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THE GOLD STANDARD AND THE BANK OF ENGLAND IN THE CRISIS OF 1847

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ABSTRACT

This paper examines 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 has been its origin: it originated from a massive real shock rather than from monetary disorder. A harvest failure gave rise to commercial distress and financial panic.

Following a brief outline of the main events during the 1847 crisis, we present a simple model of the financial sector that captures the central characteristics of the crisis. The model, which highlights the role of confidence in both external and internal convertibility, is then used for interpreting the detailed characteristics of the financial crisis.

Faced with a confidence crisis leading to international and external monetary drains, the Bank of England suspended Peel's act and thereby was allowed to issue fiat money without being constrained to have full gold backing. Our analysis shows that suspension of Peel's act was the proper policy required for the restoration of confidence. It also sheds light on the role of a lender of last resort in cases of banking panic.

As for the evaluation of the gold standard, the 1847 crisis demonstrates that International capital flows have played a key role in the adjustment mechanism. Further, it demonstrates that in contrast with the traditional representation, the gold standard has not been characterized by automatic, non-discretionary adjustment. On the contrary, banking policies and changes in the reserve-deposits and currency-deposits ratios have affected the money stock independently of gold flows.

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"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]

I. Introduction

The acceleration of world inflation during the 1970's 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. This belief is based on a casual look at history with the consequent inference that the gold standard contributed to the stability of the system. This view of prices 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 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, p. 88-9.)

But another view of the history of the gold standard during the 19th century reveals a succession of crises of varying length and depth. As documented by Hyndman (1932) the 19th century in the U.K. witnessed at least eight serious crises in 1825, 1836-39, 1847, 1857, 1866, 1873, 1882, and 1890. With this perspective of the gold standard era the relevant question should not only be how the gold standard worked but also why did it fail.

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[1] Quoted in Andreades (1966, p. 340).

The origins of the various crises during the gold standard era vary. Some were "real" and some were "financial", some automomous (like a massive harvest failure) and some were 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 since the origin of the crisis was "real". A harvest failure gave rise to commercial distress and financial panic the extremity of which were 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: the second section provides a brief account of the main events in Great Britain during 1847. Section III 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 IV. In section V we discuss whether suspension of Peel's Act was necessary. The paper concludes with some observations on the gold standard as a monetary system.

II. 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 panic resulted in a massive financial crisis, the analysis of which is the subject of this paper. The characteristics of the 1847 crisis have been 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 extra-ordinary and irrational extension of it. There are other causes; and one of more recent crises, that of 1847, is an instance, having been preceded by no particular extention 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, Book III, Chap. XII, §. 4).

Table 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 indices.

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

food stuffs 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 1-3 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 consol.[2]

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 which 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 a discount rate at an unprecedented level of 8 percent. The policy package led

[2]The source for the data are listed in the Appendix.

Table 1

SELECTED DATA FOR 1845-1848

	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

Note: All data are from B.R. Mitchell (1962). The balance of Payments data are measured in £ million, the term of trade are an index of the net barter terms (1880 = 100), the price of wheat in per Imperial quarter, and the prices of agricultural and industrial products are the Rousseaux Price Indices (1885 = 100).

