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# Some Empirical Evidence on the Relationship Between Acquisitions, Disposals and the Stock Market

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*Based on empirical studies and theoretical evidence the paper investigates the relationship between inward and outward acquisitions and disposals in the UK and the UK stock market described by the FTSE all-share index. By using the Granger causality test for both the numbers and value of acquisitions and disposals the research results suggest that for the market and period considered, one way relationships are present.*

Key words: *inward and outward acquisitions, disposals, granger causality, stock market index*

JEL classification: *G 34; G30*

## **Introduction**

An important question revolving around the issues regarding mergers and acquisitions activities (M&A) and the stock market is whether M&A activities influence the stock market or if the stock market influences M&A activities and which one influences the other more significantly. The practical relevance on the issue is determined by the fact that stock market prices can be used as predictors of acquisitions and mergers. While the issue remains open for discussion, there are many previous studies that use a variety of approaches to determine the before mentioned relationships.

In one of the earliest relevant studies on the issue, Nelson (1959) used quarterly data to investigate the relationship between merger activity, stock market prices and industrial production over the period 1895-1956. By using simple regression analysis he found that there was a positive and significant relationship, between merger activity and stock market prices between 1895 and 1920 and 1895 and 1956. Even though the results were remarkable he wasn't able to establish a correlation between merger activity and the level of industrial production.

In more recent studies, Clarke and Ioannidis (1996) investigated the relationship between merger activity and the stock market. They used two measures of merger activity (number and value) in the UK with quarterly data from January 1971 to April 1993, on one side and the London Stock Market Index, on the other side. By employing the Granger causality test, the study shows that "real" stock market prices "granger cause" both numbers and real values of mergers.

Another milestone study was developed by Sharma and Mathur (1989) in which they approached the issue whether changes in stock market prices stimulate changes in merger activities, or vice-versa. The results of the study, based on the Granger test for causality, indicated very strong causality going from stock market prices to merger activities. They also found that increases in stock market prices lead to increases in the number of mergers being completed.

Other studies have produced contrary results to the ones previously mentioned. Geroski (1984) looked at the relationship between mergers and the stock market index. Using Granger causality test he found no link between mergers and stock prices in the data he used. He also found that correlations between the variables considered were unstable. Guerard (1989) found no evidence of "Granger causality" running from stock prices or industrial production to mergers in US data in 1895-1964.

Even though various studies have found different results regarding the relationship between stock markets and M&A activities the subject

still raises interest because of one distinct characteristic of the M&A market. As Martynova and Renneborg (2007) and Shleifer and Vishny (2002) presented in their studies the bulk M&A activity took place in distinct waves. The overall characteristics of the waves determines in many aspects the outcome of the studies conducted in the respective period. For example the takeover wave of 1980 which was in its majority a hostile takeover wave is characterised by lower stock market valuations and a less sensitive market. The 1960 wave and the 1990 wave were characterised by (very) high market valuations and a more sensitive market. *In conclusion, regarding which period of M&A activity is investigated the results may vary solely because of the intrinsic characteristics of the takeover waves.*

Alongside the before mentioned empirical studies there are several theoretical considerations that are relevant for the issue. While the link between M&A activity (both numbers and value) and stock market is overall intuitively explanatory due to the fact that the basic principle behind mergers and acquisitions is to create value, *on short term or on long term*, in the form of synergy and abnormal returns.

While the relation between acquisition activity and the stock market evolution is relatively easier to demonstrate on a theoretical level, the other way around needs more fundament to be explained. There is however one interesting fact worth mentioning. One popular cause for failed mergers and acquisitions is the so called “CEO overconfidence”. Malmendier and Tate (2008) described the phenomena as a behavioural disorder that induced CEOs to initiate unfundamented M&A actions based solely on the fact that the stock market experienced periods of growth, periods of growth that determined the CEOs to wrongfully deduct that the acquisitions they would initiate would be successful. Cernat-Gruici et al. (2009) similarly described the phenomenon but stressed more on the informational dysfunction involved.

