

USING THE WIRE TO MARK UP THE ACCOUNTS: THE FEDERAL RESERVE'S TELEGRAPH SYSTEM AND THE ROAD TO MODERN MONEY AND BANKING (1913-1933)

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Abstract

Federal Reserve histories have often focused on how the decisions of the American central bank's Chairman and Board of Governors have transformed the country's economy. However, very little research has examined the role that the Fed's technology played in shaping the country's monetary operations. This article highlights the importance of nonhuman technology by employing Actor Network Theory to show how the Fed's introduction, in the first decades of the 20th century, of a telegraph-based system for money transfers, clearings, and settlements expanded the scope and speed of banking activities. It will provide insight on the nature of money in a modern economy and the Fed's operations by illustrating how the telegraph directly influenced the transition of money from a physical commodity, into an abstract number that appears on a bank's spreadsheet.

Résumé

Les histoires de la Réserve fédérale (Fed) se sont souvent intéressées à la manière dont les décisions du président de la banque centrale américaine et du conseil des gouverneurs de cette dernière ont transformé l'économie du pays. Cependant, très peu de recherches ont examiné le rôle que la technologie de la Fed a joué dans le façonnement des opérations monétaires du pays. Notre article souligne l'importance de la technologie « non-humaine » en employant la théorie de l'acteur-réseau (Actor Network Theory, ou ANT) pour démontrer comment l'introduction par la Fed, dans les premières décennies du XX^e siècle, d'un système télégraphique pour les transferts d'argent, les compensations et les règlements a élargi la portée et la vitesse des opérations bancaires. Nous donnerons

un aperçu de la nature de la monnaie dans une économie moderne et des opérations de la Fed en illustrant comment le télégraphe a directement influencé la transformation de la monnaie d'une marchandise physique en un nombre abstrait qui apparaît sur un tableau de calcul bancaire.

During the 2008 Financial Crisis, Federal Reserve Chairman Ben Bernanke stated that the central bank did not use taxpayer money to pay for the \$1 trillion worth of loans it made, but instead “used the computer to mark up the size of the account” that each bank had with the Fed.¹ Neo-Chartalist economists and investors have highlighted this statement to explain how money in a modern economy exists more as an abstract number on a spreadsheet, than as a tangible commodity.² But how did money reach a point where trillions of dollars are created by a Fed employee adding zeroes to a bank account with a computer? This article provides insight on this development by investigating the early history of the Federal Reserve’s telegraph operations from 1915 to the end of the gold standard in 1933 and identifies how this affected payments, transfers, and gold settlement operations. Publications from the Federal Reserve’s Board and Banks, Congressional documents, and relevant newspaper articles from the period have been consulted for this article. The research was further contextualized by applying Actor Network Theory (ANT) to understand the significant agency the telegraph system – or the wire –, along with the central bank, possessed in building the network that reconstructed America’s banking operations. This article demonstrates that the Federal

¹60 Minutes, “The Chairman Part 1”, *Columbia Broadcasting System*, March 15, 2009, video, 13:23, 13 August 2020, <https://www.youtube.com/watch?v=odPfHY4ekHA>.

² Neo-Chartalism refers to a school of economic thought which posits that money originates from attempts by the state to direct economic activity, rather than as a solution to facilitate barter as argued by Mainstream economic thought. See Stephanie Kelton, “The Role of the State and the Hierarchy of Money,” *Cambridge Journal of Economics* 25, no. 1 (2001):149-163; Warren Mosler, *The 7 Deadly Innocent Frauds of Economic Policy* (Saint Croix, Virgin Islands: Valance Co., 2010).

Reserve's telegraph system exerted significant agency in revolutionizing America's money and banking sector by expanding the size and scope of finance, contributing to time-space compression, and abstracting the essence of money, paving the way for modern currency.

The Federal Reserve has been the subject of significant academic research, particularly by economists. Allan Meltzer's monograph, *A History of the Federal Reserve*, remains one of the definitive publications concerning the early history of America's central bank.³ The Federal Reserve's early operations have also been examined by Milton Friedman and Anna Schwartz in their seminal work *A Monetary History of the United States, 1867–1960* and by Barry Eichengreen in a series of publications.⁴ However, Federal Reserve scholarship remains uneven. Academics who studied its operations focus more on the reasoning behind policy decisions instead of considering how the operations were carried out. While this paper does not ignore the reasoning behind Federal Reserve decisions, it highlights the importance of the technology that carried out Fed decisions by focusing on the telegraph and its impact on the country's money and banking. In this way, the Fed serves as a case study on how technologies like the telegraph exerted as much agency in transforming the country's economy as central bank decision makers.

The focus on the chairmen and board of governors among Federal Reserve histories can be attributed, in part, due to scholars perceiving these economists as the only agents responsible for

³Allan H. Meltzer, *A History of the Federal Reserve* (Chicago: University of Chicago Press, 2003).

⁴Milton Friedman and Anna Jacobson Schwartz, *A Monetary History of the United States, 1867-1960* (Princeton: Princeton University Press, 1963); Barry Eichengreen and Marc Flandreau, "The Federal Reserve, the Bank of England, and the Rise of the Dollar as an International Currency, 1914-1939," *Open Economies Review* 23, no. 1 (2012): 57-87; Barry Eichengreen, *Golden Fetters: The Gold Standard and the Great Depression, 1919-1939* (New York: Oxford University Press, 1995).

determining American currency and banking operations. I expand, in this article, the scope for analyzing monetary and banking networks by considering the technology employed by the Federal Reserve to exact its policies. To do this, Actor Network Theory (ANT) is applied to highlight the Fed's telegraph system as an "actor" that exerted agency comparable to its human counterparts in transforming money and banking. ANT holds that the social and natural world are made up of networks of relationships between various human and non-human "actors" that all exert power, or agency, in impacting how the world operates. Sociologist Rolland Munro defined agency as the "medium by which things are accomplished" and discussed how ANT argues that Western philosophy assumes that "every action lies in intention".⁵ ANT rejects this assumption by arguing that presuming volition in agency is anthropocentric and prevents us from considering how inhuman things, like technology, exert important power in influencing the outcomes of networks. This theory will help to understand the "power" exerted by the Fed's telegraph system in transforming American currency and banking following its implementation.