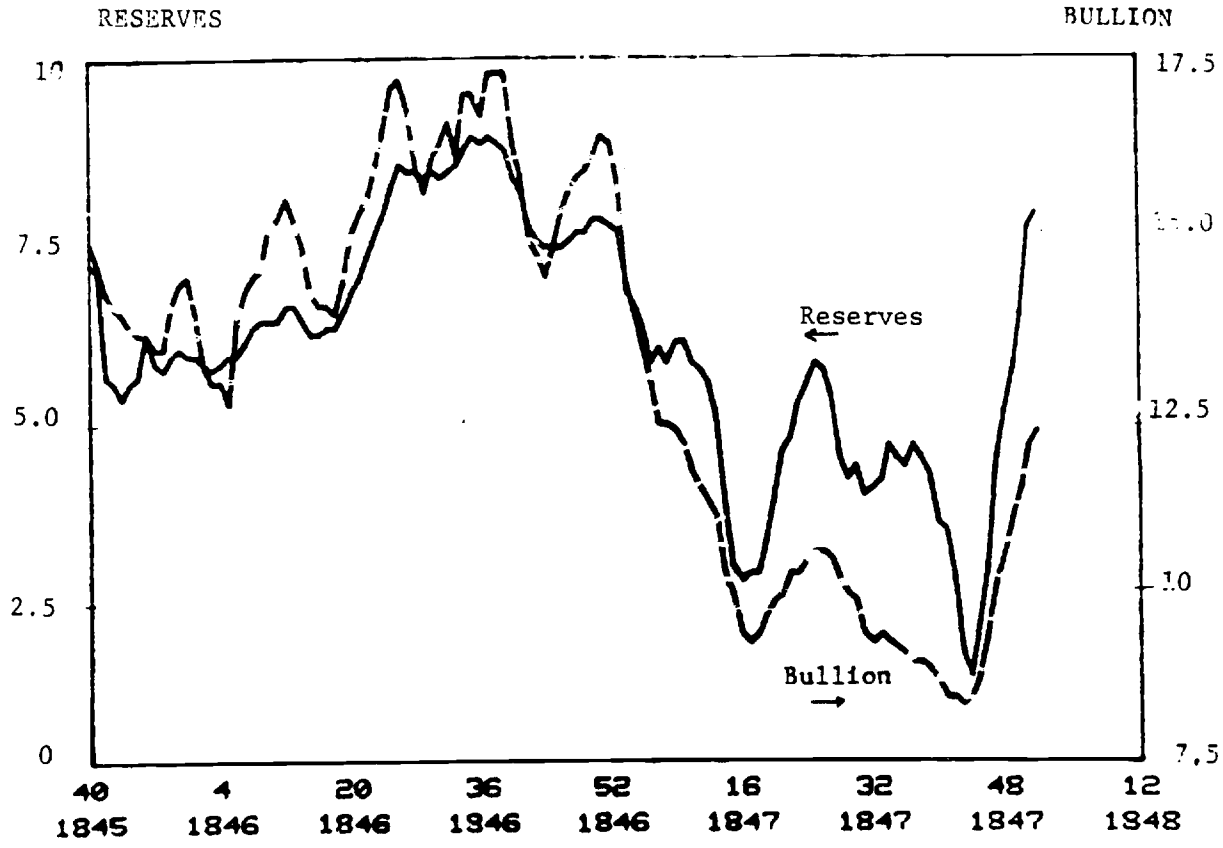

Figure 1: Bank of England Holdings of Bullion and Note Reserves

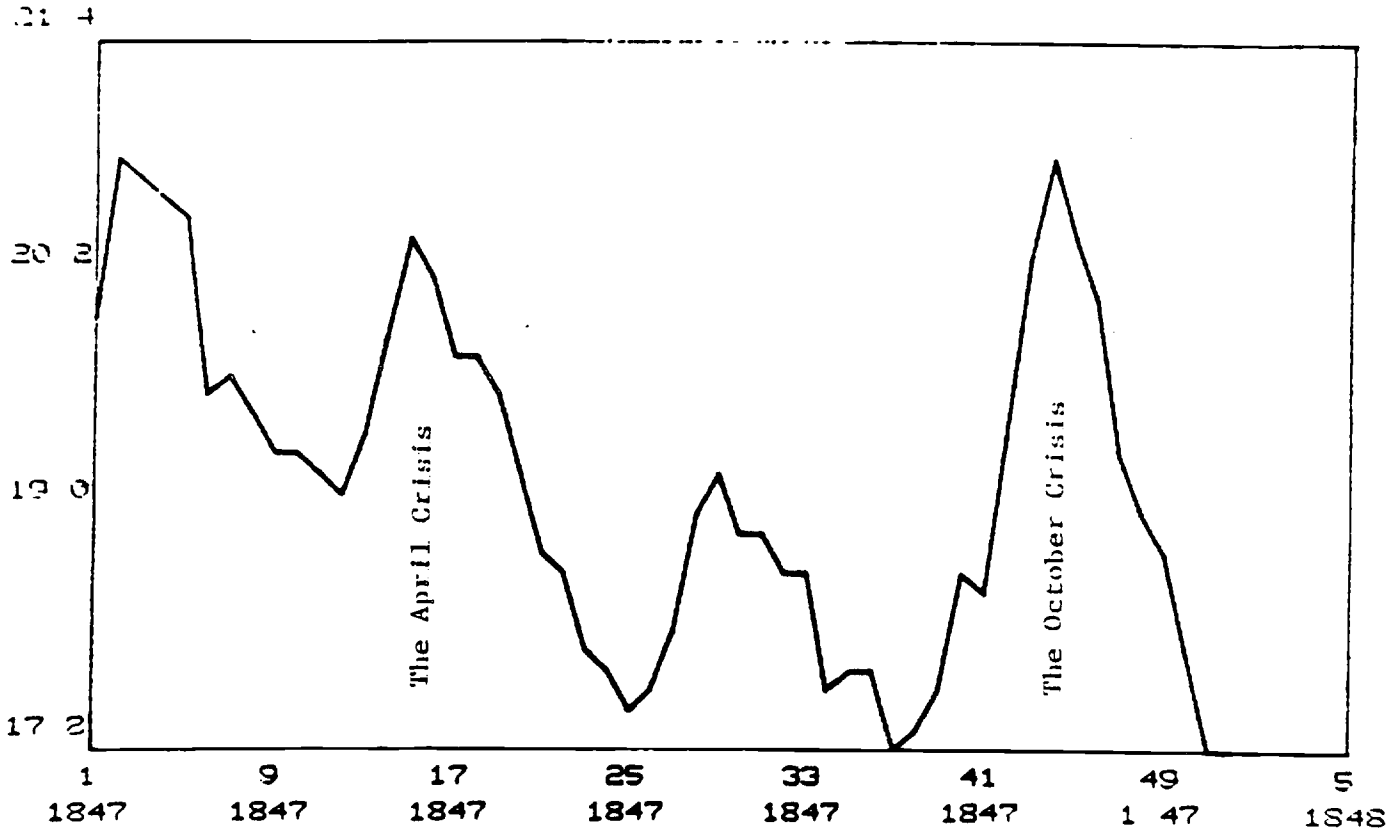

Figure 2: The Stock of Currency, 1847 weekly data

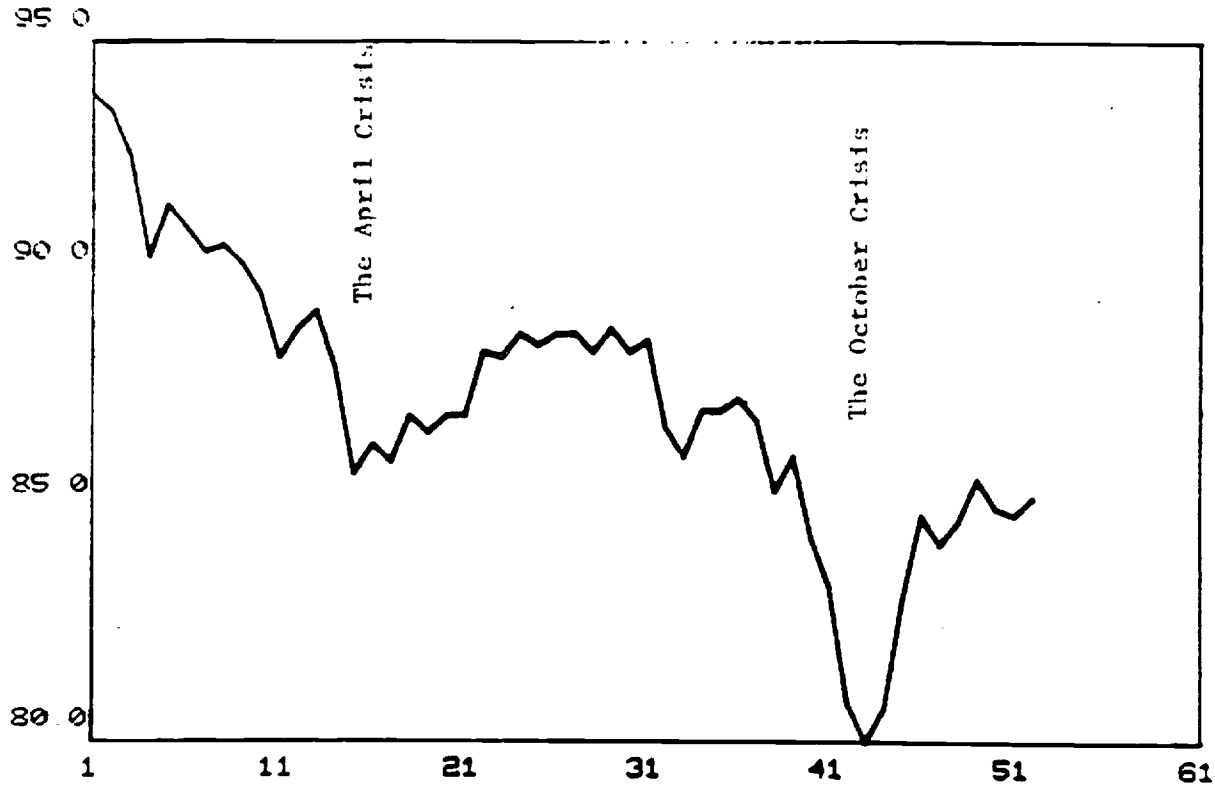

Figure 3: The Price of 3% Consols, 1847 weekly data

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.

III. Institutions and A Model of Financial Markets

In what follows we discuss the events in 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.

The Provisions of Peel's Act and the Money Supply

Peel's Act was passed by Parliament in 1844 and essentially enacted the doctrine of the "currency school."[3] The main provisions were the following:

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[3] On the "banking" and "currency" school controversy, see L. Mints (1945) and J. Viner (1955, ch. V).

TABLE 2

The Consolidated Bank of England Balance Sheet
(April 17th, 1847)

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
		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
		34,169,000

Source: Parliamentary Papers, 1847-48, Part 2, App. 8, p.131.

