

## **Probability of Mergers and Acquisitions Deal Failure**

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### **Abstract**

This study investigates whether the likelihood of deal success/failure in merger transactions is influenced by the underlying characteristics which tend to affect acquirers' shareholder returns. These characteristics include the method of payment (cash versus stock), target status (listed versus non-listed targets), diversification (domestic versus cross-border and industry-wide deals), and acquirers' prior bidding experience. We also investigate whether announced deals reflect an expectation about the likelihood of deal completion. The findings from event study confirm that market reaction is indifferent to whether the announced deals are likely to be successfully completed or not, consistent with the efficient markets hypothesis. However, the results from probit regressions confirm that the aforementioned deal characteristics, as well as certain firm and country level factors, influence the likelihood of whether previously announced deals are subsequently completed or cancelled.

*JEL Classification:* G34, G14

*Keywords:* Mergers and Acquisitions; Event Study, Abnormal Returns, Probit regressions

## 1. Introduction

Mergers and acquisitions (hereafter M&As) involve complex deals and their precise impact on shareholder wealth is an area that has been debated from various perspectives in the mainstream literature. One line of research focusses on whether M&As tend to improve or destroy shareholder wealth, and many studies have examined market reactions to announcements of M&As using event study methodology. The picture provided by the existing literature regarding the overall effects of M&As on shareholder wealth, however, is far from clear. While there is a general trend indicating that target companies tend to earn positive announcement period returns, evidence on acquiring company (or bidder<sup>1</sup>) returns has been quite mixed. Most notably, the literature has related shareholder returns to (i) the method of payment used to finance the deal, distinguishing between cash or stock payment (or a combination of both), (ii) the role and nature of information asymmetry surrounding the status of target firms (whether publicly-listed or private), (iii) industry or cross-border diversification, and (iv) acquirer characteristics such as size and experience. Investigation of such relationships is typically determined by combining event study with regression methods (see e.g. Mulherin and Boone 2000, Kohers and Kohers 2000, Andrade *et al.* 2001, Beitel *et al.* 2004, Choi and Russell 2004, Mai *et al.* 2009, Martynova and Renneboog 2011, Jaffe *et al.* 2015).

Another dimension of M&A research relates to the pre-merger characteristics of targets and acquirers that affect their likelihood of being involved in M&As. The literature in this regard offers evidence relating to both financial and non-financial firms, focussing on specific regions, such as the USA, Europe, and Asian countries (e.g. Powell 1997, Gonzalez *et al.* 1997, Ali-Yrkko *et al.* 2005, Wheelock and Wilson 2004, Rossi and Volpin 2004, Focarelli and Pozollo 2001, Buch and DeLong 2004, Hannan and Pilloff 2009, Pasiouras *et al.* 2011). Studies in this area have largely employed Logit or Probit regressions using samples of involved firms in M&A transactions (i.e. targets/acquirers) combined with non-involved peers. Owing to the nature of the investigation, most of the studies in this area have used data on completed M&A transactions only, thereby ignoring deals that ultimately failed.

An interesting extension to this area of research, not explored in previous studies, is to examine whether specific characteristics influencing shareholder wealth upon merger announcements will also affect the likelihood that such M&As will eventually succeed or (otherwise) fail. As noted above, prior empirical studies on shareholder wealth effects of M&As have largely used

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<sup>1</sup> The terms ‘acquirers’ and ‘bidders’ are used interchangeably as is conventional in the literature.

completed deals – thus ignoring unsuccessful deals (Mangold and Lippok 2008, Officer *et al.*, 2009, Rani *et al.* 2014, Jaffe *et al.* 2015).<sup>2</sup> Among other aspects of research on M&As, Hensher and Jones (2007) suggest an approach for selecting a suitable predictable model for estimating distress firms, while Peat (2007) highlights the importance of developing a hazard-type model in the validation of bankruptcy and takeovers. While there is abundance of research on the impact of M&As (Baskerville and Hay, 2006), research on predicting the success/failure of such merger deals is relatively scarce. This study aims to examine the factors affecting the likelihood of M&A deal failures once announced.

