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Guilty by Association? The Case of The Karin B Scare

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Abstract

The waste disposal industry is susceptible to bad publicity owing to the nature of the products it is sometimes required to process. At particular risk are companies which treat and dispose of hazardous substances. In this paper we test whether media concerns about public safety arising from the international transfer of hazardous wastes can have a negative impact on the stockmarket valuation of firms and of the waste disposal industry as a whole, even when the affected companies have not themselves broken the law.

Keywords: Adverse publicity, event study, hazardous waste, Karin B, waste disposal

JEL Classification: G14 (information and market efficiency; *event studies*)

With the governments of industrialised countries strengthening their legal commitment to the environment, developing economies became the recipients of a growing transboundary trade in hazardous wastes as waste producers searched for less costly disposal sites. A more sinister trend emerged during the 1980s which saw a series of reported incidents in which hazardous wastes produced within industrialised countries had been dumped unlawfully in developing countries. A notorious case arose when a ship, the Khian Sea, left Philadelphia in 1986 with 15,000 tonnes of municipal incinerator ash. The cargo was described as non-hazardous, even though it could have contained hazardous materials. After attempting to off-load its cargo in a number of Central American countries[1], the ship re-emerged off the coast of Singapore in November 1988 with an empty hold and a new name (the Pelicano). With the Khian Sea's cargo having been also 're-described' three times after leaving Philadelphia, the incident raised a whole series of questions about the labelling, description and transboundary dumping of hazardous waste.

One of the difficulties associated with establishing a formal legal framework to regulate the disposal of hazardous waste is that there is a lack of a universally agreed definition of which substances should be deemed as 'hazardous' (see Sands (1995) p457–8). Even at national level, problems can arise within definition-driven regulatory schemes, a factor which can lead to uncertainty and litigation. Nevertheless, there has emerged a body of

binding and non-binding rules which now regulate the international transfer of hazardous substances, the three main treaties being the Basel Convention (1989), the Lome Convention (1990) and the Bamako Convention (1991). The exact content of these Agreements lies outside the remit of this paper. Interested readers should consult Sands (1995, pp503–19) and Tolba et al (1992, pp260–75).

This paper refers to an incident which took place at a similar time to that of the Khian Sea. Specifically, an Italian-sponsored ship, the MV Karin B, attempted to dock in six European countries with a cargo of unknown and incorrectly labelled toxic wastes (including quantities of highly dangerous substances known as PCBs) which had originated in Italy and had been dumped previously in Nigeria. In the case of the UK, the ship was refused permission to berth at Neath on safety grounds, not before firms operating within the UK's waste disposal sector had been linked to the waste by the media. Some of these substances (now labelled correctly) were subsequently imported into the UK in October 1990 and January 1991 for processing, though this event received considerably less media attention.

In this paper, we use event-study analysis to test the hypothesis that the stock market value of waste disposal firms can be affected negatively by adverse publicity, even when firms are operating strictly within existing legal parameters. This analysis contributes to a more general body of the financial economics literature which analyses how stock markets react to unexpected news, for example when a company's product seriously fails to meet its advertised specification, as in the case of an airline crash. The distinctive feature of the forthcoming analysis is that the adverse publicity associated with the health risk and the legal integrity of the Karin B's cargo arose because some firms operating in the UK's waste management industry had the technology capable of processing the unwanted PCB-ridden waste, as opposed to having been negligent or having been a victim of an illegal act, such as drug tampering by a member of the public. Because the arrival of the Karin B off the coast of the UK was not scheduled, its emergence is an 'event' within the spirit of the event-study literature. Two specific hypotheses may therefore be tested given the dramatic increase in environmental awareness of industry and consumers. First, that the adverse publicity associated with the Karin B had a negative impact upon the stock market value of individual firms linked to the Karin B waste; and second, that the stock market value of the waste disposal industry as a whole was also affected negatively.

1. Theoretical background

The scale to which adverse publicity can affect the share price of a firm depends upon the degree to which it can be anticipated. If the risk of an accident is high, adverse publicity becomes a likely event and can be anticipated by investors. For example, the pharmaceutical industry is characterised by several hundred recalls in a typical year, most of which are 'minor' in nature. However, a major product malfunction cannot only have a negative effect upon the shares of the firm in question but can also affect confidence in the industry as a whole (see Jarrell and Peltzman 1985).