TABLE 3

Bank of England Disaggregated Balance Sheet

Banking Department		Issue Department	
Assets	Liabilities	Assets*	Liabilities
Note Reserves (R)	Private Deposits (D)	Gold (B)	Notes (N)
Loans (L)	Public Deposits (G)	Securites (F)	

*As usual we suppress the equity component in the balance sheet.

1. The Bank was separated into a "banking" and an "issue" department.

2. The fiduciary note issue was limited to 14 million pound sterling, and supplementary note issue required a 100% marginal bullion reserve.

3. Notes were issued for bullion at 13.17s9d pound sterling per ounce of gold.

The consolidated balance sheet of the Issue and Banking Departments is shown in Table 2. Several points are worth noting. First the distinction between public deposits, including in particular the exchequer and the account for debt service (entitled for payment of dividends), and the private deposits among which we include bankers' accounts. Second we note on the liability side the item "circulation" which refers to Bank of England notes including seven-day and other bills. The latter remain less than 1 million pounds throughout. On the asset side we note the item "bullion" which refers to silver and gold bullion as well as coin in the Bank.

To study the operation of the Bank of England in accord with Peel's Act we show in Table 3 the corresponding disaggregated balance sheets of the Banking and Issue departments respectively.

In analysing the balance sheet several comments are noteworthy: 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 their deposit liabilities, (D+G).

The money supply--that means 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 as shown in equation (1):

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

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 non-bank public and r is the actual reserve-total deposit ratio in the banking department.[4] From (1) we have the familiar properties 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.

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):

$$(2) \qquad c = c(r), \; c' \leqslant 0$$

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

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

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, it reduces it directly through the increased use of highpowered 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

[4] For the derivation see M. Friedman and A. Schwartz (1965). 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.

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):

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

Focusing on the short-run of weeks or months rather than a year or more, we take both prices and output as exogeneous to the financial sector.[5] 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:

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

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 ϕ ( ) and the actual ratio, r. Thus,

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

In equation (5) the desired reserve-deposit ratio, $\phi(i)$, declines as the rate

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[5]The supply shock--a harvest failure, exerted opposing effects on prices and output so that the net effect on nominal income and thereby on the interest rates may in fact be disregarded without too much obvious strain.

of interest increases. This 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 exogeneous 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:

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

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

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 (4') in (5) and (6) yields the following pair of equations:

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

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

where the signs of the partial derivatives follow from the previous assumptions. It is readily verified that the system, shown in Figure 4, must be stable.

In Figure 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 contrasts, 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 is 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 Bank the flatter the schedule and, 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 and, 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

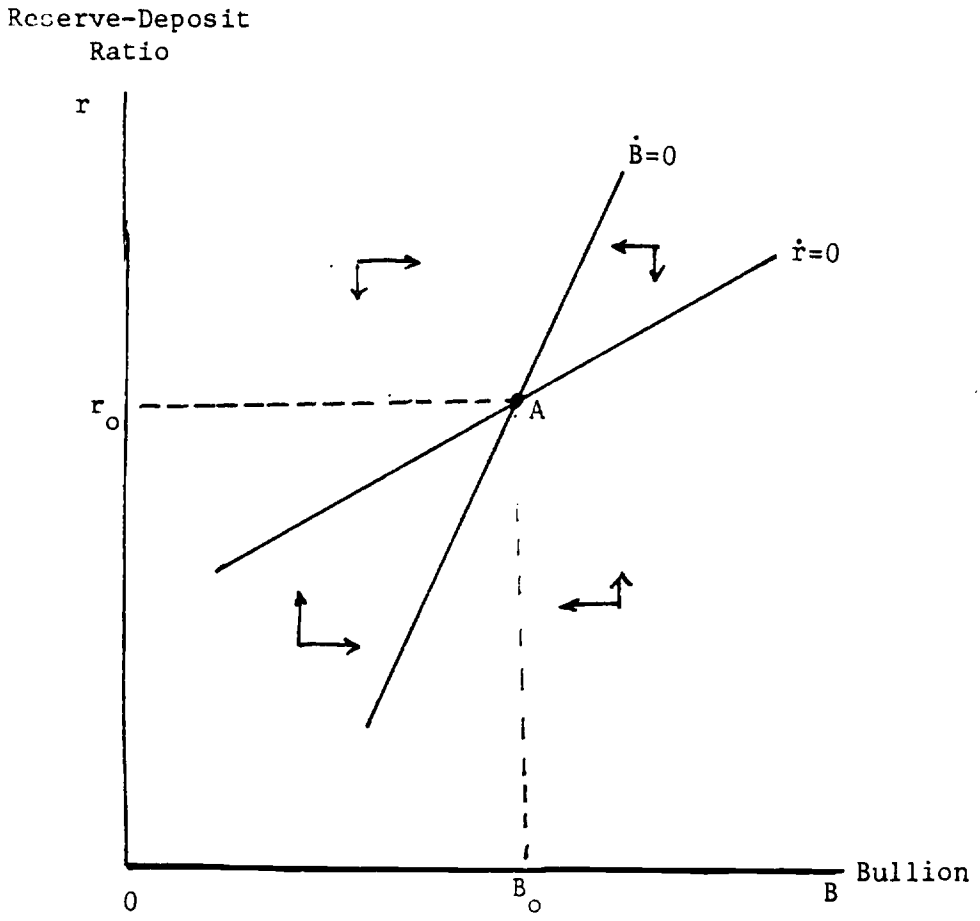

Figure 4: The Financial Model

response to high interest rates than 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.

The Adjustment Process

The traditional model of the price specie flow mechanism originating with the 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 would 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 recognized, that the passage of the precious metals from country to country is determined much more than was formally supposed by the state of the loan market in different countries and much less by the state of prices." (Mill, 1871,Book III, Chapter VIII, §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 is taken to be an automatic, non-discretionary 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 reaction 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 may in fact have amounted to partial or even complete sterilization of bullion flows. This possibility of credit expansion by the Bank and loss of reserve notes financing 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 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, 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. This 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 into 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, this reaction is for the moment not allowed to exercise a dominating influence.[6]

Some Evidence

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

The dynamic model was summerized by equations (7)-(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 4

[6]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 (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 V below.

TABLE 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	-0.625	$0.301(10^{-7})$	.36	1.85	.75
	(0.099)	(0.151)	$(0.122)10^{-7}$			
ΔB_t	$0.337(10^7)$	$0.262(10^7)$	-0.413	.66	2.00	.85
	$(0.099)10^7$	$(0.118)10^7$	(0.116)			

Note: r_t and B_t denote, respectively, reserve-deposit ratio and bullion in the Bank of England, and 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.

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.

IV. Financial Markets and the Balance of Payments in 1847

The April Crisis

The harvest failure of 1846/1847 depleted the bullion in the Bank in the fall of 1846 and, more so, in early 1847. Table 5 shows the development of bullion, the note reserve, 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 the depletion. Indeed, over the period January 2 to April 17, 1847 bullion fell by about 40 percent and the note reserve 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 along with an increasing discount rate. The table reports the weighted average discount rate applied by the Bank. From a level of 3 percent in 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

TABLE 5

The April Crisis

(Million £)

Year 1847	Note Reserve	Bullion in issue Department	Reserve-Deposit Ratio (%)	Discount Rate (%)	Notes in the hands of Public
January 2	8.23	14.26	46.0	3.10	20.0
March 6	5.71	10.99	36.0	4.14	19.3
April 3	3.70	9.55	23.9	4.25	19.9
April 17	2.56	8.80	19.6	5.25	20.2
May 1	2.74	8.51	23.6	5.25	19.8
June 5	5.09	9.43	32.0	5.20	18.3

Sources: Great Britain, House of Commons (1848). Also see Data Appendix.