In the literature there are some related studies which have focussed on analysing successful or failed takeover deals from various perspectives. Tang (2015), for example, examine acquirers' termination returns in failed deals and find that acquirer gains vary significantly depending on target type. Becher *et al.* (2015) analyse the impact of analyst recommendations on the probability of deal success and find that it increases (decreases) along with the favourability of acquirer (target) recommendations. Malmendier *et al.* (2016) analyse unsuccessful takeover bids and find that the targets of cash offers are revalued, on average, by +15% after deal failure, whereas stock-funded targets returned to their pre-announcement levels. Caiazza and Pozzolo (2016) investigate the relevance of several characteristics in explaining failed announced deals from the banking industry, including diversification (domestic versus cross-border deals), the hostility of the bidder and the presence of multiple potential acquirers. More recently, Alhenawi and Stilwell (2017) identify several reasons consistent with relevant theories in explaining value creation from M&As and the successful completion of such deals, attributing to factors such as the acquirer's historical performance and target's pre-merger value. We built upon this stand of the literature to analyse the impact of several deal-specific attributes on the probability of M&A deal failure. In a sense, this strand of research is still in its infancy, and our study adds to a limited number of recent studies by providing robust evidence based on a worldwide sample of M&A deals.

With this aim in mind, it seems natural to ask whether the market reaction at the time of deal announcement reflects an expectation regarding subsequent deal completion, which may be influenced by specific deal characteristics associated with bidder shareholder returns or pre-merger risk (Tanna and Yousef, 2019). According to the informational efficiency of markets, the market reaction at the time of deal announcement should reflect all (publicly) available

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<sup>2</sup> Moeller, Schlingemann, and Stulz (2004: 205) indicated that “to estimate the shareholder gains from acquisitions, we consider successful and unsuccessful acquisition announcements to investigate whether this focus introduces a bias in our analysis and find that it does not”.

information regarding the deal, including both deal and firm-level characteristics. Conversely, if the market reflects any uncertainty about deal completion at the time of announcement, this would be inconsistent with the efficient market hypothesis. The implicit assumption underlying this reasoning is that the market reaction from deal announcement would be indifferent to the likelihood of the deal being successfully completed or not. Addressing this kind of enquiry requires using relevant data for a sample combining both successful (i.e. completed) and unsuccessful (i.e. cancelled) deals to avoid any sample selection bias, and analysing announcement period abnormal returns using event study methodology supplemented by Probit regressions. We undertake a unique study of this kind, using an extensive, global sample of 46,758 M&A deals from 180 countries and 80 industries, which took place between the years 1977 and 2012.<sup>3</sup>

Our results indicate that there are no significant differences in announcement returns between successful and unsuccessful deals. This indicates that market reaction to deal announcement does not reflect an expectation of whether deal completion is likely or not, a finding which is consistent with the efficient market hypothesis - since abnormal returns are not impacted by uncertainty about deal completion or failure. With regard to specific deal factors, we find that domestic and focussed deals are negatively associated with the likelihood of deal failure, while the effect of diversified deals is positive. This suggests that domestic and focussed deals are more likely to be successfully completed than cross-border or cross-industry deals, an outcome which appropriately reflects the higher degree of information asymmetry associated with more diversified deals. Our results also reveal that cash payment deals increase the likelihood of deal completion, while stock payment deals support the opposite result. This finding may also be associated with information asymmetry surrounding bidder/target valuation, as cash deals tend to be more favourable from the point of view of target companies as a way of distinguishing high-value bidders from low-value bidders. We also find that deals involving public targets increase the probability of deal failure, relative to deals involving private targets. Finally, we find that acquirer prior experience is positively associated with the likelihood of deal failure.

