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INDIA'S PAPER CURRENCY DEPARTMENT (1862-1935) AS A QUASI CURRENCY BOARD

Currency Board Working Paper

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Global Health, and Study of Business Enterprise

India's Paper Currency Department (1862-1935) as a Quasi Currency Board

By Charles Weintraub and Kurt Schuler

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About the series

The *Studies in Applied Economics* series is under the general direction of Professor Steve H. Hanke, Co-Director of the Institute for Applied Economics, Global Health, and Study of Business Enterprise (hanke@jhu.edu).

This working paper is one in a series on currency boards. The currency board working papers will fill gaps in the history, statistics, and scholarship of the subject. The authors are mainly students at The Johns Hopkins University in Baltimore. Some performed their work as summer research assistants at the Institute.

About the authors

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Summary

We examine to what extent India's Paper Currency Department (1862-1935) operated like a currency board, using statistical tests based on its monthly balance sheet. Our paper makes the monthly balance sheet data available in machine-readable form for the first time, in a companion spreadsheet workbook, and likewise for the first time offers a through summary of legislation related to the Paper Currency Department.

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Keywords: Currency board, India, Paper Currency Department

JEL numbers: E59, N15

Introduction

Before its current era of central banking, India had a period of monopoly note issue by the government Paper Currency Department from 1862 to 1935. Many narrative accounts of the period exist, most famously John Maynard Keynes's first book, *Indian Currency and Finance* (1913). In contrast, statistics of the period in the high-frequency, machine-readable form necessary for detailed quantitative analysis are not readily available. Here we start to remedy the situation with monthly statistics of the balance sheet of the Paper Currency Department. An analysis of the balance sheet shows that for part of its existence the Paper Currency Department worked like a currency board—something previous work on currency boards has not noted because data to make the diagnosis were not ready to hand.[1]

We focus on determining the extent to which the Paper Currency Department operated like a currency board and do not address broader issues such as whether a different arrangement might have promoted economic growth better.[2] The statistics that we provide (in a companion spreadsheet workbook) and perhaps also the legislative history (in Appendix A) should, however, be useful to any future analysis of the Indian monetary system of the period.

Origins and Workings of the Paper Currency Department

Paper currency was a very small part of the Indian monetary system of the mid 19th century. Native credit and coins, used throughout the country, far exceeded bank deposits and paper currency, which were confined to the largest cities. India was on a silver standard, with the rupee equal to 180 troy grains of standard silver (11/12 fine) or 165 troy grains (10.6918 grams) of pure silver. The rupee and its major subdivisions were "full-bodied," containing silver equal to their face value.

Banks in India had issued notes for decades, without a government note issue. That changed under James Wilson, an accomplished Scotsman today best known as the founder of the *Economist* magazine. Wilson was appointed Financial Member (like minister of finance) in the Indian colonial government in 1859 to curtail the deficits arising from the Sepoy Rebellion of 1857-1858. Wilson proposed spending cuts, tax increases, reforms in budgeting procedures, and a government monopoly of note issue (Bagehot 1915 [1860]). Wilson's case for a government monopoly of note issue was that (a) notes enabled a considerable saving of cost over using coins; (b) the government would reap a large part of such savings; (c) the savings for all would be largest if the notes were legal tender; (d) it would be inappropriate for bank-issued notes to be legal tender; (e) government notes could be issued according to procedures that would make them secure, in fact more so than bank-issued notes; (f) a uniform, reliable, legal tender currency would contribute to government revenue both by promoting faster economic growth and by generating seigniorage; and (g) issuing notes was not a necessary part of the business of banks (Wilson 1860: 4-12).[3]

Wilson referred to the experience of the United Kingdom, which had had curtailed competitive issue of notes in 1844 and 1845. The U.K. Bank Act of 1844 established conditions that would eventually make the Bank of England the only note issuer in England. The Act divided the Bank into two parts. The Issue

[1] Chandavarkar (1983: 774) alludes to the similarity with a currency board, though.
[2] For overviews of the period of the Paper Currency Department, see Shirras (1920), Malhotra (1949), and Simha (1970: ch. 2). Sunderland (2013) contains references to most of the important work on the subject.
[3] The Scottish lawyer and economist Henry Dunning Macleod (1900: 53) later advocated a return to free banking, but his was a minority view.

Department issued paper currency and, with some qualifications, had to back notes in circulation beyond £14 million 100 percent with gold. The Banking Department accepted deposits and made loans, and faced no reserve requirement. Advocates of the Bank Act had intended to make the Bank of England into something like a currency board, but had unwittingly failed by confining currency board-type restrictions to the Issue Department rather than applying them to the whole of the balance sheet.

Wilson took inspiration from but did not precisely imitate the Bank Act. Rather than a central bank that would do both a note issuing and a deposit business, he proposed only an Issue Department. Rather than a 100 percent marginal reserve requirement in gold like the Bank of England had against notes, he proposed a one-third proportional reserve (Great Britain 1919, v. 3: 154). He died before the colonial legislative council adopted his proposal, though, and his successor, Samuel Laing, changed the reserve requirement from a proportional requirement to a 100 percent marginal requirement.

By Act 19 of 1861 the colonial government made note issue in India a government monopoly effective 1 March 1862. The Department of Issue of Paper Currency (which we will generally call by its more colloquial name, the Paper Currency Department[4]) was allowed to issue notes for 10 rupees and up. The Master of the Mint at Calcutta was initially appointed as the Head Commissioner and the Masters of the Mint at Madras and Bombay were initially the two other Commissioners, though all three positions were in principle open to other people. India was divided into three "circles of issue" based in Calcutta, Madras, and Bombay, the major cities for finance, foreign trade, and colonial administration. Notes were only redeemable in the town where issued and at the headquarters of that circle. The Department was required to issue notes on demand in exchange for Indian silver rupees, silver bullion, or foreign silver coin evaluated at its bullion value, and to redeem notes in silver.[5] The government could also provide for the Department to accept gold at specified rates. The Department could hold up to 40 million rupees of Indian government securities but had to back any rupees in circulation in excess of that amount 100 percent with precious metals.[6] (This arrangement was termed "fixed fiduciary issue.") The Department had to publish a balance sheet monthly and a statement of income and expenditures annually. Notes were liabilities of the Indian government.

The Paper Currency Department was part of the Finance Department, whose head was the Finance Member of the Indian colonial administration. The three major note-issuing banks, the Bank of Calcutta, Bank of Bombay, and Bank of Madras, which were all partly government-owned at the time, were compensated for the loss of their note issues by being made the agents for the government note issue until 1866, when the Paper Currency Department had become large enough to do the work on its own.

From our perspective, the major later changes to the 1861 law, which we discuss below, were increases in the amount of Indian securities the Paper Currency Department could hold and changes to the

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[4] Act 19 of 1861 called the department the Department of Issue of Paper Currency; Act 3 of 1871 called it the Department of Issue; Act 20 of 1882 called it the Department of Paper Currency; and Act 45 of 1920 called it the Currency Department. Statements in the *Gazette of India* use the name "Department of Issue of Paper Currency" through 1920 and "Currency Department" from 1921. Annual reports issued as separate publications, which begin with the 1883/1884 financial year, say "Paper Currency Department" initially and start using "Currency Department" in the 1911/1912 report.

[5] Exchanging foreign silver coins or silver bullion into notes involved a charge equal to 2.1 percent of the value of the bullion. In addition, there might be a waiting period while the Mint converted the bullion into coin. Exchanging silver rupees for notes involved no charge or waiting period.

[6] In a mirror image of the Bank of England, on the gold standard and allowed to hold up to a quarter of its metallic reserves in silver, the Paper Currency Department could hold up to a quarter of its metallic reserves in gold.

exchange rate. Less important changes included separating its management from that of the Mint; establishing new circles of issue; reducing the minimum denomination of notes; issuing "universal" notes redeemable across all circles of issue; and allowing British government securities to count as part of reserves. Appendix A gives a history of legislation affecting the paper currency, while Appendix B summarizes changes to the ceilings on the Paper Currency Department's holdings of securities.

The Paper Currency Department issued notes until the newly formed Reserve Bank of India, the central bank today, assumed responsibility on 1 April 1935. The Reserve Bank of India was divided into an Issue Department and a Banking Department in imitation of the Bank of England, and what had been the Paper Currency Department became the Issue Department of the central bank.

To What Extent Was the Paper Currency Department a Currency Board? A First Cut

The key characteristics of a currency board are a fixed exchange rate with an anchor currency; 100 percent net foreign reserves, at least at the margin, against the whole monetary base; and full convertibility (no exchange controls) with the anchor currency. To what extent did the Indian monetary system actually have those characteristics during the existence of the Paper Currency Department?

India was on the silver standard from before the Paper Currency Department began until 25 June 1893.[7] The pound sterling, in contrast, was on a gold standard, and from 1862 to 1893 the rupee depreciated from about 24 pence sterling to about 15 pence. (There were 12 pence per shilling and 20 shillings or 240 pence per pound sterling. For ease of exposition, we omit mention of shillings and reckon only in pence.) India was a borrower in the London financial markets, so the silver standard increased its debt burden. Pursuant to the recommendations of an exclusively British group of experts known as the Herschell Committee, on 26 June 1893 India abandoned the silver standard and switched to a "limping standard," which we today would call a managed float or perhaps a band. This was a transition period to allow the exchange rate to appreciate to 16 pence. After the rupee had appreciated, India would switch to sterling as its anchor and the rupee-sterling exchange rate would cease large fluctuations. No new silver rupees were coined during the transition period, but legislation provided for the use of gold, since gold coins were widely used in Britain. Because the exchange rate fluctuated, the Paper Currency Department by definition could not have operated as a currency board during the period.

In January 1898, India established a sterling/gold exchange standard pursuant to the recommendations of another exclusively British group of experts, the Fowler Committee. The experts envisioned a gold standard with extensive circulation of gold coins, but Indians preferred silver coins, so in practice the system was based on foreign exchange trading with the pound sterling, a gold-standard currency. The Indian colonial government became the central player of the standard by offering the most convenient financial instruments for foreign exchange trading: Council Drafts (also called "Council Bills" or simply "Councils"—rupee funds in India, sold in London for sterling) and Reverse Council Drafts on Sterling

[7] By a government notice of 23 November 1864 the government accepted British gold sovereigns (£1 pieces) as equal to 10 Indian rupees. In practice no sovereigns were proffered since the rate undervalued gold relative to silver compared to the world market ratio (Ambedkar 1947: 43). A notice of 28 October 1868 raised the rate at which the government accepted gold sovereigns to 10 rupees 4 annas (10.25 rupees) (Chalmers 1893: 345). The new rate likewise had no practical effect in increasing the use of gold coins. In May 1874 the government announced that it was not prepared to take any step to recognize gold as legal tender (Simha 1970: 44). The Native Coinage Act, Act 9 of 1876, allowed the government to admit coins issued by the "native states" (partly autonomous principalities) as legal tender upon certain conditions.