Researchers have used a number of models in order to estimate the impact of a 'one-off' piece of news or an event on a firm or on an industry. A recent survey of these approaches can be found in Armitage (1995). Common to them all is an attempt to present a counter-factual statement of what would have happened to the highlighted security(s) had an identified 'event' not occurred. Most event studies employ a return-generating process based on a 'market model'. The foundations of such empirical work rest within the theory of efficient markets, which assumes that the price of any security immediately reflects all currently available information and therefore adjusts as new information becomes available to investors. A typical analysis is based upon the following model:

$$R_{jt} = \alpha + \beta R_{mt} + \mu_{jt} \tag{1}$$

where α and β are regression parameters, R_{jt} denotes the observed return on the security of firm j in time period t, R_{mt} represents the return from a market portfolio of securities and μ is the error term for time period t, assumed to be uncorrelated with the market return. Once the regression parameters are estimated, the security's 'normal' returns are then estimated as a linear transformation with reference to the estimated parameters α and β in expression [1]. By estimating the market model for a period which is different from that of the event, the returns on security j can be forecasted. These returns are conditional on the parameter estimates (α_j,β_j) and the actual return on the market index R_{mt} for each day of the identified event period, usually referred to as the 'event window'. The abnormal return

$$AR_{jt} = R_{jt} - (\alpha_j + \beta_j R_{mt}) \tag{2}$$

measures the impact of the event on security j at time t. For events lasting more than one day, the abnormal returns are summed to obtain the cumulative abnormal return:

$$CAR_{Jt} = \sum AR_{jt} \tag{3}$$

Thus, the estimated abnormal returns defined in [3] are simply the difference between the sum of expected returns for the security in question had the event not occurred and the actual value it did assume in the light of the event (lower in the case of an adverse incident).

2. Background to the Karin B scare

Between 1987 and 1988, around 4,000 tonnes of hazardous waste (including approximately 150 tonnes of PCB-ridden material) originating from Italy had been deposited at a site near the town of Koko in Nigeria. However the waste, which had been imported with the assistance of 'flimsy' documentation, began to leak and to discharge a toxic odour, with reported health problems for the local population. Having been prominent in the past in condemning the dumping of waste in other African countries and embarassed by the

apparent corruption of its officials, the Nigerian government instigated an evacuation of Koko on health grounds, arrested a number of individuals deemed to be responsible for the importing of the waste and recalled its ambassador to Italy. The waste was subsequently transferred to two ships bound for Italy: the Deep Sea Carrier and the Karin B (causing health problems for the dock workers who handled the waste). However, local opposition prevented the Karin B from docking in Italy. As a result, the Karin B set off on voyage in an attempt to unload its cargo elsewhere. Amid an international outcry, six European countries (Spain, France, Germany, Belgium, Holland and the UK) refused to allow the Karin B to dock and unload.

The Karin B applied for permission to berth at Neath[2] on August 26 1988. However, for five days (from August 26 to August 30 1988), the status of the Karin B's waste remained uncertain. This delay highlighted the UK government's failure to implement European Community regulations governing international shipments of toxic waste, which would have required a detailed log of the Karin B's cargo and ultimate destination before it could dock. Eventually, the ship was turned away ultimately because its leaking cargo could not be handled safely. At the end of 1988, the Karin B and the Deep Sea Carrier were finally allowed to unload their cargoes in Italy (Ravenna) when the Italian government decided to recall the Karin B back to Italy and to '…seek a practical solution in the national territory.' Eventually, the most toxic PCB-ridden items in the cargo were imported into the UK and processed by Rechem (reported October 7 1990). The local Waste Disposal Authority (Torfaen Borough Council), had been informed about the PCB consignment but could not refuse to admit the cargo since it was now in a safe condition and Rechem could dispose of it legally.

