SYSTEMATIC RISK AND RETURNS TO STOCK INDEX FUTURES CONTRACTS: INTERNATIONAL EVIDENCE

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INTRODUCTION

Futures markets have traditionally been viewed as having the prime function of enabling cash market participants to reduce the risks which they face due to cash price fluctuations. However, there has been a realization that commodity futures contracts can also be viewed as a financial asset and, thus, as a means of investment. With the onset of trading on stock index futures in 1982, this alternative view of futures contracts gained strength. For example

> With the advent of futures contracts on stock indexes, active and offensively minded portfolio risk management, in its broadest sense, became practicable. In effect, the risk manager and *the individual investor* gained

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> new degrees of freedom . . . . He or she can now consider *opportunistic strategies rather than only defensive strategies.* (Fabozzi and Kipnis, 1984, p. 1, emphasis added).

Stock index futures are attractive to investors due to low transactions costs, high leverage, and high liquidity in comparison to trading in the underlying market. For any financial asset investors are concerned with the risk-return relationship that characterizes that asset.[1] Traditionally, the risk-return relationship in futures markets has been examined in terms of the Keynesian theory of normal backwardation [see, for example, Telser (1958, 1960); Cootner (1960); Gray (1961)]. Keynes argued that hedgers must pay a risk premium to speculators for underwriting the risks associated with cash price fluctuations.

However, as Dusak (1973) has shown, the development of the Capital Asset Pricing Model (CAPM) provides an alternative means of examining the risk-return relationship in futures contracts. With the CAPM, it is not the total risk of an asset that determines expected return, but rather systematic risk, as measured by the beta coefficient. Dusak's argument that futures markets are no different in principle from the markets for any other risky asset holds especially true for stock index futures. While the CAPM framework has been employed previously to examine the characteristics of risk and return for futures contracts, such investigation has been limited to commodity futures. Given the importance of stock index futures as an investment vehicle, the relationship between systematic risk and return for such contracts is clearly important and worthy of analysis. In view of this, the main objective of this article is to determine whether stock index futures contracts offer investors a return commensurate with their systematic risk, using the methodology previously applied to commodity futures. In addition, unlike previous studies, three other related issues of interest to users of stock index futures markets are examined:

1. The extent to which the systematic risk associated with stock index futures contracts varies with the day on which returns are realized. The motivation for examining this issue arises from the recent evidence relating to possible day-of-the-week effects in futures markets [see for example, Dyl and Maberly (1986a, 1986b); Cornell (1985); Phillips-Patrick and Schneeweis (1988)].

[1]Investing in futures requires no capital investment, so returns are defined in terms of percentage changes in prices, rather than return on capital employed.

2. Whether the time to maturity of the contract impacts on the systematic risk-return relationship, given that trading in the nearby contract greatly exceeds that in the next nearest, which is typically very thin; and
3. The degree to which the stock market crash of October 1987 had an impact on the risk-return relationship, in the light of the considerable shakeout in the financial services sector following this event.

These four issues all have implications for users of the market. If stock index futures are to be used by investors as an alternative to investing in a portfolio mirroring the market index, then it is important that traders are aware of the risk and return characteristics of that market, and also whether differences exist in relation to days of the week and time to maturity. In addition, changes following the crash of 1987 may have implications for the confidence with which investors view the market.

In this article the four issues outlined above are investigated in relation to the FTSE-100 stock index futures contract traded on the London International Financial Futures Exchange (LIFFE) in the United Kingdom. This contract is of particular importance to investors worldwide, because the underlying security represents the major stock index for the London Stock Exchange (LSE). The LSE trades a larger number of foreign stocks than any other exchange, with non-domestic stocks accounting for approximately 30% of total volume.

The article proceeds as follows. The next section briefly reviews the literature relating to the CAPM and futures markets. This is followed by a description of the data and methodology adopted in this study. Results of the analysis are then presented and a conclusion follows.

THE CAPITAL ASSET PRICING MODEL AND FUTURES TRADING

The CAPM, as developed by Sharpe (1964) and Lintner (1965), seeks to explain the pricing of capital assets by use of the following one period model:

$$E(R_i) = R_f + \beta_i[E(R_m) - R_f] \tag{1}$$

where $E(R_i)$ is the expected return on asset i, R_f is the risk-free rate of return, $E(R_m)$ is the expected return on the market portfolio which contains all assets and β_i is a measure of the systematic or non-diversifiable risk. In terms of futures markets the CAPM implies that holders of futures contracts can expect to earn above the risk-free rate of return only if there is positive systematic risk associated with those contracts.