Drafts ("Reverse Councils"—sterling funds in London, sold in India for rupees). The "Council" in question was the Council of India, a board of advisers to the top British official for India, the Secretary of State for India. Starting in 1893 the Indian government had begun offering Councils and sometimes Reverse Councils in amounts greater than its own needs alone required. In 1904 it announced that it would supply Councils to the market in unlimited amounts at a ceiling of 16-1/8 sterling pence per rupee. It did not announce a floor, but in practice did not sell Councils below 15-29/32 pence per rupee. Starting in 1908, it also sometimes offered Reverse Councils at 15-29/32 pence per rupee, but it made no promise to sell them without limit. The exchange rate system was therefore asymmetrical: both the British gold sovereign and the silver rupee were legal tender, and the government undertook to convert sovereigns into rupees in unlimited amounts but not necessarily rupees into sovereigns. As a later committee of experts, the Hilton Young Commission, observed, "The automatic working of the exchange standard is thus not adequately provided for in India, and never has been" (Royal Commission on Indian Currency and Finance 1926, v. 1: 8). Arbitrage also continued to occur through trade in precious metals. Unlike currency boards in other British colonies, the Paper Currency Department did not participate directly in the foreign exchange market, leaving it to another branch of the Finance Department.

On 5 August 1914, soon after World War I began, the Indian government ceased selling gold to the public, as the British government was also doing. The Paper Currency Department continued to pay notes in silver rupees, whose value as metal was at the time less than their face value. What had been a sterling/gold exchange standard thus became purely a sterling standard. On 20 December 1916, after record demand for Council Drafts in November and early December, the government limited the amount it sold (Paper Currency Department annual report, 31 March 1917: 8). Because of the key role of Council Drafts in the exchange rate system of the time, we consider that limiting their sale constituted de facto exchange rate control.

The sterling standard lasted until 26 August 1917, when a rise in the price of silver forced the government to let the rupee float. Silver rupees, still the bulk of the monetary base, were becoming worth more as metal than as money at 16 pence, threatening a melting down of coins and a contraction in the currency.[8] War aggravated the situation by hindering shipments of silver to India. There are hints that even before August 1917, the market rate was diverging from the official rate (Paper Currency Department annual report, 31 March 1917: 8). After abandoning the sterling standard, the Indian government first operated a moving peg or what we might today term a managed float, varying the exchange rate with sterling as the price of silver fluctuated. The rate appreciated to a record 28 paper pence per rupee from mid December 1919. Pursuant to the recommendations of another group of experts (this time mainly British—there was only one Indian member), the Babington Smith Committee, the government then unsuccessfully tried to establish a hard peg of 24 *gold* pence per rupee from 5 February 1920; the exchange rate reached 34-27/32 paper pence on 12 February 1920. As the price of silver began to fall as precipitously as it had risen, the government retreated to the more depreciated rate of 24 paper pence per rupee on 24 June, then ceased supporting the exchange rate after 28 September 1920. After another period of managed floating with limited intervention, the exchange rate hardened into a band around 18 pence per rupee in October 1924. In July 1925 the government announced that it did not wish the exchange rate to breach a ceiling of 18-3/16 paper pence and that it

[8] To address the shortage of coins the government also reduced the minimum denomination of notes the Paper Currency Department could issue to 1 rupee, from 5 rupees previously; bought silver from the United States to be coined into rupees; eliminated silver from coins for fractions of a rupee; issued British gold sovereigns in early 1917; minted its own gold coins, the mohurs, in early 1918; and increased the nonmetallic portion of the Paper Currency Department's reserve.

had adequate resources to prevent a breach. On 8 April 1926 it established a floor of 17-3/4 pence. In March 1927 the government set 17-49/64 pence per rupee as its selling rate for sterling for immediate delivery in London. Pursuant to the recommendations of yet another committee of experts, the Hilton Young Commission, the government officially pegged the rupee at 18 pence effective 1 April. On 27 April 1927 it initiated a system of purchase of sterling in India by public tender to help make exchange rate arbitrage work smoothly. The exchange rate of 18 pence lasted until 1966, well into India's central banking era.[9]

Unlike the Bank of England, the Paper Currency Department had no coordinate deposit department. The requirement that it hold 100 percent foreign assets (silver, gold, and later also British government securities) beyond a certain level applied to the whole of its balance sheet. Successive laws periodically increased the maximum "fiduciary" holding of Indian government securities as note circulation increased. During World War I the changes, formerly rare, became frequent, introducing a more discretionary element into the system. A law of 1920 allowed the Governor General of India to reduce the foreign reserve requirement from 100 percent at the margin to a 50 percent overall requirement. The reserve's behavior would have returned to something like James Wilson's original intention had the Governor General ever brought that provision of the law into effect, which apparently never happened.

The Paper Currency Department was not responsible for coins: that was the job of the Indian Mint. Coin circulation likely exceeded note circulation during the whole existence of the Paper Currency Department. In March 1900, for instance, note circulation was 287 million rupees, while estimated coin circulation exceeded 1 billion rupees (Brahmanandra 2001: 640-643).[10] As we have mentioned, up to 1893, the metallic value of the rupee and its major subdivisions was equal to their face value. From 1893 the metallic value of silver coins became worth less than their face value. In 1900, when the government began minting silver rupees for the first time since 1893, it established a Gold Reserve Fund (later called the Gold Standard Reserve) intended to provide backing for the difference. The reserve, which consisted mainly of British securities, did not operate according to any rigid principles, and the Indian colonial administration used it as a financial buffer as circumstances seemed to require. Our companion spreadsheet workbook contains annual balance sheet figures for the Gold Reserve Fund.

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[9] The Indian government (formally, the British Secretary of State for India) offered transfers on India in London at these rates for immediate transfers, in paper pence per rupee, roughly following the appreciating price of silver: 20 December 1916, 16-7/32; 3 January 1917, 16-1/4; 29 August 1917, 17; 11 April 1918, 18; 13 May 1919, 20; 12 August 1919, 22; 16 September 1919, 24; 25 November 1919, 26; 16 December 1919, 28. Rates for deferred transfers were typically 3/16 rupees lower. Reverse Council rates were set as follows for immediate transfer: 11 April 1918, 17-31/32; after an interval of no sales, from 2 January 1920 onward see the annual report of the Paper Currency Department of 31 March 1921. Rates for deferred transfers were typically 1/16 rupee higher. The rates in this paragraph were not fully market rates until 23 September 1919, because they were offered only to approved parties and the amount offered often fell short of demand. From February 1921 telegraphic transfers through the government practically ceased, being replaced by transfers through the recently established Imperial Bank of India, which exercised some quasi central banking functions. Starting on 9 January 1923 the government resumed the sale of Council Bills, but with emphasis on meeting its own financial needs rather than providing a vehicle for exchange rate arbitrage (Paper Currency Department annual reports, all 31 March: 1917: 8; 1918: 11; 1919: 8-9; 1920: 9-10; 1921: 13-16, 33; 1923: 10-11; 1926: 8; 1927: 3, 9-10; see also Royal Commission on Indian Currency and Finance 1926, v. 2: 10-17).

[10] "Except in the near neighbourhood of the chief centers of trade Currency Notes are hardly at all in circulation, partly because the common transactions of people in towns and villages are on too small a scale for a high-value currency, and partly because Government cannot undertake to encash Notes at every Treasury" (Paper Currency Department annual report, 31 March 1902: 3).

Table 1. Key Changes Affecting the Paper Currency Department

1862	**1 March: Paper Currency Department opened;** its ceiling for holdings of Indian government securities was 40 million rupees; the exchange rate was 1 rupee = 165 fine troy grains silver
1871	20 January: Raised ceiling for Indian securities to 60 million rupees
1872	**January: Start of first quasi currency board period as domestic assets ceased to vary**
1890	29 August: Raised ceiling for Indian securities to 80 million rupees
1893	**26 June: End of first quasi currency board period as exchange rate was floated**
1896	17 December: Raised ceiling for Indian securities to 100 million rupees
1898	**January: Start of second quasi currency board period:** government established an exchange rate of 1 rupee = 16 pence sterling (240 pence = £1), or 1 rupee = 7.53344 troy grains gold
1904	Government offered to provide unlimited exchange on India at 1 rupee = 16⅛ pence sterling
1905	22 March: Raised ceiling for securities raised to 120 million rupees, of which up to 20 million could be invested in British government securities
1907	November: Turbulence in the foreign exchange market related to the worldwide financial panic of the time; the government for a time ceased freely paying out gold in exchange for silver rupees (Kemmerer 1916: 112-113, 115)
1911	6 March: Raised ceiling for securities to 140 million rupees, of which up to 40 million could be British government securities
1914	5 August: Government ceased selling gold to public with the outbreak of World War I
1915	16 January: First of a series of temporary wartime measures raising the ceiling for securities
1916	**20 December: End of second quasi currency board period as government limited its offer of exchange on India**
1917	28 August: Abandoned a rigid exchange rate with sterling; established a moving peg (we might today call it a managed float), with the market rate sometimes diverging from the official rate
1920	5 February-September: Established an exchange rate of 1 rupee = 11.30016 troy grains fine gold (24 gold pence); retreated to a more depreciated rate of 1 rupee = 24 pence sterling on 24 June; abandoned it after 28 September as the price of silver crashed and returned to a moving peg (which we might today call a managed float)
1920	17 September: Legislation approved providing for abandoning 100 percent marginal reserves for a minimum 50 percent metallic reserve; apparently never brought into effect
1924	September: Began de facto band centered around 1 rupee = 18 pence sterling
1925	28 April: Britain in practice returned to the gold standard, so India in effect returned to a sterling/gold exchange standard similar to what had existed from 1893 to 1914
1927	1 April: Official return to a rigid exchange rate at 1 rupee = 18 pence sterling
1931	21 September: Britain abandoned gold standard; India followed, rupee remained at 18 pence
1935	**1 April: Reserve Bank of India replaced Currency Department**

Sources: Appendix A below; *Gazette of India;* Paper Currency Department annual reports.
Note: Commissions of inquiry into the Indian monetary system: Mansfield Commission (1866); Herschell Committee (1892-1893); Fowler Committee (1898-1899); Chamberlain Commission (1913-1914); Babington Smith Committee (1919-1920); Hilton Young Commission (1925-1926); Central Banking Enquiry Committee (1931). Many of their reports are available via Google Books, HathiTrust Digital Library, or the Internet Archive.