Based on previous empirical studies and theoretical evidence, in this paper we investigate the relationship between **inward and outward acquisitions in the UK** and the **UK stock market described by the FTSE all-share index**. In addition to the study of causality between acquisitions and stock market we also investigated the link between **disposals and the stock market**.

I have chosen to distinctly *analyze inward and outward acquisitions* due to the fact that alongside proving whether or not there are relationships between acquisition activity and the stock market, it is better to investigate the opportunities *generated by the global market*, making it relevant to understand the different degrees sensitivity response that a market develops according to the origin of the acquirer.

I have also considered *the disposals activities* mainly because this important area in corporate activities is generally overlooked in similar studies. Alongside acquisitions, disposals have also the potential to create value, making them just as valuable as resources in a company's "war chest".

### **The data**

To prove the relationship between acquisitions and disposals and the stock market we used quarterly data on inward and outward acquisition as well as on inward and outward disposal activity in the UK from January 2000 to June 2009. For the market performance we chose the FTSE all-share price index and consequently we determined the log returns by considering the closing price at the end of each quarter. Two measures of merger activity were used (number and value) for two areas of interest (inward and outward) resulting in the total usage of nine indicators as follows:

**Table 1 Indicators**

CBAQ	M&A : Outward : Number of acquisitions
CBAS	M&A : Outward : Number of disposals
CBAU	M&A : Inward : Number of acquisitions
CBAW	M&A : Inward : Number of disposals
CBBI	M&A : Outward : Value of acquisitions : £m
CBBT	M&A : Outward : Value of disposals : £m
CBCQ	M&A : Inward : Value of acquisitions : £m
CBDB	M&A : Inward : Value of disposals : £m
FTSE	The Londn Stock Exchange FTSE all share index

For all data series Augmented Dickey-Fuller Unit Root Tests were performed to check the stationarity condition. Based on the ADF test results the data series were stationarised accordingly:

**Table 2 Augmented Dickey-Fuller Unit Root Tests results**

Indicator	Level	1 <sup>st</sup> difference	2 <sup>nd</sup> difference
CBAQLN	Not stationary	Not stationary	Stationarised
CBASLN	Stationary	-	-
CBAULN	Not stationary	Stationarised	-
CBAWLN	Stationary	-	-
CBBILN	Not stationary	Stationarised	-
CBBTLN	Stationary	-	-
CBCQLN	Not stationary	Stationarised	-
CBDBLN	Stationary	-	-
FTSELN	Not stationary	Stationarised	-

As a sum up, the actual data series used in the analysis al all stationery or stationarised after the first or respectively the second difference, making cointegration tests irrelevant.

## Methodology and Results

To test whether stock market activity is a useful predictor of mergers or vice-versa, we used the Granger causality approach (Granger, 1969; Sims, 1972). The basic idea behind this is that “cause cannot come after effect” and that “correlation is not the equivalent of causality”. If in a set of two covariance stationary variables, the lagged values of the variable “x” affect variable “y”, then “x” can be used to predict “y”, i.e. “x” “granger causes” “y”. The approach to the question of whether “x” causes “y” is to see how much of the current “y” can be explained by past values of “x” and then to see whether adding lagged values of “x” can improve the explanation. “y” is said to be granger-caused by “x” if “x” helps in the prediction of “y”, or equivalently if the coefficients on the lagged “x”s are statistically significant.

