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LIQUIDITY AND IRISH INTEREST RATES

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Abstract

In recent papers (1993a and b) we have focused on the role of expectations in influencing Irish interest rates during the EMS period. Here we examine the role of monetary policy actions more directly, and explore the relation between interest rates, on the one hand, and actions of the monetary authorities in supplying liquidity to, and withdrawing it from, the market on the other.

Though it is not clear just how effective recent Central Bank liquidity interventions have been in influencing interest rates, there is evidence of a change in policy towards a more aggressive attempt to stabilize rates after mid-1988. Before then, the reaction of Central Bank intervention to interest rate pressures was very modest (£20 million per one per cent movement in interest rates) and the impact cannot have been great.

Liquidity and Irish Interest Rates

1 Introduction

In recent papers (1993a and b) we have focused on the role of expectations in influencing Irish interest rates during the EMS period. Of course monetary policy affects expectations, and so has already been taken account in part. Here we examine the role of monetary policy actions more directly, and explore the relation between interest rates, on the one hand, and actions of the monetary authorities in supplying liquidity to, and withdrawing it from, the market on the other. In short, we examine whether there are links between official liquidity and interest rates.

It is widely believed that the monetary authorities, especially the Central Bank, can influence short-term interest rates on a day-to-day basis. Part of such influence could be through expectations, but that is not how market participants often perceive it. Instead, they often argue that, by supplying liquid assets to the market, the Central Bank can drive down interest rates relative to where they would otherwise be, even if the action has no effect on expectations about the future.

Such a perspective need not contradict the importance of expectations, but may be seen as a refinement. Thus effectiveness of policy interventions to influence liquidity can be thought of as resulting from the additional risk assumed by speculators having to hold a larger speculative position. A further short-run impact can result from the time taken to adjust portfolios in response to the intervention.

We find that there has been a substantial response of Central Bank liquidity provision to interest rate movements, but only since the middle of 1988. It is difficult to evaluate how large an impact this intervention had on interest rates. Before then, the reaction of Central Bank intervention to interest rate pressures was very modest (£20 million per one per cent movement in interest rates) and the impact cannot have been great. The absence of substantial smoothing intervention on a comparable scale before 1988 may be reflected in the volatility of Irish interest rates.

This paper is in six sections. The next section provides a brief account of the liquidity instruments used by the Central Bank of Ireland. Section 3 quantifies the use of these instruments during the EMS period. Section 4 discusses the role of liquidity effects in theory of interest rates, with particular reference to Irish conditions. Section 5 assesses the empirical importance of liquidity effects in Ireland, and provides evidence of an apparently significant shift in Central Bank policy during 1988. Conclusions are in Section 6.

As the ultimate issuer of Irish pound liabilities, the Central Bank, like monetary authorities all over the world, is in a strong position to influence the composition of the national portfolio, and thereby potentially influence asset prices and yields.[1] The Central Bank also has the power to vary reserve requirements which may have a similar effect. The Central Bank deals primarily with commercial banks, and the effects of its actions depend largely on the response of the banks, which in turn is based on considerations of profitability.

The commercial banks themselves allocate their assets among relatively illiquid loans, and more liquid marketable securities, as well as holding very liquid reserves. The reserves of the banking system are chiefly liabilities of the Central Bank. In aggregate, the banks can increase the stock of reserves by borrowing from abroad and converting the proceeds into Irish pounds, or by borrowing from the Central Bank. If the Central Bank alters the aggregate availability of reserves, or the cost of borrowing from it the knock-on effect from competitive pressures and the need to maintain profitability will tend to transmit interest rate pressures throughout the economy. The availability, to the banks as to their customers, of foreign borrowing is the chief factor acting to dissipate such transmission.

Short-term monetary policy in Ireland has been very active in Ireland in recent years. Even before the 1992 currency crisis, discretionary interventions made by the Central Bank have frequently amounted to hundreds of millions of pounds (up to 3 per cent of GNP) over periods as short as a few weeks.

As reported by the monetary authorities themselves, there have been two main aspects of policy action: efforts to smooth interest rates by establishing an upper and lower bound for interest rates in the short-run and efforts to influence the trend in rates. In an authoritative description of the mechanisms used to manage monetary policy in Ireland, McGowan (1992) refers to these as overnight balancing and discretionary support respectively.