In summary, the Paper Currency Department was definitely not a currency board from 26 June 1893 to January 1898, when the exchange rate of the rupee floated, and from 16 December 1916 through 31 March 1927, during which time there was first de facto exchange rate control with the pound sterling and then a fluctuating exchange rate. We now examine whether the Paper Currency Department operated like a currency board during the remaining periods.

The Data and Our Tests

We (mainly Weintraub) transcribed monthly balance sheet data on the Paper Currency Department for the whole of its existence, as well as some weekly and annual data. The main source was the *Gazette of India* or, where it was missing, the annual *Report upon the Operations of the Paper Currency Department.* We also used other sources, listed in the references.

We performed tests on the balance sheet items of the Paper Currency Department as well as a test involving trade data. We followed certain conventions regarding exchange rates. During the period from 28 August 1917 to 31 March 1927 when the rupee's exchange rate with sterling fluctuated, the Paper Currency Department only changed infrequently the rate it used for converting sterling values into rupees. On 1 October 1920 it devalued sterling assets from 16 pence per rupee to 24 pence per rupee, following the market rate. It revalued them to 18 pence per rupee, the new official rate, on 1 April 1927 (Paper Currency Department annual report, 31 March 1921: 26; 31 March 1928: 14). We used the rupee equivalents that the Paper Currency Department published in its balance sheets rather than estimating different ones using market exchange rates. As for trade data, in the early years our ultimate source, the *Statistical Abstract and Review of British India,* only gives data in sterling. We used the rupee values in the Historical Financial Statistics data set, which converts sterling values to rupees according to official conventions of the time. Using more accurate market rates would make little difference.

Balance sheets of the Paper Currency Department show two measures of notes in circulation. The first (gross) measure included notes taken out of circulation by foreign circles, while the second (net) measure excluded this data. (The "circles," which we mentioned earlier, were territories of issuance somewhat like the current division of the United States into district Federal Reserve bank regions.) The net measure of notes in circulation is what the original balance sheets used as comprising note liabilities, and is therefore used exclusively throughout this study. The mean difference between the gross and net measures was less than 1 percent during all years for which both data series were reported.

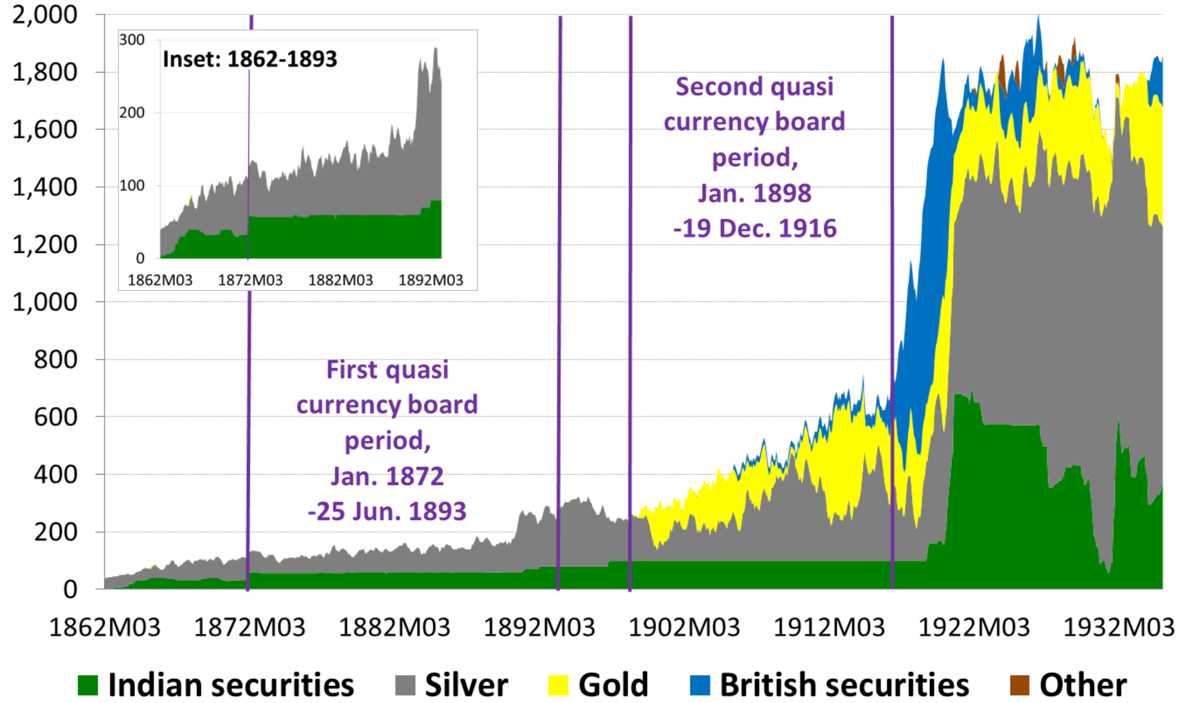
Until 1866 the Indian financial year ended on 30 April. After that it ended, as it still does today, on 31 March, so financial 1872 refers to the period 1 April 1871 to 31 March 1872. Until January 1866, the note issuing circles did not necessarily report their data for the same date. In one instance, for 30 April 1922, end of month data were not readily available, so we used data from 22 April as a proxy.

Test # 1: Domestic Assets, Foreign Assets, and the Monetary Base

Unlike an orthodox currency board, the Paper Currency Department held significant portions of its assets in Indian government securities, as Figure 1 shows. From 1920 onward it was permitted to hold Indian bills of exchange, which it only ever did in small amounts.

Figure 1. Assets of Paper Currency Department

(million rupees)



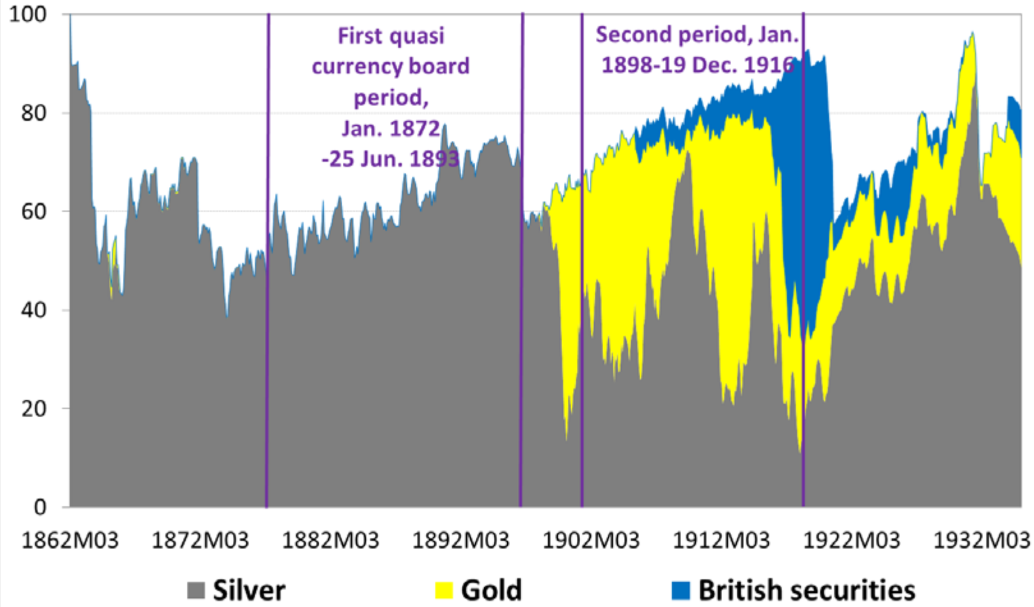
Main sources: Gazette of India; Paper Currency Department annual reports; calculations.

The inset to Figure 1, which has an enlarged vertical axis for easier viewing, makes it more apparent that until December 1871 the Paper Currency Department often varied its holdings of Indian government securities, suggesting that monetary policy was discretionary during the period, contrary to currency board principles. From January 1872 to November 1918, government securities increased in steps when permitted by law then remained at or very near to the legal maximum, suggesting that during the period the Paper Currency Department acted in a highly rule-like manner. From December 1918 onward holdings of Indian government securities vary greatly.

Another way of looking at the balance sheet is to measure net foreign assets as a share of the monetary base, as Figure 2 on the next page does. (By definition, net foreign assets + net domestic assets = monetary base.) An orthodox currency board has net foreign assets equal to 100 percent of the monetary base, or under some currency boards up to 15 percent more. The Paper Currency Department's net foreign assets ranged from approximately 40 to nearly 100 percent of the monetary base. The big declines represent periods when the Paper Currency Department increased its holdings of Indian government securities after the law increased the ceiling on such holdings.

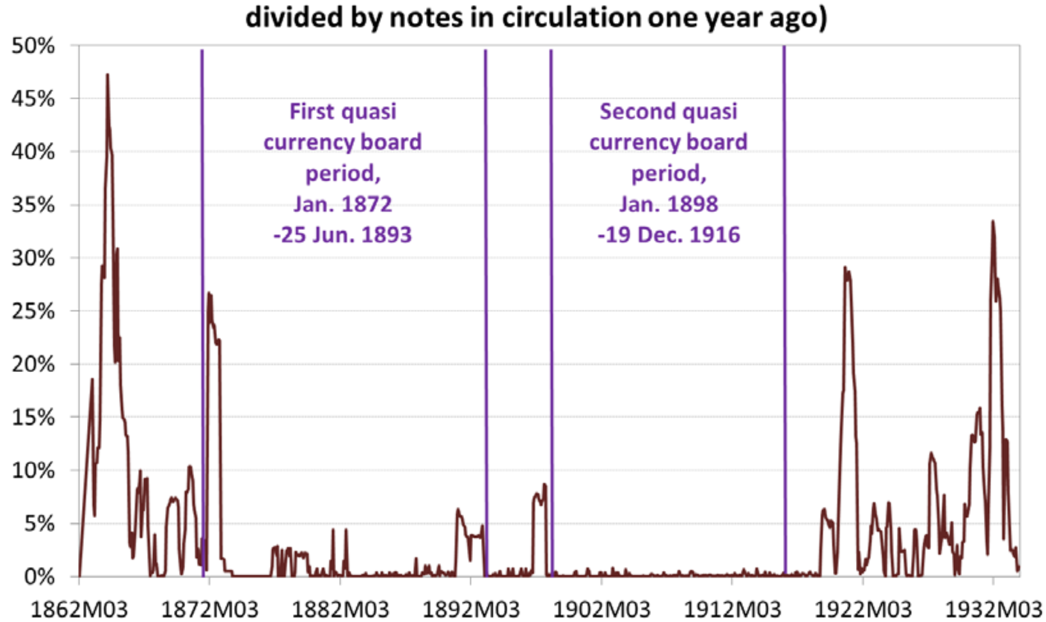
Figure 3 gives an idea of how big the absolute changes in net domestic assets were by comparing them to total liabilities (equal in this case to net note circulation) a year earlier. The graph likewise brings out the contrast between the volatility of the early and late years and the placidity of middle years of the Paper Currency Department.