3. The stockmarket effects of the 1988 Karin B scare

The 1988 Karin B scare is a noteworthy example of the way in which the media was able to draw public attention to the case of waste disposal and in particular, to the implications of international transfers of hazardous wastes. Applying event study analysis, the following investigation seeks to determine whether this media outcry had an adverse impact upon any waste disposal firms which became associated with the waste (albeit indirectly), and indeed, upon the waste disposal industry as a whole. Two alternative market models are estimated below, distinguished by the configuration of the composite security portfolio which is the main independent variable in [1]. One specification is based upon a general market indicator, proxied by movements in the Financial Times All Share Index, whereas the second specification focuses specifically upon a composite variable based upon the waste disposal industry itself, derived from the cumulative share price of all quoted waste disposal companies at the time in question. The latter is intended to provide insight into factors unique to the waste disposal sector, rather than to UK industry as a whole. This raises the issue of which firms should be included within estimates of the stock market value of the 'waste disposal industry', to serve both as a dependent variable and as an independent variable within equation [1]. Consequently, a composite value was derived by equally weighting the daily stockmarket value of each quoted firm whose primary activity

is waste management. In 1988 only three quoted waste disposal firms were trading at the time of the original Karin B incident (Attwoods, Leigh Interests and Shanks and McEwan) and due to Shanks and McEwan receiving its quotation in March 1988, it was only possible to base the analysis on a maximum of 127 trading days, a smaller set of observations than those used in earlier studies.

Three companies became linked to the Karin B through media attention: Leigh Interests, Rechem and Cleanaway. Leigh Interests had shown an interest in examining the Karin B's cargo, but did not have the facilities capable of incinerating the PCBs which were aboard the Karin B. In contrast, Rechem and Cleanaway possessed the high temperature incinerators capable of disposing of the cargo safely. Of these three firms, only Leigh Interests had a stockmarket quotation which could be used within this study.[3] Estimates of α and β for a market model were derived for three different dependent/independent variable combinations: Leigh Interests/FT All Share Index; Leigh Interests/waste disposal industry measure; and the waste disposal industry measure/FT All Share Index. It can be seen in Table 1 that for each case, the *t* statistic associated with the intercept and the independent variable coefficient is statistically significant at the 0.5% level of confidence.

Having determined the parameters of the market model [1], the next stage of the analysis is to estimate the daily abnormal return in each of the three cases defined above (expression [2]) and to estimate the cumulative adverse return (expression [3]).[1] For the purposes of this study, a series of event windows are identified in Table 2. Extending from Tuesday 31 August 1988 (the first trading day after the docking of the Karin B at Neath), event windows of 5 days, 10 days, 20 days and 30 days are used.

Table 1. Market Model Estimates[a]

(125 trading days)					
Dependent Variable	Independent Variable	α	β	F	R^2
Leigh Interests	FT All Share Index	−258.067 (−8.802)*	0.515 (16.544)*	273.717**	0.68
Leigh Interests	Waste Disposal Industry[b]	−99.778 (−6.423)*	0.285 (21.043)*	442.811**	0.78
Waste Disposal Industry	FT All Share Index	−405.493 (−2.962)*	1.886 (12.973)*	168.289**	0.57

[a] *t* ratios given in parentheses.
* significant at the 0.5% level of confidence.
** significant at the 1% level of confidence.
[b] Industry variable excludes Leigh Interests.

Table 2. Cumulative Abnormal Returns Per Share by Estimation Period (in pence).[a]

		EVENT WINDOW:			
Dependent Variable	Independent Variable	5 days	10 days	20 days	30 days
Leigh Interests	FT All Share Index	+3.7 (+0.19)	−18.6 (−0.68)	−16.9 (−0.24)	−28.3 (−0.61)
Leigh Interests	Waste Disposal Industry[b]	−46.1 (−2.90)**	−91.0 (−3.95)*	−116.8 (−3.65)*	−232.6 (−5.94)*
Waste Disposal Industry	FT All Share Index	+132.3 (+1.5)	+205.6 (+1.62)	+227.0 (+1.28)	+621.5 (+2.86)**

[a] *t* ratios given in parentheses.
* significant at the 0.5% level of confidence.
** significant at the 1% level of confidence.
[b] Industry variable excludes Leigh Interests.