Dusak points out that

> One difficulty in applying the Sharpe model of capital asset pricing to the risk-return relation on futures contracts is that of defining the appropriate capital asset and its rate of return. (Dusak, 1973, pp. 1390–1392).

This difficulty is due to trading on margin, since the purchaser of a futures contract typically only has to provide 5–10% of the contract as a deposit. This deposit is not a down payment, but rather is "good-faith" money to demonstrate that the contractual obligations will be adhered to. Further, the margin can be deposited in the form of interest-bearing assets. Consequently, at the time the contract is entered into, the party to the contract is not putting up capital in the normal sense of the term and, hence, is not forgoing any risk-free rate of return. Thus eq. (2) presents the appropriate form for the CAPM as applied to futures [see Dusak (1973)]:

$$E(R_i) = \beta_i[E(R_m) - R_f] \tag{2}$$

where $E(R_i)$ represents the expected return on the futures position given by the percentage change in the futures price.[2] The only difference between eqs. (1) and (2) is that eq. (2) does not have the intercept term R_f.

The problem here, however, is that eq. (2) cannot be estimated directly. Rather, it is necessary to transform eq. (2) from an ex ante model to a model which is capable of determining β's through empirical estimation. The following regression specification is appropriate:

$$R_{it} = \alpha_i + \beta_i(R_{mt} - R_{ft}) + \varepsilon_t \tag{3}$$

where R_{it} is the percentage change in prices for futures contracts. Note that this is equivalent to the normal market model except that the left-hand side of eq. (3) has total returns rather than returns in excess of the risk-free rate. A value of alpha significantly different from zero indicates that returns for the contract under investigation differ from the returns which are commensurate with the systematic risk of the contract. Chang,

[2]While $E(R_i)$ does not represent a rate of return in the normal sense, it is standard practice in the literature to treat it as such [see, for example, Dusak (1973), Elam and Vaught (1988), Chang, Chen, and Chen (1990)]. In the remainder of the article the percentage change in prices is referred to as *returns*.

Chen, and Chen (1990) refer to the alpha coefficient as the mean excess return to the asset i.[3]

It is this model which Dusak and others have estimated for commodity futures. Given the focus of this article on financial futures, the results of previous studies using the CAPM methodology are not particularly revealing for this study.[4] However, two points are worthy of note. Firstly, previous studies have found the CAPM to fit the data well, with excess returns, as measured by estimated alpha coefficients, being insignificantly different from zero. Thus, commodity futures offer a rate of return commensurate with their systematic risk. Secondly, there has been considerable discussion surrounding the choice of the market proxy to be used in estimating eq. (3), particularly regarding the inclusion or otherwise of commodities in the market portfolio.[5]

DATA

In this study the risk-return relationship for the LIFFE FTSE-100 stock index futures contract is investigated using eq. (3). The model is estimated for weekly returns.[6] Settlement of FTSE-100 futures contracts is in March, June, September, and December. Closing prices for Monday, Wednesday, and Friday are obtained for these contracts over the period January 1985–December 1990.[7] These data are then used to construct three series of weekly returns relating to the three days of the week. The closing futures prices are transformed into returns data according to eq. (4):

$$R_{it} = \ln(P_{it}/P_{it-1}) \tag{4}$$

where P_{it} and P_{it-1} are the closing futures prices for contract i at times t and $t - 1$, respectively.

[3]Again there are difficulties in interpreting the alpha values as excess returns given zero investment but this too has become standard practice.

[4]The main studies of commodity futures in addition to that by Dusak (1973) are Carter, Rausser, and Schmitz (1983); Baxter, Conine, and Tamarkin (1985), So (1987), Elam and Vaught (1988); and Chang, Chen, and Chen (1990). In addition, Breeden (1980) applies a different version of the CAPM, using the consumption beta model.

[5]See Dusak (1973); Carter, Rausser, and Schmitz (1983); Marcus (1984); Baxter, Conine, and Tamarkin (1985), and Elam and Vaught (1988).

[6]The CAPM provides no insight into what the appropriate interval for analysis should be. It therefore becomes a matter of practicality. Monthly intervals have frequently been used in studies of stocks. However, given that one of the concerns in this article is to investigate the possibility of day of the week effects, the use of monthly (or longer) returns is inappropriate. Similarly, given that the main focus of the article is to examine the risk-return relationship on a long futures position and that such positions are not typically held for periods of less than one week, weekly returns are the most appropriate for the issues to be addressed here.

