Features of a successful contract: financial futures on LIFFE

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The success of a futures contract, defined as its long-term survival, has generally been linked to the existence of a large and volatile spot market and to a design that makes the contract highly effective for hedging purposes. This article examines the importance of these and other factors, using data on the financial futures contracts introduced by LIFFE between 1982 and 1994.

Introduction

Futures contracts are among the oldest actively traded derivative instruments. They are legal agreements between two parties under which one party agrees to deliver to the other a certain standardised quantity of an asset at a fixed price at some specified point in the future. The Chicago Board of Trade is thought to be the oldest futures exchange, though there are other claimants to this title. It was established in 1848 to trade agricultural commodities. Trading in corn forward contracts began in 1851 and led the way for the introduction of futures contracts in 1865, enabling farmers to agree a price for their crop in advance of the harvest. It is also generally accepted that futures in financial assets were first introduced in 1972 by the Chicago Mercantile Exchange. The trading volume of financial futures contracts now substantially outstrips that of commodity futures. The financial futures market has grown rapidly during the last decade, mainly because of the huge increase in demand for financial derivatives. But exchanges have also tried to increase their share of the market through product innovation, improvements in trading technology and, more recently, by creating alliances with other markets.

In this article, we explore the question of why some futures contracts fail (ie are withdrawn because of insufficient demand) but others succeed (ie establish and maintain viable levels of interest and continue to trade). To do so, we look at 16 interest rate and index futures contracts created by LIFFE between 1982 and 1994,(2) five of which were withdrawn. It is important to recognise that contract failure is a normal feature of futures markets and that this success rate is comparable to the performance of other exchanges. For example, the Chicago Board of Trade created 26 different financial futures contracts between 1987 and 1996, only 17 of which were still traded in 1996.

Early trading levels

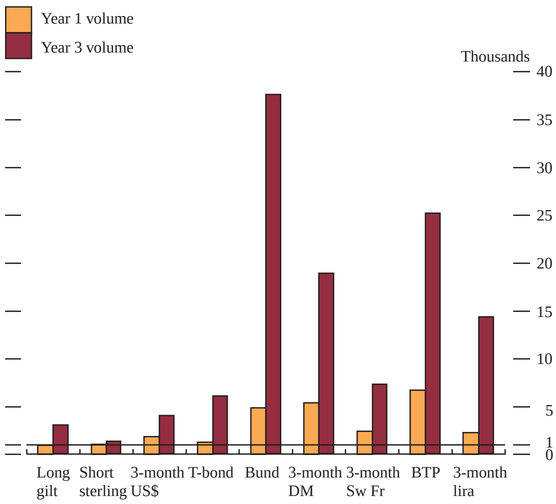
Trading is usually measured in terms of volume or of open interest (the net number of outstanding contracts at the end of the trading period). For example, the Wall Street Journal only lists a contract on its financial pages if daily open interest in it exceeds 5,000 contracts and its daily trading volume exceeds 1,000 contracts.(3) Of our sample, over half met the daily trading volume criterion in their first year of trading (see Table A), and after three years half of them met

Table A
Contract details

Contract (a)	Years traded	Average daily volume traded in first year (b)
Long gilt	1982–date	962
Short sterling	1982–date	1,045
3-month US$	1982–date	1,859
FT-SE 100	1984–date	438
T-bond	1984–93	1,254
Japanese government	1987–date	529
Bund	1988–date	4,850
3-month Ecu	1989–date	353
3-month DM	1989–date	5,374
3-month Sw Fr	1991–date	2,415
Italian government	1991–date	6,715
Ecu bond	1991–92	261
Eurotrack	1991–92	21
3-month lira	1992–date	2,290
Bobl	1993–94	4,379
Bonos	1993–93	223

(a) See notes for a fuller description of contracts.
(b) Volume traded in a contract's first year; this may not be the same calendar year for all contracts.

