in October 1984 after the new bilateral limits.[43] But the credit limits did have an effect on when the larger payments were settled; 98.5% of the daily dollar value was concluded by the cut-off before October but only 93.4% after the limits were imposed.[44] Banks were leaving larger transactions to the end of the day. Having achieved the bilateral limits, with Federal Reserve support, CHIPS began planning to impose limits for each bank against the system as a whole throughout the day, a so-called 'sender net-debit cap', which was finally introduced in 1986.

[42] Data from Tom Ferris, 'CHIPS Risk-Reduction Efforts Proceeding Smoothly, Banker Says' *American Banker*, 5 December 1984.
[43] Data from Tom Ferris, 'CHIPS Risk-Reduction Efforts Proceeding Smoothly, Banker Says' *American Banker*, 5 December 1984.
[44] Ibid.

The risks of intra-day credit continued to preoccupy supervisors, which gives a glimpse of the pattern. In 1989, the Federal Reserve monitored the level of intra-day credit between 9 and 22 February and the average levels for each 15 minutes of the day are presented in Figure 7.

Figure 7: CHIPS Average Total Net Credit Positions 9 February to 22 February 1989 (USD billion)



Source: Robert T. Clair, The Clearing House Interbank Payments System: a description of its operation and risk management', Research Paper No. 8910, Federal Reserve Bank of Dallas, June 1989.

Within 15 minutes of opening, the net value of transactions in the system was already close to $30 billion ($114 billion in 2021 relative to US GDP). This amount rose steadily throughout the morning to peak at almost $54 billion ($205 billion in 2021 equivalent) by 11:30 New York time, just before closing in Europe at 4:30pm. CHIPS closed at 4:30pm New York time to current day payments and within about 15 minutes CHIPS told participants what their net position was and all settling was due to be completed within 45 minutes, by 5:30pm. Almost immediately, banks were required to send any balance to their Clearing House correspondent

and by 6pm CHIPS finally settled with FRBNY. This example is likely not the highest level of intra-day credit in the system: transactions tended to surge after US bank holiday weekends such as Thanksgiving, when European markets had been open.

In mid-June 1988 the BIS G10 Group of Experts on Payments Systems began to compile a report on the problems of netting payments across borders. This initiative was followed by the Lamfalussy Report of 1990.[45] The particular focus was the liquidity and credit risk in cross-border payments as well as the supervisory and legal frameworks for this expanding area. The Lamfalussy Report recommended a range of best practice and minimum standards as well as highlighting the importance of international cooperation on the various netting systems that were evolving around the world in order to ensure that they were robust and did not threaten the stability of the international payments system. Netting introduced more risks and complexity compared to real time gross settlement, which finalised settlement quicker. In recognition of the importance of these issues the Group of Experts in Basel was reorganised into a permanent G10 Committee on Payment and Settlement Systems in 1990. The international fall-out from the collapse of BCCI a year later demonstrated the ongoing risks posed by cross-border banking in a supervisory framework that was still primarily based on a national basis (Herring 1994). Issues of money laundering and fraud through correspondent banking relationships also drew the attention of regulators in the 1990s. [46]

Conclusions

This paper has described some of the important changes to US correspondent banking during the 1970s and 1980s through a particular focus on the development and reform of the New York Clearing House Interbank Payments System. This was a private sector-controlled scheme that responded to an urgent need to overcome the clerical burden of the rapidly growing number of transactions during a period of financial innovation and internationalisation. In contrast to the government-guaranteed Fedwire, this private sector solution encountered problems because of the next day settlement of Clearing House payments, which increased

[45] BIS Group of Experts on Payment Systems, Angell Report on Netting Schemes, February 1989. Report of the Committee on Interbank Netting Schemes of the Central Banks of the Group of Ten countries, Lamfalussy Report, November 1990.

[46] *Role of US Correspondent Banking in International Money Laundering*, Hearings before the Permanent Sub-committee on investigations of the Committee on Governmental Affairs, US Senate, 2001.

risk in a cross-border environment across several time zones. This problem was recognised even before the system launched, but it took a decade to overcome practical difficulties and allow same-day settlement. In the meantime, there was a large accumulation of deposits in New York banks by foreign banks to provide some limited cover for their business through CHIPS.

The weaknesses in the system were revealed early on by the collapse of Herstatt Bank, which froze interbank transfers in mid-1974. The trust on which the system depended for overnight as well as daylight credit was critically challenged, but it seemed quickly restored as payments resumed and the system survived through a further 40 years of operation to the present day as the largest private sector settlement system for USD. Looking more closely, however, it is clear that this crisis had a lasting impact on the average size of transactions. It is also clear from this narrative that although the problems of liquidity and credit risk were identified early on, resolving them took a long time despite pressure from the Federal Reserve. Why this was the case, what the internal discussions entailed and the balance of power and influence within the system remains to be explored. Other themes that emerge include the role (and constraints) of the pace of technological change in ICT, and interactions between national regulators/supervisors and private sector correspondent banking relationships.

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Acknowledgements

I am grateful for suggestions from Thibaud Giddey and Marco Molteni and participants at the 2021 Workshop on Monetary and Financial History hosted by the Atlanta Federal Reserve Bank. This paper draws on research conducted for the 'Global Correspondent Banking 1870–2000' project which has received funding from the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation programme (Grant Agreement No 883758).

Published by the GloCoBank project

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Website www.glocobank.web.ox.ac.uk

ISSN 2752-7859

The GloCoBank 1870–2000 Working Paper Series is part of a project that has received funding from the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation programme (Grant Agreement No 883758).