ABOLISHING EXCHANGE CONTROL: THE UK EXPERIENCE

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ABSTRACT

Abolishing Exchange Control: The UK Experience*

The paper addresses some of the effects of the removal of exchange controls in the UK in 1979. Non-parametric tests indicate that one consequence of the removal was a marked reduction in the volatility of the on-shore/off-shore differential. Cointegration tests suggest that abolition contributed positively to the long-run integration of the UK stock market with similar markets in other international centres, though there is no evidence that the correlation of short-run stock market returns across international centres was more strongly positive after 1979. The evidence of a strong integration effect at the 'short' end of the capital market is consistent with qualitative historical evidence in suggesting that abolition in effect prohibits resort to monetary regulations which have a 'tax-like' effect. Difficulties in controlling for concurrent shocks that might have affected the economy prevent a clear identification of the effects of exchange control liberalization on asset prices and balance of payments flows.

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NON-TECHNICAL SUMMARY

In 1979 the new Conservative government abolished UK exchange control, ending 50 years of restrictions on capital movements. Abolition had marked effects on both inward and outward flows of capital. Even though the 1979 liberalization might offer lessons to those countries now planning similar steps there has been very little analysis of the consequences of the abolition of UK exchange controls for the exchange rate, interest rates, equity prices or balance of payments flows. Precise estimates of the effects of liberalization are difficult because abolition coincided with the second oil shock, Britain's shift to self-sufficiency in oil and the election of the Thatcher government.

We begin by reviewing the various arguments used to support the retention of exchange controls. These include the 'second best' argument that the removal of exchange controls may, in the presence of sluggishly adapting goods and labour markets, accentuate the exchange rate overshooting first identified by Dornbusch. It is also argued that exchange controls serve to protect the domestic banking industry and its associated monetary regulations: in the absence of exchange controls, the type of control exercised by the Central Bank over its commercial banks is firmly disciplined by the presence, or potential presence, of off-shore banks. Exchange controls break this link and provide greater room for discretion in the design and implementation of monetary controls and regulations. Exchange controls may also prevent speculative crises by limiting the amount of domestic currency that can be quickly sold in anticipation of devaluation. Controls may also raise the level and/or alter the ownership of productive capital assets held in the home country.

We then investigate the effect of the abolition of direct investment controls, portfolio investment controls and monetary controls. The pre-1979 controls on direct investment restricted sterling-financed foreign investment except where it had a positive effect on the balance of payments, and normally required that two-thirds of the after-tax profits on that investment be repatriated to the United Kingdom. The general opinion is that these controls did not significantly affect direct investment flows, but only the financing of that investment. Given that in 1979 the quantity of foreign currency borrowing for portfolio investment purposes was quite small, we can assume that the refinancing which occurred in the second half of 1979 illuminates the effects of lifting the controls on the financing of direct investment. A comparison of data on foreign currency borrowing in the six quarters before abolition in June 1979 with those for the subsequent two quarters reveals a total effect of abolition on foreign currency borrowing of £638m a quarter. The data also suggest that any effect of exchange controls in reducing outward direct investment flows may have been offset by reduced incentives to inward direct investment. We are unable to find strong evidence for any net effect of the controls on direct investment flows.

With respect to portfolio investment, the controls stipulated that purchase by UK residents of foreign exchange to invest overseas could only be made from the sale of existing foreign securities or from foreign currency borrowing, creating an 'investment currency' market in which foreign currency traded at an implied premium over the official exchange rate. The effectiveness of this control is shown by the magnitude of the premium, which generally exceeded 30% in the period 1974-9. Removal of the controls clearly allowed the net outflow of portfolio investment to increase sharply, despite a small concurrent increase in inward investment. Strict enforcement of this control implies no significant outward portfolio investment (net of foreign currency borrowing); this is supported by data from the mid-1970s. Thus the entire outward flow of portfolio investment from 1980 should be attributed to abolition of the control. We find that abolition had a large effect, in excess of £45bn. If controls had deterred inward investment then the appropriate measure of the effect of abolition is the cumulative net outflow of portfolio investment – around £30bn.

A third element of the controls restricted the holding by UK residents of foreign currency deposits and sterling lending by banks and others to overseas residents. Such lending increased significantly after 1979 and the lifting of the restriction on the holding of foreign currency bank deposits was followed by a large increase in such deposits. The ratio of £M3 (the broad monetary indicator which excludes foreign currency bank deposits) to M3 (which includes them) fell from around 91% in the late 1970s to 85-7% in the mid-1980s.

The removal of monetary controls has had a dramatic effect on the on-shore/off-shore interest differential which in turn has affected UK monetary policy. In the presence of the controls full arbitrage is inhibited; in consequence the on-shore and off-shore interest rates can diverge significantly, and this differential can show considerable volatility. We test for a downward shift in the differential between the three-month Euro-sterling and local authority interest rates after October 1979. Because of uncertainty concerning the statistical distribution of asset prices, we employ non-parametric tests under a variety of distributional assumptions. The results show an unequivocal reduction in the volatility of the on-shore/off-shore differential as a result of the relaxation of exchange controls.

Previous research has shown that the behaviour of interest rates in Euro markets closely reproduces covered interest parity (CIP). Thus deviations from CIP between on-shore rates will primarily reflect the wedge between on-shore and Euro rates. Since the abolition of controls will reduce this wedge, deviations from CIP among on-shore rates should tend to zero as a consequence of the 1979 liberalization. We present further graphical evidence, which strongly confirms a large reduction in deviations from CIP after abolition, though they still have non-zero means.

We would expect abolition of monetary exchange controls to have at least three significant implications for monetary regulation and control in the United Kingdom. First, abolition will reduce the scope for sterilized intervention, which some research suggests was an effective policy instrument in the 1970s for the United Kingdom. Second, liberalization has certainly had an effect on the nature of subsequent monetary regulation. Without exchange controls quantitative restrictions on credit are likely to be frustrated as borrowers move to off-shore lenders. Abolition of exchange controls also made redundant monetary regulations of the classical balance-sheet ratio type, since off-shore banking services, not subject to such constraints, became available. Thus while the subsequent reform of UK banking regulations on very liberal lines may have occurred in any case, the absence of exchange controls made it inevitable. Finally, such trends also raise questions about the extent to which currency substitution may grow, with radical consequences for monetary policy. UK residents may purchase banking services from off-shore locations, perhaps using other currencies for transactions, and non-UK banking services may locate in the United Kingdom.

It is particularly difficult to draw inferences about the effect of abolishing exchange controls on the exchange rate, interest rates and other financial asset prices, since abolition coincided with other major shocks, such as the election of the Thatcher government and the coming on stream of North Sea oil. We find it plausible from our discussion of balance of payments flows that the controls did contain the net demand for foreign currency, and abolition should have served to depreciate the exchange rate. The evidence of the change in on-shore/off-shore interest rate differentials suggests that controls also tended to reduce domestic interest rates. Since the off-shore rate is in CIP with US domestic interest rates, however, abolition would only fail to affect the off-shore rate if it also made no difference to the exchange rate and expectations of its future value. Isolating the effects of abolition on either the exchange rate or interest rates is difficult, however: the sterling exchange rate appreciated strongly over 1980-1 and nominal interest rates also rose during 1980, both the opposite directions to what we would expect as a result of the lifting of exchange controls alone.

Since abolition allowed the free movement of portfolio investment in and out of Britain, we would expect to observe a closer integration of UK and overseas stock markets after 1979. We test this proposition using monthly data from 1973 to 1986 for the stock market indices of West Germany, the Netherlands, Japan and the United States, as well as the United Kingdom. We test for closer *short-run* integration of stock markets by testing for a significant shift in the correlation of monthly stock market *returns,* and for greater *long-run* integration by testing for cointegration of stock market *indices* before and after October 1979.

The correlation coefficients of short-run UK stock market returns with those of each of the other four countries reveal that in no case does there appear to be a marked increase in correlation after 1979. We also estimate the cointegrating regressions and test for a unit root in the cointegrating residuals: these results imply that the UK and foreign (non-US) stock market indices were cointegrated after 1979, but not before. The abolition of exchange control has very probably contributed to the internationalization of the UK stock market, in the sense that returns in the UK market will be highly correlated in the long run with those in other markets.

By contrast with these effects, which seem clear and robust, the immediate impacts of abolition on asset prices and balance of payments flows are difficult to identify, partly because the abolition of controls itself removed the source of some of the most relevant data but more importantly because it is not possible to control for the effects, concurrent in timing, of North Sea Oil, the second oil price shock and the 'reputation' of the Thatcher regime.

1. Introduction

In 1979 the freshly-elected conservative government abolished exchange control in the UK, thus ending a continuous period of over fifty years of restricted capital movements between the UK and the international economy. The impact of this action on both inward and outward flows of capital (variously defined) was marked. The main aim of this paper is to analyse the effects of these changes on the UK economy.

It might be hoped that the abolition of exchange controls in the UK would provide some clear lessons for the effects to be expected of abolition elsewhere; yet considering the magnitude of the step involved, there has been extraordinarily little analysis of the consequences of the abolition of the controls. There is in fact a major obstacle to the precise identification of the contribution of the abolition of the controls to the exchange rate, interest rates, equity prices or to the development of balance of payments flows, due to the coincidence in timing of the abolition of the controls with two other major shocks to the British economy - the second OPEC shock (itself accompanied by the transition of the UK from oil importing to oil exporting status) and the advent of the Thatcher government and a new 'regime' of economic policy. But whilst the violation of the ceteris paribus conditions seems to rule out recourse to sophisticated modelling and readily explains the lack of well-quantified estimates, some effects are nonetheless clear enough and in this paper we seek to document them. Above all, it seems clear that the removal of exchange control, in removing protection for domestic banking activity, forced the reform of monetary regulation to take place on a very liberal basis; whilst a move in this direction might have taken place in any event, the abolition of

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exchange controls provided a ruthless logic for it. It is also now possible to see that a development of currency substitution has taken place that would have been impossible in the continued presence of these controls and that the controls on outward portfolio investment and on the currency of financing of both portfolio and direct investment were substantially effective.

