

# THE COST OF BLACK WEDNESDAY RECONSIDERED

6 August 1997

## The cost of Black Wednesday reconsidered

I attach a paper on reassessing the cost of ERM intervention in 1992 in the light of sterling's recent appreciation

2 Key points are:

- Relative to sterling, we lost around **£800m** on reserves operations in August and September 1992 and a total **£1bn** between August 1992 and April 1997
- The opportunity cost of the 1992 intervention was around **£2.4bn**, measured to the start of October 1992
- Had we kept the sterling we bought, we would have recouped some **£1.8bn** of that by April 1997 (compared to maintaining the August 1992 level of reserves) In fact, we used most of it to rebuild the reserves.
- The total opportunity cost of the 1992 intervention and subsequent rebuilding was **£1.9-£4bn**, depending on the measurement period and counterfactual assumed. The most sensible assumptions give a loss of **£3.3bn** measured at February 1994, by which time we had clearly moved to a new strategic regime.

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## The cost of Black Wednesday reconsidered

### Background

1 We sold some \$28bn of reserves on Black Wednesday (16 September 1992), taking total intervention in August and September 1992 to nearly \$40bn. The pound was then suspended from the ERM, plummeting from the bottom of its band at DM2 7780 to below DM2 50 by the end of September.

2 We rebuilt the net reserves gradually in the following months from a short position of \$16bn in September 1992 up to \$11-12bn by early 1994. At that point, we made a strategic decision not to rebuild further and kept levels broadly constant for the following two years, before moving in early 1996 to a policy of gradual reduction. That policy, together with a \$1½bn downwards revaluation, has taken us down to current levels of just under \$8bn.

3 Over that period, the pound initially slid further against the dollar down to around \$1.50, fluctuated in the ranges \$1.50-1.60 and DM2 30-2.50 for three years, and reached a low against the DM of almost DM2.20 in mid-1995. It then climbed sharply from mid-1996, returning close to ERM levels against the DM by the end of April 1997, although remaining well below 1992 levels against the dollar (chart 1).

4 The Bank put the opportunity cost of the 1992 intervention at £2.4bn measured to 1 October 1992 and £3.2bn to 1 April 1993 (██████████ of 10 December 1993). The issue is how far this cost can now be reassessed in the light of sterling's recent rise.

### What is the cost?

5 The cost depends on exactly what we want to measure - the total impact of holding and using reserves, or just the cost of certain decisions. If the latter, which decisions exactly, over what period, and what could we realistically have done instead?

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6 The total impact of holding and using reserves is the **profit and loss relative to sterling** - the change in the sterling value of our reserve assets and liabilities, taking account of sterling flowing in and out of the account and funding costs. That is the true cost to the taxpayer. It is the measure a commercial fund manager would use, and the measure we use to monitor the cost of holding reserves in less turbulent times.

7 But the profit relative to sterling includes all the gains and losses made on holding foreign currency assets and liabilities, not just the cost of intervention. As a consequence, if we hold a positive stock of net reserves, profit on this measure is always positive when the pound falls and always negative when it rises, whatever the size of intervention. It is true, however, that if intervention is consistently profitable (the market rises when we buy and falls when we sell) then we would also expect overall sterling profit to be positive on average.

8 To isolate the impact of a particular strategic decision to intervene, we need to look at the **opportunity cost**, the cost relative to what we might have done instead. That in turn depends on finding a realistic counterfactual.

9 We also need to be clear on the **measurement period** - that is which actions were part of the intervention strategy and which the results of subsequent decisions. The two obvious choices of measurement period are

- First, the immediate cost over the intervention period, marking to market when intervention stops. This assumes we genuinely had the opportunity to realize the position at the market prices prevailing at the time (even if we chose not to take that opportunity), not an unreasonable assumption if we reckon the long-run impact of intervention to be small.
- Second, the cost once the position has been fully closed-out. This avoids the problem of how to value assets, as the sterling position is booked at actual purchase and sale prices. But it covers both the cost of intervention and the cost of the strategy used to rebuild the reserves, taken together. And it can be difficult to isolate these from the impact of subsequent decisions.

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10 We take each of these measures of cost in turn.

## Profit and loss relative to sterling

11 We held nearly \$24bn of net reserves at the start of August 1992, moving down to -\$16bn by the end of September. As a result of this short position **the loss relative to sterling was nearly £800m** on reserves operations in August and September 1992.

12 Since then, performance has varied over time as sterling has risen and fallen. But on average we have made a small loss, taking the total accumulated loss since August 1992 to just over **£1bn** by end-April 1997 (chart 2 and table 1)

## Opportunity cost

13 The immediate opportunity cost of intervention is the difference between the £800m loss we actually made, and the profit we would have made had we not intervened, marked-to-market at 1 October. On that basis, **intervention in August and September 1992 cost us around £2.4bn**, compared to the alternative of maintaining the \$24bn of assets we held at the start of August 1992 (scenario A in tables 1 and 2).

14. Taking that forward, had we kept the sterling we bought and maintained the large short reserves position for another five years, we would have made a handsome sterling profit when the pound recovered. Comparing that to the position had we never intervened, we would have gained some **£1.8bn** between October 1992 and April 1997, wiping out much of the initial loss (comparing scenario A to scenario D). We have seen analysis along these lines in the recent press (attached) although written without the benefit of the true intervention figures

15 However, we did not keep the sterling we bought. Instead, we used most of it to rebuild the reserves. Had we every rebuilt them fully, that would have been a natural point at which to measure the opportunity cost a second time, taking the cost of intervention and the cost of rebuilding the reserves together. But in fact, we took a strategic decision to move to a lower equilibrium level of reserves and have never fully closed the position

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16 That leaves us with various alternative measures. The simplest is just to carry forward in time the comparison between our actual operations, and the position had we never intervened (scenario A). Compared to maintaining the \$24bn of reserves we had in August 1992, the opportunity cost of our actual operations had risen to **£3.2bn** by April 1993 (the headline figure in the Bank's original analysis) and to **£3.3bn** by the time we stopped building the reserves in early 1994.

17. Continuing on to April 1997, the apparent cost would have fallen back to **£1.9bn** as the pound recovered. But that goes far beyond the cost of the 1992 intervention and includes the substantial benefit of our later decision to move to a lower equilibrium level of reserves. Nor is it a realistic counterfactual to suppose we would have kept \$24bn of reserves for five years when the regime had fundamentally changed.

18 A more reasonable comparison is with the counterfactual of not intervening in September 1992, gradually reducing the reserves once UK had left the ERM, stabilising at actual levels of around \$11bn in early 1994, and following actual strategy thereafter. On that basis (scenario B) the opportunity cost of intervention and the subsequent rebuilding of the reserves was around **£3.3bn** measured at the end February 1994. **This is probably the most sensible measure of the cost of the 1992 intervention and subsequent rebuilding taken together and is close to the figure in the Bank's original analysis.**

19 For comparison, that cost would have risen to £4bn when measured at April 1997, taking account of sterling interest costs over the following three years. The alternative of reducing more slowly to April 1997 (scenario C) lowers the measured cost slightly, but does not change the qualitative story.