Figure 2. Net Foreign Assets (% of monetary base; currency board orthodoxy = 100% or a bit more)



Main sources: Gazette of India; Paper Currency Department annual reports; calculations.

Figure 3. Dynamic Monetary Composition
(Year-over-year change in absolute value of net domestic assets divided by notes in circulation one year ago)



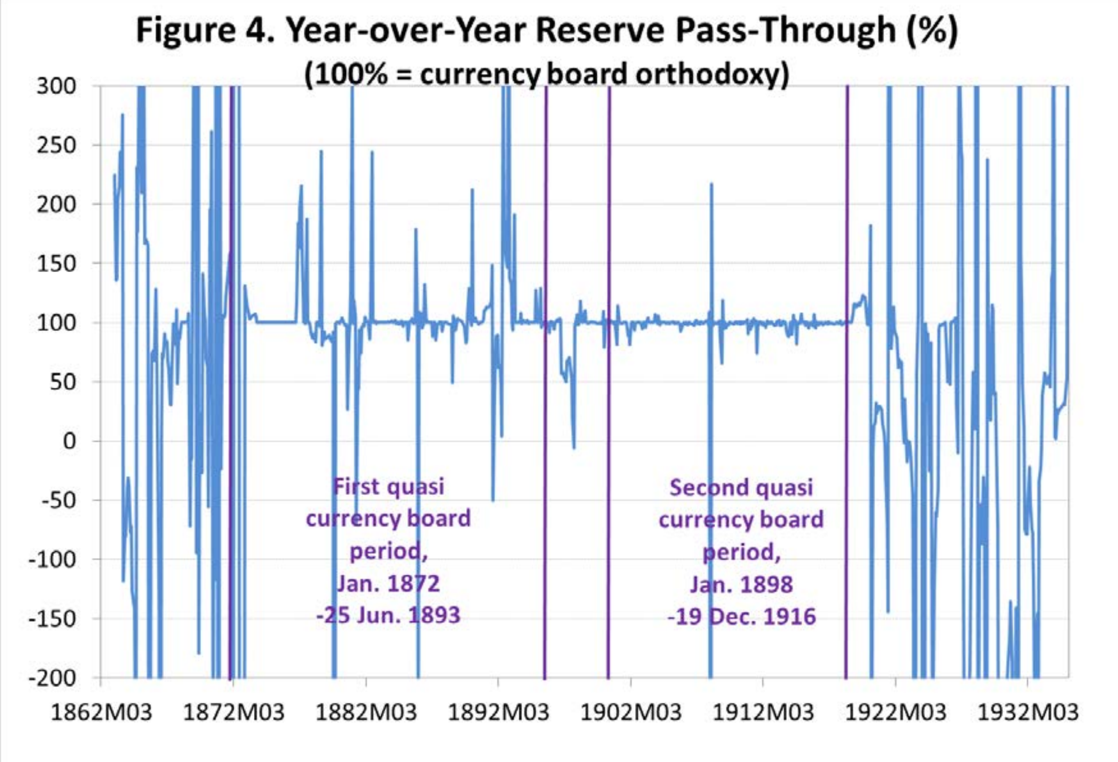
Main sources: *Gazette of India;* Paper Currency Department annual reports; calculations.

Test # 2: Reserve Pass-Through

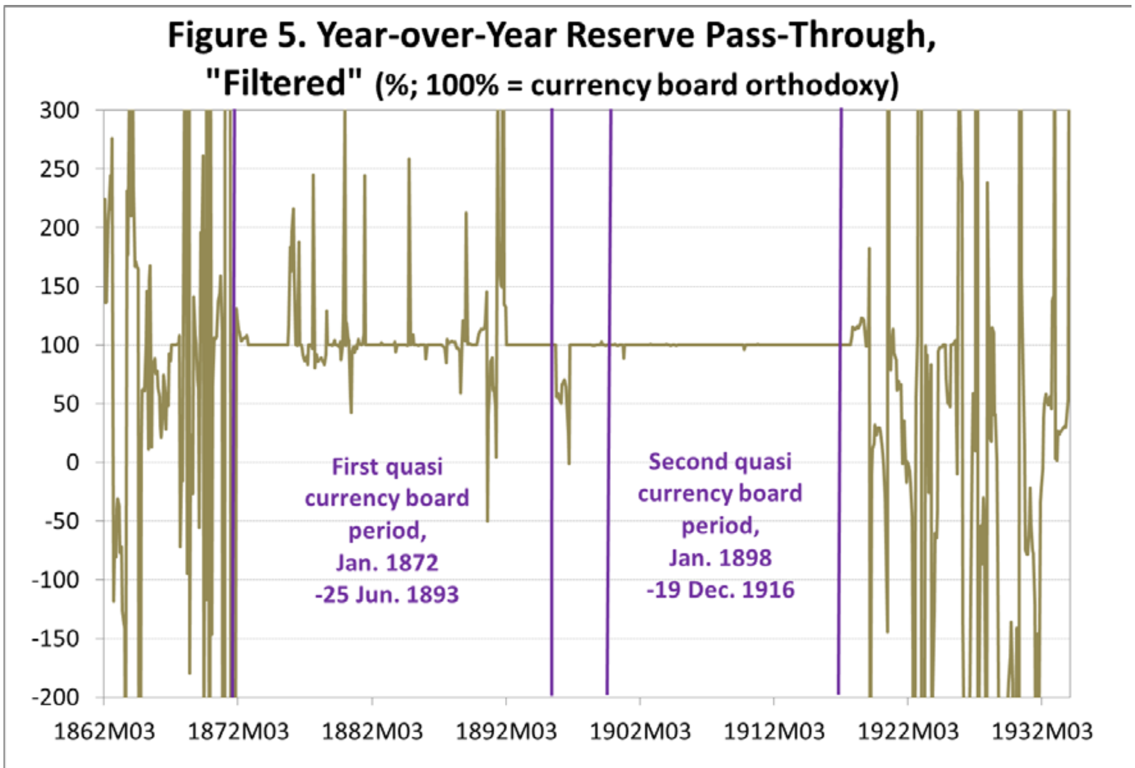
The historical facts and the data so far suggest that the Paper Currency Department may have been a quasi currency board for the periods January 1872 to 25 June 1893 and January 1898 to 19 December 1916, but not for other periods of its existence. Now we proceed to the most important single test, "reserve pass-through," which measures year over-year change in the monetary base divided by year-over-year change in net foreign reserves. Measuring on a year-over-year basis tends to eliminate any seasonal effects and diminish the importance of one-time events such as extraordinary distributions or retentions of profit. (We also ran month-over-month calculations, which are available in the accompanying spreadsheet workbook.) For an orthodox currency board, reserve pass-through should typically be "close" to 100 percent—in practice, within the 80-100 percent range.

The data for reserve pass-through tell a similar story to that of the previous graphs. Reserve pass-through was highly volatile before January 1872 and again during the final 15 years of the Paper Currency Department. During those periods it fluctuated wildly, with many values far off the graph. In between, though, spikes were the result of the transitory effects of increases in the ceiling for Indian securities or temporary adjustment items in the monthly balance sheets. From the return to a fixed exchange rate in January 1898 until the Indian government introduced what we have characterized as de facto exchange control on 20 December 1916, the deviations were smaller than in the previous fixed exchange rate period. Throughout, there was a clear tendency for reserve pass-through to return to 100 percent as the homing point.

To see the effect of temporary adjustment items on reserve pass-through, Figure 4 shows calculations of reserve pass-through including the adjustment items while Figure 5 is "filtered" to exclude them. To make the balance sheet balance in Figure 5, we removed an amount equal to the adjustment items from the net note circulation on the liability side as well as from domestic assets, where we included it on the asset side. Without the adjustment items, the contrast between the fluctuations of the early and late years of the Paper Currency Department and the much smaller fluctuations of the middle period becomes even more evident.



Main sources: *Gazette of India;* Paper Currency Department annual reports; calculations.

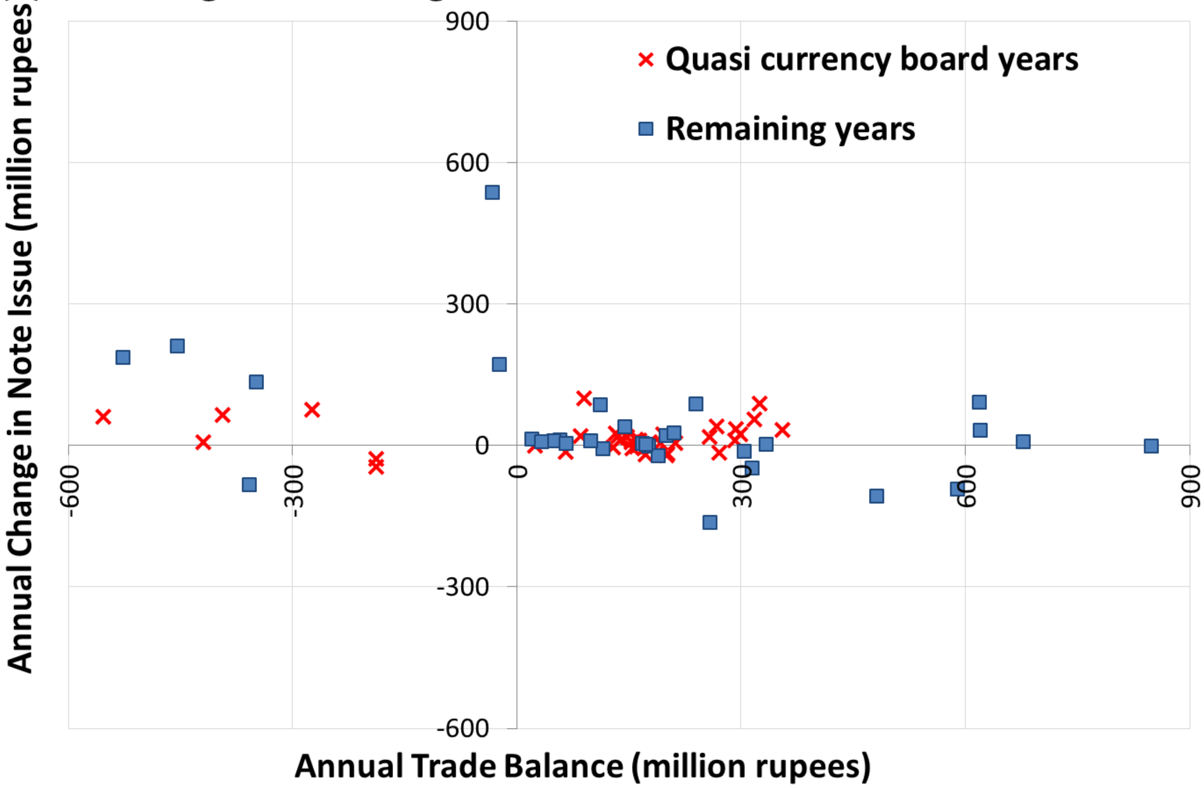


Main sources: Gazette of India; Paper Currency Department annual reports; calculations.

