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Power Plays:

An M&A approach to Market Concentration

M&A Research Centre – MARC

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MARC – Mergers & Acquisitions Research Centre

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Overview

The Bayer-Monsanto deal is controversial in a number of ways, some linked to ecological concerns around Monsanto's products. But the main opposition is well worn: that it would reduce competition in agricultural chemicals. While we are not in a position to judge whether anti-trust rules have been violated, the rationale behind the merger is at least partly likely to be linked to not just cost savings and innovation sharing, but also to an attempt to change the profitability dynamics of the industry.

It may seem obvious that increasing concentration will increase the profitability of a market, but it is not always the case. Look at the UK food retail sector. The market is already dominated by four players (the discounters still have less than 10% share) and yet some, like Tesco, are struggling to make a 5% margin. (The Asda/Sainsbury proposal is arguably a triumph of hope over experience).

In this paper we tackle the following main questions:

- Are more synergies generated by a deal the more the deal concentrates a market?
- If you are doing such a deal (a deal within your own sector), are there certain qualities about the targets you should be looking at?
- And are there aspects of your own firm that will influence the success or failure of these deals?

The approach we avoid

We take a holistic approach to the concept of synergy. We are not looking at documented cost savings, margin gains or cross selling opportunities. In particular we are not looking at the gains companies claim pre-deal in what is usually an accompanying PowerPoint PR slide pack. We are also not considering the synergies reported after the deal takes place. We believe there are two fundamental problems with taking such an approach. The first is that it is almost impossible to capture the benefits and costs in a merger by direct up-front financial analysis given the almost limitless list of impacts including, but not restricted to: cost savings, integration costs, enforced disposals, technology sharings, best practice exchange, fundamental changes in market structure, loss of key personnel, etc. Secondly, the synergies claimed by acquiring companies after the event are somewhat suspiciously almost always greater than those targeted and are impossible to verify externally given that the business units involved have merged, often the whole rationale for the deal.

We take a 'market' approach

So instead we take what might be called an independent 'market' approach and judge total synergy creation by the value the market ascribes is being added by the deal. We consider intra-sector deals only and our findings are as follows:

- The more the deal concentrates a market, the greater the synergies
- Low leverage of the target leads to higher value creation
- Low profitability of the acquirer leads to greater value creation

The findings of the paper support our initial expectations in that when firms gain higher market power, i.e., a merger upwardly changes market concentration, the merger results in more synergistic gains to the merging firms. However, it is necessary for the level of market concentration to be below a certain threshold before the deal; otherwise there is likely to be little potential for incremental operational gains and there is a risk of anti-trust intervention.

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What we knew about synergies and M&A

The ultimate goal of many if not most mergers and acquisitions is the creation of synergies that can lead to improved efficiency, strengthened market presence, greater growth opportunities and increased profitability.

On the one hand, there are numerous papers proving the existence of synergies.[1] On the other hand, just as numerous are the studies suggesting that mergers do not lead to the successful creation of synergies but rather the opposite.[2] A possible explanation for this discrepancy may be the wide range of motives for entering the transaction as well as the post-event characteristics of the merging firms' market.

Generally, regardless of the industry, a merger between two companies, within that industry, will result in a lessening of competition, and hence will tend to be better received by the market.

Factors affecting M&A

The motives behind mergers are not the only matter to impact M&A transactions. There are other factors in the financial literature that have been proven to affect M&A in regard to value creation. To distinguish them further, there are considerations not related to the primary reasoning behind the merger, which however still affect the outcome of the transaction. One paper[3] summarises 89 empirical studies published between 1984 and 2009 and concludes that the most frequent factor is relatedness of the acquiring firm (58% of studies), followed by the relative size of the target to the bidder company (52% of studies), previous M&A experience of bidder (28% of studies) and the method of payment (18% of studies). Some of these factors, and additional ones which are not listed above, are considered in our work.

Nevertheless, there are no corroborative conclusions on how exactly relatedness impacts profitability. However, another paper[4], found that related mergers result in higher abnormal returns when compared against unrelated ones while other studies[5] claim that due to cultural differences, a domestic merger has much higher chance of being successful than an international one.