While the Fed's telegraph exerted significant agency in transforming American money and banking, a series of structural changes needed to be made to the country's banking sector for the technology to "work" as intended. ANT offers a means for understanding the various processes that underlined the telegraph's successful adoption. It begins with ANT's conceptualization of what it calls problematization, which is the first part in the "translation" process of embedding actors, both human and non-human, into networks. It consists of defining a problem that exists within a system, the various stakeholders that exist, and how the problem

⁵ Rolland Munro, "Actor Network Theory," in *The SAGE Handbook of Power*, ed. R. Stewart Clegg and Mark Haugaard (Thousand Oaks: Sage Publications, 2009), 126.

negatively affects them.⁶ Once the problem in a network has been identified, the actor undertake strategies to recruit and align other actors in the network to a desired outcome during a process called *interessement*. Once the primary actor manages to convince the secondary actors in the network to accept their interests, the latter have yielded to the network as part of the translation step known as *enrollment*. The enrollment of “actors” causes the network to expand as it gains greater acceptance, with more “actors” joining as part of the final step of ANT called *mobilization*. These translation steps will provide a theoretical basis towards understanding the long, sometimes arduous, process of installing the telegraph as the primary technology used by all banks in the country.

To better understand how translation works, consider sociologist and ANT developer Bruno Latour’s example of a hotelkeeper who attempts to prevent guests from leaving the hotel with the room keys. Once the problem is identified, they undertake the necessary strategies to achieve their desired outcome of getting the guests to “surrender” to the network by returning the key. To do this, the hotelkeeper asks the guests to return the key and attaches a metal weight to the key (*interessement*). This ensures that guests *want* to return the cumbersome key, thus aligning the actors by making them yield to the network (*enrollment*).⁷ In this case, the weight on the key is an inhuman actor that exerted agency in making the human actors (guests) conform to the hotelkeeper’s directions. The Federal Reserve employed a similar process of problematizing the currency and banking sector by adopting strategies to make the actors (banks) align themselves to the network that best suited a Fed-operated telegraph system for clearings and payments. ANT will serve as a theoretical basis to help understand the complex processes that underlined the series of events undertaken between 1913 and 1933

⁶ Godfried B. Adaba and Daniel Azerikatoa Ayoung, “The Development of a Mobile Money Service: An Exploratory Actor-Network Study,” *Information Technology for Development* 23, no. 4 (October 2017): 672.

⁷ Bruno Latour, “Technology is society made durable,” *The Sociological Review* 38, no. 1 (1990): 107.

to create a banking sector built around telegraph-based operations. Once the various processes occurred, the telegraph significantly transformed the American economy by changing banking operations and abstracting currency, thus decreasing the distance and increasing scale of transactions.

When considering the telegraph's role in eliminating the distance that existed between banks across the country, it is important to further discuss the relation between money and space. Georg Simmel rightfully acknowledged the important influence money had at transforming space. He argued that, in primitive times, possessions could not exist beyond its owner. Goods were effectively "tied" to their proprietor and only travelled with their holder(s). Simmel argued further that money bridged distances by allowing owners to exist far away from their possessions while still owning them.⁸ His theory was further built upon by geographers Andrew Leyshon and Nigel Thrift, who argued that the "compression of time and space was already laying the foundations for virtual money".⁹ They argued that this virtual money arose from technological developments in communications "as communication in monetary systems became increasingly indirect, and instantaneous."¹⁰ It is, as the sociologist Anthony Giddens argued, "a means of time-space distanciation" that allows agents to do business across large distances.¹¹

Although these scholars were correct in asserting the importance of money and how it relates to transforming space, their arguments are limited by only focusing on money itself. While this article does not refute their arguments, it does expand upon them by highlighting the importance of technological mechanisms in

⁸ Georg Simmel, *The Philosophy of Money* (London: Routledge, 2004), 334.

⁹ Andrew Leyshon and Nigel Thrift, *Money/Space: Geographies of Monetary Transformation* (Florence: Routledge, 1997), 27.

¹⁰ *Ibid*, 28.

¹¹ Anthony Giddens, *The Consequences of Modernity* (Cambridge: Polity Press, 1990), 24.

achieving new understandings of not only space, but money itself. Through the agency exerted by the Federal Reserve's telegraph system, banking operations expanded in scope and complexity which, in turn, made money truly virtual. It was this mobilization of American currency within the telegraph network and its subsequent transformation from a commodity to a spreadsheet figure that truly allowed the Fed to achieve its objective of rapid transfers across the country.

PRE-FEDERAL RESERVE MONEY AND BANKING (1853-1913)

Before the introduction of the Federal Reserve's telegraph system, currency, in the form of physical commodities like gold and specie, were the most important means for enacting payments.¹² Because of these commodities, making payments or transfers throughout the nineteenth and early twentieth centuries meant having to physically ship gold and currency between banks, which made banking operations expensive for both clients and banks due to the cost and risk of the transportation process. This was unavoidable, especially during "seasonal swings"; a westward-bound gold transfer that was required after the summer crop harvest, with a counteracting eastward movement taking place during the winter months.¹³ While the introduction of checks helped to ease transactions somewhat, it did not eliminate the shipping of gold and currency, or resolve the numerous inefficiencies in clearing and transfer arrangements.

Banks usually only had bilateral clearing agreements, which involved each institution sending their own agent to settle clearings. This became unsustainable by the 1850s, when there were more than

¹² R. Alton, Gilbert, "The Advent of the Federal Reserve and the Efficiency of the Payments System: The Collection of Checks, 1915–1930," *Explorations in Economic History* 37, no. 2 (2000): 123.