Test #3: Balance of Trade

A frequent criticism of currency boards is that they tie changes in the monetary base too closely to the balance of payments. Although the criticism does not directly bear on whether the Paper Currency Department operated like a currency board, we examined the subject because other essays in this working paper series will cover it for some other currency board countries. Reliable data covering the whole period of the Paper Currency Department's existence are lacking for key elements of the balance of payments, and circulation of coins can only be roughly estimated because it was common to melt down silver rupees for nonmonetary use. Rather than comparing changes in the monetary base to changes in the current account balance, as we would like to be able to do, we only have continuous, reliable data to compare changes in note circulation to the trade balance. Scatter diagrams show that annual changes in the note issue have no strong relationship to India's annual trade balance, whether considering just the period when the Paper Currency Department operated like a currency board or the whole of its existence. Regression lines (not shown because they would make the graph too busy) are nearly flat, whether drawn for only the quasi currency board years, remaining years, or all years. The accompanying spreadsheet workbook also shows a similar looking graph using estimates of the current account balance up to 1898 that Banerji (1982: 168-169) made. The current account balance was negative almost every year, yet in what we have termed the first quasi currency board period, from January 1872 to 25 June 1893, the note issue doubled and the estimated supply of coins expanded by about one-third (see the accompanying workbook and Brahmanandra 2001: 643).

Figure 6. Change in Note Issue vs. Trade Balance



Main sources: Gazette of India (note issue); *Statistical Abstract and Review of British India* (trade); calculations.

Conclusion

The Paper Currency Department existed from 1 March 1862 to 31 March 1935. During that time it seems to have operated as a quasi currency board during two periods: from January 1872 to 25 June 1893 and from January 1898 to 19 December 1916. During its early years, March 1862 to December 1872, the Paper Currency Department did not operate as a currency board because it varied its holdings of Indian government securities in such a manner as to suggest discretionary monetary policy. Near the middle of its existence, from 26 June 1893 to early January 1898, the Paper Currency Department was not a currency board because the exchange rate floated rather than being fixed as the definition of a currency board requires. And from 20 December 1916 until the end of its life on 31 March 1935, de facto limits on convertibility into sterling and later a fluctuating exchange rate and frequent variations in domestic assets meant that the Paper Currency Department again failed to meet elements of the definition of a currency board.

During its two currency board periods, the Paper Currency Department was a quasi currency board rather than an orthodox board because unlike an orthodox board it held considerable domestic assets, in the form of Indian government securities. During those periods, though, the Paper Currency Department did not vary its holdings of Indian securities for monetary policy purposes, but instead passively held the maximum allowable by law and let the monetary action on the margin be determined in the foreign exchange market, as a currency board does. Paper currency was a smaller portion of the monetary base than coins, but coins in the first period were mainly "full-bodied" and supplied in a nondiscretionary manner. In the second period, silver coins became "fiduciary"—worth less as metal than their face value—but the Indian Mint supplied coins simply to meet the perceived needs of trade, and the Indian government established a fund to provide for the redemption of silver coins in gold or sterling in the event that the supply of silver coins exceeded market demand. The supply of coinage was hence sufficiently nondiscretionary that it seems accurate to describe the Indian monetary system overall, and not just the Paper Currency Department, as a quasi currency board. India thus becomes the third-oldest documented historical case of a currency board, after Mauritius (whose board began in 1849) and New Zealand (1850). As far as we know, though, cross-pollination of ideas and policies was weak between India and currency boards in other British colonies with strong trade links to India such as Ceylon (whose board began in 1885), the Straits Settlements (1899), and East Africa (1920).

We relied entirely on published writings and statistics to analyze the extent to which the Paper Currency Department operated as a quasi currency board. Archival research might reveal more about the reasons underlying its behavior during different periods. Another direction for further research would be to analyze other high-frequency statistics related to India's monetary system and economy of the period to examine how well the Paper Currency Department served the Indian economy as one component of the Indian monetary system of the time. Doing so would first require digitizing the underlying statistics. We leave those tasks to others.

As far as fulfilling its main tasks of issuing a uniform note currency and ensuring exchange rate stability first with silver and then with the pound sterling, the Paper Currency Department performed adequately. At its beginning in 1862, the exchange rate was approximately 24 pence (10 rupees per pound sterling) and the rupee was anchored to silver; at its end in 1935, the rate was 18 pence (13-1/3 rupees per pound) and the rupee was anchored to sterling. A tension did exist between silver and sterling that could not be fully resolved as long as rupee coins—which were outside the jurisdiction of the Paper Currency Department—contained so much silver that their value as metal might exceed their face value. The issue arose again during World War II, when the Indian government reduced rupees from eleven-twelfths silver to one-half silver starting in 1939.

Postscript: Companion Spreadsheet Workbook and Source Documents

The companion spreadsheet workbook to this paper contains the underlying data, calculations, and the original versions of the graphs. The workbook also contains some data not used in the paper, notably annual data of the income and expenditures of the Paper Currency Department and weekly balance sheet data for the financial year ending 31 March 1869. After that one year, the *Gazette of India* does not seem to have weekly (or more precisely, four times a month) balance sheets for the Paper Currency Department until October 1897, when they began to run continuously to 1935 (Paper Currency Department annual report, 31 March 1899: 9). We have extensive but still incomplete weekly data from 1899 to 1935 not shown in the workbook that we will make available eventually, either in the workbook or on the Historical Financial Statistics Web site. Especially during crisis periods, weekly data may offer insights additional to those of the monthly data.

The Digital Archive on Currency Boards on the Web site of the Institute for Applied Economics, Global Health, and Study of Business Enterprise has files of the main source documents we used: the Paper Currency Department's balance sheets printed in the *Gazette of India, Part I*—including weekly balance sheets—and its annual reports. Copyright on the main source documents has expired. The annual reports also contain much other information that will be useful to researchers.

Appendix A. Summary Legislative History of Indian Currency, 1861-1935
(acts relating to the Paper Currency Department and selected other measures)

1861	An Act to Provide for a Government Paper Currency, Act 19, assented 16 July Established a government monopoly of paper currency issue; set a ceiling of 40 million rupees on holdings of Indian government securities
1861	An Act to Enable the Banks of Bengal, Madras and Bombay to Enter into Arrangements with the Government, for Managing the Issue, Payment and Exchange of Government Currency Notes and Certain Business Hitherto Transacted by the Government Treasuries, Act 24, assented 31 August This law was a kind of compensation to the banks involved for the loss of their note issues
1862	An Act to Provide for the Payment at the Banks of Bengal, Madras, and Bombay, Respectively, of Moneys Payable at the General Treasuries of Calcutta, Madras, and Bombay, Act 5, assented 28 February Like Act 24 of 1861, a kind of compensation to the banks for the loss of their note issues
1862	An Act to Provide for a New Silver and a New Copper Coinage, Act 13, assented 23 April Nothing in this act affected the silver standard or the workings of the paper currency
1864	Notification of 23 November Provided for British gold sovereigns (£1) and half-sovereigns to be accepted at 1 sovereign = 10 rupees in payments to the government
1866	An Act to Amend Act No. 19 of 1861, Act 1, assented 5 January Specified the interval for obtaining notes after depositing foreign silver coins or bullion
1867	An Act to Amend Act No. 19 of 1861, Act 30, assented 19 June Allowed government to transfer towns where notes are issued to another circle of issue
1868	Notification of 28 October Changed the rate at which the government would accept gold sovereigns to 10.25 rupees
1870	Indian Coinage Act, Act 23, assented 6 September Consolidated legislation, dating back to the early 1800s, relating to coinage
1871	Indian Paper Currency Act, Act 3 , assented 20 January Consolidated legislation; reduced minimum denomination of notes to 5 rupees; raised ceiling on Indian securities to 60 million rupees
1871	Commerce and Finance Department, Notification No. 3565, issued 16 September Announced intention to raise holdings of Indian securities to 60 million rupees
1876	Native Coinage Act, Act 9 Coins issued by native states could be legal tender upon certain conditions
1882	Indian Paper Currency Act, Act 20, assented 26 October Consolidated legislation; established a new circle of issue centered in Rangoon; reduced minimum note denomination to 5 rupees
1890	An Act to Amend the Indian Paper Currency Act, 1882, Act 15, assented 29 August Raised ceiling on Indian securities to 80 million rupees
1890	Commerce and Finance Department, Notification No. 5900, issued 19 December Announced intention to raise holdings of Indian securities to 70 million rupees
1891	Commerce and Finance Department, Notification No. 4861, issued 3 December Announced intention to raise holdings of Indian securities to 80 million rupees
1893	Indian Coinage and Paper Currency Act, Act 8, assented 26 June Closed the mints to coinage of silver on demand, thereby abandoning the silver standard

