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The effect of captive insurer formation on stock returns: An empirical test from the UK

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Abstract

This paper examines the stock market impact of captive insurance subsidiary formation on parent companies in the United Kingdom (UK) corporate sector. We report that the formation of an insurance captive has no effect on the financial, systematic and unsystematic risks of the parent company, irrespective of the parent's market capitalisation. In addition, there is weak evidence that the market has a negative view of the captive insurance decision. Finally, our results indicate that financial risk, agency costs of free cash flow, asymmetric information and market power have no effect on the stock market's reaction to the captive formation decision. © 2000 Elsevier Science B.V. All rights reserved.

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1. Introduction

An insurance captive is a wholly-owned subsidiary insurance company of a non-insurance parent corporation whose primary purpose is to insure or re-insure the risks of the group of which it is part (Barille, 1979).² In recent years, the international captive insurance industry has witnessed rapid growth, particularly in offshore centers such as Bermuda, the Cayman Islands and Guernsey. By late 1996, there were roughly 3800 (mainly United States-owned (US)) insurance captives in the world contributing over US \$19 billion in total annual premium income (i.e., slightly less than 10% of global non-life insurance premiums) and retaining funds valued at approximately US \$99 billion (Tillinghast Towers Perrin, 1997). Of the world's estimated 3800 insurance captives, approximately 3000 (79%) were single parent captives with the remainder owned by trade associations and affiliated commercial groups.

Barille (1979) and Loy and Pertl (1982), among others, argue that captive insurers enable the owners of parent corporations to realize important financial management advantages. These include better loss control, more efficient taxation management, improved cash flow from lower premium volumes and captured investment returns, enhanced risk management capacity and flexibility, and so forth. However, if company-level risk management decisions, such as the formation of a captive insurance subsidiary, help to promote the private expense preferences of managers (Schmit and Roth, 1990; May, 1995; Scordis and Porat, 1998), then the linkage between security returns and corporate risk is unlikely to be positive.³ This study tests the impact of insurance captive formation on stockholders' wealth using data drawn from United Kingdom (UK)-owned public limited companies which have established captive insurers in the offshore center of Guernsey – the favored location for most UK-owned captive insurance subsidiaries (Tillinghast Towers Perrin, 1997).

Four principal motives underpin our research. First, with roughly 600 insurance captives in the world holding assets valued at approximately £6.5 billion and generating premium volumes of £2 billion per annum, UK-owned parent companies represent the second largest source of insurance captives

² The most common form of captive insurer and the one which is the focus of this study is the single parent captive. Single parent captives can be categorized as: (a) pure captives that only underwrite group company risks; and (b) broad captives that also cover unaffiliated risks. Other forms of captive insurer include the association captive that is established to insure the individual risks of members of a group or association, and the rent-a-captive which is a collection of business cells in which various independent non-insurance clients obtain an equity stake.

³ The insurance captive may or may not be a major investment relative to the value of group-wide annual turnover (Kloman and Rosenbaum, 1982). However, the captive insurance decision is not a trivial one "...because the use of a captive requires commitment of financial and management resources that can only be made at high levels of the organization" (Loy and Pertl, 1982, p. 32).

after US-owned corporations. Like the US, the UK has relatively few external restrictions on the risk management decisions of parent companies, thus making it an appropriate environment for empirical research on the captive insurance concept. Second, our study can contribute insights into the motives for, and implications of, the captive insurance decision in parent companies. For example, a positive change in a parent company's quoted equity prices following the formation of a captive insurer could reduce its market cost of capital and help it to mitigate the risk of financial distress. Third, we believe that our study is the first to investigate the relation between security returns and captive insurer formation outside of the US. As a consequence, our results could provide a useful benchmark against which previous US-based studies examining the effect of captive insurer formation (e.g., Wood, 1985; Cross et al., 1986, 1988; Diallo and Kim, 1989) can be compared and evaluated. We contend that this provides an important empirical contribution to the extant literature. Fourth, our study extends the literature by providing new insights as to what factors determine the captive insurance decision. For example, we extend the theoretical underpinnings of the captive insurance decision by testing the relation between the establishment of insurance captives and their impact on stock prices and the risk profile of parent companies. This is particularly germane given that recent empirical evidence (e.g., May, 1995) suggests that corporate risk management initiatives invariably fail to deliver the expected welfare gains for stockholders, but rather provide economic advantages for managers.

2. Background

Tillinghast Towers Perrin (1997) suggest that roughly 80% of the world's 3800 or so insurance captives are located in offshore centers, such as Bermuda, the Cayman Islands and Guernsey, with the remainder located in onshore jurisdictions, notably Vermont and Colorado in the US, and Luxembourg and Dublin in Europe. Most offshore and onshore jurisdictions have special regulations and favorable taxation rules to encourage the growth of local captive insurance markets. Of the present total, approximately 2300 insurance captives are owned by US organizations, while roughly 600 are owned by UK entities. The majority of UK-owned captive insurance companies are based in either one of the two offshore British Crown dependencies of Guernsey (about 270 UK-owned captives) and the Isle of Man (roughly 130 UK-owned captives), with the rest spread across such domiciles as Bermuda, the Cayman Islands and Dublin. Total admissible assets held by UK-owned captive insurers in 1997 was approximately £6.5 billion (US \$10.5 billion) and annual premiums about £2 billion (US \$3.2 billion). These statistics testify to the importance of captive insurance arrangements in the UK.