20. Detailed results and methodology are attached.

**Debt and Reserves Management Team**

July 1997

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**Table 1 Profit relative to sterling of alternative scenarios**  
(£bn marked-to-market at end month)

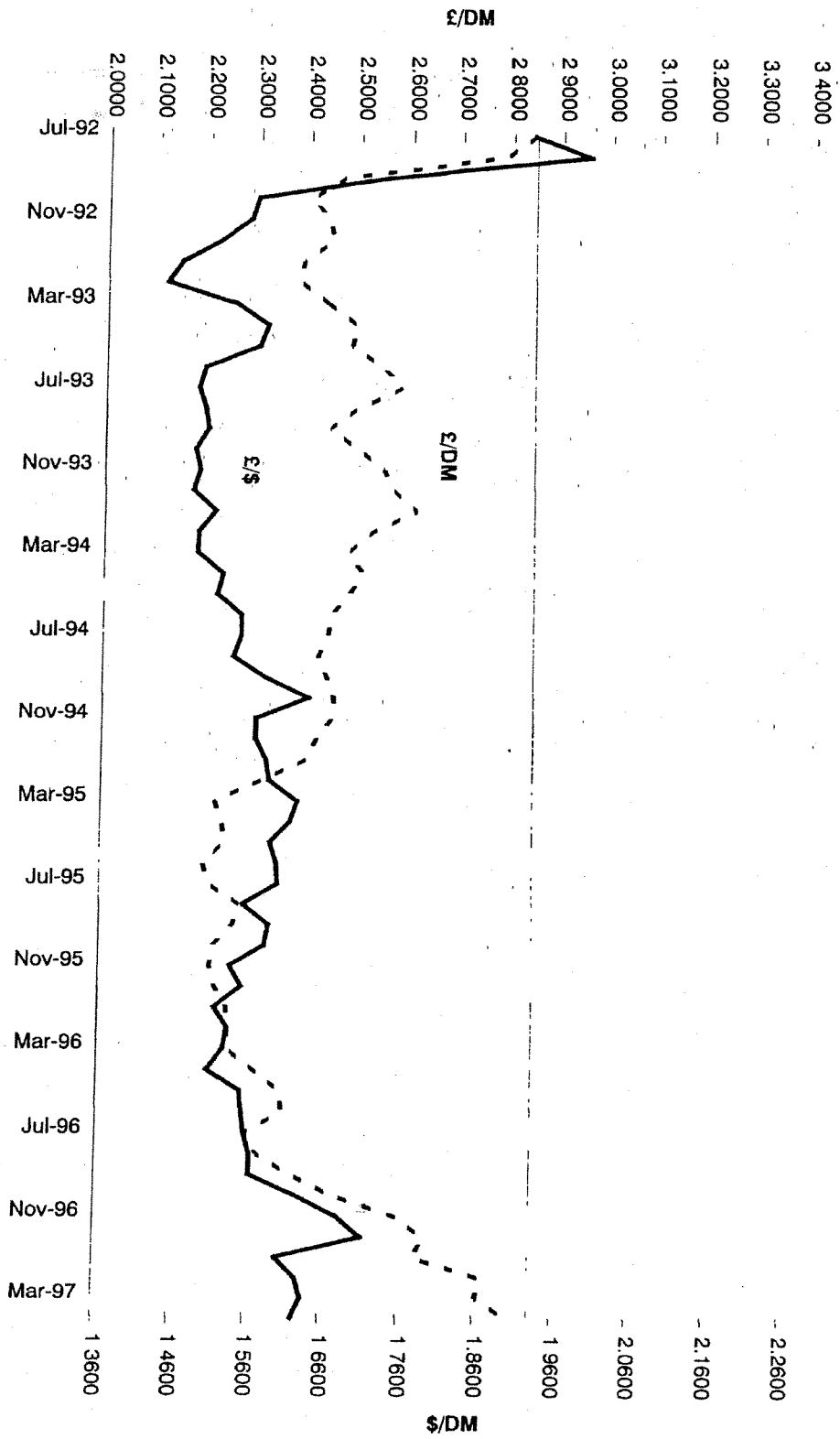
	July 1992*	Sep 1992*	Mar 1993*	Feb 1994	Apr 1997
Actual	0.0	-0.8	-0.2	-0.1	-1.0
A: No intervention	0.0	1.6	3.0	3.4	0.9
B: Run down to Feb 94	0.0	1.6	2.9	3.2	3.0
C: Run down to Apr 97	0.0	1.6	2.9	3.2	2.6
D: Maintain Oct 92 position	0.0	-0.8	-0.4	0.2	0.3

**Table 2 Opportunity costs (actual vs. alternatives)**  
(£bn marked-to-market at end month)

	July 1992*	Sep 1992*	Mar 1993*	Feb 1994	Apr 1997
A: No intervention	0.0	-2.4	-3.2	-3.5	-1.9
B: Run down to Feb 94	0.0	-2.4	-3.2	-3.3	-4.0
C: Run down to Apr 97	0.0	-2.4	-3.2	-3.4	-3.7
D: Maintain Oct 92 position	0.0	0.0	0.2	-0.3	-1.3
Memo: D-A	0.0	-2.4	-3.4	-3.2	-0.6

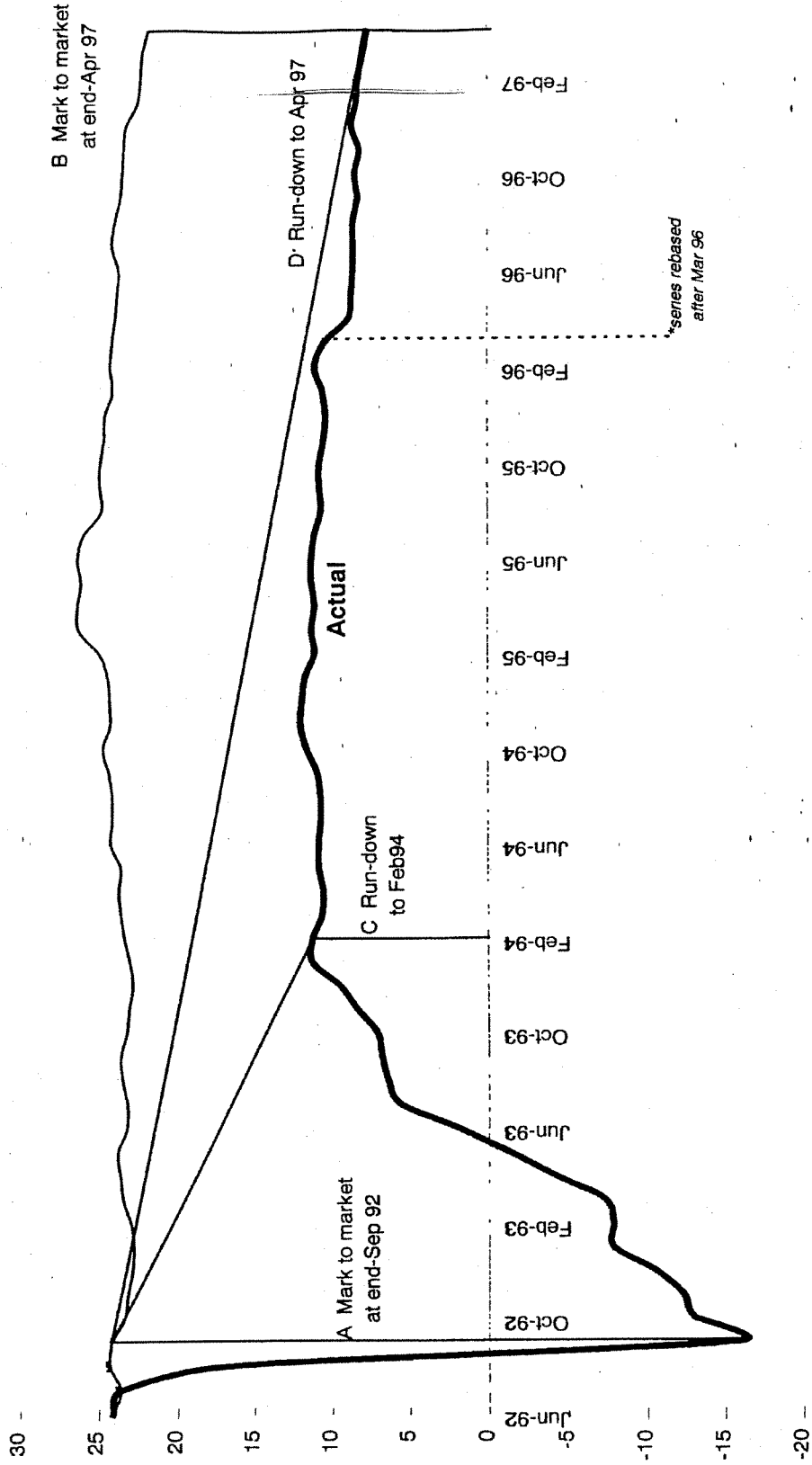
\* For consistency with 1993 analysis, end-July 1992, Sep 1992 and Mar 1993 are actually measured to 1 Aug 1992, 1 Oct 1992 and 1 April 1993 respectively