The remainder of the paper is set out as follows. In Section 2 we rehearse and discuss some of the main arguments which have been put forward in support of the maintenance of exchange control, whilst Section 3 contains a sketch of the controls as they existed before 1979. Section 4 contains the main body of the analysis, and discusses the UK experience with exchange control abolition. In particular, we discuss the impact on direct and portfolio investment, the results of the lifting of monetary controls, and the implications for monetary policy and for asset prices. A final section concludes.

2. Arguments for Exchange Controls

A number of arguments have variously been put forward in favour of the maintenance of exchange controls. Amongst these, it is possible to distinguish four broad strands of thought - 'second best' arguments, 'monetary-autonomy' arguments, 'counter-speculation' arguments, arguments relating to the distribution of ownership of productive assets and finally 'home investment' arguments[1].

2.1 The 'Second Best' Argument

A general argument against the market solution and in favour of

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restriction of some kind may be said to flow from the 'second-best' principle of welfare economics. Specifically, if distortions remain in some set of markets, it does not follow that liberalizing others will lead to an overall improvement. The application of this principle to the regulation of trade and capital movements might be said to have governed the wisdom of the founders of Bretton Woods, for whom the creation of a stable system of exchange rates and freedom from controls on current account was coupled directly with the perceived gains from liberalization of trade and the continued restriction of capital movements. The erosion of controls over capital movements in the post war world occurred in spite of, not because of, the acceptance of the principles of Bretton Woods. More recently, the analysis of exchange rate overshooting (e.g. Dornbusch, 1976) has provided a forceful analytical example whilst the experience of, first, sterling and then the dollar, supplies ample practical evidence that unregulated markets may produce untoward exchange rate behaviour. These examples are less than conclusive evidence in favour of exchange controls, however. In particular, some observers have drawn the conclusion that exchange rate behaviour can be rendered more stable without the need for exchange control, by writing rules for the conduct of policy in a world of exchange rate target zones (e.g. Williamson 1985; Edison, Miller and Williamson, 1987).

It must be said, moreover, that the case for the market solution is now understood to involve much more than 'welfare triangles' and to extend to considerations of x-efficiency and innovation in the operations of markets, here involving the global capital and credit markets. As such, the potential gains from the generalized liberalization could be large, leading to a significantly improved allocation of resources and, through time, a higher rate of innovation and efficiency increase. It is impossible to

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comment in detail on the likely distribution of benefits from such a
process, though it is probable that there will remain significant economies
of scale in the provision of financial services. But whilst this would
suggest that the provision of (though not the benefit derived from) such
services might tend to be concentrated in a few centres, the persistence of
distinctive national currencies provides an offsetting force[2].

2.2 The 'Monetary Autonomy' Argument

Exchange controls confer monetary autonomy on those countries which
deploy them in two distinct ways. First, in an adjustable peg system,
interest rates would otherwise be determined by those prevailing in the
other countries in the system, or in the leading country, plus or minus the
expected depreciation or appreciation permitted by the band width and the
position of the currency within the band. With a very narrow band, interest
rates are thus in effect determined directly by the leading country. The
presence of effective controls breaks this interest parity link and permits
some discretion for domestic interest rates to depart from the levels
otherwise dictated by it. Second, in the absence of exchange controls, the
type of control exercised by the Central Bank over its commercial banks is
firmly disciplined by the presence, or potential presence, of off-shore
banks. Any control which is onerous relative to the added cost of
transacting offshore will result in a migration of business to the off-shore
banks and make the control itself cosmetic in effect. Exchange controls
break this link and provide greater room for discretion in the design and
implementation of monetary controls and regulations.

Monetary autonomy of the first type may be recovered by widening the

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band: although the interest parity condition will still prevail with the wider band, increasing the band width will allow more of the effect of a change in interest rates in the leading country to be accepted in a change in the exchange rate and so require less of a parallel change in interest rates in the other country. The appearance of a slavish dependence can be so avoided. Autonomy of the second type cannot be secured by increasing the width of the exchange rate band, but it is questionable how far such autonomy is desirable. At any rate, if deregulation and liberalization of domestic monetary systems is desired, no more powerful ally than the liberalization of exchange controls can be imagined.

2.3 The 'Productive Assets' Argument

Exchange controls have been seen as helping to correct distortions which arise as the calculus of private rates of return yields systematically biased solutions compared to the calculus of social rates of return. The classic example here turns on the fact that private investors will rationally arbitrage after-tax rates of return; from the point of view of the capital exporting country, however, the fact that the government will absorb tax revenues arising from the returns to investment in its economy implies that the social rate of return on foreign investment falls below that on domestic investment. A developing country might also argue that exchange controls will help correct for the distortion that would otherwise arise as the exceptional external economies of investment in a developing economy will not be reflected in ex ante private returns. Moreover, relatively primitive capital markets may not offer investors instruments which are as attractive as those available in developed country capital markets, and the added liquidity cost of domestic investment will tip the balance in favour of investment overseas even if the social rate of return

on domestic investment is higher. Arguments like these may lend some support to exchange controls; but administrative (direct) controls do not often seem the best way of securing the objectives in question, where fiscal arrangements and tax-and-subsidy policies appear to provide superior solutions. It is certainly questionable how far exchange controls will succeed in raising total investment in the protected economy for, if they are successful in creating a captive market, domestic private rates of return will be reduced and as a consequence inward capital flow will be diminished. A similar point is made by Hemmings (1981), in relation to portfolio investment and by Beenstock (1977), in relation to direct investment. In this event, the controls might have to be appraised on the different grounds that they create a redistribution of asset ownership: a larger fraction of domestic assets will be owned by domestic residents and a smaller fraction of overseas assets will be owned by domestic residents than would otherwise be the case.

2.4 The 'Counter-Speculation' Argument

Arguments of the kind spelt out above apply most obviously to the control of portfolio and direct investment. Often, however, more attention is focussed on the effects of what might be described, for want of a better term, 'monetary exchange controls': by this we mean to refer to the controls over the holding by residents of foreign currency denominated bank deposits and other short-term assets and controls over the lending by domestic residents and banks of domestic currency to foreign residents. These provisions are the key to the counter-speculative role of exchange control for they limit the amount of domestic currency which can be quickly sold in anticipation of devaluation.

3 A Sketch of the Pre-1979 UK Controls

The principal controls abolished in 1979 pertained, separately, to direct and portfolio investment, to the holding by residents of foreign currency deposits and to sterling lending by UK residents and banks to non-residents.

In regard to direct investment, the controls provided for the restriction of all sterling-financed foreign investment (i.e. investment paid for with foreign exchange bought at the official rate) except where it could be shown to have advantages to the balance of payments; but direct investment financed by foreign borrowing or by foreign exchange bought from the investment currency market (see below) was freely allowed (at least, during the 1970s). In order to prevent leakage through the use of unremitted profits, the controls also normally required that at least two thirds of after-tax profits should be repatriated.

In regard to portfolio investment, the controls provided that purchase by residents of foreign exchange for the purpose of investment overseas should only be made from the sale of existing foreign securities or from foreign currency borrowing. This created an `investment currency' market in which there was an implied premium over the official exchange rate (since non-residents were free to purchase securities at the official exchange rate, there would never be a discount). In addition, for a period up to the end of 1977, sales of securities were subject to a `surrender' penalty in that 25 per cent of the proceeds of sale had to be exchanged at the official rate.

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Finally, the controls required that the holding, by residents, of foreign currency deposits should be limited to 'working balances' whilst sterling lending by banks and others overseas was similarly restricted to trade-related purposes[3].

4 The UK Experience

With the adoption by the United Kingdom of a floating exchange rate regime from 1972 onward, the original declared unifying rationale for the controls (to conserve foreign exchange) was lost and there is a dearth of official explanations for their continuation. Cairncross (1973) has remarked that the continuation of the controls may have been due, as much as anything else, to a perception that they might again be needed, for the old reasons, in the future and that to abolish them would effectively prevent their future use. This suggestion is given credence by the evident belief, at the inception of the new regime, that floating was a temporary expedient.

However this may be, the controls were finally removed in three stages in 1979. On June 12, it was announced, effective from the following day, that interest charges on foreign currency borrowing for portfolio investment could be financed at the official rate and the requirement of 115% cover for such borrowing was removed; then, on July 18 it was announced that, henceforth, repayment of foreign currency borrowing outstanding for a year or more could be made with currency purchased at the official rate, whilst purchase of EEC securities was exempted from all the restrictions. At the same time, all the remaining restrictions on direct investment and the payment of foreign currency borrowing incurred to finance it were removed. The rest of the restrictions (with the exception of some which were involved

in the economic sanctions against Rhodesia, themselves removed in December) were lifted as from 24 October.

With the removal of the restrictions and the reporting system associated with them, some of the information useful in assessing their effectiveness (in particular, that pertaining to the currency of finance of investment flows) was lost - a further hindrance to effective estimation of the impact of abolition.

Four attempts to quantify the effects of exchange control abolition are readily available: these are those by Artis (1988), the Bank of England (1981), Chrystal (1985) and Taylor and Tonks (1988); their assessment is combined with later evidence in what follows.

4.1 Direct Investment

The general opinion, before the abolition of the controls on direct investment, was that the regulatory regime of the 1970s was not intended to, and did not in fact, impinge significantly on the direct investment flows themselves (cf. e.g. Cairncross, 1973; Tew, 1978), but upon the financing of these flows. Foreign currency borrowing to finance direct investment abroad had been freely allowed, and the effect of the control was described for this reason in the Bank of England's Quarterly Bulletin for December 1979 (p. 371) as primarily one of deferred access to official exchange (in the sense, presumably, that the profits on the investment, which would otherwise be repatriated at the official rate, could be used to repay the foreign currency loan incurred to finance it).