The UK offers an interesting environment for the conduct of a study of this kind in two further respects. First, with roughly 2500 national and multinational companies listed on the London Stock Exchange (LSE), the UK is a major international financial market with relatively few restrictions placed on corporate risk transfer and risk financing decisions. As a consequence, the UK mirrors closely US corporate equity trading and risk management practices, enabling meaningful comparisons with prior US-based studies. In contrast, both the UK and US have insurance and regulatory traditions that are different from those of other developed economies such as Japan and Western Europe. In these domiciles, more stringent regulations (e.g., restrictions on the establishment of cross-border insurance subsidiaries), together with a much greater emphasis on bank-issued debt for financing corporate growth, have limited the risk management choices of companies that operate from these jurisdictions. Second, unlike in some major developing economies such as those in the Far East (e.g., China) and Eastern Europe (e.g., Russia), the captive insurance decision in the UK has been relatively unencumbered by regulatory practices such as stringent exchange controls. This attribute should enable us to perform a robust test of the theoretical propositions regarding the formation of captive insurance subsidiaries in the UK.

3. Theoretical framework

In this section we motivate the analysis and provide a basis for the hypotheses that are tested in this paper. Specifically, the captive insurance decision is examined in terms of its effect on the systematic and unsystematic risks of parent corporations. The hypothesized stock price impact of the captive insurance decision is then developed and finally, various cross-sectional sensitivity tests are carried out.

3.1. Systematic risks

One important managerial motive for the establishment of a captive insurer is the desire to insure for business risks for which the commercial insurance market either does not offer cover or does not provide complete indemnity (Barille, 1979; Schmit and Roth, 1990; Scott and Adams, 1994; Bawcutt, 1997). For instance, group companies are likely to have variable cross-sectional exposures to risks such as patent suits, product warranty claims, property risks, environmental catastrophe liabilities, and so on. Some of these business risks (e.g., property) are unlikely to be correlated with other market events and are thus diversifiable, while others (e.g., liability risks) may not. For example,

Doherty (1997) reports that in certain lines, such as employer liability and medical malpractice insurance, the incidence and level of claims could be a function of new laws and judicial precedents arising after policies are sold. In these cases, higher than expected inflation could lead to claims settlements in excess of the amount reserved by an insurer. In other cases, such as earthquake risks, losses are often correlated with geographical regions (e.g., seismic zones). In such cases, these business risks may not be easily diversified across the insurance pools held in the conventional insurance market thus encouraging the formation of captive insurance arrangements. Doherty (1997) argues that in their optimal form, insurance contracts enable the full transference of diversifiable risks to the insurer, while non-diversifiable risks are shared between the insurer and the insured. However, he adds (p. 74) that insurance markets will “...limit [the] ability for diversification by imposing strict limits on the amount of insurance offered to each policyholder”. Therefore, parent companies could establish insurance captives and enter into conventional and specialized reinsurance arrangements (e.g., financial reinsurance⁴) to alleviate some of their systematic risks over the long term.

3.2. *Unsystematic risks*

As Scott and Adams (1994) make clear, captive insurers can also use conventional reinsurance contracts to transfer unsystematic (i.e., insurable) risks from the parent corporation to the wholesale reinsurance market, thereby further reducing the organization's exposure to adverse future losses. The transference of unsystematic risks to reinsurance companies is likely to be particularly important to parent companies as few captive insurers will underwrite sufficient numbers of policies across which risks can be efficiently spread (Borch, 1990). The reinsurance market can also provide captive insurers with risk management solutions (e.g., excess loss coverage) which are sometimes difficult to achieve in the commercial insurance market (Scott and Adams, 1994). Therefore, the reduction in unsystematic risks arising from the insurance captive's efficient and effective use of reinsurance could have a positive effect on the stock prices of parent companies (e.g., by alleviating investors' uncertainties due to imperfect market information). Stockholders may also value risk management practices, such as insurance captives, which deal with unsystematic risks if the solution protects or increases group-wide cash

⁴ Financial reinsurance is a risk financing arrangement whereby a reinsurance company provides a direct insurer (or captive) with an up-front capital injection linked to the present value of expected future losses and investment performance in return for an agreed annual premium. Such an arrangement enables the insurer (or captive) to spread some of its losses over a long period of time or to obtain a substantial return of premiums paid in the event that anticipated losses are not incurred (Bawcutt, 1997).

flows (Ashby and Diacon, 1996). Captive insurers can increase group cash flows through their use of the reinsurance market from commissions received and discounts on premiums paid. These financial advantages of establishing captive insurance subsidiaries should also have a positive impact on equity prices.

