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# 7 Operations of the German Central Bank and the Rules of the Game, 1879–1913

Paul McGouldrick

Allegedly, the "rules of the game" for central banks before 1914 prescribed that central banks expand or contract their portfolios of earning assets in some proportion to gains and losses in gold and other reserve assets. This paper confirms and enlarges on Arthur Bloomfield's finding that at least one important central bank did just the opposite: Over cycle phases from troughs to peaks and from peaks to troughs, the German Reichsbank consistently expanded its portfolio when losing gold and contracted its portfolio when gaining gold. Since the former occurred during cyclical upswings and the latter during cyclical downswings, a reasonable implication might seem to be that German business fluctuations were exacerbated thereby. And yet, I find that gold inflows had no cyclical pattern and that both the monetary liabilities of the Reichsbank and all high-powered (base) money in the hands of the banks and the nonbank public moved countercyclically. Swings in Reichsbank money issues, backed by the Reichsbank portfolio, were more than offset over cycle phases by opposing swings in Reichsbank money issues, backed by gold. As a consequence, the German banks and nonbank public—not foreign sources—withdrew gold during upswings and returned gold to the Reichsbank during downswings.

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I hypothesize that the rules of the game have been misinterpreted for Germany at least. The true rule and the only one (apart from "structural" rules such as acting as a lender-of-last-resort) was to target on the exchange rate with London, which meant, under classical gold standard conditions, targeting on the price of gold. Success in this exercise is indicated by the absence of systematic cyclical fluctuations in German gold imports. The instrument of policy was the bill discount rate, which was changed over German business cycles so as to eliminate procyclical fluctuations in German imports of short-term capital. By purchasing unlimited quantities of bills offered at the prevailing discount rate, the Reichsbank made bills such close substitutes for Reichsbank money itself that errors of policy were minimized by the dampening effect of changing Reichsbank money and a close liquidity substitute in opposite directions when bills were purchased. The results of the tests I made, I believe, validate the theoretical explanation of Reichsbank policy sketched above. Moreover, the demand for Reichsbank money as estimated from quarterly data, using the average bill discount rate and estimated German permanent income as explanatory variables, is highly stable. Finally, German cycles were mild compared either to those in other countries at the time or in West Germany after 1950. I conclude that Reichsbank policy was successful in reducing, although certainly not eliminating, German business cycles in the 1879–1913 era.

Perhaps the most interesting implication of this study is that in the pre-1914 era, the sources of high-powered money, as well as its volume and fluctuations, mattered.

### 7.1 Reichsbank Structure and Operational Features

The Reichsbank was established by the German parliament (Reichstag) in 1875 and began operations in 1876. At the time, Germany was converting from the many currencies of the former thirty-one sovereign states to one currency unit (the Reichsmark) and also changing from a silver to a gold standard. The 1870s were also years of pronounced cyclical fluctuations due to an exogenous event: The receipt of a huge war indemnity from France causing first a boom and then a severe and prolonged depression. Technical problems of currency and metallic changes occupied the Reichsbank during the first three years of its operation. To eliminate that period dominated by political and institutional change, this study begins with a cyclical trough year, 1879, and concludes with a cyclical peak, 1913, just prior to World War I.

The legislative founders of the Reichsbank modeled it on the Bank of England, with modifications they regarded as improvements. Since many readers are familiar with the Bank of England's structure and operations

before 1914, the salient features of Reichsbank structure and operations are perhaps best explained by contrasting them with the English model.

1. Like the Bank of England, the Reichsbank was subject to gold-reserve rules. Specifically, it had to hold gold and subsidiary money equal to at least one-third of its note liabilities. Like the Bank of England, the Reichsbank also had a second and more stringent rule: notes in circulation could not normally exceed in value the sum of reserves plus a fixed issue covered by the portfolio (raised at irregular intervals after 1876). However, an outstanding difference was that the Reichsbank was authorized to issue additional notes routinely upon payment of a federal-government tax equal to 5 percent at annual rate of the additional notes. In Reichstag debates, this feature was advocated as ensuring flexibility of the currency while imposing a cost penalty on the Reichsbank for additional note issues.

2. Like the Bank of England, the Reichsbank had monetary liabilities additional to its notes. But while the Bank of England held bank deposits like those of modern central banks, deposits at the Reichsbank were related to the development and operation of the only nationwide system for "noncash" payments—the giro system of transfer. Functionally, the giro system was a checking system, but one operated by the central bank instead of by individual private banks; a German bank would not clear giro transfers with other banks but would make and receive all transfers within Germany (with few exceptions such as an intracity one in Hamburg) through its Reichsbank giro account. The routing of the giro system was just the opposite of a checking system once the payer had started action; the payment went directly to the payee's bank instead of to the payee and then the payee's bank. However, the function was the same as that of an English or American checking system. Like the Bank of England, the Reichsbank was *not* subject to legal restrictions on reserves against its non-note liabilities; the gold-cover rules held only for notes. (The Reichsbank was also not split between Issue and Banking departments.)

3. Both central banks were subject to disclosure rules. The Reichsbank had to publish a weekly balance sheet as well as annual reports. In addition, the Reichsbank had to disclose weekly the amount of uncovered notes outstanding subject to the tax.[1]

4. With respect to instruments of policy, the two central banks were broadly similar. Like the Bank of England, the Reichsbank used as its primary policy instrument the discount rate but, unlike the Bank of England, used it nearly exclusively. (It is commonplace in the literature that the Bank of England frequently resorted to credit rationing as a supplementary instrument.) Both central banks were obligated to buy and sell gold in unlimited quantities at fixed prices; but in fact, both banks

used gold devices to stack the deck (usually in favor of gold sellers). Yet, as will be shown below, it is likely that the Reichsbank was less apt to transgress in this respect than did the Bank of England.

5. De jure, the Bank of England was a private body, while the Reichsbank was a mixed public-private enterprise (private stockholders contributed the capital and received dividends, but the federal government chose the management, had all voting seats on the board of directors, and made all members of management and operating personnel federal civil servants, as well as receiving 40 percent of profits in excess of 4.5 percent of share capital). De facto, both were mixed enterprises, and the Reichsbank had a feature emphasizing profitability incentives for top- and middle-level managers (part of their salaries was made proportionate to profits). That feature was inserted in the enabling bill by Parliament so as to discourage bureaucratic behavior (Flink 1930, pp. 11–15).

6. Like the Bank of England, the primary constituent of the Reichsbank portfolio of earning assets was bills of exchange. The Reichsbank also made collateral (Lombard) loans and purchased and sold securities, but the latter item was de-emphasized (weekly balance sheets show only a small and irregular item comprising securities, in which swings were tiny compared to those in bills). The Reichsbank did assist federal-government security placements, but again this was a minor item. Lombard loans were of somewhat greater importance but much smaller than bills in levels and changes, and the Lombard lending rate was always pegged a a hundred basis points above the bill rate. Thus, open-market policy was *not* important to any extent in Germany, whatever its role was in Great Britain.

7. Both central banks acquired almost a monopoly of note issues, the exceptions being issues of Scottish banks in England and issues of a very few banks in Germany. (During the 1870s, many issuing banks gave up their note issues; by 1914 the four survivors were South German and Saxon state banks with very small and stable issues.) In Germany, base (high-powered) money consisted of gold coin and bullion, a small and fixed issue of Treasury fiduciary notes (Reichskassenscheine), Reichsbank money liabilities (notes and giro deposits), the small and dwindling stock of note issues by other banks, and subsidiary coinage. As in England, central-bank money was designed for business and larger transactions; until 1906, the minimum note denomination was a hundred marks, and even afterwards twenty- and fifty-mark notes did not pass into wide circulation. Giro accounts were also only for banks and large nonbank enterprises; small transactors could make remittances by direct payment of single amounts at very low fees; and the number of accounts did not ever exceed three thousand. Gold remained competitive with Reichsbank money throughout; its proportion to Reichsbank notes fell

secularly until the 1890s but then rose secularly until, by 1913, it was almost back to the 1880 ratio (Richard Tilly, an economic historian, quoted in Borchardt 1975, p. 27).

In short, the formal differences between the Bank of England and the Reichsbank appear to be minor, with the exception of the tax on note-excess issues. But as shown in a later section, certain institutional and procedural features did impress a unique stamp on Reichsbank targets, instruments, and operating policies.

## 7.2 Rules of the Game and Reichsbank Behavior over Business Cycles

According to a careful and influential student of the pre-1914 gold standard, central banks "were supposed to reinforce the effects of these [gold] flows on commercial bank reserves, not merely not to neutralize them." More concretely, "a discount rate and credit policy geared primarily to movements in central bank reserves was supposed . . . to have the effect of increasing central bank holdings of income-earnings assets when holdings of external reserves rose, and of reducing domestic assets when reserves fell" (Bloomfield 1959, p. 47). A second rule was that a central bank should raise the discount rate when losing gold and do the opposite when gaining gold (pp. 27–32). For Germany, Bloomfield found that the Reichsbank nearly always obeyed the second rule (though his measure of reserve tightness or ease was not gold but the ratio of reserves to money liabilities, introducing some uncertainty as to interpretation). Using annual data, he found that the Reichsbank violated the first rule more often than not. In the majority of years between 1880 and 1913, the Reichsbank raised income-earning assets (the portfolio) when reserves were falling and lowered assets when reserves were rising.

My analysis, using quarterly, seasonally adjusted averages of weekly Reichsbank data[2] over the same time span, strongly confirms Bloomfield's finding for Reichsbank gold and portfolio policy over business-cycle phases as well. As shown by tables 7.1 and 7.2, the portfolio expanded more algebraically than did reserves in every business upswing, and in three of the six, the portfolio grew even as reserves declined absolutely. During all 1879–1913 business contractions, the portfolio rose less algebraically than did specie reserves, and in three of the five contractions, it declined as reserves increased.[3] Averaging overall upswings and downswings separately yields the following matrix of annual percent changes during cycle phases (see tables 7.1 and 7.2).

| | Upswing | Downswing |
|---|---|---|
| Reserves | −1.7 | 12.4 |
| Portfolio | 6.8 | − 0.6 |

Table 7.1 **Percent Changes at Annual Rates in Total Portfolio of Reichsbank and Its Bill Component during Cyclical Upswings and Downswings, 1879–1913[a]**

| | Total Portfolio (1) | Bill Component (2) |
|---|---|---|
| Upswings | | |
| Feb. 1879–Jan. 1882 | 4.5 | 5.8 |
| Aug. 1886–Jan. 1890 | 6.2 | 12.2 |
| Feb. 1895–Mar. 1900 | 11.0 | 10.8 |
| Mar. 1902–Aug. 1903 | 0.6 | 2.9 |
| Feb. 1905–Jul. 1907 | 12.8 | 15.0 |
| Dec. 1908–Apr. 1913 | 5.6 | 9.9 |
| Mean change | 6.8 | 9.4 |
| Downswings | | |
| Jan. 1882–Aug. 1886 | 4.8 | 1.0 |
| Jan. 1890–Feb. 1895 | −0.6 | 0 |
| Mar. 1900–Mar. 1902 | −1.2 | −2.0 |
| Aug. 1903–Feb. 1905 | 2.3 | −3.6 |
| Jul. 1907–Dec. 1908 | −9.4 | −18.6 |
| Mean change | −0.8 | −4.6 |

*Sources*: Burns and Mitchell 1946, p. 79 for turning-points. See also note 3 of text. Reichsbank weekly balance sheets are available in Deutsche Reichsbank 1901, 1925; U.S. National Monetary Commission 1911c; and Reichsbank annual reports.

[a]From quarterly averages of monthly seasonally adjusted averages of weekly total portfolio and bill (Wechsel) component of portfolio levels.

Moreover, there is evidence that it was the intention of Reichsbank policy to raise the portfolio when reserves declined, rather than market forces overpowering weak Reichsbank attempts to follow the Bloomfield-hypothesized rule. First, the Reichsbank had more control over the bill portfolio than it had over Lombard loans, securities, and other assets. As noted earlier, the Lombard loan rate was always pegged at a fixed spread over the bill discount rate, enabling supply-and-demand forces peculiar to this market to counteract changes in discount rates. Operations to assist Reich government financing plus the absence of open-market policies of modern types distorted changes in the securities component of the portfolio. By contrast, the Reichsbank had complete freedom to set the discount rate for bills and viewed the bill portfolio as *the* instrument of bank policy. Hence, the best index of what the Reichsbank intended to do was the bill portfolio, not the total portfolio. Column (2) of table 7.1 shows much larger procyclical changes in the former than the latter.

**Table 7.2** **Percent Changes in Reichsbank Specie during Cyclical Upswings and Downswings, 1879–1913 (quarterly seasonally adjusted data)**

| | Percent Change | | |
|---|---|---|---|
| | Total (1) | At Annual Rates (2) | Beginning Level (million Rm) (3) |
| Upswings | | | |
| Feb. 1879–Jan. 1882 | 4.13 | 1.3 | 514.3 |
| Aug. 1886–Jan. 1890 | 12.42 | 3.5 | 710.4 |
| Feb. 1895–Mar. 1900 | −24.32 | −4.9 | 1,052.3 |
| Mar. 1902–Aug. 1903 | −6.60 | −4.4 | 999.3 |
| Feb. 1905–Jul. 1907 | −17.64 | −7.1 | 1,050.6 |
| Dec. 1908–Apr. 1913 | 8.89 | 1.7 | 1,158.0 |
| Mean change | −3.85 | −1.7 | |
| Downswings | | | |
| Jan. 1882–Aug. 1886 | 32.65 | 7.3 | 535.5 |
| Jan. 1890–Feb. 1895 | 31.78 | 6.4 | 798.6 |
| Mar. 1900–Mar. 1902 | 25.46 | 12.7 | 796.4 |
| Aug. 1903–Feb. 1905 | 12.57 | 8.4 | 933.2 |
| Jul. 1907–Dec. 1908 | 33.84 | 27.1 | 865.2 |
| Mean change | 27.26 | 12.4 | |

*Sources*: See table 7.1.