[7]All data used in this study are obtained from Datastream.

The U.K. Treasury bill one-month middle rate adjusted to a weekly figure is used as a proxy for the risk-free rate of return and the FT All Share Index is used to proxy the mark portfolio. While the choice of the market proxy is problematic, as demonstrated by Roll (1977), given the international nature of the London Stock Exchange the use of this index has the advantage of capturing market-wide influences on an international basis.

For the risk-free rate and for the market portfolio proxies, data relate to Monday, Wednesday, and Friday closing figures, as appropriate. Returns data for the market portfolio are constructed along similar lines to the returns on futures.

METHODOLOGY

All previous studies of futures returns adopting the CAPM framework have estimated versions of eq. (3) using the Black, Jensen, Scholes (1972, hereafter BJS) methodology. With this approach betas and average rates of return are computed in the same period of time. The first two stages of the analysis carried out here adopt the same methodology. In the third stage of the analysis the sensitivity and validity of the results from using the BJS methodology are further investigated by using the procedure proposed by Fama and Macbeth (1973, hereafter FM). With the FM approach, betas are estimated in one time period and used to predict rates of return in a subsequent period.

The first stage of the analysis investigates whether the returns to the FTSE-100 futures contract are commensurate with its systematic risk by estimating eq. (3) and testing the null hypothesis that α is insignificantly different from zero. Rejection of the null implies that excess returns could be earned from this contract, and hence, the CAPM is not an appropriate model for pricing this contract.[8] Equation (3) is estimated for three series of weekly returns, (to Mondays, Wednesdays, and Fridays) enabling investigation of whether the systematic risk-return relationship varies with the day-of-the-week on which the returns are realized. This issue is examined by comparing, firstly, the estimated values of α and β and secondly, the model specification for the equations relating to returns pertaining to Mondays, Wednesdays, and Fridays. In addition to undertaking analysis for the whole period (1985–1990), each category of estimate is carried out on two sub-periods, up to October 1987 and from November 1987, and comparisons made of the estimated coefficients.

[8]Any test of an asset pricing model is simultaneously a joint test of market efficiency. Rejection of the null implies that either the asset pricing model is in appropriate or that markets are inefficient.

The data used in this first stage comprise weekly returns over the last six months of each June and December contract.

The second stage of the study examines whether the systematic risk-return relationship varies with time to maturity. Here data on the four futures contracts for each year (i.e., with settlement in March, June, September, and December) are utilized. For reasons set out in the Results section only closing prices for Wednesdays are used. In this part of the analysis the data are partitioned to create two time-series, one relating to weekly returns on contracts with less than three months to maturity and the other to weekly returns on contracts with between three and six months to maturity. The second stage allows an investigation of the impact of time to maturity and, thus, of thin trading in futures markets.[9] Once again, analysis is carried out for the whole period and for the two sub-periods.

The third stage of the analysis employs the FM methodology to further investigate the hypothesis that excess returns are zero. In addition, it enables the robustness of the results using the BJS methodology to be assessed. This stage requires further partitioning of the data. The two sub-periods relating to before and after the October 1987 crash are investigated separately. In this stage the market model is estimated for the first 70 observations (weeks) for the first sub-period and the first 80 observations for the second sub-period. The estimated betas are then used to predict weekly returns for the remaining weeks of the sub-periods.[10] The predicted returns are then compared with the actual returns for the period and inferences drawn. This comparison is made by subtracting the predicted returns from the actual returns to yield "excess returns." The hypothesis that excess returns are equal to zero is then tested using a t test. Only data relating to weekly returns on Wednesdays for the nearby contract are utilized (i.e., with less than three months to maturity).[11]

[9]Volume and open interest on all FTSE-100 contracts are examined and a clear pattern emerges. For the period relating to between approximately 120 and 80 trading days prior to maturity, trading volume and open interest are very low. Both pick up in the period from about 80 to 60 days to maturity as one contract matures. There is then a substantial increase in both of these variables for the remaining life of the contract. There are thus good grounds for believing that time to maturity may affect the risk-return relationship. Evidence relating to open interest and volume can be provided on request.

[10]In undertaking this part of the investigation it is assumed that betas are stable within each sub-period.