For the optimum lag length we have tested all instances for which Granger causality tests will be performed using the following lag length criteria: sequential modified LR test statistic (each test at 5% level), Final prediction error, Akaike information criterion, Schwarz information criterion and Hannan-Quinn information criterion. The following optimum lag lengths have resulted:

**Table 3 optimum lag specifications**

Abbreviation	Indicator	Optimum lags
CBAQ	M&A : Outward : Number of acquisitions	5
CBAS	M&A : Outward : Number of disposals	9
CBAU	M&A : Inward : Number of acquisitions	3
CBAW	M&A : Inward : Number of disposals	3
CBBI	M&A : Outward : Value of acquisitions : £m	5
CBBT	M&A : Outward : Value of disposals : £m	2
CBCQ	M&A : Inward : Value of acquisitions : £m	3
CBDB	M&A : Inward : Value of disposals : £m	2

Furthermore, using the Schwarz Bayes and Akaike information criteria, Clarke and Ioannidis (1996) determined the optimal lag length to be five quarters, being the shortest lag for which no autocorrelation is found in either of the equations entering the VAR. Since the structure of the data used in this paper is similar we consider these findings to be relevant for this paper.

We first test for “Granger causality” between the inward numbers of acquisitions and the stock market index. Since the number of inward acquisitions stock market index are not stationary we used the first difference for both time series in this test.

The first results are shown in Table 4. The hypothesis of “non-causality” from stock market returns to inward acquisitions was rejected at the 10% level of significance. We were not able to reject the complementary hypothesis that inward acquisitions do not “granger cause” stock market prices.

**Table 4 Causality between the number of inward acquisitions and stock market prices from January 2000 until June 2009**

Lags: 3			
Null Hypothesis:	Obs	F-Statistic	Probability
FTSE_D1 does not Granger Cause CBAU_LN_D1	34	2.78542	0.05992
CBAU_LN_D1 does not Granger Cause FTSE_D1		0.99251	0.41121

The same conclusion is drawn when examining the causality relationship between the value of inward acquisitions and stock market prices. For the considered 3 lags, the hypothesis of “non-causality” from stock market returns to inward acquisitions was rejected at the 5% level of significance. We were not able to reject the complementary hypothesis that inward acquisitions do not “granger cause” real stock market prices.

**Table 5 Causality between the value of inward acquisitions and stock market prices from January 2000 until June 2009**

Lags: 3			
Null Hypothesis:	Obs	F-Statistic	Probability
FTSE_D1 does not Granger Cause CBCQ_LN_D1	34	5.25912	0.00548
CBCQ_LN_D1 does not Granger Cause FTSE_D1		1.08009	0.37417

As a sum up, we can clearly state that for the considered time period and market, evidence of one way causality between the stock market and inward acquisitions for both number and value dimensions was discovered. This means that a growing market represents a sufficient incentive to attract foreign companies to make acquisitions on the mentioned market but the same cannot be said vice-versa, meaning that acquisitions involving foreign companies do not exercise any influence on the stock market.

The second group of acquisitions investigated is the outward acquisition group. We tested using the same methodology the causality relationship between the number and value of outward acquisitions and the stock market index.

**Table 6 Causality between the number of outward acquisitions and stock market prices from January 2000 until June 2009**

Lags: 5			
Null Hypothesis:	Obs	F-Statistic	Probability
FTSE_D1 does not Granger Cause CBAQ_LN_D2	31	2.44544	0.06951
CBAQ_LN_D2 does not Granger Cause FTSE_D1		1.40787	0.26400

The findings presented in Table 6 show that for a 10% level of significance hypothesis for non causality can be rejected in the case of market “granger causes” the outward number of acquisitions. As observed



in the case of inward acquisitions the vice-versa relationship is not present.

**Table 7 Causality between the value of outward acquisitions and stock market prices from January 2000 until June 2009**

Lags: 5			
Null Hypothesis:	Obs	F-Statistic	Probability
FTSE_D1 does not Granger Cause CBBI_LN_D1	32	2.14471	0.09969
CBBI_LN_D1 does not Granger Cause FTSE_D1		2.06559	0.11050

The conclusion resulting when examining the causality relationship between the value of outward acquisitions and stock market prices is that for the considered 5 lags, the hypothesis of “non-causality” from stock market returns to inward acquisitions was rejected at the 10% level of significance, which is consistent with the findings regarding the number of outward acquisitions. We were not able to reject the complementary hypothesis that outward acquisitions do not “granger cause” real stock market prices.

