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Chapter Author: Rudiger Dornbusch, Jacob A. Frenkel

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5 The Gold Standard and the Bank of England in the Crisis of 1847

Rudiger Dornbusch and Jacob A. Frenkel

> When there occurs a state of panic—a state which cannot be foreseen or provided against by law—which cannot be reasoned with, the government must assume a power to prevent the consequence which may occur.
>
> —Sir Robert Peel (1847)[1]

5.1 Introduction

The acceleration of world inflation during the 1970s along with the rise in the rate of unemployment and the general instability of money and prices have renewed interest in the operation of the gold standard. Recent proposals for a return to some variant of the gold standard stem from the belief that a return to such a standard will restore macroeconomic stability. The belief is based on a casual look at history with the consequent inference that the gold standard contributed to the stability of the system. That view of price stability was supported by Keynes who argued in *Essays in Persuasion*:

> The course of events during the nineteenth century favoured such ideas. . . . The remarkable feature of this long period was the relative *stability* of the price level. Approximately the *same* level of price ruled in or about the years 1826, 1841, 1855, 1862, 1867, 1871, and 1915. Prices were also level in the years 1844, 1881, and 1914. . . . No

Rudiger Dornbusch is professor of economics at the Massachusetts Institute of Technology and a research associate of the National Bureau of Economic Research.

Jacob A. Frenkel is professor of economics at the University of Chicago and a research associate of the National Bureau of Economic Research.

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> wonder that we came to believe in the stability of money contracts over a long period. The metal *gold* might not possess all the theoretical advantages of an artificially regulated standard, but it could not be tampered with and had proved reliable in practice. (Keynes 1932, pp. 88–89)

But another view of the history of the gold standard during the nineteenth century reveals a succession of crises of varying length and depth. As documented by Hyndman [1932] 1967, the nineteenth century in the United Kingdom witnessed at least eight serious crises: in 1825, 1836–39, 1847, 1857, 1866, 1873, 1882, and 1890. Given this perspective of the gold standard era the relevant question should be not only how the gold standard worked but also why did it fail.

The origins of the various crises during the gold standard era vary. Some were "real" and some were "financial," some autonomous (like a massive harvest failure), and some induced by mistaken policies. Of course, no proponent of the gold standard has suggested that it would eliminate harvest failures. The question, therefore, is whether and to what extent the policies that are induced by the rules of the game mitigate or exacerbate the severity of crises. Our paper examines the 1847 crisis in Great Britain. That year, well documented by parliamentary inquiries, is of special interest because the origin of the crisis was "real." A harvest failure gave rise to commercial distress and financial panic, the extremity of which was remarkable. Our analysis examines the operation of the gold standard, the policies of the Bank of England, as well as the speed and extent of international adjustment in the form of gold and capital flows.

The paper proceeds as follows: Section 5.2 provides a brief account of the main events in the United Kingdom during 1847. Section 5.3 studies the institutional setting of the gold standard and spells out a formal model of the financial markets. The two crises of April and October 1847 are studied in section 5.4. In section 5.5 we discuss whether suspension of Peel's Act was necessary. The paper concludes with some observations on the gold standard as a monetary system.

5.2 Outline of Events

The events of 1847 were initiated by a major harvest failure in Ireland and England in 1846. The shortage of domestic food supplies led to large price increases and trade deficits which in turn brought about an external drain of bullion from the Bank of England. These developments occurred against the background of the "railway mania" which commenced in 1845. The railway mania along with the food shortage resulted in a massive financial crisis, the analysis of which is the subject of this paper. The characteristics of the 1847 crisis were stated by John Stuart Mill:

> It is not, however, universally true that the contraction of credit, characteristic of a commercial crisis, must have been preceded by an extraordinary and irrational extension of it. There are other causes; and one of the more recent crises, that of 1847, is an instance, having been preceded by no particular extension of credit, and by no speculations; except those in railway shares. . . . The crisis of 1847 belonged to another class of mercantile phenomena. There occasionally happens a concurrence of circumstances tending to withdraw from the loan market a considerable portion of the capital which usually supplies it. These circumstances, in the present case, were great foreign payments, (occasioned by a high price of cotton and an unprecedented importation of food,) together with the continual demands on the circulating capital of the country by railway calls and the loan transactions of railways companies. . . . This combination of a fresh demand for loans, with a curtailment of the capital disposable for them, raised the rate of interest, and made it impossible to borrow except on the very best security. Some firms . . . stopped payment: their failure involved more or less deeply many other firms which had trusted them; and, as usual in such cases, the general distrust, commonly called a panic, began to set in, and might have produced a destruction of credit equal to that of 1825, had not circumstances which may almost be called accidental, given to a very simple measure of the government (the suspension of the Bank Charter Act of 1844) a fortunate power of allaying panic, to which, when considered in itself, it had no sort of claim. (Mill 1871, bk. 3, chap. 12, section 3)

Table 5.1 reports selected data for the period 1845–48. 1847 was characterized by a deterioration in the balance of trade and the terms of trade as well as by a significant rise in the price of wheat and the other price indexes.

The trade-balance deficit caused gold outflows and an accompanying reduction in the supply of Bank of England liabilities and credit. While

Table 5.1 **Selected Data for Great Britain, 1845–48**

	1845	1846	1847	1848
Exports	69.4	67.0	70.5	61.2
Imports	88.4	87.3	112.1	88.2
Trade balance	−19.0	−20.3	−41.6	−27.0
Terms of trade	119.6	115.1	112.5	121.7
Price of wheat	50.8	54.7	70.0	50.5
Price of agricultural products	120.0	118.0	125.0	107.0
Price of industrial products	99.0	99.0	104.0	92.0

Source: All data are from Mitchell 1962.

Notes: The balance-of-payments data are measured in £ million; the terms of trade are an index of the net barter terms (1880 = 100); the price of wheat is in shillings per imperial quarter; and the prices of agricultural and industrial products are the Rousseaux price indexes (1885 = 100).

the external bullion drain was one direct consequence of the harvest failure, a second one was the extensive commercial failures arising from speculative forward purchases of foodstuffs for delivery in mid-1847. By the time these contracts came to maturity, a good harvest for 1847 was expected, and that change in expectations led to a drastic decline in spot prices and default of many trading establishments. In addition, the precarious financial position of many enterprises that had taken part in the railway speculations reduced confidence in the financial integrity of the system and resulted in an internal drain of bank reserves.

Figures 5.1–5.3 show the weekly data for the stock of bullion in the Bank of England, the Bank's note reserve, the stock of notes held outside the Bank, and the price of consols (the sources of the data are listed in the Appendix).

Two major crises occurred during the year. The April crisis arose from the reversal of Bank of England credit policy. Having followed to that date a policy of sterilization of the credit effect of the deficit by lowering its reserve-deposit ratio, the Bank reversed its policy in April by raising the discount rate and only sparingly accommodating the discount market. The suddenness and severity of the action led to a panic as the best houses in the trade found it impossible to obtain domestic credit.

The panic in October by contrast was due to an internal drain that resulted from a loss of confidence in the convertibility of bank deposits into Bank of England notes and was essentially due to the operation of Peel's Act, which is described in the next section. That crisis was overcome by the joint effect of a suspension of the prohibition of fiduciary issue and of a discount rate at an unprecedented level of 8 percent. The

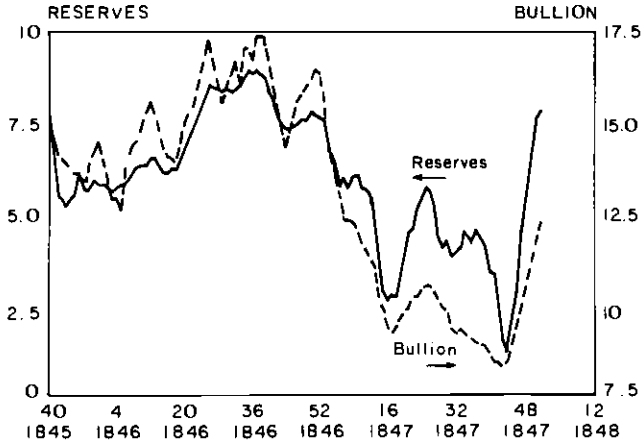

Fig. 5.1 Bank of England holdings of bullion and note reserves (in million £).

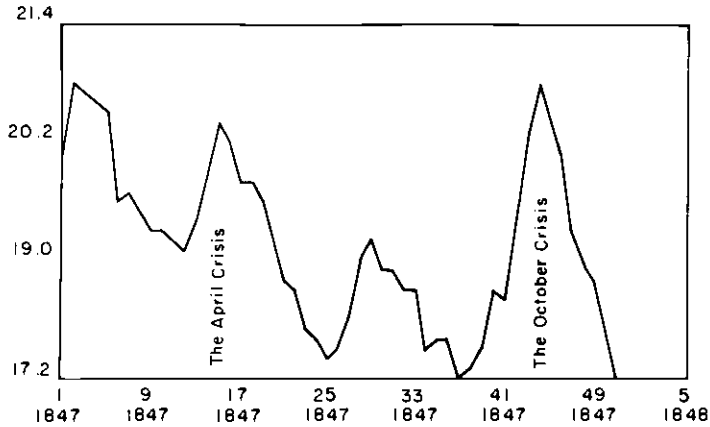

Fig. 5.2 Stock of currency, 1847 weekly data (in million £).

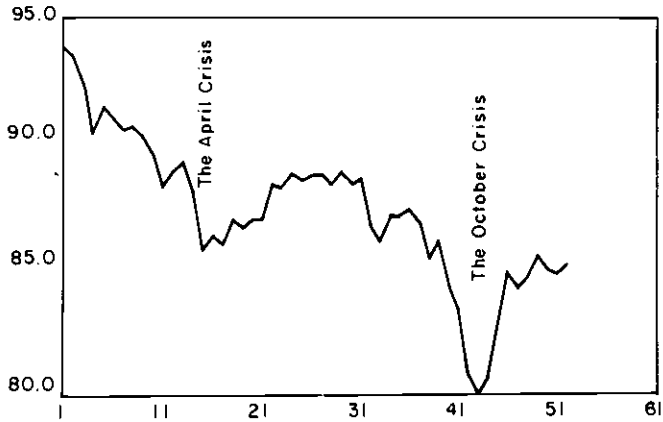

Fig. 5.3 Price of 3 percent consols, 1847 weekly data.

policy led domestically to a full return of confidence and a reduction in defensive liquidity positions while at the same time attracting gold and capital from the rest of the world. By the end of the year the Bank of England had restored its note reserve as well as its stock of bullion to the levels prevailing prior to the year of crisis. Both in April and in October the timing of the public-sector-deposit withdrawals aggravated significantly Bank of England liquidity problems and contributed to precipitating the crises.

The policies pursued to alleviate the October panic were an early application of by now well-accepted central-banking principles. In the subsequent section we develop an analytical framework to study the interaction of external payments and the financial system.