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<sup>3</sup> Prior studies in the literature have used much smaller samples, typically less than 1000 deals. To give some examples, Raj and Uddin (2013) used a sample of 340 deals in the UK, Rani et al. (2014) used 268 deals, Bhabra and Huang (2013) used 136 completed domestic and cross-border deals. Studies involving relatively larger samples include Ahern (2007), who used a sample of 12,942 deals, and Moeller, *et al.* (2005), whose sample included 12,023 acquisitions. At the middle of the spectrum, Andrade, *et al.* (2001) and Martynova and Renneboog (2011) looked at 3,688 and 2,149 acquisitions, respectively. Fuller, *et al.* (2002) used 3,135. Faccio, et al. (2006) looked at 4,429, and the sample of Jaffe, *et al.* (2015) contained 835 acquisitions of subsidiaries and 2,571 acquisitions of public targets. Our sample, by contrast, is much larger and includes all M&A deals, both completed and cancelled, obtained from Thomson One Banker SDC M&A Database.

The remainder of this paper is organised as follows: Section 2 provides a discussion of the sampling procedure used for data collection. Section 3 presents the relevant hypotheses and outlines the methodological approach. Section 4 discusses the empirical results, which include univariate tests based on event study results and multivariate analysis summarising the results of Probit regressions. Section 5 concludes.

## **2. Sampling and Data Collection**

The worldwide sample of deals used in this study, along with associated share price information for acquirers, covers 180 countries and 88 sub-industries, which have been chosen on the basis of data availability. The information is sourced primarily from two databases, SDC M&A Database and Datastream. The M&A data include, as far as possible, all initial bids announced between 1970 and 2012. The criteria for inclusion in the sample are:

1. The acquirer is a public firm.
2. The target is a public, private, or subsidiary firm.
3. The acquirer's market share prices and local index prices are available in DataStream.
4. The type of transaction is coded either '1' or '2', where 1 = Disclosed Value (indicates all deals that have a disclosed dollar value, and the acquirer is acquiring an interest of 50% or more in a target, raising its interest from below 50% to above 50%, or acquiring the remaining interest it does not already own), and 2 = Undisclosed Value (indicates all deals that do not have a disclosed dollar value, and the acquirer is acquiring an interest of 50% or more in a target, raising its interest from below 50% to above 50%, or acquiring the remaining interest it does not already own).
5. Status of Transaction: C, W, where C = Completed (the transaction has closed), and W = Withdrawn (the target or acquirer in the transaction has terminated its agreement, letter of intent, or plans for the acquisition or merger).
6. Value of Transaction: \$1 million or more, i.e. the total value of consideration paid by the acquirer, excluding fees and expenses.
7. Percentage of Shares Owned After Transaction: From below 50% up to 100%. This represents the number of common shares acquired in the transaction plus any shares previously owned by the acquirer divided by the total number of shares outstanding.

Based on the above criteria, the total sample includes 46,758 initial bids, of which 36,489 deals were successfully completed while 10,269 deals were cancelled. Appendix 1-5 lists the relevant details including target and acquirer countries, industries and number of deals per year.

### **3. Empirical Strategy**

#### **3.1 Hypotheses**

According to the efficient market hypothesis (EMH), any market reaction to deal announcement should reflect all available information including relevant deal, firm, or country-level characteristics. That said, there is always future uncertainty about whether a deal will eventually be completed or fail once announced. Therefore, it is important to investigate whether the market reaction around deal announcement reflects an expectation regarding deal failure, an assumption that is inconsistent with the EMH. Thus our main hypothesis is whether market reaction is indifferent to whether announced deals are likely to be successfully completed or not.

H1: There are no significant differences in announcement period abnormal returns between deals that are eventually successful (completed) or unsuccessful (cancelled).