> Discretionary support, i.e. money market intervention at the Central Bank's initiative (which is by far the most important quantitatively) has the objective of avoiding "unwarranted changes in domestic interest rates". By systematically undersupplying or oversupplying the market with discretionary liquidity, the Central Bank can put pressure on market interest rates. Discretionary support is normally influenced through sale and repurchase agreements (repos) of Irish government bonds, term deposits solicited from the banks and forex swaps. In each case, the Central Bank typically sets the maturity and calls for bids as to price and quantity.

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[1]Current practices in interest rate policy in industrial countries are reviewed in Honohan (1993).

In contrast, overnight balancing is done at the initiative of a commercial bank and at off-market interest rates, i.e. rates that are fixed for some time and are normally a little away from market-clearing rates. They effectively provide the short-term floor and ceiling to money market interest rates. The major instrument, establishing the ceiling, is the short-term facility (STF), a standing loan facility offering banks funds at a posted interest rate normally a little above market rates. The size and timing of changes in the STF rate are sometimes used as a signal of Central Bank intent, though it normally moves with the market. Though the STF thus normally provides the upper bound to market interest rates, it has been suspended at times of crisis. The Central Bank also normally posts a rate at which it will accept overnight deposits: this normally provides the lower bound on market interest rates.

The effectiveness of Central Bank interventions in influencing money market conditions generally is enhanced by the degree to which the money market itself is an active allocator of funds in the system, and to the degree to which the Central Bank deals with the market on an impersonal basis.

There has been a very marked shift to the use of market-based instruments of monetary policy over the past decade. Bank-by-bank credit ceilings are gone, as is the interest rate cartel. The so-called primary liquidity ratios (reserve requirements yielding below market rates) have been lowered, thereby reducing an implicit tax which has in recent years been equivalent to about £30 million annually. The restrictions on the banks' open foreign exchange positions and their "spot against forward" positions have been liberalized. Yet implementation of monetary policy is not wholly indifferent to the identity of the counterparty banks. Thus, for example McGowan observes that "the Central Bank's views about the distribution of liquidity among the banks and its views about the influence of dominant players in the market" may influence the allocation by the Central Bank of swaps between the banks.

On the whole, however, the Irish money market may be regarded as quite efficient in transmitting interest rate pressures throughout the economy, even where policy interventions have a bilateral character.

3 *The scale of liquidity interventions in Ireland*

Table 1 provides a summary of the main elements in the Central Bank's balance sheet. Currency outstanding and the official external reserves are normally the largest elements, but the Central Bank's position vis-a-vis the government and the banking system is also important.[2]

The main elements relevant to the question of bank liquidity are as follows: Banks' primary liquidity is a mandatory percentage of deposit liabilities; its decline in the last few years reflects reductions in the required percentage. The other deposits, usually small, include both overnight and term deposits. Published figures do not allow these to be fully distinguished. Banks may borrow through the STF or through advances secured by Government securities. A sale and repurchase agreement is similar to a loan in its effects on liquidity. Foreign exchange swaps also have the effect of increasing banks' Irish pound liquidity at the expense of their foreign exchange liquidity. The banks' Irish pound liquidity yielded by a swap appears in the balance sheet (and the swap also tends to increase official external reserves), but the corresponding future obligation of the banks does not show up as an asset in the Central Bank's balance sheet. Before 1992, swaps data is available only for end-year dates.

Figure 1 provides a broad indication of the scale of fluctuations in Central Bank liquidity intervention on an annual basis 1979-92. The variable chosen to summarize Central Bank support here is the change in the net position of the banks at the Central Bank, taking account of forex swaps. (An alternative definition - cf. McGowan, 1992, Kelly, 1993 - ignores the primary liquidity of the banks, but it may be preferable to include it in order to take some account of the net liquidity effect of the changes in primary liquidity requirements.)[3] Thus, in order to obtain our variable, we begin with the net asset-liability position of the banks *vis-à-vis* the Central Bank, thus including both their primary liquidity holdings and voluntary deposits on the assets side, while subtracting borrowing, whether from the STF, in the form of sale and repurchase arrangements, or secured advances. It is this net banks' position with the Central Bank which the latter can manipulate to influence banks' liquidity. The end-year interest differential (Irish pound minus DM) is also included for reference in the upper panel of the figure, and its annual change in the lower panel. Three main features stand out.

> First, the scale of intervention has been very large, with net change in support in excess of £1 billion in three of the fourteen years, and in

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[2]Recently the gross position of other credit institutions has been growing.

[3]A more sophisticated method again would be to calculate primary liquidity at a standard liquidity ratio and use the difference between this and the actual primary liquidity. Our approach can be regarded in that light as using zero as the standard liquidity ratio.

excess of £0.5 billion in six years. For comparison, the narrow money supply M1 increased from about £1.3 billion in 1979 to about £3.9 billion at the end of 1992.