5.3 Institutions and a Model of Financial Markets

In what follows we discuss the events of 1847 in the context of a simple model. The model establishes how the rate of interest is determined by the existing stock of bullion, currency preferences of the public, and reserve behavior of the Bank of England. The analysis starts with the institutional setting, namely the provisions of Peel's Act of 1844.

5.3.1 The Provisions of Peel's Act and the Money Supply

Peel's Act, passed by Parliament in 1844, essentially enacted the doctrine of the "currency school."[2] The main provisions were the following:

1. The Bank was separated into Banking and Issue departments.
2. The fiduciary note issue was limited to fourteen million pounds sterling, and the supplementary note issue required a 100-percent marginal bullion reserve.
3. Notes were issued for bullion at 13.17*s*.9*d* pound sterling per ounce of gold.

The consolidated balance sheet of the Issue and Banking departments is shown in table 5.2. Several points are worth noting. First, public deposits, including in particular the Exchequer and the account for debt service (entitled "For Payment of Dividends"), are distinguished from private deposits that include bankers' accounts. Second, on the liability side, the item "circulation" refers to Bank of England notes including seven-day and other bills. The latter remain less than one million pounds throughout. On the asset side, the item "bullion" refers to silver and gold bullion as well as coin in the Bank.

To study the Bank of England as it operated under Peel's Act, we show in table 5.3 the corresponding disaggregated balance sheets of the Banking and Issue departments, respectively.

In analyzing the balance sheet two comments are relevant: First, the Issue Department has security holdings in the amount of £14 million that back the fiduciary component, (F), of note issue, (N), but at the margin there is 100 percent backing of note issue. Furthermore, note issue is confined to the Issue Department. Second, the Banking Department holds part of the Bank of England note issue as reserve, (R), against its deposit liabilities, $(D + G)$.

The money supply—by which is meant here the supply of Bank of England liabilities—equals the sum of currency and *private* deposits, and the monetary base equals the sum of currency and reserves. With these definitions we express the proximate determinants of the money supply in equation (1):

$$M \equiv \frac{1 + c}{c + r\alpha}[B + F] = m(c, r)[B + F], \tag{1}$$

Table 5.2 **The Consolidated Bank of England Balance Sheet, 17 April 1847** (in £)

	Assets	
Public securities:		
Advances on Exchequer bills:		
Deficiency	1,315,000	
Other Exchequer bills	—	
Exchequer bills purchased	10,000	
Stock and annuities	9,800,000	
		11,125,000
Private securities:		
Bills discounted:		
London	6,375,000	
Country	4,280,000	
		10,655,000
East India bonds	466,000	
City bonds, &c.	4,140,000	
Mortgage	512,000	
Advances:		
Bills of exchange	931,000	
Exchequer bills, stock, &c.	407,000	
		6,456,000
		28,236,000
Bullion		9,330,000
TOTAL		37,566,000
	Liabilities	
Circulation:		
London	14,274,000	
Country	6,879,000	
		21,153,000
Deposits, public, viz.		
Exchequer account	712,000	
For payment of dividends	1,232,000	
Savings banks, &c.	259,000	
Other public accounts	808,000	
		3,011,000
Deposits, private, viz.		
Railways	1,228,000	
London bankers	1,695,000	
East India company	536,000	
Bank of Ireland, Royal Bank of Scotland, &c.	297,000	
Other deposits	5,129,000	
Deposits at branches	1,120,000	
		10,005,000
TOTAL		34,169,000

Source: United Kingdom, Parliament 1848a, app. 8, p. 131.

Table 5.3 **Bank of England Disaggregated Balance Sheet**

Banking Department		Issue Department	
Assets	Liabilities	Assets[a]	Liabilities
Note reserves (R)	Private deposits (D)	Gold (B)	Notes (N)
Loans (L)	Public deposits (G)	Securities (F)	

[a]As usual, we suppress the equity component in the balance sheet.

where $m(c, r) \equiv (1 + c)/(c + r\alpha)$ is the money multiplier. The ratio of total to private deposits is denoted by $\alpha \equiv (D + G)/D$, c denotes the currency–private-deposit ratio of the nonbank public, and r is the actual reserve–total-deposit ratio of the Banking Department.[3] From equation (1) it can be seen that an increase in bullion B, given the reserve- and currency-deposit ratios, will increase the money stock as will a reduction of the ratio of total to private deposits and of the reserve- and currency-deposit ratios. Throughout this paper the discussion is confined to the supply of Bank of England note and deposit liabilities.

5.3.2 The Financial Model

The currency-deposit ratio is determined by institutional factors as well as by the reserve-deposit ratio. Specifically, a rise in the actual reserve-deposit ratio, r, is assumed to enhance confidence in the convertibility of deposits into notes (internal convertibility), and therefore it reduces the desired currency-deposit ratio, c. This relation between c and r is expressed by equation (2):

$$c = c(r),\ c' \leqslant 0. \tag{2}$$

With this assumption the money-supply function (1) becomes:

$$M = \tilde{m}(r)\,[B + F];\ \tilde{m}' \leqslant 0. \tag{3}$$

where $\tilde{m}(r) \equiv m(c(r), r)$.

Our specification implies that a rise in the reserve-deposit ratio exerts two effects on the money multiplier. First, the ratio reduces the multiplier directly through the increased use of high-powered money by the Banking Department; and second, the rise in the reserve-deposit ratio raises confidence and thereby reduces the currency-deposit ratio, which in turn increases the money multiplier. In what follows we assume that the net effect of a higher reserve-deposit ratio is to lower the money multiplier, that is, $\tilde{m}' < 0$. This may appear plausible at first sight but is in fact a strong assumption since it eliminates the possibility of a dominating impact of the internal convertibility problem.

The demand for real balances is assumed to depend on real income, y,

as well as on the rate of interest, i, in the conventional way. Monetary equilibrium requires that the real money stock, M/P, equals the demand for real balances, $L(\ )$ as in equation (4):

$$\tilde{m}(r)[B + F]/P = L(i, y); \qquad L_i < 0,\ L_y > 0. \tag{4}$$

Focusing on the short run of weeks or months rather than a year or more, we take both prices and output as exogenous to the financial sector.[4] With this assumption and with a given fixed stock of fiduciary issue, equation (4) can be solved for the equilibrium interest rate as a function of the reserve-deposit ratio and the stock of bullion:

$$i = i(r, B; \ldots); \qquad i_r > 0,\ i_B < 0. \tag{4'}$$

The adjustment of the Bank's lending policy, motivated by prudence and profit, is described in equation (5). The Banking Department adjusts gradually, raising the reserve-deposit ratio through credit contraction, in proportion to the discrepancy between the desired reserve-deposit ratio $\phi(\ )$ and the actual ratio, r. Thus,

$$\dot{r} = v[\phi(i) - r],\ \phi' < 0. \tag{5}$$

In equation (5) the desired reserve-deposit ratio, $\phi(i)$, declines as the rate of interest increases. This decline reflects the behavior of the Banking Department: in response to more profitable loan opportunities the desired liquidity of the balance sheet is reduced.

A specification of the rate of inflow of bullion completes the model. The rate of inflow of bullion or the balance of payments, denoted by $\dot{B}$, depends on the exogenous trade balance as well as on the rate of capital inflow. Capital flows respond positively to the international interest differential, $i - i^*$, and the foreign interest rate, i^*, is taken as given:

$$\dot{B} = B(i - i^*; \ldots);\ \dot{B}_i > 0. \tag{6}$$

Again, we concentrate on the short term and therefore leave relative prices and output as exogenous to the model.

5.3.3 Formal Dynamics

Equations (4'), (5), and (6) represent a dynamic model of the interaction between the Banking Department's credit policy and the balance of payments. Substituting equation (4') in equations (5) and (6) yields the following pair of equations:

$$\dot{r} = G(r, B);\ G_r < 0,\ G_B > 0. \tag{7}$$

$$\dot{B} = H(r, B);\ H_r > 0,\ H_B < 0. \tag{8}$$

where the signs of the partial derivatives follow from the previous assumptions. It is readily verified that the system shown in figure 5.4 must be stable.

In figure 5.4 the $\dot{r} = 0$ schedule shows the locus of reserve-deposit ratios and levels of bullion at which the Banking Department is in equilibrium with respect to its liquidity position. Therefore, along that schedule the reserve-deposit ratio is neither rising nor falling. At points above the schedule, the high reserve-deposit ratio implies a low real-money supply and thus high interest rates. The preferred reserve-deposit ratio is low, and therefore above the $\dot{r} = 0$ schedule the reserve-deposit ratio is being lowered. Conversely, below the $\dot{r} = 0$ schedule, the Banking Department seeks to become more liquid because interest rates are low, and therefore the reserve-deposit ratio is raised.

Along the $\dot{B} = 0$ schedule the balance of payments is in equilibrium. Points below and to the right of the schedule correspond to high money supplies, low interest rates, capital outflows, and therefore deficits and falling bullion. By contrast, points to the left of the schedule involve high interest rates and growing levels of bullion. Along the $\dot{B} = 0$ schedule the interest rate is compatible with external balance. The interest rate is higher above and to the left of the schedule and lower below and to the right of the schedule. The relative slopes of the two schedules are implied by the previously assumed restrictions.

As the arrows indicate, the dynamic model of the financial sector must be stable and the approach to equilibrium cannot be oscillatory. From any initial reserve-deposit ratio and stock of bullion, the adjustment process leads to the steady state at point A where the Bank's liquidity position is in equilibrium and external payments are balanced.

The response of the Bank's reserve-deposit ratio to the rate of interest is reflected in the slope of the $\dot{r} = 0$ schedule. The less responsive the

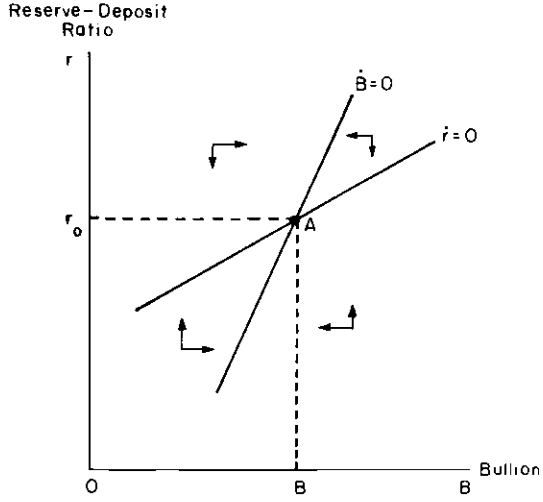

Fig. 5.4 Financial model.