Testing this hypothesis involves an examination of announcement period return differentials from event study before and after deal announcement, as well as including a factor that reflects an expectation of deal completion in Probit regressions. Since our sample includes both successful and unsuccessful deals, it seems appropriate to consider whether specific deal, firm, and country-level characteristics influence the probability of deal success/failure once announced. Hence, it seems sensible to investigate whether the likelihood of deal failure, once a merger deal has been agreed and announced, is affected by the relevant deal characteristics that distinguish between (i) cash or stock payment offered for the deals, (ii) deals involving public and non-public targets, (iii) deals that are focussed versus diversified, and (iv) deals distinguished according to acquirers' previous experience of acquisitions (serial acquirers). As such, the analysis aims to investigate the following additional null hypotheses:

H2: There are no significant differences in the probability of deal failure between cash and stock payment deals.

H3: There are no significant differences in the probability of deal failure between focussed and diversified deals.

H4: Target status (where public on non-public) has no impact on the probability of deal failure.

H5: Acquirers' prior acquisition experience has no impact on the probability of deal failure.

All the above hypotheses are investigated using both univariate analysis, which summarise event study results, and multivariate analysis using Probit estimation to test the influence of relevant conditioning variables on the probability of deal failure.

### 3.2 Event Study

We follow Brown and Warner's (1985) and Fuller et al.'s (2002) event study methodology to calculate acquirers' abnormal returns for a up to 10 days before and after the announcement date. Abnormal returns are calculated by subtracting the actual returns during the event window from expected returns (MacKinlay, 1997). Specifically, for acquirer  $i$  in period  $t$ , the abnormal return is calculated as follows:

$$AR_{i,t} = r_{i,t} - E(r_{i,t}) \quad (1)$$

where  $AR_{i,t}$  is the abnormal return for stock  $i$  at time  $t$ ;  $r_{i,t}$  the actual return on stock  $i$  at time  $t$ ; and  $E(r_{i,t})$  the expected return on stock  $i$  at time  $t$

The expected returns are derived using the market model, which expresses the relation between expected and market returns as follows:

$$E(r_{i,t}) = \alpha + \beta r_{m,t} + \varepsilon_{i,t} \quad (t = -110, \dots, -11) \quad (2)$$

where  $r_{m,t}$  is the market return (determined using a benchmark local market index) at time  $t$ ; and  $\varepsilon_{i,t}$  is the random error term.

The parameters of equation (2) are estimated using acquirers' daily stock price data (converted into returns using log differences) over the period from 110 days to 11 days prior to deal announcement date. The average abnormal returns (AARs) and cumulative abnormal returns (CARs) are then calculated according to the formula:

$$AARs = \frac{1}{N} \sum_{i=1}^N \widehat{AR}_{i,t} \quad (3)$$

$$CARs(T_1, T_2) = \sum_{t=T_1}^{T_2} \widehat{AR}_{i,t} \quad (4)$$

where  $\widehat{AR}_{i,t}$  is the calculated abnormal return for each stock  $i$  at time  $t$ ;  $N$  constitutes the number of deals, and  $T_1$  and  $T_2$  reflect the start and end dates of the event window around the announcement date. (Can you check if Equation 4 is correct??)

### 3.3 Probit Regression



The base category for the dependent variable in the probit model, specified below, is that the deal is successful after it has been announced. Thus, the dependent variable is binary: equal to ‘1’ if the deal is cancelled and ‘0’ if the deal is completed:

$$Z_i = \begin{cases} 1 & \text{for cancelled deal} \\ 0 & \text{for completed deal} \end{cases} \quad (5)$$

The specification of the probit model takes the form:

$$\Pr(Z = 1 \mid x) = \alpha + \beta_d Deal_i + \beta_f Firm_i + \beta_c Country_i + \varepsilon_i \quad (6)$$

where  $\alpha$  is the intercept term; and  $\beta_d$ ,  $\beta_f$ , and  $\beta_c$  are the coefficients associated with the corresponding set of explanatory variables representing deal, firm, and country level characteristics.