3.3. Stock price reaction

Mayers and Smith (1982) point out that in frictionless capital markets stockholders will be disinclined to insure their business activities because they can more efficiently diversify against insurable risks at negligible cost by holding balanced portfolios of investments. However, Diallo and Kim (1989) point out that compared with stockholders, managers are relatively inefficient bearers of diversifiable risks. As such, it is rational for them to engage in projects, such as establishing a captive insurer, which promise to improve the efficiency of risk bearing and reduce the variability of future cash flows. Mayers and Smith (1982) also argue that given imperfect markets (e.g., information asymmetries, regulatory costs and so on), insurance is a rational pre-loss financing decision undertaken by managers to mitigate the underinvestment problem faced by companies whose financial solvency is at risk from large uninsured losses.⁵ Insurance can also increase stockholders' wealth by helping companies to avoid political costs (e.g., stringent solvency regulation) and reduce their taxation liabilities (e.g., by permitting the deduction of insurance premiums from taxable annual earnings). Additionally, as Leyland and Pyle (1977), Diamond (1984) and Grace and Rebello (1993) have acknowledged, the corporate use of insurance helps to assure prospective investors, regulators and others, that business risks and exposures are adequately protected against severe future losses. Therefore, the academic literature contends that corporate insurance decisions are primarily motivated by the desire of managers to achieve risk reduction and/or signal to the market the existence of prudent management.

Scott and Adams (1994) report that an important benefit of forming an in-house risk financing mechanism, such as a captive insurer, is that it encourages managers to better control their loss probabilities, reduce the market cost of capital and so enhance stockholders' value. Because of their espoused expertise in managing company-specific risks, captive insurance managers are expected to be more cost-effective in advising and educating business unit managers in

⁵ The underinvestment problem occurs where stockholders and their managers decline to invest in projects projected to yield positive discounted cash flows because such ventures are perceived to benefit other claimants (e.g., debtholders) rather than themselves. The underinvestment problem is likely to afflict highly leveraged companies with limited free cash flow.

risk management techniques and monitoring losses than external insurers. Such improvements in loss prevention and control could translate into lower premiums and realize additional cash flow benefits for the corporate group. Indeed, Diallo and Kim (1989) and Wood (1985) argue that if parent corporations realize reductions in the cost of insuring exposures through the formation of captives, the consequential increase in cash flows should result in an increase in stock value. Therefore, we predict that, other things being equal, the formation of a captive insurer will lead to an increase in the stock price of parent companies.

3.4. Financial risks

From their survey of US Fortune 500 companies, Loy and Pertl (1982) found that financial structure bears directly on an organization's ability to effectively use risk management arrangements such as captive insurers. MacMinn (1987) demonstrates that insurance can increase stockholders' wealth by helping managers to avoid the costs of financial distress and reduce agency costs (e.g., monitoring expenditures) by providing debtholders with indemnity in the event of financial distress. Additionally, Roberts and Viscione (1981) argue that the establishment of a captive insurer enables group companies to improve the level of their free cash flows (e.g., as a result of lower premiums) and so alleviate financial risks such as debt default. Scott and Adams (1994) also report that in contrast to the advance premium payment terms which characterize the direct insurance market, premiums paid by a captive insurer to its reinsurers are normally made in arrears. As a result, a captive insurance subsidiary is expected to realize a positive cash flow benefit for corporate owners as a result of the switch from the primary insurance market to the reinsurance market. This reasoning therefore implies that the use of insurance captives will decrease the financial risks of parent companies and thereby induce improvements to stockholders' wealth.

4. Research design

4.1. Data

The data used in this study were collected from three main sources: the Extel and Datastream financial company accounting and analysis services, and public records held by the Guernsey Financial Services Commission (GFSC). Guernsey, the second largest of the British Channel Islands, is an independent Crown Dependency and the third largest captive insurance center in the world (after Bermuda and the Cayman Islands) with 328 registered captives at the end of October 1996 (Tillinghast Towers Perrin, 1997). Unlike in some other

jurisdictions (e.g., Bermuda), parent corporations incorporating insurance captives in Guernsey are not required to publicly announce their intention to establish a captive prior to registration. As such, we take the date of captive insurers' registration with the GFSC as the relevant event date for the purpose of our analysis. This treatment is also consistent with prior US-based captive insurance studies such as Diallo and Kim (1989). We also reviewed other prospective sources of disclosure of the decision to establish an insurance captive (e.g., public media disks covering the Financial Times and insurance press) for the six months before the date of registration in order to detect evidence of pre-event information leakage. However, we found no evidence of prior notice of captive insurer formation.