Certainly, it had always seemed doubtful to what extent the two thirds

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rule for repatriation of foreign earnings was effective for the companies covered by the balance of payments statistics, where the figures showed that the proportion repatriated (though variable) was often closer to two fifths than to two thirds (see e.g. Tew, 1978, p. 333); among other differences, the exchange control provisions extended only to companies where the voting control lay within the UK, whereas the balance of payments statistics embrace the earnings of companies in which the UK interest is in a minority. This explanation, whilst consistent with the nominal effectiveness of exchange control over direct investment suggests that the penetration of foreign investment activities by multinational companies will significantly dilute the overall impact of such restrictions.

As the outstanding foreign currency borrowing associated with portfolio investment was comparatively small, most of the refinancing which appeared to occur during the third and final quarters of 1979, could be attributed to the relaxation of the controls over direct investment: a comparison of net borrowing for overseas investment in these quarters with its average in the previous two years prompted the Bank of England to suggest an effect of the order of £1bn in each quarter (Quarterly Bulletin, December 1979, p. 372; March 1980, pp. 13-14). This assessment, though, is somewhat bigger than the figures adduced in the Bank's subsequent analysis of the effects of abolition (Bank of England, 1981), would readily support. These figures (see Table 1) give the amount of direct investment and its financing in the period before the relaxation of controls in June and July, and in the third and fourth quarters of 1979, after which the foreign currency financing data are no longer available. These figures suggest a turnround in identified foreign currency borrowing from £260m to a repayment of £378m, a total

effect of £638m a quarter, total direct investment itself remaining more or less the same.

The direct investment data for subsequent and earlier years, together with their (end-of-year) stock counterparts are shown in Table 2. These reveal some important implied revisions to the earlier data used in Table 1; for example the revised outflow figures corresponding to the quarterly averages shown in Table 1 and with the addition of the last period shown are, in £m: 1978Q1-1979Q2: 1047; 1979Q3-1979Q4: 1563; 1980Q1-1981Q2: 1305; 1981Q3-1986Q2: 1412. But it is not clear that these revisions significantly alter the provisional verdict of the earlier studies that the controls did little to affect outward direct investment in total.

Table 2 indicates an increase in inward as well as in outward direct investment after abolition, consistent with some effect of the controls in reducing domestic rates of return; and whilst the net outward flow has risen over the period it is clearly an erratic series, much influenced in the last two years shown by disinvestment by overseas oil companies. Tentatively removing the oil-related component flattens the upward trend in net investment almost completely[4]. Table 2 also reports stock data for direct investment held abroad by UK residents and those held by foreign residents in the UK.

The net asset position has clearly improved, but trends here are additionally complicated by valuation changes, including those due to exchange rate changes, and cannot be said to cast any light on the effect of removing exchange controls.

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What seems to emerge, then, is this: whereas the controls were not (not in their latter years) intended to reduce overseas direct investment significantly they were aimed at the financing of this investment. There is evidence that the controls had some effect in this sense, though their abolition also removed the data source needed to track this over a reasonable period of time. General considerations suggest that where there was an effect on outward investment it may have been purchased at the expense of some reduction in the incentive for inward investment to occur and this would further reduce the impact of the controls on the net flow and the net foreign exchange position. There is no strong evidence in the relevant figures for any net effect.

4.2 Portfolio Investment

The effectiveness of the controls over portfolio investment was always evident in the height of the investment currency premium created by them. As Chart 1 shows, this premium was not infrequently in the range 30-50%, and on some occasions was even higher than this. Variations in the premium were frequently discussed in the pages of the Bank of England's Quarterly Bulletin and attributed to speculation on the exchange rate or on the stock markets in New York or London. The decline in the premium before abolition owed much to the circulation of rumours about the impending abolition of the controls.

Recourse to foreign currency borrowing to support portfolio investment was less significant than for direct investment: the Bank (1981) quoted an estimate of £1.6-£1.7bn outstanding associated foreign currency borrowing at the end of 1978. Accordingly, refinancing of the existing stock of such

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CHART 1 : UK: the investment currency premium
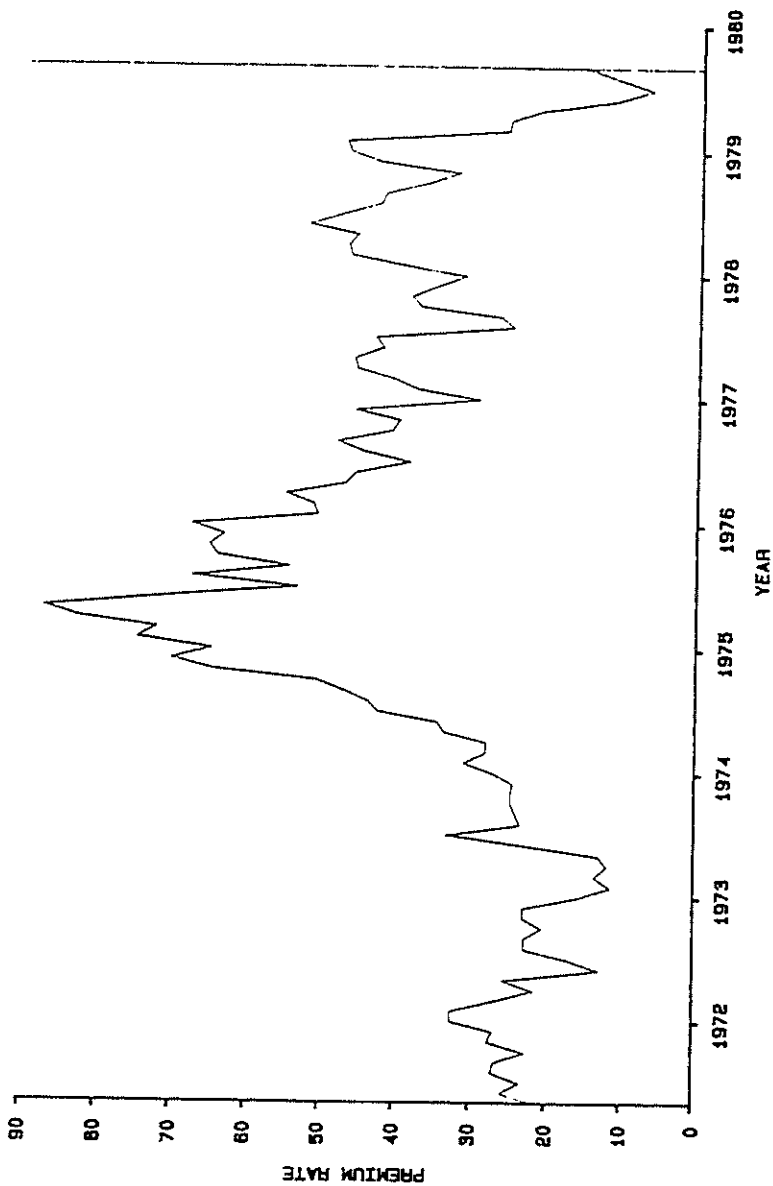
EFFECTIVE DOLLAR PREMIUM RATE

Exchange controls abolished October, 1979

borrowing was less significant (and in any case indistinguishable from the refinancing of borrowing connected with direct investment); but the removal of the controls clearly allowed outward investment to increase (see Table 3) and raised the net outflow sharply, despite some concurrent increase in 'inward' investment.

Strict enforcement of the controls would have implied no outward portfolio investment net of foreign currency borrowing, and in 1975-1978, the average gross outward flow was very small. Assuming that this is what would have been enforced by the continued presence of the controls, virtually the whole outward flow from 1980 on might be put down as the 'effect' of abolishing the control - an amount in excess of £45bn; granting that the controls deterred some inward investment, cumulating the increase in net outflow over the period might seem more appropriate - something of the order of £30bn. A somewhat similar order of magnitude is suggested by crude calculations based on the increase in the share of overseas assets in financial institutions' portfolios, as portrayed in Table 4. Comparing the share in 1985 with either the average for 1975-1978 or for 1978 alone suggests an increase of the order of 6-9 basis points, worth £30-40bn on 1985's total portfolio.

All such calculations are exceptionally crude and can only be treated as broadly indicative of what has been agreed in previous analyses (Bank of England, 1981; Chrystal, 1985), viz. that there was a large effect on portfolio investment from the removal of the controls.

4.3 The Monetary Controls

The lifting of the monetary restrictions on bank lending in sterling to

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overseas residents and on the holding by residents of foreign currency denominated deposits has had some clear and sizeable effects. In addition, a particularly striking impact is noticeable from the removal of controls on the on-shore/off-shore differential and consequently on departures from covered interest parity. These in turn have implied significant changes in the scope and form of monetary policy.

The restriction of sterling lending overseas was an important component in the system of exchange control; such lending had broadly to be associated with UK trade. The statistics collected on bank lending give a straightforward picture of the consequences of removing this control: Table 5 shows bank lending in three categories - for identified long-term export credit, for other identified export credit and for 'other' purposes. Lending in the last category increases significantly after 1979, a good part of it going to the offices of unrelated banks abroad (which banks have also in this period increased their holdings of sterling deposits with UK banks as part of the growth in Eurocurrency business).