Chart 1: Sterling exchange rates 1992-1997



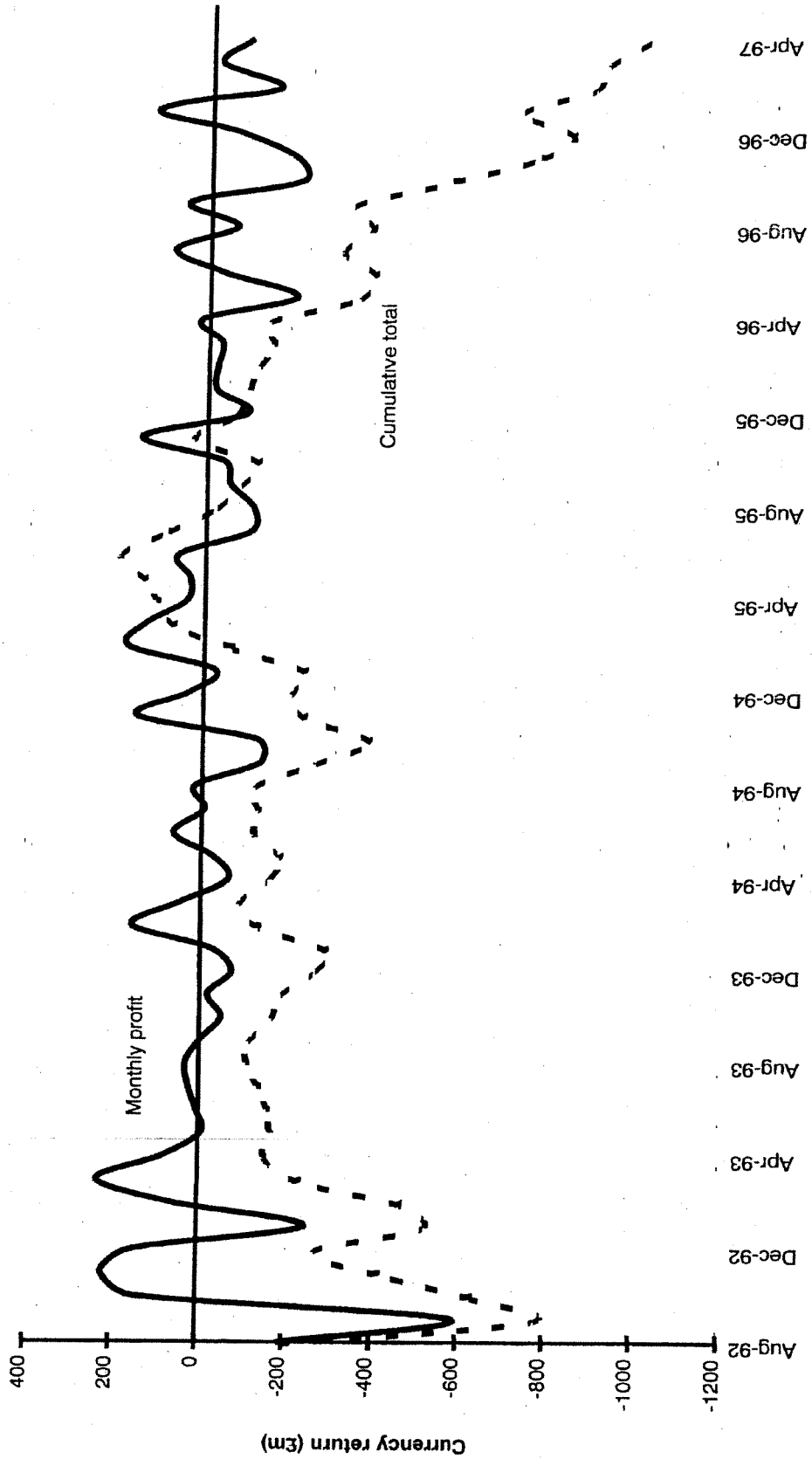
Levels chart

Chart 2: Net reserves (\$bn) under alternative scenarios





**Chart 3: Profit and loss relative to sterling 1992-97**  
(£m currency switch to end-month)



# Bank of England nets £1bn from soaring sterling

Diane Coyle  
Economics Editor

The rise in the pound has generated profits of around £1bn for the Bank of England, thanks to the increasing value of the sterling held in its reserves.

As the pound has soared past its old level in the exchange rate mechanism, it has eliminated the losses the Bank made when it tried and failed to support the currency by buying it on the foreign exchanges in the autumn of 1992, in the run-up to 'Black Wednesday'. The Bank is thought to have spent about £10bn on that intervention, making a paper loss of up to £2bn.

The losses on the intervention, which failed to keep sterling in the ERM, have now turned into a profit of around £1bn due to the appreciation of the pound and interest earnings during the past five years.

The pound's exchange rate against the German mark fell from DM2.78 in September 1992 to a low of DM2.18 in November 1995. Last night it stood near its highest for seven years at DM3.02.

However, the pound's strength on the foreign exchange led to fresh predictions yesterday of massive job losses in manufacturing. There were also warnings from currency traders that the Bank of England would soon have to intervene to sell sterling and prevent the pound from rising any further.

Professor Andrew Senance of the London Business School, speaking to the Foundation for Manufacturing and Industry last night, said the current strength of the exchange rate threatened the loss of 100,000 jobs in manufacturing.

"We have not seen anything like an appreciation on this scale in one year before," he said. He predicted that the shake-out in industry would not approach the early 1980s recession in its scale, but there would nevertheless be big job cuts. "Manufacturing is not grinding into reverse, but this estimate of potential job losses is quite conservative."