*Notes*: As in all other tables using quarterly data for months when business cycles peaked or troughed, a small error arises from using calendar, not centered, three-month periods. The latter could be constructed from the author's worksheets and printouts.

Even more persuasive is table 7.3 showing the change in the spread between the Berlin open-market rate for high-grade bills and the Reichsbank discount rate over business upswings and downswings. In theory, the Reichsbank could have attempted to restrain growth in the bill portfolio during business upswings by raising the discount rate more sharply than the open-market rate. If bill supply by borrowers rose vigorously enough, the bill portfolio would still have moved procyclically, but the Reichsbank could be credited with the intent to restrain. But as table 7.3 shows, the pattern was just the opposite. When open-market rates rose during business upswings, so did the discount rate, *but by less* than the rise in the former. Consequently the spread between the higher discount rate and the lower open-market rate narrowed, encouraging borrowers or bill holders to switch sales to the Reichsbank. In recessions Reichsbank behavior was symmetrical; it encouraged the decline (or below-normal rise) in its portfolio by reducing its discount rate by less than open-market rates fell. And this "perverse" behavior was remark-

Table 7.3 **Cyclical Changes in the Spread between the Reichsbank Discount Rate and the Berlin Open-Market Rate, 1879–1913 (in basis points)**

| | Beginning Spread | Ending Spread | Change |
|---|---|---|---|
| Upswings | | | |
| Feb. 1879–Jan 1882 | 120 | 70 | −50 |
| Aug. 1886–Jan. 1890 | 115 | 70 | −45 |
| Feb. 1895–Mar. 1900 | 135 | 83 | −52 |
| Mar. 1902–Aug. 1903 | 123 | 75 | −38 |
| Feb. 1905–Jul. 1907 | 110 | 90 | −20 |
| Dec. 1908–Apr. 1913 | 125 | 78 | −47 |
| Means | 121 | 78 | −43 |
| Downswings | | | |
| Jan. 1882–Aug. 1886 | 70 | 115 | 45 |
| Jan. 1890–Feb. 1895 | 70 | 135 | 65 |
| Mar. 1900–Mar. 1902 | 83 | 123 | 40 |
| Aug. 1903–Feb. 1905 | 75 | 110 | 35 |
| Jul. 1907–Dec. 1908 | 90 | 125 | 35 |
| Means | 78 | 122 | 42 |

*Note*: Levels in above table were read by eye from Morgenstern 1959, chart 50 and are therefore approximations. The positive spread is due to the fact that the Berlin open-market rate was for the highest-quality paper while the Reichsbank rate was for all commercial paper satisfying minimum requirements and Reichsbank staff criteria.

ably consistent; there was never an upswing in which the spread rose nor a recession when it declined. Thus the Reichsbank's obedience to the Bloomfield discount-rate rule was only formal; in reality, it contravened that rule by inadequate discount-rate adjustments.

So far, Bloomfield's tests have been confirmed and his conclusions strengthened, with the addition of evidence that it was conscious Reichsbank policy to achieve that result rather than an ineffectual effort on the bank's part (or that the bank was overwhelmed by events). However, the Bloomfield tests are seriously inadequate with respect to both the Reichsbank's own interpretation of the rules and the validity of the theoretical rules as optimal or descriptive of actual German central-bank policies during the classical gold standard period. The supposed rule of a fixed link between central-bank reserves and the portfolio would have been consistent with the second rule—a central bank should raise (lower) the discount rate when gold is leaving (entering) the country—only if excess demand for base money by banks and the public also had produced a balance-of-payments deficit and excess supply of base money, a balance-of-payments surplus. In the excess-demand case, gold would have moved from the central bank into both domestic and foreign hands, making a

contraction of the portfolio necessary for both domestic and balance-of-payments stability. But if excess demand for base money domestically were accompanied by a balance-of-payments surplus, one rule conflicted with the other by necessity. Raising the discount rate to eliminate domestic excess demand for base money would have aggravated the external-payments surplus and hence generated an inflow of gold. In turn, the inflow would have counteracted discount policy. According to the monetary approach to the balance of international payments, domestic excess demand for money is consistent with balance-of-payments surpluses—presumably the normal case under classical gold standard conditions.

The results of table 7.4 should therefore not be surprising. Although the Reichsbank portfolio moved procyclically, its total money liabilities moved countercyclically, averaging a greater percentage rise during recessions than business upswings. In two out of six upswings, Reichsbank money actually declined, and the largest increase was only 6.9 percent at an annual rate. Moreover, even this and another still-moderate rate of increase (5.7 percent) occurred at the beginning of the 1880–1913 period when lack of experience might explain them. As experience was gained and the Berlin money market became more closely connected with money markets of other leading centers, Reichsbank money during cyclical upswings either declined or rose at below-trend rates. And in every recession, Reichsbank money rose and by not inconsiderable annual rates; the lowest was 3.9 percent, the highest, 8.0 percent. Intentionally or not, the Reichsbank thus reached a goal that has eluded modern central banks at different periods, namely, avoiding procyclical movements in its money liabilities. Unlike William McChesney Martin or Arthur Burns, the Reichsbank succeeded in leaning against the wind!

Since this conclusion is important in what follows, I tested to be sure that it is a fact and not a statistical artifact due to data imperfections. Like the data underlying tables 7.1 and 7.2, the Reichsbank money levels from which table 7.4's percent changes were calculated are quarterly averages of monthly balance-sheet items that I seasonally adjusted. Two possible sources of bias can be eliminated. The seasonally unadjusted quarterly and monthly averages (in unpublished tables) also bear out the conclusions reached above. Panel 2 of table 7.4 furthermore shows that over the whole 1879–1913 period, the conclusions are not changed, with an extended-base adjustment of Reichsbank money that eliminates the effect of other note banks giving up note issues that the Reichsbank assumed.[4]

During the classical gold standard era, base money consisted of specie outside the central bank as well as central-bank money. The moderate countercyclical movement of Reichsbank money was due to losses of reserves outweighting portfolio expansions during business upswings and gains in reserves outweighing portfolio contractions during recessions. But if drains and refluxes of gold were internal ones, total base money

Table 7.4 **Changes in Monetary Liabilities of Reichsbank during Cyclical Upswings and Downswings, 1879–1913 (percentages based on quarterly averages)[a]**

| | Beginning Level (million Rm) (1) | Percent change: Total (2) | Percent change: At Annual Rate (3) |
|---|---|---|---|
| 1. Actual monetary liabilities | | | |
| Upswings | | | |
| Feb. 1879–Jan. 1882 | 794.0 | 16.73 | 5.7 |
| Aug. 1886–Jan. 1890 | 1,095.2 | 23.63 | 6.9 |
| Feb. 1895–Mar. 1900 | 1,621.8 | −2.27 | −0.5 |
| Mar. 1902–Aug. 1903 | 1,813.4 | −1.91 | −1.4 |
| Feb. 1905–Jul. 1907 | 1,902.9 | 8.25 | 3.4 |
| Dec. 1908–Apr. 1913 | 2,266.3 | 10.62 | 2.5 |
| Mean change | | | 2.8 |
| Downswings | | | |
| Jan. 1882–Aug. 1886 | 926.7 | 18.2 | 4.0 |
| Jan. 1890–Feb. 1895 | 1,356.0 | 19.6 | 3.9 |
| Mar. 1900–Mar. 1902 | 1,585.0 | 14.4 | 7.2 |
| Aug. 1903–Feb. 1905 | 1,778.7 | 7.0 | 4.7 |
| Jul. 1907–Dec. 1908 | 2,059.9 | 10.0 | 8.0 |
| Mean change | | | 5.6 |

held by banks and the nonbank public could still have moved procyclically and thus contributed to business cycles.

Table 7.5, which estimates specie held in Germany outside the Reichsbank, rejects this possibility.[5] Such specie did move procyclically, although mildly so, averaging a 6.7 percent annual rate of increase during expansions and 5.2 percent during recessions. But specie plus Reichsbank money (column 4) moved countercyclically because the stronger movements in Reichsbank money dominated the weaker movements in specie. Unfortunately, reliable estimates of monthly net specie inflows into Germany (U.S. National Monetary Commission 1911c) are available only for cycle phases between 1895 and 1908, but inferior data (Hoffman 1965, table 241) confirm this finding for specie (a mild procyclical movement swamped by the Reichsbank money swings) for the 1879–95 and 1908–13 business-cycle phases. (The largest expansion of specie held by the public in 1879–95 and 1909–13 periods—an estimated 3.9 percent at annual rate from December 1908 to April 1913—was smaller than the 4.0 percent expansion during the February 1905–July 1907 upswing and the 6.7 percent expansion during the 1903–5 recession). Thus, the conclu-

**Table 7.4** (cont.)

| | Beginning Level (million Rm) (1) | Percent change | |
|---|---|---|---|
| | | Total (2) | At Annual Rate (3) |
| 2. Extended base concept[b] | | | |
| Upswings | | | |
| Feb. 1879–Jan. 1882 | 840.0 | 16.16 | 5.5 |
| Aug. 1886–Jan. 1890 | 1,148.2 | 21.67 | 6.3 |
| Feb. 1895–Mar. 1900 | 1,660.8 | −1.80 | −0.4 |
| Mar. 1902–Aug. 1903 | 1,835.4 | −2.43 | −1.7 |
| Feb. 1905–Jul. 1907 | 1,903.9 | 8.35 | 3.5 |
| Dec. 1908–Apr. 1913 | 2,266.3 | 10.63 | 2.5 |
| Mean change | | | 2.6 |
| Downswings | | | |
| Jan. 1882–Aug. 1886 | 975.7 | 17.67 | 3.9 |
| Jan. 1890–Feb. 1895 | 1,397.0 | 18.89 | 3.7 |
| Mar. 1900–Mar. 1902 | 1,631.0 | 12.53 | 6.3 |
| Aug. 1903–Feb. 1905 | 1,790.7 | 6.32 | 4.2 |
| Jul. 1907–Dec. 1908 | 2,062.9 | 9.86 | 7.9 |
| Mean change | | | 5.2 |

*Sources*: See table 7.1.

[a]Beginning and ending quarters are those of the month in which the cycle phase began and ended, respectively. Quarterly averages of monthly seasonally adjusted items are taken to reduce irregular variation. However, unpublished percentage changes based on month-only beginning and ending data do not show appreciably different results; in particular, rank orders are never affected.

[b]Money liabilities are calculated as if the Reichsbank had been the sole issuer of notes throughout, except for notes of banks still issuing them on December 1910. Thus, this panel eliminates "noise" due to banks giving up note issues (and the Reichsbank assuming them) during the entire 1879–1913 period. See note 4 of text.

sions are not upset by rough estimates for earlier and later periods, although caution is indicated.

Accordingly, base money held by banks and the public (in contrast to their specie holdings) grew at a remarkably stable pace over German business cycles, and what deviations there were from absolute stability were in a countercyclical direction.[6] What the Reichsbank actually did was to substitute internal for external drains and refluxes of specie over phases of German business cycles, by techniques explained later. Its success is indicated by the gold imports net of gold exports for the business-cycle phases starting in January 1890 and ending in December 1908, shown in table 7.6. In the 1890s imports were virtually the same

**Table 7.5** **German High-Powered-Money Approximation, January 1890–December 1908: Levels and Percent Changes during Cyclical Upswings and Downswings**

| | (million Rm) | | Percent Changes at Annual Rate | |
|---|---|---|---|---|
| | Specie Outside Reichsbank[a] (1) | Total HP money[a] (2) | Outside Specie (3) | HP Money (4) |
| Upswings | | | | |
| Feb. 1895–Mar. 1900 | 1,699.4 | 3,303.9 | 6.2 | 3.4 |
| Mar. 1902–Aug. 1903 | 2,427.9 | 4,276.2 | 4.4 | 1.2 |
| Feb. 1905–Jul. 1907 | 2,966.5 | 4,870.8 | 9.6 | 6.9 |
| Mean percent change | | | 6.7 | 3.8 |
| Downswings | | | | |
| Jan. 1890–Feb. 1895 | 1,603.0 | 2,954.6 | 1.2 | 2.4 |
| Mar. 1900–Mar. 1902 | 2,234.2 | 3,863.2 | 4.3 | 5.3 |
| Aug. 1903–Feb. 1905 | 2,579.3 | 4,355.9 | 10.0 | 6.9 |
| Jul. 1903–Dec. 1908 | 3,655.0 | 5,707.9 | 3.3 | 5.3 |
| (*Memo*: Dec. 1908 level) | 3,805.6 | 6,085.0 | | |
| Mean percent change | | | 5.2 | 5.0 |

*Sources*: High-powered-money (HP) approximation equals monetary liabilities of the Reichsbank plus estimated monetary specie in Germany outside the Reichsbank. Other components, such as Treasury notes (Reichskassenscheine) and notes of state banks, were very stable and are excluded. Specie outside the Reichsbank was estimated by cumulating on Hoffman (1959, table 240 *Metallgeld* benchmark for end of 1889) annual changes for 1890 and 1891, and specie-imports net of exports, by month, in U.S. National Monetary Commission 1911c, less monthly changes in specie at the Reichsbank.

*Notes*: Both the net specie imports and Reichsbank levels from which changes are derived are *not* seasonally adjusted. No adjustment is made for industrial uses of specie, so a cumulative upward bias exists in the trend of the series.

[a]Beginning of cycle phase.

regardless of cycle phase, and from 1900 through 1908 the very mild fluctuations at annual rates were countercyclical, not procyclical. The flows are consistent with the hypothesis that the Reichsbank operated successfully to stabilize gold inflows and thereby stabilized the monetary base. Indeed, an upward trend and noncyclical swings dominate the table 7.6 series.