The lifting of the restriction on the holding of foreign currency bank deposits has been followed by a large increase in such deposits. M3, the broad monetary magnitude which includes foreign currency deposits, has grown faster than £M3 which excludes them. The ratio of £M3 to M3 has consequently fallen, as illustrated in the graph (Chart 2), from pre-abolition levels in the late '70s of the order of 91% to 85-87% in the mid-80s. This would not have been possible without the removal of the controls; Chart 3 illustrates the relationship of the difference M3-£M3 to trade (exports) before 1979, and the shift in this relationship in the post-
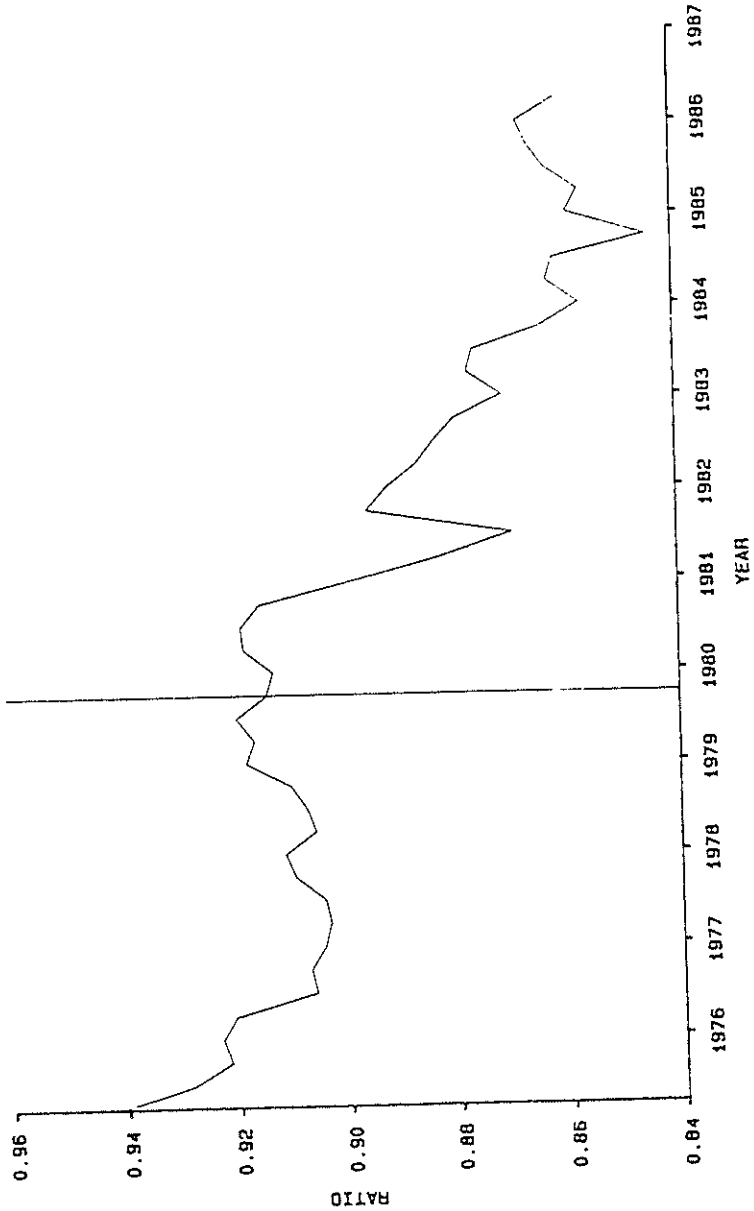
RATIO £M3/M3
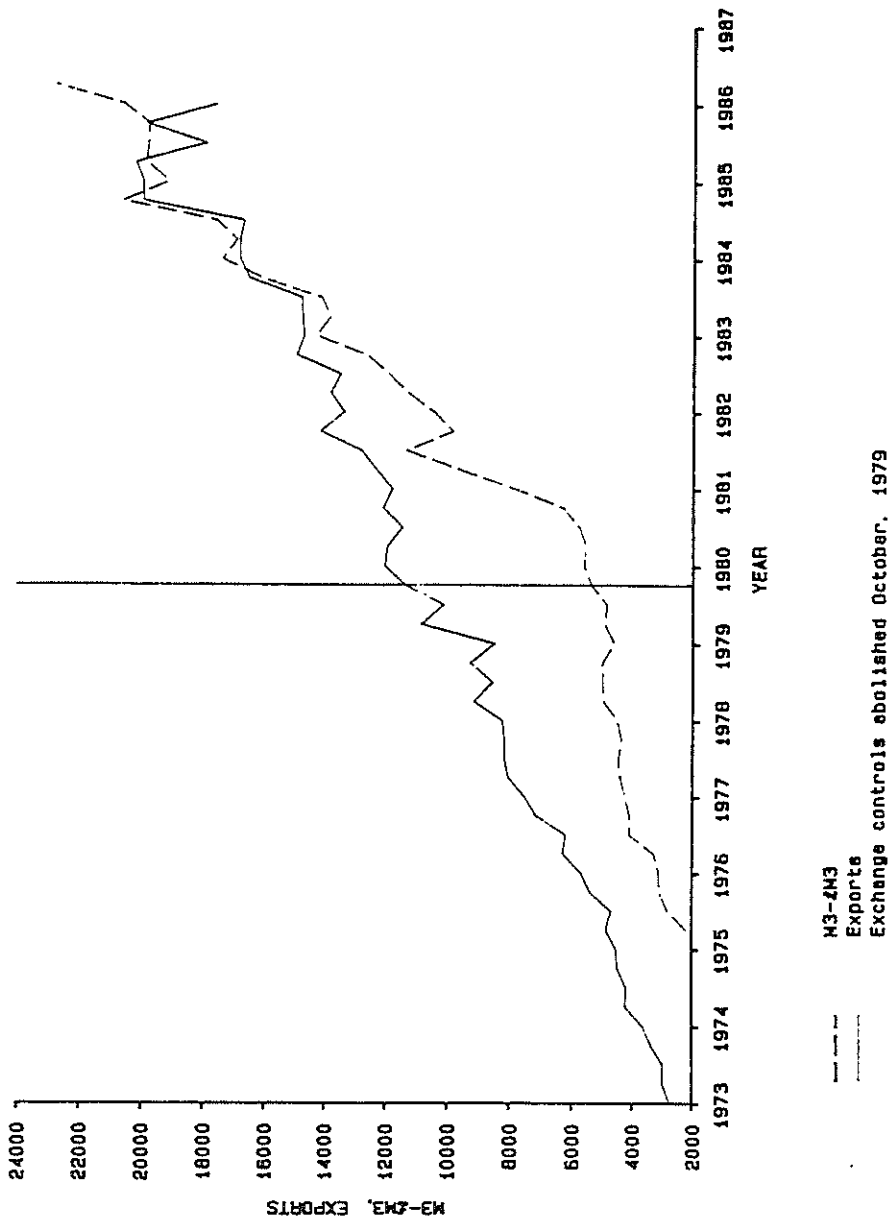
Exchange controls abolished October, 1979

CHART 3: Foreign currency deposits, trade and the removal of exchange controls

M3-£M3
Exports
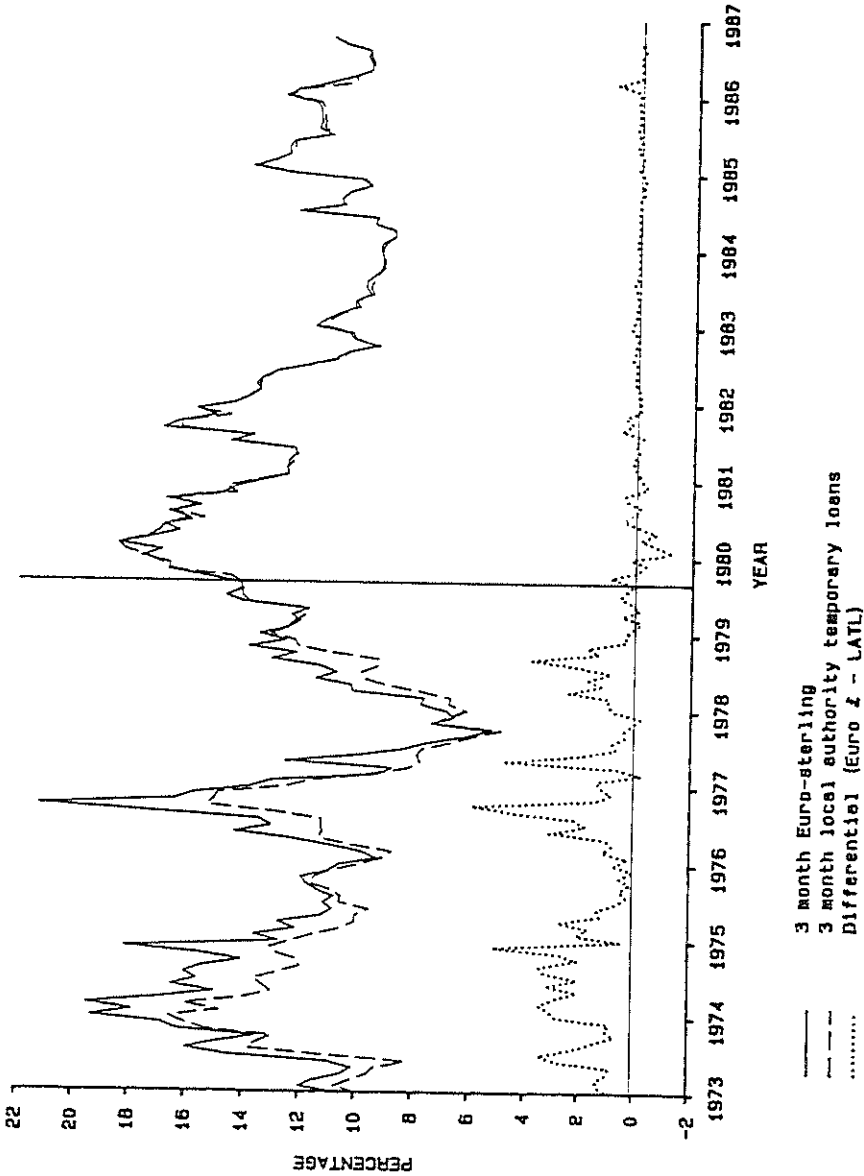Exchange controls abolished October, 1979

abolition period.