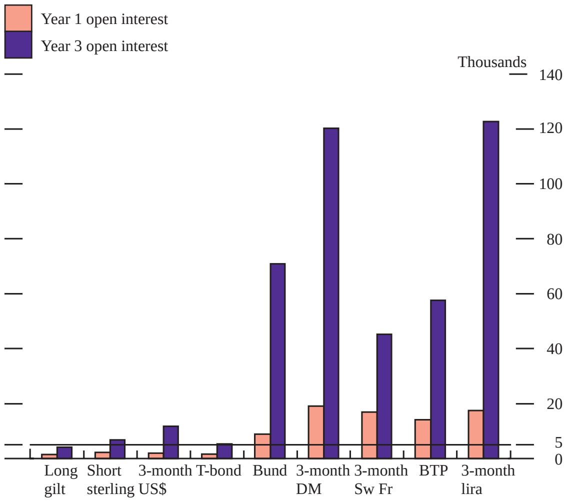
Chart 1
Average daily turnover



Source: LIFFE.

(1) Based on research carried out by Jo Corkish and Anne Fremault Vila while the latter was a member of the LSE Financial Markets Group.
(2) Because of data constraints we exclude the short gilt, medium gilt and FT-SE 250 futures contract from our analysis.
(3) One drawback of this is that it makes no allowance for differences in the face value of contracts and therefore we may not be comparing like with like.

Chart 2
Average daily open interest



Source: LIFFE.

both criteria (see Charts 1 and 2). These included the Treasury bond (T-bond) futures contract, which was later de-listed.[1] This shows that meeting these criteria in the early years of trading is no guarantee of continuing success. Moreover, failing to meet them (the long gilt contract did not meet the open interest criterion in any of its first three years of trading) has not necessarily led to failure.

Continuing success

If maintaining a viable volume of trading is our measure of success, can we say anything about the factors which are likely to drive this? Theory suggests that turnover in a contract is likely to be high when (i) the contract's design provides maximum correlation with the risk to be hedged ('hedging effectiveness') and (ii) the underlying spot market is large and characterised by volatile prices. We have also considered three additional factors: the creation of duplicate contracts by rival exchanges; the introduction of options on contracts; and the liquidity of the market, defined as the ability of the market to accommodate a large unexpected order without a significant impact on prices. Our findings are set out below.

Hedging effectiveness

One of the main economic functions of a futures market is to transfer risk. The stronger the relationship between returns in the futures market and those in the spot market, the better the hedge will be, since losses in one market will offset profits in the other. We can measure the hedging effectiveness of futures contracts by the coefficient of determination, the 'fit', of the regression $RS_t = \alpha + \beta RF_t + e_t$; where the spot returns (RS_t) and futures returns (RF_t) are defined for a variety of holding periods (the length of time the asset is held). Table B shows that hedging effectiveness increases with the length of the holding period. It also increases as failed contracts drop out of our sample (years six and ten), suggesting that failed contracts are less effective than successful contracts as hedging instruments.[2]

Table B
Hedging effectiveness

Contract lifetime	Total sample: Average HE	Total sample: Rank correlation	Successful contracts (Lifetime > 10 years): Average HE	Successful contracts (Lifetime > 10 years): Rank correlation
Five-day holding period				
Year 1	0.538	-0.09	0.762	-0.70
Year 3	0.539	0.13	0.642	-0.30
Year 6	0.625	-0.12	0.755	0.60
Year 10	0.745	-0.20	0.745	-0.20
Ten-day holding period				
Year 1	0.532	0.08	0.724	-0.70
Year 3	0.610	0.03	0.718	-0.30
Year 6	0.702	0.05	0.804	0.60
Year 10	0.762	-0.20	0.762	-0.20
20-day holding period				
Year 1	0.603	-0.01	0.809	-0.70
Year 3	0.739	0.06	0.801	-0.30
Year 6	0.768	0.29	0.856	0.60
Year 10	0.775	-0.20	0.775	-0.20

Notes: A perfect relationship between hedging effectiveness and turnover would be indicated by a correlation coefficient of 1. The significance of the correlation was tested in years 1 and 3 (the test is only valid when the number of contracts in the sample is greater than ten) but none of the coefficients was significant.

We tested the relationship between hedging effectiveness and futures turnover using Spearman's rank correlation coefficient. Table B shows that this correlation is surprisingly low and often negative. Testing for its significance, we find that the relationship between the two variables is insignificant. The level of hedging effectiveness therefore appears to reflect the success of the contract, but not to influence it.