Gloom about industry's prospects if the exchange rate stays strong enough to bite into exports is spreading.

Kenneth Clarke, former Chancellor of the Exchequer, said yesterday, "If we are not careful, this will wipe out our manufacturing industry."

The alarm was not universal. Kevin Gardiner, UK economist at investment bank Morgan Stanley, said, "The strong pound is as much an effect as a cause. The home market which is still the biggest, is expanding strongly enough for manufacturing to continue to grow."

However, the mood in the foreign currency markets was becoming a matter for concern, some analysts said. Michael Lewis at Deutsche Morgan Grenfell said it could only be a

matter of time before the Bank of England had to sell pounds to control the exchange rate.

"It is becoming increasingly disorderly, and a lot of hot money is going into sterling. The markets will continue to test the resolve of the central banks," he said.

The excitement is not confined to the pound, but rather reflects the general weakness of the German currency. The Bank of Italy yesterday intervened in the markets on a small scale to sell lire and buy marks.

Meanwhile, the dollar has been strengthening against a range of other currencies, particularly the mark and yen. The health of the US economy was confirmed by new figures yesterday showing that retail sales increased by 0.5 per cent, more than expected, in June.

The currency markets have become convinced that there is nothing to lose from bidding up the pound and dollar and bidding down the mark. The Bank of England and Federal Reserve are expected to raise interest rates during the next few months, while the Bundesbank is thought unlikely to increase key interest rates until the German economy shows more signs of life.

The pound ended yesterday almost unchanged at DM3.02. Its index against a range of other currencies was down 0.4 at 105.1. It has risen by 24 per cent in value during the past 12 months.



Eddle George, Governor of the Bank of England: The Bank's losses on intervention in the run-up to 'Black Wednesday' have turned into a profit of around £1bn in the past five years

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## Annex - methodology and detailed results

1 The Bank produced a paper in August 1993 based on detailed daily figures for reserve holdings in the period 1 August 1992 to 1 April 1993. They concluded that the opportunity cost of intervening and rebuilding the reserves, relative to the alternative of no intervention, was around \$4bn to 1 October 1992 and \$4.9bn to 1 April 1993 (£2.4bn and £3.2bn respectively).

2 This paper is based on the same methodology, carrying forward results to later months and using monthly figures for asset holding and currency gains and losses from the reserves management accounts. We have used the Bank's estimates wherever possible for the period to April 1993, when intervention was concentrated on certain days and exchange rates particularly volatile. Where direct comparison was possible, our estimates are very close to the Bank's.

### Methodology

3 Interest and exchange rates are taken as given. Intervention has no impact. Assets and liabilities are marked-to-market at the beginning and end of each period.

4 Sterling profit and loss is the change in net assets including sterling liabilities, less the cost of sterling funding. In practice that is measured as:

- the increase in the sterling value of net foreign currency assets,
- plus
- net purchases of sterling (approximated where not available by the change in foreign currency assets plus net foreign currency interest, converted to sterling at average exchange rates over the period),

less

- the notional cost of sterling funding.

5 Returns from interest rate strategy and active management are excluded. These estimates show only the cost of intervention positions, except where indicated below.

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6 There is an assumed sterling liability of \$23.63bn on 3 August 1992, equal to the currency assets held at that point. That is, all the scenarios start at a zero base.

7 For simplicity, foreign currency assets are assumed to earn interest at 1-month  $\text{libor}-\frac{1}{4}$  (approximating to  $\text{libid}-\frac{1}{8}$ ). This may slightly underestimate actual interest received, but not by enough to affect the estimates. Similarly, the sterling funding cost is assumed to be 1 month sterling  $\text{libor}-\frac{1}{4}$ , implying that the marginal source of funds is the money markets.

8 Notional interest payments are rolled forwards in sterling, earning interest at 1-month  $\text{libor}-\frac{1}{4}$ , to give value at the end of the measurement period.

## Methodology for particular strategies

9. Adjustments for particular strategies are.

- **Actual strategy** All currency returns are included from August 1992 to April 1993 on the grounds currency positions were part of the overall intervention strategy. Benchmark 40% US dollars, 40% DM, 20% yen positions are assumed from the start of April 1993 onwards. Total accumulated profit is estimated by rolling forwards monthly profit and loss, accruing interest. For consistency, figures from April 1996 are adjusted to remove the profit on the short SDR position.
- **Strategy A (no intervention)**. The currency mix at 1 August is taken directly from monthly reports for end-July 1992. These holdings are maintained to April 1997, allowing exchange rate fluctuations to change the dollar value of the reserves.
- **Strategy B (no intervention, reduce gradually to Feb 1994)**. The August 1992 currency mix is assumed until end-September 1992, the 40:40:20 benchmark thereafter. Net reserves are then assumed to fall at a steady rate in dollar terms, with the portfolio readjusted to maintain the 40:40:20 mix, reaching \$11.3bn at end-Feb 1994.

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- Strategy C (no intervention, reduce gradually to April 1997). As above but with a slower pace of reduction
- Strategy D (intervene then hold October 92 levels) Asset holdings at 1 Oct 1992 are taken from monthly reports. There is a small discrepancy with the figures in the original Bank paper, perhaps accounted for by the 1 day difference. For consistency, we have adopted the figures used in the Bank papers (currency holdings of \$16.1bn and sterling liabilities of -\$14.74bn, including the cost of carry to October 1992) by assuming a net purchase of DM1.4bn relative to the end month figures. There is also a case for assuming assets were swapped back into the neutral 40:40:20 benchmark at 1 Oct 1992. But that would confuse the impact of intervention (which was mainly in DM and ECU) with subsequent action to restore the position and it makes little difference to the results.

## Detailed results

10 Detailed results are attached in table 3 (actual) and tables 4a-d (alternative strategies)

Actual

Profit to end	Monthly £m	Cumulative £m
Aug-92	-195	-195
Sep-92	-589	-785
Oct-92	148	-641
Nov-92	220	-426
Dec-92	150	-278
Jan-93	-248	-528
Feb-93	58	-473
Mar-93	233	-242
Apr-93	82	-161
May-93	-9	-171
Jun-93	4	-167
Jul-93	22	-146
Aug-93	29	-118
Sep-93	-4	-122
Oct-93	-51	-174
Nov-93	-20	-195
Dec-93	-75	-271
Jan-94	-27 9	-300
Feb-94	157 9	-143
Mar-94	46 8	-97
Apr-94	-64 6	-162
May-94	-29 2	-192
Jun-94	61 6	-131
Jul-94	-9	-141
Aug-94	12 4	-129
Sep-94	-136 8	-266
Oct-94	-127 7	-395
Nov-94	150 7	-246
Dec-94	31 1	-216
Jan-95	-28 8	-246
Feb-95	172 6	-74
Mar-95	134 8	60
Apr-95	39	99
May-95	30 6	130
Jun-95	58 2	189
Jul-95	-106 8	84
Aug-95	-113	-29
Sep-95	-58 9	-88
Oct-95	-41 8	-130
Nov-95	149 3	18
Dec-95	-94 4	-76
Jan-96	-23 9	-100
Feb-96	-25 5	-126
Mar-96	-34 9	-162
Apr-96	11	-152
May-96	-208	-360
Jun-96	-36	-398
Jul-96	76	-324
Aug-96	-67	-392
Sep-96	45	-349
Oct-96	-220	-571
Nov-96	-204	-778
Dec-96	-78	-860
Jan-97	121	-744
Feb-97	-162	-909
Mar-97	-26	-940
Apr-97	-92	-1036