The removal of the controls has had a dramatic effect on the on-shore/off-shore interest differential. In the presence of the controls full arbitrage is inhibited and in consequence the on-shore/off-shore differential can exhibit significant departures from zero and significant variability. A predicted effect of removing the controls is that these distortions will be removed[5]. The calculations reported in Table 6 and the graphical displays in Charts 4A and 4B show the 3-month Euro-sterling rate and the 3-month Local Authority Temporary Loan rate and the differential between them, whilst Chart 4B displays the Euro-sterling rate against interbank rate. In the table is given information on the mean, variance and range of each of these differentials before and after October 1979.

In order to assess scientifically the contribution of exchange control in this respect, one should perhaps use inferential rather than purely descriptive statistics. Accordingly, we decided to test for a downward shift in the UK on-shore/off-shore interest differential (difference between three month local authority and Eurosterling rates) after October 1979. Because of the uncertainty concerning the statistical distributions of asset prices, we used non-parametric tests for a variety of distributional assumptions. The statistical methods are described in the appendix; the results are reported in Table 7. In each case, the test statistic is distributed as standard normal $N(0,1)$, under the null hypothesis of no shift in volatility; a significantly positive (negative) statistic implies a reduction (increase) in volatility. The results show an unequivocal volatility reduction in the on-shore/off-shore interest differential as a result of the relaxation of exchange controls.

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3 month Euro-sterling
3 month local authority temporary loans
Differential (Euro £ - LATL)

Exchange controls abolished October, 1979

PERCENTAGE

YEAR

CHART 4B: UK: the off-shore/on-shore differential
(Interbank Rate)
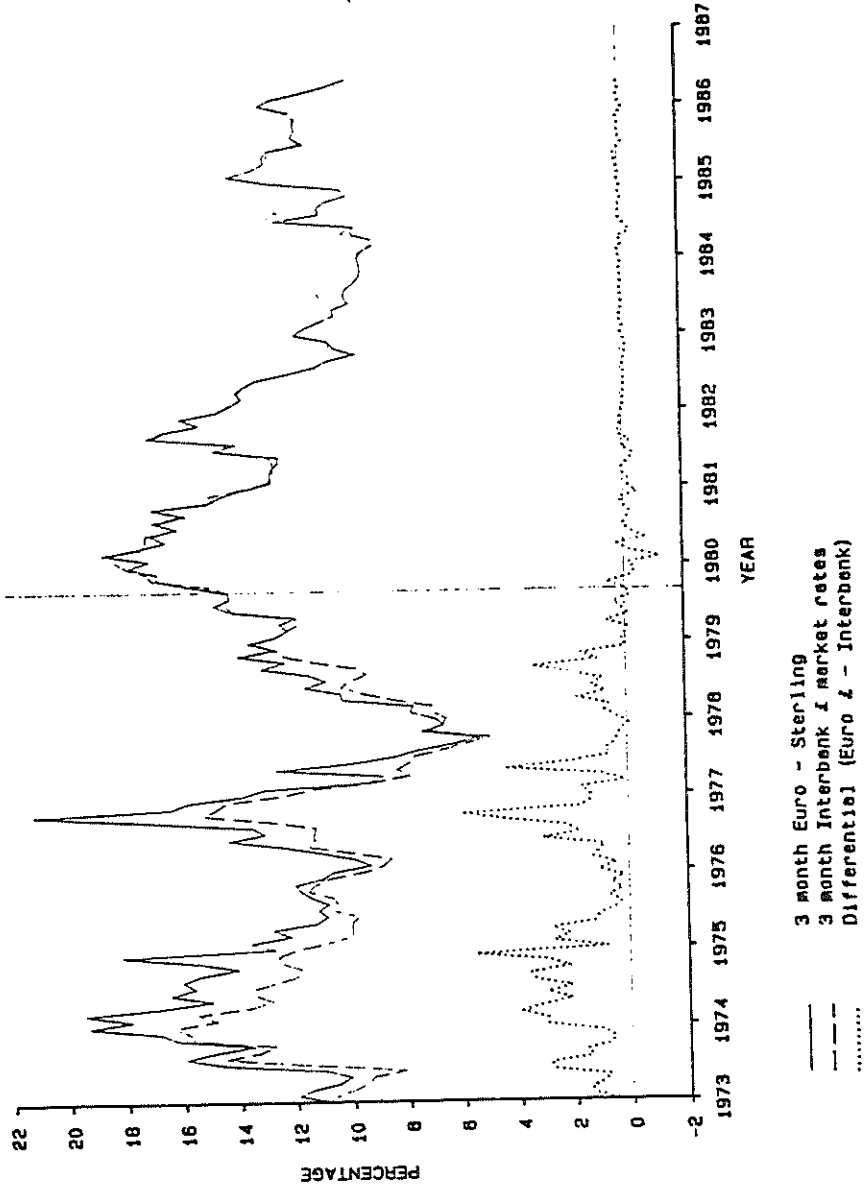
3 month Euro - Sterling
3 month Interbank £ market rates
Differential (Euro £ - Interbank)

Exchange controls abolished October, 1979

It is known that interest rates in Euro markets closely reproduce covered interest parity (Taylor 1987a,b); the interest rate on Euro-X deposits may actually be set directly by adjusting the corresponding $ rate for the cost of forward cover in the $/X market. This being so, deviations from covered interest parity between on-shore rates will primarily reflect the wedge between on-shore and Euro-rates and will tend to vanish as the wedge is removed. Since we have already found the abolition of exchange controls to be effective in this respect, it must be expected that deviations from covered interest parity between on-shore rates will tend to zero after abolition of exchange control. Once again the graphical evidence (Charts 5A and 5B) strongly confirms this. It will be seen that both the on-shore/off-shore differential and the covered interest differentials after abolition have non-zero means, however much reduced they are from pre-abolition levels. Inter alia, these are likely to be explicable in terms of observation error and systematic differences in perceived risk and transactions costs. In their study of this question Frenkel and Levich (1977) argued that the presence of transactions costs meant that there was a band within which such deviations from interest parity could fall consistently with perfect arbitrage and they argued that a large proportion of observed deviations from covered parity between US and UK interest rates actually fell within this band. McCormick (1979) subsequently showed, however, that Frenkel and Levich had estimated too wide a band and calculated that the proportion of observed deviations from parity of on-shore rates which fell within the band was less than 30 percent, not 96 per cent as implied by Frenkel and Levich. (For off-shore rates, the recalculation sustained the contention that virtually all deviations fell

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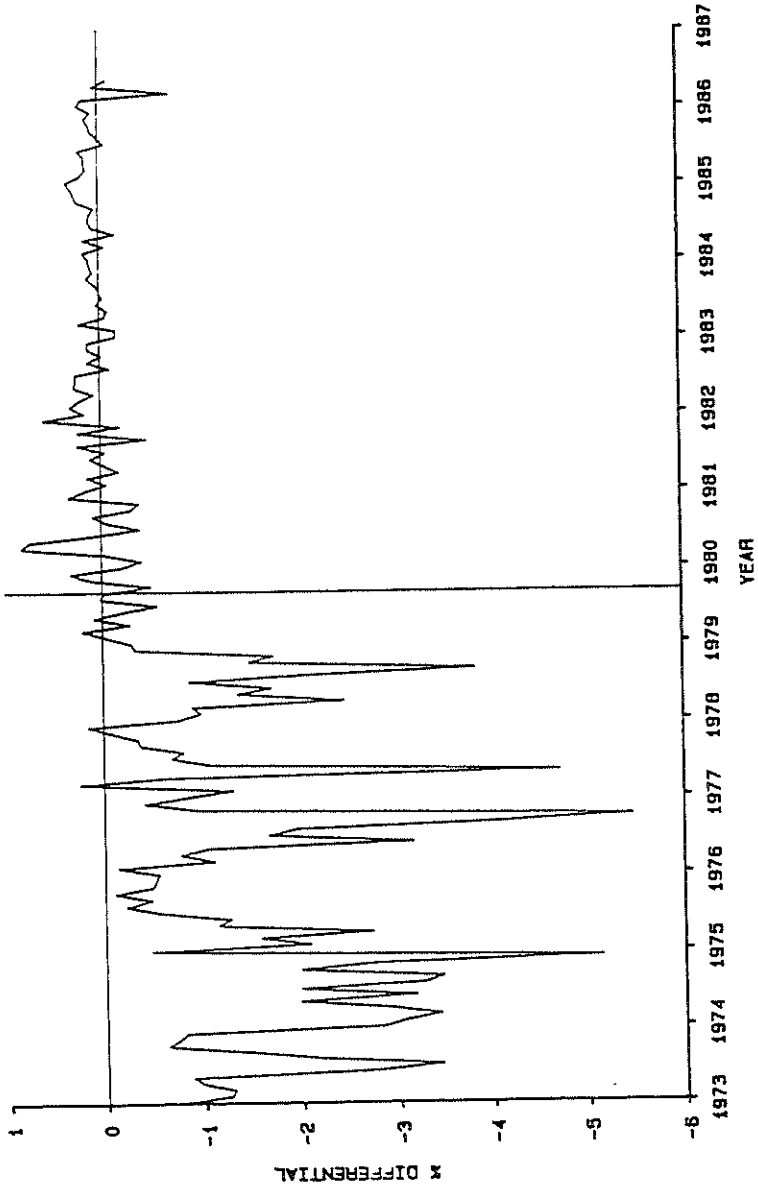
Covered interest rate differentials
(Local authority temporary loans -
Euro market rate)