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 the reserve was not sufficiently considered, either by those who were favorable 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." (F.T. Baring, 1847, as quoted in MacLeod, 1896, pp. 141-2).

The relative constancy of notes in the hands of the public to which Baring refers, is shown in Table 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. Bullion losses did not exert their full contractionary effect on money and credit because the reserve-deposit ratio was declining.[7]

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

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[7]The defects of the Bank act were discussed forcefully by Thomas Tooke (1844) whose views are analysed by Laidler (1975). For a further analysis see Morgan (1943).

drain of bullion was reinforced dramatically by the seasonal payment of the dividend which meant a significant run-down of public deposit. During the week of April 17th 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 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 6 shows that the public sector deposit withdrawal led only partially to a loss in reserves and that the money stock did not change substantially. The Table confirms that the Bank of England managed to face the runoff by selling securities. Figure 6 shows the weekly series of the reserve-deposit ratio during the year. The effects of the extra ordinary loss of reserves (by April 17th) and the reaction of the financial markets and the Bank of England have been described by MacLeod (1896, p. 142):

> "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 per-cent, 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 relanded. During this period the rate of discount for the best bills rose to nine, ten and twelve percent."

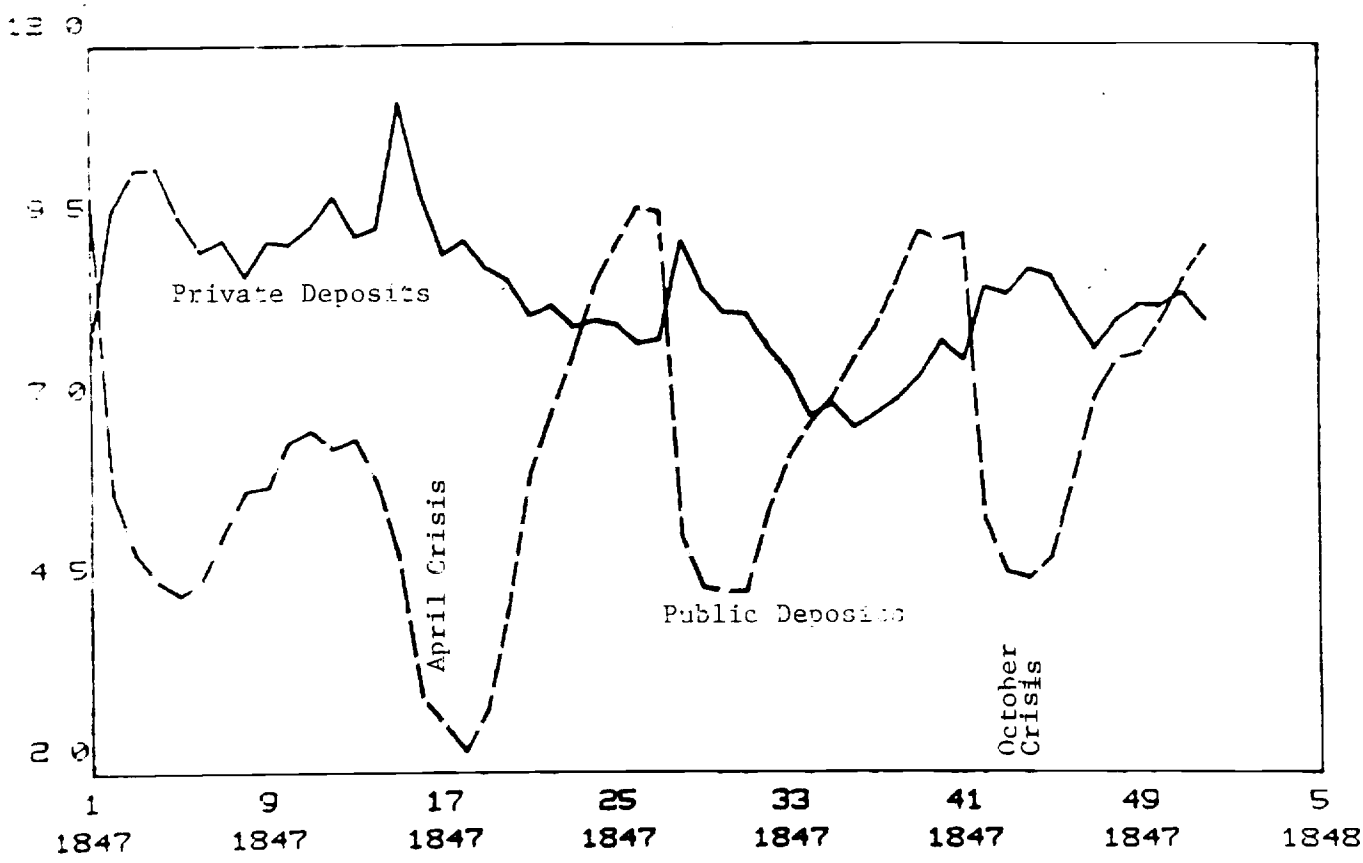

Figure 5: PUBLIC AND PRIVATE DEPOSITS AT THE BANK OF ENGLAND

TABLE 6

Money, Public Deposits and Reserves in the April Crisis
(Million £)

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

[a]Total Bullion in the Issue and Banking departments including coin.