So far, the discussion has been exclusively cast in terms of base money, its components, and Reichsbank portfolio changes over cycle phases from troughs to peaks and peaks to troughs. What about shorter periods? As tables 7.4 and 7.7 show, the remarkable stability in cycle-phase percent changes at annual rates in Reichsbank money contrasts sharply

**Table 7.6** **Net Gold Imports into Germany during Cyclical Upswings and Downswings, 1890–1908**

| | Total Net Inflow (million Rm rounded) (1) | Net Inflow (at annual rate) (2) |
|---|---|---|
| Upswings | | |
| Feb. 1895–Mar. 1900 | 254 | 50 |
| Mar. 1902–Aug. 1903 | 68 | 48 |
| Feb. 1905–Jul. 1907 | 462 | 191 |
| Downswings | | |
| Jan. 1890–Feb. 1895 | 259 | 51 |
| Mar. 1900–Mar. 1902 | 408 | 204 |
| Aug. 1903–Feb. 1905 | 541 | 361 |
| Jul. 1907–Dec. 1908 | 314 | 222 |

*Sources*: For 1892–1907, U.S. National Monetary Commission 1911c, pp. 247–50. Estimated for 1890–95 and 1907–8 phases from Hoffmann 1965, table 240, with arithmetic interpolation from previous calendar year for January 1890 and February 1895.

with high quarter-to-quarter instability. In 140 quarters between January–March 1879 and April–June 1913, 48 had plus or minus changes greater than 10 percent; and the absence of any decline whatsoever during cycle phases must be juxtaposed against 49 quarter-to-quarter declines. But these quarterly changes were also unsystematic, having the appearance of a random walk. Table 7.8 shows regressions of current on lagged percent changes in Reichsbank money; none of the regression coefficients for lagged changes are statistically significant at the 5 percent level and the coefficient signs are generally negative, not positive. The Durbin-Watson $h$ ratios for the three equations also permit us to infer randomness of short-period changes in the equation residuals. This inference does not imply that money demand was not stable; as I show below, it was. But that stable demand explains only a minor portion of quarterly changes in Reichsbank money. The systematic, mildly countercyclical movements in Reichsbank money over cycle phases, in contrast to a picture of a random walk superimposed on an upward trend, are explained theoretically in a subsequent section of the paper.

Intermediate-term instability or stability in Reichsbank money can be assessed by dividing the cycle phase into two halves. Changes over half-phases indicate instability during upswings; in all of them, the larger change was more than twice the size of the smaller change without regard to sign, and the sign changed during four out of six upswings (McGouldrick 1982, table 7). The changes also indicate little or no intention or success, on the part of the Reichsbank, in raising its money liabilities by

**Table 7.7** **Size Distribution of Quarterly Changes in Monetary Liabilities of the Reichsbank (percent changes at annual rate)**

| | Less than −30 (1) | −30 to −20.1 (2) | −20 to −10.1 (3) | −10 to −5.1 (4) | −5 to −0.1 (5) | 0 to 4.9 (6) | 5 to 9.9 (7) | 10 to 19.9 (8) | 20 to 29.9 (9) | 30 to 39.9 (10) | Total Quarters (11) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1879–1896 | 0 | 1 | 6 | 7 | 10 | 16 | 14 | 13 | 4 | 1 | 72 |
| 1897–1913 | 0 | 0 | 6 | 4 | 15 | 15 | 11 | 14 | 2 | 1 | 68 |
| Whole period | 0 | 1 | 12 | 11 | 25 | 31 | 25 | 27 | 6 | 2 | 140 |

*Sources*: See table 7.1.

*Note*: As in other tables, monetary liabilities are quarterly averages of seasonally adjusted monthly Reichsbank-balance-sheet items.

**Table 7.8** **The Relationship between Current and Lagged Values of Reichsbank Money Percent Changes, II 1892–IV 1907**

| Eq. No.[a] | Constant | Lagged One Quarter | Lagged Two Quarters | Average Change from First to Third Lagged Quarters | Durbin *h* Ratio |
|---|---|---|---|---|---|
| (1) | .60[b] | −.154 | | | −1.28 |
| | (2.10) | (1.23) | | | |
| (2) | .52[b] | −.134 | .133 | | −1.28[c] |
| | (1.76) | (1.06) | (1.05) | | |
| (3) | .53[b] | | | −.019 | −1.14 |
| | (1.74) | | | (0.80) | |

*Note*: Absolute *t*-values are in parentheses.

[a]Regressions are ordinary least squares.

[b]Significant at the 5-percent level.

[c]Applies only to the first independent variable.

more near the trough than near the peak of the business cycle, an obvious goal of modern stabilization policies of a nonmonetarist type. In four out of six expansions, the change was algebraically greater during the second than the first half. The modern stabilization goal was more nearly approximated during downswings (gunning money liabilities as the economy slid further into recession); the percent change was greater in four out of six second halves of contractions. Changes in both halves of recession phases were all positive. It may be that the strong upward trend in German output made the Reichsbank more sensitive to unduly large expansions. However, the basis for such a conjecture is slight since the proportion of higher second-half-recession percentage changes to the total of percentage changes is not particularly large.

The bank's portfolio was a better indicator of Reichsbank policy than was Reichsbank money. The bank could affect the portfolio directly by discount-rate policy while its gold stock (and thus money liabilities) was subject to undesired changes attributable to the public's demand for gold and international specie flows. However, half-phase movements of the portfolio show just about the same degree of instability as do the money liability half-phase results—algebraically greater percent movements during the second than the first half in four out of six business expansions, and greater percent movements in the second half of three out of five contractions. Neither Reichsbank money nor its portfolio thus offers any evidence that the bank (or market forces) was systematically providing more resistance to deviations from long-term trends as the German economy moved more decisively to peaks or troughs.

In sum, Reichsbank money moved countercyclically over whole business-cycle phases (trough to peak and peak to trough), measured by average phase percent changes at annual rates. If phase changes are compared with those in adjacent phases, one exception to countercylical behavior is observed: the 1886–90 expansion rate was higher than for the preceding or succeeding contraction (table 7.4, col. 3). The higher rate can be explained by the very rapid development of the Reichsbank's giro-account business during these years, a Schumpeterian innovation that induced wealth holders to substitute Reichsbank money for other assets. Countercyclical swings in money occurred despite procyclical swings in the portfolio because changes in gold reserves more than offset portfolio changes. Gold flowed out during upswings and returned during downswings, but the flows were internal, not external. Gold movements into Germany show an upward trend but no cyclical pattern. Thus, the ex post data tend to show that Reichsbank policy was directed towards stabilizing gold flows rather than portfolio growth (and certainly not linking portfolio changes to gold-reserve changes, according to the Bloomfield interpretation of the rules of the game). Moreover, the "perverse" behavior of the portfolio was due to Reichsbank action rather than market forces, as is shown by the invariant practice of the Reichsbank in raising its average lending rate by less than the Berlin open-market rate rose during business expansions and cutting its average lending rate by less than declines in the open-market rate during recessions. Within cycle phases, money liabilities show randomlike movements on a quarterly seasonally adjusted basis and highly irregular movements as between first and second halves of cyclical contractions and expansions.

Before offering a theoretical explanation for these patterns, I first turn to the question of the relative stability of the growth of the German economy from 1879 to 1913.

## 7.3 The Relative Stability of German Growth, 1879–1913

First of all, the imperial German economy grew vigorously. The growth rate of real GNP from 1881 to 1913 was topped only by that of the United States, and German GNP growth exceeded that of France and Great Britain by a large margin. (Russia probably did better from 1900 to 1913 but not nearly as well from 1881 to 1913.) The principal engine of growth was vigorous industrialization, concentrated especially in output of investment and production goods. As a consequence, investment in fixed capital and residential housing was high relative to net social product, ranging from 8 to 17 percent and usually in excess of 12 percent.

Germany was blessed with relatively stable growth. We can compare the stability of German growth with that of other leading countries,

specifically that of the United States and Great Britain. (We rule out France from the comparison because its economic growth was slow and its industrial sector was small.)

One measure of instability is fluctuations in the average annual growth rate of real GNP. German real growth proceeded at a much more even rate after than before 1879—I exclude the 1870s because of the distorting factor of the receipt of the 6-billion-franc French indemnity after the Franco-Prussian War (Borchardt 1976, chart of Hoffmann real-net-social-product estimates, p. 21). Measured by standard deviations of annual percent changes, the same holds true of intercountry comparisons. German instability in 1880–1913 was considerably lower than that of the United States (though greater than that of the British), and even a little lower than the instability in Germany in 1951–68, the golden age of the economic miracle (table 7.9).

Moreover, the impression of stability is further heightened by examination of fluctuations in industrial production, in respect of which German relative stability is even more striking. Imperial Germany ranks at the bottom of the instability league before 1914 and below economic-miracle Germany and the United States in 1951–68 (table 7.10). The instability of the United States in the gold standard era stands out. Even when measured for the 1897–1913 period, to exclude the pre-1897 alleged

**Table 7.9** **Standard Deviations of Annual Percent Changes in Real GNP, 1880–1913 and 1951–68**

| | 1880–1913 | 1951–68 |
|---|---|---|
| Germany | 3.1 | 3.5 |
| Great Britain | 1.8 | 1.4 |
| United States | 5.2 | 2.7 |

*Sources*: For 1880–1913 from Hoffmann 1965; Deane 1968; Gallman (unpublished U.S. estimates); for 1951–68, United Nations *Yearbook*.

**Table 7.10** **Standard Deviations of Annual Percent Changes in Indexes of Industrial Production, 1876–1913 and 1950–68**

| | 1876–1913 | 1950–68 |
|---|---|---|
| Germany | 3.3 | 6.6 |
| Great Britain | 4.4 | 2.8 |
| United States[a] | 11.1 | 5.7 |

*Sources*: For 1876–1913, Hoffmann 1965, tables 10, 13; Mitchell and Deane 1962, pp. 271–72; U.S. Bureau of the Census 1960, series P-13. For 1950–68, United Nations *Yearbook* and *Survey of Current Business*.

[a]Only for 1897–1913, to exclude period of monetary instability before 1897.

destabilizing effects of free-silver agitation, instability of the United States is more than three times as high as that of Germany.

However, the case for relative German stability is not established by these statistical comparisons. Differences among countries in data availability and measurement techniques in the construction of industrial production and GNP cast doubt on measures of instability. The Hoffmann index of industrial production, for example, is based in part on industrial employment, which is more stable cyclically than the outputs of sensitive materials that figure largely in the Frickey index (see table 7.10). Additional evidence, however, may be consulted.

The high stability of German base-money growth (indeed, its mild countercyclical pattern) implies a high stability of growth of German broad money (defined as base money plus all deposits at German commercial banks exclusive of savings banks). Unpublished estimates of broad money that I constructed do not disappoint this expectation. Table 7.11 shows no single year in the 1878–1913 period in which broad money declined and only four out of thirty-six years in that period in which broad money rose by less than 2 or more than 10 percent.

Such a moderate stability of broad-money growth implies a low incidence of bank and financial intermediary failures, and in this respect the German record was outstanding. A few private, unincorporated banks failed in 1891, but 1901, when two banks and two insurance companies went under, was the single year of failure of large institutions. To find whether there were any ripple effects familiar in American economic history, I read weekly issues of the German counterpart of the London *Economist* (*der Deutsche Oekonomist*) from the crisis weeks to six months afterwards. The weekly periodical simply reported the crisis and was thereafter silent. It made no mention of stock-market turmoil, any policy change by the Reichsbank (the discount rate was not raised), any drains of reserves from individual banks or groups of banks, or any

**Table 7.11** **Frequency Distribution of Annual Percent Changes in Broad Money, 1878–1913**[a]

| | Growth Rates | | | | | | |
|---|---|---|---|---|---|---|---|
| | 0 or less | 0.1 to 2.0 | 2.1 to 4.0 | 4.1 to 6.0 | 6.1 to 8.0 | 8.1 to 10.0 | Over 10.0 |
| Years | 0 | 3 | 7 | 12 | 6 | 7 | 1 |

*Sources*: See table 7.1 for Reichsbank money; Hoffmann 1965 for specie and credit bank deposits; Kaiserliches Statistisches Amt. 1879–1914 for other data.

[a]Broad money equals base money plus all deposits (including current-account ones paying interest) at German credit banks less interbank deposits. Not included are deposits at savings banks (Sparkassen) and at financial intermediaries other than credit banks.

sustained reaction of open-market interest rates (the Berlin rate jumped briefly but soon returned to 2.5 percent, low even by pre-1914 standards). Long-term interest rates on German imperial bonds were also stable or declining, week-by-week and month-by-month.

Still another quantitative indicator, which is also statistically independent of real GNP and output time series, is the rate of unemployment. That reported by the German trade unions for all members was low and fluctuated only between 1.5 and 3 percent (Borchardt 1976, p. 31). Since union membership was more concentrated in cyclically sensitive than insensitive industries, this percentage testifies to unemployment stability greater than in Great Britain (where trade-union reports showed higher levels and greater changes) and certainly greater than in the United States (Lebergott 1964).

In addition, nonquantitative evidence is available. The lack of discussion of business-cycle problems by contemporary German economists, social scientists, intellectuals, and politicians was certainly not due to a lack of awareness of social and economic problems. What is suggested, however, is that the economy was stable. This was the age when the Social Democratic Party became the largest party in the German parliament and when the professional organization of German economists bore the title the Association for Social Policy (Verein der Sozialpolitik). Complaints and investigations abounded, according to historians such as Holborn (1969, chaps. 6–8) and Mann (1968, parts 7–8). Welfare and social insurance, high tariffs on foodstuffs, the plight of small farmers, structural problems in heavy industry and cartelization, low wages and the overweening power of capital, the alleged power of the Jews or of East Elbian junkers, militarism and heavy military spending, even the subjugation of tavern keepers to the brewers—these themes resound through the writings of moderates like Gustav Schmoller and Max Weber as well as radicals of the right or the left. But there is one theme that is an exception: business instability of a macroeconomic type is scarcely mentioned.