Exchange controls abolished October, 1979

CHART 5 B : UK: departures from covered interest parity
(Interbank Rate)
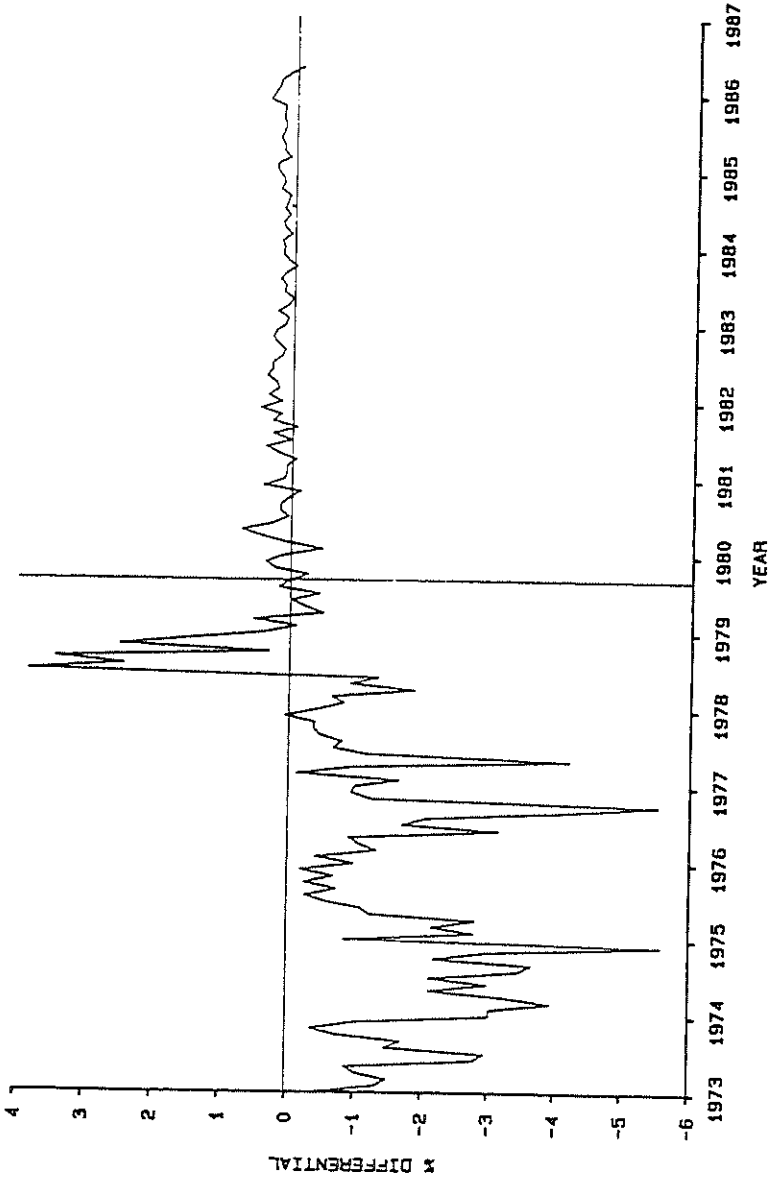
Covered Interest rate differentials
(3 month Interbank market rate — 3 month Euro rate)

Exchange controls abolished October, 1979

within the neutral band). These observations serve to strengthen the suggestion here that exchange controls did inhibit full arbitrage and that the decline in observed deviations from parity ensuing upon their abolition does indicate a real change in this respect[6].

4.4 Implications for Monetary Policy

The abolition of the monetary exchange controls in principle poses several problems for monetary control and in practice has disciplined the system of monetary regulation and control employed in the United Kingdom.

Three aspects of this may be singled out for discussion: the scope for intervention in the foreign exchange markets; the nature of monetary regulation; and, finally, the consequences of currency substitution.

Considered as part of a trend towards greater integration, and more efficient financial markets, abolition of exchange control can be considered to reduce the scope for sterilized intervention and for manoeuvres in the forward markets. As an example of the latter, a traditional Bank of England tactic to exploit the forward markets to exert a bear squeeze on speculators may be mentioned. This tactic consisted of selling sterling forward, thus raising Euro-sterling interest rates but not on-shore rates of interest, discouraging spot sales and reducing the profit from selling sterling short. This manoeuvre cannot take place in the absence of exchange control, because the possibility of raising off-shore rates without also raising on-shore rates no longer exists[7]. Kearney and Macdonald (1986), more generally, have found some evidence that sterilized intervention was an effective instrument of policy in the 1970s for the UK, in contrast to Obstfeld's (1984) findings for Germany. Since the finding for the UK implies that capital mobility was

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less than perfect, they tentatively suggest that exchange control may have been responsible.

That the liberalization of exchange controls has had implications for the nature of monetary control and regulation is not in doubt. In a liberal regime, quantitative credit restrictions, or similar instruments, are subject to added leakage as frustrated business moves off-shore: this was forcefully illustrated in the British case (as noted in Artis and Lewis, 1981) when the Governor of the Bank of England requested the domestic banks in 1979 not to participate in or encourage the use of off-shore facilities to frustrate the impact of the then existing Special Supplementary Deposit scheme (popularly known as the 'corset'). The corset control specified a steeply rising rate of call to zero-interest account at the Bank of England on interest bearing deposits received by banks in excess of pre-specified allowable rates of growth. The banks reacted to this by rationing borrowers for credit and reducing their competition for deposits. In the presence of freely available off-shore banking facilities, frustrated borrowers could tap off-shore banking facilities, whilst lenders would find it profitable to divert deposits from on-shore to off-shore banks. The lifting of the exchange restrictions thus rendered the use of this control otiose and it was subsequently dropped in June 1980. Aside from its implications for the use of quantitative controls, or controls with a rationing effect, the lifting of exchange restrictions also implies that monetary regulations of the classical balance sheet ratio type may be redundant too. The ready availability of off-shore banking services, undertaken on the basis of complete freedom from imposed balance sheet ratios, implies that the scope for imposing such ratios on competing on-shore banks must be strictly

limited. Ratios which are onerous will result in a migration of banking services to off-shore locations. In this light, the reform of the regulations governing the British banking system in 1981, which placed the system on a very liberal and essentially ratio-free basis was inevitable; though there would probably have been a movement in this direction in any case, the absence of exchange control was compelling.

In the long haul, these trends inevitably raise questions about the extent to which currency substitution will grow. The market solution draws its legitimacy from the efficiency gains of locating production in the lowest cost location; since banking services are highly mobile there is no guarantee that these services will not in future be purchased more efficiently from off-shore locations, perhaps involving non-sterling currencies as transactions media. Alternatively, as there are economies of scale in production, a UK location may prove efficient for global services performed for other economies. In either event, widespread currency substitution would have radical consequences for monetary policy, as has been spelt out in a number of recent papers by McKinnon[8].

4.5 Consequences for Asset Prices

It is particularly difficult to draw inferences from the removal of exchange control for its consequences for the exchange rate, interest rates and other financial asset prices such as equity prices. The coincidence of other major shocks at this time is especially awkward in this respect.

The Bank of England's (1981) study cautiously concluded that the abolition of controls must have had some depreciating effect on the exchange rate, considered in itself, and may have had some effect in keeping

interest rates down. The two effects are to some degree alternatives; if the controls succeeded in holding down the rate of return on British assets, investment in them would have been correspondingly less attractive for foreign investors and the impact on the net demand for sterling and therefore the exchange rate consequently diminished.

It seems plausible, in view of our discussion of the probable impact of abolition on balance of payments flows, that the controls did contain the net demand for foreign currency: removing them should have depreciated the exchange rate. The evidence of the change in on-shore/off-shore interest differentials might be thought to indicate that domestic rates were reduced by the controls, since positive pre-abolition differentials in favour of off-shore rates fall or become negative after abolition. But the off-shore rate is in covered interest parity with the US domestic rate, and would only be itself unaffected by abolition if abolition made no difference to the exchange rate and expectations of its future value. Raw data processing on a pre- and post-abolition basis has no chance of revealing effects on either the exchange rate or on interest rates; as is well known, the sterling exchange rate continued to appreciate strongly through 1980 and 1981 whilst nominal interest rates also rose through 1980. Chrystal (1985) has also looked at real interest rates, but arrived at no firm conclusion that abolition had definite effects on either nominal or real interest rates. There were strong coincidental forces making for an effect in the direction opposite to that which might have been associated with abolition per se both on the exchange rate and on interest rates.

Concerning the effects on equity prices, there exists quite a large

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literature which examines more general questions of stock market internationalisation and segmentation. One group of studies[9] has examined the question of gains from international portfolio diversification, whilst a second strand in the literature[10] has examined stock market segmentation. In a segmented market, assets are priced according to factors particular to that market, whilst in an integrated market domestic assets are priced according to international factors.

Given the marked impact of UK exchange control abolition on portfolio investment, noted above, one might conjecture that this may have led to a closer integration of UK and overseas stock markets post 1979. In order to test this proposition, we carried out two kinds of procedures. Firstly, we tested for closer short-run integration of stock markets by testing for a significant shift in the correlation of monthly stock market returns post October 1979; and secondly, we tested for long-run stock market integration post 1979 by testing for co-integration of stock market prices (Engle and Granger, 1987).

Monthly data were collected for five major stock market indices, United Kingdom, West Germany, Netherlands, Japan and the United States, for the period January 1973 to June 1986[11], [12]. Tests were carried out with respect to two sub-periods: October 1979 to June 1986 and April 1973 to September 1979.

Table 8 reports correlation coefficients of UK stock market returns (first difference in the log-level) with those of four other countries examined, for each of the sub-periods. In no case does there appear to be a marked increase in the correlation during the second sub-period, and a test

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statistic for equality of correlation coefficients across the two sub-periods is in each case highly insignificant[13]. These results suggest that there has been no significant increase in the correlation of short-run stock market returns as a result of the abolition of exchange control.

