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International Debt and Foreign Exchange Markets.

by

W.P. Hogan

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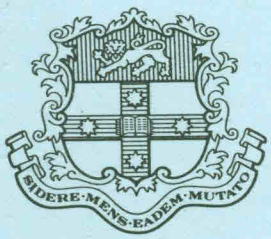

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1. Introduction.

The purpose of this paper is an assessment of the connexions between the workings of eurofinance markets, especially the activities of participating intermediaries, and the relative value of the United States dollar (US$) in foreign exchange markets. Its significance lies in showing how the relative value of that currency, in which more than 70 per cent of transactions in those markets are denominated, is influenced directly by the working of participating intermediaries. Focus is on adaptation by these intermediaries to changing external circumstances bearing upon the maturity structure of their liabilities and assets.[1] This approach differs from other interpretations where emphasis is given to those external circumstances directly when seeking explanations for shifts in the relative value of the US$(21).

Problems of servicing and repaying huge accumulations of foreign debt, much of it held as claims by participating intermediaries, have been explored at length and in much detail during the past five years(2,4). These issues are not treated in this paper except in so far as they bear upon the activities of participating intermediaries in eurofinance markets. It was the rapid worsening in the capacity of many chronic borrowing countries to meet their debt servicing commitments which led to the closing off of additional funding, at least on a voluntary basis, in the latter part of 1982 and then through 1983. In most cases these restrictions

1 A preliminary exploration of some issues treated in this paper was advanced in a contribution to a recent collection of essays.(19)

have not been eased except as part of debt rescheduling arrangements most often under the aegis of the International Monetary Fund (IMF).

Debt negotiations and rescheduling of debt have affected the maturity structure of the assets, or claims, held by the participating intermediaries. The impact of these developments on the maturity transformation of deposits to loans brought liquidity problems and then a redirection of asset management including the substitution of marketable bonds for direct loans. It is not the intention to explore these mechanisms.[2] What is of interest are their implications for foreign exchange rate determination.

The paper concentrates on recent experiences in foreign exchange markets, most of all the remarkable shifts in the relative value of the US$ during the first half of the 1980s. Explanations for this phenomenon have been explored in the attempt to clarify what has been taking place. However, one lengthy assessment offered by Jeffrey Frankel disposes of some interpretations on the causes of the "overvaluation" of the US$ in recent years(9). He listed six interpretations; a failure to clear markets, an exchange relativity supported by central bank intervention, discordance between long-term and short-term economic concerns producing "overshooting", speculative impacts reflecting uncertain or unstable expectations, speculative bubbles being departures from equilibrium, and, overvaluation reflecting the real effects of exchange rate changes. Two of the six explanations, being the third and sixth listed in the preceding sentence, were found to have applicability.

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2 Much of this material has been covered in a book first published in 1982(18). More recent developments will be explored in a later paper, "International Debt Creation: Eurofinancing Activities", Department of Economics Working Paper, (forthcoming).

Other views tend to suggest a measure of uncertainty as to the basis of explanation for what has been taking place(16,22). An emphasis on market mechanisms in this paper has been treated elsewhere(1). However, arguments and analyses offered by Robert Aliber were directed mainly to the connexion between domestic and off-shore money markets rather than examining the eurofinance mechanism itself when assessing the links to exchange rate determination.

2. Eurofinance Direct Lending.

During the two decades to the end of 1981 eurofinance markets grew at an annual rate of about 25 per cent since when there has been a sharp slowing in new lending. However, with transactions expressed in United States dollars, that slowing may be somewhat deceptive because the exchange rate effects are not excluded from the compilation. Hence were the aggregates shown in Table 1 expressed in another major currency the slowing might not be so pronounced.

The scale of lending only became apparent in the 1970s. Prior to that time the sums were not large in relation to international trade. But, as the series in Table 1 shows, gross lending in eurofinance markets grew from US$203.7 billion at the end of December 1972 to US$1550.2 billion at the end of December, 1981. Between 1981 and 1984 total direct lending grew only slowly but surged again in 1985. The estimates shown in Table 1 do not reflect fully this slowing down owing to frequent changes in coverage embodied in the

Table 1: Eurofinance Lending, 1972 to 1985.
(US$ billions)

Year	Amounts Outstanding at end of year:			
	Gross		Net	
	Value (1)	% increase (2)	Value (3)	% increase (4)
1972	203.7	-	120.6	-
1973	291.6	43.2	175.0	45.1
1974	362.1	23.4	230.0	31.4
1975	442.3	22.2	265.0	15.2
1976	548.0	23.9	340.0	28.3
1977	689.8(a)	19.9	435.0	20.6
1978	893.2(b)	29.5	530.0	21.8
1979	1111.0	24.4	665.0	25.5
1980	1321.9	19.0	810.0	21.8
1981	1550.2(c)	16.6	945.0	16.0
1982	1694.5	9.3	1020.0	7.9
1983	2097.9(d)	3.7	1240.0	6.4
1984	2164.3(e)	2.6	1285.0	3.6
1985	2568.7(f)	17.0	1485.0	15.6

Source: Bank for International Settlements, various annual reports and reviews.

Note:
(a) Series adjusted for coverage. Estimates for 1977 comparable with earlier years are US$657.1 billions (gross) and US$410 billions (net).
(b) Series adjusted for coverage. Estimates for 1978 comparable with earlier years are US$904.8 billions (gross) and US$535 billions (net).
(c) Series adjusted for coverage. Estimates for 1981 comparable with those for 1978 to 1980 are US$1541.4 billions (gross) and US$940 billions (net).
(d) Series adjusted for coverage. Estimates for 1983 comparable with earlier years are US$1757.1 billions (gross) and US$1085 billions (net).
(e) Series adjusted for coverage. Estimates for 1984 comparable with earlier years are US$2155.3 billions (gross) and US$1275 billions (net).
(f) Series adjusted for coverage. Estimates for 1985 comparable with earlier years are US$2532.8 billions (gross) and US$1485 billions (net).

series. These revisions reflect not only improvements in the geographical coverage of all participating intermediaries in these international financial transactions but also the spreading of activties to centres outside Europe.

The data has been compiled by the Bank for International Settlements(BIS). An alternative series has been published for many years by Morgan Guaranty Trust Company, New York. Only recently has the IMF provided somewhat comparable estimates; for the end of 1985 it is US$3208.2 billion. The BIS estimates are the most conservative of the three series, a feature to be recalled when reviewing results from later calculations.