¹³ G. Alex Hope, "How the Reserve Banks Clear by Wire: What the Gold Settlement Fund and Telegraphic Transfers Are Doing for Greater Fluidity of the Nation's Currency," *Bankers' Magazine* 104, no. 5 (1922): 815.

fifty banks in cities like New York, making it impossible for a single agent to settle business with every bank.¹⁴ Clearing houses were created in 1853 to try and rectify these inefficiencies, which facilitated bank agents to meet in a single location, presenting their checks drawn from other member banks, and settling their claims with one another. These money transfers were also a time-consuming process. Before the Federal Reserve's creation, a typical New York wholesaler was forced to wait at least a week to receive money from a Dallas retailer after rendering a service to them. Because the wholesaler's deposited check would have to travel to the retailer's bank in Dallas before a check could be shipped back to New York to complete the transaction, the process of having money appear in one's bank account was significantly long and often impractical.¹⁵

While private clearing house arrangements did find success at speeding up settlements, Bank of England economists Ben Norman, Rachel Shaw and George Speight argued in a 2011 study that they suffered from a problem of "ownership structure". A bank that had control over clearing and settlement operations generated profit from these actions at the expense of its competitors. This eventually drew protests from the rival financial institutions, evident from the Suffolk bank dispute in the late 1850s, where the Suffolk bank in Boston was accused of monopolizing banknote brokerage and exerting undue pressure on country banks.¹⁶ While the Suffolk bank succeeded in standardizing banknote issuance and improving their redemption at par, its monopolistic nature and penchant for banking panics led economist Wilfred Lake, in 1947, to call it a "good

¹⁴ James N. Duprey, and Clarence W. Nelson, "A Visible Hand: The Fed's Involvement in the Check Payments System," *Federal Reserve Bank of Minneapolis Quarterly Review* 10, no. 2 (1986): 19.

¹⁵ Ibid.

¹⁶ Ben Norman, Rachel Shaw, and George Speight, "The History of Interbank Settlement Arrangements: Exploring Central Banks' Role in the Payment System," *The Bank of England*, Working Paper no. 412 (2011): 13-14.

regulator of a bad system”.¹⁷ As such, it is clear that the private sector’s profit motive ensured that inefficiencies and instability would persist within the banking sector.

Due to the persistence of clearing issues throughout the nineteenth century, it became more apparent that, to eliminate the inadequacies of the country’s banking arrangements, an independent body was needed to ensure the proper functioning and control of the country’s banking and transfer systems. The aftermath of the Panic of 1907 also led to greater support for central banking, culminating in the signing of the *Federal Reserve Act* in 1913. While most envisioned the Federal Reserve as being an institution for stabilizing American banking practices, it ended up revolutionizing America’s financial sector by remolding the pace of finance and the very nature of money itself.

THE FEDERAL RESERVE’S EARLY BEGINNINGS (1913-1915)

In considering the *Federal Reserve Act*, Section 16 is the most relevant area of the legislation regarding transfer powers. This part of the Act defined the Fed’s responsibilities regarding clearings and payments. Specifically, it stated that the Federal Reserve Board was empowered to regulate “the transfer of funds and charges [...] among Federal Reserve Banks [and] exercise the functions of a clearing house for such Federal Reserve banks”.¹⁸ As stated in a report for the Subcommittee on Banking, Finance, and Urban Affairs, Congress envisioned the Federal Reserve “to collect and clear checks on a nationwide basis” so as to eliminate the

¹⁷ Wilfred S. Lake, “The End of the Suffolk System,” *The Journal of Economic History* 7, no. 2 (1947): 202.

¹⁸ U.S. Congress, Federal Reserve Act: Public Law 63-43: *An Act to Provide for the Establishment of Federal Reserve Banks, to Furnish an Elastic Currency, to Afford Means of Rediscounting Commercial Paper, to Establish a More Effective Supervision of Banking in the United States, and for Other Purposes*, 63d Cong., 2nd sess., H.R. 7837 (1913), 21.

inefficiencies of the previous systems.¹⁹ In short, the Fed was meant to ensure reliability and efficiency in the country's payment system. However, by not specifying how the Fed was to accomplish this, Section 16 gave the Federal Reserve freedom to enact significant innovations to America's banking sector that had widespread implications for the country's economy and geography.

By creating Section 16, the drafters of the legislation and the central bank advocates established the problematization that necessitated the Fed's creation and powers. The advocates for a central bank-controlled telegraph system highlighted the private sector's failures to resolve the country's transfer issues. They also noted how the private sector's actions had caused the shuttering of banks and the burdening of clients with excessive fees. In 1915, an anonymous author contributed a column to *The New York Times* criticizing private banks for levying unnecessary costs, arguing that banks profiting from remittance charges were making money through "defective organization" and that "friends of sound banking" should welcome a new telegraph-based system, even if it makes banks unable to pay interest on deposits by not being able to collect exchange charges.²⁰

In addition to dealing with flaws in the country's banking structure, the Federal Reserve problematized another significant hurdle towards improving payments, transfers, and clearings: the gold standard. Under this system, U.S. currency was pegged to a finite quantity of gold that could be redeemed for an equivalent value upon the money holders request. Given the persistence of the system, gold holdings remained relevant to bank operations by restricting the amount of money that could be created and its need

¹⁹ U.S. Congress, House of Representatives, Committee on Government Operations, *The Role of the Federal Reserve in Check Clearing and the Nation's Payments System: Joint Hearings Before Certain Subcommittees of the Committee on Government Operations and the Committee on Banking, Finance, and Urban Affairs.*" 98th Cong., 1st sess., 1983, 345.

²⁰ *The New York Times*, "Federal Reserve Clearings," (February 20, 1915), 10.

to be transported between banks to enact transfers/payments. Economic historian Karl Polanyi argued that, under the gold standard, “any governmental measure that caused a budgetary deficit might start a depreciation of the currency”.²¹ In this way, the gold standard discouraged the expansion of money, credit, and the associated movement of large volumes of money between banks, as doing so would devalue the currency and create inflationary pressure.

Not only did the gold standard limit the expansion of money, but it also significantly limited the scope of American banking. Before the creation of the Federal Reserve, banks had established subtreasuries to hold their gold and silver reserves for the nine regions in the country. This arrangement confined banking practices to a costly regional scale. Congressman Jo Byrns (D-TN-6) noted that, by 1918, it costed more than \$600,000 per year for each of the nine cities with subtreasuries to maintain that institution.²² This inefficiency persisted while the Federal Reserve became increasingly focused on improving the operations of the country’s transfer system. Specifically, it sought to make credit transfers rapid and remove the “float” that characterized mail-based banking transactions.²³ This reflects another aspect of the Federal Reserve’s problematization of America’s currency and banking system that it sought to correct through the implementation of telegraph-based transactions. As such, ANT helps to understand the way new nonhuman “actors”, in the form of the Federal Reserve

²¹ Karl Polanyi, *The Great Transformation: The Political and Economic Origins of Our Time* (Boston: Beacon Press, 2001), 219.