Table 9 reports the results of unit root tests. For the stock market indices, the null hypothesis of a unit root can in no case be rejected at even the ten per cent level. For stock market returns, however, the null hypothesis is strongly rejected with significance levels much less than one per cent. Thus, there appears to be a unit root in each of the stock market index series which cancels out on first differencing - i.e. they appear to be integrated of order one, I(1), during each sub-period (Engle and Granger, 1987).

Table 10 contains results of estimating the cointegrating regressions and of testing for a unit root in the co-integrating residuals. Although non-cointegration can in no case be rejected for the first sub-period, the test statistics (except for the US) become significant at the 5% level for the post-abolition of exchange control period. These results imply that the UK and foreign (non-US) stock market indices were cointegrated post-1979, but not before[14], [15]. Since the stock market indices were found to be non-stationary (more particularly, I(1)), the coefficient estimates where co-integration was not found (pre-1979 for all countries and post-1979 for the US) are of little interest, since they are from `spurious regressions' (Granger and Newbold, 1974). Although Stock (1988) shows that coefficient estimates of cointegrating parameters may have desirable asymptotic properties, he does suggest that there may be substantial finite-sample

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bias, and this is borne out in the Monte Carlo study of Banerjee et al (1986). Since, moreover, we currently have no way of estimating the standard errors in cointegrating regressions, we cannot infer that the estimated slope coefficients for Germany, the Netherlands and Japan post-1979 are significantly different from unity. This in no way affects our inferences concerning cointegration, however.

Note also that we cannot infer from these results that the UK market is perfectly correlated with the German, Dutch and Japanese markets in the long run post-1979. We can infer, however, that these markets will be highly correlated in the long run, so the long-run gains from diversification across them will be slight[16]. Thus, it seems that the abolition of exchange control has very probably contributed to the internationalisation of the UK stock market.

5 Conclusion

Several conclusions can be drawn from the British experience in removing exchange controls. First, the removal of those controls does appear to have contributed towards eliminating deviations from covered interest parity and reveals their presence to have been more of a hindrance to financial integration than was perhaps fully realized at the time. The integration which abolition has accomplished has in turn posed a felt discipline on the type of monetary policy available; it creates a presumption of a strong decline in the effectiveness of sterilized intervention, a presumption against quantitative controls on credit (or controls producing this effect) and a presumption in favour of a very liberal regime of monetary regulation such as the UK now enjoys. Further into the future, the potential for currency substitution has still to be

revealed. Second, various effects on the balance of payments flows can be discerned; in particular, a marked outflow of portfolio investment is to be found, and the balance of payments flows (on both sides of the balance sheet) bear witness to a greater degree of financial integration. This is also evidenced by our finding that the UK stock market appears to be co-integrated with certain overseas stock markets post-1979. Third, whilst there is a presumption from the apparent balance of payments effects that abolition produced a depreciation impact on the exchange rate and some presumption that interest rates may have been raised ceteris paribus, neither effect is evident from the data. At the time when the restrictions were lifted the UK balance of payments was also affected by other important shocks: the new monetary regime of the Thatcher Government, the second oil price shock and the move from oil deficit to self-sufficiency in production. These factors serve to obscure any effects abolition may have had on asset prices and hinder quantitative assessment of the effects on balance of payments flows. They also qualify the value of the British experiment as a guide to the likely experience of other countries taking the same route; among the findings, those pertaining to the impetus to financial integration are perhaps the most robust to this qualification.

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Appendix : Non-Parametric Tests

This appendix describes the non-parametric method used to test for a shift in the on-shore/off-shore interest differential post-October 1979 as reported in Section 4.

Let di_t be the on-shore/off-shore interest differential at time t, then the maintained hypothesis is:

$$di_t = \mu + \sigma_t \ \epsilon_t \tag{1}$$

$$\sigma_t = \exp \ (\alpha + \beta z_t)$$

where μ, α and β are unknown, constant scalars, ϵt is independently and identically distributed with distribution function F and density function f, and z_t is a binary variable reflecting the hypothesised change in volatility, i.e.:

$$z_t = \begin{cases} 1, \ t < \text{October } 1979 \\ 0, \ \text{otherwise} \end{cases}$$

Given (1), the null hypothesis of no shift in volatility is then:

$$H_o : \beta = 0 \tag{2}$$

Hajek and Sidak (1967) (henceforth HS) develop a number of non-parametric rank tests for dealing with problems involving this kind of framework, which, under appropriate regularity conditions, are locally most powerful (HS pp 70-71).

The test statistics take the form

$$\delta = \sum_{t=1}^{T} (z_t - \bar{z}) \ \alpha(u_t) \tag{3}$$

where $\bar{z}$ is the arithmetic mean of the z_t sequence of T observations $(\bar{z} = T^{-1} \sum_{t=1}^{T} \bar{z}_t)$, and u_t is defined as follows. Let $r(di_t)$ be the rank of di_t - ie di_t is the $r(di_t)$-th smallest change in the total sequence of

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length T considered; then

$$u_t = r(di_t)/(T + 1).$$

Clearly, u_t must lie in the closed interval [1/(T+1), T/(T+1)] (for no ties in rank). The function $\alpha(.)$ in (3) is a score function defined in HS (p 70), depending upon the assumed density of ε_t, ie f. HS define a class of functions which can be used in place of the score function in large samples, since $\alpha(.)$ may in practice be difficult to evaluate. If F is the assumed distribution function of ε_t:

$$F(x) = \int_{-\infty}^{x} f(y)dy$$

and $F^{-1}(u)$ is the inverse of F:

$$F^{-1}(u) = \inf \{x \mid F(x) \geq u\}$$

then the asymptotic score function, $\emptyset(.)$ is defined (HS p 19):

$$\emptyset : (0,1) \rightarrow \mathbb{R}$$

$$\emptyset(u) = -F^{-1}(u) \left[\frac{f'\{F^{-1}(u)\}}{f\{F^{-1}(u)\}} \right] - 1 \tag{4}$$

Under the maintained hypothesis (1), the statistic

$$\pi = \sum_{t=1}^{T} (z_t - \bar{z}) \, \emptyset(u_t) \tag{5}$$

(ie as in (3) with $\alpha(.)$ replaced by $\emptyset(.)$) will by asymptotically normally distributed. Under the null hypothesis (2), π will have mean zero and variance ρ^2 given by (HS pp 159-160):

$$\rho^2 = \sum_{t=1}^{T} (z_t - \bar{z})^2 \int_0^1 \left\{ \emptyset(u) - \bar{\emptyset} \right\}^2 du \tag{6}$$

where

$$\bar{\emptyset} = \int_0^1 \emptyset(u) \, du$$

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The test is now as follows. For a given choice of f, π can be calculated as in (5) and referred to the normal distribution, to construct a test of any given nominal size, of the null hypothesis (2) (no change in volatility). Significantly negative values of π reflect a negative value for β in (1) - ie an increase in volatility post-October 1979. The statistic π in (5) provides the locally most powerful test among the class of all possible tests (HS p 249). The statistic π/ρ (as reported in Section 4) will be standard normally distributed under the null hypothesis (no shift in volatility).

Note that although the test procedure just outlined is non-parametric in the sense that no volatility measures are actually estimated, in implementing the procedure we cannot avoid choosing an appropriate distribution for changes in the exchange rate. In order to try and minimise the damage due to choosing an inappropriate distribution we selected four well-known ones - hopefully, the true distribution of exchange rate changes is close to one of them. The densities used correspond to the normal, logistic, double exponential and Cauchy distributions. All of the chosen distributions are symmetric and both the double exponential and Cauchy distributions have fat tails.

Notes

1. See also Cairncross 1973.

2. The logic of market solution may in the long run, however, lead to the displacement of national currencies even for the conduct of substantial amounts of domestic business - a further erosion of monetary autonomy and sovereignty. Thus exchange control may be seen as a form of protection both for banking and for the national currency of denomination.

3. All of the controls are described in detail in the Bank of England's (1977) Manual.

4. The data only allow this to be done up to 1983 after which oil companies' investment, which was previously located in the category 'other UK residents' (which it might be assumed to dominate) can no longer be even approximately identified. Assuming that the investment shown for 'other UK residents' excluding oil companies after 1984 is representative of earlier figures, the net balance of direct investment, approximately excluding that of oil companies, beginning in 1975, emerges as, in £bn: 0.7; 1.5; 0.8; 1.6; 1.5; 1.3; 3.9; 1.4 and, in 1983, 1.5.

5. Phylaktis and Wood (1986) have noted such findings in Johnston(1979) for Germany and in Otani and Tiwari (1981) for Japan in similar instances.

6. Some recent work by Chrystal (1986), however, might provide a possible qualification. Using daily data on Euro-sterling and Interbank rates Chrystal finds evidence of a move to integration before the abolition of the controls, especially in the period September 1978 - February 1979. What is unknown of course is whether this movement would have proved irreversible in the absence of a lifting of the controls or would, on the contary, have been shown to be a temporary and accidental phase. On our view of the matter, the latter is more likely.

7. This is discussed in Llewellyn,(1980).

8. See e.g. McKinnon,(1984).

9. See e.g. Grubel(1968), Levy and Sarnat(1970), Grubel and Fadner(1971), Ripley(1973) Panton, Lessig and Joy(1976).

10. See e.g. Agmon(1972, 1973) Lessard(1974), Stehle(1977), Errunza and Losq (1985) and Jorion and Schwartz(1986). All of these studies find significant national factors in the pricing of assets.

11. All data are from Datastream and are monthly (closing reading, last working day), unadjusted. The precise indices used are: UK, FTA All Share Index; US, Standard and Poor's Composite Index; Japan, Tokyo New Stock Exchange Index; West Germany, Commerzbank Index; Netherlands, Datastream Total Market Index. All data were deflated by the sterling exchange rate and converted to natural logarithms.