Bank, the flatter the schedule; in the extreme, when the Bank is entirely unresponsive, the desired reserve-deposit ratio is constant and the $\dot{r} = 0$ schedule is horizontal. As the reserve-deposit ratio becomes more responsive, the schedule steepens until, in the limit, its slope coincides with that of the $\dot{B} = 0$ schedule. The responsiveness of the reserve-deposit ratio, of course, determines the extent to which interest rates move in the adjustment process. If the reserve-deposit ratio declines in response to high interest rates, then a shortage of bullion will in part be offset by increased lending on the part of the Bank and interest rates therefore will tend to be lower, the balance of payments will be smaller, and the rate of adjustment will be slower. Conversely, if the reserve-deposit ratio is unresponsive, a shortage of bullion implies a sharper reduction in the money stock, high equilibrium interest rates, larger capital flows, and faster adjustment.

5.3.4 The Adjustment Process

The traditional model of the price-specie-flow mechanism, originating with David Hume, emphasizes the impact of relative prices on the trade balance and hence on the balance of payments and the international flow of bullion. A deterioration of the external balance due to increased aggregate spending or an adverse development of net exports will lead to bullion export, monetary deflation, declining spending, and price deflation. Both the decline in spending and deflation work to restore external balance.

The model we have sketched here, on the contrary, places emphasis on capital flows and banking policy as the main factors in the adjustment process. The two views of the adjustment mechanism are of course complementary, although they may well correspond to different adjustment periods. In the short run, banking policy and capital flows are likely to be the main factors determining bullion flows, since, in the short run, prices and trade flows do not adjust to the full, possible extent.

The role of capital flows in the adjustment process was recognized by contemporaries. John Stuart Mill, in particular, noted:

> It is a fact now beginning to be recognised, that the passage of the precious metals from country to country is determined much more than was formerly supposed, by the state of the loan market in different countries, and much less by the state of prices. (Mill 1871, bk. 3, chap. 8, section 4)

In addition to the difference between the balance of trade and the capital account in facilitating adjustment, there is another aspect of the adjustment process that deserves emphasis. The traditional representation of the gold standard takes it to be an automatic, nondiscretionary

adjustment. Bullion flows are matched one-for-one by changes in the amount of currency outstanding. This is, of course, not the case once the reactions of the Banking Department are taken into account. Changes in the reserve-deposit ratio of the Banking Department affect the money stock independently of the existing stock of bullion. The question then arises whether during the 1847 episode the Banking Department's credit policy might in fact have amounted to partial or even complete *sterilization* of bullion flows. The possibility of credit expansion by the Bank and of loss of note reserves to finance the export of bullion is suggested by the data which reveal a high correlation between weekly changes in bullion and in note reserves.

Consider an autonomous, transitory improvement in the trade balance which leads to an inflow of bullion and therefore to a monetary expansion. The monetary expansion lowers the interest rate, and, with a constant reserve-deposit ratio (or a flat $\dot{r} = 0$ schedule in figure 5.4), the lower interest rate leads to capital outflows and thereby to restoration of the initial equilibrium. Now if, on the contrary, the reserve-deposit ratio rises due to the Banking Department response to the reduced profitability of loans, then the rise in the reserve-deposit ratio dampens the decline in interest rates and therefore slows down the adjustment process. The Banking Department's reaction to the interest rate will only slow the speed of adjustment but will not eliminate the adjustment process. Thus our model is also capable of incorporating a partial sterilization policy with an effect of dampening interest-rate movements and reducing the speed of adjustment.

Changes in the reserve-deposit ratio enter consideration in another respect. If the Bank, perhaps in response to a loss of confidence on the part of the public, decides to raise the reserve-deposit ratio, then this raise, of course, leads to a reduction in the supply of money and credit. Interest rates rise and that state persists until bullion inflows accommodate the desired increase in reserves. The model suggests therefore that changes in the Bank's reserve preferences may be an important source of macroeconomic disturbance.

The possibility of internal inconvertibility turns out to be an important issue in the 1847 crisis. Internal inconvertibility would arise if the Banking Department should become sufficiently illiquid not to be able to redeem its deposit liabilities in notes. Thus there is a clear distinction between external or gold convertibility and internal or note convertibility. Note convertibility involves the Banking Department's reserve-deposit ratio. If the reserve-deposit ratio falls too low, the public loses confidence and reacts by raising the currency-deposit ratio. While our model embodies this reaction of the public, the reaction is for the moment not allowed to exercise a dominating influence.[5]

5.3.5 Some Evidence

Before discussing in detail the various crises that occurred during 1847, we look at some evidence that is consistent with the general analytical framework outlined in this section.

The dynamic model was summarized by equations (7) and (8). Changes in the reserve-deposit ratio depend negatively on the level of that ratio and positively on the stock of bullion, while changes in the stock of bullion depend positively on the reserve-deposit ratio and negatively on the stock of bullion. In table 5.4 we report regressions of the changes in the reserve-deposit ratio and bullion on the previous-week levels of these variables. The coefficients have the predicted sign and are statistically significant. We view these estimates as providing support for the analytical framework that was developed in this section, and we turn next to a more detailed analysis of the crises of 1847.

5.4 Financial Markets and the Balance of Payments in 1847

5.4.1 The April Crisis

The harvest failure of 1846–47 depleted the bullion in the Bank in the fall of 1846 and more so in early 1847. Table 5.5 shows the development of bullion, note reserves, the reserve-deposit ratio, the discount rate, and the stock of notes in the hands of the public during the first half of 1847. The table brings out forcefully the magnitude of this depletion. Indeed, over the period 2 January to 17 April 1847, bullion fell by about 40 percent and note reserves in the Banking Department declined by about 70 percent. The extraordinary decline in the reserve-deposit ratio from 46 percent to 19.6 percent implies that the Bank sterilized substantially the effect of gold outflows. The decline in the reserve-deposit ratio occurred

Table 5.4 **The Dynamic Model, 1847 Weekly Data (standard errors in parentheses)**

Dependent Variable	Constant	r_{t-1}	B_{t-1}	R^2	D.W.	ρ
Δr_t	−0.119 (0.099)	−0.625 (0.151)	$0.301(10^{-7})$ $(0.122)10^{-7}$	.36	1.85	.75
ΔB_t	$0.337(10^7)$ $(0.099)10^7$	$0.262(10^7)$ $(0.118)10^7$	−0.413 (0.116)	.66	2.00	.85

Notes: r_t and B_t denote, respectively, reserve-deposit ratio and bullion in the Bank of England; Δr_t and ΔB_t denote the weekly change in these variables. R^2 denotes the coefficient of determination and ρ the first-order autocorrelation coefficient.

along with an increasing discount rate. The table reports the weighted average discount rate applied by the Bank. From a level of 3 percent at the beginning of the year, the rate was gradually raised toward 5 percent in early April 1847.

These developments suggest that part of the effects of the external drain on the money supply were sterilized. Whether sterilization was a conscious policy, or whether it was a banking response to increasing interest rates and credit tightness, is open to question. But it is certainly interesting to note that F. T. Baring, the ex-chancellor of the exchequer, argued that the possibility of sterilization was a major defect of the Bank Act of 1844:

> I believe, if we look back, we shall find that the operation of the deposits and the question of reserve was not sufficiently considered, either by those who were favourable or those who were opposed to the bill. I cannot find in the evidence before the committee of 1840 more than a few sentences leading me to suppose that danger arising from such a cause was contemplated or referred to; yet this was a most important consideration; for it was by the reserve, the bank was enabled to do what was contrary to the spirit of the bill when gold was running out, not to reduce their circulation by a single pound. I do not think that the system works satisfactorily in this respect; and in fact, the point did not receive anything like a sufficient consideration. Perhaps it was impossible before the bill was in practical operation to see how the reserve of notes would operate; but it certainly never entered into the contemplation of anyone then considering the subject that £7,000,000 in gold should run off, yet that the notes in the hands of the public would rather increase than diminish. (MacLeod 1896, pp. 141–42)

The relative constancy of notes in the hands of the public, to which Baring refers, is shown in table 5.5. Through late April 1847, notes were practically unchanging while bullion declined by nearly one-third. In this period the Bank of England expansion "financed" the export of bullion.

Table 5.5 **The April 1847 Crisis (million £)**

	Note Reserves	Bullion in Issue Department	Reserve-Deposit Ratio (%)	Discount Rate (%)	Notes in Public Hands
2 January	8.23	14.26	46.0	3.10	20.0
6 March	5.71	10.99	36.0	4.14	19.3
3 April	3.70	9.55	23.9	4.25	19.9
17 April	2.56	8.80	19.6	5.25	20.2
1 May	2.74	8.51	23.6	5.25	19.8
5 June	5.09	9.43	32.0	5.20	18.3

Sources: See table 5.2 and Appendix.

Bullion losses did not exert their full contractionary effect on money and credit because the reserve-deposit ratio was declining.[6]

In March and April things became troublesome. The ongoing decline of bullion tightened credit-market conditions, and the failure of the Bank to change its accommodating stance in the face of a deteriorating balance sheet evoked concern about a sudden reversal of policies that would leave the public without notes and without loans. In April, therefore, the ongoing drain of bullion was reinforced dramatically by the seasonal payment of the dividend, which meant a significant run-down of public deposits. During the week of 17 April reserves fell to a level of only £2.56 million; the reserve-deposit ratio fell to less than 20 percent. Consol prices fell in March–April by 4.5 percent and short-term interest rates skyrocketed as the Bank moved vigorously to restore its liquidity position by reduced discounts, consol sales, and high discount rates.

Figure 5.5 shows the series for private and public deposits. The figure makes it clear that whatever influence the bullion drain had on the liquidity position of the Bank, the sharp public-deposit withdrawal could not but accentuate the problem. Table 5.6 shows that the public-sector-deposit withdrawal led only partially to a loss of note reserves and that the money stock (currency held by the public plus private deposits at the Bank of England) did not change substantially. The table confirms that the Bank of England managed to face the runoff by selling securities. Figure 5.6 shows the weekly series of the reserve-deposit ratio during the year. The effects of the extraordinary loss of reserves (by 17 April) and the reaction of the financial markets and the Bank of England have been described by MacLeod (1896, p. 142):

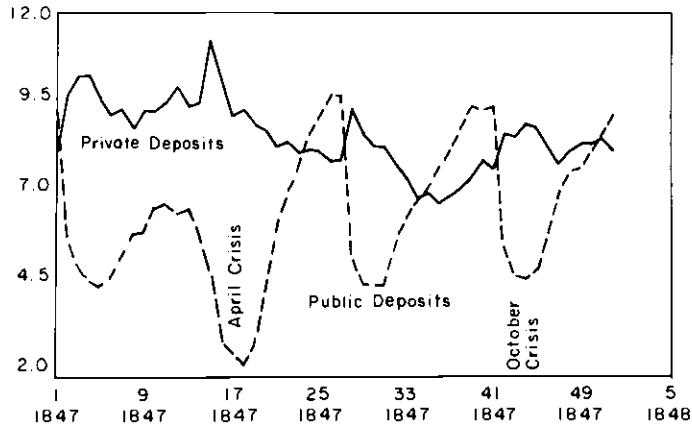

Fig. 5.5 Public and private deposits at the Bank of England (in million £).