1893	Commerce and Finance Department, Notifications No. 2662-2664, 26 June Arranged for the Mint to receive gold at 7.53344 troy grains of fine gold or 16 pence per rupee; allowed British gold sovereigns (£1 coins) and half-sovereigns to be used in payments to the government at 16 pence per rupee; and arranged for currency notes to be issued for payment of British gold sovereigns or half-sovereigns
1896	Indian Currency Act Amendment Act, Act 21, assented 17 December Raised ceiling on Indian securities to 100 million rupees
1896	Commerce and Finance Department, Notification No. 5366, 18 December Announced intention to raise holdings of Indian securities to 100 million rupees
1897	Commerce and Finance Department, Notification of 11 September Announced that government would accept British gold coins at 1 sovereign (£1) = 15 rupees
1898	Indian Paper Currency Act, Act 2, assented 21 January Allowed government to issue currency notes against gold held abroad (in practice, London) for six months at such rates as it might set; the resulting reserve was separate from other Indian Treasury accounts
1898	Commerce and Finance Department, Notification of 21 January Announced that the government would issue notes at 1 rupee = 7.53344 troy grains fine gold and offer exchange on India in London at rates not exceeding 16-5/32 pence per rupee
1898	Indian Paper Currency Act Amendment Act, Act 8, assented 15 July Extended the period set by Act 2 of 1898 a further two years
1899	Indian Coinage and Paper Currency Act, Act 22, assented 15 September Made British gold coins legal tender at 1 sovereign (£1) = 15 rupees
1900	Indian Paper Currency Act, Act 8, assented 29 June Allowed the Indian government to issue notes for gold at 1 sovereign (£1) = 15 rupees for two years, if the British government consented
1902	Indian Paper Currency Act, Act , 9, assented 27 June Removed two-year time limit of Act 8 of 1898
1903	Indian Paper Currency (Amendment) Act, Act 6, assented 13 March Made 5-rupee notes legal tender even outside their circles of issue except in Burma
1905	Indian Paper Currency Act, Act 3, assented 22 March Consolidated legislation; raised ceiling for securities raised to 120 million rupees, of which up to 20 million could be British government securities; allowed gold and silver in transit to Britain to count as part of reserves; required publication of balance sheet four times a month
1906	Indian Coinage Act, Act 3, assented 2 March Consolidated legislation, including provisions of Act 8 of 1893 and Act 22 of 1899 relating to coins
1909	Indian Paper Currency (Amendment) Act, Act 2, assented 5 February Made all 5-rupee notes, wherever issued, legal tender throughout British India
1910	Indian Paper Currency Act, Act 2, assented 18 February Consolidated legislation; provided for "universal currency notes" of 5-50 rupees that were legal tender throughout British India
1911	Indian Paper Currency (Amendment) Act, Act 7, assented 6 March Raised ceiling for securities to 140 million rupees, of which up to 40 million could be British government securities
1914	Repealing and Amendment Act, Act 10, assented 17 March Schedule 2 repealed part of a section of Act 2 of 1910; the change was minor

1914	Notification? of 5 August (Paper Currency Department annual report, 31 March 1915: 13) Government ceased selling gold to private persons soon after World War I began
1915	Indian Paper Currency (Amendment) Ordinance, No. 1, published 16 January Raised ceiling for securities to 200 million rupees (as before, up to 40 million could be British government securities)
1915	Indian Paper Currency (Temporary Amendment) Act, Act 5, assented 22 March Confirmed ceiling for securities at 200 million rupees (as before, up to 40 million could be British government securities) until six months after the end of World War I; repealed Ordinance No. 1 of 1915
1916	Indian Paper Currency (Amendment) Ordinance, No. 1, published 11 January Raised ceiling for holdings of British government securities to 100 million rupees
1916	Indian Paper Currency (Temporary Amendment) Act, Act 9, assented 21 March Confirmed ceiling for holdings of British government securities at 100 million rupees; government could also issue up to 60 million additional rupees of notes against British Treasury bills; act to be in force until six months after the end of World War I; repealed Ordinance No. 1 of 1916
1916	Indian Paper Currency (Further Amendment) Ordinance, No. 6, published 11 November Raised ceiling on notes issued against British Treasury bills to 180 million rupees
1916	Second Indian Paper Currency (Further Amendment) Ordinance, No. 7, published 14 December Raised ceiling on notes issued against British Treasury bills to 300 million rupees
1917	Indian Paper Currency (Temporary Amendment) Act, Act 11, assented 21 March Confirmed recent temporary amendments to be in force until six months after the end of World War I: a ceiling of 200 million rupees for total securities (including up to 100 million rupees of British government securities), and a separate ceiling of 300 million rupees for notes issued against British Treasury bills; repealed Act 5 of 1915, Act 9 of 1916,and Ordinance No. 7 of 1916
1917	Indian Paper Currency (Amendment) Ordinance, No. 2, published 18 April Raised ceiling for notes issued against British Treasury bills to 420 million rupees
1917	Gold (Import) Ordinance, No. 3, published 29 June Allowed government to take possession of all gold imported into India at 15 rupees per British gold sovereign, or 1 rupee per 7.53344 troy grains of fine gold
1917	Notification No. 1469-F, 29 June Prohibited imports of gold except under license
1917	Silver (Import) Ordinance, No. 4, published 11 July Allowed government to take possession of all silver imported into India at 5 percent below the London Silver Market rate for that day
1917	Notification No. 1571-F, 11 July Prohibited imports of silver bullion and coins except under license; this or another notification of the same date prohibited using silver and gold coins for any purpose other than as currency
1917	Notification of 3 September (cited in Paper Currency Department annual report, 31 March 1918: 5) Prohibited exportation of all silver coin and bullion; this notification or another around the same time also restricted the transport of silver by rail and boat
1917	Indian Paper Currency (Amendment) Act, Act 19, assented 19 September Reduced minimum denomination of notes to 1 rupee; confirmed ceiling for notes issued against British Treasury bills of 420 million rupees; allowed government to count gold and silver held in other British dominions as part of reserve until six months after the end of World War I; repealed Ordinance No. 2 of 1917

1917	Gold (Import) Act, Act 22, assented 27 September Allowed government to take possession of all gold imported into India at such rates as it might prescribe; repealed Ordinance No. 3 of 1917
1918	Indian Coinage (Amendment) Act, Act 4, assented 6 March Replaced silver with nickel in 2-anna (1/8 rupee) coins
1918	Indian Paper Currency (Amendment) Act, Act 6, assented 12 March Raised ceiling for notes issued against British Treasury bills to 660 million rupees
1918	Indian Paper Currency Ordinance, No. 1, published 15 April Allowed silver held in or in transit from the United States to count as part of the silver reserve
1918	Gold Coinage Ordinance, No. 2, published 14 June Provided for coinage of gold mohurs (15 rupees), 123.27447 troy grains, 11/12 fine gold (equal to the British gold sovereign)
1918	Notification? of 24? August (U.S. Mint annual report, 30 June 1919: 244) Forbade dealing in current coins at a premium to their face value
1918	Indian Paper Currency Act, Act 13, assented 12 September Allowed silver held in or in transit from the United States to count as part of the silver reserve until six months after the end of World War I; repealed Ordinance No. 1 of 1918
1918	Gold Coinage Act, Act 14, assented 12 September Provided for coinage of gold mohurs (15 rupees), 123.27447 troy grains, 11/12 fine gold (equal to the British gold sovereign); repealed Ordinance No. 2 of 1918
1918	Bronze Coin (Legal Tender) Act, Act 22, assented 22 September Permitted the government to make bronze coins coined outside of India legal tender
1918	Indian Paper Currency (Amendment) Ordinance, No. 3, published 7 December Raised ceiling for notes issued against British Treasury bills to 800 million rupees
1919	Indian Paper Currency (Amendment) Act, Act 2, assented 12 March Confirmed ceiling for securities issued against British Treasury bills of 800 million rupees; repealed Act 6 of 1918 and Ordinance No. 3 of 1918
1919	Secretary of State for India, announcement? of 12 August 1919 (U.S. Mint annual report, 30 June 1920: 248) Authorized the Canadian Mint in Ottawa to issue telegraphic transfers on India without limit at 1 rupee = 10.3585 fine troy grains gold
1919	Notification? of 15 September (Royal Commission on Indian Currency and Finance 1926, v. 2: 16) Removed restrictions on the export of silver and apparently relaxed restrictions on international trade in gold
1919	Notification? Of 19 September (Paper Currency Department annual report, 31 March 1920: 9) Removed wartime restrictions limiting who could buy Council Drafts and Reverse Councils; cancelled the rates at which banks were required to conduct foreign exchange with the public
1919	Indian Coinage (Amendment) Act, Act 21, assented 24 September Replaced silver with nickel in 8- and 4-anna (½ rupee and ¼ rupee) coins
1919	Indian Paper Currency (Further Amendment) Act, Act 26, assented 24 September Raised ceiling for securities issued against British Treasury bills to 1,000 million rupees; allowed gold held in or in transit from the United States to count as part of the gold reserve until six months after the end of World War I

1920	Notification(s)? of February (Paper Currency Department annual report, 31 March 1920: 8; Royal Commission on Indian Currency and Finance 1926: 16) Removed prohibition on importing silver (exports were still prohibited); this or another notification in February also removed notifications under the Defense of India Act prohibiting the use of gold and silver coin other than as currency or dealing in them at a premium to face value; the effect of removing these restrictions and of the rate at which the government offered exchange on London was to place India on a gold standard at 11.30016 troy grains fine gold per rupee (versus 7.53344 grains in 1914)
1920	Indian Paper Currency (Temporary Amendment) Act, Act 21, assented 23 March Consolidated recent temporary legislation; created a ceiling on total holdings of securities of 1,200 million rupees and eliminated subceilings on Indian government securities, British government securities, and British Treasury bills, until 1 October 1920; repealed Act 11 of 1917, part of Act 19 of 1917, Act 13 of 1918, and Act 26 of 1919
1920	Notification? of 18 June (Paper Currency Department annual report, 31 March 1921: 19) Removed restriction on the transit of silver by rail and boat in India
1920	Gold Ordinance, No. 3, published 21 June Eliminated gold coins as legal tender; they could be exchanged for notes for 21 days at 1 British gold sovereign = 15 rupees
1920	Notification? of 25 June (Paper Currency Department annual report, 31 March 1921: 19) Removed partial restrictions on the use of silver in payments by the government
1920	Notification? of 10 July (Paper Currency Department annual report, 31 March 1921: 16) Removed restrictions on importing British gold coins
1920	Indian Coinage (Amendment) Act, Act 36, assented 9 September Altered exchange rate of gold coins to 1 British sovereign = 10 rupees (versus 15 rupees previously); repealed Ordinance No. 3 of 1920
1920	Indian Paper Currency (Amendment) Act, Act 45, assented 17 September, effective 1 October Changed name of department to Currency Department; established Paper Currency Reserve; established exchange rate of 11.30016 troy grains fine gold per rupee (versus 7.53344 grains in 1914; the new rate was equal to 10 rupees = 1 gold sovereign, but Britain was not yet back on the gold standard); government could abandon 100 percent marginal foreign reserves for a minimum 50 percent metallic reserve, and a maximum holding of 200 million rupees of Indian government securities, on a date to be set by the Governor General; but in the meantime the ceiling on securities was 850 million rupees, with no subceilings, plus a separate ceiling of up to 50 million rupees more against bills of exchange
1920	Imperial Bank of India Act, Act 47, assented 19 September 1920 Established the Imperial Bank of India
1922	Notification of 16 February (Royal Commission on Indian Currency and Finance 1926, v. 2: 19) Detailed provisions for issuing notes against bills of exchange
1922	Indian Finance Act, Act 12, assented 27 March Postponed date for starting to use interest received to reduce holdings of "created" Indian government securities until they did not exceed 120 million rupees (first of a series of postponements, such that the provision postponed never came into effect)
1923	Indian Paper Currency Act, Act 10, assented 5 March Consolidated legislation; extended actual and potential issue of universal currency notes to denominations above 50 rupees; reiterated Act 45 of 1920 on reserves and ceilings