In the empirical analysis, consistent with hypotheses H2-H5 above, we include four sets of deal characteristics, representing the method of payment, target status, diversification, and acquirer prior bidding experience, along with a host of firm level and country level control variables. More precisely, in relation to the method of payment, we distinguish between cash (*CSH*) and stock (*STC*) payment deals. On target status, we distinguish between public (*Pub*), private (*Priv*) and subsidiary (*Subs*) targets. In testing the impact of diversification, we distinguish between domestic and focussed (*DAF*), domestic and cross-industry (*DCI*), cross-border and focussed (*CBF*), and cross-border and cross-industry (*CBCI*) deals. As for acquirer prior experience (*Exp*), this is represented by the cumulative number of previous takeovers by the same acquirer in previous three years.

Taking these factors into account, a detailed empirical specification of the probit model, including all the control variables, is as follows:

$$\Pr(y = 1 \mid x) = \alpha + B_1 DAF_i + B_2 DCI_i + B_3 CBF_i + B_4 CBCI_i + B_5 CSH_i + B_6 STC_i + B_7 Pub_i + B_8 Priv_i + B_9 Subs_i + B_{10} Exp_i + B_{11} VT_i + B_{12} GDP_j + B_{13} \frac{M}{B_i} + B_{14} AS_i + B_{15} LIQ_j + B_{16} IP_j + B_{17} CAR_j + B_{18} Pre\_Beta + \varepsilon_i$$

The control variables included in the above model allow for both firm-level and country-specific heterogeneity. These are:  $VT_i$  which denotes the value of transaction, representing target size;  $GDP_j$  represents GDP per capita of country  $j$  where the target is located;  $AS_i$  represents acquirer's size;  $LIQ_j$  is the legal institutional quality indicator for target country  $j$ ;

$M/B_i$ , the acquirer's market-to-book ratio on announcement day;  $IP_j$  denotes investor protection;  $CAR_i$  is the estimate of cumulative abnormal return for deal  $i$  for a three-day window (-1,+1) calculated the event study method outlined above (equation 4); and  $Pre\_Beta_i$  is the acquirer's ex-ante market risk. Table 1 presents a list of all the variables, including their precise definitions and relevant data sources.

**(Insert Table 1 here)**

The inclusion of  $CAR$  in the probit model is a proxy intended to reflect the market's expectation of deal completion. This enables further testing of hypothesis H1, in addition to the event study results. The inclusion of  $Pre-Beta$  controls for acquirers' pre-merger risk. Following Tanna and Yousef (2019), we use the capital asset pricing model (CAPM) to derive an estimate of this variable, which effectively measures the firm's systematic risk (beta before deal). This involves using simple OLS regression of the acquirers' daily stock returns on market returns by invoking the market model with estimation conducted over the period from -110 to -10 working days before announcement day.

## **4 Empirical Findings**

### **4.1 Event Study Results**

**(Insert Table 2 here)**

Table 2 presents the announcement period event study results of the acquirers' abnormal returns and cumulative abnormal returns (CARs) for the overall sample and for sub-samples of completed and cancelled deals. The results uniformly indicate that the abnormal returns (presented for the overall sample only) increase steadily in the days before announcement date, peaking up at one day after announcement, and then declining steadily thereafter. Similarly, the CARs in all cases (both completed and cancelled deals) increase steadily up to one day after announcement and then decline thereafter. All returns are statistically significant for windows of up to six days before and for 10 days after the announcement date. The abnormal returns (AR) for most days prior to day 6 of deal announcement are statistically insignificant but the CARs are mostly significant at 5% level.

The event study results confirm significant information leakage prior to deal announcements. In essence, merger announcements can be anticipated prior to the official date and therefore

significant positive abnormal returns can be expected beforehand. Halpern (1983) argues that such leakage may be due to signalling provided by earlier successful bids, or there may be insider trading. Seyhun (1990) argues that leakages may be due to hubris bias which leads to overconfidence and, therefore, overestimation of the merger synergies.

The results also suggest significant post-announcement returns. This arises mainly because new information about the deals that may be revealed after announcement corrects any market reaction that was made on the event date (Martynova and Renneboog, 2011). Hence, when the conditions of the deal become clearer, the market reassesses the quality of the takeover and makes downward corrections to the expected returns.