Table 5.6 **Money, Public Deposits, and Note Reserves in the April 1847 Crisis (million £)**

	Money Stock[a]	Public Deposits	Note Reserves	Bullion[b]
3 April	30.3	6.0	3.7	10.2
10	32.7	5.0	2.8	9.8
17	32.2	3.0	2.6	9.3
24	29.8	2.6	2.7	9.2

Sources: See table 5.2 and Appendix.

[a]Notes in the hands of the public plus private deposits at the Bank of England.

[b]Total bullion in the Issue and Banking departments including coin.

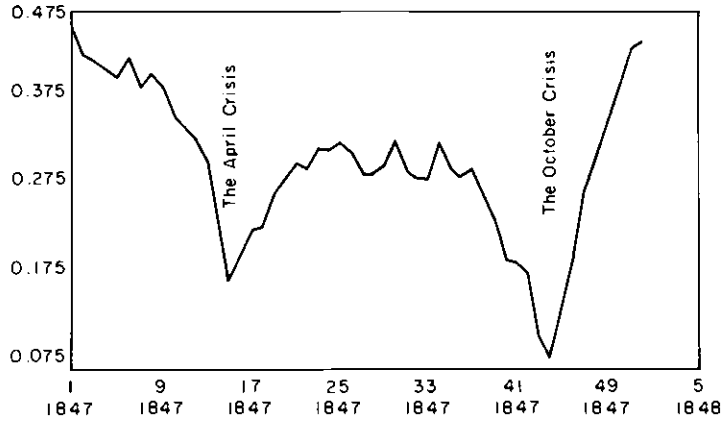

Fig. 5.6 Reserve–total-deposit ratio, 1847 weekly data.

When, therefore, the public saw that the whole banking resources of the bank were reduced to £2,558,000, a complete panic seized both the public and the directors. The latter adopted severe measures to check the demand for notes. The rate was not only raised to five percent, but this was only applicable to bills having only a few days to run, and a limit was placed upon the amount of bills discounted, however good they might be. Merchants who had received loans were called upon to repay them without being permitted to renew them. During some days it was impossible to get bills discounted at all. These measures were effectual in stopping the efflux of bullion; and a sum of £100,000 in sovereigns, which had been actually shipped for America, was re-landed. During this period the rate of discount for the best bills rose to nine, ten and twelve percent.

The tightening of credit led to internal dishoarding and to some reflow of bullion. Accordingly, the Bank's reserve-deposit ratio quickly rose to about 30 percent. The crisis was overcome and the adjustment process of

tight money was underway. The external part of that adjustment process involved importation of bullion and foreign investment in London as well as English borrowing abroad. In response to high yields on consols, the emperor of Russia decided to substitute foreign securities for gold as backing for the Russian currency and made substantial purchases of consols. These developments and their effect on the restoration of confidence were described by a contemporary as follows:

> Between the 25th and 28th of April confidence in a slight degree revived. The Bank was then discounting more freely; and the important news was announced that the Emperor of Russia had issued a Ukase "ordering an investment of about four and a half million sterling in home and foreign securities." Under the impression that a large amount of the money would find employment in Consols, as ultimately was the case, this circumstance, coupled with greater disposition of the Bank to grant facilities for accommodation, tended to abate the pressure. (Evans 1849, p. 62)

It seems fairly clear from the events that the Bank's policy in the first half of the year was certainly poor. It had all the characteristics of a policy of "too late, and (therefore) too vigorously." The continued expansion of credit in the face of falling reserves and the prospect of further decline in bullion meant that a crunch was quite inevitable. To wait too long before tightening, and ultimately to administer it with severity, led to an unnecessary panic in the money market.

5.4.2 The October Crisis

The severe credit tightening following the April crisis restored the Bank's ability to maintain convertibility. Table 5.7 shows that by June the reserve-deposit ratio was again substantial. Currency outstanding was significantly lower than during the April crisis. But during the late summer, and especially in early fall, conditions deteriorated, setting the basis for the October crisis.

Table 5.7 **The October 1847 Crisis (million £)**

	Note Reserves	Bullion in Issue Department	Reserve-Deposit Ratio (%)	Discount Rate (%)	Notes in Public Hands
5 June	5.09	9.43	32.0	5.2	18.3
4 September	4.19	8.40	28.9	5.9	18.2
23 October	1.55	7.87	11.6	8.1	20.3
24 December	7.79	11.61	44.5	5.7	17.8

Sources: See table 5.2 and Appendix.

The credit tightening starting with the April crisis raised the cost of credit substantially above what it had been in past years, and indeed above anything the public could remember. This raise is the burden of "The Petition of Merchants, Bankers, and Traders of London against the Bank Charter Act" issued in July 1847, in which the opening statement reads: "That there has lately been apparent throughout the commercial and manufacturing community of this country an extent of monetary pressure, such as is without precedent in the memory of the oldest living merchant" (Gregory 1929, 2: p. 3).

Figure 5.7 confirms that 1847 interest rates were at a peak relative to the preceding twenty-five years. In May, first-class bills had been discounted at an all-time high of 7 percent, but by July the rate had in fact returned to 5.5 percent which, as the figure shows, was still very high.

By October the increasing tightness of credit, the extraordinary height of the rate of interest, commercial failures, and the threat of default by financial institutions had increased even further. Sir Charles Wood, the chancellor of the exchequer, is quoted as stating:

> When he came to town in October he found the City in a state of panic. He saw persons of all classes and descriptions from the time he was up until he went to bed, and he never passed so painful a week. The interest of money rose to an exorbitant rate, and 60 percent per annum was charged for what were called "continuations" for one day. It was thought impossible that the loans could be repaid. (Gregory 1929, 2: p. 11)

Developments between June and September resulted in some decline in both bullion and note reserves. The large payments for grain shipments received in June and July from Russia became due and caused a further drain of bullion and reserves. By now, of course, the cumulative external drain had reduced both bullion and note reserves. Bullion in the Issue

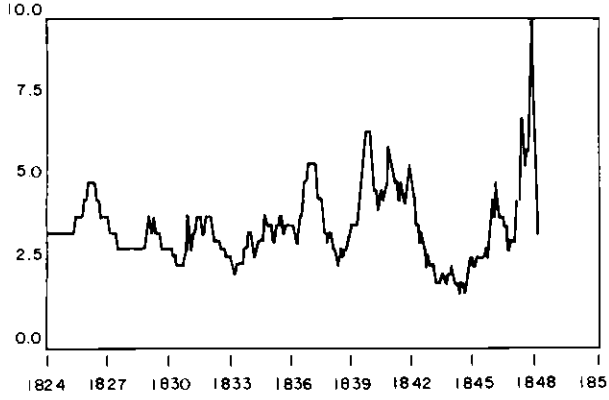

Fig. 5.7 Rate of discount on first-class bills, 1824–48 (percent per year). *Source*: United Kingdom, Parliament 1848a, app. C, p. 467.

and Banking departments still remained at a comfortable £8.3 million, but note reserves were down to only £1.55 million, well within the possibility of depletion by a scramble for currency. The same point is evident from the reserve-deposit ratio that had declined from 32 percent in June to only 11.6 percent by late October.

In the October crisis, once again, public-sector-deposit movements played a role, but this time in combination with a scramble for currency by the public. Table 5.8 shows a large decline in public-sector deposits of nearly £4 million between 9 and 16 October. Three-quarters of that deposit reduction is matched by a reduction in Exchequer bills on the asset side. In the week of 23 October, dividend payments further reduced public-sector deposits and showed up in increased currency in circulation. The increase in currency during the first three weeks was only £2 million and as such did not appear large, but that gain must be compared to note reserves in the Issue Department which by the 23rd had fallen to only £1.5 million. The crisis thus involved potential minor increases in currency holdings reducing the Bank to insolvency.

While the external drain set the preconditions for the crisis, it was the internal run and scramble for currency shown in figure 5.8 that caused the panic of October. The poor liquidity position of the Bank deteriorated further as a result of commercial failures. These caused the public to question the soundness of private banks and thus required, on the banks' part, increased liquidity to demonstrate convertibility of their liabilities into Bank of England notes or specie. Again this factor exacerbated the shortage of Bank of England notes and the inadequacy of note reserves.[7]

It is not certain who broke the Old Lady's back. There is some indication in the inquiry that private bankers threatened the withdrawal of deposits from the Bank in excess of the amount of notes on hand (Gregory 1929, 2: p. 113).[8] The Bank, however, put up an admirable stone face and would claim in the inquiry that convertibility was never in question. Thus, in 1848, the governor of the Bank, James Morris, told the House of Lords:

Table 5.8 **The Bank in October 1847 (million £)**

	Public Deposits	Private Deposits	Circulation[a]	Exchequer[b] Bills	Bullion[c]
9 October	9.4	7.7	19.5	3.9	8.4
16	5.5	8.7	20.3	0.8	8.4
23	4.8	8.6	21.3	0.7	8.3
30	4.7	8.9	21.8	1.2	8.4

Sources: See table 5.2 and Appendix.

[a]Including seven-day bills.

[b]Held by the Banking Department.

[c]Total bullion, including coin in the Issue and Banking departments.

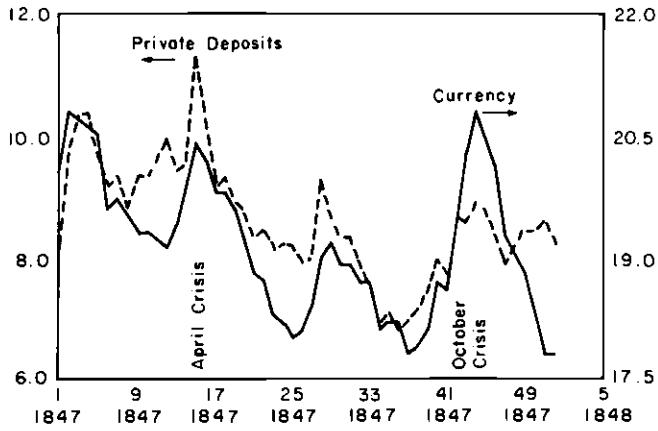

Fig. 5.8 Private deposits and currency.