Second, there is a clear indication of negative autocorrelation: almost each year of positive support has been followed by a year of draining support. There is no large net trend in the stock of support.

Third, there is strong evidence of a positive relation with the change in interest differentials, i.e the Irish pound interest rates tend to have increased over a period when support is high (the correlation coefficient is 0.86).

Figure 2 presents monthly data on the banks' net position *vis-à-vis* the Central Bank. This time the level, rather than the change, is shown. The monthly data is incomplete insofar as it does not include support to the market which came in the form of swaps. Such swaps have been important, especially at time of turbulence, but, as mentioned data on a monthly basis has only been published in respect of very recent months. Monthly fluctuations in support are very large and there is evidence of a seasonal pattern, with support to the market being low during December and January, high in June. The negative autocorrelation remains evident and non-stationarity of the time series can easily be rejected. A later section examines the relationship between the monthly liquidity data and interest rates.

Another important element of liquidity policy is the degree to which the Government has recourse to the Central Bank for funding its borrowing requirement. Table 1 includes a row for this where the Central Banks' holdings of Government securities (other than the Certificates of Indebtedness issued mainly in connection with the Insurance Corporation of Ireland administration in 1985) are netted from Government deposits. As the Government's banker the Central Bank always holds large deposits for the Government, and these have generally grown over the years. Even apart from the sizeable 1992 dip, it will be seen that fluctuations in the Government's net position with the Central Bank have also contributed to liquidity conditions. However, this would be a very partial view of the role of Exchequer in liquidity fluctuations, as fluctuations here have been dominated over the years by the Exchequer's recourse to foreign borrowing. Anyway the role of Exchequer financing in interest rate management is not further discussed in this paper.

4 *Liquidity effects in theory*

In the international empirical literature, the liquidity effect has normally been modelled by reference to the demand for money. Several authors derive this demand from a formal model which assumes that economic agents must have cash-in-hand before making their purchases of goods or bonds, and that adjusting one's portfolio takes time[4]. Alternatively, we can simply assume a stable demand relationship between real money balances (on the one hand) and interest rates and some scale variable such as nominal income (on the other). On either basis, it is easily deduced that an increase in the supply of money must, in equilibrium, result in changes in prices, income and interest rates. The most rapidly adjusting of these variables in an uncontrolled market economy is likely to be interest rates.

In models where the monetary aggregate whose supply is increased is a broad one containing interest-bearing assets, care must be taken in interpreting interest rate movements, as some interest rates will represent the yield on elements of the monetary aggregate, while others represent an opportunity cost of holding the monetary aggregate.

But in models dealing with currency, or the monetary base, or a component of the money stock which is interest-free or on which the interest rate is controlled at below-market rates, then market interest rates do unambiguously indicate the opportunity cost. In that case an exogenous expansion of the money stock should result in a lowering of interest rates.

Three important qualifications must be made to this simple demand-side story.

> First, changes in the money stock may result from policy actions which are themselves influenced by interest rates. For instance the authorities may expand liquidity to offset an increase in interest rates: that would make the relationship between money and interest rates ambiguous. (This point thus brings in supply-side effects).
>
> Second, there could be expectational effects: a liquidity expansion might generate expectations of further inflationary policy, thereby tending to increase interest rates rather than lowering them. (This second effect implies that the demand for money function is more complex than

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[4]If the time taken to adjust portfolios is significant, the short-run impact of liquidity intervention can be greatly magnified, causing sharp - though transitory - deviations of interest rates from what would be predicted by expectations-based models. Furthermore, a consistent correlation pattern between monetary policy interventions and other economic shocks could induce a permanent liquidity premium. Among the main theoretical contributions to the recent literature on liquidity are Lucas (1990), Christiano and Eichenbaum (1992), Coleman et al. (1992), and Engel (1992).

described in the previous paragraph).

Third, there may be a difference in the response between anticipated and unanticipated liquidity expansions. Thus, for example, if all prices and monetary aggregates have been increasing steadily by 10 per cent per annum, then a ten per cent increase in liquidity this year should not cause any change in interest rates, but will instead be absorbed by the continuing increase in other nominal magnitudes.

It is probably because of these qualifications that, though the importance of the liquidity effect is almost universally acknowledged, it is extremely difficult to document using econometric methods (cf. Leeper and Gordon, 1992).