The rates of growth of assets outstanding at the end of each year, measured gross and net in Table 1 and depicted in columns 2 and 4, are based upon comparable data. As noted earlier the BIS has made numerous revisions in their series reflecting changes in composition and coverage. Six major adjustments are noted in Table 1. When calculating annual rates of growth the "old" estimates, as listed in the notes, are used to compare with the previous year. For example, the rate of growth of gross lending in 1984 is calculated using the estimate of US$2155.3 billion in the relevant note to the table and this is then compared with US$2097.9 billion shown in the main body of the table, to arrive at an increase of 2.6 per cent.

The distinction between gross and net series listed in Table 1 reflects the difference between total lending and lending to "final users" not being participating eurofinance intermediaries (EFIs). Thus the margin between the two is the measure of the "inter-bank" market. Its significance lies in this "inter-bank" activity being

the basis for liquidity amongst EFIs in as much as there is no central bank to stand as lender of last resort.(12) Hence differences in the relative rates of growth of the two series point to relative shifts in liquidity requirements for participating EFIs whatever may be the cause of changes in these liquidity needs.

Only limited information exists on the pattern and timing of activities conducted by the EFIs. The maturity structure of liabilities and assets is available only for participating intermediaries based in London where data is collected by the Bank of England. However, as London remains the main centre for eurofinance activities, especially in the relation to foreign exchange transactions and with participating EFIs drawn from many countries, the data is probably most representative of the pattern of activity generally.

The data in Table 2 shows quite clearly the liquidity of deposits held by EFIs. The great bulk of their liabilities have a maturity of less than six months, 88.1 per cent in 1974 and 87.5 per cent in 1985. The maturity structure of the assets, or claims, are longer with 73.8 per cent having a maturity of less than six months in 1974 and 69.7 per cent in 1985. Maturity transformation was being extended in eurofinance markets, certainly from 1979, rather than achieving a maturity matching of liabilities and assets.

In Table 2 some estimates of this maturity transformation are provided in a transformation index which relates the ratio of liabilities with maturities up to three months to the assets or claims with similar maturity to the ratio of liabilities over 1 year to assets or claims with similar maturity. Although these two ratios are at the "short" and "long" end of the maturities, this

Table 2: Maturity Distribution of Liabilities and Assets; London.
(November in each year shown)

Liabilities	1974 %	1977 %	1979 %	1981 %	1982 %	1983 %	1984 %	1985 %
less than 8 days	22.2	22.0	21.0	20.7	20.7	21.5	21.1	23.3
8 to less than month	20.8	17.3	18.7	20.0	20.5	20.9	22.7	22.3
1 month to 3 months	28.2	28.4	28.6	29.8	29.5	28.7	27.3	27.4
3 month to 6 months	16.9	18.7	19.3	19.0	18.9	17.4	17.2	14.5
6 months to 1 year	5.2	7.5	7.4	6.1	6.0	6.4	6.1	6.0
1 year to 3 years	2.3	4.5	3.3	2.6	2.6	2.7	2.7	2.6
3 years plus	4.4	1.8	1.7	1.8	1.9	2.4	3.1	4.0
Total (US$ billions)	154.3	225.4	373.8	563.8	600.1	610.4	638.8	695.7
Assets (or Claims)								
less than 8 day	17.4	16.0	16.6	16.6	15.0	15.1	15.6	16.7
8 to less than month	17.2	14.0	15.4	16.7	16.1	16.7	18.2	17.6
1 month to 3 months	24.1	22.9	23.7	24.1	25.6	23.4	21.7	22.8
3 months to 6 months	15.1	16.3	17.2	16.2	16.3	14.2	14.4	12.6
6 months to 1 year	5.6	7.5	6.9	6.5	6.7	6.7	6.1	6.3
1 year to 3 years	5.7	9.5	6.7	6.3	6.6	7.3	7.2	6.6
3 years plus	14.9	13.7	13.5	13.6	13.6	16.7	16.8	17.4
Total (US$ billions)	154.5	224.7	370.2	557.8	586.0	615.6	646.5	715.9
Ratio 1	1.212	1.220	1.226	1.228	1.246	1.289	1.280	1.277
Ratio 2	.326	.289	.250	.222	.221	.212	.241	.276
Transformation Index (Ratio 1/Ratio 2)	3.717	4.226	4.900	5.540	5.642	6.092	5.307	4.635

Source: Bank of England; Quarterly Bulletin, various issues.

Note: Ratio 1 = % liabilities up to 3 months maturity divided by % claims up to 3 months maturity

Ratio 2 = % liabilities over 1 year maturity divided % claims over 1 year maturity

transformation index does point to an increasing margin between the average maturity of liabilities on the one hand and assets or claims on the other during the early 1980s.

The EFIs were becoming ever more exposed to the risk of liquidity strains at the beginning of the 1980s.(11,13) The calculations in Table 2 show how maturity transformation was increasing through the 1970s most probably in response to competitive pressures amongst the EFIs leading to a squeezing of margins between borrowing and lending rates. Escape from this strain lay with extension of maturity mismatching and reliance on a relatively diminishing capital base. This was taking place well before the onset of extensive debt problems during August 1982. Subsequent debt rescheduling brought an involuntary rise in the proportion of assets with long maturities thus exposing many EFIs already prone to risks of financial illiquidity.(15) The striking changes in the transformation index between 1981 and 1984 bear full witness to these impacts and then from 1984 the efforts to adjust portfolios to these liquidity strains.

3. Foreign Exchange Implications.

Lending and borrowing in eurofinance markets are foreign exchange activities. The significance of this development for foreign exchange rate determination lies in the connection between balance of payments adjustment, central to many provisions about future conduct by chronic borrowing countries, and changes in exchange relativities. Recent analyses of the links between current account deficits and capital flows do not support an equilibrating role for the latter(6). While that contribution is rich with insights on a wide range of issues for the conduct of domestic and

foreign economic policy, it hints at the ways the workings of eurofinance markets may affect determination of relative exchange rates. Moreover, capital flows have impacts on foreign exchange rates which may further impede adjustment to current account balances without severe internal restraints. As capital mobility is central to modern interpretations of exchange rate adjustment, whether of the portfolio-balance or monetary varieties, the potential of that mobility should be reflected in the workings of eurofinance markets. This is not necessarily to support claims for the validity of many interpretations of the asset view on exchange rate determination.