The figures in Table 2 suggest that the long term impact of Leigh Interests' association with the Karin B upon shareholder wealth was negative, in terms of its comparative stockmarket performance against both the quoted waste disposal sector and the general UK industry index (the FT All Share Index). Adverse returns for Leigh Interests estimated with reference to the waste disposal industry average share price, was a little over −9 pence for the first 10 days. Over 20 days, this figure had fallen to −5.8 pence, before rising again to −7.75 pence over the full 30 day event window. With the actual share price of Leigh Interests averaging 216 pence during the 30 day event window period, this represnts an average daily loss of around 3.5 per cent per share. In the case of the comparison with the FT All Share Index, Leigh Interests' shares experienced an average daily decline in value of around −1.8 pence within the 10 day event window, −0.8 pence over 20 days and an average of −1.2 pence over the widest 30 day period. This represents an estimated average daily loss of −0.5 pence. It is therefore not surprising that the *t* statistics in all these cases were not significant.

In contrast, Table 2 shows that the waste disposal industry as a whole was not affected detrimentally by the Karin B scare. Overall it experienced positive abnormal returns throughout the identified event windows. This implies that Attwoods and Shanks & McEwan were not associated with Karin B's toxic waste. In addition, the outcomes of both regressions utilising the FT All Share Index reflect a general decline in stock market prices following a government statement at the end of August announcing that the economy was under-performing relative to previous forecasts.

These outcomes are not consistent with those found in similar studies. In the case of airline safety, Mitchell and Maloney (1989) make a distinction between accidents or events for which negligence can be attributed to the carrier (for example, pilot error) and events which were outside of the carriers direct control domain (for example, a hijacking). Where company negligence prevailed, stockholder confidence in the carrier declined whereas events such as a highjacking did not spillover onto the shareprice of the affected carrier. In contrast, this study suggests that investors' confidence in Leigh Interests fell in

the long term, despite the fact that the firm had been associated with the waste in an advisory capacity rather than because it had behaved inappropriately. In a highly publicised case of drug tampering (Tylenol) analysed by Mitchell (1989), both the affected company (Johnson and Johnson), and the industry as a whole experienced a decline in investor confidence even though the incident lay outside of Johnson and Johnson's control domain.

4. Conclusions

Due to the toxicity of some of the substances it is sometimes required to process, the waste disposal industry is always susceptible to adverse publicity, even when the association is tenuous. If economic agents believe that environmental regulations are not strict enough, and hence do not meet their perception of an appropriate standard, adherence to the law may be insufficient to protect firms from adverse publicity. Sometimes, adverse publicity can be specific to one firm and ongoing, for example if a population resides in the shadow of a hazardous waste incinerator. Alternatively, public concern may result from a specific event, such as the arrival of the Karin B in British territorial waters.

Reports that waste originating from the Karin B was being re-admitted into the UK for processing by Rechem, albeit correctly labelled and with the appropriate documentation, emerged in the press on October 7 1990. A similar analysis to that outlined in the previous section was undertaken by the authors, focusing upon Rechem. With the Karin B's waste now scheduled and legal, estimated abnormal returns for Rechem proved to be positive, consistent with a priori expectation. In contrast, the decline in the stock market value of Leigh Interest's shares during the 1988 incident can be attributed to the media helping to fuel the debate about the ethical issues arising from transboundary transfers of hazardous waste to developing countries and the health risks associated with the handling of such substances.

This study has not addressed the question of firm negligence—no waste disposal firm behaved inappropriately in relation to the law which prevailed at that time. Although the industry did not experience a negative spill-over effect from the arrival of the Karin B, Leigh Interests, the only quoted firm to be associated with the waste, experienced a decline in the value of its shares.

Notes

1. 2,000 tonnes were dumped in Haiti in January 1988.
2. Presumably to be close to Rechem's high temperature incinerator plant which would have been capable of processing the Karin-B's most hazardous PCB-ridden waste.
3. Shares in Rechem had been traded on the stock market from August 5 1988, too late to contribute to a meaningful market model.

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