Our previous papers (1993a and b) have stressed the role of expectations in influencing interest rates. But the underlying theoretical approach developed to rationalize the role of expectations can be extended to take account of liquidity. One way of modelling this is to imagine two classes of private sector holders of monetary assets. First, the liquidity-driven agents, who have a supply and demand of funds for non-speculative purposes, a supply and demand which is interest sensitive, but not infinitely so, and whose ability or willingness to assume speculative positions is small. We can think of the "stable demand for money function" as being dominated by this non-speculative supply and demand. The liquidity-driven agents trade with the second group, whose behaviour is modelled as essentially speculative, and for whom the role of expectations predominates.

The relative importance of expectations and of fluctuations in the non-speculative net demand for funds depends on the elasticity of speculative supply, and thus on the degree of risk aversion and the wealth of the speculators. After all, for example, if non-speculative demand is very high, the emergence of high interest rates at home - so high that expected excess returns are above normal - can be closed by speculative flows only if speculators are prepared to increase their exposure to exchange risk involving the Irish pound. The required risk premium could be related to the volume of the open position of speculators. Here is where the monetary authorities could have some influence. By meeting some of the demand for funds by expanding the stock of bank reserves, the authorities can reduce the magnitude of the speculative flows required. Conversely, withdrawing liquidity can drive interest rates higher by affecting the size of the net position adopted by speculators.

Thus, if speculators are risk averse, the interest rate they will establish will depend on the net non-speculative demand for liquidity, including that of the monetary authorities. This can be plotted in the interest rate liquidity supply plane as a positively sloped demand relationship or curve. Where this intersects the point of zero net non-speculative liquidity demand will, in this approach, reflect the interest rate at which the expected excess return is zero. Equivalently, it is the risk-neutral speculative equilibrium interest rate. This demand line will shift with changes in expectations concerning exchange rates and other factors. In the same plane, the monetary authorities' policy reaction function may be

represented as a negatively sloped line. The shallower the line, the more liquidity support the authorities are prepared to provide to limit interest rate movements. An activist interest rate policy (standing ready to accommodate shifts in private sector money demand to reduce their impact on interest rates) will have a shallow slope. A passive interest rate policy, intervening little to provide or withdraw liquidity support in response to interest rates pressures, will have a steep slope.

5 *Liquidity management and interest rates during the 1980s*

In order to investigate to what extent systematic patterns of liquidity management are evident in Ireland during the EMS period, we have plotted net bank liquidity[5] against the Irish-German interest differential (left hand side of Figure 3). The upper panel covers the whole period to 1993, the lower one stops in August 1992 before the currency crisis. As we have argued that both supply and demand factors are relevant, our ability to identify the source of the patterns depends on the relative degree of stability in supply and demand. Since realignment expectations are very variable over time, our prior belief is that the demand curve would be more variable and that the plot would reveal a negatively sloped supply of liquidity curve.

Indeed, the plot shows not one but two distinct negatively sloped curves which (following Leamer, 1981) we are encouraged to think of as supply curves[6]. As is clear from the labelling of the monthly observations, the earlier period, running up to mid-1988, displays a steep reaction function indicating a passive interest rate policy. After mid-1988 the reaction function becomes much flatter. The two data clouds merge during the Summer of 1988, so that it is hard to say exactly when one regime begins and the other ends. The new regime might begin as early as May 1988, or as late as October 1988. The earlier date corresponds to the turning point in many macroeconomic time series (Honohan, 1992).

The right hand side of Figure 3 plots monthly changes in the interest differential against monthly changes in net bank liquidity (the upper panel shows the full sample, the lower panel excludes the outliers). Here too there is evidence of a firmer intent to smooth interest rate movements in the later period, as evidenced by the clustering of the later observations around the "no change" horizontal axis.

Of course some of the earlier observations relate to a period of relatively frequent devaluations, and the trend-change in the interest differential in these years may mask the true reaction function. We attempted to address this possibility by regression analysis. The results (summarized in Table 2) confirm the visual

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[5]As previously defined. Note that this does not take account of liquidity provided through forex swaps.

[6]We have not been able to think of a convincing set of instruments for monthly data which would allow conventional identification is available.

impression of Figure 3. From 1979 to mid-1988 there is a trend decline in the relationship between net bank liquidity[7] and the interest differential; after taking account of this, the negative relationship is significant but relatively small: a one hundred basis point increase in the interest rate differential elicits additional liquidity support from the Central Bank, but only of the order of about £20 million. After mid-1988, the trend changes sign, and the response of liquidity support to a one hundred basis point increase in the differential jumps to the order of £250 million. These results refer to the period before September 1992. Thereafter, the same equation fit quite well, except for two observations from the exchange rate crisis, November 1992 and January 1993: the interest differential was much higher than predicted by the equation in those two months.