No single collection of data exists on foreign exchange transactions executed around the major centres. What can be derived is the *potential* for switching and shunting funds in the eurofinance markets as revealed by short-term deposits in the EFIs. In Table 3 estimates are provided for potential foreign exchange transactions in maturing eurofinance deposits between 1972 and 1985. The series is compiled on the basis of the maturity structure in the London market; the same pattern is assumed for other financial centres. The proportions of maturities in the London market are applied to total deposits in the eurofinance markets as measured by the BIS.

The basis for estimating foreign exchange transactions associated with maturing deposits is set out in Appendix A. The results of those calculations are summarised in Table 3. The two series reflect two different approaches to the available working days in foreign exchange markets. The first one treats every day in the year as being available for the conduct of foreign exchange business, in short the 365 day year. The other series is based upon a five day working week providing 260 days in the year.

Table 3: Liabilities Turnover, 1972-85.
(US$ billions)

Year	365 Day Basis (1)	260 Day Basis (2)
1972	5852.9	4168.1
1973	8375.2	5964.3
1974	10480.1	7463.3
1975	10442.6	7422.1
1976	13994.0	9965.6
1977	17281.0	12306.4
1978	20713.8	14750.7
1979	28218.6	20095.3
1980	33548.5	23890.9
1981	38703.4	27561.4
1982	41039.5	29225.0
1983	52869.2	37649.7
1984	55227.0	39328.8
1985	69842.1	49737.6
Alternate Series		
1983	44366.6	31594.7
1984	46014.3	32768.2
1985	57791.6	41155.9

Note: Tables derived in Appendix A. The components of the estimate of total turnover on a 365 day basis are shown in Table A2.

With the rapid extension of electronic communications for financial trading during the past decade, working arrangements may have been close to the 260 day position in the early to middle 1970s but akin to the 365 day basis in the 1980s. Should that have been the experience, which seems very likely, then the rate of change between 1972 and 1985 in terms of potential annual turnover would be *grossly understated*. Using the 365 day series, turnover grew some 11.93 times during the period under review. But with the estimate for total turnover in 1972 on a 260 day basis at US$4168 million a much higher rate of growth for potential foreign exchange turnover may well have been recorded with the progress of market integration during the 1980s. The turnover would then show a multiple of 16.76.

The alternate series shown in Table 3 for the last three years, 1983 to 1985, reflects the substantial adjustments to coverage in the BIS series, especially in 1983. Those adjustments were noted for Table 1 and are treated as well in Appendix A. The effect of this adjustment is to nullify the substantial increases in coverage allowed for in adjustments to the series between 1983 and 1985 so preserving a greater uniformity of coverage in the entire series from 1972.

This is not to say that the extension in coverage is a less accurate representation of what was taking place in eurofinance markets. Far from it. With growth of these markets it was inevitable that new centres of activity would develop and new financing techniques employed. Indeed a very characteristic feature of the eurofinance markets has been innovation of financing techniques. Moreover, data available in the more recent IMF series, while not available back to 1972, confirms the rate of expansion depicted in the main series rather than the alternate one.

Estimates in Table 3 should be viewed as conservative. The BIS data on eurofinance lending, shown in Table 1, and deposits, shown in Table A1, may be compared with alternative series offered by Morgan Guaranty and the new data published from early in 1985 by the IMF. Whereas the BIS estimate for liabilities at the end of 1985 is US$2513.1 billion, the latest available estimate from the IMF at the end of 1985 is US$3133.9 billion. If the IMF series was used in the derivation of Table 3 then the estimate for 1985 in column 1 would be US$87650.3 billion for the 365 day year, being over 25 per cent

higher than series based on BIS data, and US$62419.6 billion for the 260 day series.

The estimates of annual turnover in EFIs' liabilities are compared with the value of world trade, exports and imports added together, in Table 4 to show the connexion between trade and foreign exchange transactions. The ratio of annual turnover to trade shows perceptible increases during the second half of the 1970s with a clear acceleration in the 1980s. Even when the main series is adjusted for the change in coverage of the BIS collections in 1983 to 1985, the ratio shows a rapid increase though not quite as striking as that recorded for the main series.

Table 4: World Trade and Funds Mobility

Year	World Trade (US$bn)	Liabilities Turnover		Ratio: Turnover/Trade	
		365 day Year	260 day Year	365 day Year	260 day Year
	(1)	(2)	(3)	(4)	(5)
1972	776.7	5852.9	4168.1	7.54	5.37
1973	1075.4	8375.2	5964.3	7.79	5.55
1974	1589.6	10480.1	7463.3	6.59	4.70
1975	1638.3	10422.6	7422.1	6.36	4.53
1976	1857.3	13994.0	9965.6	7.53	5.37
1977	2118.9	17281.0	12306.4	8.16	5.81
1978	2455.4	20713.8	14750.7	8.44	6.01
1979	3104.5	28218.6	20095.3	9.09	6.47
1980	3811.6	33548.5	23890.9	8.80	6.27
1981	3761.0	38703.4	27561.4	10.29	7.33
1982	3509.2	41039.5	29225.0	11.69	8.33
1983	3402.3	52869.2	37649.7	15.54	11.07
1984	3610.2	55227.0	39328.8	15.30	10.89
1985	3661.9	69842.1	49737.6	19.07	13.58
Alternate Series					
1983	3402.3	44366.6	31594.7	13.04	9.29
1984	3610.2	46014.3	32768.2	12.75	9.08
1985	3661.9	57791.6	41155.9	15.78	11.24

Source: I.M.F.; International Financial Statistics, various issues; and data derived from Table 3.

Interpretation of this ratio, as a measure, is straightforward. A ratio of 9 implies that 90 per cent of foreign exchange transactions are taken up with activities other than receiving and paying for exports and imports. A ratio of 19 implies that only 5 per cent of foreign exchange activity reflects transactions supporting exports and imports.

The meaning of the ratio is another matter. It depends upon the interpretation of foreign exchange transactions associated with trade in goods and services. Transactions in goods may induce forward purchases or sales of foreign exchange to hedge spot commitments or vice versa. But no suggestion has been advanced that they grow more than proportionately with trade. Moreover the period under review has been one of progressive reduction in national exchange controls on capital transactions so that the scope for proliferating new devices or instruments has been extended greatly. Under various exchange control regimes restraints were imposed on financing techniques designed to hedge exposures in capital transactions. What has been witnessed during the 1980s is the rapid growth of new techniques, such as interest and currency swaps, to mitigate the effects of exchange and interest volatility on the real value of financial liabilities and assets.(17) Thus the scale of the turnover in deposits and the sharp rise in the ratio of that turnover to trade between 1972 and 1985 are impressive for their implications. The divorce of exchange rate variations from current account adjustments is the main conclusion from this assessment owing to the growing proportion of foreign exchange transactions bearing upon the

management of financial assets and liabilities, a doubling or more since the early 1970s.