> The Question was put to me over and over again whether we were able to take care of the Bank. I always stated that, so far as the Bank itself was concerned, we had no Difficulty; but that, whether Her Majesty's Government might have any political Reasons, such as Fear of Mills being stopped, or Riots in the Country, was a Question for them to decide, and one which we could not answer. (Gregory 1929, 2: p. 11)

Indeed, the way the Bank proposed to restore its financial position suggests that it might well have been able to maintain convertibility by an extraordinary contraction of credit. Here it is worth quoting what the governor told the House of Lords:

> We should have had no Difficulty whatever in meeting all our Liabilities. We should not have been able to give the same Extent of Accommodation that Parties were requiring from us. Parties came and thought they had only to ask for Money and they would have it at once. We might have put into the Account a considerable Amount by selling Consols. We had going off weekly Bills to the Extent of £1,500,000, so that by discounting even at the Rate of £100,000 a Day to give the Public some Accommodation our Reserve would still have increased at the Rate of £900,000 a Week. It is certain that in a very short Period we should have had as large a Reserve as would be necessary for our Purposes, and therefore I maintain that the Bank was never at any Period in Jeopardy. (Evans 1849, p. 89)

Whether the Bank might have been successful or not, the contraction of money and credit was so severe, commercial failure was so widespread and reaching increasingly the banking system, the government felt it was wise to suspend Peel's Act, authorizing the Bank to issue notes without gold backing. The letter of instruction, dated 25 October 1847, is given below (the letter is reproduced in Turner 1897, pp. 159–60 and in Evans 1849, p. 87).

Downing Street, Oct. 25th, 1847.

GENTLEMEN,—Her Majesty's Government have seen with the deepest regret the pressure which has existed for some weeks upon the commercial interests of the country, and that this pressure has been aggravated by a want of that confidence which is necessary for carrying on the ordinary dealings of trade.

They have been in hopes that the check given to dealings of a speculative character, the transfer of capital from other countries, the influx of bullion, and a feeling which the knowledge of these circumstances might have been expected to produce, would have removed the prevailing distrust.

They were encouraged in this expectation by the speedy cessation of a similar state of feeling in the month of April last.

These hopes have, however, been disappointed, and Her Majesty's Government have come to the conclusion that the time has arrived when they ought to attempt, by some extraordinary and temporary measure, to restore confidence to the mercantile and manufacturing community.

For this purpose, they recommend to the directors of the Bank of England in the present emergency to enlarge the amount of their discounts and advances upon approved security; but that in order to retain this operation within reasonable limits a high rate of interest should be charged.

In present circumstances they would suggest that the rate of interest should not be less than 8 per cent.

If this course should lead to any infringement of the existing law, Her Majesty's Government will be prepared to propose to Parliament on its meeting a Bill of Indemnity. They will rely upon the discretion of the directors to reduce as soon as possible the amount of their notes if any extraordinary issue should take place within the limits prescribed by law.

Her Majesty's Government are of opinion that any extra profit derived from this measure should be carried to the account of the public, but the precise mode of doing so must be left to future arrangement.

Her Majesty's Government are not insensible of the evil of any departure from the law which has placed the currency of this country upon a sound basis; but they feel confident that, in the present circumstances, the measure which they have proposed may be safely adopted, and at the same time the main provisions of that law, and the vital principle of preserving the convertibility of the bank-note may be firmly maintained.

We have the honour to be, Gentlemen,
Your obedient, humble Servants,

(Signed) J. RUSSELL.
CHARLES WOOD.

The Governor and Deputy Governor
of the Bank of England.

The authorization for fiduciary issue, coupled with the high discount that the Bank was charging, rapidly restored financial stability. The removal of the restriction of fiat-money issue dissipated the concern for the internal convertibility of deposits into notes. High interest rates, at the same time, brought about very substantial inflows of capital. The capital inflows, in turn, expanded the bullion in the Bank and thus led to internal monetary expansion that over time alleviated the extreme tightness in credit markets. By 24 December 1847, the reserve-deposit ratio had risen substantially while interest rates had declined from their panic peaks of late October.

It is important to recognize the role of international capital flows in the adjustment process. A key aspect, in the eyes of the government, was that suspension of Peel's Act be implemented in a manner in no way prejudicial to external convertibility, as it would be if fiat-money issue financed export of bullion. To prevent such a course of events, a high interest rate was an essential part of the suspension of Peel's Act since the very size of the international interest differential would ensure that gold imports were advantageous. They would in turn provide an external basis for domestic monetary expansion.

The 1847 episode was probably responsible for the popular maxim that "7 percent will draw gold from the moon."[9] That high interest rates do attract gold flows is immediately obvious from the bullion gain. Between October and December the Bank's holdings of bullion rose by more than 50 percent. The interest responsiveness of bullion flows is substantiated by a regression of the flow of bullion on lagged interest rates. To examine the interest responsiveness of bullion flows we regressed the change in the stock of bullion on current and lagged values of the consol yield (up to a lag of eight weeks). We experimented with various lag structures and, consistently, the only significant coefficients were on the fourth and the seventh lag. Equation (9) reports the regression of gold flows on the four- and seven-week lagged interest rate; standard errors are reported below the coefficients:

$$\Delta B_t = \underset{(0.131)10^7}{-0.892(10^7)} + \underset{(0.043)10^9}{0.179(10^9)} i_{t-4} + \underset{(0.396)10^8}{0.795(10^8)} i_{t-7}. \tag{9}$$

$$R^2 = 0.75, \text{ D.W.} = 2.16, \rho = 0.43.$$

The results are consistent with the expectation that the rate of capital inflow is related positively to the domestic rate of interest. Since in the pretelegraph period information on interest differentials could not be transmitted instantaneously, it is reasonable that gold flows responded to lagged values of interest rates. The length of the lag, in turn, should correspond to the length of time needed for a round trip between the home country and its trading partners. The round trip was necessary since the information on rates of interest had to be transmitted and then the

gold had to be shipped. The four- and seven-week lags that are reported in equation (9) correspond, respectively, to the length of time of the round trip between London and New York and London and St. Petersburg.[10] If this interpretation of the lag structure is correct, one might expect that in subsequent periods, following the introduction of the telegraph, the lag structure would be shortened by a factor of 50 percent.

What the regression bears out is also quite clear from contemporary accounts—capital did move in response to interest rates.

> The season was advanced and the navigation on the Baltic near its close; but even at the disadvantage of a double rate of insurance, orders had been sent to St. Petersburg, under the impulse of an 8 percent rate of interest, which sufficed to bring back all, and more than all the gold which had been exported in the beginning of the year. (Hubbard 1848, p. 23)

That same principle was understood by the Bank of England.

> It was desirable that capital and bullion should be attracted to this country, and it was only by the attraction of a high rate of interest that this desideratum could be accomplished. He [the chancellor of the exchequer] was convinced, therefore, that the mode in which the Government had acted was the one best calculated to attain the end they had in view—namely, the influx of capital and the importation of bullion, and thereby the removal of the panic. (Evans 1849, p. 98)

It is relevant to note in the context of the discussion of capital flows that in the case of a transitory real disturbance, such as a harvest failure, the correct response is indeed financing through the capital account of the balance of payments as opposed to the price-specie-flow mechanism of adjustment which operates through the trade account. The 1847 episode illustrates that principle.

5.5 Was the Suspension of Peel's Act Necessary?

The authorization for uncovered note issue, as we already mentioned, immediately removed the panic, so much so that there was almost no need to actually issue uncovered notes. In fact during the period of suspension the Bank issued only £400,000 in notes in excess of the limits set by the Act of 1844. The rapid restoration of confidence and the normalization of affairs allowed the government to revoke the suspension on 23 November (reprinted from Evans 1849, p. 102):

> Downing Street, Nov. 23, 1847.
>
> GENTLEMEN,—Her Majesty's Government have watched with the deepest interest the gradual revival of confidence in the commercial classes of the country.
>
> They have the satisfaction of believing that the course adopted by

the Bank of England on their recommendation has contributed to produce this result, whilst it has led to no infringement of the law.

It appears from the accounts which you have transmitted to us, that the reserve of the Bank of England has been for some time steadily increasing, and now amounts to £5,000,000. This increase has in great measure arisen from the return of notes and coin from the country.

The bullion exceeds £10,000,000, and the state of the exchanges promise a further influx of the precious metals.

The knowledge of these facts by the public is calculated to inspire still further confidence.

In these circumstances it appears to her Majesty's Government that the purposes which they had in view in the letter which we addressed to you on the 25th of October has been fully answered, and that it is unnecessary to continue that letter any longer in force.

We have the honour to be, Gentlemen,
Your obedient humble servants,
(Signed)
J. RUSSELL
CHARLES WOOD,
The Governor and Deputy-Governor of the Bank of England.

The rapid normalization led in some quarters (in the Bank and elsewhere) to the belief that there had been no real reason for the panic and no need to suspend Peel's Act. Thus Hubbard (1848, p. 25) commented:

> How utterly baseless were the apprehensions of the panic-mongers is now proved by the fact that the Bank not only never availed itself of the power of additional issue, but met from its own resources all the demands made upon it, including the extraordinary applications which would naturally be encouraged by the prospect of their being favourably received.

Of course, the statement reflects, in an exemplary way, the lack of understanding of an *internal* convertibility crisis. A convertibility crisis or run occurs only if in fact not everybody can be paid off. Suspension of the act removed any conceivable basis for panic and therefore immediately restored a measure of financial stability.

The special characteristics of an internal drain and the remedies that are called for were fully perceived by Bagehot ([1873] 1962):

> A domestic drain is very different. Such a drain arises from a disturbance of credit within the country, and the difficulty of dealing with it is the greater, because it is often caused, or at least often enhanced, by a foreign drain. . . . What then ought to be done? In opposition to what be at first sight supposed, the best way for the bank . . . to deal with a drain arising from internal discredit, is to lend freely. (P. 23)

Since the key issue underlying an internal drain is lack of confidence, it is clear that

> what is wanted and what is necessary to stop a panic is to diffuse the impression, that though money may be dear, still money is to be had. If people could be really convinced that they could have money . . . they would cease to run in such a mad way for money. Either shut the Bank at once . . . or lend freely, boldly, and so that the public may feel you mean to go on lending. (P. 31)

Chancellor of the Exchequer Sir Charles Wood told the committee of inquiry that the basis of the panic was indeed a lack of confidence in internal convertibility. He quotes commercial traders and bankers as stating:

> We do not want notes—what we desire is that you should give us confidence, it is only for you to say that you will stand by us, and nothing in the world else will give us confidence. We do not want notes, but only to know where we can get them. . . . Charge 10 or 12 percent interest if you like—we do not mean to take notes, but let us know that at some rate of interest we can get them and that will amply suffice. (Evans 1849, p. 96)

Sir Robert Peel for his part expressed the view that the Bank Charter Act had failed in one important respect, namely, it failed to secure a gradual and early, as opposed to severe and sudden, adjustment:

> If the Bank had possessed the resolution to meet the coming danger by a contraction of its issue, by raising the rate of discount . . . if they had been firm and determined in the adopting of those precautions, the necessity of extrinsic interference might have been prevented, it might not have been necessary for the Government to authorise the violation of the Act of 1844. (Andreades 1924, p. 339)

Many felt that the act, as opposed to Bank of England policy, had no effect in aggravating the crisis. S. J. Loyd, for example, stated to the committee that