Scholars and publicists are scarcely apt to neglect a serious problem if one is around. Contrast German neglect with the concern in the United States, where pre-1914 cyclical instability led to the foundation of the National Bureau of Economic Research. And finally note the general satisfaction with the gold standard in imperial Germany. The sole interest group that made an issue of the gold standard prior to the turn of the twentieth century was that of estate owners dissatisfied with falling prices of wheat and rye, who agitated for a bimetallic standard. Tariff protection and the upturn in world prices after 1896 led to a discontinuance of the estate owners' monetary agitation. The Social Democrats defended the gold standard staunchly throughout; according to an article in *Vorwaerts* (9 July 1896), "the German working class and its representatives,

the Social Democrats, will always be found in favor of the gold standard during our monetary controversies which are breaking out" (Borchardt 1976, p. 39, quoting Max Schippel).

### 7.4 An Interpretation of the Reichsbank's Influence on the Money Stock

It is impossible to avoid the conclusion that there was a link between the Reichsbank's operations and the relative stability of German-output growth prior to 1914. Taken by itself, the mildly countercyclical behavior of high-powered money was scarcely decisive; Cagan (1965, charts 6–7, pp. 103–4) found that in the much-less-stable American economy, prior to the founding of the Federal Reserve system in 1914, high-powered money did not in general move procyclically. While the German countercyclical pattern was more uniform than that for the United States, the difference was not huge.

This section maintains that the Reichsbank limited German cyclical fluctuations in two ways. First of all, the centralization of gold reserves in the Reichsbank increased the information available to banks and the public as to bank-reserve positions. In the United States, by contrast, individual bankers, businessmen, and farmers had only the vaguest knowledge of the aggregate liquidity or illiquidity of the banking system taken as a whole. This structural superiority could be found in any country with a central bank under pre-1914 gold standard rules. In addition the composition of German high-powered money mattered a great deal as opposed to its level. By systematically lowering the spread between the discount rate and open-market rates during business expansions and raising the spread during contractions, the Reichsbank achieved two objectives, one external and one internal. The external objective was to put downward (upward) pressure on short-term open-market rates and thereby discourage (encourage) inflows of short-term capital during business upswings (downswings). The result contributed to stabilizing gold inflows so that they did not behave procyclically. The internal objective was to induce German banks not to vary their reserve-deposit ratios in the procyclical manner Cagan found characterized U.S. banks. The technique was to make bills of exchange eligible for discounting such a close substitute for high-powered money that Reichsbank portfolio operations, which added to (reduced) high-powered money, simultaneously withdrew (added to) the highly liquid, eligible-bill substitute from bank and nonbank portfolios during business upswings (downswings). As a result, true bank liquidity did not vary procyclically or did so by little, inducing German credit and savings banks to maintain loans, investments, and deposits free of pronounced swings of a cyclical nature.

Thus the composition and sources of high-powered money made a difference, as Tobin (1965, pp. 467, 469; also Tobin and Brainard 1963, pp. 383–84, 398–400) argued.[7] Additions of Reichsbank money liabilities had less of a stimulative effect on portfolio decisions by banks and nonbank wealthholders than did additions to the latter's holdings of gold. The external and internal policy objectives did not have to be pursued consciously but resulted automatically in pre-1914 Germany from the overriding target of Reichsbank policy—to keep the mark stable in gold value. Finally, the *supply* of bills from borrowers did not vary in such a way as to undercut the dampening effect on total liquid-asset holdings from exchange of one very liquid asset—Reichsbank money liabilities—for another—bills of exchange eligible for sale to the Reichsbank—in normal Reichsbank operations.

What were the avowed targets of Reichsbank policy? One was structural—to make gold freely available within Germany by adherence to gold standard rules and therefore to make it a near-perfect substitute for Reichsbank money in bank and public holdings. Robert Franz put this strongly: "It has always been the Reichsbank's policy to satiate the channels of circulation with gold as much as possible, with the result that the per capita gold circulation in Germany is much larger than in any other country" (U.S. National Monetary Commission 1911a, p. 54; 1910a, p. 147). No obstacles were placed in the way of internal conversions of notes or deposits into gold, and seigniorage charges on gold coin were kept so low that jewellers in Pforzheim, Germany melted down coin to obtain gold instead of purchasing bullion (U.S. National Monetary Commission 1910c). This practice contrasts sharply with the lack of domestic convertibility when the gold standard was formally reestablished in Germany in 1925–26; the Reichsbank then limited convertibility to foreign transactions. In Britain, likewise, the minimum conversion under the post-1925 gold bullion standard was four hundred ounces of gold (Moggridge 1969, p. 60).

For international transactions, the picture is a little different. The Reichsbank used gold devices in addition to discount policy; at times it granted interest-free advances for importation of bullion, paid out gold only in Berlin instead of in port cities such as Hamburg, and may have used moral suasion in 1907 to persuade banks to reduce demands for gold. But this was all; 1881 was the only time purchase and sale prices were varied to encourage purchases and discourage sales. The effects of the interest-free advance and Berlin-only sale policies were minimal indeed. Even if one assumes a 7 percent interest rate and a generous twelve-day transit period for gold from London to Berlin, the implicit devaluation of the mark was only 21/100ths of 1 percent. Since Berlin was less than two hundred miles from Hamburg, the freight disadvantage of taking deliveries in Berlin was negligible.

How influential was moral suasion? A quantitative index might be the violations of gold export and import points in exchange rates; export points, in particular, were heavily bunched during business upswings, but the deviations were extremely small (Morgenstern 1959, tables 33 and 53). If we accept Morgenstern's estimate of median gold import and export points as 20.34 and 20.505 marks per pound sterling, the maximum deviation was two pfennings on the low side and three pfennings on the high side, except for November 1907 when the deviation reached five pfennings. Even the last case represented a violation equal to only 24/100ths of 1 percent—scarcely an incentive for a German to load his rucksack with coins and wander into Switzerland. If we take Morgenstern's estimate of maximum gold points (an estimate because shipping, insurance, and other costs of moving gold varied), the one breach of gold points during the whole 1879–1913 period occurred in November 1907.

I have belabored the Reichsbank's near-purity in observing the gold-availability rule of the game under the pre-1914 gold standard in order to reject a competing hypothesis—direct management by gold devices—a thesis originating with Sayers (1936) and mentioned quite extensively in the historical literature on the pre-1914 era. Instead, my explanation of Reichsbank operations runs as follows:

1. Pre-1914 German business cycles originated in the real, not the monetary, sector of the German economy. An earlier section established that base money moved countercyclically. In addition, turning points of Reichsbank money do not precede cyclical peaks or troughs (unpublished charts). More often than not, the aggregate reserve-deposit ratio of German credit and savings banks moved countercyclically, not procyclically, quite unlike the case for the United States (see section 7.5 below). Thus the general picture is one of a "Keynesian," not monetarist, explanation of the mild German business cycles that occurred.

Keynesian cycles, originating in fluctuations in business investment, are not a residual explanation (because autonomous monetary fluctuations are excluded as a cause). The German economy grew more rapidly than any other advanced economy except that of the United States from 1880 through 1913. Vigorous growth is frequently associated with high uncertainty about future rates of return on real assets. Even more decisively, German growth was peculiarly associated with an explosive development of the investment and basic-production-goods sectors (iron and steel, chemicals, electrical goods, machinery of all types), which required large capital investment per unit of output. Hence, cycles due to fluctuations in expected rates of return on durable capital are credible.

2. As argued in the preceding paragraphs, Keynesian cycles originated in fluctuations in business investment. They were not due to movements in the current account. The latter actually moved countercyclically, the positive balance rising in recessions and falling in business upswings

(Hoffmann 1965, table 241 excluding gold movements). On the other hand, swings in business investment were large and procyclical (Hoffmann 1965, tables 248, 249). Germany was always a net lender on total capital account, but its aggregate lending declined during business upswings and rose during contractions (thus offsetting swings in the current account). But—and this is crucial—the behavior of short-term capital was very different. The persistently higher open-market interest rates in Berlin and in London and Paris testify to long-term capital exports but short-term capital imports as the normal state of affairs for business upswing and downswing alike.

3. A Bloomfield theoretic rule of the game would have generated procyclical inflows and outflows of gold, because the Bloomfield-posited counterfactual type of central bank would not have attempted to influence domestic short-term interest rates. During a business upswing (contraction), the strong cycles in business investment would have caused the capital balance to rise (fall) by more than the current-account balance declined (rose), as German interest rates rose (fell) relative to those in London and Paris. As a consequence, the balance of payments would have moved procyclically, causing gold inflows during upswings and outflows during recessions. But as table 7.6 shows, this movement did not occur.

The Reichsbank exercised a dampening influence on German short-term interest rates within German business cycles in order to avoid procyclical movements in the mark exchange rate and in gold inflows and outflows. During business upswings, the bank raised its discount rate but *by less than open-market rates were rising* (table 7.3) and conversely lowered them by less than open-market rates during recessions. Structurally, the discount rate was always higher than the measured open-market rate in Berlin; the latter applied only to prime bills of exchange while the Reichsbank discount rate was for all classes of bills; hence the Reichsbank held lower-class bills (Whale 1968, p. 113). But this structural difference did not preclude a considerable elasticity of substitution between prime and other bills in asset-holder portfolios. Hence the failure of the Reichsbank to raise (lower) its discount rate by as much as prime rates rose (fell) indicates downward (upward) pressure on open-market interest rates during business upswings (downswings). As a result of this countercyclical pressure on internal interest rates, German net exports of securities did not rise (decline) enough in upswings (downswings) to do more than counteract the accompanying worsening (improvement) of the current-account balance. Hence gold did not flow in or out during upswings and downswings, respectively.

Put another way, internal drains of gold from the Reichsbank reserves took the place of gold flows from abroad during German business upswings. (As table 7.5 shows, the stock of gold held in Germany outside

the Reichsbank moved procyclically.) But were interest rates the target of monetary policy, if not the ratio of reserves to monetary liabilities? No. Jacob Riesser, perhaps Germany's leading expert on money and banking, correctly described the target as follows in testifying before the Bank Inquiry Commission in 1908:

> The rate of private discount is made at least in a general way in conformity with the ratio of supply and demand existing in the market. On the other hand, the rate of bank discount, fixed by the Reichsbank with an eye to the regulation of credit transactions and the maintenance of the gold standard, depends in the foremost place on the favorable or unfavorable condition of the total balance of payments, whose primary expression is to be seen in low or high exchange rates. (U.S. National Monetary Commission, 1910c, pp. 305–6)

The exchange-rate target was far better than an interest-rate target for stabilizing gold inflows (because of the high rate of economic growth and the continued preference of the public for the gold component of high-powered money, cycle phases always showed gold inflows, never outflows). The exchange rate was known immediately and summarized all influences on the external demand for and supply of German money. On the other hand, reliable interest-rate information for Germany and other countries embraced only bills and securities of the highest quality; if there is so much uncertainty today on international elasticities of demand and supply for bills and securities, how much greater was the lack of knowledge then!

This policy undoubtedly stabilized gold inflows, but why did it also tend to stabilize the economy? The answer is twofold. First, the Reichsbank had a structural bill-purchase policy to make bills of exchange (strictly, bills eligible for discount—a very large proportion of all bills) such close substitutes for high-powered money that the procyclical swings observed in table 7.1 for the Reichsbank bill portfolio did not generate procyclical portfolio decisions by German banks and spending decisions by the nonbank public. Second, the demand for money by banks and the nonbank public was highly stable.

The first is the major point, since stability of money demand did not matter so much for a single country under gold standard rules (an excess demand for high-powered money could be eliminated fairly promptly by an induced balance-of-payments surplus). What the Reichsbank did to make bills extremely close to money in liquidity characteristics was to express a willingness to discount all bills presented within cyclically invariant standards of eligibility. A Hamburg banker stated this clearly in testimony before the bank inquiry of 1908:

> The Bank of England reserves to itself, in fact, the right to discount or not to discount, a system not practiced with us by the Reichsbank. If

> the quality of the bill satisfies the Reichsbank, it takes any amount that is sent to it, at the official rate. This is a wonderful safety valve for traffic in general, not only for the banks but for all the patrons of the Reichsbank. (testimony of banker Max Schinckel, U.S. National Monetary Commission 1910c, pp. 377–78)

Whale (1968, pp. 163–65 and 125–31), who also noted this policy, stressed that it involved accepting very large seasonal and irregular swings in Reichsbank credit and money, and that German-bank cash reserves were much smaller than English-bank reserves. Robert Franz (editor of the *Deutsche Oekonomist*, Berlin), referred to a qualitative impact of the Reichsbank policy on bank balance sheets; cash was high-powered money only and not interbank deposits (U.S. National Monetary Commission 1911a, p. 83). A German banker sgreed—banks only kept till money to satisfy daily transactions needs (U.S. National Monetary Commission 1910c, p. 186).

Such extremely small bank reserves of base money were encouraged by another salient feature of Reichsbank policy: it did *not* adhere to the real-bills doctrine in the sense of attempting to screen applications for discount and rejecting bills not related to the "needs of trade." This notion deserves emphasis. In the Reichsbank's own first-quarter-century history only one paragraph espoused the needs of trade doctrine in rather perfunctory terms (U.S. National Monetary Commission 1910a, p. 78). Flink (1930) found no such screening prior to 1908. In practice, the credit banks generated large amounts of finance paper, supposedly the abomination of abominations for real-bills theorists, but the Reichsbank was ready to discount them. The Reichsbank's "most important task [was] to grant all credit required" (Flink 1930, pp. 25, 27). A source quoted by Flink agreed: "In times of money scarcity, surprisingly large amounts of commercial paper have been thrown into the portfolio of the Reichsbank which the latter could not prevent" (Flink 1930, quoting von Lumm, p. 27n). Franz quantified the departure from real-bills theory; between 1905 and 1907, money and banking bills were between 49 and 53 percent of all Reichsbank bill assets (U.S. National Monetary Commission 1911a, pp. 63–64).