As an aside, on a very basic level mergers and acquisitions can be of such size as to affect the whole acquiring company's risk profile. This is mainly due to their intrinsic nature, as in addition to improving efficiency, mergers often lead to better diversification, i.e. healthier risk appearance. A positive result of this reduced business risk is that many companies appear to improve their financial leverage post-merger as well as experience greater tax benefits from using more debt.

It is important to note that there is a gap in the extant M&A literature since not many papers have examined the effect of changes in industry concentration on deal synergies. The papers studying market concentration in mergers mainly examine the relationship between merging firms and their rivals, and whether the merger results in anticompetitive behaviour.[6] Generally, results show a positive synergy creation. This is most evidenced in the banking sector. Studies have documented that since 1990, mergers between banks in highly concentrated markets lead to higher deposit rates, and hence, higher profitability to the merging banks.[7]

[1] As an example, see Craninckx, K. and Hyghebaert, M., European Management Journal, 2015
[2] As an example, see Moeller, S. B., Schlingemann, F.P. and Stulz, R.M. Journal of Finance, 2005
[3] As an example, see Hitt, M., King, D., Krishnan, H. and Makri, M., Business Horizons, 2009
[4] Singh, H. and Montgomery, C., Strategic Management Journal, 1987
[5] As an example, see Piekkari, R., Vaara, E., Tienari, J. and Sdntti, R., The International Journal of Human Resource Management, 2005
[6] As an example, see Shahrur, H., Journal of Financial Economics, 2005
[7] As an example, see Hankir, Y., Rauch, C. and Umber, M., Journal of Banking & Finance, 2011

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Market Power

In many instances, firms strive to increase their presence in the market since doing so will allow them to have a bigger impact on the pricing of products. This can be exceptionally harmful to consumers, and it is the reason why governments may intervene if a proposed merger would result in monopolistic power in the market. Intra-industry mergers between two large relative companies result in a substantial lessening of competition.[8] It is often argued that the weakened regulatory oversight through the late 1990s increased incentives for companies to acquire competitors with the intention of extending their power over price, quality and nature of the product. This rise in market power can be seen as a transfer from consumers to the company and, thus, a value stream which is interconnected with the deal premium. On the contrary, three potential sources of merger gains, specifically, tax savings, productive efficiencies and increased market power, actually indicate that neither tax savings nor higher market power lead to as many gains as the better deployment of available resources.[9]

The main question

In this study, the focus is on intra-sector mergers. Since these mergers occur between two companies in the same industry, they have the potential to change the market concentration and competitiveness within that industry. Moreover, acquisitions which occur within an already concentrated industry may lead to a substantial holding of market power and in extreme cases, a monopoly one. In some occasions, mergers within highly concentrated industries, may effortlessly enable collusion. It could then be argued that if such a collusion probability exists, competitors of the combining companies are also expected to earn positive abnormal returns around the M&A announcement.

This is how the Market Power Hypothesis was born. It is centred on anticompetitive effects arising from mergers and acquisitions. For this reason, antitrust authorities usually inspect whether a merger may lead to such an outcome. This is evident in the banking sector, for example, as it may lead to more limited lending: in one study in the early 1990's, substantial mergers led to a change in deposit rates because of greater market power, whereas smaller mergers, with a lower impact on concentration, did not affect deposit rates at all.[10] This suggests a link between realised effects and post-event market concentration.

As such, the study posits that the synergistic gains generated by mergers are affected by post-event market concentration because if they lead to reduced competition, the market will notice this and react. The main reason for this is that the greater market concentration may lead to strengthened market power of not only acquirers but rivals as well, possibly resulting in higher prices and hence, higher revenues.

Our angle

As mentioned at the opening of this report, there is no definite method of measuring synergistic gains. So, to test for our hypothesis, we use the method suggested by Ellert (1976[11]), stating that the existence of any positive abnormal returns around a merger will confirm the existence of synergies. This will in turn show whether the created synergies are affected by market concentration. A positive relationship between created synergies and market concentration is expected, since investors, who believe that higher market power leads to higher profitability, will revalue the merged company.