1923	Indian Finance Act, no number, made by the Governor General 29 March Postponed date for starting to use interest received to reduce holdings of “created” Indian government securities until they did not exceed 120 million rupees
1923	Indian Paper Currency (Amendment) Act, Act 36, assented 3 August Raised ceiling on notes against bills of exchange to 120 million rupees
1924	Indian Coinage (Amendment) Act, Act 10, assented 26 March Allowed government to remove legal tender quality from certain coins
1924	Indian Finance Act, no number, made by Governor General 26 March Postponed date for starting to use interest received to reduce holdings of “created” Indian government securities until they did not exceed 120 million rupees
1925	Indian Paper Currency (Amendment) Act, Act 2, assented 11 February Raised ceiling on securities to 1,000 million rupees; established a ceiling of 500 million rupees for “created” Indian government securities
1925	Indian Finance Act, Act 13, assented 25 March Postponed date for starting to use interest received to reduce holdings of “created” Indian government securities until they did not exceed 120 million rupees
1926	Indian Finance Act, Act 19, assented 25 March Postponed date for starting to use interest received to reduce holdings of “created” Indian government securities until they did not exceed 120 million rupees
1927	Currency Act, Act 4, assented 26 March, effective 1 April Provided that gold coins were not legal tender but that the government had to accept them at 8.47512 troy grains of fine gold per rupee (equivalent to 18 sterling pence per rupee); required the Indian Mint to accept gold freely for coinage, or, at the option of the top officials of the Currency Department, sterling in London at an equivalent rate in amounts of 1,065 tolas and up (1 tola = 180 troy grains) at 21 rupees, 3 annas, 10 pies (almost 21.24 rupees) per tola of fine gold
1927	Indian Finance Act, Act 5, assented 30 March Postponed date for starting to use interest received to reduce holdings of “created” Indian government securities until they did not exceed 120 million rupees
1927	Repealing Act, Act 12, assented 8 September Repealed Act 36 of 1920 and certain provisions of other acts
1928	Indian Finance Act, Act 5, assented 27 March Postponed date for starting to use interest received to reduce holdings of “created” Indian government securities until they did not exceed 120 million rupees
1929	Indian Finance Act, Act 6, assented 30 March Postponed date for starting to use interest received to reduce holdings of “created” Indian government securities until they did not exceed 120 million rupees
1930	Repealing and Amending Act, Act 8, assented 16 March Repealed Act 5 of 1928 and sections of some previous Finance Acts
1930	Indian Finance Act, Act 15, assented 28 March Postponed date for starting to use interest received to reduce holdings of “created” Indian government securities until they did not exceed 120 million rupees
1930	Silver (Excise Duty) Act, Act 18, assented 4 April Imposed a duty of 4 annas (0.25 rupee) per ounce of silver produced in or imported into India.

1931	Indian Finance Act, no number, made by Governor General 30 March Postponed date for starting to use interest received to reduce holdings of "created" Indian government securities until they did not exceed 120 million rupees; raised silver duty to 6 annas (0.375 rupee) per ounce, effective 1 March 1931
1931	Currency Ordinance, No. 6, assented and published 21 September Relieved government of the obligation to sell gold or silver for three days; marked the abandonment of the gold standard, following Britain
1931	Gold and Sterling Sales Regulation Ordinance, No. 7, assented and published 24 September Repealed Ordinance No. 6 of 1931; restricted sales of gold and sterling
1931	Gold and Sterling Sales Regulation Rules, Notification No. D 6604-F, issued 24 September Restricted sales to banks to amounts of £25,000 and up
1931	Indian Finance (Supplementary and Extending) Act, no number, made by Governor General 28 November Postponed date for starting to use interest received to reduce holdings of "created" Indian government securities until they did not exceed 120 million rupees; raised silver duty to 7.5 annas (0.46875 rupee) per ounce
1932	Repealing Ordinance, No. 6, assented and published 30 January Repealed Ordinance No. 7 of 1931
1933	Indian Finance Act, Act 7, assented 31 March Postponed date for starting to use interest received to reduce holdings of "created" Indian government securities until they did not exceed 120 million rupees
1934	Reserve Bank of India Act, Act 2, assented 6 March Established Reserve Bank of India to replace Currency Department as of 1 April 1935
1934	Imperial Bank of India (amendment) Act, Act 3, assented 6 March 1934 Made amendments in part to coordinate with the creation of the Reserve Bank of India
1934	Indian Finance Act, Act 9, assented 29 March Postponed date for starting to use interest received to reduce holdings of "created" Indian government securities until they did not exceed 120 million rupees; reduced duty on silver to 5 annas (0.3125 rupee) per ounce

Notes: Acts and ordinances had Roman numerals, which we have replaced with Arabic ones for simplicity. Numbers refer to the order in which acts or ordinances were issued within a calendar year. Occasionally the Paper Currency Act was republished incorporating all revisions, which the table notes by saying that an act "consolidated legislation." Ordinances were explicitly temporary enactments by the Governor General that would lapse unless confirmed in an act by the next session of the legislature. Notifications were announcements implementing acts or ordinances.

Sources: All of the acts, most of the ordinances, and some of the notifications are available online; see References. The list of acts and ordinances is complete, or nearly so; the list of notifications is not.

Appendix B. History of the Ceilings on Securities
(amounts in millions of rupees)

Act or ordinance	Overall ceiling on holdings of securities	Subceilings on holdings of:				
		Indian government securities	British government securities	British Treasury Bills*	Bills of exchange	"Created" Indian government securities
Act 3 of 1871	60	60				
Act 15 of 1890	80	80				
Act 21 of 1896	100	100				
Act 3 of 1905	120	100	20			
Act 7 of 1911	140	100	40			
Ordinance 1 of 1915	200	200	40			
Act 5 of 1915	200	200	40			
Ordinance 1 of 1916	200	200	100			
Act 9 of 1916	260	200	100	60		
Ordinance 6 of 1916	380	200	100	180		
Ordinance 7 of 1916	500	200	100	300		
Act 11 of 1917	500	200	100	300		
Ordinance 2 of 1917	620	200	100	420		
Act 19 of 1917	620	200	100	420		
Act 6 of 1918	860	200	100	660		
Ordinance 3 of 1918	1,000	200	100	800		
Act 2 of 1919	1,000	200	100	800		
Act 26 of 1919	1,200	200	100	1,000		
Act 21 of 1920	1,200	1,200	1,200	1,200		
Act 45 of 1920**	900	850	850	850	50	
Act 10 of 1923	900	850	850	850	50	
Act 36 of 1923	970	850	850	850	120	
Act 2 of 1925	1,120	1,000	1,000	1,000	120	500

* The ceiling for British Treasury bills was additional to the ceiling for British government securities, which were understood to be longer-term securities.

**Act 45 of 1920 had permanent and temporary provisions about ceilings on securities. The permanent provisions (section 12 of the act) set a ceiling for securities of 50 percent of notes in circulation, of which no more than 200 million could be Indian government securities. As long as the Paper Currency Department held more than 120 million rupees of "created" (book-entry) securities sold directly to it rather than saleable on the open market, it had to retain the interest from all its securities to reduce the "created" securities outstanding rather than paying the profits to the government. Less important limitations from the perspective of this table provided that no more than 50 million rupees of gold and gold bullion held in London could be counted as part of the Currency Department's reserves (prodding it to hold the excess in India), and that besides Indian securities, only British securities with less than a year to maturity could be counted as part of reserves. The permanent provisions did not take effect until a declaration by the Governor General. The temporary provisions (section 13 of the act) provided that until the permanent provisions took effect, the overall ceiling and subceilings shown here would be in effect. The Governor General apparently never brought the permanent provisions into effect.

References (* indicates references used only in companion spreadsheet workbook)

All Web links, originally from October-November 2013, have been rechecked and updated as of 25 February 2016.

Ambedkar, B[himrao] R[amji]. 1947. *History of Indian Currency and Banking.* v. 1. Bombay: Thacker and Company. In Digital Library of India, http://dli.serc.iisc.ernet.in/handle/2015/33045. (Volume 1 of the work is a reprint of Ambedkar's 1923 work *The Problem of the Rupee, Its Origin and Its Solution*; the projected volume 2 was never published.)

Bagehot, Walter. 1915 [1860]. "Memoir of the Right Honourable James Wilson." In Mrs. Russell Barrington, editor, *The Works and Life of Walter Bagehot,* v. 3. London: Longmans, Green, and Company. In Online Library of Liberty (Liberty Fund, Indianapolis), http://oll.libertyfund.org/?option=com_staticxt&staticfile=show.php%3Ftitle=2261&chapter=212982&layout=html.

*Banerji, A[run] K. 1982. *Aspects of Indo-British Economic Relations 1858-1898.* Bombay: Oxford University Press.

Brahmanandra, P. R. 2001. *Money, Income, Prices in 19th Century India: A Historical, Quantitative and Theoretical Study.* Mumbai: Himalaya Publishing House.

Chalmers, [Sir] Robert. 1893. *A History of Currency in the British Colonies.* London: Eyre and Spottiswoode for Her Majesty's Stationery Office. In Internet Archive, https://archive.org/details/historyofcurrenc00chaluoft.

Chandavarkar, A[nand] G. 1983. "Money and Credit, 1858-1947." In Dharma Kumar with Meghnad Desai, editors, *The Cambridge Economic History of India,* v. 2: 762-803. Cambridge: Cambridge University Press. (Volume 1 was edited by Tapan Raychaudhuri and Irfan Habib, under whose names both volumes are sometimes listed.)

Great Britain. 1919. India Office. Committee on Indian Exchange and Currency [Babington Smith Committee]. *Report of the Committee Appointed by the Secretary of State for India to Enquire into Indian Exchange and Currency* (v. 1). Cmd. 527. *Minutes of Evidence Taken before the Committee Appointed by the Secretary of State for India to Enquire into Indian Exchange and Currency* (v. 2). Cmd. 528. *Appendices to the Report of the Committee Appointed by the Secretary of State for India to Enquire into Indian Exchange and Currency* (v. 3). Cmd. 529. *Index to Minutes of Evidence Taken by, and Appendices to Report of, Committee on Indian Currency and Exchange* (v. 4). Cmd. 530. London: His Majesty's Stationery Office. In HathiTrust Digital Library, http://babel.hathitrust.org/cgi/pt?id=njp.32101078171996;view=1up;seq=1.