There thus appears to be a clear monetary policy regime shift at mid-1988. This coincides with a number of other events. Most macroeconomic indicators begin to turn around close to that period. These include retail sales (May 1988 is the last month until January 1991 which showed a twelve-month seasonally adjusted fall), employment in building and construction (trough in April 1988), employment in industry and unemployment (peaked in May 1987). Non-resident holdings of Government stock were also increasing rapidly at around this time, growing from £1.1 billion at end-1986 to £1.8 billion at end-1987 and £2.7 billion at end-1988). Above all, fiscal indicators improved sharply in 1988 (Honohan, 1992).

It appears that monetary policy was enabled, by these positive trends to adopt a more confident line. The growing belief in the stability of the EMS at that time (Giavazzi and Spaventa, 1990) also helped cement the relevance of German interest rates as a reference point and the authorities acted to insulate Irish interest rates around German reference levels. Even when sterling weakened in late 1989, the Irish interest rate response was moderated by liquidity support at unprecedented levels. As fiscal policy contracted, monetary policy adopted a more relaxed and confident tone. The stability and lower interest rates that this encouraged undoubtedly helped underpin the vigorous recovery in economic activity that was maintained in the following years, and even survived the world recession.

Our methodology does not provide enough information to allow us to estimate the degree to which interest rates in the post 1988 period would have been higher had the new policy regime not been in place. That would require the estimation of the slope of the private sector net demand for liquidity schedule.

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[7]Note that this monthly data does exclude the effects of forex swaps. This exclusion will not qualitatively affect the results if use of such swaps did not vary systematically over time by much.

6 *Concluding remarks*

Though it is not clear just how effective recent Central Bank liquidity interventions have been in influencing interest rates, there is evidence of a change in policy towards a more aggressive attempt to stabilize rates after mid-1988. Before then, the reaction of Central Bank intervention to interest rate pressures was very modest (£20 million per one per cent movement in interest rates) and the impact cannot have been great.

As already mentioned the management of the Government's cash balances and its foreign borrowing are another factor which needs to be kept in mind in this context. It is not known how far these activities (latterly conducted by the National Treasury Management Agency) have been coordinated with the Central Bank's policy, or if it is better to think of them as exogenous disturbance to which the Central Bank responds. This matter deserves further analysis.

With a weaker expectational anchor resulting from the wider margins brought into the EMS since August 1993, it is quite possible that the effectiveness of Central Bank liquidity intervention has increased. Certainly the relative stability of interest differentials vis-a-vis the DM since then provide no reason to doubt this hypothesis. If so, the role of official liquidity policy, more aggressive since 1988, will now have become much more important.

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Table 1: Elements of Central Bank Balance Sheet