Previous literature also, unsurprisingly, attests that if the two combining companies are related, they are much more likely to achieve synergistic gains than if they were unrelated. This is taken into account by only including mergers where the acquirer and the target share the same first 3-digit primary SIC code, i.e., horizontal

[8] Hankir, Y., Rauch, C. and Umber, M., Journal of Banking & Finance, 2011

[9] Devos, E., Kadapakkam, P. and Krishnamurthy, S., The Society for Financial Studies, 2008

[10] Prager, R. and Hannan, T., Journal of Industrial Economics, 1998

[11] Ellert, J., The Journal of Finance, 1976

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mergers. One paper argues that horizontal mergers have a higher chance of achieving successful synergies as they allow for the realisation of economies of scale and scope as well as gains from market power. [12] Furthermore, of course, horizontal mergers are the only ones that we could meaningfully test for market concentration effects.

Hence, the focus of this study is to determine whether returns related to merger events intra-sector are affected by potential changes in market concentration.

[12] Seth, A., Strategic Management Journal, 1990

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Our approach and our questions

Our deal sample is based on the U.S. market, with transactions taking place between 1 January 2004 and 31 December 2014, This yields 10,757 mergers and acquisitions. We then impose certain criteria necessary for this study (detailed in the Appendix).

Considering these aforementioned restrictions and the additional restriction that the buyer and selling companies have the first 3 digits of their SIC code in common, the sample is reduced to 589 mergers. However, after obtaining stock prices of both bidders and targets, the sample is additionally restricted in that all acquirers and targets should have share prices data available for at least 240 days before and 80 days after the M&A announcement date. The purpose of the restriction is to perform the Event Study. Ultimately, this gives a sample of 461 mergers meeting all requirements.

The event study

In brief, to do this, the abnormal returns to the target, acquirer, and the merged company, are calculated during each merger event, and further assessed whether they are significantly influenced by the change in the Herfindahl–Hirschman Index stemming from the merger.

To study the effect of the merger announcement on both parties of the merger, the research utilises the event study methodology. Event studies are used because there is a general acceptance in the financial literature that they are able to capture the effects of merger announcements on targets and bidders.[13] Event studies employ the use of firms' share prices, which according to the value theory facilitate the correct determination of companies' financial performance since embedded in the share price is the present value of expected future returns. This means that whenever there is a change of expectations about the future performance of the firm, the stock price will immediately react. In this manner, it is important to note that the event study methodology assumes the market is semi-strong efficient and will react to any new information as soon as it is available.

Our event study methodology

We measure the market reaction to the announcement of a deal over a given period. For those believers in efficient markets this is taken as a marker as to the value creation (or not) of the deal. While this data is often cited and is the most widely used to judge deal success, there are issues with that viewpoint such as its interaction with risk arbitrage strategies. In the final study, we therefore use a window that runs from two days prior to announcement to two days after. This is to catch any pre-announcement run up and to allow the market to digest the financial implications of a deal. The abnormal returns are calculated versus those of the average stock in the study. (We also considered using the market as the benchmark, but robustness checks indicated that the outcomes were qualitatively consistent). This event window is the most commonly used in the literature but note that we show our early analysis across a range of windows.

In our particular study we need to analyse the share price movements in the context of synergy creation and market concentration.

Synergy measure

In order to create a measure for synergies as the dependent variable, the study follows the model developed by Bradley et al. and constructs a value-weighted portfolio of the acquirer and target, weighting their respective market capitalisations 20 trading days before the announcement.[14] It employs the constant-mean-adjusted model to calculate the expected normal returns. Then, as suggested by Lang et al., once the portfolio has been created, its cumulative abnormal returns over the various

[13] Fama, E. and Jensen, M., The Journal of Law and Economics, 1983)

[14] Bradley, M., Desai, A. and Kim, E., Journal of Financial Economics, 1988

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event windows can be seen as a valid measure of the created synergies.[15] The formula for the returns is given as Figure 7 in the Appendix.

This will be used to test the market power hypothesis, which posits that there is a positive relationship between abnormal returns of the merging firms and both the concentration of the industry in which the merger takes place and the merger-provoked change in concentration.