[11]The reason for restricting the data set to Wednesdays is the same as that for the analysis of time to maturity. Given that the vast majority of trading takes place in the nearby futures and that the purpose of this analysis is not to explicitly examine the time to maturity effect, data for the nearby contract only is utilized.

RESULTS

Tables IA and IB present the mean and standard deviation of weekly returns, together with the number of observations used in the analysis for the whole period and for the two sub-periods. t-statistics relating to whether the mean returns are significantly different from zero are also included. Table IA relates to weekly returns for Monday, Wednesday, and Friday, taking no account of time to maturity. Table IB presents information on weekly returns for Wednesday, for contracts with less than 3 months and 3–6 months to maturity. In all cases returns for the whole period and for the second sub-period are considerably smaller than for the first sub-period. There is evidence of differences in returns to different days of the week, although all returns are relatively low. For the whole period the weekly returns correspond to annual returns of only 4.2%, 3.1%, and 5.2% to Mondays, Wednesdays, and Fridays, respectively. Indeed, mean returns for the whole period and after the crash are insignificantly different from zero at the 5% confidence level.

Standard deviation of returns is also greater for the whole period and for the second sub-period. In contrast to CCC (1990) there is no clear evidence of contract maturity impacting on the standard deviation of returns. As far as a day-of-the-week effect is concerned, weekly returns to a Wednesday have a lower standard deviation than do those to Mondays

TABLE IA

Means and Standard Deviations of Weekly Returns on the Futures Contract to Mondays, Wednesdays, and Fridays

Week to	*Mean*	*SD*	*t-statistic*	n
		1985–1990		
Monday	0.0008	0.0287	0.4848	301
Wednesday	0.0006	0.0261	0.4167	301
Friday	0.0010	0.0287	0.5921	304
		1985–October 1987		
Monday	0.0037	0.0202	2.1659	140
Wednesday	0.0035	0.0192	2.1830	140
Friday	0.0039	0.0204	2.2569	141
		Nov 1987–1990		
Monday	0.0004	0.0277	0.1972	157
Wednesday	0.0006	0.0228	0.3513	157
Friday	0.0011	0.0240	0.5542	159

Notes

t-statistics relate to the hypothesis that mean returns equal zero

Mean returns on the risk-free asset are 0.0021 for the whole period and 0.0020 and 0.0022 for the two sub-periods.

Mean returns on the market portfolio in excess of the risk-free rate are −0.0003 for the whole period and 0.0032 and −0.0013 for the two sub periods

Returns refer to percentage change in prices and thus exclude dividend income

TABLE IB
Means and Standard Deviations of Weekly Returns on the Futures Contract to Wednesdays According to Time to Maturity

Months to Maturity	*Mean*	*SD*	*t-statistic*	n
		1985 1990		
<3 months	0.0006	0.0257	0.3971	302
3 6 months	0.0009	0.0261	0.6037	279
		1985 Oct 1987		
<3 months	0.0039	0.0191	2.3593	135
3 6 months	0.0047	0.0191	2.7875	130
		Nov 1987–1990		
<3 months	0.0004	0.0218	0.2206	163
3 6 months	0.0004	0.0219	0.2070	145

and Fridays and the mean return is also less (with the exception of weekly returns to Monday post-October 1987).

Table II presents the results of the estimation of the market model for weekly returns to Monday, Wednesday, and Friday using the BJS methodology. The first set of results in Table II relates to the whole period and the other results to the two sub-periods. Strong similarities

TABLE II
Estimated Market Model Coefficients for Weekly Returns to Mondays, Wednesdays, and Fridays

$$R_{it} = \alpha_i + \beta_i(R_{mt} - R_{ft}) + \varepsilon_t$$

Week to	α_i	$SE(\alpha_i)$	β_i	$SE(\beta_i)$	R^2	F_{sc}
			1985 1990			
M	0.0013[a]	0.0005	1.0607[b]	0.0203	0.9140	11.75[c]
W	0.0013[b]	0.0004	1.0660[b]	0.0188	0.9151	2.735
F	0.0013[b]	0.0004	1.1104[b]	0.0179	0.9272	18.97[c]
			1985 Oct. 1987			
M	0.0006	0.0006	1.0652	0.0342	0.8754	19.12[c]
W	0.0006	0.0005	1.0459	0.0273	0.9142	2.450
F	0.0007	0.0005	1.0170	0.0261	0.9160	6.476[d]
			Nov. 1987–1990			
M	0.0019[b]	0.0005	1.1175[b]	0.0229	0.9389	8.583[c]
W	0.0019[b]	0.0007	1.0971[b]	0.0359	0.8575	3.599
F	0.0019[b]	0.0005	1.1328[b]	0.0258	0.9246	5.271[d]