At the end of 1996, the single parent captive insurance subsidiaries of UK-owned public limited companies (excluding the insurance captives of former public sector utilities) comprised 120 entities (37%) of the total Guernsey-based captive insurance market ($N = 328$). The majority of these captives were formed in the 10 years 1987–1996 following the enactment of the Insurance Business (Guernsey) Law 1986 and supporting legislation. The remainder of the Guernsey-based captive insurance market is made up of the single parent captive insurers of UK non-listed organizations (e.g., mutuals and private companies), the subsidiaries of foreign-owned multinationals, and other captive insurance arrangements belonging to trade associations and business groups. All parent companies in our (non-random) sample survived in the post-event period and so our data do not suffer from the non-survival problem (e.g., see Kothari and Warner, 1997). Unfortunately, however, a complete data set covering all UK-owned single parent insurance captives located in other jurisdictions, such as Bermuda and the Cayman Islands, were not available from easily accessible public sources. Nonetheless, our sample includes roughly 40% of the total estimated number of listed UK-owned single parent insurance captives operating throughout the world. As a result, our data set is judged to be representative of the total population of UK-owned public limited companies with single parent insurance captives (e.g., in terms of size distribution and industry). The exclusion of non-UK-owned entities from our sample was also considered to be advantageous. For instance, it mitigates the possibility that the empirical results may be confounded by the effects of foreign ownership, such as those arising from different managerial attitudes to corporate risk management and different professional training and experience.

Table 1 provides descriptive statistics of the UK-owned parent companies in our sample. On the whole, the parent companies selected in this study were very large with a mean market capital value of £1290 million at the time the captive insurance subsidiary was formed. However, the range of parent company sizes in our data set was also wide with the smallest company having a market capital value of £0.75 million, while the largest company had a market capital value of £16,685 million (standard deviation = £2299 million). This

Table 1
Summary descriptive statistics for a sample of UK-owned parent corporations with captive insurance subsidiaries, 1987–1996 ($n = 120$)

Measure	Mean	Median	Standard deviation	Minimum	Maximum
Market value (in million)	£1290	£526	£2299	£0.75	£16,685
Beta	0.76	0.78	0.45	0.05	1.70
Debt/equity ratio	0.52	0.43	0.49	0.02	2.51
Industry	Construction/ heavy eng.	Manufact.	Financial serv.	Other	Total
Number	8	33	18	61	120

statistical evidence reinforces the observations of commentators (e.g., Brockett et al., 1986) that the formation of captive insurers is biased towards those large-sized entities which have sufficient resources to capitalize and operate them. As one would expect for big parent companies, the average systematic risk (beta) measure for our sample was also below the cross-sectional mean for Fortune 500 companies (benchmark beta = 1.0) (e.g., see Fama and French, 1992). That is, the mean beta of the parent companies in our sample was 0.76 and the computed standard deviation was 0.45. The financial risk profile of the (generally large) parent companies in our sample (as measured by the debt/equity ratio) was also low with a mean value of 0.52 and standard deviation of 0.49. These figures further support the contention, widely reported in the academic corporate finance literature, that large companies tend to have lower financial risks than small companies (e.g., see Nance et al., 1993).

5. Results

5.1. Systematic risks

Any permanent change in a company's systematic risks (i.e., beta) subsequent to the formation of a captive insurer could confound our empirical results on the price reaction of the captive parent (Dimson and Marsh, 1986). Therefore, we test for the stability of parent companies' beta values around the date of captive insurer formation. For each company, we carry out two Ordinary Least Squares (OLS) market regression models corresponding to a pre-event and post-event period. The pre-event window covers six months from 131 to 11 days prior to the captive formation date and the post-event window ranges from 11 to 131 days after the formation date. The cross-sectional sample of the pre- and post-market model beta estimates are then compared using a two-sample *t*-test and a non-parametric sign test.

Table 2

The effect of captive insurance subsidiary formation on the systematic risk (Beta) of UK-owned parent corporations, 1987–1996^a

Sample	Before	After	Two sample <i>t</i> -test	Sign test
Full sample	0.75	0.82	1.78	2.69*
Largest companies	0.98	1.00	0.31	1.00
Rest of sample	0.47	0.61	1.57	1.46

^a For each company in the sample, two OLS market model regressions were carried out, one for the period $t - 131$ to $t - 11$ days prior to the establishment of a captive insurer and $t + 11$ to $t + 131$ days subsequent to the establishment of a captive insurer. Two measures of beta are thus measured corresponding to before and after the event. For each event, the difference between betas (after – before) are calculated. A two sample *t*-test assuming unequal variances and a sign test are then carried out for each sample of data.

Source: Research data.

* The difference is significantly different from zero at the $\alpha = 0.05$ level or better, one tail.

Our results are shown in Table 2 and they provide conflicting evidence that the formation of a captive insurer has an impact on the systematic risks of the parent company. Although the sign test statistic of a difference between the pre- and post-formation betas is significant for the full sample at the 0.05 level ($t = 2.69$, one tail), the test is unable to reject the null hypothesis of no difference for samples constructed on parent company size. Furthermore, the parametric two sample *t*-test shows no statistically significant difference between the two samples ($t = 1.78$, one tail). Upon closer investigation, we also found that the significant sign test result appears to be driven by the large number of beta increases after the event. However, almost all the betas of large parent companies change only by between 0.01 and 0.05. Therefore, although the number of beta values change, the movements are not economically significant and as a result, we do not view the formation of a captive insurer as a systematic risk increasing event.