and their contribution to liquidity support

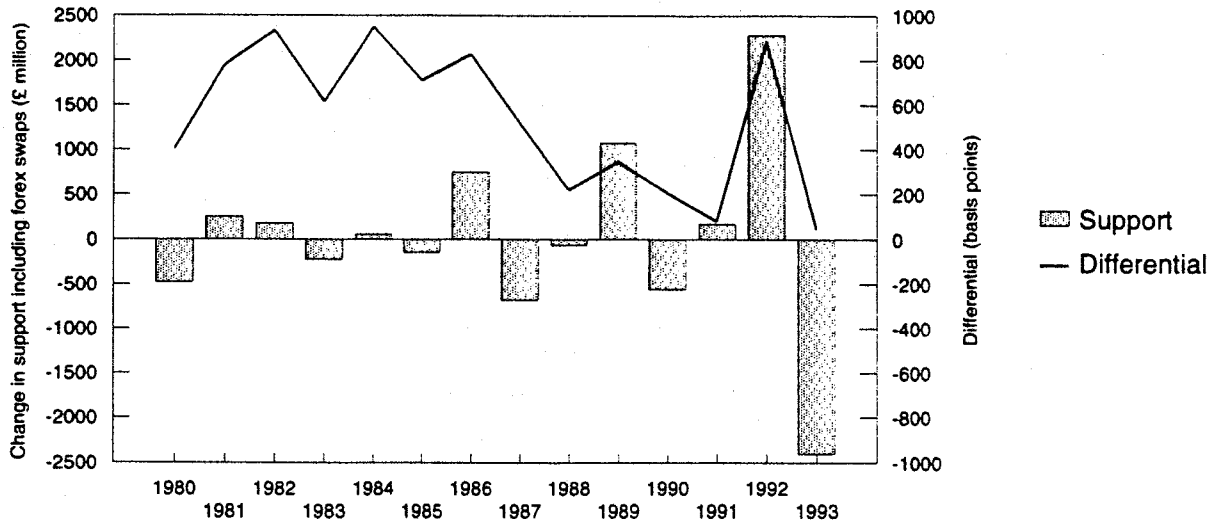
	End-year, £ million	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
	Liabilities															
A	Currency	634	721	797	879	985	1035	1073	1130	1215	1347	1302	1550	1568	1604	1776
B	Government deposits	180	138	130	186	222	198	193	273	647	882	1132	979	1248	639	1425
C	Banks' primary liquidity	421	584	447	513	560	560	723	715	839	768	759	903	669	446	544
D	Banks' other deposits	85	16	34	0	0	0	0	12	0	2	2	2	2	1	27
	Assets															
E	Official External Reserves	975	1346	1473	1594	2015	2101	2272	2205	2821	3161	2521	2892	3256	2113	4278
F	STF drawings and secured advances	281	46	28	103	69	122	32	59	65	69	161	94	18	95	9
G	Sale and repurchase agreements	0	0	0	0	0	0	54	310	273	171	1141	790	799	1979	588
H	Irish Government bonds	287	333	326	444	403	501	338	320	319	362	356	365	229	230	183
	Other items (net)				-563	-720	-931	-707	-764	-777	-764	-984	-707	-815	-1727	-1286
J	Forex swaps (liquidity provided)	63	-86	60	195	50	50	105	577	40	0	0	0	0	800	NA
C+D	Bank deposits	505	600	481	513	560	560	723	727	839	770	761	905	671	447	571
F+G	Bank borrowings	281	46	28	103	69	122	86	369	338	240	1302	884	817	2074	597
C+D-(F+G)	Net banks' posn (ignoring swaps)	224	554	453	410	491	438	637	358	501	530	-541	21	-146	-1627	-26
C+D-(F+G+J)	Net banks' posn (taking a/c of swaps)	161	640	393	215	441	388	532	-219	461	530	-541	21	-146	-2427	NA
F+G+J-D	CB support net of voluntary deposits	260	-56	54	298	119	172	191	934	378	238	1300	882	815	2873	NA
B-H	Net Government position	-107	-195	-196	-258	-181	-303	-145	-47	328	520	776	614	1019	409	1242

Source: Central Bank Reports; Kelly, 1993.

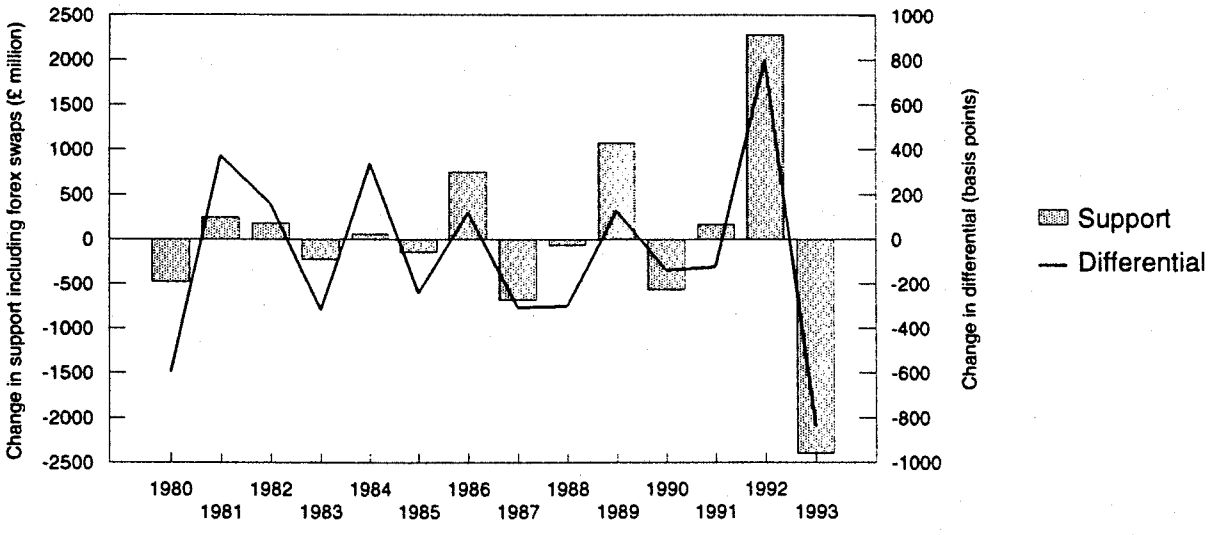
Table 2: Regression Results: Central Bank Support