²² Congressman Jo Byrns, speaking on H.R. 10358, on March 9, 1918, 65th Cong., 2nd sess., *Congressional Record* 56, 3268.

²³ A “float” refers to money that is counted twice due to time gaps when registering a transfer or other bank transactions. These were common in mail-based transactions due to how slow the method was, which led to inaccurate bookkeeping by the banks, further leading to the desire to adopt quicker methods. Board of Governors of the Federal Reserve System, “Fifth Annual Report of the Federal Reserve Board,” *Annual Report of the Board of Governors of the Federal Reserve System*, (Washington: Government Printing Office, 1918), 560.

infrastructure and the telegraph wire system, were required to reconstruct America's banking network to facilitate improvements that could rectify the previous failures.

***CONSTRUCTING TELEGRAPH-BASED CURRENCY AND BANKS
(1915-1918)***

After problematizing the issues in the banking sector, the first change the Fed implemented was the ability for Reserve Banks to use transfer drafts. This allowed for payments to be made across the country and paid immediately in bank funds; banks were able to avoid physically shipping currency and gold to make payments, and it set in motion the greater need/use of the telegraph to carry out banking operations.²⁴ The *Federal Reserve Act* established the Federal Reserve Board, which acted as the overseer of the twelve Federal Reserve Banks and their operations. Because banking activities were largely confined to local and regional spaces, coordinating operations between the twelve Federal Reserve Banks, which stretched from Boston to San Francisco, would be infeasible without implementing a new system for making transfers and clearings. This was, in part, where the decision to adopt telegraph wires came from.

Advocates for central bank-controlled telegraphic transfers were forced to identify the various actors they needed to recruit and align to the new telegraph-based banking network they were trying to establish. These actors included various companies, banking officials and regions into the Federal Reserve scheme. Because the government lacked the necessary infrastructure to have its own telegraph lines, the Federal Reserve decided, in 1915, that it would run its operations using telegraph wires leased from the Western Union Corporation.²⁵ As M.C. Elliot, counsel to Federal Reserve Board Governor Charles Hamlin, explained in the Federal Reserve

²⁴ U.S. Congress, House of Representatives, Committee, *The Role of the Federal Reserve in Check Clearing and the Nation's Payments System*, 404.

²⁵ *Ibid*, 405.

Bulletin's 1915 report: "telegraphic directions will be sufficient to make a transfer of the credit to the Federal reserve bank in any case where notes are offered."²⁶ This new business practice was a significant improvement upon the pre-Federal Reserve arrangements and featured a much more streamlined process, but not without its issues. The significant expansion of financial transactions and transfers were so great by 1918 that the leased wires became cumbersome. In its fifth annual report, the Federal Reserve Bank of Chicago reported that the leased wire system's mileage extended by approximately 12,500 miles, with services extending to cities like Little Rock and Nashville. This expansion occurred simultaneously with the greater usage of the system. Concerns began to arise about the efficacy and security of this arrangement, especially due to the rapid increase in transactions occurring on the leased telegraph lines. As such, the Board implemented duplex wires between New York and Chicago, which allowed messages to be sent over the same wire to two different banks simultaneously.²⁷

The Federal Reserve's contracting of Western Union for its telegraphic infrastructure is a clear example of one of the various enrollments the Board had to make to achieve its objective of improving telegraphic transfers. As the Federal Reserve Bank of New York argued in its publication about the evolution of its Fedwire system, when the Fed first began operating in 1914 it was still forced to ship currency and gold. To remedy this, the Board had "no choice" but to use the public telegraph facilities of the Western Union, since the government lacked the necessary telegraph infrastructure and no other company could adequately meet their

²⁶ Board of Governors of the Federal Reserve System, "Federal Reserve Bulletin: Issued By The Federal Reserve Board At Washington - September 1915," *Federal Reserve Bulletin* (Washington, 1915), 274.

²⁷ Federal Reserve Bank of Chicago, "Operation of Federal Reserve Bank of Chicago, 1919: Fifth Annual Report to the Federal Reserve Board," *Annual Report of the Federal Reserve Bank of Chicago*, (Illinois, 1920), 14.

needs.²⁸ As such, given contemporary restrictions, the Board was forced to enroll Western Union to provide the necessary telegraph wires for the Fed's transfer system, which, in turn, saw a rise in the usage of telegraph wires compared to the nineteenth century.

Because the transmission facilities were not under Federal Reserve control, it was used "only occasionally" to transfer funds until the Fed implemented its own dedicated funds transfer network with a Morse code system in 1918.²⁹ The process of enrollment pursued by the Federal Reserve was constantly evolving and changing to achieve its goal of fast, large money transfers. In addition to improving transfers, the Fed also prioritized fostering trust for the central bank within the bank sector. Although the Western Union lines allowed the system to exist, there was a lack of trust in using a private company's wires, which prevented it from being used to its full potential by member banks. This serves to emphasize how important the central bank and its independent, quasi-public institutional power was to the banking network and the successful enrollment of telegraphic wires for transfer operations. However, enrolling the wires was just one part of the massive restructuring that was undergone to remold money and banking around the telegraph.

Before the use of the telegraph, the network of transfers and clearings were dominated primarily by human actors. Because interactions between banks relied primarily on the physical meeting of its agents, improving the scale and speed of its operations was not feasible until these agents were automated. This resulted in reforms that not only changed the proportion of nonhuman "actors" within the network, but completely transformed the banks internal organization, making their operations increasingly specialized and complex. As such, a revolution in banking structure was needed, specifically through the transformation of a bank's internal operations to allow for telegraph-based activities.

²⁸ Federal Reserve Bank of New York, *Fedwire: The Federal Reserve Bank of New York Wire Transfer Service* (New York, 1995), 3.

²⁹ *Ibid*, 3.