Note F_{sc} denotes the F-statistic for the test of serial correlation.
[a]Denotes α_i significantly different from zero or β_i significantly different from 1 at the 5% level.
[b]Denotes α_i significantly different from zero or β_i significantly different from 1 at the 1% level.
[c]Denotes significant at the 1% level.
[d]Denotes significant at the 5% level.
M, W, and F relate to Monday, Wednesday, and Friday, respectively.

are evident across the estimations. The estimated betas all fall within the range 1.01–1.14. Given the nature of the futures contract under consideration and the market proxy used, it is expected that the betas approximate unity.[12] However, there is a difference in the values of the estimated betas for the periods before and after the crash of 1987. For the period up to October 1987 the betas are insignificantly different from unity at the 5% level. However, for the period post-October 1987, the estimated betas are significantly different from unity. This suggests that the FTSE-100 stock index futures contract has become a riskier asset in systematic risk terms following the stock market crash.

Of more significance are the estimated values of alpha. For the three estimations within each period there is evidence of consistent values of alpha. However, while the values of alpha for the whole period and for the second sub-period are positive and significantly different from zero, they are not significant for the first sub-period. Thus it appears that prior to the crash of 1987 the CAPM adequately explains the returns for the futures index contract, but that post-October 1987 the futures index offers returns in excess of those commensurate with its systematic risk. This result could be explained by the fact that in the wake of the crash, a number of smaller brokers and analysts ceased business, resulting in a reduction in the search for information. This in turn could lead to pricing inefficiency with the consequence that unexploited arbitrage opportunities led to abnormal returns being earned. While the question of efficiency is beyond the scope of this article, this finding does suggest that the efficiency of the market for the futures index contract post-October 1987 needs to be addressed.

The final column in Table II presents the F-statistic for the test for serial correlation. Interestingly, for Mondays and Fridays there is evidence of serial correlation. However, for Wednesdays no such evidence exists. Clearly, there are a number of reasons why serial correlation may be observed. However, given the above findings, a reasonable interpretation would appear to be that a day-of-the-week effect is in evidence, with some misspecification being evident for the estimations for Mondays and Fridays. This may be related to higher volumes of activity in futures trading taking place on Mondays and Fridays as fund managers adjust their portfolios to avoid any possible beginning and end of week effects.

[12] The estimated beta is expected to approximate unity due to the high correlation between the asset on which the contract is written and the proxy for the market portfolio.

TABLE III
Estimated Market Model Coefficients for Wednesday Weekly Returns according to Time to Maturity

$$R_{it} = \alpha_i + \beta_i(R_{mt} - R_{ft}) + \varepsilon_t$$

Months to Maturity	α_i	$SE(\alpha_i)$	β_i	$SE(\beta_i)$	R^2	F_{se}
			1985–1990			
<3	0.0010[b]	0.0003	1.0705[b]	0.0149	0.9451	1.104
3–6	0.0014[b]	0.0004	1.0624[b]	0.0153	0.9459	0.471
			1985–Oct. 1987			
<3	0.0004	0.0004	1.0632[b]	0.0268	0.9220	3.247
3–6	0.0009	0.0005	1.0533	0.0280	0.9173	4.059[d]
			Nov. 1987–1990			
<3	0.0014[b]	0.0005	1.0973[b]	0.0245	0.9259	2.893
3–6	0.0018[b]	0.0004	1.0931[b]	0.0248	0.9314	1.628

Note: See Table II.

Table III presents the results of estimations taking account of time to maturity. In the light of results presented above, estimations are carried out for weekly returns to Wednesday only. In terms of the size and significance of the betas the results are consistent with the findings presented in Table II. The estimated betas for contracts with three or more months to maturity are marginally lower than for those with less than three months to maturity. While this might suggest that contracts with longer time to maturity are less risky in terms of systematic risk, the differences are very small. However, they do conform to the findings of CCC (1990) for metal futures. In all cases the beta estimates are significantly different from unity at the 5% level, with the exception of the beta for contracts with between three and six months to maturity pre-October 1987.