## **4.2 Univariate Tests**

While the results of Table 2 confirm that the CARs are statistically significant and also consistent for the subsamples of completed and failed deals, formal testing of hypothesis H1 requires that the mean differences of the CARs for the two subsamples are statistically insignificant. Table 3 presents the results of both the parametric t-test and the non-parametric Mann-Whitney U test of the mean differences for different event windows. All results confirm that the mean differences are statistically insignificant, which provides strong evidence that the market reaction is neutral to whether merger deals are eventually completed or not. In another sense, this result confirms the semi-strong form of market efficiency, which holds that markets reflect all publicly available information as revealed in the announcement and/or corporate disclosures before eventual deal completion or termination.

**(Insert Table 3 here)**

For preliminary investigation of the hypotheses H2-H5, before formal testing using Probit estimation, we consider univariate tests of the independence of association between the dichotomous classification of completed/failed deals and the specific deal categories under investigation (i.e. target status, payment method, diversification, and acquirer's bidding experience). Since the variable of interest in each case is dichotomous, the appropriate test for the independence of association when the explanatory variable is also dichotomous is the Pearson's chi-squared test. Hence, this test is employed to examine the independence of association in the appropriate subsamples of completed and failed deals, split according to the dichotomous deal categories representing target status (public/private/subsidiary), payment

method (cash/stock), diversification (DAF, DCI, CBF, CBCI), and acquirer's experience (serial/non-serial bidder).

Table 4 presents the results of the chi-squared tests for each of the categories, showing statistically significant differences between observed and expected frequencies. Here, the test is for the independence of association between the 0/1 classification of the 'dependent' variable (completed/failed deals) and the 0/1 classification of the relevant 'independent' variable, taken in turn (hence 2x2). It is important to bear in mind that the chi-squared test is meant to only assess the significance of the association between the categories rather than uncover causal relationships. The Pearson's chi-squared test measures how well the observed distribution of data fits with the distribution of data that would be otherwise expected (by chance), as if the variables were independent. The statistical significance of Pearson's chi-squared and the phi and Cramer's V tests determines the association between the two relevant categories of variables, i.e. whether the relevant category of the independent variable is associated with the likelihood of a deal being a success or failure. In particular, the positive values of the phi and Cramer's V tests reveal that the respective categories have a positive association with the likelihood of deal failure/success while the negative values indicate the opposite.

**(Insert Table 4 here)**

The results in Table 4 clearly indicate the statistical significance (mostly at the 1 percent level) of the association between the 2x2 categories of variables, although in most cases these differences, as revealed by the values of the phi and Cramer's V tests, are small. Most notable are the differences in the outcomes that distinguish between target status and diversification. For instance, the overall sample reveals a lower percentage of failed deals involving publicly listed targets (19.3%) while the corresponding figures for private or subsidiary targets are slightly higher (24.6% and 28.5% respectively). As the expected percentage of failed deals is 22% under the independence of association assumption, there is greater likelihood (relative to chance) of deals with non-public targets failing. In contrast, deals involving publicly listed targets are less likely to fail, and these differences in the outcomes between the two categories of deals are reflected in the negative and positive values of the phi and Cramer's V tests. Based on similar reasoning, there is a greater chance of cross-industry and cross-border deals being unsuccessful, relative to domestic and focussed deals.

Interestingly, the results in Table 4 also indicate a negative association between method of payment (cash or stock) and failed deals. Similarly, the association between serial acquirers

and completed deals is also negative. These results indicate that method of payment and prior bidding experience may be significant factors affecting the probability of deal failure.