Therefore, eligibility of bills for sale to the Reichsbank only concerned formal characteristics. Bills had to be private, nongovernment, have at least two signatures, and, we may infer from the Reichsbank first-quarter-century history, sellers had to have an ongoing business relationship. No one could wander in off the street and sell a packet of bills. But that was all. The number of persons, firms, and banks discounting was over sixty thousand. After 1908, the Reichsbank made some attempt to screen bills; before then, bills were as good as cash to the German commercial (Kredit) bank system. One policy restriction held, however:

with almost no exceptions, the Reichsbank purchased only bills of very short maturity, forty days or less.

As a result, eligible bills of less than forty-days maturity *were* virtually equivalent to base money when held by the German banking system. The Reichsbank was ready to purchase unlimited quantities from the banking system, and the de facto refusal to screen bills meant that there was little or no uncertainty that specific bills might be ineligible as long as the two-signature, less-than-thirty-to-forty-days effective-maturity characteristics were present.

Bank holdings of bills were indeed subject to risk of decline in value (if the discount rate rose) or appreciation of value (if the rate declined). But the interest income from bills, combined with very short maturities, made eligible bills quite attractive vis-à-vis gold or Reichsbank money holdings.

The consequence was that Reichsbank expansion during business upswings and contraction during recessions had only a small net effect on the true reserves of the banking system. During upswings, banks gained base-money proper from Reichsbank portfolio expansion but lost eligible bills; during recessions, banks lost base-money proper from the same policy but gained eligible bills as nonbank borrowers turned from the Reichsbank to the banking system. (Such nonbank borrowers did have access to the Reichsbank—see U.S. National Monetary Commission 1911a, p. 63.) As a result, base money *inclusive of eligible bills* did not change, so that bank lending and money creation were discouraged during business upswings and encouraged during recessions.

However, cyclical stability of gold, Reichsbank money, and eligible bill holdings by banks and the public required one other condition as well. The *supply* of bills by borrowers had to be reasonably stable as well. Table 7.12 is a test of that requirement. The table shows annual average percent changes over business-cycle phases of estimates of thirty-day-maturity bills held by banks and the nonbank public added to high-powered-money proper for the years 1879 to 1900, compared to the annual average percent changes of high-powered money. As the reader can see, the rates of change of the two concepts of high-powered money differed significantly during only one out of five cycle phases. Evidently, and with the one exception noted, Reichsbank operations to dampen cyclical fluctuations in short-term interest rates did not elicit perverse procyclical movements in bills supplied and not taken up by the Reichsbank. Such movements would have destroyed or seriously weakened the stabilizing effects of Reichsbank policy.

A fairly high degree of stability of demand for Reichsbank money liabilities by banks and the public is also indicated by the results of multiple regressions shown in table 7.13. The dependent variable in both equations is changes in Reichsbank money. The functions are based on a Koyck distributed-lag theory of adjustment of actual to desired Reichs-

Table 7.12 **Level of Extended High-Powered Money at Trough or Peak Years, and Annual Average Percentage Changes between Turning Points Compared to Those of High-Powered Money Proper, 1879–1900**

| Year | Trough or Peak (1) | Extended HP Money[a] (2) | Annual Average Percent Change between Turning Points: Extended HP Money (3) | Annual Average Percent Change between Turning Points: HP-Money Proper (4) |
|---|---|---|---|---|
| 1879 | trough | 3,582 | | |
| 1882 | peak | 3,595 | 0.1 | 0 |
| 1886 | trough | 3,583 | −0.1 | 0.2 |
| 1890 | peak | 3,936 | 2.4 | 2.6 |
| 1895 | trough | 4,522 | 3.0 | 3.2 |
| 1900 | peak | 5,524 | 4.4 | 2.9 |

*Sources*: Same as those for table 7.5, plus estimates of thirty-day bills (Deutsche Reichsbank 1901, table 35, stock estimate by Reichsbank) divided by 3 (to obtain thirty- from ninety-day bills) minus annual average of Reichsbank bill holdings (see table 7.1).

[a]Extended high-powered (HP) money is high-powered-money proper (see table 7.5) plus estimates of bills of exchange of thirty days' maturity held outside the Reichsbank.

bank money holdings by German banks and the public. The results show desired money holdings determined by quarterly German permanent income (having a positive effect) and the Reichsbank average lending rate[8] (having a negative effect); other variables thought to affect desired money holdings had no statistically significant and/or sizable impact, as the first row of coefficients and the *t*-statistic values indicate. The coefficient for the lagged *stock* of Reichsbank money is given in the last column of table 7.13. If transformed to the magnitudes appropriate for levels, the lagged-stock coefficients of both equations indicate that over one-half (55 percent) of the discrepancy between the desired and the actual level of Reichsbank money was made up in the quarter when a disturbance caused a difference between actual and desired levels. During the following three quarters, nearly all the discrepancy between desired and actual Reichsbank money was eliminated. Thus, adjustment lags were not long at all.

When evaluated at the means of table 7.13, the results indicate a decided stability of demand for money with respect to permanent income and the average Reichsbank lending rate (differing from the discount rate from 1892 to 1897 because the Reichsbank had preferential lending rates for some discounts in these years). A 3.7 percent rise in permanent income eventually generated a rise in demand for Reichsbank money of 1.2 percent, i.e., the income elasticity of demand was roughly one-third of one.[9] A one-hundred-basis-point rise in the Reichsbank lending rate

**Table 7.13** **Regressions Explaining Absolute Quarterly Changes in Reichsbank Money, II 1892–IV 1907**

| Equation No. | Constant | Independent Variables: Permanent Income | Reichsbank Lending Rate | Reichsbank Liquidity | London Bill Rate | Dummy[a] | Lagged Reichsbank Money |
|---|---|---|---|---|---|---|---|
| (1)[b] | 442 | .018 | −24.6 | −205.8 | −4.2 | −9.5 | −.450 |
| | (2.55)* | (4.22)* | (2.77)* | (1.02) | −(0.46) | (0.56) | (4.72)* |
| (2)[c] | 546 | .017 | −26.1 | | | | −.454 |
| | (1.57) | (2.94)* | (3.22)* | | | | (4.77)* |

| | Equation (1) | Equation (2) |
|---|---|---|
| Adjusted $R^2$ | .347 | .344 |
| Standard error | 31.8 | 31.9 |
| Durbin $h$ ratio | .42 | .42 |

*Notes*: Permanent income is scaled in millions of marks; the dependent variable and lagged Reichsbank money in millions of marks; the Reichsbank and London interest rates in percentages; and Reichsbank liquidity (the ratio of its reserve to money liabilities) as a ratio. Absolute $t$-values are in parentheses.

The means of the dependent and independent variables are as follows: change in Reichsbank money (millions), 8.986; Lagged Reichsbank money (millions), 1,694; Permanent income (millions), 30,110; Reichsbank lending rate, 4.078; London bill rate, 2.638; Reichsbank liquidity, .534; Dummy variable, .6349.

[a]Dummy variable, to test for effects of alleged shift in Reichsbank monetary policy, coded 0 for II 1892–IV 1897, 1 for I 1898–IV 1907.

[b]Ordinary least squares.

[c]Two-stage least squares, with Reichsbank lending rate determined in the first stage by German and foreign short-term interest rates.

*Significant at 1 percent level.

reduced demand for Reichsbank money eventually to a rounded 25 million marks, equal to slightly less than three-quarters of average quarterly growth. But evaluated at the means of the Reichsbank lending rate and the stock of Reichsbank money, this relation translates only to an arc elasticity of −.06, meaning a highly interest-inelastic demand for Reichsbank money. Evidently, then, making bills virtually equivalent to Reichsbank money in their liquidity characteristics does not imply a large cross-elasticity of demand between bills and Reichsbank money with respect to the interest rates on eligible bills. The Durbin $h$ ratios permit us to infer that all systematic influences have been captured by the two equations shown.

The stable demand for money and stable supply of bills of exchange, with respect to cyclical movements in output, permitted Reichsbank policy to be highly effective. By making gold freely available at a fixed price, the policy made gold and Reichsbank money close substitutes, and the policy of taking unlimited quantities of eligible bills at the prevailing

discount rate made such bills and Reichsbank money also close substitutes in wealthholder portfolios. But while the substitutability of bills and Reichsbank money (and, by inference, also gold) corresponds with the views of James Tobin, the very low interest elasticity of demand for Reichsbank money corresponds more with the views of Milton Friedman. Low interest elasticity of demand for Reichsbank money enabled the German central bank to moderate interest swings (so as to keep the balance of payments in balance) over German cycles.

### 7.5 Testing the Interpretation of the Reichsbank's Influence

Tests of the foregoing interpretations can be set up by comparing relevant statistics for Germany and the United States. Both countries grew at very rapid rates prior to 1914, and both had high and strongly fluctuating ratios of gross-investment-in-plant-and-equipment to GNP (the United States) or net-social-product (Germany). Germany had a central bank, while the United States did not.

The view presented in this study is that by keeping fluctuations in the discount rate smaller than fluctuations in open-market interest rates over pre-1914 business cycles, the Reichsbank succeeded in dampening German cyclical fluctuations in interest rates. A test of this hypothesis is to compare the cyclical behavior of the spreads between the German and London and between the New York and London open-market rates of interest. Since the basis of interest-rate spreads for both is London, noise from British cycles is the same in both series, and therefore does not affect comparisons between the two. Each spread is a proxy for short-term capital flows: The higher is the rate of one country relative to the London rate, the greater should be the short-term capital inflow. (Unfortunately, I did not have access to intrayear data on gold inflows and outflows for the United States, and U.S. and German data on short-term capital movements are either faulty or completely lacking.)

The New York–London spread widened during U.S. business upswings and fell during downswings in a least twelve out of eighteen U.S. cycle phases from 1879 to 1913. But the Berlin-London spread behaved quite differently; it rose during German upswings and fell during German downswings, in only three out of eleven German cycle phases (inferred form Morgenstern 1959, chart 18).

A second test of the hypothesis is to compare differences in fluctuations of gold held by banks and the nonbank public in Germany and the United States. If the Reichsbank succeeded in dampening German business cycles, German gold fluctuations should have been smaller adjusted for the scale of the economy. The test is less satisfactory than the first one since I had access only to annual estimates of gold outside the Treasury for the United States (and for Germany after 1907 and before 1890), and

the brevity of American business cycles blurs comparisons using annual data. Still, the standard deviation of annual percent changes in gold held by banks and the public in the United States was 12.0—huge relative to the German equivalent standard deviation of 4.58 for the 1879–1913 period. Even if the years 1879–81 are excluded from the test, to eliminate disturbances due to the resumption of specie payments by the United States in 1879, the standard deviation declines only to 7.55—65 percent greater than the German figure of 4.58.[10]

A more satisfactory test is to compare German and U.S. cyclical movements of reserve-deposit ratios. If it is correct that the Reichsbank dampened cyclical swings in the sum of high-powered money and an asset close to high-powered money in its liquidity characteristics—eligible bills—by withdrawing one even as it supplied the other, reserve-deposit ratios should not have fallen during business upswings and risen during downswings. If they did occur, such swings should have been smaller than those in reserve-deposit ratios of U.S. banks. Like the U.S. banks, German banks could control their loans and investments and therefore their reserve-deposit ratios. If eligible bills were close to high-powered money as effective reserves, the Reichsbank's withdrawal of bills as it expanded the portfolio during business upswings, and converse behavior during downswings, should have changed effective bank reserves less than measured reserves, so that the creation of bank money would have been stable.

Table 7.14 compares German reserve-deposit ratios of the credit and savings banks at cycle peaks and troughs from February 1879 to April 1913 and shows annual average percent changes in the ratios from trough to peak and peak to trough. By the test of comparing given-phase change with that in the preceding phase (see table note for specification), the German ratio moved countercyclically in six out of ten available phases (1882 to 1913), procyclically in only four out of ten. By contrast, the same test applied to U.S. reserve-deposit ratios (1879–1913) shows procyclical swings in changes in eighteen of nineteen cycle phases (Cagan 1965, table 27). By an alternate test (direction of change during cycle phase), the U.S. ratio behaved procyclically in all but two of sixteen cycle phases while the German ratio behaved countercyclically in five out of eleven phases.[11]

One interpretation casts an even more favorable light on the relative stability of German-bank reserve-deposit ratios. The cyclical contraction from 1890 to 1895 was the one exception to the Reichsbank's usual powerful influence on bill rates of interest and to the usual volume of bills that it absorbed. During those years, open-market bill rates reached lows not seen again until the 1930s in the United States. For reasons not explained in its official quarter-century history, the Reichsbank chose not to follow open-market rates down in setting its discount rate but to

**Table 7.14** **Reserve-Deposit Ratios of German Credit and Savings Banks: Levels and Annual Average Percent Changes Between Turning Points, 1879–1913**

| Cycle Turning Point | | Levels | Annual Average Percent Change Between Turning Points |
|---|---|---|---|
| Feb. 1879 | trough | 0.0520 | — |
| Jan. 1882 | peak | 0.0530 | +0.6 |
| Aug. 1886 | trough | 0.0392 | −5.7[a] |
| Jan. 1890 | peak | 0.0447 | +4.1[a] |
| Feb. 1895 | trough | 0.0508 | +2.7[a] |
| Mar. 1900 | peak | 0.0416 | −3.6 |
| Mar. 1902 | trough | 0.0430 | +1.7 |
| Aug. 1903 | peak | 0.0397 | −5.4 |
| Feb. 1905 | trough | 0.0371 | −4.4 |
| Jul. 1907 | peak | 0.0355 | −1.8[a] |
| Dec. 1908 | trough | 0.0332 | −4.6[a] |
| Apr. 1913 | peak | 0.0282 | −3.5[a] |

*Source*: Reserves and deposits at German credit and savings banks (Kreditbanken and Sparkassen), Hoffmann 1965, tables 202, 207.