But this claim does not rest solely on the estimates developed so far in this paper. An analysis of transactions on foreign exchange markets offered some years ago by Giddy pointed to an enormous growth during the 1970s(10). The Federal Reserve Bank of New York (FRBNY) estimated daily transactions in foreign exchange amongst 119 reporting banks in March 1983 as $26 billion(7). Between 1977 and 1983 these transactions had multiplied three times. In the same period the nominal value of world trade had grown by little more than 50 per cent. The most recent survey conducted by the FRBNY during March 1986 shows daily foreign exchange transactions amounting to $63.1 billion per day indicating a rate of expansion even higher than between 1977 and 1983(8). That survey was co-ordinated with similar ones in London and Tokyo the results of which revealed daily transactions of $90 and $40 billion respectively to give a total for the three centres amounting to over $190 billion.

This calculation is well above a recent set of estimates from the Group of Thirty which provided an estimate of US$150 billion in 1984(14). Suffice it to record that this estimate is based upon a survey of banks and security houses so that it rests entirely on respondents' knowledge of their relative share of foreign exchange business in each major financial centre rather than data collections and analysis of market participants. Nevertheless some useful insights stem from a comparison between these results from the Group of Thirty and the 1986 survey for London, New York and Tokyo. Some 60 per cent of all foreign exchange transactions in the 1984 survey

by the Group of Thirty were undertaken in these three cities (14, p11). If that percentage is applied to the total sum recorded in the 1986 surveys then daily transactions around the world would appear to be about $315 billion.

As has been argued elsewhere these sets of estimates can be related to the workings of eurofinance markets(18). Using BIS data for total liabilities and the maturity structure in the London market in similar fashion to the procedures used in Appendix A for deriving the estimates summarised in Table 3, it is possible to estimate potential daily turnover around the world. They are shown in Table 5. The procedures used for deriving these estimates are set out in Appendix B.

It is reasonable to assume that any EFI seeking to borrow, in short to take deposits, would immediately cover its position by buying forward. Actual foreign exchange transactions would then be some multiple of the daily deposit requirements of the EFIs. Moreover, this judgement is supported by the FRBNY data for 1983 showing some 40 per cent of all transactions being hedges of one type or another(7). Applying that proportion to daily deposit requirements shown in Table 5, column 1 gives a potential level of daily foreign exchange transactions for each year from 1972 to 1985; these estimates are shown in column 2. The results of these calculations point to a scale of daily transactions stemming from the activities of EFIs not too much different from the other estimates for the mid-1980s associated with the surveys conducted in New York and elsewhere.

Table 5: Eurofinance Markets: Daily Turnover
(US$billions)

Year	Estimated Liabilities Turnover (1)	Estimated Foreign Exchange Transactions (2)	Estimated Assets Turnover (3)
1972	16.03	26.72	11.84
1973	22.95	38.25	16.95
1974	28.71	47.85	21.04
1975	28.55	47.58	22.83
1976	38.33	63.88	30.10
1977	47.33	78.88	36.34
1978	56.73	94.55	45.29
1979	77.30	128.83	61.39
1980	91.90	153.17	72.87
1981	106.02	176.70	86.85
1982	112.41	187.35	87.77
1983	144.81	241.35	108.94
1984	151.28	252.13	116.04
1985	191.31	318.85	144.45
Alternate Series			
1983	121.53	202.55	91.25
1984	126.04	210.07	96.67
1985	158.31	263.85	118.61

Note: (a) The estimates in column 1 are adjusted for hedging transactions representing 40 per cent of foreign exchange transactions to develop an estimate of daily market transactions in column 2.

(b) Estimated daily turnover of assets is treated in the next section; their derivation is treated in Appendix B.

The empirical work pursued in this section has shown the huge volume of foreign exchange transactions associated with the workings of the eurofinance market. Estimates of potential transactions by EFIs have been compared with a restricted range of information based upon surveys conducted by central banks as well as the Group of Thirty. The results point to the dominance of decisions bearing upon

the management of financial assets and liabilities in the determination of exchange rates.

One objection may be directed to the measure of potential turnover of EFIs deposit liabilities. Those deposits, should they be renewed, need not influence the foreign exchange market at the time that decision is made. That is true. However, the decision to renew will be influenced by what is happening in foreign exchange and domestic money markets so that at any time the potential impact may be realised. Reflection on the growth of foreign exchange transactions suggests that EFIs have been the major source of the phenomenon.

4. Exchange Rate Impacts

Demand for funds by EFIs, taken together as the eurofinance market, depends largely upon liabilities maturing and the demands of borrowers for new loans from the EFIs. Maturing liabilities are fixed by past commitments, not to be influenced by current interest rates. Certainly the past may be very recent but those commitments are still fixed if only for some days. Customers demands for loans are a small portion of maturing liabilities, especially so in the 1980s when the rate of growth of lending declined. The larger the accumulated liabilities of the EFIs the smaller is the influence of those customers' demands. In this sense the demand for funds by the EFIs is largely *fixed*. Accordingly, the interest rate structure in eurofinance markets, and hence the interest rate differential with national money markets, is essentially determined by supply.

There is a fixed demand from maturing liabilities amounting in 1985 to about $190 billion per day according to the estimates derived

from BIS data and shown in Table 5, column 1. This demand cannot be suppressed in any way. It is explicit in the workings of the eurofinance market and the commitments of the intermediaries participating in it. The EFIs must meet their obligations to repay maturing liabilities while at the same time attracting funds, including rollovers of maturity deposits, to maintain their liquidity and solvency.

The supply of funds to the eurofinance market depends upon the value of maturing assets accruing to the individual EFIs, and new deposits or other borrowings such as the issue of bonds. *This supply could at any one time be zero.* Individual EFIs within the eurofinance market can extend their supply by bidding in the "inter-bank" market but this cannot hold for obvious reasons in the market as a whole.

This analysis provides the framework for assessing the effects of eurofinance mechanisms on the relative value of the US$. Mention was made in the opening paragraphs of this paper about the various interpretations of the influences bearing on the relative value of that currency. This aspect is now taken up.