Spot market characteristics, competition and options

The effects on trading volume of the size and volatility of the spot market, contract competition from other exchanges and the existence of an option on the contract were assessed using regression analysis on data for eleven contracts ('panel data estimation'). The methodology is explained in the box. Rank correlation coefficients were also calculated for spot market characteristics.

A priori we would expect hedging demand (and therefore futures turnover) to be positively related to the size and volatility of the spot market. If the proportion of the market that is hedged remains constant, then hedging demand will grow in line with the spot market. We might also expect this proportion to increase as volatility in the spot market increases. The expected effect of cross-listing of a product is less clear. As it is the introduction of a substitute good, its impact may be negative; however, it may create new trading opportunities, through arbitrage for example or by effectively extending the hours during which investors can trade. We expect that other related financial products, such as options, might behave like complementary goods and have a positive effect on futures turnover, perhaps by generating increased hedging demand.

(1) The other contracts that failed in our sample were de-listed before their third year of trading.
(2) The hedging effectiveness of the successful sub-sample is higher than that of the whole sample at all points.

Panel data estimation

Quarterly data on turnover between 1982 and 1994 were collected on a panel of eleven contracts. However, because contracts were introduced at different times our panel is unbalanced. Each was included in the panel in its first full quarter of trading, so, for example, if a contract was introduced in May 1990 it would first appear in the panel in 1990 Q3. The change in quarterly futures volume ($DFVOL_{it}$) was the dependent (endogenous) variable.

We then tested two explanatory variables to see whether either was statistically important in determining futures success: changes in quarterly spot market capitalisation (*DSVOL*) and changes in spot market volatility (*DSVOLAT*). Volatility was defined as the quarterly average of daily closing price changes: $\log(C_t/C_{t-1})$.

A number of dummies were also constructed for: contracts with an option traded on them; those which were first-mover contracts; those with a dual listing on exchanges with no overlapping trading hours (*COMPD*);(1) and, finally, those with a dual listing in exchanges with overlapping trading hours (*COMPS*).(2) Thus the panel estimation was:

$$DFVOLit = \alpha + \beta_1\, DSVOL_{it} + \beta_2\, DSVOLAT_{it} + \beta_3\, D_{it} + w_{it}$$

where D_{it} refers to the dummy variables and the error terms are assumed to have zero mean and constant variance.

The model was estimated as a panel with common intercept and coefficients, using OLS with White heteroskedasticity consistent standard errors. An alternative specification which allowed for contract heterogeneity by including a contract specific error term, $w_{it} = v_i + \varepsilon_{it}$, (random effects model) yielded similar qualitative results, and has not been reported.

Panel data estimation

	Option effect		First-mover effect		Competition effect	
DSVOL	0.324×10^{-4}	(4.36)*	0.297×10^{-4}	(3.76)*	0.247×10^{-4}	(2.08)*
DSVOLAT	$0.888 * 10^{8}$	(1.59)	0.885×10^{8}	(1.58)	0.876×10^{8}	(1.59)
Dummies:						
Option	-0.33×10^{5}	(-0.43)				
First mover			0.115×10^{6}	(2.22)*		
COMPD					-0.779×10^{5}	(-2.0)*
COMPS					0.127×10^{6}	(0.84)
R squared	0.03		0.04		0.05	

Notes: The coefficients *t*-statistics are shown in brackets; an * denotes significance at the 95% level. The constant is not reported.

(1) These contracts include the eurodollar, the euroecu, the euromark (cross-listed on the CME), the US Treasury bond and the FT-SE 100.
(2) These contracts include the euromark (cross-listed on MATIF), the euroswiss, the Bund and the BTP.

The main findings of our analysis were:

- demand for futures contracts is significantly increased by growth in the spot market. Correlation coefficients (Table C) also show that the size of the spot market is positively correlated with the level of turnover in the associated futures contract and this relationship is, on the whole, significant. So it appears that a futures contract benefits from the existence of a large spot market;

Table C
Rank correlation coefficients

Contract lifetime	Size of the spot market		Spot volatility
Futures volume			
Year 1	0.20		-0.38
Year 3	0.52	*	-0.07
Year 6	0.37		-0.17
Year 10	-0.70		-0.10
Futures value			
Year 1	0.64	*	-0.32
Year 3	0.73	*	-0.14
Year 6	0.37		-0.02
Year 10	-0.70		-0.10

Notes: This table shows rank correlation coefficients, using daily data, for the LIFFE futures contracts listed in Table A and their underlying markets. An * indicates that the correlation is significant. A perfect relationship would be indicated by a coefficient of 1.