Just like the case of the previously drawn conclusions regarding inward acquisitions, the same behaviour is observed in the case of outward acquisitions. Although the level of statistical significance is greater in the case of inward acquisitions, the nature of the relationship between the stock market and the two types of acquisitions remains is the same.

Regarding the causality relation between inward and outward disposals and the stock market, by using the same methodology we have found different results. Although the results are more inconclusive than in the case of acquisitions some evidence of granger causality was identified.

The causality between the number of inward disposals and stock market prices is shown in Table 8. Unlike the case of acquisitions where

the market index “granger caused” acquisitions, in the case of disposals, for a 5% level of significance, the number of inward disposals “granger causes” the stock market. Like in the case of acquisitions however, the vice-versa relationship is not present.

**Table 8 Causality between the number of inward disposals and stock market prices from January 2000 until June 2009**

Lags: 3			
Null Hypothesis:	Obs	F-Statistic	Probability
FTSE_D1 does not Granger Cause CBAW_LN	34	1.90922	0.15191
CBAW_LN does not Granger Cause FTSE_D1		3.33645	0.03409

Even though some evidence of causality can be identified between the number inward and outward disposals and the stock market, no such evidence was found for the value of inward or outward disposals. One explanation for this phenomenon is that disposals are mainly employed to preserve value on the short term.

**Table 9 Sum up of the Granger causality tests**

Instance	Significance	No. of Lags
<b>Market Performance “granger causes” the:</b>		
number of inward acquisitions	Significant at 10%	3
value of inward acquisitions	Singnificant at 5%	3
number of outward acquisitions	Significant at 10%	5
value of outward acquisitions	Significant at 10%	5
number of inward disposals	Not significant	3
value of inward disposals	Not significant	-
number of outward disposals	Not significant	-
value of outward disposals	Not significant	-

<b>Market Performance is “granger caused” by the:</b>		
number of inward acquisitions	Not significant	3
value of inward acquisitions	Not significant	3
number of outward acquisitions	Not significant	5
value of outward acquisitions	Not significant	5
number of inward disposals	Singnificant at 5%	3
value of inward disposals	Not significant	-
number of outward disposals	Not significant	-
value of outward disposals	Not significant	-

### Conclusions

The results found in this paper are consistent with the findings of Clarke and Ioannidis (1996) and Sharma and Mathur (1989) in the way that stock market prices “granger cause” acquisitions. Even though there are studies that contradict these findings, one of the main reasons for the existence of contrary results is the time interval studied, the characteristics of mergers and acquisitions waves playing a major role in the outcome of the studies.

The first results show that both the number and value of inward acquisitions are “granger caused” by stock market prices, adding to the theory that CEOs, and in this case foreign companies’ CEOs, decisions to merge with or acquire companies on other markets are strongly influenced by the respective stock market evolution, driven by the perspective of high future market capitalisation.

Even though evidence of causality was found between the stock market and inward acquisitions, no such evidence was found between inward acquisitions and the stock market index. Considering that one of the proposed common causes for failed acquisitions is the “CEO overconfidence” the result is consistent with the fact that the stock

market “granger causes” inward acquisitions. Although indirect, the results in this paper support the “CEO overconfidence” justification.

Regarding the number and value of outward acquisitions, even though the results have less statistical significance than the case of inward acquisitions, proof is still found that the stock market “granger causes” outward acquisitions. Like in the case of inward acquisitions, bilateral causality is still not present. The evidence shows that the stock market stimulates not only acquisitions on the respective market but global outgoing acquisitions. A solid stock market does indeed encourage CEOs to initiate costly merger and acquisition transactions, the domestic market acting in a way as a safety net in case the overseas acquisitions go bust.