*Historical Financial Statistics (data set). 2013. New York: Center for Financial Stability. http://www.centerforfinancialstability.org/hfs.php.

India. Acts. 1851-1935. *A Collection of the Acts Passed by the Governor General of India in Council in the Year …* (1851-1921); *A Collection of the Acts of the Indian Legislature and of the Governor General for the Year … (1922-1925); A Collection of the Acts of the Acts of the Indian Legislature for the Year …* (1926-1935). Calcutta: Military Orphans Press (Bengal Military Orphan Press) (1851-1859?); Calcutta: Thacker, Spink & Co., F. S. D'Rozario & Co., and the Other Book-Sellers (1860); Calcutta: Office of the Superintendent of Government Printing (1861-1922); Delhi: Government Central Press (1923); Delhi: Government of India Press (1924); Calcutta: Government of India Central Publications Branch (1925-1930); Delhi: Manager of Publications (1931-1935). In India, Ministry of Law and Justice Web site, http://lawmin.nic.in/legislative/textofcentralacts/index.htm. (Years given here are the years covered by each volume; the year of publication lags one year behind.)

*India. 1864-1935. *The Gazette of India*. Calcutta: Manager of Publications. (The first issue of the *Gazette* was 6 January 1864. The *Gazette* is issued in parts, and Part I contains the balance sheets of the Paper Currency Department. Some issues of the *Gazette* are in the Digital Library of India, http://www.dli.ernet.in/, which however is cumbersome to use.)

India. Currency Department [also called Department of Issue of Paper Currency, Department of Issue, Department of Paper Currency, Paper Currency Department]. 1883/1884-1934/1935. *Report on the Operations of the Paper Currency Department, India* (1883/1884-1910/1911) *Report on the Operations of the Currency Department, the Movement of Funds and on the Resource Operations of the Government of India for the Year …* (1911/1912-1922/1923); *Report of the Controller of Currency for the Year …* (1923/1924-1934/1935). Calcutta: Central Publications Branch (1883/1884-1910/1911); Calcutta: Superintendent Government Printing, India (1911/1912-1922/1923); Government of India Central Publication Branch (1923/1924-1931/1932); Delhi: Manager of Publications (1932/1933-1934/1935). (Before this series started, the annual report was printed in the *Gazette of India.* There were also separate reports on the operations of the Currency Department in different note issue circles (regions) of India, which we do not list, such as this: http://babel.hathitrust.org/cgi/pt?id=njp.32101078298864;view=1up;seq=7; they ceased after the financial year ending 31 March 1920.)

*India. Finance and Commerce Department. 1893. *Finance and Revenue Accounts, and Miscellaneous Statistics Relating to the Finances of British India. Part III: Revenue and Charges, Statistics of the Administration of Revenue, and Miscellaneous Statistics. Fifteenth Issue.* Calcutta: Office of the Superintendent of Government Printing, India. (Our source for early statistics when we could not find issues of the *Gazette of India.*) In Google Books, https://books.google.com/books?id=txYPAQAAMAAJ&pg=PR1&lpg=PR1&dq=%22Finance+and+Revenue+Accounts,+and+Miscellaneous+Statistics+Relating+to+the+Finances+of+British+India.%22&source=bl&ots=3n2eIjbtoY&sig=hMwGEJxd73rCppNpbDvRGbgeShA&hl=en&sa=X&ved=0ahUKEwjk2ZGI9ZXLAhWKJh4KHSDJAe4Q6AEIJjAE#v=onepage&q=%22Finance%20and%20Revenue%20Accounts%2C%20and%20Miscellaneous%20Statistics%20Relating%20to%20the%20Finances%20of%20British%20India.%22&f=false

India. Governor General. 1931. *A Collection of the Ordinances Made by the Governor General of India from the Year 1861 to 1930.* Calcutta: Government of India Press. In India, Ministry of Law and Justice Web site, http://lawmin.nic.in/ld/textord/1861-1930.pdf.

India. Legislative Department. 1893. **"**The Indian Paper Currency Act, 1882, As Modified Up to the 27th June 1893, (with an Appendix Containing the Indian Coinage and Paper Currency Act, 1893, and the Notifications by the Government of India in the Finance and Commerce Department, Nos. 2662, 2663 and 2664, Dated the 26th June, 1893, Connected Therewith.)" Calcutta: Office of the Superintendent, Government Printing, India. In HathiTrust Digital Library, http://babel.hathitrust.org/cgi/pt?id=hvd.hl2qmj;view=1up;seq=3.

India. Legislative Department. 1907. *General Rules and Orders Made under Enactments in Force in British India,* 3 v. Calcutta: Office of the Superintendent, Government Printing, India. In HathiTrust Digital Library, http://catalog.hathitrust.org/Record/100472624. (Contains some details on the administration of the Paper Currency Department.)

India. Ministry of Law and Justice. Legislative Department. Legislative I Section. [2012?] "List of Ordinances from 1918 to 2011." http://lawmin.nic.in/ld/folder1/listord.doc, viewed 18 October 2013.

*India. Statistical Bureau. 1899. *Financial and Commercial Statistics for British India. Sixth Issue.* Calcutta: Office of the Superintendent of Government Printing, India. In Google Books, https://books.google.com/books?id=Pmo0AQAAMAAJ&pg=PR1&lpg=PR1&dq=Financial+and+Commercial+Statistics+for+British+India.+Sixth+Issue&source=bl&ots=fq-tBLGI2C&sig=eSbOdtgFGwuMnUltUWclfqLcQNU&hl=en&sa=X&ved=0ahUKEwig4srO9pXLAhXHWD4KHVjHBkoQ6AEIHzAB#v=onepage&q=Financial%20and%20Commercial%20Statistics%20for%20British%20India.%20Sixth%20Issue&f=false.

Kemmerer, Edwin Walter. 1916. *Modern Currency Reforms: A History and Discussion of Recent Currency Reforms in India, Porto Rico, Philippine Islands, Straits Settlements and Mexico.* New York: Macmillan. In Internet Archive, https://archive.org/details/cu31924013734508.

Keynes, John Maynard. 1913. *Indian Currency and Finance.* London: Macmillan and Company. In Internet Archive, https://archive.org/details/indiancurrencyan014875mbp.

Leavens, Dickson H. 1939. *Silver Money.* Bloomington, Indiana: Principia Press. In Cowles Commission Web site, http://cowles.yale.edu/sites/default/files/files/pub/mon/m04-all.pdf. (Contains a useful overview of Indian monetary policy.)

MacLeod, Henry Dunning. 1900. "Banking in India." *The Imperial and Asiatic Quarterly Review and Oriental and Colonial Record,* Third Series, v. 9, no. 17, January: 49-55. In Internet Archive, https://archive.org/details/imperialandasia00unkngoog.

Malhotra, D[aya] K[rishnan]. 1949. *History and Problems of Indian Currency, 1835-1949: An Introductory Study,* fifth revised edition. Simla, India: Minerva Book Shop. In Internet Archive, https://archive.org/details/historyandproble032929mbp.

Paper Currency Department. *See* India. Currency Department. (That is the heading the Library of Congress cataloging system uses.)

*Reserve Bank of India. 1954. *Banking and Monetary Statistics of India.* Bombay: Reserve Bank of India, In Digital Library of India, http://dli.serc.iisc.ernet.in/handle/2015/505603.

Royal Commission on Indian Currency and Finance (Great Britain) [Hilton Young Commission]. 1926. *Report of the Royal Commission on Indian Currency and Finance* (v. 1); *Appendices to the Report of the Royal Commission on Indian Currency and Finance* (v. 2, 3 of 6 v.). Cmd. 2687. London: His Majesty's Stationery Office. In HathiTrust Digital Library, http://catalog.hathitrust.org/Record/001739472 (v. 1 only).

*SARBI. Great Britain. India Office, etc. 1840/1865-1946/1947. *Statistical Abstract Relating to British India from …* (1840/1865-1919/1920); *Statistical Abstract for British India: With Statistics, Where Available, Relating to Certain Indian States* (1920/1921-1940/1941); *Statistical Abstract* (1946/1947). London: Her/His Majesty's Stationery Office (1840/1865-1919/1920); Calcutta: Superintendent, Government Printing, India (1921/1921-1946/1947). Issued 1840/1865-1910/1911 by the India Office; 1911/1912-1921/1922 by the Commercial Intelligence Department of the Board of Trade; 1923/1924-1945/1946 by the Department of Commercial Intelligence and Statistics of the Board of Trade; 1946/1947 by the Office of the Economic Adviser, Dominion of India. (The years listed are related to the date of the statistics included, not the date of publication, which was generally a year or two later.) Selected volumes (1, 4, 12, 21, 30, 39, 48, and 55) are in the Digital South Asia Library, http://dsal.uchicago.edu/statistics/.

Simha, S[eshadriiyengar] L[akshmi] N[ara]. 1970. *History of the Reserve Bank of India, Volume 1: 1935–1951*. Bombay: Reserve Bank of India. Chapter 2, the most relevant to this paper, is available via the Reserve Bank of India at http://rbidocs.rbi.org.in/rdocs/content/PDFs/89635.pdf.

Shirras, Findlay. 1920. *Indian Finance and Banking.* London: Macmillan and Company. In Internet Archive, https://archive.org/details/indianfinanceban00shir.

Sunderland, David. 2013. *Financing the Raj: The City of London and Colonial India, 1858-1940.* Woodbridge, England: Boydell. (Bibliography as well as text is useful. Pages 221-223 list the annual financial statements [reports] of the Indian government available in the British Parliamentary Papers, which we have not examined.)

Wilson, James. 1860. "Speech on a Paper Currency for India." (Supertitle "March 3rd. Legislative Council, Calcutta.") Calcutta: G. A. Savielle, Bengal Printing Company Limited. In Google Books, https://books.google.com/books?id=L8BVAAAAcAAJ&pg=PR2&lpg=PR2&dq=%E2%80%9CSpeech+on+a+Paper+Currency+for+India%E2%80%9D&source=bl&ots=i4kQOj9X1j&sig=n8MvyHz1sRAi4So7c7sXlh5vlK0&hl=en&sa=X&ved=0ahUKEwiNruzd85XLAhVLWD4KHVLqCUwQ6AEIHDAA#v=onepage&q=%E2%80%9CSpeech%20on%20a%20Paper%20Currency%20for%20India%E2%80%9D&f=false