- an increase in spot market volatility also generates increased demand for futures contracts, but the effect is statistically insignificant. So there is weak support for the hypothesis that a volatile spot market is a necessary condition for the continuing success of a futures contract;

- there is evidence that the exchange which is first to list a contract gains a significant competitive advantage (first-mover advantage);

- the effect of competition from contracts listed on other exchanges differs according to whether the trading hours of the competing exchanges overlap. Competition from contracts with overlapping trading hours slightly increases volumes, but competing contracts with non-overlapping trading hours significantly reduces volumes. Overlapping trading hours creates new arbitrage opportunities. The positive effect of these will be enhanced because, in each instance of simultaneous trading, LIFFE was the first to list the contract. In most cases of non-overlapping trading hours the competing exchange was the first. This may suggest that the first-mover advantage more than offsets any increase in trading opportunities created by the extension of the trading hours of the contract; and

- the existence of an option on the futures contract does not significantly affect futures volumes. It should be noted, however, that lack of data prevents precise measurement of the demand for futures to hedge ‘over-the-counter’ (OTC) options or net swaps exposures, which is likely to have grown significantly. (Between 1988 and 1996, the notional principal outstanding in OTC swaps and interest rate options increased at an average annual rate of 40.5%.[(1)] Some of these OTC deals will offset one another; but some of the remaining exposure is likely to be hedged with an exchange-traded futures contract.)

Market liquidity

Using a series of liquidity measures, we examined whether the evidence suggests that a successful contract is always liquid and also whether a liquid contract is always successful. First, we considered the ratio of futures volume to open interest.[(2)] A high ratio, indicating that trading is high compared with the number of outstanding contracts, implies that agents can open and close their positions with relative ease. Table D shows that contracts such as the Bund or long gilt, which have continued to trade in sizable volumes, have high ratios; contracts such as the Bobl or the Eurotrack futures, which were de-listed after trading for only a year or so, have very low ratios.[(3)]

Table D
Ratio of futures volume to open interest

Per cent

	Year of trading				
Contract	1	2	3	6	9
Long gilt	0.68	0.62	0.68	1.06	0.67
T-bond	0.81	0.92	1.08	0.53	0.40
Bund	0.55	0.62	0.53	0.50	
Japanese government	n.a.	n.a.	n.a.		
Italian government	0.48	0.49	0.43		
Bobl	0.25	0.13			
Ecu bond	0.21	0.45			
Bonos	0.09				
Short sterling	0.49	0.20	0.19	0.30	0.21
3-month sterling	0.93	0.33	0.33	0.23	0.13
3-month Ecu	0.35	0.10	0.11	0.08	
3-month DM	0.28	0.17	0.16	0.14	
3-month Sw Fr	0.14	0.19	0.16		
3-month lira	0.13	0.09	0.12		
FT-SE 100	0.46	0.22	0.20	0.18	0.24
Eurotrack	0.08	0			

n.a. = not available.

As a second measure of liquidity, we examined the execution risk associated with twelve LIFFE contracts on two days of trading (2 February 1993 and 19 April 1994) using tick-by-tick data. Execution risk is determined by (i) the frequency of trade arrival (how long it will take to find a match) and (ii) intra-day price volatility (how much prices will move if there is a delay in finding a match). The risk would be expected to be lower for more liquid contracts. Contracts are classified here as either high frequency (at least one trade per minute in 1993 and two trades per minute in 1994), intermediate (ranging from one trade every 40 seconds to one every three minutes) or low (less than one trade every three minutes). Intra-day price volatility is calculated as the standard deviation of the absolute value of returns based on adjacent price changes (ie adjacent ticks).[(4)] Table E shows that volatility is fairly uniform across all