**Table AA (No intervention)**  
Interest (£bn)

Assets	£	DM	ECU	VEN	Total carry	Cum carry	Total reserve	Total assets	Total position
	10.20	12.60	0.00	0.10	£bn	£bn	£bn	£bn	£bn
01-Aug-92	-0.1334	0.0135	0.0000	0.0000	-0.0449	0.0000	23.8500	0.0000	0.0000
01-Oct-92	-0.1000	0.0157	0.0000	0.0000	-0.0449	-0.0449	24.2948	-0.1178	-0.1627
01-Nov-92	-0.0943	0.0160	0.0000	0.0000	-0.0449	-0.0449	24.1953	1.7145	1.8351
01-Dec-92	-0.0805	0.0162	0.0000	0.0000	0.0104	0.1041	23.7775	2.7482	2.6401
01-Jan-93	-0.0781	0.0229	0.0000	0.0000	-0.0167	0.1285	23.1821	2.7092	2.5837
01-Feb-93	-0.0702	0.0182	0.0000	0.0000	-0.0029	0.1256	22.9154	2.5287	2.7992
01-Mar-93	-0.0695	0.0158	0.0000	0.0000	-0.0029	0.1302	22.8285	2.4003	3.2672
01-Apr-93	-0.0624	0.0166	0.0000	0.0000	-0.0013	0.1361	23.0568	3.7403	3.6052
30-Apr-93	-0.0653	0.0151	0.0000	0.0000	0.0009	0.1352	23.5214	3.1164	2.9812
31-May-93	-0.0611	0.0159	0.0000	0.0000	-0.0083	0.1384	23.7012	2.8109	2.6790
30-Jun-93	-0.0668	0.0169	0.0000	0.0000	-0.0028	0.1384	23.8799	3.0312	2.8928
31-Jul-93	-0.0605	0.0172	0.0000	0.0000	0.0018	0.1375	23.3170	3.3915	3.2540
31-Aug-93	-0.0598	0.0171	0.0000	0.0000	0.0018	0.1400	23.2912	3.4484	3.3185
30-Sep-93	-0.0595	0.0165	0.0000	0.0000	0.0102	0.0000	23.5974	3.5699	3.4290
31-Oct-93	0.0811	0.0172	0.0000	0.0000	-0.0048	0.1494	23.7069	3.6998	3.4504
30-Nov-93	-0.0579	0.0166	0.0000	0.0000	0.0075	0.1578	23.3369	3.8212	3.3634
31-Dec-93	-0.0533	0.0194	0.0000	0.0000	-0.0063	0.1668	23.0866	3.9583	3.1915
28-Feb-94	-0.0546	0.0172	0.0000	0.0000	-0.0009	0.1684	22.9532	3.2934	3.1249
31-Mar-94	-0.0514	0.0151	0.0000	0.0000	-0.0081	0.1753	23.1433	3.1102	2.9448
30-Apr-94	-0.0497	0.0180	0.0000	0.0000	-0.0049	0.1809	23.4869	3.5691	3.3882
31-May-94	-0.0501	0.0215	0.0000	0.0000	0.0074	0.1908	23.7198	3.7687	3.5856
30-Jun-94	-0.0484	0.0227	0.0000	0.0000	-0.0012	0.1927	23.8728	3.7196	3.2988
31-Jul-94	-0.0501	0.0242	0.0000	0.0000	0.0000	0.1825	23.7358	3.4602	3.2777
31-Aug-94	-0.0527	0.0240	0.0000	0.0000	0.0011	0.1821	24.3904	3.4945	3.3129
30-Sep-94	-0.0478	0.0246	0.0000	0.0000	0.0013	0.1815	24.3047	3.6075	3.4240
31-Oct-94	-0.0478	0.0246	0.0000	0.0000	0.0013	0.1815	24.3047	3.6075	3.4240
30-Nov-94	-0.0528	0.0258	0.0000	0.0000	0.0012	0.1800	24.5418	3.1551	3.1353
31-Dec-94	-0.0566	0.0252	0.0000	0.0000	0.0067	-0.0012	0.1850	24.9371	3.0051
28-Feb-95	-0.0598	0.0315	0.0000	0.0000	0.0000	0.1852	24.4536	3.3783	3.1951
31-Mar-95	-0.0581	0.0315	0.0000	0.0000	0.0071	0.0000	0.1789	24.5206	3.4210
30-Apr-95	-0.0580	0.0314	0.0000	0.0000	0.0004	-0.1794	24.6567	3.3684	3.1890
31-May-95	-0.0582	0.0314	0.0000	0.0000	-0.0031	0.1834	25.1855	3.6529	3.4896
30-Jun-95	-0.0582	0.0306	0.0000	0.0000	0.0025	0.1868	26.5000	4.0909	3.9041
31-Jul-95	-0.0587	0.0318	0.0000	0.0000	0.0061	-0.1928	26.5722	4.2370	4.0441
30-Aug-95	-0.0617	0.0306	0.0000	0.0000	-0.0086	-0.2025	26.3804	4.3863	4.1838
31-Sep-95	-0.0670	0.0313	0.0000	0.0000	0.0040	-0.2105	26.6003	4.4303	4.2197
30-Oct-95	-0.0670	0.0313	0.0000	0.0000	0.0000	0.2116	26.2489	4.1894	3.9878
30-Nov-95	-0.0689	0.0314	0.0000	0.0000	-0.0149	0.2377	25.1119	3.8442	3.7165
30-Dec-95	-0.0683	0.0298	0.0000	0.0000	0.0021	-0.2539	25.2055	3.6555	3.4016
31-Jan-96	-0.0683	0.0309	0.0000	0.0000	0.0007	-0.2732	25.1978	3.7009	3.4277
30-Feb-96	-0.0679	0.0320	0.0000	0.0000	-0.0182	-0.2809	24.9563	4.0218	3.7308
31-Mar-96	-0.0657	0.0311	0.0000	0.0000	-0.0167	0.0000	24.9186	3.8011	3.5209
29-Apr-96	-0.0658	0.0274	0.0000	0.0000	-0.0156	0.0000	24.9386	3.8881	3.5606
31-May-96	-0.0631	0.0287	0.0000	0.0000	-0.0171	-0.1482	24.6143	3.8136	3.4734
30-Jun-96	-0.0686	0.0289	0.0000	0.0000	-0.0175	0.0000	24.4668	3.7889	3.4233
31-Jul-96	-0.0605	0.0250	0.0000	0.0000	0.0011	-0.3818	24.2877	3.8803	3.4988
30-Aug-96	-0.0688	0.0260	0.0000	0.0000	-0.0059	-0.4002	24.1784	3.4419	2.9418
31-Sep-96	-0.0581	0.0262	0.0000	0.0000	0.0008	-0.4186	24.0879	3.2638	2.8451
30-Oct-96	-0.0579	0.0289	0.0000	0.0000	-0.0139	-0.4486	24.3720	3.3282	2.8765
31-Nov-96	-0.0560	0.0278	0.0000	0.0000	0.0007	-0.4465	24.0048	3.0915	2.6250
31-Dec-96	-0.0589	0.0276	0.0000	0.0000	-0.0182	-0.4870	23.9146	2.4516	1.9646
31-Jan-97	-0.0611	0.0255	0.0000	0.0000	0.0007	-0.5112	23.8652	1.9059	1.3647
31-Feb-97	-0.0624	0.0284	0.0000	0.0000	-0.0212	-0.5349	23.7034	1.8203	1.0474
28-Mar-97	-0.0611	0.0275	0.0000	0.0000	0.0006	-0.5593	22.9777	2.0961	1.5368
31-Apr-97	-0.0611	0.0275	0.0000	0.0000	0.0006	-0.5823	22.7779	1.7357	1.1534
30-May-97	-0.0594	0.0281	0.0000	0.0000	0.0007	0.0000	0.6063	22.8976	1.6147
30-Jun-97	-0.0594	0.0281	0.0000	0.0000	-0.0184	-0.6288	22.3363	1.5069	0.8781