> the Act had no effect whatever in aggravating the Pressure. It protected the Public from the additional evil, which would otherwise have occurred, of a Failure in maintaining Convertibility of the Notes, and the consequent complete Destruction of our Monetary System. (Gregory 1929, 2: p. 44)

But this view was not how the House of Lords came to see it. While also agreeing on the fundamental importance of external convertibility, the committee concluded that

> the recent panic was materially aggravated by the operation of that statute, and by the proceedings of the Bank itself. This effect may be traced, directly, to the Act of 1844, in the legislative restriction imposed on the means of accommodation, whilst a large amount of bullion was held in the coffers of the Bank, and during a time of

> favourable exchanges; and it may be traced to the same cause, indirectly, as a consequence of great fluctuations in the rate of discount, and of capital previously advanced at an unusually low rate of interest. This course the Bank would hardly have felt itself justified in taking, had not an impression existed that, by the separation of the issue and the banking departments, one inflexible rule for regulating the Bank issues had been substituted by law in place of the discretion formerly vested in the Bank. (Turner 1897, pp. 162–63)

Likewise,

> the Committee are fully aware that Alternations of Periods of Commercial Excitement and of Discredit, of Speculation and of Collapse, are likely to arise under all Systems of Currency; it would be visionary to imagine that they could be averted altogether, even if the Circulation were exclusively Metallic. But it is on this Account that greater Care should be taken to avoid increasing an Evil, perhaps inevitable, by any arbitrary and artificial Enactments.
>
> The Committee are of opinion, that the Principle on which the Act of 1844 should be amended is the Introduction of a discretionary relaxing Power; such Power, in whomsoever vested, to be exercised only during the Existence of a favourable Foreign Exchange. (Gregory 1929, 2: p. 40)

The very interesting aspect of the House of Lords' recommendation is the link between fiat issue and the state of the foreign exchanges. It represents a departure from strict gold standard rules where only *actual* gold flows can be monetized. Under the proposal of the committee it is enough to have the *conditions* for gold flows to take place, as opposed to actual arrival of gold, for suspension to be allowed. There is money issue, so to speak, on credit. The compromise of lending freely at high rates—the high rates ensuring in time the arrival of gold and the validation of the fiat issue—is important in that it is a remedy specifically for internal convertibility crises for which Peel's Act had made no allowance.

The model of the gold standard developed in section 5.3 above did not make provision for issues of stability and crisis. Portfolio adjustment by the Bank and gold flows in response to interest differentials brought about smooth adjustment. How can the panic of October be accommodated in such a framework? Here it becomes essential to recognize the dominating effect of the currency-deposit ratio. When the reserve-deposit ratio of the Bank is sufficiently low so as to reduce confidence in the viability of internal convertibility, then further reduction in the reserve-deposit ratio may bring about changes in the currency-deposit ratio so large as actually to reduce the money multiplier and the money stock.

In terms of equation (3), the money multiplier, in that low reserve-deposit-ratio region, responds positively to an increase in the reserve-

deposit ratio, and therefore the equilibrium interest rate responds negatively. The sign reversal implies the possibility of multiple equilibria as shown in figure 5.9. Point A′ is the stable equilibrium studied earlier; point A is another equilibrium in the region where convertibility concerns dominate the money-supply process. Point A is an unstable equilibrium that can be attained only for initial conditions on the GG schedule. Initial conditions below and to the left of GG lead to unstable paths of the reserve ratio that decline to zero. From a point such as C, with low bullion and low reserves, the Bank lowers the reserve-deposit ratio while bullion is rising. The reserve-deposit ratio keeps falling, the currency-deposit ratio keeps rising, and the system must collapse.

5.6 Concluding Remarks

In this paper we examined the operation of the gold standard and the performance of the Bank of England during the crisis of 1847. The key feature of that crisis was its origin: it began with the instability of the real sector rather than from monetary disorder. That crisis highlights the role of confidence in both external and internal convertibility. We presented a simple model that seems to capture the central characteristics of the crisis and that emphasizes the role of international capital flows during the adjustment process. Our analysis suggests that the suspension of Peel's Act, i.e., the collapse of the rigid rules of the gold standard, was the correct and the essential policy required for the restoration of confidence.

We return now to the more general question of the gold standard as a frame for macroeconomic stability. The monetary system, to work satis-

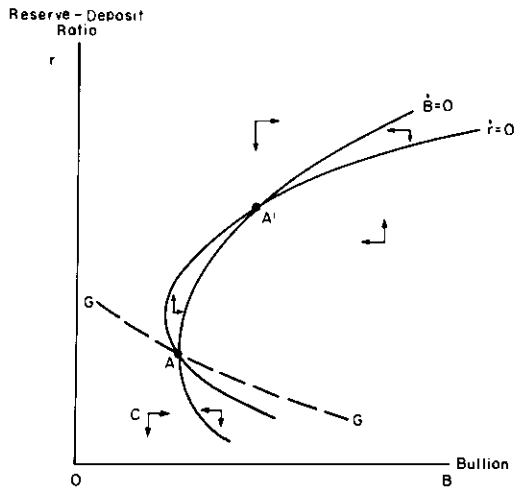

Fig. 5.9 Financial model—the unstable case.

factorily, would have to satisfy three criteria: (1) assure stability and predictability of the general level of prices and output; (2) separate banking and financial problems, to a large extent, from the macroeconomy; and (3) provide a stable financial framework that facilitates financial intermediation and lending, both domestically and in the world economy.

There is considerable doubt now whether the objective of price-level stability was well served by the gold standard. There is evidence of short-term price variability substantially in excess of post–World War II experience. It may also be argued that long-term stability was, to a large extent, accidental—a consequence of fortuitous gold discoveries rather than the systematic operation of the system. But even with these qualifications there can be little question that the gold standard was a system that utterly excluded the extreme monetary instability Europe witnessed, for example, in the 1920s. The system also excluded the accelerating path of inflation that we experienced in the 1970s from the interaction of macroeconomic shocks, inertia, and accommodation.

But on a different account the gold standard was disappointing. Until the principle "during crisis, discount freely" was firmly established, the gold standard provided an exceedingly poor framework for financial markets. The presence of a lender of last resort—whether it be the Treasury or the central bank—is essential with fractional reserve banking. The lack of a lender of last resort was emphasized in the 1847 crisis when the Bank of England, in the midst of a banking panic, *sold* consols and *reduced* discounts, thus assuring confidence in deposit convertibility (not gold convertibility) at the expense of devastating financial distress.

Appendix **Weekly Observations, December 1846–December 1847**

Date	R	$D+G$	D	B	i	P_c	P_w	C	C/D	$R/(D+G)$	m
DEC 26	8814	18037	7696	15067	3.204	93.625	63.000	20253	2.63163	0.4887	1.69285
JAN 2	8227	17895	7904	14952	3.196	93.875	64.333	20725	2.62209	0.4597	1.77478
9	6715	15645	9785	14308	3.209	93.500	66.833	21593	2.20675	0.4292	1.90170
16	6546	15374	10340	13949	3.243	92.500	70.250	21403	2.06992	0.4258	1.87984
23	6167	15024	10356	13443	3.320	90.375	73.250	21276	2.05446	0.4105	1.91442
30	5704	14123	9660	12902	3.279	91.500	74.917	21198	2.19441	0.4039	2.00846
FEB 6	5891	13851	9183	12288	3.297	91.000	73.833	20397	2.22117	0.4253	1.96232
13	5747	14628	9330	12299	3.315	90.500	71.583	20552	2.20279	0.3929	1.98196
20	5977	14707	8837	12215	3.310	90.625	71.583	20238	2.29014	0.4064	1.96267
27	6017	15250	9322	12045	3.324	90.250	74.583	20028	2.14847	0.3946	1.91342
MAR 6	5715	15860	9289	11596	3.347	89.625	74.333	19881	2.14027	0.3603	1.94415
13	5554	16252	9536	11449	3.399	88.250	74.166	19895	2.08630	0.3417	1.95036
20	5419	16434	9962	11232	3.376	88.875	75.833	19813	1.98886	0.3297	1.93583
27	4876	16019	9403	11016	3.361	89.250	77.000	20140	2.14187	0.3044	2.06898
APR 3	3700	15504	9502	10246	3.409	88.000	77.083	20546	2.16228	0.2386	2.27602
10	2833	16242	11258	9867	3.499	85.750	74.416	21034	1.86836	0.1744	2.29168
17	2558	13016	10005	9330	3.473	86.375	74.083	20772	2.07616	0.1965	2.44981
24	2719	11760	9125	9214	3.488	86.000	75.833	20495	2.24603	0.2312	2.50084
MAY 1	2741	11611	9312	9338	3.448	87.000	79.500	20597	2.21188	0.2361	2.48146
8	3197	11800	8930	9589	3.463	86.625	81.833	20392	2.28354	0.2709	2.41791
15	3793	13071	8751	9870	3.448	87.000	85.166	20077	2.29425	0.2902	2.29815
22	4420	14430	8289	9949	3.448	87.000	94.833	19529	2.35601	0.3063	2.18884
29	4628	15410	8432	10170	3.395	88.375	102.420	19542	2.31760	0.3003	2.14196
JUN 5	5089	15923	8151	10237	3.399	88.250	99.833	19148	2.34916	0.3196	2.06186
12	5375	16922	8228	10359	3.380	88.750	88.833	18984	2.30724	0.3176	2.00044
19	5665	17419	8160	10512	3.390	88.500	91.583	18847	2.30968	0.3252	1.95349
26	5625	17717	7921	10526	3.380	88.750	91.833	18901	2.38619	0.3175	1.98007

Appendix (continued)