American banks were forced to change their internal operations into a complex system of departments to ensure the speed and efficacy of telegraphic transfers. Walter Spahr, who served as chairman of New York University's department of economics from 1927 to 1956, explained that customers made telegraphic requests to their bank, which were then forwarded to the bank's Telegraph and Cable Department. This department would send the request to the "Test-Word" Department to verify the customer's information/request, who then transmitted it to the Note-Teller's Department. The Note-Teller's Department then froze the customer's account to limit both the client and the bank's liabilities, before finally returning the customer's case to the Telegraph and Cable Department, who transmitted the request.³⁰ Despite the speed of transactions, the telegraph still required a complex set of interconnected processes to carry out its operations. As such, reforms made by the Federal Reserve banks to their internal operations for accommodating increased telegraph use is evident of the agency the technology exerted in transforming all banking operations in the country.

Banks would go from relying on face-to-face dealings on the clearing house floor to enrolling a large bureaucracy that could carry-out transfers and payments while verifying information in an increasingly abstract business process. As the telegraph transformed bank bureaucracy to accommodate its capabilities, it proved to offer even more opportunities for expanding business. Specifically, banks were able to grow their departments to handle transfer requests from outside of their cities. Glenn Munn, a Chase Manhattan Bank worker during the 1920s, noted that the volume of out-of-town collections were so large that banks created transit departments to handle these requests and sort them by the intended banks (Federal Reserve or

³⁰ Walter Earl Spahr, *The Clearing and Collection of Checks* (New York: Bankers Publishing Co., 1926), 467-8.

correspondent banks).³¹ This bureaucracy developed in response to technology that was significantly transforming space and time.

The effects of technology on time-space compression are well documented; for instance, economist Jeremy Stein, a former member of the Federal Reserve Board of Governors, highlights how the emergence of new nineteenth century technologies, like railways and the telegraph, brought world economies closer together.³² The increase in the scale of business and the metaphorical “shrinking” of geography caused by technology was also frequently observed during the nineteenth century. Marx argued that capital sought to “annihilate” space and time through technological innovations so that it could circulate more easily within markets.³³ These examples contextualize how the telegraph significantly impacted financial transactions by the turn of the twentieth century, which then continued with Fed’s implementation of its own telegraph system. This increase in the speed of transactions was not just caused by changes to America’s banking structures but to its currency as well. Recall that the gold standard ensured that banking activities remained restricted through the limits it placed on the amount of currency that could circulate. To solve this issue, the Federal Reserve Board conceived of the Gold Settlement Fund. Under this plan, each of the twelve Federal Reserve District banks would contribute a portion of their gold holdings to be held with the Federal Reserve Board at Washington D.C. The gold sent to Washington would then exist as part of each bank’s legal holdings, which meant that it could not circulate normally.³⁴ Because of this, banks would not have to

³¹ Glenn G. Munn, “Collections, Transits and Transfers: Article V of a Reading Course in Banking,” *Bankers’ Magazine* 107, no. 2 (1923): 203.

³² Jeremy Stein, “Reflections on Time, Time-Space Compression and Technology in the Nineteenth Century,” in *Timespace: Geographies of Temporality*, ed. Jon May and Nigel Thrift (London: Taylor & Francis Group, 2001), 119.

³³ Karl Marx, *Grundrisse: Foundations of the Critique of Political Economy*, trans. Martin Nicholas (London: Penguin Books, 1973), 464.

³⁴ Hope, “How the Reserve Banks Clear by Wire”, 816.

concern themselves with transportation to the same degree as before the centralization of gold deposits.

The ramifications of the new gold settlement, telegraph-based system was originally discussed as early as 1915. In the Federal Reserve Board's first annual report, it discussed how the gold deposit carried on each Reserve Bank's account meant that settlement only needed to occur on a weekly basis, and that the banks would only have to wire to the Fed clearing house its balance and which banks it held debits and credits with. The Board acknowledged that the system could all be managed quickly and orderly, but recognized that "banks would have no tangible evidence of the ownership of the gold other than a book credit."³⁵ Once the Federal Reserve banks were unified and linked to the same telegraphic system, the technology offered the ability for bookkeeping to become much more important for clearings, transfers, and settlements. This allowed larger transactions to occur at even faster rates. Because of this, the subtreasury system became increasingly obsolete before eventually being dissolved under the *Independent Treasury Act*, which ordered that "Sub-treasuries of the United States are hereby repealed from and after July 1, 1921".³⁶ Following this dissolution, enough gold was consolidated with the Fed in Washington to ensure that transportation would no longer restrain banking operations to a large extent. Newspapers reported that, because of the Gold Settlement Fund and the national clearing system, "[c]urrency hereafter will only seldom be shipped in bales, like freight."³⁷ This was not possible before the telegraph's implementation, due to long delays in enacting transactions, especially from different parts of the country, which

³⁵ Board of Governors of the Federal Reserve System, "First Annual Report of the Federal Reserve Board for The Period Ending December 31, 1914," *Federal Reserve Bulletin* (Washington, 1915), 140.

³⁶ United States, Congress, House of Representatives, *The Independent Treasury Act*, May 29, 1920, 66th Cong., 3rd sess., H.R. 14100, Public, No. 231, 41 Stat. at L. 631.

³⁷ *The New York Times*, "National Clearings at Washington," (July 7, 1915), 10.

were, in part, driven by a lack of effective communicative technology. But with banks starting to make telegraph's integral to their transactions, the Federal Reserve system expanded, successfully mobilizing new actors into the system while forcefully enrolling others.

EXPANDING THE TELEGRAPH-BASED BANKING SYSTEM (1918-1933)

The telegraph's implementation into America's banking sector had also succeeded in, what ANT would call, mobilizing currency into the network that had already enrolled several reserve banks, companies (Western Union), and bureaucracy (Federal Reserve Board) to facilitate the telegraph's use. Mobilizing the currency into the network resulted in transforming its essence from a physical commodity to one that was increasingly abstract. In short, the mobilization of currency within the network resulted in it becoming "virtual" in nature. Regarding the development of this "virtual money", the Board's telegraph-based clearing system was a means for transforming America's currency to facilitate its expansion. Money as a physical commodity did not work well within the telegraph system due to its cumbersome nature and need to be physically shipped. Once the telegraph-based banking network was established, currency was mobilized into the new banking network through a significant restructuring of its essence to make it conform to telegraph-based transactions. For example, the Federal Reserve Bank of San Francisco remarked in its 1918 report that it had sought the replacement of gold with paper as the commonly accepted currency. Increasing the Federal Reserve's gold reserve became more important by 1918, with the amount outstanding ballooning from \$15,398,695 on April 6, 1917 to \$67,744,305 by the end of the year.³⁸

³⁸ Federal Reserve Bank of San Francisco, "Fourth Annual Report of the Federal Reserve Bank of San Francisco for the Year Ended December 31, 1918," *Annual Report of the Federal Reserve Bank of San Francisco (California, 1919)*, 14.