*Notes*: Both reserves and deposits were interpolated to cycle peak and trough months by changes in the preceding year (an alternate method—prorating by given-year changes—produced just about the same results in terms of ratio changes). To allow for the declining trend in the series, the test cited in the text is as follows. A ratio movement reinforcing business-cycle phases is algebraically larger than the change in the preceding phase for a business contraction, algebraically smaller for a business expansion. A change offsetting (dampening) a cycle phase has the opposite pattern.

[a]Contracyclical. Other entries in the column are procyclical, except for the first ones.

practice price discrimination by discounting some bills at a preferential rate (Privatdiskontsatz). As a consequence, to some extent bills lost their high liquidity since banks and others were uncertain about their rates of return. Accordingly, the normal mechanism of Reichsbank control became partly inoperative. If this contraction and the following expansion are excluded (the latter because the phase starting point was distorted), the count runs: countercyclical changes in the reserve-deposit ratio in six cycle phases, clear procyclical movements in only two (using the test specified in the notes to table 7.14).

A final test uses fluctuations of rates of exchange for the German mark and other currencies (the pound, the French franc, and the dollar). If the Reichsbank's monetary policy targeted on the German rate of exchange and operated successfully thereby, two results should have followed. Violations of gold points, i.e., mark price changes, which made it profitable to ship gold in settlement of claims rather than purchasing or selling marks, should have been rare. In addition, fluctuations of the foreign-exchange value of the mark within the gold points should have been

randomlike instead of being correlated with interest rates, interest-rate spreads, or real activity in the German economy.

In terms of violations of gold points, the Berlin-London exchange rate shows much better performance than three other exchange rates not involving Germany (New York–London, Paris–New York, and Paris-London), according to Morgenstern (1959, table 56). The former shows only one monthly deviation from maximum gold points from 1880 to the outbreak of World War I, compared with four (New York–London), thirty (Paris–New York), and sixteen (Paris-London). By another criterion—percent deviation from median gold points—the average percent deviation was 0.06 for the German-London rate compared with 0.16 percent for both New York–London and Paris–New York and 0.09 percent for Paris-London.

Concerning the key target, the Berlin-London exchange rate, the pound price of a hundred marks rose in two German business expansions and fell in four, while it rose in three and fell in two contractions. This performance permits a reasonable, though intuitive, inference that this exchange rate was not related to German business cycles, or if related, the association was weak. To the naked eye, the movements in the chart of the series resemble nothing so much as a random walk with respect to German business cycles (Morgenstern 1959, chart 21). The mark price does show longer-run swings, rising from 1880 to late 1880s and early 1890s, and thereafter falling to about 1900, after which the trend was stable. But these longer swings were not cycle-related.

To summarize, the evidence is consistent with the hypothesis that the German central bank targeted exclusively on the mark exchange rate. Moreover, the policy was successful. The bank never suspended specie payments. In the one episode when such a suspension was threatened—the 1907 crisis—it was clearly due to an exogenous event: American flotation of large loans in Europe and massive gold purchases following the American suspension of specie payments earlier in 1907 (U.S. National Monetary Commission 1910c, pp.306–7, 35, 341, 363, and 624). There is clear evidence that the Reichsbank used moral suasion to avoid large gold shipments; this episode is the only one in thirty-four years of pre-1914 operation when maximum gold points were violated. But a 7.5 percent discount rate turned the corner, and the October–November period of gold-point violation was succeeded by monetary ease. Nor did the real sector of the economy suffer unduly; in 1908 industrial output was only 0.9 percent lower than in 1907 and 6.9 percent higher than in 1906 (Hoffmann 1965, tables 10, 13).

The foregoing explanation for Reichsbank success in monetary policy—concentration on convertibility into gold and British pounds as the overriding target—is not the only possible one. Another could be found in terms of information available to bankers and the public. In the United

States, each banker knew his own reserves of high-powered money at all times but had only the vaguest idea of current reserves available to other banks. In Germany, the centralization of gold reserves in the hands of the central bank made the reserve position of all banks (in terms of ultimate liquidity) known each week when a statement was published. This information facilitated better coordination of lending and investing decisions by the banking system. In addition, the continued use of gold as a medium of exchange and store of value by the nonbank public served to police central-bank behavior. As stated earlier, the proportion of gold to Reichsbank money did not decline over 1879–1913, and each business upswing was accompanied by an internal drain of gold from the central bank, forcing the Reichsbank to pay attention to the gold value of its currency.

### 7.6 Reasons for Reichsbank Policy

Maintenance of a stable gold value of the mark, accordingly, was the true rule of the game and changing the discount rate as the proportion of reserves to money liabilities varied was a false rule. The Reichsbank indeed influenced domestic short-term interest rates. This rule rejects two older views about central-bank behavior prior to 1914, for Germany at least. One of extreme laissez-faire provenance was the *Konstatierungstheorie*: The central bank never determines the appropriate, market-clearing discount rate but only finds it (Bopp 1944). The second is that prior to 1914, central banks used gold devices, foreign-exchange holdings, credit rationing, and open-market policies to insulate central banks from the rigors of following market rates (Bopp 1944; Sayers 1936). Reichsbank policy also did not conform with the mechanical link of central-bank money liabilities to gold espoused by the currency school in England prior to Peel's Bank Act. Such a link would have been valid only if the velocities of central-bank money and gold were identical (Viner 1937, pp. 221–22), and modern experience permits the inference that this would have been impossible if gold and central-bank money had been used in different proportions by the household, government, and business sectors of the German economy (McGouldrick 1962). Such a difference in proportion is highly likely; the German government, for example, was bound by law to make all payments of civil-servant salaries in gold coin. But the convertibility target satisfied the rule of at least one member of the English currency school, Lord Overstone, who specified only that a proper system should "secure with respect to a paper currency that regulation of its amount which in a metallic currency necessarily results from its intrinsic value" (Viner 1937, p. 389).

But why did the Reichsbank act as it did? A plausible reason was profitability considerations, understood as the selection of the desired

point on the Reichsbank's expected-rate-of-return–risk curve. For one thing, the Reichsbank imported nearly all gold for German nonmonetary as well as monetary uses, and it was obliged by law to sell gold to private buyers or the mint at a fixed price without seigniorage. Stabilizing the exchange rate therefore reduced risk on its gold operations. Another profitability consideration was that of earnings on the Reichsbank's portfolio. Letting the portfolio rise and fall as interest rates did was consistent with profit influences. On the other hand, the apparent success in avoiding overexpansion when rates were high or rising and thereby a depreciation of the mark suggests that profits or losses from gold operations offered a happy counterweight to profits from the portfolio and so assured that the central bank followed the convertibility target of policy.

Another reason for the choice of that target was the uncertainty surrounding any other. The offer to purchase all bills offered at the prevailing discount rate helped to reduce bank reserves to very small proportions of deposits, as can be seen by comparing the reserve-deposit ratios of table 7.14 with the far higher U.S. ones at the time. However, huge seasonal and irregular fluctuations in demand for Reichsbank money liabilities necessarily occurred, as banks carried out frequent and large switches between eligible bills and money. Frequently the maximum note issue within a year was twice the size of the minimum note issue. (See the large quarterly percentage changes in Reichsbank money liabilities shown in table 7.7.) Hence the market, not the central bank, had to determine the appropriate quantity of central-bank money, given the unlimited-availability rule. Targeting on interest rates was also impossible because of the sensitivity of German to foreign rates and questions about which interest rate was appropriate. Macroeconomic information was absent or available with long lags. The exchange rate on London, the world's leading financial center, was left as the only feasible target.

Profit-maximizing within the constraint of exchange-rate targeting also appears plausible from the structure of the central bank's management. It is true that stockholders had no voice in the voting assembly of the Reichsbank; their interests were confined to directors who had the right to be present at meetings and to advise and express opinions but not to cast votes. The directorate that managed the Reichsbank was composed exclusively of civil servants, and stockholders received only four-tenths of all profits in excess of a 4.5 percent of share capital. But, as noted earlier, the salaries of all higher officials were made proportionate to Reichsbank profits (except for a fixed component) in order to avoid "bureaucracy" (Flink 1930, pp. 11–12), and dividends varied as profits did. These facts are quite consistent with profitability as a subsidiary target.

Given the overriding constraint of keeping the mark in a stable relationship to gold, expanding the portfolio as demand for money rose and

contracting it as that demand fell may well have been optimal behavior from a social point of view. The behavior did not result in procyclical movements in central-bank money liabilities as more "altruistic" rules of central banks did in the post-1945 era. The convertibility target allowed the public and the banks to determine the quantity of central-bank money that it desired to hold and avoided indirect manipulation of desired money holdings by the central bank. As shown earlier, the demand for central-bank money was remarkably stable and business cycles were mild. If profitability played a role (we cannot be certain for lack of information—the surviving archives of the pre-1914 Reichsbank are located in East Germany and are inaccessible to Western scholars), the results may not have been undesirable in the slightest.

### 7.7 Concluding Observations

The hypothesis that the sources of high-powered money affected the impact of the aggregate on economic activity and liquidity may not be applicable only to imperial Germany prior to 1914. In their celebrated *Monetary History of the United States*, Friedman and Schwartz (1963) ascribed the stability of velocity from 1947 until the outbreak of the Korean War to federal fiscal policy and expectations that prices would later fall. But a contributing factor might also have been the Federal Reserve bond-price-support program which "liquified" U.S. government securities of all maturities in much the same way that the pre-1914 German Reichsbank "liquified" private bills of exchange. Either should have been inflationary, the United States program much more so than that of the Reichsbank because the latter could and did change the support price (the discount rate) rather frequently and also because Germany was constrained by unlimited convertibility into gold. But American velocity and prices were astonishingly stable; the latter even declined in 1948–49, the one and only time that prices fell in a recession during the postwar era. Quite posibly therefore, the bond-price-support program may have reinforced the effect of stable price expectations by neutralizing errors of the central bank in estimating the U.S. demand for money and acting on these estimates. Just as the Reichsbank removed one source of liquidity (bills) as it provided another (money) by bill purchases, the Federal Reserve did the same with government securities. (Of course, stable or falling price expectations were also necessary for this result). It is ironic that implementation of the 1951 accord between the Federal Reserve and the Treasury was followed not by stable but by rising prices and velocity.

The foregoing hypotheses and conclusions do not necessarily have applicability to current policy problems and specifically to whether the United States should attempt to return to some type of gold standard.

The pre-1914 system had evolved over centuries and was embedded in a culture emphasizing sanctity of contracts and government restraint in economic intervention. Whether substitute preconditions for confidence in a hypothetical gold standard of the future can be created is more than doubtful. At the same time, however, the relative stability of the German monetary system must be described as remarkable. German economic growth was centered in areas—iron and steel, chemicals, electrical and residential construction—that are frequently alleged to impart a high degree of instability to economies undergoing economic growth. Even more to the point perhaps, German credit banks were highly venturesome, investing in long-term, illiquid capital of industrial enterprises and underwriting securities issues on a considerable scale (Whale 1968). Political historians such as Mann and Holborn, cited earlier, have also emphasized the political and social conflicts of the era. The contrasting relative stability of the monetary realm therefore stands as strong testimony to the advantages of the pre-1914 gold standard when properly ruled by a central bank.

# Notes

1. The titles of the balance-sheet categories remained constant throughout the period. The only serious confusion as to the character of assets and liabilities seems to have been the inclusion of foreign-exchange assets under "other assets" instead of under reserves (*Metall*). Such assets were small relative to metallic reserves, as noted later.

2. Weekly balance sheets were aggregated into monthly and quarterly averages by the writer and then seasonally adjusted with the Census X 11 program, component by component. The usual caveat applies that after seasonal adjustment, balance sheets do not add up exactly as they did before.

3. All cycle phases are measured from trough to peak and peak to trough. The dates of German troughs and peaks were selected by Burns and Mitchell (1946, table 16).

4. By the extended base adjustment, Reichsbank money is calculated as if it had always included the note issues of German banks giving them up prior to 1913. Thus, if a bank gave up its note issue and the Reichsbank assumed it in year $t$, Reichsbank money is increased by this amount for all years prior to $t$, eliminating distortions due to a transfer of note liabilities from a bank to the central bank.

5. Industrial use of gold has not been subtracted from net inflows. However, this qualification serves to make the recorded changes in tables 7.5 and 7.6 more procyclical (or less countercyclical) than they probably were in fact, since it is reasonable to assume that industrial use of gold rose more proportionately than money use during business upswings and fell more proportionately than money use during downswings. Hence the true stocks and flows of monetary gold would show less of a procyclical movement than the series in tables 7.5 and 7.6.

6. Base (high-powered) money also included Treasury fiat money (Reichskassenscheine), omitted from the levels of table 7.5 from which the percentage changes over cycle phases were computed. However, the amount of fiat issued by the Reich Treasury was fixed after 1876, so the estimated extremely small fluctuations in fiat holdings of banks and the public (unpublished worksheets) reflect only randomlike movements. Therefore, exclusion

of this component affects only the estimates of levels in table 7.5 and not the annual average percent changes.

7. A monetarist interpretation would be that by setting price supports for eligible bills, the Reichsbank made them as good as high-powered money and hence justified their inclusion in the stock of high-powered money. The interest rate on the bills compensated holders for the small losses caused by adjustments of the support price, i.e., the discount rate.