It thus appears that captive insurers do not substantially influence stockholders' value by reducing systematic risks. There are four main plausible explanations for this finding. First, the captive insurers of UK-owned parent companies could be too small to have a major impact on the overall systematic risk profile of the corporate group. Second, UK captive insurers could be inefficient at managing business risks compared with, for example, the commercial insurance sector. Third, it is possible that UK-owned parent corporations have retained much of their loss exposure to systematic risks within the corporate group prior to the establishment of the captive insurance subsidiary indicating that "...captives provide little or no increased control over the risk management function..." (Wood, 1985, p. 85). Fourth, unlike many of their US counterparts, UK captive insurers could only be covering traditionally insurable (unsystematic) risks and not systematic risks, such as environmental risks (e.g., earthquakes).

We also note that the beta estimates of larger parent companies in our sample are generally greater than smaller parent companies, suggesting that systematic risks increase with corporate size and the complexity of operations. This finding is again consistent with that reported in other studies (e.g., Dimson and Marsh, 1986) and previously been reported as a common feature among small UK-listed companies (Strong and Xu, 1997). What is more, recent research by Hillier and Yadav (1998) in the UK suggests that small companies appear to have low beta values even after controlling for infrequent stock trading. That is, the existence of low betas for small companies appears to be an intrinsic feature of the UK corporate environment. Consequently, we consider that our results do not appear to be affected by infrequent trading.

5.2. Unsystematic risks

We also analyzed the effect of captive insurer formation on the unsystematic risks profile of parent companies. A common definition of unsystematic risk is that which can be diversified away and is unrelated to movements in the market (e.g., see Brealey and Myers, 1996). This can be modelled by measuring the standard deviation of the market model abnormal returns for any security during the event period. We thus test the prediction that the establishment of an insurance captive reduces the unsystematic risks of a parent corporation by carrying out a two sample *t*-test and a non-parametric sign test for differences in the standard deviation of event period abnormal returns.

Our results, which are presented in Table 3, provide no statistically significant evidence of a change in the unsystematic risk profile of UK parent corporations following the establishment of a captive insurance subsidiary. The

Table 3
The effect of captive insurance subsidiary formation on the unsystematic risk of UK-owned parent corporations, 1987–1996^a

Sample	Before	After	Two sample <i>t</i> -test	Sign test
Full sample	0.0136	0.0142	0.81	0.36
Largest companies	0.0133	0.0126	-0.67	-1.51
Rest of sample	0.0140	0.0161	0.77	0.16

^a For each company in the sample, a market model regression was carried out for the period $t - 490$ to $t - 131$ days prior to the establishment of the captive insurer. The market model parameter estimates are then used to calculate the abnormal return for each day in the window. Two measures of standard deviation are measured for each event corresponding to standard deviation in the period $t - 131$ to $t - 11$ days before the event and standard deviation in the period $t + 11$ to $t + 131$ days after the event. For each event, the difference between the standard deviations (after /before) are calculated. A two sample *t*-test assuming unequal variances and a sign test are then carried out for each sample.

Source: Research data.

findings are further robust to differences in parent company size. As a consequence, substantive conclusions regarding the effectiveness of insurance captives in alleviating the diversifiable risk profile of UK parent companies (e.g., through the reinsurance markets) cannot be drawn from the evidence.

5.3. *Stock price reaction*

We adopt a standard event study methodology by using an OLS market model regression and Boehmer et al. (1991) standardized cross-sectional standard errors to test the hypothesis that the formation of an insurance captive impacted positively on the stock price of the parent company. We define the event period as ranging from 10 trading days prior to the formation of the captive insurer to 10 trading days afterwards (i.e., a 21-day event window) and the estimation period was taken to be 120 days spanning 11–130 days before the event.⁶ The market index is taken to be the FT All Share index.

Panel A of Table 4 gives the abnormal stock price performance statistics for the whole of our sample of UK-owned parent corporations. The figures show that the average abnormal returns (AAR) are generally not statistically significant at the 0.05 level or beyond (in a one-tailed test). However, it is possible that because of late registration, slow release of registration information or thin trading, the event date may be slightly later than the registration date.⁷ To investigate whether there may be a delayed stock price effect, we cumulate the AAR over various event windows (see panel B of Table 4). Table 4, panel B indicates that the market reacts negatively in the short-term to the formation of an insurance captive. Cumulating abnormal returns over a four-day window spanning the event date through to three days subsequent, we report a significantly negative cumulative abnormal return ($t = -1.96$). Thus, the hypothesis of a positive stock price reaction following the formation of a captive insurer is not supported.