The Reserve Bank substituted the gold of its member banks for Federal Reserve notes, thus making its paper money the exclusive currency.³⁹ By standardizing the currency in Federal Reserve Notes and consolidating gold reserves with the Fed in Washington, it succeeded in making the banks capable of doing business with any other Reserve Bank in the country. George Seay, Governor of the Federal Reserve Bank in Richmond, discussed the success of telegraph-based transfer activities, highlighting how the San Francisco Bank was able to transfer \$200,000 to the Boston Bank in 1915, which led to transfers and payments by wire becoming more prominent in banking operations.⁴⁰ The fact that money of such a large quantity could be sent from one end of the country to the other almost instantly helps to illustrate that the money being sent over the wire, while still considered legal tender, did not exist as it once had in previous decades. Through the telegraph's linking of banks by the intra-district network and the standardization of currency in Federal Reserve Notes, money was transforming around the speed of telegraphic transfers.

The success and speed of the telegraph in allowing the operations of the Gold Settlement Fund to occur began to be recognized by the press. In 1921, the *New York Tribune* called the Fund "the most important contribution the Federal Reserve system has made to American finance" by making national funds mobile to the extent that it allowed for "instantaneous settlement of all balances throughout the country".⁴¹ Interestingly, as more money began to be circulated and interchanged between the Federal Reserve banks, the less material it became. With the telegraph, not only did money not have to be physically shipped and held by the

³⁹ Ibid.

⁴⁰ George J. Seay, "The Evolution and Practical Operation of the Gold Settlement Fund," *The Annals of the American Academy of Political and Social Science* 99, no. 1 (1922): 99.

⁴¹ Edgar D. Thornburgh, "Federal Reserve System's Weekly Figures Form Epitome of Financial Situation in This Country," *The New York Tribune* (September 11, 1921), 8.

banks, its existence in society seemed to completely transform to conform to the telegraph's speed and convenience. The meeting minutes of the Fed's Board of Governors discussed how the New York Federal Reserve Bank requested that "there be withdrawn from their credit balance in the Gold Settlement fund \$425,000,000".⁴² Once the bank asserted that it was "vitaly necessary" to have this money, the payment was authorized and completed via telegraphic confirmation, with no further actions required. In this way, the telegraph made it possible to transfer large sums of money between different owners in a near instant. This led to the greater importance of sound bookkeeping for the Fed's operations as the emergence of "spreadsheet money" became more prominent.

The telegraph facilitated the emergence of bookkeeping banking in ways once thought to be impossible. The queries and concerns about this new system became a significant point of debate within political circles as the implications became more noticeable. In 1921, John Skelton Williams, who was a member of the Federal Reserve Board and the Comptroller of the Currency, appeared before the United States Senate to answer Senator Lee Overman (D-NC) about the Fed's various operations, including its transfer system and gold settlement fund. Williams explained to the senator that no large movement of gold was ever occurring and that the banks' transfer actions were nothing more than "mere bookkeeping entries".⁴³ The Federal Reserve's banking system had brought strong nationwide infrastructure, reliability as the official central bank of the country, standardization of currency in the form of Federal Reserve notes, and accelerated business operations through the use of the telegraph. All these processes within the banking network meant that keeping track of money transfers could be carried out with standard accounting measures, while physical currency became increasingly

⁴² Board of Governors of the Federal Reserve System, "Meeting Minutes, Volume 4, Part 1," *Minutes of the Board of Governors of the Federal Reserve System* (May 16, 1917), 522.

⁴³ John Skelton Williams, writing to Senator Overman, on December 19, 1921, 67th Cong., 2nd sess., *Congressional Record* 62, 510.

obsolete. This result should be understood as a by-product of the mobilisation stage in ANT, as currency becoming part of the banking system not only transformed its own essence, but it also emphasized other actors (i.e. bank accountants) more and de-emphasized others (currency/gold shippers) within the network. With the speed and volume of its circulation, money became more relevant as a number that appeared on a bank's financial statement than a physical good. After all, with the introduction of duplex wires, money was being "sent" to multiple banks simultaneously over the same wires in mere seconds. This, in turn, caused significant transformations to money in society, resulting in an abstraction so significant that it often led to startling outcomes that typified modern money and banking.

In 1918, *The New York Times* reported that the Fed's banks had "lost" \$9,500,000 worth of gold as a result of a telegraphic transfer between Reserve Banks. The funds had been deducted from the transferring bank's account but had not reached the receiving New York bank in time to be added to their reserves.⁴⁴ As such, for several hours, millions of dollars worth of gold had technically disappeared from existence. This serves to highlight the significant agency that the telegraph exerted in impacting banking practices. The importance of accurate bookkeeping for banking operations was not born from government legislation or human process but became vitally important given the agency exerted by the telegraph in accelerating transfers. Because of this speed, if strong accounting practices were not kept, the telegraph literally had the ability to make money "vanish" from existence. Indeed, the telegraph's agency required the enactment of laws and regulations to prevent it from becoming the greatest bank robber of the twentieth century.