How the scarcity of dollars might arise need not detain the general analysis. One obvious source is familiar in the debt problems of the past five years; a relative loss of confidence in the financial viability of EFIs brings a switch of deposits from them to other outlets. That diversion does not affect exchange rates directly because dollars available for depositing with EFIs must be demand deposits with U.S. commercial banks. The change in ownership from EFIs to others helps create scarcity in eurofinance markets.

There are two possibilities open to EFIs to maintain financial viability. The EFIs must bid for other currencies, by offering higher rates of interest, and then convert them into U.S. dollars. The effect will be to upvalue the U.S. dollar against other currencies. Alternatively, interest rates on eurodollars might be raised; that action, while attracting dollars, would make expected future incomes on dollar-denominated deposits relatively more rewarding, again with implications for exchange relativities.

All of this would take place as a possible shift *away* from equilibrium even though it is market generated. That possibility is not hard to conjure. Yet it bedevils much analysis(6).

With maturing liabilities not matched by maturing assets, an EFI must buy back the stream of future income, which it had previously sold to depositors on funds now maturing, at a price which is *greater*. This may involve foreign exchange transactions as well as offering a price greater than it would have to pay if it was in other markets. There is an obvious implication arising from such an experience. If the exchange rate relativities tended toward a parity before the scarcity in eurofinance markets because of increased uncertainty about the stability of EFIs, then when the shortage is relieved the relative rate for the U.S. dollar will have shifted away from that parity.

The magnitudes of this influence can be appreciated. The potential dollar shortfall in the eurofinance market could be up to US$190 billion per day. Could possibilities of, say, a US$2 billion shortfall be a persistent daily feature? Searching for non-dollar

currencies as well as demand deposits in the United States to correct this scarcity could be sustained for long periods.

It is possible to put some perspective on this question. Using the BIS data and the structure of claims in the London market as guide to the entire eurofinance market, estimates emerge on the average amount of daily maturities of assets, or claims, associated with lending by EFIs. On the same basis as applied to the liabilities (deposits) calculations for Tables 3 and 5 estimated daily maturities of assets can be derived. This is shown in Table 5, column 3, for 1972 to 1985. This gives an inflow to the EFIs of about $144 billion during 1985. Assuming all this flow is be available to the EFIs this would mean a shortfall in supply of $46 billion. That shortfall must be remedied by bidding for dollars in demand deposits in the United States directly or for other currencies to switch into dollars.

What does this mean in the existing context of trade and payments? Evidence on the present current account balance for the United States shows it running at an annual rate of about $150 billion. That means a supply of dollars at a daily rate of about $0.5 billion, a modest percentage of the daily requirements of the EFIs. Hence even with the huge current account deficit of the United States this *trade effect* may be swamped by the size of the *debt effect*.

The huge expansion of the eurofinance markets has distorted international trade and payments. Notions of equilibrium adjustments are being sorely tested by eurofinance mechanisms. With so much of eurofinance transactions expressed in United States dollars, the impact of the eurofinance mechanisms may give rise to an upward bias

in the relative value of that currency. That prospect is simply an extension of the familiar seignorage feature associated with a central reserve currency.

Relief from this chronic strain can be given only by an expansion in the supply of United States dollars or a shift into denomination of transactions in other currencies. The significance of this position should be carefully noted. Expansion of the U.S. domestic money supply may help relieve international economic and financial strains. Hence domestic and international requirements for monetary management may appear to be incompatible for a central reserve currency; perceptions of the impact of domestic monetary policy on the national economy may need rapid adaptation to shifts in external financial markets.

These themes may be related to recent experiences with the relative value of the US$. In Table 6 a set of data is shown to clarify further the connexions between that currency and the eurofinance sphere. The first column is a composite index for the relative value of the US$ based upon the three major trading currencies, the Deutschemark, the Yen and the Pound Sterling weighted by their relative trading use in the late 1970s and early 1980s. The second column shows the rate of growth of the money base, or reserve money, to indicate liquidity changes bearing upon the supply of US$. The third column shows the relative use of the US$ as the currency of denomination in eurofinance markets. The fourth column shows the ratio of the daily turnover of assets to the daily turnover of liabilities amongst EFIs the derivation of which is explained in Appendix B.

The final column in Table 5 is an attempt to correct the ratio of daily turnovers of column 4 for the relative utilisation of the US$ in eurofinance markets. The ratio in column 4 is a measure of the internal generation of funds by the EFIs thus indicating the degree of need for new funding. But that is an average for all currencies used by the EFIs. What the correction attempts is a measure of the relative need for US$. Thus should the corrected ratio rise above 100 then the need for new funding in US$ is relatively less than suggested by the initial ratio shown in column 4. But it is the relative shifts in the corrected ratio from year to year which suggest the extent of changes in demand for access by the EFIs to US$ demand deposits in ther United States.

In the latter half of the 1970s the US$ declined sharply in relative value to be explained at least in part by the decline in relative use of that currency in eurofinance transactions, a relatively stable daily demand by the EFIs for "new" funding as revealed by the ratio of assets to liabilities in Table 5, column 4 and the expanding supply of US$ shown by increased growth of reserve money. Thus the use of the US$ in eurofinance activities was declining in the late 1970s at the very time the supply of US$ was increasing. Repercussions for the exchange rate are not too surprising.

No doubt the low relative value of the US$ and its relative availability led to its increased utilisation in 1980 and more so in 1981 when the rate of growth of lending by EFIs still remained quite high, see Table 1. But the sharp reduction in the rate of growth of reserve money in face of this increased demand for funding to support

Table 6: Exchange Rate and Financial Indices

Year	US$ Exchange Rate Index (1980=100) (1)	US Reserve Money Growth % (2)	%US$ Denomination of EFIs Liabilities (3)	EFIs Daily Turnover Ratio of Assets to Liabilities (4)	EFIs Daily Turnover Corrected Ratio (5)
1974	125.17	9.0	74.0	73.3	199.1
1975	122.87	5.9	76.0	80.0	105.3
1976	136.51	5.9	76.5	78.5	102.6
1977	128.01	6.6	72.6	76.8	105.8
1978	110.49	9.8	70.4	79.8	113.4
1979	102.91	8.7	68.4	79.4	116.1
1980	97.41	7.2	70.9	79.3	111.8
1981	117.99	3.7	73.4	81.9	111.6
1982	126.34	4.8	74.9	78.1	104.3
1983	131.86	7.0	75.4	75.2	99.7
1984	140.05	5.7	76.1	76.7	100.8
1985	153.45	8.1	67.6	75.5	111.7
1986	115.10	n.a	n.a	n.a	n.a