Table 4b (No intervention, run down reserves to end-Feb 1994)

Date	Assets		Reserves		Sterling		Dollars		DMark		ECU		Yen		Total carry		Assets		Cumulative carry			
	£	\$	£	\$	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£		
01-Aug-92	-12.25	10.20	12.68	0.00	610.56	23.50																
01-Sep-92	-12.25	10.20	12.68	0.00	610.56	24.29	-0.1034	0.0195	0.0388	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
01-Oct-92	-12.25	9.68	13.78	0.00	590.17	24.20	-0.1000	0.0167	0.0404	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
01-Nov-92	-12.30	9.98	14.45	0.00	575.76	23.44	-0.9843	0.0162	0.0433	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
01-Dec-92	-11.98	9.07	14.20	0.00	563.20	22.68	-0.8810	0.0148	0.0432	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
01-Jan-93	-11.67	8.77	14.22	0.00	547.47	21.92	-0.9744	0.0204	0.0446	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
01-Feb-93	-11.22	8.47	13.86	0.00	529.54	21.18	-0.8669	0.0158	0.0433	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
01-Mar-93	-9.71	8.16	13.51	0.00	494.68	20.41	-0.8554	0.0130	0.0377	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
30-Apr-93	8.49	7.85	12.51	0.00	448.15	19.85	-0.8541	0.0117	0.0351	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
30-May-93	8.65	7.25	11.97	0.00	388.26	18.13	-0.8459	0.0118	0.0312	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
30-Jun-93	-8.02	6.64	11.58	0.00	349.19	16.61	0.0419	0.0111	0.0285	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
31-Aug-93	7.34	6.34	10.63	0.00	320.30	15.85	0.0392	0.0117	0.0285	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
31-Oct-93	-8.42	5.73	9.88	0.00	311.36	14.34	-0.8337	0.0102	0.0285	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
30-Nov-93	-5.97	5.43	9.32	0.00	295.18	13.58	0.8003	0.0083	0.0284	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
31-Dec-93	-5.55	5.13	8.92	0.00	288.73	12.82	-0.8260	0.0103	0.0198	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
31-Jan-94	4.99	4.82	8.36	0.00	261.65	12.06	0.8248	0.0087	0.0172	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
28-Feb-94	-4.37	4.52	7.70	0.00	236.17	11.30	0.8201	0.0072	0.0152	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
31-Mar-94																						
30-Apr-94																						
31-May-94																						
30-Jun-94																						
31-Jul-94																						
31-Aug-94																						
30-Sep-94																						
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31-Jul-96																						
31-Aug-96																						
30-Sep-96																						
31-Oct-96																						
30-Nov-96																						
31-Dec-96																						
31-Jan-97																						
28-Feb-97																						
31-Mar-97																						
30-Apr-97																						



Table 4c (No intervention, run down reserves to end-April 1997)