However, despite successes in mobilizing actors like currency into "spreadsheet money" within the telegraph-based banking

⁴⁴ *The New York Times*, "\$9,500,000 in Gold 'Lost' by Telegraph: Due to Delay in Transmission of Telegrams from One Reserve Bank to Another," (September 6, 1918), 29.

network, there remained significant roadblocks to its full implementation in the U.S. economy. Simply put, while Federal Reserve banks were succeeding and transforming the country's economy, its full impact was limited by the fact that numerous banks remained outside the system. By 1916, the Fed concluded in its annual report that allowing banks to voluntarily enter the Federal Reserve system was failing, as the "number of members did not increase materially, and in some districts declined."⁴⁵ The Board of Governors acknowledged the importance of growing the membership of the collection system. It noted that "Out of 625 member banks, only 150 send items regularly, of which one-half are country banks and the other half are situated in big cities."⁴⁶ The Board stated that this was unacceptable, since it encouraged reliance on the larger, city banks to handle collections. This not only put more pressure on the large banks to handle the significant amount of deposits, but it also disincentivized the smaller banks from improving their transfer operations. The report concluded by arguing that, until the smaller banks were capable of handling items from around the country, the collections system would never fully work.⁴⁷ The Board saw telegraph transfers as a means through which banks could "grow more intimate" with each other and perform quick and regular transfer operations.⁴⁸

The difficulty of the situation was that there was still significant opposition to the Federal Reserve's system. With the Fed's emergence and speculation about how banking practices would be affected by it, opposition to the central bank grew among bankers and politicians. During the debates surrounding the impact

⁴⁵ Board of Governors of the Federal Reserve System, "Third Annual Report of the Federal Reserve Board Covering Operations for the Year 1916," *Annual Report of the Board of Governors of the Federal Reserve System (Washington, 1917)*, 9.

⁴⁶ Board of Governors of the Federal Reserve System, "Third Annual Report," 233-4.

⁴⁷ *Ibid*, 234.

⁴⁸ *Ibid*, 269.

of the Gold Settlement Fund, there was significant desire for preserving the subtreasury system. In 1918, Emil Albrecht, President of the Philadelphia Bourse, wrote to Congressman William S. Vare (R-PA-1) to defend the subtreasuries. He argued that the Philadelphia subtreasury was important to the banking and business interests of the city and that the convenience and vicinity of the system “would be very much curtailed” if the operations were consolidated in Washington.⁴⁹ The convenience of subtreasuries were often argued for, mistakenly, during contemporary disputes. Russell Cornell Leffingwell, a banker who had been summoned by Congress in 1918 to debate the subtreasury issue, maintained that their continued existence, despite the high maintenance costs, was “highly desirable”. His testimony focused on transportation issues, where he argued that “[g]old does not move from one point to another in the United States except by railroad”.⁵⁰ Given the size of the country, he reasoned that the subtreasuries made transportation easy since it divided the land into various districts that made the transportation of money easier. He then argued that the ease of transportation would be gone if gold were consolidated in a single location at Washington DC. Bankers and statesmen like Leffingwell could not comprehend the profound transformation to money and banking that would be facilitated by the telegraph’s implementation. By the late 1910s/early 1920s, most of the opponents to the Federal Reserve’s plan for transforming banking operations were still beholden to orthodox ideas of money being a physical commodity that needed to be transported to settle bank transactions. Leffingwell’s argument showed that he could not understand the country’s new reality where banking operations were not carried out via the physical movement of commodities.

Opposition to abandoning subtreasuries was joined by a hostility from many regional bankers who believed that the

⁴⁹ Emil P. Albrecht, writing to Representative William S. Vare, on March 8, 1918, 65th Cong., 2nd sess., *Congressional Record* 56, 3231.

⁵⁰ Russell Cornell Leffingwell, speaking on H.R. 10358, on March 9, 1918, 65th Cong., 2nd sess., *Congressional Record* 56, 3268.

centralization of clearing operations would negatively impact their operations. Perhaps the biggest concern during the Federal Reserve's early years of operation was the Fed's goal to have all the banks within its network remit at par which, in turn, eliminated existing domestic exchange rates. However, it is interesting to note that, by the time of the Federal Reserve's creation, bank opposition was not due to fear of accepting checks at par from failing/disreputable banks. Instead, most of the hostility to the Federal Reserve's impact on country banks was about how these institutions depended on the revenue it earned from charging fees. Walter Wyatt, a Federal Reserve lawyer from 1922 to 1946, noted how, in 1917, many country bankers were worried that measures meant to mobilize the country's finances for war, specifically the extension of the Fed's check collection facilities, would result in the "loss of the profits which they derived from exchange charges".⁵¹ As early as 1913, bankers representing the country's southern and western interests met in Chicago and were reported to have supported a series of recommendations for American banking, which included a policy that membership in reserve banks be voluntary.⁵² By having the right to exist outside the Fed's system, they would be able to continue charging exchange fees.

This existing opposition prevented the further modernising of banking operations and abstraction of currency, which forced the Federal Reserve to take decisive action to meet its objective of improving transfer operations at the expense of bank autonomy. They attempted to promote membership within the central bank's system by advertising the advantages of its telegraph transfers. A 1916 *New York Times* article discussed a letter from Federal Reserve Deputy Governor Robert Treman, who claimed that member banks with the Fed would be able to make "excess balances or deposits

⁵¹ Walter Wyatt, "The Par Clearance Controversy," *Virginia Law Review* 30, no. 3 (1944): 373.

⁵² *The New York Times*, "Bankers Insist on Bill Changes: Sentiment in South and West Strong for Currency Plan Outlined at Chicago," (August 30, 1913), 1.

[...] immediately available with any reserve bank or member of the system”.⁵³ The *New York Tribune* reported that the Federal Reserve’s telegraphic transfer arrangement would allow the banks to make payments and transfers both within and outside its district at no extra cost other than for the telegram itself, “thus rendering this service at a nominal expense”.⁵⁴ This argument served as a first, less durable interestment step, as defined in ANT, by attempting to enroll banks in the telegraph network. Despite the attempts to promote the cost savings associated with the Federal Reserve’s system, efforts to undermine the Fed’s position in American banking persisted.