Notes: Column 1. This index is a composite based upon the DM/US, Yen/US and Sterling/US rates with weights of .4667, .3066 and .2267 respectively. The base is 1980=100. The estimates are for the end of June in each year shown. The higher the index the higher is the relative value of the US$.
Column 2. International Financial Statistics, Yearbook 1986.
Column 3. This percentage is based upon activities in the reporting countries to the BIS. Alternative estimates based upon different compilations of US$ contributions, including its use as domestic currency by US EFIs, provide similar trends to those shown.
Column 4 Summary from Appendix B, Table B1.
Column 5 This ratio is estimated by the ratio of daily turnover of assets to the daily turnover of liabilities by the percentage denomination of EFIs' transactions in US$ as shown in Column 3.

eurofinance activities had its repercussion in the sharp upvaluation of the US$ sustained right through 1983 and into early 1984. Some restraint on the upvaluation appears to have come from the expansion of reserve money in 1983 and 1984.

Between 1981 and 1984 the EFIs were strained by problems of a rising maturity transformation, as the portfolio mismatch between

liabilities and assets widened, and the sharply worsening debt crisis during 1982. That experience was depicted initially in the estimates on transformation derived in Table 2. After 1980 the EFIs were being increasingly stretched by the effects of these influences. The worsening maturity mismatch or transformation meant that the proportion of daily requirements for funding of the EFIs met by internal resources, namely debt repayments, was falling; the clear evidence for that is in Table 6, column 4. The liquidity strains inherent in this situation were only contained by the increased growth of the money base in the United States in 1983.

During 1984 the worst of the immediate strains on the EFIs receded. The increase in maturity transformation from 1979 was reversed as the EFIs adjusted maturities of liabilities and a proportion of assets to offset the effects of being locked in to longer maturities through involuntary rolling-over of loans as a result of debt rescheduling. These adjustments can be detected in the estimates for 1984 and 1985 shown in Table 2.

The relatively high value of the US$ was yielding market responses. Borrowers were tending to switch to other currencies while the monetary authorities in the United States were increasing the growth of money. In some respects the stage was being set for a fall in the relative value of the US$. As the estimates in Table 6, column 3 show the US$ was diminishing rapidly in its role as currency of denomination during 1985. When representatives of the Group of Five - France, Federal Republic of Germany, Japan, United Kingdom and United States - met at the Hotel Plaza in New York on 22 September,

1985 circumstances were propitious for the realignment of currencies they agreed to seek.

5. Exchange Rates and Balance of Payments Adjustment.

Work in preceding sections points to the dominance of capital transactions, reflecting the management of liabilities and assets, in foreign exchange markets. Nowhere is this more evident than in continuous adaptation of EFIs' portfolios. Clarification of some points bearing upon exchange rate determination is necessary. International trade in financial instruments is no different from any trade in international commodities and services; the purchase of a financial claim is the purchase of an expected future income. Expected future incomes will be bought in whatever currency is thought to offer the highest rewards, taking account of differing degrees with risk and uncertainty.(11) The currency of an economy with the most favourable expected future income streams should rise against other countries. In this way the relative purchasing power of future incomes is equilibrated between economies.

Note the significance of this point. Purchasing power parity themes are as relevant to international financial markets as they are to international commodities markets or any other market involving tradeable goods or services. What flows from this position is no less important. *Movements of funds between currencies cannot be the cause of unstable exchange rates, rather they are the consequence of them.*

Escape from this conclusion can only come by rejecting purchasing power parity concepts. But this leaves no rational basis for an exchange equilibrating mechanism with foreign exchange markets

nothing more than casinos. Whatever may be claimed about the breakdown in purchasing power parity, the underlying concept still prevails. Interpretation of a breakdown having occurred would appear to be a failure to look beyond an analysis couched only in terms of goods and services. Discussion of "overvalued" and "undervalued" currencies implies some respect for relative purchasing power. Estimates of real effective exchange rates are commonplace calculations. Related estimates of relative inflation rates and productivity changes are pursued with diligence.

The analysis in this paper would not, however, support claims that the dominance of capital transactions has brought gambling on future exchange and interest rates.(2) Many exchange transactions, perhaps about 40 per cent, are currency hedges being the purchase of one currency spot combined with a contract to repurchase at some future data. Such transactions guard against possible losses arising out of a liability mismatch. They involve judgements on future prices but the purpose is a hedge not a gamble. With exchange markets having become more sensitive than hitherto to shifts in expectations it was inevitable that financial instruments offering scope for mitigating the effects of interest and exchange rates volatilities would proliferate.

This interpretation against an interpretation of activities in foreign exchange markets as gambling must be qualified in two respects. Options trading has at least some of the characteristics of gambling resting for its potential profitablity on volatility in the price of the underlying asset. The Black-Scholes model on which options trading strategies are based assumes that variability of the asset price is known (5, p240). But with that variability not always

known with any precision, trading is based on taking a position in relation to volatility, in effect a gamble. There is also the possibility of a gamble in some aspects of arbitrage price behaviour between the asset and futures markets, most likely in those instances where delivery dates are quite long and financing costs much less certain. In both instances taking a position amounts to as much or more a gamble as a hedge.

What makes present circumstances different from the 1960s and early 1970s is the much greater weight now on relative prices of future income streams than the relative prices of goods and services in the determination of exchange rates. That is the major shift, most clearly in the 1980s. Hence assessments of risk and uncertainty across national boundaries must encompass tax impacts and after-tax rates of return. Clearly, the phenomenon changes established procedures for interpreting relative exchange rate movements and the domestic impact of national monetary measures for the currencies in which transactions are mainly denominated. Equilibrating mechanisms in foreign exchange markets have been altered drastically with ample scope for perverse movements. Adjustments necessary for the balancing of goods and services markets between national economies need not necessarily be synchronised with shifts in relative prices in foreign exchange markets.

6. Conclusions.

The thrust of the analysis conveyed here is about the workings of eurofinance markets and their implications for the determination of exchange rates. Within this framework the treatment of debt problems can be placed in wider perspectives. The connexions with exchange rate determination and to the continued viability of

eurofinance activities can be made explict. There can be no disagreement with the view that solutions to the problems of individual countries experiencing chronic debt problems can only be found in the medium-term with debtor economies adjusting spending.(20) But relief for individual debtor countries does not change the basis of eurofinance markets.