8. Preferential rates, prior to 1897, were limited to bill purchases by the Reichsbank at rates below the discount rate. This discriminatory pricing of bills purchased was said to have been due to the very low level of short-term interest rates in the 1880–96 period. The real motivation behind the pricing was probably profit maximization. To account for the deviation from the announced discount rate, the interest rate used in the regressions shown in table 7.13 is the average lending rate of the Reichsbank on all bills of exchange.

9. The low income elasticity of demand is explainable by the rapid development of German credit and savings banks from 1879 to 1913. These institutions offered superior substitutes for Reichsbank money. In addition, gold more than maintained its place as a form of high-powered money; estimates of gold outside the Reichsbank increased by 111 percent from 1879 to 1913, while Reichsbank money rose by only 62 percent (unpublished worksheets). Rising international tensions might possibly explain the increase in gold six years before World War I broke out; statements made to the bank inquiry of 1908 already predicted a suspension of specie payments in case of war.

10. U.S. percentage changes computed from Cagan 1965 (table F-7, col. 1); German percentage changes computed from Hoffmann 1965 (table 240, column *Metallgeld*). The former series excludes, the latter includes, subsidiary coinage of silver and base metals. While Cagan stresses that U.S. high-powered money changes were less procyclical during the pre-central-bank era than they were after the Federal reserve system started operations in 1914, the comparison here is not between different periods in the United States but between the United States and Germany for one period, that prior to 1914. In a footnote Cagan acknowledges some possibility that output fluctuations prior to 1914 induced accommodating gold flows (Cagan 1965, pp. 245–46, n. 7).

11. Legal or central-bank nonprice rules cannot be invoked in the German case as a cause of good-banking performance. Throughout the 1872–1914 period, German banks were *not* subject to reserve requirements (banking regulations covered ratios of capital to assets and types of permitted transactions only). At the very end of the period, Reichsbank President Walther Havenstein attempted to persuade banks to carry money reserves equal to 15 percent of deposit liabilities, but he did not succeed (Flink 1930, p. 35).

# References

Bloomfield, Arthur I. 1959. *Monetary policy under the international gold standard, 1880–1914*. New York: Federal Reserve Bank of New York.

Bopp, Karl. 1944. Central banking at the crossroads. *Proceedings of the American Economic Association* 4 (Mar.): 260–77.

———. 1954. Die Tätigkeit der Reichsbank von 1876 bis 1914. *Weltwirtschaftliches archiv*. Bd. 1.

Borchardt, Knut. 1976. Währung und Wirtschaft bis zum 1. Weltkrieg in der Deutschen Bundesbank. In *Währung und Wirtschaft in Deutschland 1876–1976*. Frankfurt/Main: Verlag Fritz Knapp.

Burns, Arthur F., and Wesley Clair Mitchell. 1946. *Measuring business cycles*. New York: National Bureau of Economic Research.

Cagan, Phillip. 1965. *Determinants and effects of changes in the stock of money, 1875–1960*. New York: Columbia University Press.

Deane, Phyllis. 1968. New estimates of gross national roduct for the United Kingdom, 1830–1914. *Review of Income and Wealth* 14 (June): 104–7.

Deutsche Reichsbank. 1901. *Die Reichsbank 1876–1900*. Berlin: Reichsdruckerei, Kommissions Verlag von Gustav Fischer, Jena.

———. 1925. *Die Reichsbank 1876–1925*. Berlin: Reichsdruckerei.

Flink, Salomon. 1930. *The German Reichsbank and economic Germany*. New York: Harper & Brothers.

Friedman, Milton, and Anna J. Schwartz. 1963. *A monetary history of the United States, 1867–1960*. Princeton: Princeton University Press.

Gallman, Robert E. 1965. Annual estimates of gross national product in the United States, 1834–1909. University of North Carolina. Mimeo.

Hoffmann, Walther. 1965. *Das Wachstum der deutschen Wirtschaft seit der Mitte des 19. Jahrhunderts*. Berlin: Springer Verlag.

Holborn, Hajo. 1969. *A history of modern Germany*. Vol. 3. New York: Alfred Knopf.

Kaiserliches Statistisches Amt. 1879–1914. *Statistiches Jahrhbuch für das Deutsche Reich*. Annual volumes. Berlin: Verlag von Puttkammer & Mühlbrecht.

Lebergott, Stanley. 1964. *Manpower in economic growth: The American record*. New York: McGraw-Hill.

McGouldrick, Paul F. 1982. "Rules of the game" and operation of the Reichsbank under the gold standard. Paper delivered at the National Bureau of Economic Research conference, A Retrospective on the Classical Gold Standard, 20 March 1982, at Hilton Head, South Carolina.

———. 1962. A sectoral analysis of velocity. *Federal Reserve Bulletin* 48 (Dec.): 1557–70.

Mann, Golo. 1968. *The history of Germany since 1789*. London: Chatto and Windus.

Mitchell, B. R., and Phyllis Deane. 1962. *Abstract of British historical statistics*. Cambridge: Cambridge University Press.

Moggridge, D. E. 1969. *The return to gold, 1925*. Cambridge: Cambridge University Press.

Morgenstern, Oskar. 1959. *International financial transactions and business cycles*. Princeton: Princeton University Press.

Riesser, Jacob. 1911. *See* U.S. National Monetary Commission 1911b.

Sayers, Richard S. 1936. *Bank of England operations, 1890–1914*. London: P. S. King and Sons.

Sommer, Albrecht. 1931. *Die Reichsbank unter Herman von Dechend*. Berlin: Heymann's Verlag.

Tilly, Richard. 1973. Zeitreihen zum Geldumlauf in Deutschland 1870–1913. *Jahrbücher für Nationaloekonomie und Statistik* 187 (Heft 4).
Tobin, James. 1965. The monetary interpretation of history. *American Economic Review* 55 (June): 464–85.
Tobin, James, and W. C. Brainard. 1963. Financial intermediaries and the effectiveness of monetary controls. *American Economic Review Papers and Proceedings* 53 (May): 383–400.
U.N. 1950 68. *Yearbook*, vols. 4–22. New York: United Nations.
U.S Bureau of the Census. 1960. *Historical Statistics of the United States, Colonial Times to 1957*. Washington, D.C.: GPO.
U.S. Department of Commerce, Office of Business Economics, 1950–68. *Survey of Current Business*, monthly issues.
U.S. National Monetary Commission. 1910a. The Reichsbank, 1876–1900. In *The Reichsbank and renewal of its charter*. Vol. 10. Translated from the German. Washington, D.C.: Government Printing Office.
———. 1910b. Renewal of Reichsbank charter. In *The Reichsbank and renewal of its charter*. *See* U.S. National Monetary Commission 1910a.
———. 1910c. *German bank inquiry of 1908, stenographic reports*. Vol. 12. Washington, D.C.: Government Printing Office.
———. 1911a. *Articles on German banking and German banking laws*. Vol. 11. Washington, D.C.: Government Printing Office.
———. 1911b. *German great banks and their concentration*. Vol. 14. Prepared by Jacob Riesser. Washington, D.C.: Government Printing Office.
———. 1911c. *Statistics for United States, Great Britain, Germany, and France*. Vol. 21. Washington, D.C.: Government Printing Office.
Viner, Jacob. 1937. *Studies in the theory of international trade*. New York: Harper and Brothers.
Whale, Philip. 1968. *Joint stock banking in Germany*. London: Frank Cass.

## Comment

Heywood Fleisig

Several yardsticks could be used to measure the contribution of this paper. We might ask, in the framework of a historian's "model," how the paper contributes to understanding the goals and instruments of Reichsbank managers as they operated their institution under the gold standard. Or we might ask questions answerable in the framework of economic

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models: How did Reichsbank operation affect German growth and macroeconomic performance? Does examination of the Reichsbank help us distinguish between the Viner version of the specie-flow mechanism and the perfectly arbitraged version of gold standard adjustment set forth in the McCloskey-Zecher paper? Or, more generally, does the paper help choose among competing contemporary theoretical models? The last question might cast light on the desirability of adopting the gold standard today, a question of contemporary interest considered in the *Report of the Commission on the Role of Gold* (U.S. Congress 1982), released shortly after this conference was held.

By these measures, the paper falls short of delivering the evidence we need in order to choose among competing historical and economic views of the operation of both the Reichsbank and the gold standard.

## The Paper's Contribution to Resolving Historical Issues

A series of questions might interest historians and economists concerned about the German case study that wouldn't require rich economic tools to answer: What did Reichsbank operators intend? How did they achieve their intentions? What were their larger objectives, if any, for the German economy? How did they see the gold standard furthering or impeding these objectives? What did they perceive as the relation between Reichsbank operations and the major economic changes occurring in Germany and the world?

The paper more narrowly circumscribes its inquiry, though, finding that: Reichsbank holdings of bills increased with domestic German economic activity. Reichsbank lending rates fell relative to market interest rates as domestic German economic activity expanded. The money stock moved inversely with German economic activity because giro accounts fell as interest rates rose. And gold drained internally from the Reichsbank as German income rose.

An historian of the gold standard would probably find these facts useful, but they don't move us very far along in understanding what Reichsbank policymakers intended and how they executed their actions.

The author sets forth *manifestations* of intent, but his quantitative measures are consistent with unlimited numbers of stories about the intentions and perceptions of Reichsbank operators. What we see in the pattern of Reichsbank lending rates, for example, might have represented its operators' intent, might have occurred despite their best efforts, might have been the unintended and—to them—the inconsequential side effect of something else they were attempting, or might have been—in their view—exogenous or unavoidable. The paper doesn't present documented hypotheses about the behavior of Reichsbank operators, so its quantitative evidence doesn't permit choosing among these hypotheses.

Historians, like economists, can't escape the positivist assumption underlying science, as expressed starkly and perhaps somewhat extremely by Koopmans: No useful measurement occurs without theory. Explaining Reichsbank behavior requires causal statements. Cause is *defined* by the model, not *observed* in the world. Hume is surely the last philosopher we should neglect at a conference on the gold standard. Explanations, therefore, require models.

Historians construct the functional equivalent of economists' models with webs of conjectures about motive, means, and goals, constructed by examining the complete historical record: documents, letters, speeches, debates, diaries, memoirs, and newspapers. From these facts and conjectures historians produce candidate explanations consistent with these facts and with generally held beliefs about human behavior. Then they devise verbal and quantitative tests to separate false and true explanations.

This difficult, but achievable, standard marks the best monetary histories of the interwar years: those of Chandler (1970), Clarke (1967), Friedman and Schwartz (1963), Kindleberger (1973), and Wicker (1966). These histories all digest large volumes of qualitative material, pose hypotheses about behavior, and examine them with qualitative or quantitative tests. Their hypotheses often reflect both older and present views of how these economic links work, so that we understand how past policymakers operated, not only in terms of their own "views of the world" but as their actions and as events confirm or disconfirm our own current views of how the world works. Sometimes the results are stunning, as when Chandler and Clarke spelled out the motivation for the stabilization loans of the mid-1902s; sometimes the results are provocative, as when Friedman and Schwartz documented the Federal Reserve's puzzling lack of concern over halting the bank failures in the face of the Federal Reserve's clear mandate to operate as the domestic lender-of-last-resort; and sometimes the results are ambiguous, as when we try to determine whether Warren or Rogers had the most influence on Roosevelt's 1933 decision to devalue when both Warren's gold-price theory and Rogers's desire to maintain sterling parity conformed to Roosevelt's ultimate action.

Little of this historical hypothesis building and testing occurs in the paper. Rather, the paper proposes to circumvent that procedure by deducing policymakers' motives from the movements of variables they might control. But such a procedure can no more succeed here than in economics, where econometric reduced-form tests can never distinguish between two different models with the same reduced form. The paper frequently asserts its support for this "historical reduced form," but by failing to independently determine the motives of the Reichsbank operators, this method preserves an elemental vagueness about what the

operators were doing. The same methodology, after all, would permit concluding that the Federal Reserve *desired* the rising volume of bank failures witnessed in its first twenty years.

## The Paper's Contribution to Resolving Economic Issues

The paper needn't answer these historical questions, however, if it aims instead at evaluating the performance of an economy operating under the gold standard. Evaluating German macroeconomic performance does not require knowing the motives of those operating the Reichsbank. It requires knowing only the movements of Reichsbank instruments. Our present understanding of how those instruments affect the economy permits evaluating the effectiveness of Reichsbank operation.

Toward that end, the paper produces several measures of German economic performance: Growth rates of GNP and industrial production showed less year-to-year variation between 1879 and 1913 than between 1951 and 1968, unemployment rates were "low," price stability was "reasonable," and interest rates were "low."

But what permits linking Reichsbank "operation"—and I use this terminology to emphasize that so far we have no evidence of "policy" at all—with the behavior of any of these macroeconomic series? Claiming these macroeconomic consequences follow from Reichsbank actions requires causal statements, and causal statements require models that define cause. Except in this case the models are not the vague, multidisciplinary, heuristic models of the historian, but rather the more formal, optimizing, behavioral models of the economist.

And here this paper, like several others at this conference, goes badly astray: It presents tests that can't distinguish among models with dramatically different implications concerning how the Reichsbank could affect the money stock, and how money could affect real activity. In one rationalization of the specie-flow mechanism, for example, money neutrality operates with some lag; gold flows can alter national money stocks and change some combination of price levels, terms of trade, real trade volumes, and real output. Money and output are correlated, and the Reichsbank can use its financial operations to influence real activity. But in a Mundell-Fleming gold standard world, perfect capital mobility would ensure that no change in monetary instrument could affect real activity. Rather, only real changes can affect real activity: investment incentives, government spending, taxes, or tariffs. Since money demand is always satisfied, we again observe money correlated with output; but money is not a policy instrument and the Reichsbank cannot affect real activity. Or, in the McCloskey-Zecher (1976) version of the monetary theory of the balance of payments, money neutrality is always satisfied, product substitution is high, and arbitrage is perfect. Monetary policy cannot change relative price levels, the trade balance, or real output—it can only

cause gold movements. Money and output are again correlated, but Reichsbank operations have no effect on the real economy.