In 1917, Congress debated an amendment to the *Federal Reserve Act* that would have made remittance at par optional for banks. Senator Asle Gronna (R-ND) noted that the amendment, known as the Hardwick Amendment, had been prepared in conjunction with the Banker’s Association of the United States “for the purpose of increasing [the banks] revenue.”⁵⁵ *The New York Times* also reported that hostility to the Fed’s plan on national clearings was mostly among interior banks who were opposed to the taking “away [of] their clearing charges”.⁵⁶ Despite support for the Fed’s telegraph clearing system among some bankers, the opposition from state and regional banks highlighted a major hurdle to the Federal Reserve’s mission to centralize and accelerate bank operations.⁵⁷ Banks that charged exchange fees challenged the Fed’s remittance policy in court, leading to a 1923 Supreme Court ruling that the Fed could not compel non-members to pay at par.⁵⁸ The continued

⁵³ *The New York Times*, “Cheaper Money Transfers: Reserve Bank Will Send Funds by Telegraph Without Extra Cost,” (December 31st, 1916), 18.

⁵⁴ *The New York Tribune*, “Federal Reserve Rank to Transfer Funds by Telegraph,” (December 31, 1916), 5.

⁵⁵ Senator Gronna, speaking on the Kitchin Bill, on May 9, 1917, 65th Cong., 1st sess., *Congressional Record* 55, 1994.

⁵⁶ *The New York Times*, “National Clearings at Washington,” (July 7, 1915), 10.

⁵⁷ J. Adams Brown, “Federal Reserve Clearings: To the Editor of the New York Times,” *The New York Times* (February 23, 1915), 12.

⁵⁸ Gilbert, “The Advent of the Federal Reserve,” 128-9.

existence of domestic exchange rates prevented the scope of banking operations to continue expanding while also limiting the efficacy of the telegraph. Banking would need to be interconnected across the entire country if the technology's utmost potential was to be harnessed. The Supreme Court's 1923 decision forced the proponents of the central bank-administered telegraph system to pursue more decisive measures for enrolling banks into the newly developing banking sector.

This decisive action involved making banks want to become part of the telegraph system by remolding the banking sector so that remaining outside of it became undesirable. Economist Alton Gilbert noted in 2000 that, following the Supreme Court's ruling in 1923 against the Fed, "the Reserve Banks began refusing to accept for collection checks drawn upon nonpar banks".⁵⁹ If banks wanted to do business with the Federal Reserve, they would have to become a part of its telegraph system. In this case, the focal "actor" (the Federal Reserve) leveraged its increasing institutional power as the central bank, through the process of interestment, to transform the country's banking conditions and satisfy its own objectives, thus forcefully enrolling non-compliant banks into its system/network. While significantly limiting the autonomy of regional and state banks, the implementation of these restrictions allowed for the creation of a system where banking operations, centered on the telegraph, could truly move from the local to the national scale. By doing this, the Fed would be able to unlock the full potential of the telegraph for streamlining payments/transfers and transforming the country's money and banking.

As the evidence presented thus far illustrates, implementing telegraph operations was no simple task. A telegraph-based system for clearings and payments required that every bank in America participate in the system, and the Federal Reserve was forced to pursue numerous strategies as part of the process of interestment

⁵⁹ *Ibid*, 129.

to convince banks to accept its telegraph operations. The mobilizing of currency and further enrollment of banks in the country succeeded, and the telegraph-based system for bank transactions continued to improve and expand. In 1919, the Philadelphia Federal Reserve noted that the number of items passing through its departments increased from 17,133,761 in 1918 to 34,886,768 a year later while handling 156,000 items per day.⁶⁰ These figures would continue to grow during the 1920s and 1930s with the greater use of the Federal Reserve's wires by cities to settle clearing house balances. It even increased during the Depression, going from \$166,000,000 worth of transactions in 1930 to \$172,400,000 the following year.⁶¹ By 1933, the year when the gold standard was abandoned, the New York Federal Reserve calculated that \$37,289,786,000 worth of funds had been transferred that year, highlighting how large the volume of transfers had become, even during a period of economic depression.⁶² From this, it is clear how significant the telegraph was in expanding banking operations even when American currency was still pegged to gold. Considering the extent to which America's banking sector reformed to facilitate the adoption of telegraphic transfers, it is evident that the telegraph exerted significant agency in changing the country's banking operations. The technology required a significant restructuring of the banking sector and the enrollment of all banks into the telegraph network for it to properly work. It can be said the telegraph helped transform the banking sector from a

⁶⁰ Federal Reserve Bank of Philadelphia, "Fifth Annual Report of the Federal Reserve Bank of Philadelphia for the Year Ending December 31, 1919," *Annual Report of the Federal Reserve Bank of Philadelphia* (Pennsylvania, 1920), 24.

⁶¹ Federal Reserve Bank of Philadelphia, "Seventeenth Annual Report of the Federal Reserve Bank of Philadelphia, Made to the Federal Reserve Board for the Third Federal Reserve District by the Chairman of the Board and Federal Reserve Agent: 1931," *Annual Report of the Federal Reserve Bank of Philadelphia* (Pennsylvania, 1932), 23.

⁶² Federal Reserve Bank of New York, "Nineteenth Annual Report of the Federal Reserve Bank of New York for the Year Ended December 31, 1933," *Annual Report of the Federal Reserve Bank of New York* (New York, 1934), 38.

collection of regional banks to a more uniform, national system. As such, the Federal Reserve's telegraph system fostered new economic and financial realities by centralizing and modernising banking operations to move "spreadsheet money" between the Reserve Banks accounting books.

CONCLUSION

This article has sought to take a new approach in understanding the history of the Federal Reserve and how it impacted American money and banking. While most of the Federal Reserve's historiography has focused on macroeconomic policy decisions, this article has examined the telegraph to emphasize the equal importance of technological innovations employed by the Fed in revolutionizing money and banking. By applying Actor Network Theory, it has highlighted how the implementation of the telegraph led to the occurrence of a series of complex processes and changes. The internal operations of banks became increasingly intricate, while various "actors" were enrolled and mobilized, sometimes forcefully, into the central bank's organization. This allowed for telegraph-based banking processes to occur through innovations like the Gold Settlement Fund. The telegraph, in combination with the Federal Reserve's institutional influence within the banking sector, led to profound alterations in America's financial practices that had not been possible before 1915. Because of this technology, banking operations expanded across the country, making money, in its form and circulation, more abstract to the point where it could be anywhere and everywhere in an instant. Therefore, the telegraph exhibited significant agency, comparable to any monetary policy, in transforming the country's banks and currency and paving the way for modern money and banking operations.

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