Debt re-scheduling negotiations therefore involve risks of a nature not at all well-perceived especially when those negotiations involve involuntary extensions of loans. The effort to relieve the strains on any number of countries, and so reduce the risk of country default, can have the effects of increasing the risk to the stability of the system as a whole and generating perverse shifts in relative exchange rates.

What EFIs cannot guard against is market assessments of their continued financial viability.(12) Vulnerability has had major implications for foreign exchange and capital markets as well as stability of individual EFIs, as the experiences between 1981 and 1984 fully attest. These complicated interrelationships cannot be set aside too easily.(3)

Reference was made early in this paper to the many interpretations of how and why the sharp changes in exchange relativities took place during the 1980s. Most attention in these interpretations was given to the overvaluation of the US$. What is offered in this paper is an explanation of how "overshooting", to which Jeffrey Frankel referred, arose through the workings of eurofinance markets. The repercussions for goods and service markets

can be made explicit in this context; perverse impacts from financial markets are then readily understood.

Explanations for instability or volatility of relative exchange rates do not have to rest upon unstable or uncertain expectations. Rather the adaptation of expectations to changes in prospects for national economies, and the currencies associated with them, must bring exchange rate variations just as inducements reflecting movcements in future income streams are necessary to stabilise activities in eurofinance markets. Expectations have moved to the forefront of exchange rates determination only because foreign exchange markets are dominated more than ever before by the outlooks for future income streams across major currencies and the assets denominated in them.

Appendix A

Relationship between Eurofinance Liabilities and Foreign Exchange Transactions

Estimates are shown in Table A1 for the growth of liabilities held by EFIs between 1972 and 1985. These are depicted on a comparable basis to those shown for assets in Table 1. The pattern of growth revealed in the series is similar to that shown for assets or claims; a relatively high rate of growth through to 1981 followed by a sharp reduction until the renewed spurt in 1985. However, there

Table A1: Eurofinance Liabilities, 1972 to 1985
(US$billions)

	Amounts Outstanding at end of year	
	Value (1)	% increase (2)
1972	220.2	–
1973	315.1	43.10
1974	394.3	25.13
1975	448.0	13.62
1976	543.9	21.41
1977	671.3(a)	20.92
1978	856.4(b)	28.88
1979	1120.3	30.82
1980	1335.4	19.20
1981	1532.0(c)	14.09
1982	1622.4	5.90
1983	2028.3(d)	4.91
1984	2131.7(e)	4.35
1985	2513.1(f)	17.08

Source: Bank for International Settlements, various reviews and annual reports

Note:
(a) Series adjusted for coverage. Estimate for 1977 comparable with earlier years is US$ 657.7 billions.
(b) Series adjusted for coverage. Estimate for 1978 comparable with earlier years is US$865.2 billions.
(c) Series adjusted for coverage. Estimate for 1981 comparable with earlier years is US$1523.5 billions.
(d) Series adjusted for coverage. Estimate for 1983 comparable with earlier years is US$1702.1 billions.
(e) Series ajdusted for coverage. Estimate for 1984 comparable with earlier years is US$2116.5 billions.
(f) Series adjusted for coverage. Estimate for 1985 comparable with earlier years is US$2495.9 billions.

were frequent changes in coverage of items and locations treated in the series, a feature noted in the discussion of the growth of assets in the main text. Hence major revisions are listed in the notes to Table A1.

The estimates for the rates of growth of liabilities shown in Table A1, column 2 are based upon the unadjusted data shown in the note to the table. In this way some comparability in coverage through the series is preserved. As is evident from the estimates contained in the note the largest adjustments were made in the last three years, 1983 to 1985.

This series provides the basis for establishing the potential for switching and shunting funds through eurofinance markets. The approach used in this treatment is as follows:

(a) Data is available on the maturity structure of liabilities and assets (or claims) in the London market and are shown in Table 2;

(b) These two series on the maturity structure of assets and liabilities (or claims) in the London market are assumed to reflect activities in other centres;

(c) Using that data on the maturity structure of liabilities, the proportions in each of the categories revealed in Table 2 are applied to the estimates of total liabilities in all eurofinance markets as shown in Table A1; and,

(d) The series may then be calculated in two ways by assuming that markets are open every day of the year or only five working

days each week to give a 260 "day" year rather than a 365 day one.

The implications of these assumptions for the measurement of the impact of eurofinance markets on foreign exchange transactions are explored fully in the main text.

What flows for the purposes of measurement should be understood. When examining the effects on foreign exchange transactions, only the first four categories of deposit liabilities shown in Table 2 need be treated. The understatement of turnover is negligible. This is no more than a reflection of the rapid turnover of deposits with very short maturities compared with those over 6 months where the turnover is less than once a year.

The average maturity of deposits of less than 8 days is assumed to be 4 days. With markets open every day of the year these deposits turnover 91.25 times per year; with a 260 day year the turnover would be 65 times. The average maturity of deposits for 8 days to less than 1 month is taken as 18 days to give annual turnovers of 20.28 for a 365 day year and 14.44 for a 260 day year. The average maturity of deposits for 1 month to less than 3 months is 2 months (61 days) giving annual turnovers of 6 and 4.26 respectively. For deposits from 3 months to less than 6 months the average maturity is 4.5 months (137 days) giving annual turnovers of 2.667 and 1.90 respectively.

The estimates for potential turnover of deposits are shown in Table A2. It should be noted that the estimates for 1972 and 1973 are based upon the maturity structure of liabilities in 1974 that being the earliest year for which data is available from the Bank of

England. The calculations show just how much the potential turnover is dominated by deposits with very short maturities; deposits with a maturity from 3 months to less than 6 months provide between 1 and 2 per cent of the total.