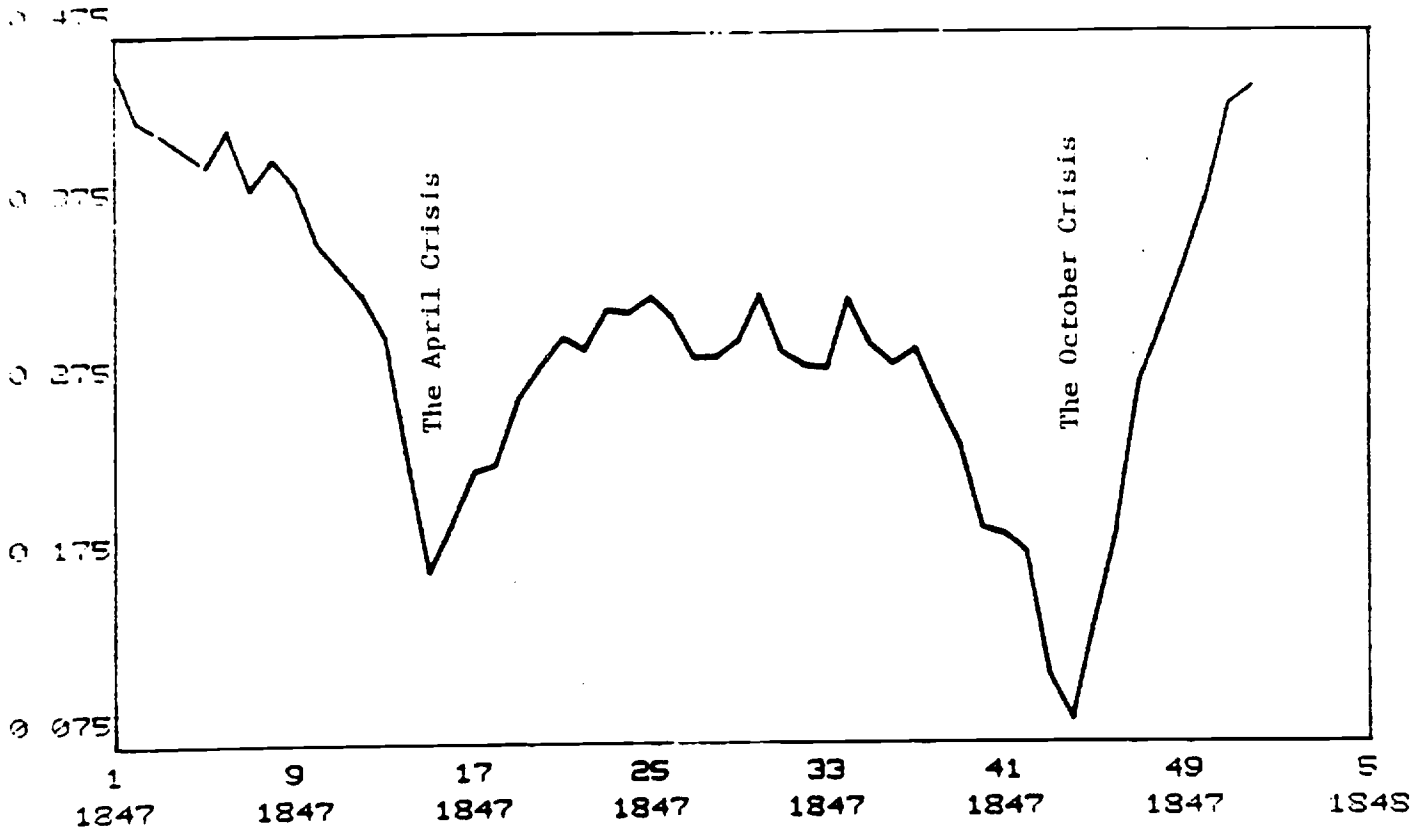

Figure 6: Reserve Total Deposit Ratio, 1847 weekly data

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 or Russia decided to substitute foreign securities for gold as a backing of the Russian currency and effected substantial purchases of consols. These developments and their effect on the restoration of confidence were described in the contemporary writings 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 the falling reserves, and of the prospect of further decline in bullion, meant that a crunch was quite inevitable. To wait with tightening for too long, and to ultimately administer it with severity, led to an unnecessary panic in the money market.

The October Crisis

The severe credit tightening following the April crisis restored the Bank's ability to maintain convertibility. Table 7 shows that by June the reserve-deposit ratio was again substantial. The 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.

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 is reflected in "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, vol. II, p. 3.)

Figure 7 confirms that 1847 interest rates were at a peak relative to the preceding 25 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, is still very high.[8]

[8]The data source is Great Britain, House of Lords, Secret Committee on the Commercial Distress, Apprndex C, p. 467.

TABLE 7

The October Crisis

(Million £)

Year 1847	Note Reserve	Bullion in issue Department	Reserve-Deposit Ratio (%)	Discount Rate (%)	Notes in the hands of Public
June 5	5.09	9.43	32.0	5.2	18.3
September 4	4.19	8.40	28.9	5.9	18.2
October 23	1.55	7.87	11.6	8.1	20.3
December 24	7.79	11.61	44.5	5.7	17.8

Source: Great Britain, House of Commons (1848). Also see Data Appendix.

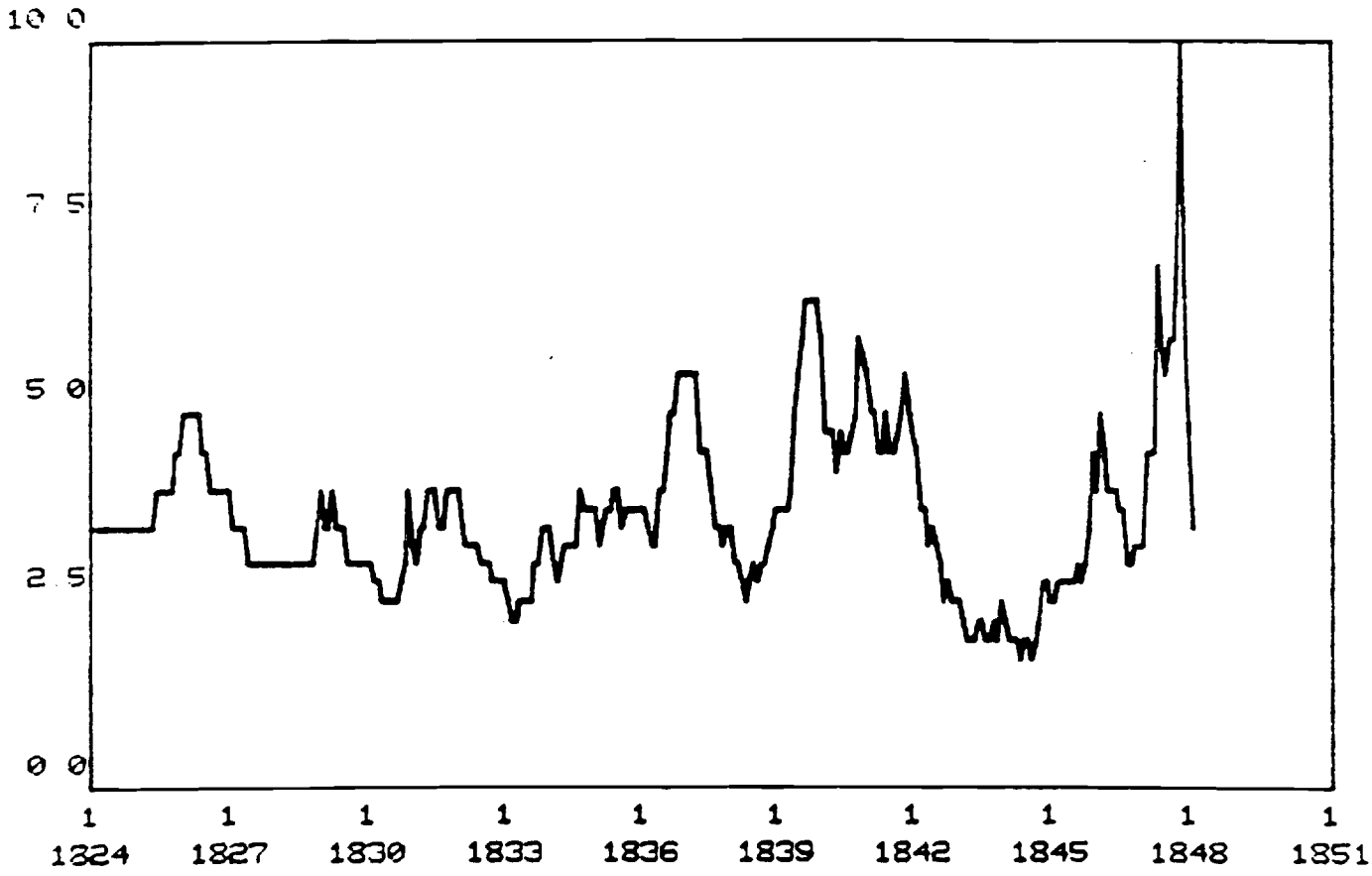

Figure 7: Rate of Discount of First-Class Bills 1824-1848

By October the increasing tightness of credit, the extra-ordinary height of the rate of interest, commercial failures and the threat of financial institutions defaulting 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, vol. II, p. 11.)