The results reinforce those reported in Wood (1985) and Diallo and Kim (1989) in their US-based captive insurance event studies. Consequently, the formation of a captive insurance subsidiary does not appear to directly benefit stockholders' wealth. The captive insurance decision in the UK is therefore probably motivated by managerial incentives, such as those associated with alleviating managers' inefficient risk-bearing positions and providing opportunities for perquisite consumption. Indeed, Scordis and Porat (1998) provide evidence from the US that parent companies that establish captive insurers are

⁶ Various estimation period lengths were tested to establish robustness of our results. However, our findings were largely invariant to the length of the estimation period.

⁷ We thank an anonymous referee for this suggestion.

Table 4
Abnormal performance statistics of UK-owned parent corporations ($n = 120$) forming captive insurance company subsidiaries, 1987–1996^a

Panel A – Abnormal return statistics

Day	AAR	<i>t</i> -Statistic	MAR	Prop. +ve ^b	Sign test
-10	<0.001	0.53	-0.001	0.49	0.79
-9	-0.001	-1.12	-0.001	0.44	-0.16
-8	0.001	0.61	<0.001	0.47	0.41
-7	0.001	1.18	<0.001	0.45	0.03
-6	<0.001	0.60	-0.001	0.42	-0.54
-5	<0.001	-0.77	-0.001	0.45	0.03
-4	0.001	-0.24	<0.001	0.50	0.98
-3	-0.001	-1.34	-0.001	0.42	-0.54
-2	<0.001	0.10	<0.001	0.47	0.41
-1	0.001	-0.68	-0.001	0.43	-0.35
0	-0.003	-1.33	-0.001	0.40	-1.11
1	-0.001	-0.82	-0.001	0.43	-0.35
2	-0.002	-1.20	-0.001	0.45	0.03
3	<0.001	1.02	-0.001	0.46	0.22
4	-0.001	-0.20	-0.001	0.44	-0.16
5	<0.001	0.47	-0.001	0.47	0.41
6	-0.001	-0.75	-0.001	0.46	0.22
7	0.001	0.56	-0.001	0.43	-0.35
8	-0.003	-0.66	-0.003	0.36	-1.87
9	-0.001	-0.27	-0.001	0.42	-0.54
10	<0.001	0.40	-0.001	0.46	0.22

Panel B – Cumulative abnormal return statistics for selected event windows

Event window	CAR	<i>t</i> -Statistic
$(t - 10)$ to $(t - 1)$	0.002	0.41
t	-0.003	-1.33
t to $(t + 3)$	-0.006*	-1.96
$(t + 4)$ to $(t + 10)$	-0.005	0.01

^a For each company in the sample, a market model regression was carried out for the period $t - 130$ to $t - 11$ days prior to the establishment of a captive insurer. The market model parameter estimates are then used to calculate the abnormal return for each day in the event window ($t - 10$ to $t + 10$ days). Individual security abnormal returns are averaged cross-sectionally to construct an AAR. Test statistics are the cross-sectional standardized *t*-statistic of Boehmer et al. (1991) and the generalized sign test statistic (Cowan, 1992). MAR is the median abnormal return. The cumulative abnormal return (CAR) series in panel B is constructed by aggregating each company's abnormal return series over the relevant window and cross-sectionally averaging over the sample. The test statistic is the cross-sectional standardized *t*-statistic of Boehmer et al. (1991).

^b Expected proportion of positive abnormal returns = 0.44.

Source: Research data.

*The coefficient is significantly different from zero at the $\alpha = 0.05$ level or better, one tail.

more likely to have heightened owner manager conflicts (e.g., with regard to the managerial misuse of excess cash flow) than parent companies that do not have captive insurance subsidiaries.

As mentioned previously, researchers such as Grace and Rebello (1993) contend that financial intermediaries (such as direct insurers) play an important role in screening, monitoring and certifying the quality of information disseminated by companies to financial markets concerning the business risks that they face. Accordingly, by internalizing the risk financing function through an insurance captive, parent companies could be foregoing the signalling benefits of insuring directly with the conventional insurance market. As a consequence, investors may impound this enhanced information asymmetry problem through lower equity prices. In other words, stockholders could have more confidence in the experience of conventional insurers than in the risk management capabilities of captive insurance managers (e.g., see Main, 1982). Our results therefore suggest that in the UK, the financial advantages of the captive insurance concept relative to other risk transfer/financing strategies (e.g., conventional insurance) need to be closely scrutinized by stockholders, prospective investors and financial analysts to better ensure that stockholders' wealth is maximized.

5.3.1. Financial risks

To examine whether the formation of a captive insurance subsidiary affects the financial risks of the parent corporation, we performed a test using the ratio of total debt (short-term and long-term) to equity as a proxy for financial risks (Altman, 1984). This test calculates the debt to equity ratio for each parent company for a year prior to the establishment of the captive insurer and a year afterwards. A non-parametric signs rank test was then applied to examine for statistically significant differences between the two values. The overall z -test statistic (one tailed) of 0.612 was not significant at conventional levels (0.05 or better) and thus not supportive of the hypothesis that insurance captives reduce the financial risks of parent companies. We also segregated our data into decile groups and ran a signs rank test between the top decile group and the remainder (e.g., see Gregory, 1997). Again the results were not statistically significant further indicating that corporate financial risks are unaffected by captive insurer formation across all size categories of UK-owned parent corporations (i.e., $z = 1.155$ for large companies and $z = -0.429$ for small companies, both one-tailed tests).