The general pattern of alpha coefficients is not affected by the partitioning, with significant values for the whole period and the latter sub-period, but not for the first sub-period. However, the extent of excess returns appears to be higher for contracts with longer time to maturity. This may be due to higher trading costs for contracts with longer times to maturity, due to the fact that the bid–ask spread is wider because of less frequent trading.

Table IV presents the results of the analysis for the third stage which employs the FM methodology. The first two columns show the beta values and the standard error of the beta values for the first part of each of the two sub-periods. The other three columns relate to the

TABLE IV
Estimated Beta Values and Mean and Standard Deviation of Excess Returns for Wednesday Weekly Returns

$$R_{it} = \alpha_i + \beta_i(R_{mt} - R_{ft}) + \varepsilon_t$$

Sample Period (Weeks)	β_i	$SE(\beta_i)$	Excess Returns *Mean*	σ	t[a]
1–70	1.0354	0.0332			
71–135			−0.00036	0.00623	0.0462
140–219	1.0571	0.0387			
220–302			0.00182	0.00557	2.9690[b]

[a] t-statistic relates to the null hypothesis that mean excess returns are zero.
[b] Denotes significantly different from zero at the 1% level.

second part of each sub-period. For these periods returns are predicted on the basis of the estimated beta values from the earlier period. The difference between actual returns in the second part of each sub-period and the predicted returns are referred to as excess returns. The three columns show the mean value of these excess returns, the standard deviations of the returns and the t-statistic relating to the hypothesis that mean excess returns are zero.

The results presented in Table IV confirm the findings of the analysis using the BJS approach. Before the October 1987 crash the excess returns to the stock index futures contract are not significantly different from zero. Thus, futures returns compensate for the systematic risk and are as predicted by the CAPM. However, post-crash there is evidence of excess returns. The mean of the excess returns is significantly different from zero for this period. In particular, actual returns post-October 1987 are higher than those predicted by the CAPM by 0.182% per week. This corresponds to annual excess returns of 9.5% and suggests that the market may be inefficient, or that the betas are not stable over time.

CONCLUSIONS

This article considers the systematic risk and return associated with the LIFFE FTSE-100 stock index futures contract within a CAPM framework over the period 1985–1990. This is done against a background of a lack of study in this area in terms of using United Kingdom data and analyzing financial futures. To examine the possibility of a day-of-the-week effect, weekly returns to Mondays, Wednesdays, and Fridays are examined. Further, the impact of the time to maturity is analyzed. In addition, previous studies have used only the BJS approach to test the CAPM for futures. This study employs the FM methodology to examine the validity of results using the BJS approach.

A number of interesting results emerge from this analysis. In all of the estimations carried out, the beta values are found to be in the range 1.01–1.14. This relative closeness to unity (even given that post-October 1987 betas are statistically different from unity) conforms to expectations about beta values for futures contracts written on indexes which mirror the market portfolio. Indeed, the results suggest that a portfolio comprising the market portfolio and selling the futures index in approximately equal proportions would lead to a situation of near zero systematic risk. It also suggests that the FTSE-100 futures contract provides a satisfactory alternative investment vehicle to investing in the cash market, since returns are earned which at least compensate for the systematic risk associated with the contract.

The findings suggest that index futures returns are adequately explained by the CAPM up to October 1987. After the crash returns in excess of those due to systematic risk are earned from the futures contract. This could be due to the considerable shakeout which occurred in the financial services sector following the crash, which may have led to a reduction in the search for information, and hence, to inefficiency. In addition, for weekly returns to Mondays and Fridays there are serious problems of serial correlation. These results suggest that there is a day-of-the-week effect and raise doubts regarding the efficiency of trading in the futures contract for the FTSE-100. Clearly, this issue is worthy of further examination.

As far as the time to maturity of a contract is concerned, it does appear to have some impact on futures returns. In particular, contracts further from maturity appear to be associated with less systematic risk and offer higher excess returns. Evidence of excess returns in thinly traded markets is consistent with findings for stock markets [see, for example, Butler and Malaikah (1992); Wong, Hui, and Chan (1992)]. This finding suggests that the hedging and price discovery roles of futures may be better achieved using the nearby contract.

The results of this study are important and clearly have implications for market participants wishing to use the FTSE-100 futures contract whether for investing, for hedging or for price discovery. Given the importance of this contract in terms of the size of the

London Stock Exchange and the number of foreign stocks traded on the exchange, the results suggest that further investigation of trading in this contract is called for, especially in relation to the efficiency of the market.

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