Developments between June and September resulted in some decline in both bullion and note reserve. 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 still remained at a comfortable £8.3 million, but the note reserve was down to only £1.55 million, well within the reach of depletion by a scramble for currency. The same point is clear from the reserve-deposit ratio that had declined from 32 percent in June to only 11.6 percent by late October.

The October crisis, once again, shows the role of public sector deposit movements, but this time in combination with a scramble for currency by the public. Table 8 shows a large decline in public sector deposits of nearly 4 million between the 9th and 16th. Three quarters of that deposit reduction are matched by a reduction in exchequer bills on the asset side. In the week of the 23rd dividened payments further reduced public sector deposits and showed up in increased currency in circulation. The increase in currency during the

TABLE 8

The Bank in October
(Million £)

	Public Deposits	Private Deposits	Circulation[a]	Exchequer Bills[b]	Bullion[c]
October 9	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

Source: See Table 2

[a]including Seven-day bills; [b]held by the banking department;

[c]total bullion, including coin.

first three weeks was only 2 million and as such did not appear large, but that gain must be compared to the reserves in the issue department which by the 23rd had fallen to only 1.5 million. The crisis thus involved the potential of minor increases in currency holdings putting the Bank into insolvency.

While the external drain set the pre-conditions for the crisis, it was the internal run and scramble for currency shown in Figure 8 that caused the panic of October. The poor liquidity position of the Bank was deteriorated further by a lot of commercial failures which in turn caused the public to question the soundness of private banks and thus required, on their part, increased liquidity and an ability to demonstrate convertibility of their liabilities into Bank of England notes or specie. Again this factor enhanced the shortage of Bank of England notes and the inadequacy of the note reserve.[9]

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, vol. II, p. 113).[10] The Bank, however, put up an admirable stone face and, would claim in the Enquiry that there was no issue of convertibility having been in question. Thus, in 1848, the Governor of the Bank, James Morris, told the House of Lords:

> "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, vol. II, p. 11.)

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[9] It is interesting to note that the developments during the October Crisis were part of the evidence which stimulated Jevons' theory of the "Frequent Autumnal Pressure" (see Jevons, 1884, ch. V).

[10] On October 23 London Bankers held £1.6 million with the Bank of England whereas the note reserve was only £1.5 million. While balances of all Bankers had risen from 1.5 to 2.1 million in the week of the 16th, they declined to only 1.8 million by October 23.

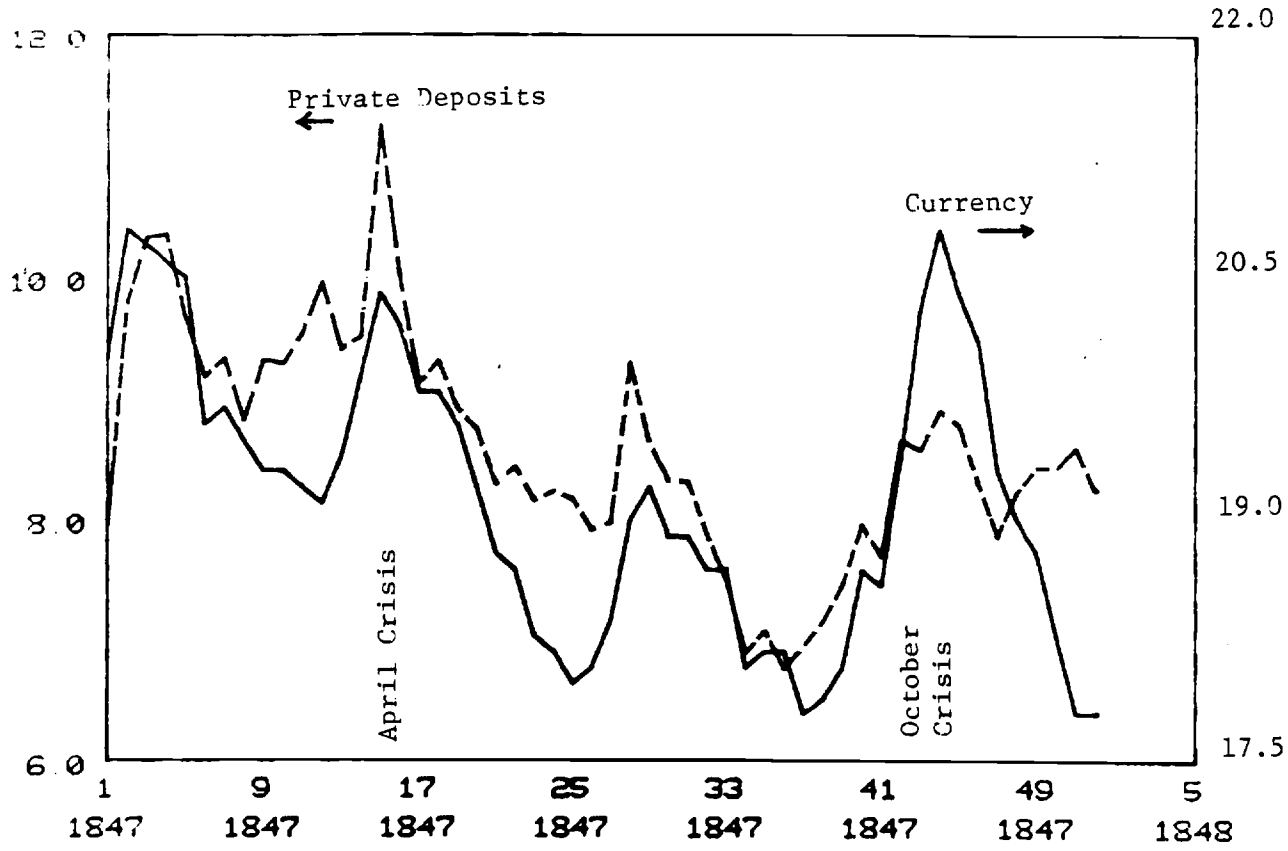

Figure 8: Private Deposits and Currency

Indeed, the way the Bank proposed to restore its financial position suggests that they may 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, that 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 October 25, 1847, is reproduced here [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 rate that the Bank was charging, rapidly restored financial stability. The

removal of the restriction on fiat money issue dispensed with the concern for the internal convertibility of deposits into notes. The 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 December 24, 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 way that was in no way prejudical to external convertibility, i.e., fiat money issue that would finance export of bullion. To prevent such a course of events the 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 there was an advantage for gold import and thus an external support of domestic monetary expansion.