Date	R	$D+G$	D	B	i	P_c	P_w	C	C/D	$R/(D+G)$	m
JUL 3	5185	17707	7968	10397	3.380	88.750	87.083	19212	2.41114	0.2928	2.06645
10	4331	14550	9305	10086	3.380	88.750	82.250	19755	2.12305	0.2977	2.13112
17	4069	13200	8640	9919	3.376	88.875	74.000	19850	2.29745	0.3083	2.24172
24	4216	12830	8326	9770	3.395	88.375	75.500	19554	2.34855	0.3286	2.22293
31	3775	12820	8316	9331	3.385	88.625	77.250	19556	2.35161	0.2945	2.30519
AUG 7	3946	13457	7886	9253	3.458	86.750	75.416	19307	2.44826	0.2932	2.29826
14	3992	13872	7514	9287	3.483	86.125	66.833	19295	2.56787	0.2878	2.33000
21	4488	13762	6931	9240	3.443	87.125	66.500	18752	2.70553	0.3261	2.24915
28	4330	14299	7106	9140	3.443	87.125	60.333	18810	2.64706	0.3028	2.26618
SEP 4	4190	14514	6791	8960	3.433	87.375	56.666	18770	2.76395	0.2887	2.32775
11	4467	15147	6981	8915	3.453	86.875	51.333	18448	2.64260	0.2949	2.22126
18	4273	15934	7185	8880	3.514	85.375	49.500	18607	2.58970	0.2682	2.25100
25	4112	16932	7484	8782	3.483	86.125	53.500	18670	2.49466	0.2429	2.25543
OCT 2	3409	17291	7962	8565	3.556	84.375	56.750	19156	2.40593	0.1972	2.38484
9	3322	17129	7714	8409	3.598	83.375	54.166	19087	2.47433	0.1939	2.42851
16	2630	14171	8675	8431	3.709	80.875	54.250	19801	2.28254	0.1856	2.51889
23	1547	13347	8581	8313	3.750	80.000	55.166	20766	2.42000	0.1159	2.89761
30	1177	13607	8911	8439	3.715	80.750	53.500	21262	2.38604	0.0865	2.99098
NOV 6	2030	13796	8804	8730	3.609	83.125	52.333	20700	2.35120	0.1471	2.72328
13	2798	14304	8312	9259	3.535	84.875	53.666	20461	2.46162	0.1956	2.58983
20	4228	15086	7866	10017	3.561	84.250	54.250	19789	2.51576	0.2803	2.28667
27	4986	15968	8239	10533	3.540	84.750	52.917	19547	2.37250	0.3122	2.10102
DEC 4	5583	16241	8441	11033	3.504	85.625	52.083	19450	2.30423	0.3438	1.98880
11	6449	16667	8437	11426	3.529	85.000	51.917	18977	2.24926	0.3869	1.84160
18	7551	17370	8607	11991	3.535	84.875	52.833	18440	2.14244	0.4347	1.67391
25	7786	17479	8243	12237	3.519	85.250	52.750	18451	2.23838	0.4454	1.66536

Sources: Data for R, $D+G$, D, and B come fron United Kingdom, Parliament 1848a, app. 8, pp. 126–43. All other data are from Hubbard 1848.

Notes: R, $D+G$, D, and B denote, respectively, the stock of note reserves held by the Bank of England; total deposits including Exchequer; London Bankers and private deposits; and the total amount of bullion. All are measured in thousand pounds sterling. C denotes currency, which is measured as bullion minus reserves + 14,000 (the fiduciary issue); m denotes the money multiplier. P_c denotes the price of 3-percent consols; P_w the price of wheat; and i is a hundred times the yield on consols, i.e., $(100\times 3)/P_c$.

Notes

1. Quoted in Andreades 1924, p. 340.

2. On the banking-and-currency-school controversy, see Mints 1945 and Viner 1937, chap. 5.

3. For the derivation see Friedman and Schwartz 1963. Throughout our discussion we abstract from the existence of private banks, their note issue, their deposit liabilities, or their demand for Bank of England notes.

4. The supply shock—a harvest failure—exerted opposing effects on prices and output so that the net effect on nominal income and thereby on interest rates may in fact be disregarded without obvious strain.

5. If a rise in the reserve-deposit ratio lowers the currency-deposit ratio so much as to *raise* the money multiplier, in contrast with our assumption in equation (3), then a higher reserve-deposit ratio would lower interest rates and thus change the specification in equation (4′). The $\dot{B} = 0$ schedule might then be negatively sloped at low levels of r, and so may even the $\dot{r} = 0$ curve. We examine this case in section 5.5 below.

6. The defects of the Bank Act were discused forcefully by Thomas Tooke (1844) whose views are analyzed by Laidler (1975). For a further analysis see Morgan 1943.

7. It is interesting to note that the developments during the October crisis were part of the evidence that stimulated Jevons's theory of the "frequent autumnal pressure" (see Jevons 1884, chap. 5).

8. On 23 October, when London bankers held deposits of £1.6 million at the Bank of England, the note reserves were only £1.5 million. Balances of all bankers rose from £1.5 to £2.1 million in the week of 16 October, but they declined to only £1.8 million by 23 October.

9. While we could not trace the exact origin of this maxim, it was referred to by Lionel Robbins in a memorandum submitted to the (Radcliffe) Committee on the Working of the Monetary System (United Kingdom, Parliament 1960, p. 218). Robbins ascribes this maxim to "a practical banker." We are indebted to David Laidler for this reference. It is interesting to note that a similar statement can be found in Leaf 1927, p. 34. There it is described as an "old saying in the City." Leaf then goes on to say "but it takes time to bring it even from Paris." We are indebted to Geoffrey Wood for this reference and to Anna J. Schwartz for help in the search for the source of the popular maxim.

10. For some evidence, see Howarth 1974, p. 313.

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Comment

J. R. T. Hughes

The papers by Dornbusch and Frenkel, Dutton, and Pippenger cover part of the more than nine decades (1821–1914) when England was on the classical gold standard. The return to gold payments was threatened in 1825 and sequentially in 1835, 1836, 1837, and 1839. Former Governor J. Horsley Palmer's defense of the Bank of England's policy after 1836 and criticism of that defense by Samuel Jones Loyd (later Lord Overstone) led to the legislation of 1844, the Bank of England Act—Peel's Bank Act (see Palmer 1836; Loyd 1837a, 1837b; Horsefield 1953). That act essentially put into statute form David Ricardo's posthumously published *Plan for the Establishment of a National Bank* (1824). Loyd had been the major propagandist for the Ricardian solution—division of the Bank of England into two parts, a Banking Department to do a strictly banking business, like any commercial bank, and an Issue Department to mechanically exchange Bank of England notes for gold, and gold for Bank of England notes at a fixed gold price.[1] This arrangement would produce a convertible currency and, as other nations established fixed mint-par values for gold, an international regime of fixed exchange rates within the gold points would come into existence.

The Bank of England Act of 1844 remained mainly unchanged[2] for seven decades until 1914 when it was "suspended" for the last time. Leaving aside the period before 1844, the British monetary system was to be tested in three very different economic environments: (1) 1844–73, the era Sir John Hicks once described as the "great Victorian boom" (and which hosted the famous crises of 1847, 1857, and 1866); (2) 1874–95, a period of puzzling sluggishness in British monetary affairs in which there was never any monetary strain of the sort that had once capped each boom; and (3) 1896–1914, when prices and interest rates rose again.

The Bank of England, at the center of the gold standard system, learned to live in these environments by trial and error. Before 1873 the Bank was relatively large, but was surrounded by a huge, privately issued money stock (the inland bill system), a unit banking system (429 "country banks" in 1842, and still 167 banks by 1874), and an economy that periodically expanded with force, straining the monetary system at the seams (Coppieters 1955, pp. 158–59). During the long compression of the interest-rate structure in 1874–96 and stagnating prices, the economy never boomed again; there was no strain on the financial system (although when Barings threatened to suspend payments in 1890 another panic was feared); and Bank policy became conservative to a remarkable degree (Hughes 1968). After 1896 a plateau in gold reserves and an

J. R. T. Hughes is professor of economics at Northwestern University, Evanston, Illinois. The comment prepared by Hughes, who did not attend the conference, was read by Lawrence H. White of New York University.

expanding economy resulted in the defensive Bank-policy stance noted by Pippenger. There really are two separate questions to answer here: (1) How well did the Bank of England manage the gold standard during these three very different long-term financial climates? (2) How does the gold standard system of 1844–1914 rate as an international financial system compared to what followed it after World War I?

Frenkel and Dornbusch give us a close-up of the Bank during the first great financial crisis under the Bank Act of 1844. Their paper explains well the great surprise: Panic hoarding shifted from the earlier emphasis on gold to an excess internal demand for gold's representative, the Bank of England note. They correctly see that the Bank was playing its own game in 1847, not Dutton's rules of the game. When gold flowed out, the Bank had expanded its holdings of securities, replacing the gold with notes in circulation and thus "financing" the gold outflow. But that policy was probably an unintended outcome; the Bank's managers, as representatives of a private, profit-making institution, were competing aggressively for business. They kept Bank rate below the market rate of discount. As C. N. Ward-Perkins (1966, p. 264) put it in his classic paper a century later:

> The day after the Act became law, on 5 September 1844, the directors, taking Sir Robert's advice to heart, announced a new rate and policy for discounting, a minimum rate of 2½ per cent being accepted for first-class three-month bills. This was competition indeed; market rate, though it had stood below 2 per cent, was tending to rise, and for the next three years minimum bank rate was consistently lower than market rate.

The policy objective was no higher than that, whatever the outcome.

The supply of money is defined by Dornbusch and Frenkel, excluding the circulation of private merchants' money—bills of exchange. We would not exclude them now from our various definitions of money. They would at least be part of M4. They circulated hand-to-hand as means of payment in normal times (Ashton 1953), but in a crisis they fell to heavy discounts as interest rates rose. They were dumped in part to avoid capital losses (Hughes 1960, pp. 256–74). In volume the bills were much larger than the Bank of England's own circulation, and in the great crises of 1847, 1857, and 1866 it was their cascading deluge upon the banks and discount houses that made the Bank Act of 1844 an iron lid that later had to be removed by the Treasury letter. William Newmarch's estimates show that the average volume of bills afloat, £54.89 million in the fourth quarter of 1843, had risen by an astonishing 44 percent to £78.93 million by the first quarter of 1847, while the Bank of England's own aggregate circulation (in the public's hands and in the Banking Department's reserve) had remained nearly unchanged at just under £20 million (see

Tooke and Newmarch 1857, pp. 589–92). The country bank issue of notes in 1847 was about £7 million, so a total liquidation of the private money stock would put some £87 million of private money against the Bank's £20 million in Bank of England notes. In addition, bank deposits totaled £55 million outside the Bank, and the Bank's own deposits were £15 million. That made £157 million to be exchanged for Bank of England notes totalling £20 million, without considering government debt, private issues of stocks and bonds, and other forms of credit sellable or at call (for data see Coppieters 1955, pp. 149–60). The Bank under the act could not normally increase its notes except through an inflow of gold to the Bank. The Bank's gold reserve had meanwhile fallen.

When panic came to a head in the autumn, the Bank's oft-denied role as lender of last resort came into play—the Bank was expected by the public and the government to be the banker for the entire nation. And while the Bank profited handsomely from its public duty to discount huge amounts at high rates, the Bank was running out of its own notes even while discounting. In the Treasury letter, the chancellor and prime minister intervened, authorizing the Bank to trade securities to the Issue Department for fiduciary notes (to be used for loans only at the highest discount rates). At the same time they promised a bill of indemnity intended to get bank officials off the hook for their violations of the Bank Act fiduciary-issue restrictions.