Market concentration measure

The paper employs the method used by the U.S. Department of Justice (DoJ) to monitor for market concentration, through the use of the Herfindahl-Hirschman Index (HHI). The index is calculated as the sum of the squared market shares (MS_i) of all (N) firms within the industry and is scaled from 0 to 10,000 points, where higher concentration is indicated by a higher number.

$$HHI = \sum_{i=1}^{N} {MS_i}^2$$

The change in market concentration caused by a merger is calculated independently from the industry level HHI. It is simply the doubled product of the market shares of both acquirer (MS_A) and target (MS_T).

$$Change\ in\ HHI = 2 * MS_A * MS_T$$

The event study methodology is performed in a multivariate framework so we can consider other (in addition to market concentration) potential drivers of synergy size such as profitability and leverage. The variables considered and their averages in our study are shown below.

Figure 1: Descriptive Statistics for accounting control variables

	Acquirer			Target		
Accounting Ratio	**Mean**	**Median**	**Std. Dev.**	**Mean**	**Median**	**Std. Dev.**
Return on Equity	5.84%	11.69%	1.409	4.39%	7.26%	1.560
Debt/Equity	1.343	0.529	9.773	0.743	0.374	4.127
Debt/Capital	0.388	0.361	0.317	0.407	0.311	1.624
Equity/Total Assets	0.384	0.391	0.284	0.398	0.403	0.386
Net Profit Margin	8.85%	10.97%	0.298	-68.92%	6.33%	12.318
Cash Flow/Sales	0.222	0.232	0.185	-0.528	0.153	11.314
Cash/Current Assets	0.405	0.412	0.256	0.455	0.451	0.297
Book-to-Market	0.615	0.517	0.760	0.679	0.550	0.858

Source: Cass Business School

[15] Lang, L., Stulz, R. and Walkling, R., Journal of Financial Economics, 1989

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Our findings

First, we consider the overall returns around the deals in our study.

In accordance with the financial literature, the paper finds that targets earn statistically significant positive returns, in contrast to the acquirers' negative such returns as shown in Figure 2.[16]

Figure 2: Cumulative abnormal returns to targets and bidders across event windows

Event period	**Target** Abnormal return	**Acquirer** Abnormal return
(-1, +1) Significance	**29.01%** (Strong)	**-0.13%** (Very weak)
(-2, +2) Significance	**29.24%** (Strong)	**-0.19%** (Very weak)
(-5, +5) Significance	**29.46%** (Strong)	**-0.21%** (Very weak)
(-10, +10) Significance	**29.12%** (Strong)	**-0.45%** (Very weak)

Source: Cass Business School

Even though the average acquirer experiences negative returns, they are statistically insignificant. Thus, it cannot be concluded that the merger destroys value. To test this proposition, we examine whether synergies are actually created by looking at the combined reaction of acquirers' and targets' shares. Irrespective of the event window period selected, the results show significantly positive abnormal returns (see Figure 3 below). The values are consistent with previous literature studying the existence of value gains in intra-sector mergers. More importantly, it can be said that the results agree with the synergy expectation in that the total gain to both parties is significantly positive.

Therefore, it can be said that for the studied sample, mergers, on average, result in synergistic gains. Subsequently, this gives us the opportunity to examine the hypothesis that they are affected by the level of market concentration, in that the higher the change in market concentration induced by the merger, the higher the abnormal returns generated.

Figure 3: Statistics of created synergies in combined entity

Event Window	**Observations**	**Mean abnormal return**	**Median abnormal return**	**Significance**
(-1, +1)	461	3.01%	1.85%	Strong
(-2, +2)	461	2.95%	1.80%	Strong
(-5, +5)	461	2.94%	1.70%	Strong
(-10, +10)	461	2.50%	1.74%	Strong

Source: Cass Business School

[16] In the regression analysis results that follows we ascribe the following descriptors to various significance levels: Strong (p value < 0.01), Moderate (p<0.05), Weak (p<0.1), Very weak (All other values).

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The first significant finding is that the higher the market concentration within the industry the higher the value of total synergies created (Figure 4). But as we will see even this 'basic' finding has its limits.

Now we return to our three main questions:

- Are more synergies generated by a deal the more the deal concentrates a market?
- If you are doing such a deal (a deal within your own sector), are there certain qualities about the targets you should be looking at?
- And are there aspects of your own firm that will influence the success or failure of these deals?