The 1847 episode was probably responsible for the popular maximum (ascribed to Bagehot) that "seven percent will draw gold home from the moon".[11] 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 fifty percent. This 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 have experimented with various lag structures and,

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[11] While we could not trace the exact origin of this maxim, it is being refered to by Lionel Robbins in his testimony before the (Radcliffe) Committee on the working of the Monetary System (1959, p. 218). We are indebted to David Laidler for this reference.

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 weeks lagged interest rate; standard errors are reported below the coefficients:

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

$$R^2=0.75, \quad D.W.=2.16, \quad \rho=0.43$$

The results are consistent with the expectations that the rate of capital inflow is related positively to the domestic rate of interest. Since in the pre-telegraph period information on interest differentials could not be transmitted instantaneously, it is reasonable to expect that gold flows respond to lagged value 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 the rates of interest had to be transmitted and then the gold had to be shipped. The four and seven weeks lags that are reported in equation (9) correspond, respectively, to the length of the round trip between England and New York and England and St. Petersburg.[12] If this interpretation of the lag structure is correct, one might expect that in subsequent periods, following the introduction of telegraph, the lag structure would be shortened by a factor of 50 percent.

What the regressions bear 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.)

[12] For some evidence see Howarth (1974), p. 313.

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, 1848, 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 as in the case of 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 this principle.

V. Was the Suspension of Peel's Act Necessary?

The authorisation for uncovered note issue, as we already noted, 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 November 23: (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.
> " The Governor and Deputy-Governor of the Bank of England." Charles Wood,

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 allow suspension of Peel's Act in the first place. 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 favorable 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):

> "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" (Bagehot, 1873, 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" (Bagehot, 1873, p.31).

The 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." (quoted in Evans, 1848, p. 96.)

Sir Robert Peel for his part expressed the view that the Bank Charter Act had failed in one of important respects, 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 adoption of those precautions, the necessity for extrinsic interference might have been prevented, it might not have been necessary for the Government to authorise the violation of the Act of 1844." [Quoted in Andreades (1966, p. 339)]

Many felt that the Act, as opposed to the Bank of England policy, had no effect in aggravating the crisis. S.J. Lloyd, 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, vol. II, p. 44.)

But this was not the view the House of Lords came to. 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." (quoted in Turner, 1897, pp. 162-3.)

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, vol. II, p. 40.)

The very interesting aspect of the 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 <u>actual</u> gold flows can be monetized. Under the proposal of the Committee it is enough to have the <u>conditions</u> 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 III above did not raise issues of stability and crisis in that model. 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 to actually 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 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 reserve ratio that decline to zero. From a point such as C, with low bullion and low reserves, the Bank lowers the

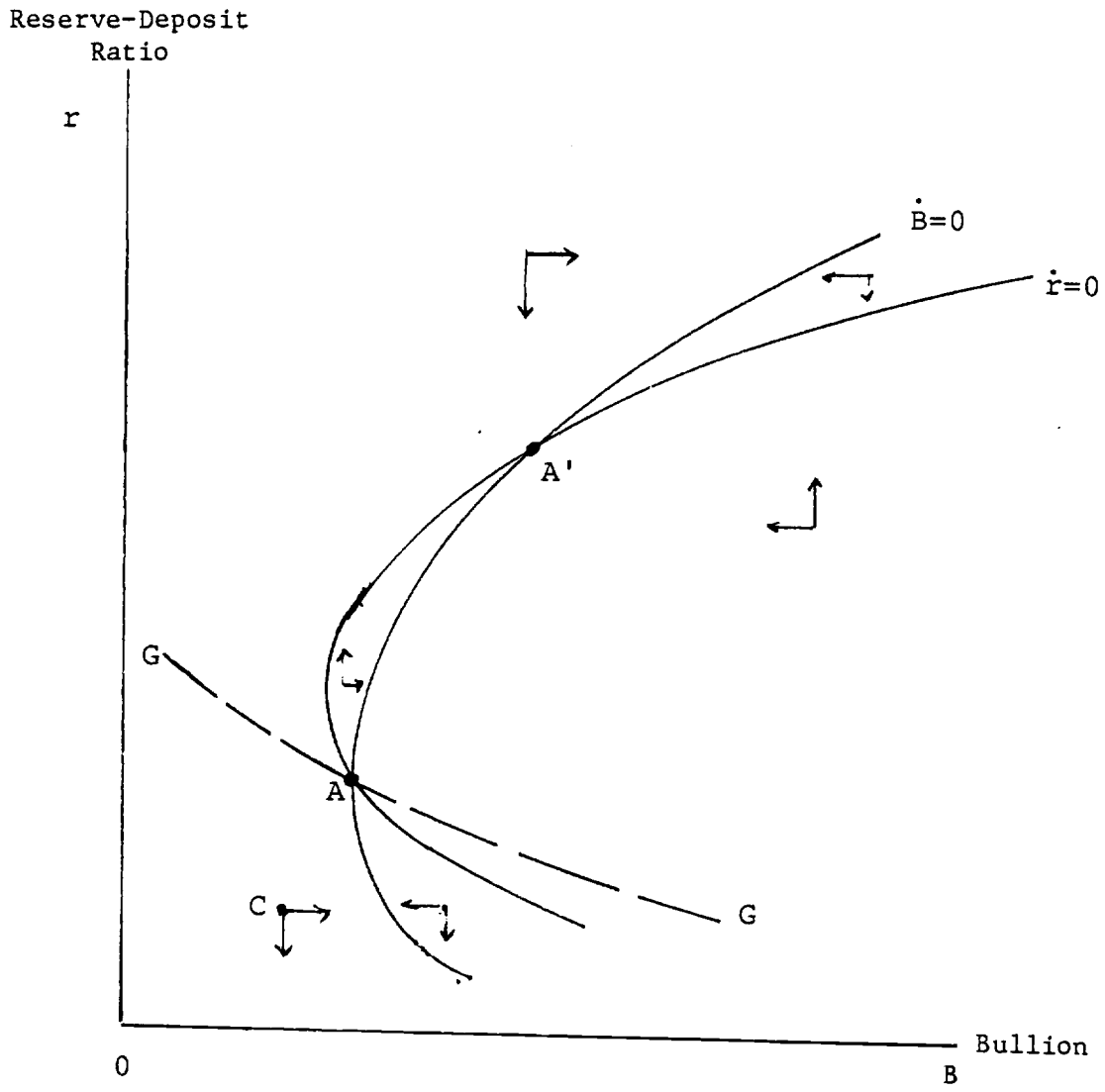

Figure 9 : The Financial Model-the Unstable Case

reserve-deposit ratio while bullion is rising. The reserve-deposit ratio keeps falling, the currency deposit ratio keeps rising and the system must collapse.

VI. Concluding Remarks

In this paper we have 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 has been its origin: it originated from 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 have presented a simple model that seems to capture the central characteristics of the crisis and that emphasize the role of international capital flows during the adjustment process . Our analysis suggests that the repeal of Peel's Act, i.e. the collapse of the rigid rules of the gold standard, was the correct and the essential policy which was required for the restoration of confidence.