12. Some justification should perhaps be given for converting the indices into common currency (sterling) terms, apart from the fact that this

is standard practice in the literature. The point is that we are implictly examining the short- and long-run gains available to a British investor by diversifying his or her portfolio into foreign stock markets. Clearly, this requires the conversion of all returns into sterling terms. It might be argued that this procedure begs a question concerning exchange rate risk, and that separate exchange rate equations should be included in the analysis. However, we are mainly concerned with ex post rather than ex ante phenomena: was there a significant increase in the degree of correlation of ex post British and overseas stock market returns after 1979?

13. The test statistic for the equality of the correlation coefficients (column 3, Table 8) was constructed as follows. If r is the sample correlation coefficient, then the statistic

$$\delta = \frac{1}{2} \ln \frac{1 + r}{1 - r}$$

is approximately normally distributed with approximate mean and variance of $1/2 \ln \{(1 + \rho)/(1 - \rho)\}$ and $1/(T - 3)$ respectively, where T is the sample size and ρ is the population correlation coefficient. Moreover, these approximations will be close in sample sizes greater than fifty (Kendall and Stuart, 1967, pp 292-293). Hence, denoting two subsamples by subscripts 1 and 2, under the null hypothesis $H_0 : \rho_1 = \rho_2$ the statistic

$$\pi = \frac{\ln \{(1 + r_1)/(1 - r_1)\} - \ln \{(1 + r_2)/(1 - r_2)\}}{2/\{1/(T_1 - 3) + 1/(T_2 - 3)\}}$$

will be distributed approximately standard normal.

14. Note that it is unnecessary to test for cointegration amongst other

stock market pairs in the system because of the transitivity property of cointegration. That is to say, if we have three I(1) variables, x, y and z, and x and y and x and z are cointegrated then, for some b and c we have -x+by~I(0) and x-cz~I(0), hence adding and rearranging, y-(c/b)z~I(0) - ie y and z are cointegrated. The UK market may act as a 'clearing house' in this sense.

15. In each case, the 'reverse regressions' were also used to test cointegration, eg regressing the German index on the UK index, etc. This yielded qualitatively identical results.

16. The presence of cointegration in this context also has some interesting implications for market efficiency - see Taylor and Tonks, 1988.

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TABLE 1

Direct Investment and Refinancing[a]

£m: quarterly averages

	1978Q1- 1979Q2	1979Q3- 1979Q4	1980Q1- 1981Q2
Outward direct investment	707	643	724
Financed by: Retained Earnings	325	473	341
Identified foreign currency borrowing	260	-378	..
Unidentified finance	122	548	383

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a   .. = not available

Source: Bank of England (1981), p. 371.

TABLE 2

Direct Investment 1975-1985[a]

£000m

	Flows			Stocks		
	Outward	Inward	Net Outward	External assets of UK	UK liabilities to overseas residents	Net, UK
1975	1.3	1.5	0.2	18.6	12.1	6.5
1976	2.4	1.7	0.7	23.5	13.7	9.8
1977	2.4	2.5	-0.1	24.4	15.7	8.7
1978	3.5	2.0	1.5	28.1	17.9	10.2
1979	5.9	3.0	2.9	31.4	22.0	9.4
1980	4.9	4.4	0.5	33.3	26.4	7.9
1981	6.1	2.9	3.2	45.2	30.0	15.2
1982	4.3	3.0	1.3	53.3	31.8	21.5
1983	5.3	3.4	1.9	60.3	36.3	14.0
1984	6.0	0.4	5.6	81.5	38.0	43.5
1985	7.3	3.4	4.0	76.7	40.5	36.2

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a   By convention these figures are shown with sign reversed in the balance
of payments tables.

Source: CSO, Balance of Payments Pink Book, 1986.

TABLE 3

Portfolio Investment 1975-1985[a]

£000m

	Flows			Stocks		
	Outward	Inward	Net Outward	External assets of UK	UK liabilities to overseas residents	Net, UK
1975	0.1	0.2	-0.1	6.9	6.1	0.8
1976	-0.1	1.0	-1.1	8.7	7.8	0.9
1977	-	1.9	-1.9	8.7	10.6	-1.9
1978	1.1	-1.0	1.1	10.3	9.7	0.6
1979	0.9	1.5	0.6	12.3	10.4	1.9
1980	3.2	1.5	1.7	18.7	12.1	6.6
1981	4.3	0.3	4.0	25.4	12.7	12.7
1982	6.7	0.2	6.5	40.3	15.7	24.6
1983	6.5	1.9	4.6	60.0	19.3	40.7
1984	9.6	1.4	8.1	84.3	23.5	60.8
1985	18.2	7.1	11.2	100.6	32.1	68.5
1986[b]	12.0	2.3	9.7	..	..	..

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a End of year; b first half-year; .. not available.   By convention these
figures are shown with sign reversed in the balance of payments tables.

Source: CSO, Balance of Payments Pink Book, 1986..

TABLE 4

Financial Assets and Liabilities of Other Financial (Non-Bank) Institutions: Overseas Components

£000m

	Overseas Assets	Overseas Liabilities	Net Overseas	Gross Financial wealth (total assets)	Per Cent	
					Portfolio	Shares
					Net Overseas	Gross Overseas
1975	7.0	1.4	5.6	77.3	7.3	9.1
1976	9.0	1.6	7.4	88.4	8.3	10.2
1977	8.6	1.8	6.8	117.1	5.8	7.3
1978	10.4	1.5	8.9	132.8	6.7	7.8
1979	11.0	2.2	8.9	150.1	5.9	7.3
1980	16.2	2.0	14.2	185.5	7.7	8.7
1981	22.5	2.3	20.2	210.3	9.6	10.7
1982	38.2	5.3	32.9	263.3	12.5	14.5
1983	54.9	7.6	47.3	326.7	14.5	17.7
1984	75.7	9.0	66.7	401.2	16.6	18.9
1985	77.3	9.9	67.5	472.9	14.3	16.4

Source: CSO Financial Statistics, November 1986.

TABLE 5

Bank Lending (in Sterling) Abroad[a]

£000m

	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
Identified long-term export credit	0.2	0.2	0.5	0.6	0.1	0.2	0.2	1.0	0.9	0.3	-
Other identified export credit	-	0.1	-	0.1	0.1	0.1	-0.1	-0.2	-	-0.1	-0.1
Other sterling lending	-0.1	0.4	0.1	0.1	-0.2	2.5	3.0	3.3	1.3	4.7	1.7

a - = less than £50 million; by convention these figures are shown with sign reversed in the balance of payments tables.

Source: CSO Balance of Payments Pink Book, 1986, Table 8.4.

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TABLE 6

On-shore/Off-shore Interest Differentials

per cent per annum

end of month data

	Euro-£ minus Local Authority Rate	Euro-£ minus Interbank Rate
Jan 1973-Sept 1979		
Mean	1.476	1.510
Variance	1.731	1.735
Range	-0.250 to 5.940	-0.160 to 6.000
Oct 1979-Oct 1986		
Mean	0.075	-0.040
Variance	0.069	0.045
Range	-1.280 to 0.940	-1.220 to 0.690

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TABLE 7

Non-Parametric Tests for a Shift in the Volatility of the UK Off-shore-Onshore Interest Differential after October 1979[a]

Assumed underlying distribution:	Normal	Logistic	Double Exponential	Cauchy
Test Statistic:	5.74	4.92	4.85	4.98

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a All statistics are standard normal variates under the null hypothesis of no shift in volatility (see appendix). Significantly positive statistics indicate a reduction in volatility post-October 1979.

TABLE 8

Correlation of Stock Market Returns[a]

Correlation of UK with	(1) 73(4) - 79(9)	(2) 79(10 - 86(6)	(3) Test (1) = (2)
West Germany	0.211	0.220	0.058
Netherlands	0.439	0.445	0.348
Japan	0.157	0.303	0.955
United States	0.418	0.289	0.914

TABLE 9

Unit Root Tests for Stock Market Indices and Returns[b]

	Stock Market Indices		Stock Market Returns	
	73(4)-79(9)	79(10)-86(6)	73(4)-79(9)	79(10)-86(6)
United Kingdom	-0.940	0.141	-6.920	-10.290
West Germany	-0.932	1.251	-8.738	-8.673
Netherlands	-0.841	0.868	-8.996	-9.574
Japan	-0.331	1.072	-7.534	-8.669
United States	-1.247	-0.250	-9.447	-8.695

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a Under the hypothesis that the population correlation coefficients are the same over both sub-periods, the test statistic listed in column 3 has a standard normal distribution.

b All test statistics are (non-augmented) Dickey-Fuller statistics. Approximate critical value at the 5% level is -2.89, with rejection region $(\theta/\theta < -2.89)$.

TABLE 10

Cointegrating Regressions and Tests for a Unit Root in the Cointegrating Residuals[a]

$$S_{UK} = \alpha + \beta \, S_{country} + e$$

	73(4)-79(9)				79(10)-86(6)			
Country	$\hat{\alpha}$	$\hat{\beta}$	R^2	ADF	$\hat{\alpha}$	$\hat{\beta}$	R^2	ADF
West Germany	14.86	0.71	0.45	-2.21	137.41	1.17	0.85	-3.43
Netherlands	14.11	0.97	0.58	-2.35	90.51	1.085	0.96	-3.73
Japan	59.79	1.62	0.63	-2.64	149.54	1.43	0.97	-3.50
United States	50.17	2.62	0.23	-1.70	57.86	3.97	0.92	-2.36

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a Coefficient estimates were obtained by ordinary least squares. Standard errors are not reported as they may be misleading in this context (Granger and Newbold 1974). R^2 is the coefficient of determination.   ADF is the augmented Dickey-Fuller statistic for the null hypothesis of non-cointegration; approximate critical value for ADF at the 5% level is -3.17, with rejection region $\{\theta | \theta < -3.17\}$ (Engle and Granger 1987).