These questions are tackled using a multi-variable analysis, with results shown in Figure 5. At this stage we proceed only with the (-2,2) event window with results to this point being largely independent of deal window and (-2,2) being the most common window seen in other studies.

Results

There are three significant results:

- The more the deal concentrates a market, the greater the synergies
- In intra-sector deals, low leverage of the target leads to greater value creation
- In intra-sector deals, low profitability of the acquirer leads to greater value creation

Note: the data for other control variables with an insignificant impact (as described in Figure 1) is not shown.

The model shows that the most influential factors on the created synergies are in fact the change in market concentration, the change in market concentration relative to the industry, the target's debt-to-equity ratio and the acquirer's ROE.

We can interpret the figures in percentage terms which helps give a better feel for the relative importance of these factors. So, a 1% increase in concentration post-merger will lead to a 4.6% increase in synergies.

However, in contrast to previous models, the level of Herfindahl Index itself is no longer significant in explaining synergies. Nonetheless, the high significance of the change in market concentration and the change relative to the industry imply that it is indeed the change in post-event market concentration that drives the value of created synergies, as hypothesised. Furthermore, the High Concentration (HH index >1,800) result suggests that if a merger is within a highly concentrated market, the synergies created are expected to be 3.1% higher. The results agree with another study in that mergers between firms within highly concentrated industries generally lead to better efficiency, which the market prices into the shares.[17]

The analysis also gives us two drivers of intra-sector merger synergies. Lower leverage of a target leads to greater value creation through synergy, as does lower target profitability.

There is one final conclusion, and that comes from the significant negative relationship between synergy and the term (Change in HHI * absolute level of HHI). This tells us that there is a limit. If industries are close to being a monopoly/duopoly then further increases in HHI start to see diminishing returns in terms of further synergy through mergers.

[17] Peltzmann, S., The Journal of Law and Economics, 1977

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Figure 4: Testing for effect of Herfindahl-Hirschman Index on synergies

	Interval (days)			
Variable	**(-1, 1)**	**(-2, 2)**	**(-5, 5)**	**(-10, 10)**
Herfindahl Index	**0.0180** (Strong)	**0.0187** (Strong)	**0.018*** (Moderate)	**0.0142** (Weak)
Observations	461	461	461	461

Source: Cass Business School

Figure 5: Multiple regression model: Testing for effect of influencing variables on synergies (-2,2 event window)

Variable	**Synergy impact**
Herfindahl Index	-0.00296 (Very weak)
Change in Herfindahl Index	**0.0460** (Strong)
Change in HHI * Herfindahl Index	**-0.00559** (Strong)
Deal Value	-0.000152 (Very weak)
Target's Debt/Equity	**-0.00291** (Strong)
Acquirer's Return on Equity	**-0.00492** (Strong)
High Concentration	0.0311 (Weak)

Source: Cass Business School

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Conclusions and recommendations

This report examined the effect of market concentration on value creation in mergers and acquisitions by studying a sample of 461 horizontal mergers in the U.S. between 2004 and 2014. In competitive markets, companies earn normal profits in the long-run. This usually means that if markets are more concentrated, firms have a higher potential to realise superior gains. Therefore, the investigation had an initial expectation that if mergers lead to higher concentration, they are likely to achieve higher gains when compared to those occurring in already more competitive markets.

In order to assess if this is true, the study used the market value-weighted combined abnormal returns reaction of targets and bidders to M&A announcements as a proxy of additional value creation, i.e., synergies.

Market power pays off

The in-market mergers studied in this report showed positive synergy creation in that, on average, they resulted in a positive total gain to both bidders and targets. Furthermore, the study concluded that those mergers which result in higher merger-induced changes in market concentration lead to a higher value of created synergies. Moreover, the study found that additional value is created when the target firm has a lower leverage and the bidder has lower profitability, as measured by their debt-to-equity and return on equity ratios respectively (in the year prior to the merger).

We would argue that the latter of these findings in particular makes intuitive sense in that a less profitable acquirer has more to gain from an in-market acquisition from pricing power and basic economies of scale, than an already optimised business. The leverage finding is perhaps less intuitively obvious but could be linked to the market's dislike of the acquisition of already highly leveraged targets.