We return now to the more general question of the gold standard as a framework for macroeconomic stability. The monetary system, to work satisfactorily would have to satisfy three criteria: First, to assure stability and predictability of the general level of prices and output. Second, to separate to a large extent banking and financial problems from the macroeconomy. Third, to 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 the price level stability was well served by the gold standard. There is evidence

of short term price variability substantially in excess of the post World War II experience. It may also be argued that long term stability was, to a large extent accidental being due to 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. It also excluded the accelerating path of inflation that we have experienced from the interaction of macroeconomic shocks, inertia and accommodation in the 1970s.

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 of the Central Bank--is essential as long as there is less than 100 percent reserve banking. The lack of a lender of last resort was sharply obvious 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.

DATA 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
DEC26	8814	18037	7696	15067	3.204	93.625	63.000	20253	2.63163	0.4887	1.69285
JAN02	8227	17895	7904	14952	3.196	93.875	64.333	20725	2.62209	0.4597	1.77478
JAN09	6715	15645	9785	14308	3.209	93.500	66.833	21593	2.20675	0.4292	1.90170
JAN16	6546	15374	10340	13949	3.243	92.500	70.250	21403	2.06992	0.4258	1.87984
JAN23	6167	15024	10356	13443	3.320	90.375	73.250	21276	2.05446	0.4105	1.91442
JAN30	5704	14123	9660	12902	3.279	91.500	74.917	21198	2.19441	0.4039	2.00846
FEB06	5891	13851	9183	12288	3.297	91.000	73.833	20397	2.22117	0.4253	1.96232
FEB13	5747	14628	9330	12299	3.315	90.500	71.583	20552	2.20279	0.3929	1.98196
FEB20	5977	14707	8837	12215	3.310	90.625	71.583	20238	2.29014	0.4064	1.96267
FEB27	6017	15250	9322	12045	3.324	90.250	74.583	20028	2.14847	0.3946	1.91342
MAR06	5715	15860	9289	11596	3.347	89.625	74.333	19881	2.14027	0.3603	1.94415
MAR13	5554	16252	9536	11449	3.399	88.250	74.166	19895	2.08630	0.3417	1.95036
MAR20	5419	16434	9962	11232	3.376	88.875	75.833	19813	1.98886	0.3297	1.93583
MAR27	4876	16019	9403	11016	3.361	89.250	77.000	20140	2.14187	0.3044	2.06898
APR03	3700	15504	9502	10246	3.409	88.000	77.083	20546	2.16228	0.2386	2.27602
APR10	2833	16242	11258	9867	3.499	85.750	74.416	21034	1.86836	0.1744	2.29168
APR17	2558	13016	10005	9330	3.473	86.375	74.083	20772	2.07616	0.1965	2.44981
APR24	2719	11760	9125	9214	3.488	86.000	75.833	20495	2.24603	0.2312	2.50084
MAY01	2741	11611	9312	9338	3.448	87.000	79.500	20597	2.21188	0.2361	2.48146
MAY08	3197	11800	8930	9589	3.463	86.625	81.833	20392	2.28354	0.2709	2.41791
MAY15	3793	13071	8751	9870	3.448	87.000	85.166	20077	2.29425	0.2902	2.29815
MAY22	4420	14430	8289	9949	3.448	87.000	94.833	19529	2.35601	0.3063	2.18884
MAY29	4628	15410	8432	10170	3.395	88.375	102.42	19542	2.31760	0.3003	2.14196
JUN05	5089	15923	8151	10237	3.399	88.250	99.833	19148	2.34916	0.3196	2.06186
JUN12	5375	16922	8228	10359	3.380	88.750	88.833	18984	2.30724	0.3176	2.00044
JUN19	5665	17419	8160	10512	3.390	88.500	91.583	18847	2.30968	0.3252	1.95349
JUN26	5625	17717	7921	10526	3.380	88.750	91.833	18901	2.38619	0.3175	1.98007
JUL03	5185	17707	7968	10397	3.380	88.750	87.083	19212	2.41114	0.2928	2.06645
JUL10	4331	14550	9305	10086	3.380	88.750	82.250	19755	2.12305	0.2977	2.13112
JUL17	4069	13200	8640	9919	3.376	88.875	74.000	19850	2.29745	0.3083	2.24172
JUL24	4216	12830	8326	9770	3.395	88.375	75.500	19554	2.34855	0.3286	2.22293
JUL31	3775	12820	8316	9331	3.385	88.625	77.250	19556	2.35161	0.2945	2.30519
AUG07	3946	13457	7886	9253	3.458	86.750	75.416	19307	2.44826	0.2932	2.29826
AUG14	3992	13872	7514	9287	3.483	86.125	66.833	19295	2.56787	0.2878	2.33000
AUG21	4488	13762	6931	9240	3.443	87.125	66.500	18752	2.70553	0.3261	2.24915
AUG28	4330	14299	7106	9140	3.443	87.125	60.333	18810	2.64706	0.3028	2.26618
SEP04	4190	14514	6791	8960	3.433	87.375	56.666	18770	2.76395	0.2887	2.32775
SEP11	4467	15147	6981	8915	3.453	86.875	51.333	19448	2.64260	0.2949	2.22126
SEP18	4273	15934	7185	8880	3.514	85.375	49.500	18607	2.58970	0.2682	2.25100
SEP25	4112	16932	7484	8782	3.483	86.125	53.500	18670	2.49466	0.2429	2.25543
OCT02	3409	17291	7962	8565	3.556	84.375	56.750	19156	2.40593	0.1972	2.38484
OCT09	3322	17129	7714	8409	3.598	83.375	54.166	19087	2.47433	0.1939	2.42851
OCT16	2630	14171	8675	8431	3.709	80.875	54.250	19801	2.28254	0.1856	2.51889
OCT23	1547	13347	8581	8313	3.750	80.000	55.166	20766	2.42000	0.1159	2.89761
OCT30	1177	13607	8911	8439	3.715	80.750	53.500	21262	2.38604	0.0865	2.99098
NOV06	2030	13796	8804	8730	3.609	83.125	52.333	20700	2.35120	0.1471	2.72328
NOV13	2798	14304	8312	9259	3.535	84.875	53.666	20461	2.46162	0.1956	2.58983
NOV20	4228	15086	7866	10017	3.561	84.250	54.250	19789	2.51576	0.2803	2.28667
NOV27	4986	15968	8239	10533	3.540	84.750	52.917	19547	2.37250	0.3122	2.10102
DEC04	5583	16241	8441	11033	3.504	85.625	52.083	19450	2.30423	0.3438	1.98880
DEC11	6449	16667	8437	11426	3.529	85.000	51.917	18977	2.24926	0.3869	1.84160
DEC18	7551	17370	8607	11991	3.535	84.875	52.833	18440	2.14244	0.4347	1.67391
DEC25	7786	17479	8243	12237	3.519	85.250	52.750	18451	2.23838	0.4454	1.66536

Note: R, D+G, D, and B denote, respectively, the stock of reserve held by the Bank of England, total deposits including Exchequer and London Bankers, private deposits, and the total amount of Bullion; all are measured in thousand pounds sterling. These data are from Appendix to Reports (1848). C denotes currency which is measured as Bullion minus reserves + 14,000 (the fiduciary issue), and m denotes the money multiplier. P_c denotes the price of 3 percent consol, P_w the price of wheat and i is 100 times the yield on consols, i.e., $(100x3)/P_c$. The source for these data is Hubbard (1848).

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