Estimates shown in Table A2 are derived in the following way. The percentage of total liabilities recorded in London for each of the four categories mentioned earlier and shown in Table 2 is applied to total liabilities shown in Table A1. Then each of those derived estimates is multiplied by the estimated annual turnover in the appropriate category of deposits. For example, in 1979 the percentage of liabilities with a maturity of less than 8 days is shown as 21.0 per cent in Table 2. The estimate of total liabilities shown in Table A1 of US$1120.3 billion is multiplied by 0.21 per cent to give US$235.26 billion. This is then multiplied by 91.25 to give

Table A2: Liabilities Turnover, 1972 to 1985.
(US$billions)

Year	Less than 8 days (1)	8 days to 1 month (2)	1 month to 3 months (3)	3 months to 6 months (4)	Total Turnover (5)
1972	4453.0	927.6	372.8	99.5	5852.9
1973	6372.0	1327.3	533.5	142.4	8375.2
1974	7973.4	1660.9	667.6	178.1	10480.1
1975	7770.9	1638.0	765.8	247.9	10422.6
1976	10789.4	2037.3	912.1	255.2	13994.0
1977	13445.7	2358.0	1143.1	334.3	17281.0
1978	15692.3	3100.2	1487.6	433.7	20713.8
1979	21467.5	4253.1	1921.1	577.0	28218.6
1980	25540.9	5042.6	2213.8	751.1	33548.5
1981	28979.2	6207.5	2742.0	774.7	38703.4
1982	30600.7	6751.6	2870.7	816.5	41039.5
1983	39848.0	8588.8	3489.1	943.4	52869.2
1984	40965.8	9796.1	3487.9	977.3	55227.0
1985	53363.0	11380.7	4128.5	969.9	69842.1
Alternate Series					
1983	33439.5	7207.5	2927.9	791.7	44366.6
1984	34132.1	8161.9	2906.0	814.3	46014.3
1985	44155.9	9417.0	3416.2	802.5	57791.6

one of the four components in total turnover, in this case US$21467.5 billion as shown in Table A2, column 1 for 1979.

These estimates are based upon a 365 day year showing growth between 1972 and 1985 of nearly twelve times, 11.93 more precisely. However, part of that growth is explained by the changes of coverage in the BIS series. In an attempt to extract the major changes in coverage between 198 and 1985 especially, an alternate series has been calculated based upon the rates of growth of liabilities shown in Table A1, column 2. Those rates of growth are applied consecutively to the estimate of total liabilities at the end of 1982 being US$1622.4 billion.

The same set of calculations can be developed for the 260 day year. In as much as the estimates can be calculated using the data and assumptions mentioned earlier, the total turnover only is shown in Table A3. The rate of growth of the series being the same as that for the 365 day series shown in Table A2, the interest is in the relative scale of the turnover. Thus the 260 day series records a turnover just over 70 per cent of that estimated for the 365 day year.

Table A3: Liabilities Turnover (260 day year), 1972 to 1985

(US$ billions)

Year	Total Turnover
1972	4168.1
1973	5964.3
1974	7463.3
1975	7422.1
1976	9965.6
1977	12306.4
1978	14750.7
1979	20095.3
1980	23890.9
1981	27561.4
1982	29225.0
1983	37649.7
1984	39328.8
1985	49737.6
Alternative Series	
1983	31594.7
1984	32768.2
1985	41155.9

Appendix B

Daily Foreign Exchange Transactions Generated in Eurofinance Markets

In Appendix A estimates were derived for potential foreign exchange turnover in eurofinance markets. The purpose of this appendix is the exploration of the daily foreign exchange transactions generated in these markets. The approach is the same basically as that depicted in the previous appendix. It rests upon the maturity distributions of liabilities and assets (or claims) in the London market and the application of those distributions to the estimates of the totals for liabilities and assets in the eurofinance markets shown in Table 1 and A1.

As with procedures used in Appendix A the maturity distributions shown in Table 2 for London are applied for each at the years from 1972 to 1985. The four categories in that maturity distribution are used:

(a) Liabilities with a maturity of less than 8 days with an average maturity of 4 days;

(b) Liabilities with a maturity of between 8 days and less than a month with an average maturity of 18 days;

(c) Liabilities with a maturity from 1 month to less than 3 months with an average maturity of 61 days; and,

(d) Liabilities with a maturity from 3 months to less than 6 months with an average maturity of 137 days.

The same procedures apply when estimating turnover based upon assets.

The maturity distributions are applied in each of the four categories to the total liabilities in eurofinance markets. Then to derive a daily turnover the estimate in each of the four categories must be divided by the average maturity applicable to that category. An example may help clarify procedures. The estimate for total liabilities shown in Table A1 for 1979 is US$1120.3 billion. Applying 21 per cent to that for liabilities with less than eight days to maturity gives US$235.26 billion. The average maturity is 4 days so that daily turnover in that category is US$58.82 billion. Then proportion in the next category of liabilities is 18.72 per cent to give US$209.72 billion and US$11.65 billion. For the third category the percentage is 28.58 to give US$320.18 billion and US$5.25 billion. The final category - 3 months to less than 6 months - is 19.31 per cent to bring US$216.13 billion and US$1.58 billion.

The same procedure can apply to estimates of the daily turnover of assets; essentially this offers insight to the supply of funds to the EFIs arising from the maturing of their claims upon borrowers from them. The series for gross assets or lending shown in Table 1 can be used with the maturity distribution for assets (or claims) shown in Table 2.

Estimates of the daily turnover in assets and liabilities are shown in Table B1. Then the ratio of the daily turnover of assets in relation to the daily turnover of liabilities is estimated. The purpose of this measure is to assess the proportion of daily funding requirements, namely the maintaining of deposits let alone their expansion, which could be met by repayment of loans from borrowers.

It is evident from Table B1 that the proportion of deposits matched by maturing liabilities rose during the 1970s. But with the onset of the debt crisis in 1982, the ratio fell rapidly between 1981 and 1983 and then stabilised. What this means is that the search for additional funding to meet withdrawals of deposits on maturity as well as sustain the asset portfolio was most demanding at that time.

Table B1: Daily Turnover of Liabilities and Assets.

US$ billions

Year	Liabilities (1)	Assets (2)	Ratio of Assets to Liabilities (3=2÷1)
1972	16.03	11.84	73.86
1973	22.95	16.95	73.86
1974	28.71	21.04	73.28
1975	28.55	22.83	79.96
1976	38.33	30.10	78.53
1977	47.33	36.34	76.78
1978	56.73	45.29	79.83
1979	77.30	61.39	79.42
1980	91.90	72.87	79.29
1981	106.02	86.85	81.92
1982	112.41	87.77	78.08
1983	144.81	108.94	75.23
1984	151.28	116.04	76.71
1985	191.31	144.45	75.51
Alternate Series			
1983	121.53	91.25	75.08
1984	126.04	96.67	76.70
1985	158.31	118.61	74.92

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