Table E
Market liquidity

2 February 1993

	Daily volume	Number of trades	Trade frequency (trades per minute)	Volatility	Spread (per cent)
Bund	32,895	1,179	1.9	0.006	0.009
FT-SE 100	14,564	1,273	1.6	0.019	0.022
Long gilt	36,734	736	1.3	0.016	0.032
Italian government	13,161	951	2.5	0.008	0.011
Short sterling	31,504	490	0.9	0.005	0.006
3-month DM	24,143	395	0.7	0.006	0.008
Bobl	2,741	174	0.3	0.008	0.006
3-month Sw Fr	8,392	262	0.5	0.006	0.009
3-month lira	1071	58	0.1	0.007	n.a.
Japanese government	943	163	0.3	0.005	0.003
3-month Ecu	554	38	0.08	0.009	n.a.
3-month US$	1155	28	0.05	0.005	n.a.

19 May 1994

	Daily volume	Number of trades	Trade frequency (trades per minute)	Volatility	Spread (per cent)
Bund	132,221	127,310	4.4	0.006	0.008
FT-SE 100	10,436	8,153	2.1	0.021	0.019
Long gilt	107,495	57,275	3.0	0.017	0.01
Italian government	44,615	42,254	2.7	0.008	0.01
Short sterling	10,558	12,498	0.2	0.005	0.008
3-month DM	20,753	19,751	0.4	0.005	0.008
Bobl	n.a.	n.a.	n.a.	n.a.	n.a.
3-month Sw Fr	4,517	5,100	0.2	0.006	0.008
3-month lira	4,257	53	0.0	0.005	0.007
Japanese government	352	2,543	0.1	0.006	0.007
3-month Ecu	2,646	56	0.1	0.005	n.a.
3-month US$	61	6	0.02	n.a.	n.a.

n.a. = not available.

frequency classes of contracts, in spite of wide differences in frequency of trading and volume of daily trading. So execution risk is not necessarily higher for intermediate or less actively traded contracts; even though there may be longer to wait for a trade to be executed, the probability of an adverse price movement occurring before execution does not appear to be any higher.

Third, we considered variable trading costs (the spread), as represented by the prices at which trades are done. The bid-ask spread compensates market makers (or 'locals'[(5)]) for three types of costs/risks: (i) order processing costs; (ii) inventory risk; and (iii) adverse selection risk. In futures markets, it is generally accepted that inventory risk is minimal, since locals take open positions only for very short periods of time. Adverse selection risk is also considered to be low, since information asymmetries are less pronounced in interest rate or index products (ie the probability that a counterparty has private information on an interest rate product is lower than on single equity products).[(6)]

The daily bid-ask spread was estimated for each contract using a standard measure developed by Roll[(7)] which is calculated from transactions price data. It only reflects order-processing costs. The basic intuition behind it is that transactions prices randomly bounce between the bid and the ask quote (so the arrival of a buy order is as likely as a

(1) Source: International Swaps and Derivatives Association (ISDA).
(2) This ratio measures the total number of contracts traded in a period relative to the size of open positions at the end of the period.
(3) It is also worth noting that the ratios of turnover to open interest for bond futures are generally higher than those for money-market instruments, perhaps indicating different sources of investor demand. Given that open interest primarily reflects hedging demand, a low ratio might indicate high hedging demand and a high ratio speculative demand.
(4) So volatility = standard deviation of $|\ln(P_n/P_{n-1})|$, where n is the nth tick.
(5) Locals are individuals who trade solely for their own account.
(6) Adverse selection risk is also believed to be lower in open-outcry markets, such as LIFFE, where counterparties are known to each other in advance of a trade.
(7) See Roll, (1984), 'A simple implicit measure of the effective bid-ask spread in an efficient market', *Journal of Finance*, 4, pages 1,127–39. The estimator is defined as $S_R = 200 * \sqrt{-\text{cov}(R_t, R_{t-1})}$ where $R_t = \ln(P_t/P_{t-1})$ is the logarithm of the return at time t.

sell order). This induces negative autocorrelation between successive price changes (or returns) and can therefore be used to infer the bid-ask spread. It should be noted, however, that it relies on two restrictive assumptions: (i) no serial correlation in trades, which would arise from the splitting of large trades, and (ii) constant expected returns over time, which may not hold in periods of rapid news arrival. If these assumptions are violated, the estimator will be biased downward. Nevertheless, any significant differences in spreads should be identifiable. The results in Table E show that estimated spreads are around one tick size for all contracts irrespective of daily volume or trade frequency.[(1)] So liquidity in terms of transaction costs is broadly constant across active LIFFE contracts.