Equation No:	1		2	
	Coeff	t-stat	Coeff	t-stat
Intercept	580.8	(7.7)	3748.3	(2.4)
Interest differential	-20.7	(3.1)	-259.7	(2.6)
Time	2.4	(3.3)	-19.8	(2.0)
AR(1)	0.58	(7.3)	0.74	(6.2)
RSQ / DW	0.636	2.13	0.663	1.72
F / d.f.	61.6	3,106	31.4	3,48
Method / No. of obs.	OLS	110	OLS	52
Sample period	Mar 79 - Apr 88		May 88 - Aug 92	

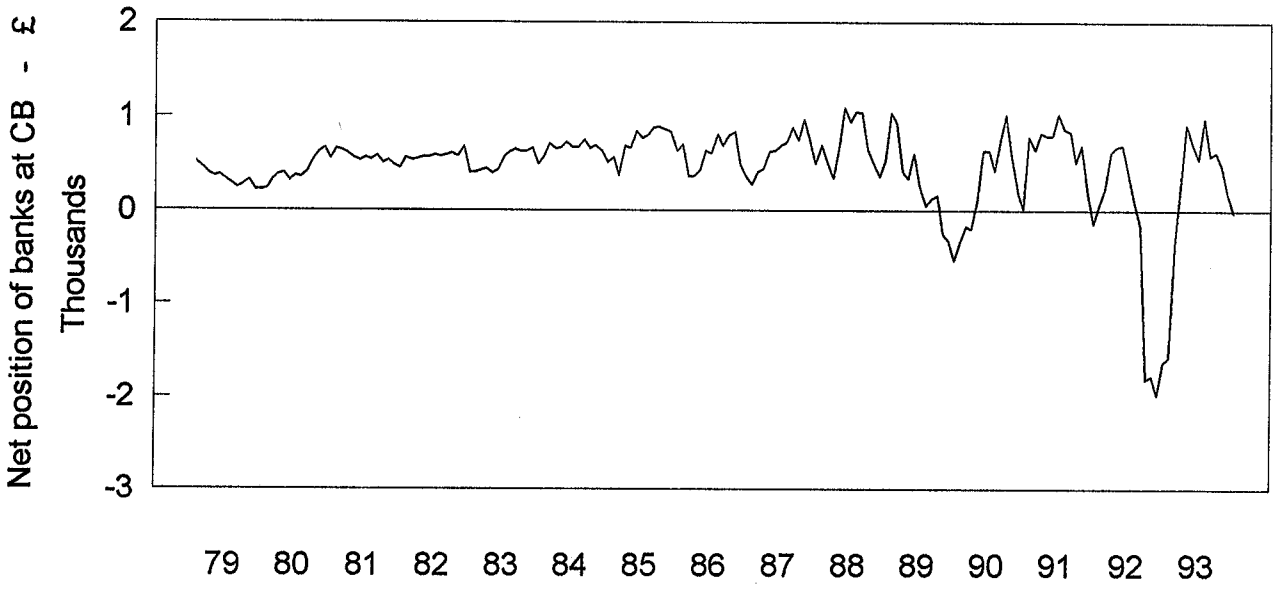
Change in Central Bank Support and IR£/DM Interest Differential