5.4. Cross-sectional sensitivity tests

In this section we develop and perform cross-sectional tests to examine the effect of various factors on the stock price impact of a parent company's decision to establish a captive insurance subsidiary. The variables were financial risks (measured by the debt to equity ratio), the agency costs of free cash flow (measured by total cash), asymmetric information costs (represented by the bid-ask spread) and parent company size (measured by the market value of

equity). These variables are motivated in several regards. For instance, Scordis and Porat (1998) observe that owner–manager conflicts become more severe as companies become bigger. As a consequence, managers are likely to misuse free cash flow in larger parent companies and so nullify the cash flow (and hence stock price) benefits of establishing captive insurance subsidiaries. In addition, stock price movements can be affected by cross-sectional differences in market information asymmetries and the costs of financial distress.

We test the sensitivity of these variables by carrying out a Weighted Least Squares (WLS) cross-sectional regression analysis using the reciprocal of the standard deviation of event period abnormal returns as the weighting variable. The dependent variable is the four-day event window (t to $t + 3$) abnormal return and the independent variable is the relevant one being tested. Our results are given in Table 5 and they suggest that none of the company – specific factors that we tested for in our cross-sectional tests influence the observed stock market reaction to the formation of an insurance captive at the 0.05 level or beyond in a one-tailed test⁸ OLS regression analysis was also used, but in each case our conclusions did not change.

Following Dyckman et al. (1984), we also carried out a sensitivity test to examine whether our results were confounded by industry membership effects, such as those arising from different activity risks. In addition, like Higson and Elliott (1998) we performed a test to determine whether stock price movements were influenced by extraneous changes in market conditions (e.g., high levels of takeover activity). In both of these tests, our results were found not to be statistically significant at the 0.05 level or beyond (one tail), suggesting that our findings are not confounded by industry and inter-temporal instability.

5.5. *Implications*

Consistent with the results of previous captive insurance studies conducted in the US (e.g., Wood, 1985; Diallo and Kim, 1989) and risk management research carried out on cross-sectional corporate data (e.g., May, 1995), our study suggests that the formation of captive insurers does not produce windfall gains for stockholders. Writers, such as Barille (1979) and Strutt (1997), contend that decision-makers in parent companies are induced to establish captive insurance subsidiaries by the marketing-hype of insurance brokers and risk management consultants. Managers may also establish insurance captives because they are more confident than investors that captive insurers will realize net positive future cash flows (i.e., a case of managerial hubris) (e.g., see Roll, 1986). In addition, managers could form insurance captives as a response to the

⁸ A possible explanation for the poor performance of the models is that the proxies that we used are mis-specified. However, alternative measures did not produce different results.

Table 5
Weighted Least Squares (WLS) cross-sectional analysis of parent abnormal returns^a

	Constant ^b	Debt/equity ^b	Bid-ask spread ^b	Total cash flow ^b	Market value ^b	Time period ^b
Model 1	-0.1162 (-0.56)	<0.0001 (0.79)				
Model 2	-0.1166 (-0.56)		0.0008 (0.73)			
Model 3	-0.1390 (-0.67)			-0.0918 (-0.34)		
Model 4	-0.1601 (-0.79)				0.0664 (0.66)	
Model 5	-0.7192 (-1.60)					0.7156 (1.42)
Model 6	-0.7122 (-1.44)	<0.0001 (0.15)	<-0.0001 (-0.09)	-0.1513 (-0.52)	0.0692 (0.49)	0.7135 (1.32)

^a For each company, D/E, bid-ask spread, total cash flow and market value were collected from Datastream. Bid-ask spread is in percentage units, total cash flow and market value are in £1,000,000 units. A WLS regression using the reciprocal of the standard deviation of event period abnormal returns is carried out for each model. The dependant variable is the 4 day non-standardized cumulative abnormal return (t to $t + 3$). The first number in each cell is the WLS regression coefficient and the number in parenthesis is the t -statistic.

^b All coefficients have been multiplied by 10,000 to facilitate comparison.

strategic behavior of competitor companies (i.e., a case of market herding) or because insurance captives are perceived as status symbols (e.g., see Ashby and Diacon, 1998; Scordis and Porat, 1998). If tangible increases in stockholder value do not emerge from the captive insurance decision then we postulate that it is likely to be because in general, managers are not fully realizing the espoused advantages of captive insurance formation. As mentioned earlier, possible reasons for this state-of-affairs include the lack of risk management expertise, managerial inertia, inefficient use of reinsurance markets and the use of insurance captives as vehicles for satisfying managerial preferences (e.g., perquisite consumption). The high costs of transacting reinsurance can be particularly high for insurance captives that do not have long claims histories, close personal contacts and well established relationships with the reinsurance markets. This consideration could also dilute stockholder value and contribute to the observed insensitivity of the captive insurance decision to the security returns of UK-owned parent companies. Another possible reason for the lack of support for our primary hypothesis is that the controlled foreign companies legislation introduced in the Finance Act (UK) (1984) has reduced the taxation (and hence the cash flow) advantages of offshore-based captive insurers (e.g., see Bawcutt, 1997).