Date	£	\$	DM	ECU	YEN	Reserves	Interest received (Bn)	DMark	ECU	Yen	Total carry	Assets	Cumulative carry	Total
	£	\$	DM	ECU	YEN	\$	£	£	£	£	£	£	£	£
01-Aug-92	-12.25	10.20	12.69	0.00	510.56	23.60	0.1034	0.0368	0.0000	0.0082	-0.0448	0.0000	0.0000	0.0000
01-Sep-92	-12.25	10.20	12.69	0.00	510.55	24.29	0.1034	0.0368	0.0000	0.0082	-0.0448	0.0000	0.0000	0.0000
01-Oct-92	-12.25	9.68	13.79	0.00	580.17	24.20	-0.1000	0.0404	0.0000	0.0088	-0.0341	1.7172	-0.0764	1.8378
01-Nov-92	-12.61	9.56	14.74	0.00	580.23	23.91	-0.0843	0.0152	0.0000	0.0068	-0.0258	2.7217	0.1653	2.6158
01-Dec-92	12.57	9.44	14.86	0.00	586.26	23.61	0.0829	0.0152	0.0000	0.0093	0.0143	2.6573	0.1210	2.5483
01-Jan-93	12.57	9.33	15.12	0.00	582.26	23.32	-0.0780	0.0212	0.0000	0.0093	0.0143	2.8694	0.1222	2.7441
01-Feb-93	12.44	9.21	15.07	0.00	576.01	23.02	0.0721	0.0166	0.0000	0.0100	0.0006	3.3353	-0.1224	3.2130
01-Mar-93	12.15	9.09	15.05	0.00	539.82	22.73	-0.0615	0.0141	0.0000	0.0096	0.0222	3.6480	-0.1208	3.5278
01-Apr-93	11.59	8.97	14.29	0.00	511.69	22.44	-0.0619	0.0148	0.0000	0.0085	0.0250	3.6646	0.1165	2.9482
30-May-93	-11.02	8.74	13.89	0.00	487.80	21.94	0.0684	0.0133	0.0000	0.0071	0.0047	2.7697	0.1121	2.6566
30-Jun-93	-11.10	8.62	14.72	0.00	462.44	21.55	0.0610	0.0144	0.0000	0.0074	0.0056	3.2089	-0.1061	3.1028
31-Jul-93	-10.87	8.38	14.61	0.00	446.77	21.26	0.0585	0.0145	0.0000	0.0074	0.0056	3.2324	-0.1034	3.1290
31-Aug-93	-10.67	8.38	14.05	0.00	439.35	20.97	-0.0542	0.0142	0.0000	0.0074	0.0056	3.3753	0.1022	3.2730
30-Sep-93	10.38	8.37	13.81	0.00	439.35	20.67	-0.0510	0.0135	0.0000	0.0062	0.0004	3.4385	0.1023	3.3061
31-Oct-93	10.42	8.15	13.75	0.00	437.99	20.08	-0.0482	0.0132	0.0000	0.0062	0.0004	3.4818	-0.1046	3.2438
30-Nov-93	10.22	8.03	13.78	0.00	442.48	19.78	-0.0449	0.0133	0.0000	0.0046	0.0008	3.1340	-0.1078	3.0296
31-Dec-93	9.97	7.91	13.76	0.00	442.52	19.49	-0.0457	0.0134	0.0000	0.0046	0.0008	3.2648	-0.1058	2.8690
30-Jan-94	-9.56	7.68	13.08	0.00	401.13	19.19	0.0401	0.0116	0.0000	0.0043	0.0003	3.3420	-0.1059	3.2361
30-Feb-94	-9.25	7.44	12.31	0.00	378.40	18.60	-0.0375	0.0141	0.0000	0.0043	0.0003	3.4852	0.1008	3.3643
30-Mar-94	-8.82	7.32	12.05	0.00	383.69	18.31	-0.0387	0.0157	0.0000	0.0042	0.0000	3.2851	-0.0828	3.2023
31-May-94	-8.31	7.21	11.44	0.00	354.87	18.01	-0.0340	0.0171	0.0000	0.0039	0.0050	3.3573	-0.0881	3.2681
30-Jun-94	-8.15	7.06	11.23	0.00	354.93	17.72	-0.0349	0.0171	0.0000	0.0037	0.0050	3.3291	-0.0928	3.2465
31-Aug-94	-7.95	6.97	11.03	0.00	348.68	17.43	0.0350	0.0167	0.0000	0.0037	0.0050	3.4113	-0.0792	3.3321
30-Sep-94	-7.65	6.85	10.62	0.00	339.71	17.13	-0.0310	0.0168	0.0000	0.0034	0.0044	3.106	-0.0680	3.1430
31-Oct-94	-7.29	6.73	10.12	0.00	326.47	16.84	0.0317	0.0171	0.0000	0.0038	0.0044	3.2448	-0.0643	3.1818
30-Nov-94	-7.33	6.62	10.36	0.00	327.25	16.54	0.0314	0.0170	0.0000	0.0038	0.0044	3.2857	-0.0643	3.2514
31-Dec-94	-7.10	6.50	10.07	0.00	320.88	16.25	-0.0338	0.0209	0.0000	0.0038	0.0044	3.2618	-0.0482	3.2138
28-Feb-95	-5.40	6.26	9.16	0.00	317.62	15.95	0.0347	0.0201	0.0000	0.0032	0.0041	3.4619	-0.0445	3.4075
31-Mar-95	-5.79	6.13	8.43	0.00	302.78	15.66	0.0325	0.0181	0.0000	0.0032	0.0041	3.4519	-0.0445	3.4075
30-Apr-95	-5.49	6.03	8.37	0.00	285.94	15.36	-0.0341	0.0193	0.0000	0.0039	0.0058	3.6853	0.0387	3.6466
31-May-95	-5.49	5.91	8.36	0.00	284.17	15.07	-0.0394	0.0184	0.0000	0.0039	0.0058	3.7459	0.0336	3.7123
30-Jun-95	-5.22	5.79	8.00	0.00	285.07	14.77	0.0300	0.0188	0.0000	0.0039	0.0058	3.8222	0.0295	3.7927
31-Jul-95	-5.13	5.67	7.87	0.00	245.07	14.48	0.0277	0.0177	0.0000	0.0039	0.0058	3.8584	-0.0247	3.8347
31-Aug-95	-5.32	5.56	7.77	0.00	250.93	14.19	-0.0285	0.0181	0.0000	0.0039	0.0058	3.7533	-0.0283	3.7330
30-Sep-95	-5.07	5.44	7.77	0.00	270.78	13.89	-0.0285	0.0175	0.0000	0.0039	0.0058	3.6446	-0.0182	3.6264
31-Oct-95	-4.78	5.32	7.49	0.00	271.24	13.60	0.0284	0.0182	0.0000	0.0039	0.0058	3.5050	0.0176	3.4874
30-Nov-95	-4.78	5.20	7.52	0.00	265.44	13.31	-0.0281	0.0164	0.0000	0.0039	0.0058	3.8422	-0.0177	3.8245
31-Dec-95	-4.59	5.09	7.31	0.00	263.19	12.71	0.0285	0.0163	0.0000	0.0039	0.0058	3.7005	-0.0189	3.6895
28-Feb-96	-4.57	4.97	7.39	0.00	265.86	12.42	0.0246	0.0155	0.0000	0.0039	0.0058	3.6084	0.0159	3.5925
31-Mar-96	-4.31	4.85	7.14	0.00	265.14	12.12	-0.0222	0.0134	0.0000	0.0039	0.0058	3.5931	0.0149	3.6191
30-Apr-96	-4.05	4.73	6.98	0.00	263.75	11.83	-0.0222	0.0134	0.0000	0.0039	0.0058	3.5931	0.0149	3.6191
31-May-96	-3.88	4.61	6.77	0.00	242.53	11.53	-0.0195	0.0134	0.0000	0.0039	0.0058	3.5931	0.0149	3.6191
30-Jun-96	-3.71	4.38	6.67	0.00	242.95	11.24	-0.0200	0.0131	0.0000	0.0039	0.0058	3.5931	0.0149	3.6191
31-Jul-96	-3.39	4.26	6.27	0.00	240.20	10.95	0.0186	0.0123	0.0000	0.0039	0.0058	3.3354	-0.0103	3.3250
31-Aug-96	-3.24	4.14	6.14	0.00	225.55	10.65	-0.0176	0.0125	0.0000	0.0039	0.0058	3.4513	-0.0074	3.4438
31-Sep-96	-2.99	3.91	5.93	0.00	222.82	9.77	-0.0152	0.0109	0.0000	0.0039	0.0058	3.3744	-0.0040	3.3704
30-Oct-96	-2.89	3.79	5.83	0.00	215.69	9.47	-0.0146	0.0098	0.0000	0.0039	0.0058	3.107	0.0008	3.1114
31-Nov-96	-2.69	3.67	5.68	0.00	212.38	9.18	0.0142	0.0100	0.0000	0.0039	0.0058	2.8605	0.0034	2.8659
28-Feb-97	-2.58	3.44	5.61	0.00	208.79	8.59	-0.0124	0.0087	0.0000	0.0039	0.0058	2.6668	0.0068	2.7023
31-Mar-97	-2.41	3.32	5.57	0.00	205.36	8.29	0.0129	0.0092	0.0000	0.0039	0.0058	2.6562	0.0087	2.6549
30-Apr-97	-2.32	3.20	5.54	0.00	203.35	8.00	-0.0117	0.0081	0.0000	0.0039	0.0058	2.6068	0.0113	2.6201

Table 4D (Intervene then hold position)