These results suggest that successful contracts are liquid, however measured, but that liquidity does not necessarily ensure sufficient volume to guarantee success. In our sample, the contracts that failed were less liquid as measured by their ratio of turnover to open interest, but not significantly less liquid in terms of spreads or execution risk. This suggests that there may be a critical level of acceptance of the contract beyond which bid-ask spreads and execution risk vary relatively little. The liquidity of unsuccessful contracts, such as the Bobl, only deteriorated after trading volume had dropped to very low levels. So it appears that liquidity may be a consequence, rather than a cause, of contract success.

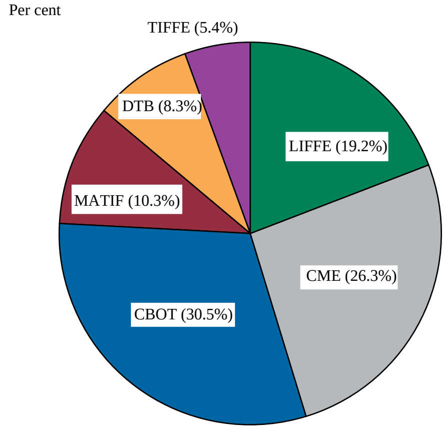
Conclusion

We have examined a number of factors that may be important in determining the success of a futures contract. Our findings show that continuing success cannot easily be inferred from a contract's first years of trading. As expected, contract success is highly correlated with the size of the underlying spot market, and to a lesser extent with its volatility. Where contracts are listed on more than one exchange, there appears to be a first-mover advantage which, in the case of simultaneously traded contracts, is reinforced by the creation of new arbitrage trading opportunities. And liquidity seems to be a feature of successful contracts, but does not always lead to success.

A further related issue is whether the creation of a futures market could help to boost liquidity in the spot market. This issue has been raised in recent discussion regarding liquidity in the index-linked gilt market.[(2)] The results presented here show that a large spot market benefits the futures market and standard tests would support causation in this direction. Spot and futures demand may of course be determined simultaneously, in which case the reverse causality would also hold, but we do not test for this here.

These results may provide a useful perspective as European exchanges prepare themselves for the possibility of

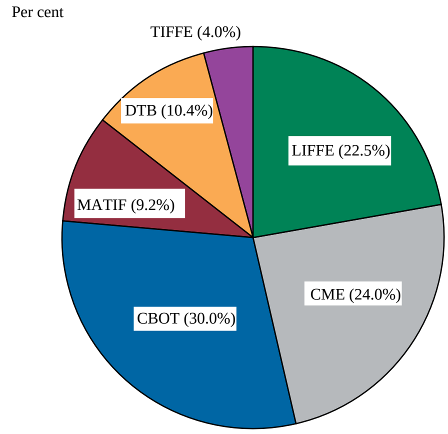
Chart 3
Market share of the major futures exchanges in 1995[(a)]



Source: Individual exchanges.

(a) Based on number of contracts traded on all the major futures exchanges in 1995.

Chart 4
Market share of the major futures exchanges in 1996[(a)]



Source: Individual exchanges.

(a) Based on number of contracts traded on all the major futures exchanges in 1996.

European Monetary Union. This will bring new challenges and new opportunities. LIFFE is the largest European futures exchange and currently the second largest of the 68 exchanges worldwide.[(3)] In 1996 it captured 22.5% of all trading on the major futures exchanges, an increase of three percentage points on the previous year (see Charts 3 and 4) and more than the combined total of the Deutsche Terminborse (DTB) (Frankfurt) and Marché à Terme International de France (MATIF) (Paris). But the outlook for European futures exchanges is uncertain. Following monetary union, products denominated in the currency of participating countries will be superseded by (necessarily fewer) euro-denominated products. The European exchanges will need either to transform their existing contracts into euro form (as some have already indicated they will do) or to introduce new contracts in order to compete. So the viability of new products will still be vital to the continuing success of these exchanges.