This paper uses a specie-flow model that essentially assumes that economies interact only through the movement of gold and are in other respects closed. Using a closed-economy monetary model to describe an open economy is an understandable error in the Friedman and Schwartz monetary history, written on the eve of "Mundell-Fleming" (1968; 1971) before twenty years of professional ferment on the question of how open economies interact. But what can be the use of replicating correlations between money and output when we now know they cannot distinguish among competing underlying models?

My own priors, weak for reasons I set forth below, are that nineteenth-century central bankers were probably right in believing they had little control over national price levels and real output. I will now present some theoretical issues that might help distinguish among these various versions of gold standard operation and that might give hints about how changes in the Reichsbank's economic environment might have changed its ability to operate during the period considered in the paper. And I will consider some other theoretical issues that raise questions about other functions that central banks might have served under the gold standard.

*Capital Mobility*

In an early Mundell-Fleming result, perfect capital mobility under fixed exchange rates and money neutrality combined to ensure that central-bank operations had no effect on domestic output. In that world, the effectiveness of domestic monetary change, as found in the Friedman and Schwartz monetary history, could depend on capital-market imperfection, or on substitution between assets denominated in different currencies being sufficiently imperfect to permit domestic interest rates to diverge from foreign interest rates and differentially affect the home economy. Without such barriers to capital mobility or imperfect substitution among assets, U.S. interwar monetary policy could have caused the U.S. Great Depression only if U.S. monetary policy so dominated other countries' monetary policies that it produced recession abroad at the same time or even before it produced recession within the United States. The latter, of course, was Keynes's own view of the origins of the Depression.

In this Mundell-Fleming world, countercyclical movements of monetary aggregates in small economies can affect the real economy only when barriers impede capital flows. The history of monetary policy becomes the history of the integration of one country's capital market with those of other countries. Whether integration was sufficiently small or changed enough to permit the Reichsbank to affect relative interest rates by enough to affect real output would be an interesting question. But aside

from an inconclusive regression on U.K. interest rates and a conjecture that direct foreign investment might have financed the trade deficits that were positively correlated with German income movements, the paper does not discuss how changing asset substitutability and interest-rate differentials might have combined to change Reichsbank control over the real economy.

*Goods-Market Integration and Price-Level Determination*

Integration of goods markets, homogeneity of commodities, and neutrality of money imply no difference in national price levels, measured in gold, so long as countries remain on the gold standard; relative national aggregate price levels, moreover, cannot change if the exchange rate is fixed. The central bank performs no function besides guaranteeing gold convertibility (I will discuss default below). If the central bank attempts to change the domestic money stock in order to change the externally imposed price level, gold will flow in or out until the attempt stops. This prospect explains the extreme view of the monetary theory of the balance of payments, where the central bank determines only gold flows, not the price level or real activity.

The current international-finance literature largely views the perfect-substitute, short-run money neutrality version of the monetary theory of the balance of payments as inadequately characterizing international economic adjustment. In most current views, national price levels do diverge and purchasing-power parity does not hold at every instant. National price levels and real terms of trade change—not by accident or randomly as some papers here suggest—to equilibrate both goods and asset markets (discussed below).

One determinant of the effectiveness of national monetary policy, therefore, lies in how much the terms of trade can change, which depends on changing substitutability among different national outputs and the speed with which long-run money neutrality obtains. An investigation of this issue might stress the shift from noncommercial agriculture to commercial agriculture facing world markets, the rise of product-differentiating manufacturing industries, changes in market organization such as cartel formation, evolution of national market power, or changes in commercial policy. Each of these changes occurred in Germany during this period. Dramatic changes in potential terms-of-trade adjustment can occur over a thirty-five-year period. The adjustment will differ substantially among countries and may explain changes in the apparent performance of the gold standard as well as national differences in its operation. But the paper I discuss, like several others presented here, addresses such issues only peripherally because such questions have no place in the paper's theoretical framework.

*Portfolio Balance and Asset-Market Equilibrium*

Under the gold standard, domestic economic agents collectively hold at least the money, gold, and securities of their own countries. Yet these assets have different traits and cannot be perfect substitutes because, among other reasons, there is some chance of uncorrelated defaults (a point recognized in the paper). The effectiveness of monetary policy could be greater than I expressed in my weak prior, or it could increase over time, because different financial instruments exist or come into being. Such instruments could give the Reichsbank more ability to influence interest rates and interest-rate differentials, since imperfect substitution would have changing rates equilibrating the foreign demand for Reichsmark-denominated interest-bearing assets and the domestic German demand for money.

Bits and pieces of this story appear in the paper: federal debt rises to 10 percent of social product by 1913, an unspecified mechanism determines the volume of bills of exchange, the Reichsbank might be holding foreign securities at the end of the period, inflows of direct foreign investment might finance payments imbalances (in unspecified form), but short-term lending might as well.

In newer hypotheses about international adjustment, monetary changes alter portfolio equilibria and generate the changes in the real terms of trade required for adjustment. So in one version of the story, relative price-level adjustment would be determined entirely by the pieces of the gold standard story this paper holds offstage.

*Default Conditions*

In one polar view of the gold standard, central banks serve no national monetary stabilization function. Price levels in individual countries remaining on the gold standard rise and fall system-wide since national monetary policy has no uniquely national effect; national policies spill out and affect the whole system. In any country, for any nominal value of gold, default conditions determine the volume of paper claims convertible to gold—at some volume of such redeemable claims, the promise to redeem becomes implausible, and a run on the country's gold stock forces it off the gold standard. These default conditions determine the stock of assets convertible to gold and the price level in each currency and, thereby, the world price level associated with a certain set of national currency gold prices.

The central bank can't affect the price level or real activity; only different real factors produce differences in national economic outcomes. In such a world, the only important role of the central bank is maintaining gold convertibility—managing currency to avoid internal and external

drains large enough to produce runs. The correct model for the Reichsbank would emphasize the same issues as would the solvency of any individual borrower—the relation between the stock of gold and the stocks of currency and national-debt instruments convertible to gold.

Or, in a less polar view of gold standard operation, a different default risk might, by itself, guarantee the imperfect asset substitution required to give the Reichsbank some influence over interest rates and real variables. Imperfect substitution could arise from the different probabilities of default on the pledge to redeem in gold different assets like gold coin, Reichsbank notes, federal-government debt, and private debt. Central-bank operations in that portfolio could then change relative rates of return and real activity.

These issues have been discussed extensively in the bank-run, speculative bubble, and debt-default literature. But to answer these questions we need to know such things as the expected rate of GNP growth, the savings rate, the maximum-sustainable current-account surplus, and the variance of these magnitudes. Here, as before, the paper presents no such data and measures no such concept because the paper's underlying model ignores these elements in explaining the link between Reichsbank actions and German macroeconomic performance.

*Finite Resource Economics*

Long before OPEC drove Hotelling's (1931) result in finite-resource economics into every corner of the profession—even to the gold standard with the work of Flood and Garber (1981)—the "finiteness" of gold was featured as an attractive part of making it money. Now we know, though, that equilibrium in the gold market requires that the marginal profit from holding gold rise with the rate of interest. Under some cost conditions, the price of gold must then rise as well. But if the nominal price of gold is fixed, its real price can rise only if the general price level falls. In such a world, general price stability exists only when serendipitous changes in gold refining and discovery shift the rising real-equilibrium gold-price path downward to offset its rising equilibrium price path.

The older, itself precarious view, was that Providence, in its wisdom, would permit the gold stock to rise exogenously at about the same rate that exogenous labor-force growth and technical progress continued to raise output and increase the transactions demand for money. To this view we now must add the requirement of *unexpected* increases in the gold stock; expected ones can't suffice because they will be factored into the initial price path, determining the initial level but not its rate of increase.

## Conclusion

It is always difficult to balance the unfairness of attacking the author for failing to write the paper you would have liked to read with the need to

point out where the paper falls short of contributing to our knowledge. Moreover, this paper certainly does not stand alone at this conference in neglecting the issues raised in this comment.

As a history paper, the author presents some measures of Reichsbank operation that may be consistent with any number of bank objectives including, as the paper favors, nothing more than the desire to maintain gold convertibility. The evidence presented in the paper, though, proves no one Reichsbank objective more important than any other.

As an economics paper, all the evidence presented is consistent with the simple null hypothesis I started with: independent German Reichsbank manipulation of monetary aggregates could have no important independent effect on German prices, interest rates, or output between 1879 and 1913; all important events in the real German economy occurred because of other events in the real German economy or because of *world* movements in monetary variables. As I have indicated, I hold this view only weakly because other factors could have made national monetary policy effective; but the paper does not cast light on this possibility.

**References**

Chandler, Lester V. 1970. *America's greatest depression, 1929–1941*. New York: Harper & Row.

Clarke, Stephen, V. O. 1967. *Central bank cooperation. 1924–31*. New York: Federal Reserve Bank of New York.

Fleming, J. Marcus. 1971. *Essays in international economics*. Cambridge: Harvard University Press.

Flood, Robert P., and Peter M. Garber. 1981. Gold monetization and gold discipline. International Finance Discussion Papers no. 190, Board of Governors of the Federal Reserve System.

Friedman, Milton, and Anna J. Schwartz. 1963. *A monetary history of the United States, 1867–1960*. Princeton: Princeton University Press.

Hotelling, Harold. 1931. The economics of exhaustible resources. *Journal of Political Economy* 39 (Apr.): 137–75.

Kindleberger, Charles P. 1973. *The world in depression, 1929–1939*. Berkeley: University of California Press.

McCloskey, Donald N., and J. Richard Zecher. 1976. How the gold standard worked, 1880—1913. In *The monetary approach to the balance of payments*, ed. J. Frenkel and H. G. Johnson. Toronto: University of Toronto Press.

Mundell, Robert A. 1968. *International economics*. New York: Macmillan.

U.S. Congress. 1982. *Report of the commission on the role of gold in the domestic and international monetary systems*. Washington, D.C.: GPO.

Wicker, Elmus R. 1966. *Federal Reserve monetary policy, 1917–1933.* New York: Random House.

## General Discussion

PIPPENGER commented on Fleisig's remarks concerning the portfolio-balance approach to international adjustment. The portfolio-balance view suggests that there should be systematic patterns in the real exchange rate. Pippenger suggested that real exchange rates apparently performing a random walk are inconsistent with the asset-market approach to the balance of payments. In respect of the behavior of the Reichsbank, Pippenger suggested a very simple model. Portfolio balance is an inappropriate assumption to use to model the behavior of the Reichsbank, a profit-maximizing institution. Since the Reichsbank's stock was privately owned, it almost certainly had an interest in profit. Such a bank would have had a desired reserve ratio, which would fall as market interest rates rose. As the market rate rose, the Reichsbank would increase the rate it charged for loans, but by less than the market rate, narrowing the spread between market rates and loan rates, increasing its holdings of securities, and reducing its reserve ratio.

MCGOULDRICK responded by noting that his paper mentions as a possibility the hypothesis of profit-maximizing behavior. The problem with the profit-maximizing hypothesis is that it implies that the mark should fall in value relative to other currencies during an upswing. However, we do not observe the mark falling in value, even within the gold points, during business-cycle upswings, and, symmetrically, we do not see the mark consistently rising in value during business downswings.

While acknowledging that the Reichsbank had private shareholders, McGouldrick noted that Reichsbank officials were Reich civil servants, paid according to the civil servant's scale. One does not usually think of bureaucrats as intimately concerned with the level of dividends paid to shareholders. But the question remains open.

FRENKEL commented on various discussants' different conceptions of the monetary approach to the balance of payments. He argued that the monetary approach is merely an analytical framework that suggests to the extent a central bank conducts open-market operations, it can affect the composition of the monetary base but not its level, at least in the long run. The speed of adjustment is a separate consideration. Frenkel argued that it may not be illuminating to pose various approaches in the context of a horse race, where one must win and others must lose. A reasonable approach must simply be consistent with the fact that a deficit in the balance of payments cannot be sustained unless the central bank is both

willing and able to consistently intervene in such a way as to supply more money than is demanded.

EICHENGREEN raised a point in connection with the discussion of the proper way to model the international transmission mechanism. He noted the absence from the conference of a paper that presents evidence concerning covered and uncovered interest parity for the major participants in the classical gold standard. Fleisig's comments could be taken to suggest that there existed a risk premium that would have rendered assets denominated in different currencies imperfect substitutes for one another, permitting interest parity to be violated. Another way of modeling the financial sector is to assume the absence of a risk premium and, since interest parity holds, to concentrate on the margin of substitution between money and bonds. The first approach would suggest the adoption of a fully articulated portfolio-balance model; the second would suggest a simple model of the money market. Thus, a crucial question is the importance of currency-specific risk. There are a number examples in the late nineteenth century of Latin American countries that defaulted on their foreign debt. Whether there are examples of default or similar sources of currency-specific risk close to the center of the gold standard system would seem to be a crucial consideration in guiding choice of specification for modeling the financial sector.

RICH questioned McGouldrick's assertion that the German monetary base actually moved countercyclically. He argued that one must also take into account gold coin held outside banks, which moved procyclically and may have more than offset the countercyclical movement of Reichsbank liabilities.

MCGOULDRICK pointed out that his table 7.5 contradicts Rich's statement. He found that high-powered money grew on average by 3.8 percent a year during upswings but rose by 5.0 percent on average during business-cycle downswings. In other words, high-powered money moved countercyclically. Specie alone did have a mild procyclical movement, its annual growth rate averaging 6.7 percent during upswings but only 5.2 percent during downswings. Putting the two components of high-powered money together indicates that the countercyclical movements in Reichsbank liabilities more than outweighed the mild procyclical movement in specie in the hands of the public. Thus, total high-powered money moved countercyclically.