While it is true, as Frenkel and Dornbusch emphasize, that Sir Francis Baring and others were shocked that the Banking Department's reserve of notes could be exhausted while the Issue Department's reserve of gold held at high levels, the situation was of no surprise or disappointment to Lord Overstone. He believed that credit cycles were inevitable, that the Bank Act protected convertibility, and that the financial massacre created by the dwindling reserve of the Banking Department was a necessity. Overstone's only objection was the Bank's perception that it had *any* public duties at all, that it had attempted to mitigate the crisis. To Overstone the origin of financial trouble was no concern of the Bank's directors. When asked by the Lords' Committee of 1848 ([1848] 1857, question 1376) about this: "You consider that in its Banking Department the Bank should conduct its Banking Business in the same way whether the drain is for foreign or internal purposes?" Overstone replied, "I apprehend that the Banking Department should not look to the causes of a Drain of Bullion, but simply look to the State of the Banking reserve." If disaster came, so be it. He was asked: "If the causes which naturally and necessarily produce changes [contractions] are actually in operation it is not desirable by any artificial means to endeavor to prevent those violent results. In fact, the patient, however painful the operation may be, must submit to it, if it becomes necessary?" (questions 1395–96). Overstone's answer was simply "Yes." It was to be rules, not authority,

all the way. Writing in 1857, a decade later, as Mercator in the *Times*, Overstone stated his principles about money supplies (quoted in Hughes 1960, p. 231) thus:

> The great laws which determine the monetary equilibrium of the commercial world assign to this country a certain amount of money. No internal arrangements to which we may resort can alter or suspend the law . . . the monetary arrangements of this, as of every other country, must be sub-ordinate to the great principles which regulate the monetary equilibrium of the world. Any attempt to resist or modify the result of these principles can result only in confusion and embarrassment.

Overstone was not one for pusillanimous countercyclical monetary policies.

When in 1857 a similar sequence of events occurred—a downturn in the real economy followed by mounting financial panic and another huge liquidation of the bill system—history repeated itself, only this time the Banking Department reserve went bone dry and the Treasury letter relieved the markets of a drought of Bank of England notes (Hughes 1967). The effect was not "magical" (Ward-Perkins 1966, p. 266) as it had been in 1847, but the currency remained convertible and economic recovery came quickly enough. As in 1847 the Issue Department's bullion hoard held up nicely while the Banking Department scraped bottom and then went through the floor (Hughes 1960, app. 5).

One more great crisis with application of the Treasury letter came in 1866 and then the old-time experience of the Bank under the 1844 Act became irrelevant. In 1873 the British financial crisis was not severe as it was in the United States. The British financial system had already been purged by the crash of Overend and Gurney in 1866. With the British economy facing two decades of mainly falling prices, the Bank followed market interest rates downward, but now kept Bank rate *above* them (Hughes 1968). Stung by the criticism it had earlier faced for putting Bank rate below market rate in 1844–47, the Bank resolutely kept its reserves high, its discounts low, and achieved the high reserve ratios noted by Pippenger. Friedman and Schwartz (1963, p. 514) would comment on a similar policy pursued by the Federal Reserve system in the 1930s that did or did not contribute to stagnation, depending upon how one views Wicksell's monetary theory (see Hicks 1977, chap 3). To some extent, as Dutton notes, the Bank continued to expand its loans in times of gold outflows, thus sterilizing the gold-outflow consequences on the money supply.

When recovery came with the Alaskan and South African gold discoveries after 1896, the Bank of England maintained its conservative

policies and the British investor went on a binge of foreign acquisitions—he had now become the aging *rentier* noted by Brinley Thomas. By 1913 more than 80 percent of the new issues in the City of London were foreign (Thomas 1954, pp. 228–30). The Bank of England, now much reduced in size relative to the great (now) amalgamated banks of London, acted defensively to maintain the center of the old financial system until the Germans marched in 1914. Although the Bank continued to maintain a restraining hold on the money market by keeping its Bank rate above the market rate (King 1936, chap. 9), without any return to the old booming economy of the earlier nineteenth century the Bank's quantitative weakness was never tested.

The second factor suggested by the work of Frenkel and Dornbusch is worth additional comment. The technique of "crisis management" worked out in 1847 was applied again in 1857 and, routinely, in 1866. Originally the Bank of England itself had suggested that such an escape hatch be put into the 1844 Bank Act. But Peel left it out of the final legislation (Horsefield 1953, pp. 110–11). Once the London financial world realized that a Treasury letter could always be counted on to be forthcoming, the Bank's crisis-proven management technique conceivably added long-term stability to expectations and thus to the gold standard itself. *Conceivably*. Many writers, besides Bagehot, urged the Bank to engage in countercyclical operations. Dutton finds some not very strong evidence that the Bank followed such advice, or at least its actions made it appear so. The fact is that from 1866 to 1914 the system was never tested again. The stability of the gold standard in England may well have been due to the failure of the economy to boom again before World War I.

The Bank had lived for seven decades under the 1844 Act and the world had lived that long under the gold standard centered on the Bank. The experience of the Bank in those years, apart from its policy of *selling* government securities during panics to raise cash, evolved into our main notions about central banking. The currency had remained convertible at the center, at the Bank of England. Was the gold standard, thus managed, a good international financial system? It did not generate long periods of inflation. The periods of stagnation were followed by periods of growth. There was vast worldwide economic growth based upon free capital movement as well as the dynamic influences of England's free trade policies. To say such achievements were unimpressive implies that an example of a superior system can be found. Perhaps it was the Bretton Woods system in the two decades before it drowned in dollars. However, Nixon's speech of 15 August 1971 was an international Treasury letter in reverse, and there was no commitment ever again to redeem dollars for gold. The United States needed no bill of indemnity from anyone.

Notes

1. Page 1 of Ricardo's pamphlet reads: "The Bank of England performs two operations of Banking . . . it issues a paper currency as a substitute for a metallic one; and it advances money in the way of loan to merchants and others. . . . That these two operations have no necessary connection, will appear obvious from this, that they might be carried on by two separate bodies, without the slightest loss of advantage, either to the country or to the merchants who receive accommodation from such loans."

2. There was no change in the Act of 1844 apart from periodic expansions of the fiduciary issue as country banks gave up their issuing rights over time. There had been 636 licensed issuers of private money as late as 1832. The last private issuer was taken over by Lloyd's Bank in 1921 (see Coppieters 1955, p. 159; Feavearyear 1963, p. 321).

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General Discussion

McCauley noted the authors' suggestion that the suspension of Peel's Act was a good thing. He asked them to elaborate on how behavior after the crisis was affected by the suspension.

McCloskey commented on the rapidity of the economy's adjustment to the crisis. If a crisis of confidence or a harvest-induced financial crisis of this magnitude could be resolved within a month, as Dornbusch and Frenkel suggest in their paper, then why be concerned about the adjustment mechanism under the gold standard? If the adjustment takes place so fast, it may be worthwhile to make the simplifying assumption that interest rates were exogenous to the British economy.

Dornbusch restated the aims of the Dornbusch-Frenkel paper. The authors' objective was to look at a particular year in which the gold standard was in operation and to ask how the system responded to shocks. The shocks in question were not reckless credit expansion, which was impossible under Peel's Act; rather, in this instance, the disturbance eminated from the real side. Under Peel's Act, there was a presumption that when an external bullion drain took place, domestic currency in the hands of the public would decline as well. An adjustment would be facilitated. In this episode, however, the Banking Department of the Bank of England initially offset the attempt by individuals to run down their cash balances. Therefore no adjustment took place until the Bank of England decided that it was no longer feasible to continue to intervene, at which time the Bank liquidated its consol portfolio. In a single day it lowered the price of consols, or raised the discount rate, by four hundred basis points. A lot of firms went bankrupt that day. The Bank justified its

action by stating that its primary responsibility was to maintain the integrity of its note issue—a comment on the Bank of England's perception of what it meant to act in the public interest. At this time, the Bank's sole responsibility was to protect convertibility of its notes; if the Bank's initiatives created fears of mills being closed or riots in the streets, that was the government's problem. The Bank of England did not think of itself as engaged in countercyclical monetary policy; its interest was to make profits. Whenever there was the risk of an internal run, its concern was to have enough consols to be able to go to the stock market and liquidate them.

Dornbusch again restated the paper's conclusion: During the crisis of 1847, the Bank of England did not act as a lender-of-last-resort; in fact it did exactly the opposite. When bankruptcies were spreading because of an internal shortage of notes, the Bank of England went into the market and bought notes, selling consols from its portfolio. Its actions were exactly the opposite of those required of a lender-of-last-resort.

In response to McCloskey, Dornbusch suggested that adjustment was so rapid because the interest-rate increase forced upon the market by the Bank of England was so extreme. For twenty-five years the highest interest rate observed had been 6 percent. Suddenly the interest rate was driven up to 10 percent, and a large number of banks failed. Adjustment was rapid, but there is no presumption that this was a good way of managing monetary affairs.

Dornbusch elaborated upon what he meant when he stated that the gold standard was working badly: he meant relative to the post-1847 period when there was an understanding that in response to an internal drain, the Bank of England would discount freely. If the gold standard is understood to be a regime under which notes can be issued on the strength of gold, then the pre-1847 system worked poorly. The Bank of England certainly wished to avoid the possibility of a reckless credit expansion and wished to contract credit whenever bullion was lost; but any time the exchanges were favorable and a crisis occurred, it was expected that the Bank should print money freely. Thus the lesson from the 1847 episode is the distinction between internal- and external-convertibility difficulties.

GOODHART raised a question about the October crisis. In his opinion, the April crisis was explained perfectly in the paper. The analysis of what happened when the 1844 Act was relaxed raises no unresolved problems. But in Goodhart's view, Dornbusch and Frenkel fail to adequately explain the October crisis. In April a crisis occurs, Bank rate is raised, gold starts flowing in, and there is a recovery of confidence. Yet later the authors write: "During the late summer and especially in early fall, conditions deteriorated, setting the basis for the October crisis."

Goodhart wondered whether the authors had an explanation for the October crisis.

DORNBUSCH explained the October crisis as the culmination of six months of gold outflows to pay for imported grains. The decline in the Bank's reserve ratio led the public to question whether the Bank could recover from the loss of its reserves.

WHITE noted the authors' argument that the crisis of 1847 was a real crisis in the sense that the immediate factor precipitating it was a harvest failure. At the time, however, some individuals interpreted the event as a delayed reaction to the overissuance of bank notes starting in 1844, when the Banking Department of the Bank of England was freed to pursue any policy it desired. White wondered if Dornbusch and Frenkel had considered those arguments and whether they found evidence to support them.

In response, FRENKEL referred to a quote from John Stuart Mill, who describes the crisis of 1847 as a completely exogenous harvest failure that differed fundamentally from prior financial crises.

MCCLOSKEY returned to the question of the economy's speed of adjustment. He noted that there were two possible interpretations of the 1847 episode. Either the economy was tremendously agile or the Bank of England was tremendously agile. Either the elasticities that facilitate the adjustment were very high or the violence with which the policy instruments moved was very great. On the basis of the evidence presented in the paper, it is not clear which is true.

PART

III. International Experience in the Operation of the Gold Standard