Some evidence of causality was identified in the case of inward disposals also. Contrary to the findings regarding the acquisitions, in the case of disposals the causality relationship was identified for the number of inward disposals in the sense that the number of disposals “granger cause” the stock market prices. Even though the results are not backed by findings regarding the causality between the number of outward disposals and the value of inward and outward disposals and the stock market, we have identified some evidence that the number of disposals has influence over the stock market. Further deeper studies regarding this matter will undoubtedly provide more solid evidence.

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**number of inward acquisitions**

Lag	LogL	LR	FPE	AIC	SC	HQ
0	23.20872	NA	0.000754	-1.514908	-1.419751	-1.485818
1	30.29884	12.66094*	0.000605	-1.735632	-1.450159*	-1.648360*
2	33.92053	5.949917	0.000626	-1.708609	-1.232822	-1.563156
3	39.10059	7.770092	0.000583*	-1.792900*	-1.126797	-1.589265
4	40.10791	1.367074	0.000741	-1.579136	-0.722719	-1.317321
5	45.33243	6.344059	0.000708	-1.666602	-0.619870	-1.346606
6	49.64651	4.622230	0.000738	-1.689037	-0.451989	-1.310859
7	50.50886	0.800749	0.001017	-1.464918	-0.037556	-1.028560
8	51.86634	1.066595	0.001412	-1.276167	0.341510	-0.781627
9	56.75184	3.140677	0.001623	-1.339417	0.468575	-0.786696

\* indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

**value of inward acquisitions**

Lag	LogL	LR	FPE	AIC	SC	HQ
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### number of outward acquisitions

Lag	LogL	LR	FPE	AIC	SC	HQ
0	8.117012	NA	0.002179	-0.453112	-0.357124	-0.424570
1	26.41693	32.53319	0.000757	-1.512365	-1.224401*	-1.426738
2	32.84256	10.47140	0.000637	-1.692042	-1.212102	-1.549330
3	35.44696	3.858368	0.000717	-1.588664	-0.916748	-1.388868
4	42.91493	9.957297*	0.000571	-1.845551	-0.981659	-1.588670
5	49.13149	7.367770	0.000508*	-2.009740*	-0.953873	-1.695775*
6	52.19215	3.174021	0.000586	-1.940159	-0.692316	-1.569110
7	54.61147	2.150506	0.000735	-1.823072	-0.383253	-1.394938
8	60.63644	4.462942	0.000744	-1.973070	-0.341275	-1.487852
9	62.97389	1.385151	0.001068	-1.849917	-0.026147	-1.307615

\* indicates lag order selected by the criterion

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HQ: Hannan-Quinn information criterion

### value of outward acquisitions

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-4.959021	NA	0.005636	0.497073	0.592230	0.526164
1	3.619800	15.31932	0.004070	0.170014	0.455487*	0.257286*
2	6.139542	4.139576	0.004552	0.275747	0.751534	0.421200
3	11.31395	7.761615	0.004244	0.191861	0.857963	0.395495
4	11.83042	0.700924	0.005584	0.440684	1.297101	0.702499

5	22.81507	13.33850*	0.003536*	-0.058219*	0.988513	0.261777
6	23.99428	1.263435	0.004614	0.143266	1.380313	0.521443
7	27.15965	2.939277	0.005390	0.202882	1.630244	0.639241
8	29.03700	1.475060	0.007210	0.354500	1.972177	0.849040
9	36.62411	4.877424	0.006834	0.098278	1.906270	0.650999

\* indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

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HQ: Hannan-Quinn information criterion