Another finding of the paper was that many of the factors that have been proven to affect mergers and acquisitions in general had no impact on the studied intra-sector deal sample. The paper also showed that if the market is close to monopolistically dominated, mergers are expected to result in a lower value of synergistic gains. This may be explained by the antitrust laws imposed on mergers and acquisitions in the U.S. (and elsewhere), which require merging companies in less competitive industries to amend their initial deal arrangements if they are to result in higher market concentration. These amendments may cause different outcomes than originally planned, hence the lower value creation.

Overall, the findings of this study are additive to previous papers in the field that the merger-induced change in market concentration is looked at in terms of its impact on total value creation for the firms involved, whereas previous literature is mainly focused on whether mergers result in collusive and anticompetitive benefits as measured by the combined gains to the merging firms and their rivals. Therefore, this paper contributes to the existing literature by showing the positive impact of greater market concentration in various industries on the creation of additional value for the merging firms only.

Some lessons

For firms looking to make acquisitions the messages are fairly clear. First, the market is probably right in typically pushing you towards in-market deals rather than cross-border or cross-sector acquisitions, as long as your own market is yet to be near oligopoly status (in which case the regulators may have something to say anyway!). Second, markets may also welcome such deals as a way out of a profitability hole, as long as you are not taking on a deal with excessive leverage.

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Appendix

Deal sample

Our deal sample is based on the U.S. market, which offers the most complete data due to the SEC's consistent and detailed reporting requirements. To gather the merger data, the study uses the Thomson One Banker's M&A Database for transactions between 1 January 2004 and 31 December 2014, where both the target and the acquirer are U.S. public companies. This yields 10,757 mergers and acquisitions meeting these conditions. However, all deals also have to comply with the following criteria:

- M&A deal information is disclosed
- Transaction Value is disclosed
- Transaction Value is greater than $100 million
- Deal is not cross-border
- Deal is not cross-industry
- SIC codes of Acquirers and Targets are available
- Deal is completed

The below table summarises the satisfying 461 deals:

Figure 6: Descriptive Statistics of deals according to major division of operations

Division	**Number of Deals**	**% of Total**	**Total Deal Value ($Mil)**	**Average Deal Value ($Mil)**	**Median Deal Value ($Mil)**
Mining	28	6.07%	$121,162	$4,327	$1,684
Manufacturing	154	33.41%	$284,001	$1,844	$709
Transportation & Public Utilities	48	10.41%	$245,944	$5,123	$1,611
Wholesale Trade	5	1.08%	$2,513	$502	$592
Retail Trade	10	2.17%	$9,535	$953	$733
Finance, Insurance, & Real Estate	140	30.37%	$293,805	$2,098	$314
Services	76	16.49%	$106,322	$1,398	$540
Total	**461**	**100%**	**$1,063,285.96**	**$16,249**	**$6,186**

Source: Cass Business School

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Return formulation

Figure 7: Weighted abnormal return formulation

$$Combined\ Reaction = \frac{CAR_{A,(-t_1,t_2)} * MV_{A,t=-20} + CAR_{T,(-t_1,t_2)} * MV_{T,t=-20}}{MV_{A,t=-20} + MV_{T,t=-20}}$$

***$CAR_{A,(-t1,t2)}$*:** Acquirer's cumulative abnormal return for event window ($-t_1$, t_2);

***$CAR_{T,(-t1,t2)}$*:** Target's cumulative abnormal return for event window ($-t_1$, t_2);

***$MV_{A,t=-20}$*:** Acquirer's market capitalisation 20 trading days prior the announcement;

***$MV_{T,t=-20}$*:** Target's market capitalisation 20 trading days prior the announcement.

Source: Lang et al. (1989)

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Cass Business School
In 2002, City University's Business School was renamed Sir John Cass Business School following a generous donation towards the development of its new building in Bunhill Row. The School's name is usually abbreviated to Cass Business School.

Sir John Cass's Foundation
Sir John Cass's Foundation has supported education in London since the 18th century and takes its name from its founder, Sir John Cass, who established a school in Aldgate in 1710. Born in the City of London in 1661, Sir John served as an MP for the City and was knighted in 1713.