(1) The tick size (minimum price change) is 0.01% for most contracts except the FT-SE 100 contract (0.018%) and the long gilt contract (0.03%).
(2) See Bank of England (1996), *Index-Linked Debt*, papers presented at the Bank of England Conference, September 1995.
(3) Based on the number of contracts traded in the first quarter of 1997.

Notes: Brief definitions of contracts[(1)]

Long gilt: The UK long bond futures contract; notional coupon of 9%; traded in units of £50,000; deliverable gilts are those with 10–15 years remaining maturity. Traded 1982 to date.

Short sterling: The short sterling interest rate futures contract; traded in units of £500,000; based on the British Banker's Association Interest Settlement Rate (BBAISR) for three-month sterling deposits at 11.00 am on the last trading day. Traded 1982 to date.

3-month US$: The three-month eurodollar interest rate futures contract; traded in units of $1,000,000; based on BBAISR for three-month eurodollar deposits at 11.00 am on the last trading day. Traded 1982 to date.

FT-SE 100: The FT-SE 100 index futures contract; valued at £25 per index point; cash settled based on the average level of the FT-SE 100 index between 10.10 am and 10.30 am on the last trading day. Traded 1984 to date.

T-bond: The American Treasury bond futures contract; notional coupon 8%; traded in units of $100,000; deliverable Treasury bonds are those with at least 15 years remaining maturity if not callable and at least 15 years to the first callable date if callable. Traded 1984 to 1993.

Bund: The German government bond futures contract; notional coupon 6%; traded in units of DM 250,000; deliverable Bundesanleihens (bunds) are those with 8½–10 years remaining maturity. Traded 1988 to date.

3-month Ecu: The three-month Ecu interest rate futures contract; traded in units of ECU 1,000,000; based on BBAISR for three-month Ecu deposits at 11.00 am on the last trading day. Traded 1989 to date.

3-month DM: The three-month euromark interest rate futures contract; traded in units of DM 1,000,000; based on BBAISR for three-month euro Deutsche Mark deposits at 11.00 am on the last trading day. Traded 1989 to date.

Japanese government: The Japanese government bond futures contract; notional coupon 6%; traded in units of 100,000,000; all open positions on LIFFE at close of business will be closed out automatically at the first subsequent opening price of the Tokyo Stock Exchange. Traded 1987 to date. (Note: The original contract began trading in 1987. This was replaced by the new Japanese bond contract in 1990.)

3-month Sw Fr: The three-month euroswiss interest rate futures contract; traded in units of Sw Fr 1,000,000; based on BBAISR for three-month euroswiss franc deposits at 11.00 am on the last trading day. Traded 1991 to date.

Italian government: The Italian government bond futures contract (BTP); notional coupon 12%; traded in units of Lit 200,000; deliverable Buoni del Tesoro Poliennalis (BTPs) are those with 8½–10 years remaining maturity. Traded 1991 to date.

Ecu bond: The Ecu bond futures contract; notional coupon 9%; traded in units of ECU 200,000; deliverable ECU bonds are those with 6–10 years remaining maturity. Traded 1991 to 1992.

Eurotrack: The Eurotrack 100 index futures contract; valued at DM 100 per index point; cash settled based on the average level of the FT-SE Eurotrack 100 index between 11.00 am and 11.20 am on the last trading day. Traded 1991 to 1992.

3-month lira: The three-month eurolira interest rate futures contract; traded in units of Lit 1,000,000,000; based on BBAISR for three-month eurolira deposits at 11.00 am on the last trading day. Traded 1992 to date.

Bobl: The German medium-term government bond; notional coupon 6%; traded in units of DM 250,000; deliverable bunds are those with 3½–5 years remaining maturity. Traded 1993 to 1994.

Bonos: The Spanish government bond futures contract; notional coupon 10%; traded in units of Pta 20,000,000; deliverable bonds are those with 7–10 years remaining maturity. Traded in 1993.

(1) For full contract specifications refer to LIFFE.