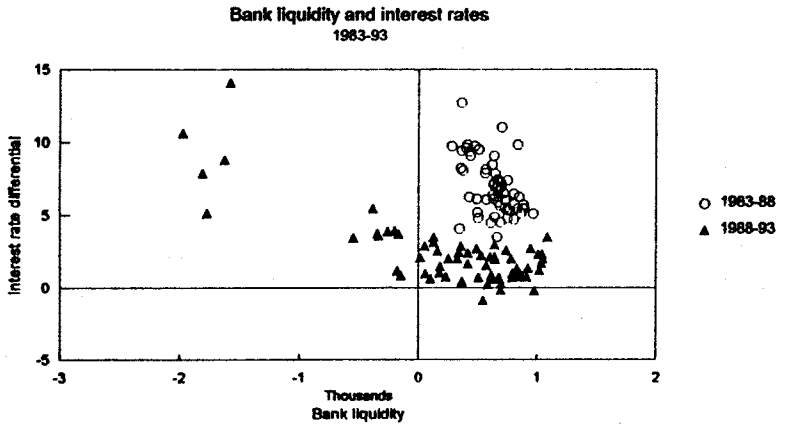


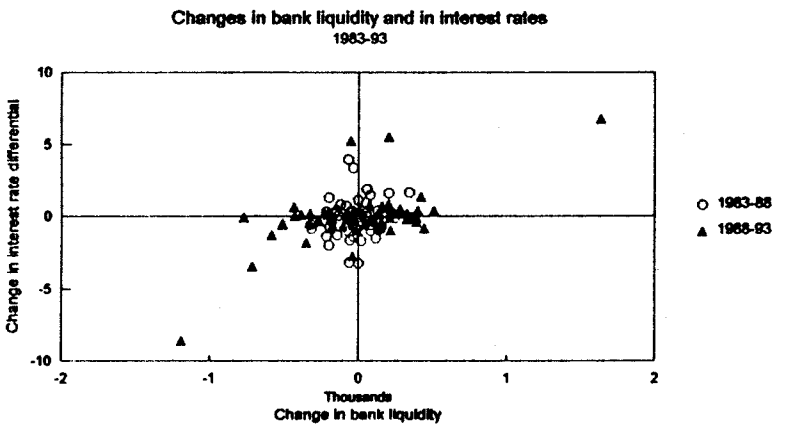
Change in Central Bank Support and in IR£/DM Interest Differential

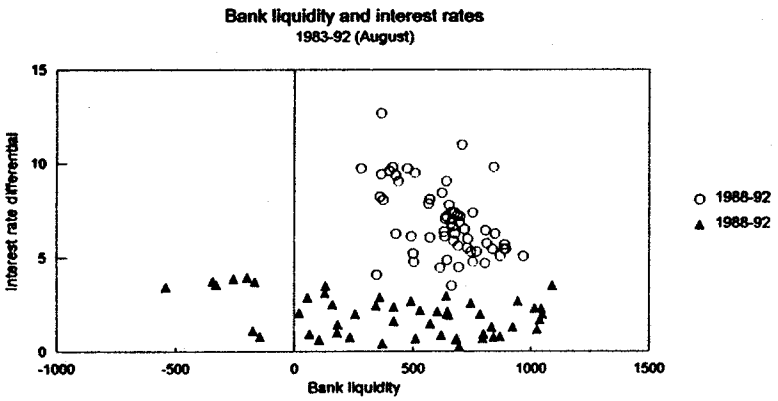


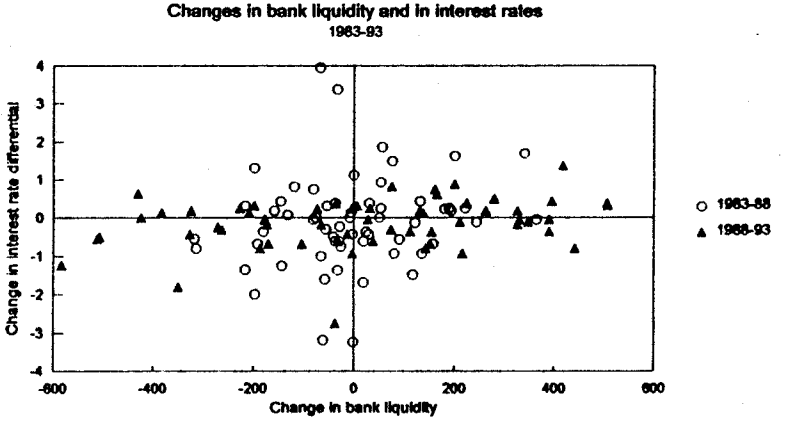
Net bank liquidity
1979-93




Bank liquidity and interest rates
1983-93
Interest rate differential
15
10
5
0
-5
-3
-2
-1
0
1
2
Thousands
Bank liquidity
1983-88
1988-93


Changes in bank liquidity and in interest rates
1983-93
Change in interest rate differential
10
5
0
-5
-10
-2
-1
0
1
2
Thousands
Change in bank liquidity
1983-88
1988-93


Bank liquidity and interest rates
1983-92 (August)
Interest rate differential
15
10
5
0
-1000
-500
0
500
1000
1500
Bank liquidity
1988-92
1988-92


Changes in bank liquidity and in interest rates
1983-93
Change in interest rate differential
4
3
2
1
0
-1
-2
-3
-4
-600
-400
-200
0
200
400
600
Change in bank liquidity
1983-88
1988-93