### number of inward disposals

Lag	LogL	LR	FPE	AIC	SC	HQ
0	11.71293	NA	0.001713	-0.693781	-0.598623	-0.664690
1	22.38190	19.05173	0.001066	-1.170136	-0.884663	-1.082864
2	27.19526	7.907662	0.001012	-1.228233	-0.752446	-1.082780
3	37.51758	15.48347*	0.000653*	-1.679827*	-1.013725*	-1.476193*
4	37.66040	0.193832	0.000882	-1.404314	-0.547897	-1.142499
5	39.39359	2.104583	0.001082	-1.242399	-0.195667	-0.922403
6	44.19725	5.146787	0.001090	-1.299804	-0.062757	-0.921626
7	45.78030	1.469968	0.001425	-1.127164	0.300198	-0.690805
8	52.14752	5.002817	0.001384	-1.296251	0.321426	-0.801711
9	60.51458	5.378825	0.001240	-1.608184	0.199808	-1.055463

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### value of inward disposals



Lag	LogL	LR	FPE	AIC	SC	HQ
0	10.11102	NA	0.001921	-0.579359	-0.484201	-0.550268
1	21.34468	20.06011*	0.001148	-1.096049	-0.810576*	-1.008777
2	22.21273	1.426081	0.001444	-0.872338	-0.396551	-0.726885
3	28.45453	9.362695	0.001248	-1.032466	-0.366364	-0.828832
4	34.28928	7.918588	0.001123	-1.163520	-0.307103	-0.901705
5	39.53420	6.368833	0.001071	-1.252443	-0.205711	-0.932446
6	43.71692	4.481487	0.001128	-1.265494	-0.028447	-0.887317
7	50.74819	6.529040	0.001000	-1.482014	-0.054652	-1.045655
8	60.08933	7.339461	0.000785*	-1.863523	-0.245846	-1.368983
9	66.73629	4.273049	0.000795	-2.052592*	-0.244600	-1.499871*

\* indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

### number of outward disposals

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-6.629427	NA	0.006350	0.616388	0.711545	0.645478
1	1.476162	14.47427*	0.004744*	0.323131*	0.608604*	0.410403*
2	1.985324	0.836480	0.006124	0.572477	1.048264	0.717930
3	6.338382	6.529587	0.006055	0.547258	1.213361	0.750893
4	9.297108	4.015413	0.006692	0.621635	1.478052	0.883450
5	13.46591	5.062118	0.006895	0.609578	1.656310	0.929574
6	13.97916	0.549910	0.009436	0.858631	2.095678	1.236809
7	16.35249	2.203807	0.011664	0.974822	2.402184	1.411181
8	19.80976	2.716425	0.013937	1.013589	2.631266	1.508129
9	25.58681	3.713817	0.015033	0.886657	2.694648	1.439378

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LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

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### value of outward disposals

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-10.23522	NA	0.008215	0.873945	0.969102	0.903035
1	-3.396540	12.21194*	0.006718*	0.671181*	0.956654*	0.758453*
2	-1.804195	2.615996	0.008028	0.843157	1.318944	0.988610
3	3.007140	7.217002	0.007682	0.785204	1.451307	0.988838
4	5.146027	2.902775	0.009001	0.918141	1.774558	1.179956
5	8.874519	4.527454	0.009572	0.937534	1.984266	1.257531
6	11.37228	2.676172	0.011367	1.044837	2.281884	1.423015
7	14.81120	3.193284	0.013021	1.084914	2.512276	1.521273
8	17.08653	1.787759	0.016930	1.208105	2.825782	1.702645
9	24.80635	4.962743	0.015894	0.942403	2.750395	1.495124

\* indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

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Relevant papers:

– Bogdan CERNAT-GRUICI, *The way to victory – Using military strategies in business situations*, The Romanian Economic Journal (3) 2008 pp. 99- 116 , ISSN 1454-4296

– Bogdan CERNAT-GRUICI, Gheorghe Hurduzeu, Laura Gabriela Constantin, *A century of corporate warfare- A military perspective on acquisitions and hostile takeovers*, Regional Stability and Security, Carol I National Defence University Press, Bucharest 2009, Volume I pp.114-125, ISBN 978-973-663-722-3