Assets	Interest (£bn)				DM	ECU	YEN	Total assets		Cumulative Total position	
	£	\$	DM	ECU				£	£	£	£
01-Oct-82	0.851	3.90	-11.76	-11.26	468.27			-0.7873	0.0000	-0.7873	
01-Nov-82	0.0555	0.0060	-0.0369	-0.1036	0.0080	0.0611	0.0000	-0.7255	0.0611	-0.7866	
01-Dec-82	0.0559	0.0060	-0.0352	-0.0786	0.0075	-0.0424	-0.4747	-1.0038	-0.5785	-1.5823	
01-Jan-83	0.0528	0.0085	-0.0367	-0.0943	0.0078	-0.0619	-0.3190	-1.664	-0.4854	-2.1494	
01-Feb-83	0.0489	0.0068	-0.0358	-0.0785	0.0072	-0.0517	-0.4525	-2.190	-0.8715	-3.0615	
01-Mar-83	0.0420	0.0058	-0.0320	-0.0695	0.0068	-0.0468	-0.2899	-2.6659	-0.5569	-3.2228	
01-Apr-83	0.0403	0.0062	-0.0341	-0.0714	0.0070	-0.0490	-0.1257	-3.173	-0.4430	-3.6163	
30-Apr-83	0.0384	0.0058	-0.0302	-0.0653	0.0064	-0.0451	0.0525	-3.6538	0.3113	-3.3425	
31-May-83	0.0424	0.0059	-0.0307	-0.0628	0.0073	-0.0378	0.1728	-3.4810	0.4034	-3.0776	
30-Jun-83	0.0393	0.0065	-0.0284	-0.0562	0.0072	-0.0318	0.6889	-0.4371	0.2511	-2.8260	
31-Jul-83	0.0420	0.0064	-0.0292	-0.0530	0.0078	-0.0280	1.2016	-0.4653	0.7383	-2.1177	
31-Aug-83	0.0415	0.0064	-0.0272	-0.0538	0.0070	-0.0382	1.7527	-0.5038	0.2490	-1.7548	
30-Sep-83	0.0408	0.0061	-0.0265	-0.0567	0.0066	-0.0308	2.4211	-0.5389	-0.1159	-1.6548	
31-Oct-83	0.0424	0.0064	-0.0267	-0.0554	0.0056	-0.0278	3.0470	-0.5674	0.0795	-1.4879	
30-Nov-83	0.0402	0.0062	-0.0242	-0.0488	0.0049	-0.0227	3.6410	-0.5927	0.2483	-1.3444	
31-Dec-83	0.0370	0.0072	-0.0248	-0.0491	0.0051	-0.0243	4.2447	-0.6196	0.2251	-1.1245	
28-Feb-84	0.0343	0.0066	-0.0227	-0.0454	0.0050	-0.0187	4.8314	-0.6411	0.3619	-0.9792	
31-Mar-84	0.0357	0.0072	-0.0236	-0.0464	0.0054	-0.0180	5.4187	-0.6577	0.0295	-0.9282	
30-Apr-84	0.0345	0.0071	-0.0212	-0.0436	0.0051	-0.0181	6.0057	-0.7090	-0.0183	-0.7273	
31-May-84	0.0348	0.0080	-0.0211	-0.0426	0.0047	-0.0182	6.5924	-0.7272	-0.2084	-0.5188	
30-Jun-84	0.0336	0.0083	-0.0195	-0.0438	0.0047	-0.0165	7.1791	-0.7466	-0.2852	-0.4614	
31-Jul-84	0.0348	0.0080	-0.0184	-0.0421	0.0048	-0.0129	7.7658	-0.7626	-0.3578	-0.4036	
31-Aug-84	0.0366	0.0080	-0.0166	-0.0419	0.0060	-0.0099	8.3524	-0.7756	-0.4524	-0.3502	
30-Sep-84	0.0332	0.0092	-0.0185	-0.0393	0.0051	-0.0104	8.9391	-0.7893	-0.4818	-0.3034	
31-Oct-84	0.0375	0.0095	-0.0181	-0.0389	0.0042	-0.0068	9.5258	-0.7995	-0.5455	-0.2580	
30-Nov-84	0.0387	0.0098	-0.0185	-0.0381	0.0053	-0.0060	10.1125	-0.8100	-0.3850	-0.2150	
31-Dec-84	0.0393	0.0120	-0.0209	-0.0422	0.0053	-0.0065	10.6992	-0.8216	-0.1822	-0.1694	
28-Feb-85	0.0415	0.0118	-0.0202	-0.0432	0.0051	-0.0050	11.2859	-0.8340	-0.9936	-0.1536	
31-Mar-85	0.0404	0.0108	-0.0185	-0.0395	0.0050	-0.0072	11.8726	-0.8467	-1.1772	-0.1363	
30-Apr-85	0.0451	0.0117	-0.0192	-0.0470	0.0046	-0.0072	12.4593	-0.8597	-1.3609	-0.1190	
31-May-85	0.0456	0.0118	-0.0191	-0.0475	0.0034	-0.0081	13.0460	-0.8732	-1.5446	-0.1017	
30-Jun-85	0.0428	0.0114	-0.0197	-0.0465	0.0030	-0.0079	13.6327	-0.8871	-1.7293	-0.0844	
31-Jul-85	0.0465	0.0119	-0.0197	-0.0462	0.0018	-0.0078	14.2194	-0.9012	-1.9140	-0.0670	
31-Aug-85	0.0479	0.0117	-0.0190	-0.0455	0.0017	-0.0081	14.8061	-0.9153	-2.1000	-0.0500	
30-Sep-85	0.0454	0.0111	-0.0174	-0.0442	0.0005	-0.0115	15.3928	-0.9304	-2.2854	-0.0330	
31-Oct-85	0.0474	0.0116	-0.0174	-0.0434	0.0005	-0.0114	15.9795	-0.9457	-2.4708	-0.0160	
30-Nov-85	0.0456	0.0114	-0.0168	-0.0424	0.0005	-0.0117	16.5662	-0.9610	-2.6562	0.0010	
31-Dec-85	0.0472	0.0119	-0.0171	-0.0418	0.0005	-0.0116	17.1529	-0.9763	-2.8416	0.0160	
28-Feb-86	0.0456	0.0116	-0.0161	-0.0385	0.0007	-0.0116	17.7396	-0.9916	-3.0270	0.0310	
31-Mar-86	0.0414	0.0102	-0.0132	-0.0330	0.0014	-0.0114	18.3263	-1.0069	-3.2124	0.0460	
30-Apr-86	0.0438	0.0107	-0.0138	-0.0323	0.0008	-0.0063	18.9130	-1.0222	-3.3978	0.0610	
31-May-86	0.0418	0.0108	-0.0131	-0.0314	0.0007	-0.0068	19.4997	-1.0375	-3.5832	0.0760	
30-Jun-86	0.0409	0.0104	-0.0128	-0.0314	0.0006	-0.0077	20.0864	-1.0528	-3.7686	0.0910	
31-Jul-86	0.0404	0.0109	-0.0135	-0.0323	0.0006	-0.0054	20.6731	-1.0681	-3.9540	0.1060	
31-Aug-86	0.0402	0.0108	-0.0134	-0.0326	0.0006	-0.0056	21.2598	-1.0834	-4.1394	0.1210	
30-Sep-86	0.0389	0.0104	-0.0118	-0.0302	0.0005	-0.0078	21.8465	-1.0987	-4.3248	0.1360	
31-Oct-86	0.0409	0.0103	-0.0115	-0.0292	0.0005	-0.0110	22.4332	-1.1140	-4.5102	0.1510	
30-Nov-86	0.0414	0.0095	-0.0107	-0.0272	0.0005	-0.0135	23.0199	-1.1293	-4.6956	0.1660	
31-Dec-86	0.0424	0.0100	-0.0116	-0.0278	0.0005	-0.0134	23.6066	-1.1446	-4.8810	0.1810	
31-Jan-87	0.0433	0.0105	-0.0109	-0.0277	0.0005	-0.0137	24.1933	-1.1599	-5.0664	0.1960	
28-Feb-87	0.0380	0.0093	-0.0094	-0.0269	0.0005	-0.0155	24.7800	-1.1752	-5.2518	0.2110	
31-Mar-87	0.0424	0.0102	-0.0110	-0.0271	0.0008	-0.0152	25.3667	-1.1905	-5.4372	0.2260	
30-Apr-87	0.0412	0.0105	-0.0103	-0.0265	0.0006	-0.0163	25.9534	-1.2058	-5.6226	0.2410	