We consider that the results reported in this study are not trivial and that they could have important implications for many groups with an interest in the

captive insurance concept such as policymakers, risk managers, investors, and others. We identify at least six possible ramifications as follows.

First, captive insurers may be more appropriate to manager-controlled-type organizations, such as insurance mutuals, friendly societies, public sector bodies and partnerships, that do not have to maximize stockholder value. For example, these forms of organization do not have the high degree of owner-manager incentive conflicts that appear to be important in influencing the captive insurance decision (Scordis and Porat, 1998). As a result, regulatory authorities, insurance brokers and risk management consultants could target the captive insurance concept to these organizational forms to a much greater extent than hitherto has been the case. Second, we believe that there is scope for modifying and extending the captive insurance concept to embrace the notion of mutuality and risk-sharing pools, particularly among small and medium-sized entities operating within the same (or similar) industry. Indeed, the growth of rent-a-captives among trade associations and business groups in offshore domiciles, such as Guernsey, is one manifestation of the realization of this potential.⁹ This initiative could be extended to embrace some of the risk cases faced by small and medium-sized organizations, such as those covering medical and executive directors' liability. Third, the opportunities for more effectively using the risk financing/risk transfer capabilities of insurance captives via the international reinsurance markets (e.g., via financial reinsurance) could be further developed in order to enhance their cash flow effects for the benefit of stockholders. This could provide a marketing opportunity for insurance brokerages and risk management consultants engaged in the promotion and management of the captive insurance concept. It could also encourage reinsurance companies to broaden the delivery of their products to the captive insurance industry. Fourth, for educators and executive training consultants there could be prospects for assisting corporate group risk managers and captive insurance managers to deliver improved and customized risk management solutions which directly enhance stockholder value. Increasing awareness of the contingent-capital opportunities and cash flow benefits emanating from financial reinsurance arrangements and financial markets-linked policies are examples which management could employ to increase stockholders' returns. Fifth, stockholders (or their nominated representatives, e.g.,

⁹ As a self-governing Crown Dependency, Guernsey's legislature is separate from that of the UK. The Island therefore has the freedom to introduce legislation to encourage the development of its financial services sector. One recent initiative is Guernsey's Protected Cell Companies Ordinance (1997) which aims to promote the rent-a-captive concept by protecting the assets of members of a collective captive arrangement against the insolvency of other members. This legislative initiative could also give small organizations the opportunity to access the wholesale reinsurance market and thus provide them with coverage for previously non-insurable risks, such as product liability and environmental hazards.

risk management consultants) could subject the corporate group insurance captive to regular reviews and analyses of cost-effectiveness. This monitoring activity should ensure that the captive insurer maintains its economic worth over the medium to long-term and provides continued value to the organization, particularly when compared with alternative risk transfer/risk financing methods such as financial/insurance derivatives. Such an approach should enable the captive insurance industry to compete more effectively with financial institutions and international capital markets in the provision of risk management solutions. Sixth, the lack of statistically significant positive abnormal returns on stock prices following the formation of captive insurers could reflect acute information asymmetries between risk managers, investors and the financial analyst community. For example, investors and financial analysts may not recognize that risk management is (or should be) about value creation and not just concerned with risk reduction (e.g., see Ashby and Diacon, 1996, 1998). As a result, closer liaison between risk managers and financial analysts could be encouraged by those engaged in the promotion and delivery of the captive insurance concept such as international brokerages and independent captive insurance managers.

6. Conclusions

This study uses event study methodology to examine the stock price effect of the formation of captive insurance subsidiaries by UK-owned parent corporations. Our research finds no conclusive evidence that the formation of a captive insurer produces abnormal security returns. In addition, there is no evidence that the establishment of an insurance captive changes the financial, systematic and unsystematic risks posture of parent corporations. The results are also consistent for parent companies of all size categories in our sample. Moreover, our findings reinforce those of other academic studies carried out in the US captive insurance industry (e.g., Wood, 1985; Diallo and Kim, 1989) and are consistent with observations reported in the general risk management literature (e.g., Bawcutt, 1997; Strutt, 1997). We consider that the results of our research have important implications for investors, managers, industry regulators, and others. For example, there could be scope for improving the training and education of captive insurance managers in risk management techniques. We acknowledge that there are potential shortcomings with our research design. For example, event studies can be sensitive to methodological issues such as the length of the event window and confounding effects on the movement of equity prices (e.g., as a result of pre-announcement information leakage). However, we have attempted to control for these possible limitations in the performance of this study. Finally, we consider that the results of this research provide fresh insights into the motivations and effects of the captive

insurance decision and as such, our work could help to stimulate further empirical research in other captive insurance markets such as those emerging in Europe and the Far East.

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