### 4.3 Probit Estimates

As explained in section 3.3, the dependent variable in probit estimation is binary (1/0), examining the probability of deal failure relative to deals that are completed. The explanatory variables include a set of dummy variables to facilitate testing of the hypotheses H2-H5, as well as a set of control variables to represent firm-specific and country-specific differences. Additionally, we include a proxy for investor expectation of deal completion at the time of announcement, represented by acquirers' three-day CARs (-1,+1), to provide a supplementary test of hypothesis H1. In all regressions, we account for industry, country and year fixed effects, and a minimal set of control variables which include target size (proxied by transaction value), bidder and target country GDP per capita, and acquirers' *ex-ante* market risk (pre-beta). Furthermore, in some regressions, we include acquirers' market-to-book ratio and bidder size, and control for investor protection (legal origin) and institutional quality in bidder and target countries. The inclusion of these additional controls, despite reducing the sample size, serve to assess the consistency of the results.

Table 5 presents the estimated results of 11 models aiming to analyse the impact of the above M&A factors on the probability of deal failure. Models 1-7 are estimated using the full sample of completed and failed deals for all countries. Here we progressively add the dummy variables representing the effects of payment method, target status, diversification, and acquirers' prior experience. Model 8-9 include all of these variables (as with models 6-7) and additional control variables, which lowers the sample size for estimation. Models 10 and 11 are estimated using data for deals involving only U.S. acquirers and non-U.S. acquirers, respectively. As confirmed by the values of McFadden's  $R^2$  and adjusted  $R^2$ , the explanatory power of the estimated model increases as more regressions are added.

**(Insert Table 5 here)**

Consistent with the univariate tests, the probit results confirm that market reaction at the time of deal announcement (proxied by acquirers' CAR) has, in the full sample, an insignificant impact on the probability of deal failure. Although this finding confirms the neutrality of market reaction to eventual deal outcome, implying support for hypothesis H1, it should be noted that the effect of CAR is statistically significant and negative in Models 9-11, and we

attribute this statistical significance to the reduced sample size. On the whole, it is difficult to assess the impact of this factor, given that CAR is generally a very imperfect proxy to test this hypothesis in regression.

The results also indicate that cash payment deals reduce the probability of merger failure, while stock payment deals have a mixed or insignificant impact. Thus, payment method does affect the prospect of deal success/failure, and our findings therefore reject hypothesis H2. A possible explanation of why payment method matters in this regard is due to information asymmetry surrounding bidder/target valuations. Cash payment deals are more favourable for targets as a way of distinguishing high-value bidders from low-value bidders. Thus, as Branch and Yang (2003) argue, cash deals are more likely to be accepted by targets than stock payment deals. However, for U.S. acquirers (model 10), neither of these factors is statistically significant.

With regard to the impact of target status, the results show that the acquisition of public targets increases the chances of deal failure while that of private targets has the opposite effect. This stands in contrast to the findings of the univariate analysis in which the chi-squared tests indicated a relatively higher likelihood of deal success for public targets. However, as noted earlier, the latter reflects the strength of association based on sample proportions and not causal effects. The probit results are more credible in light of theoretical arguments which suggest that public target shareholders are more likely to ‘free-ride’ on bidder offers while private targets, which tend to have concentrated shareholders, have better negotiating power to ensure deal success. These considerations suggest that, as with payment method, target status affects the probability of deal success/failure, implying rejection of hypothesis H3.

The results also suggest that domestic and focussed deals (DAF) negatively influence the likelihood of deal failure, while diversified deals (here represented by cross-border and cross-industry – CBCI - deals) positively influence this likelihood.<sup>4</sup> This implies that diversified deals are more likely to fail compared to focussed deals, and this outcome is consistent with the univariate tests. The result is plausible and can be explained by greater uncertainty associated with diversified deals. Evidence shows that greater positive acquirer returns are achieved from such deals relative to domestic and focussed transactions (see e.g. Danbolt and Maciver 2012). Even though synergy gains may be higher from diversification, transaction and monitoring costs associated with such deals may represent a barrier to their successful completion. On the

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<sup>4</sup> We have omitted other diversification categories (DCI, CBF) from the results as their effects are similar.

whole, the results suggest that diversification affects the probability of deal success/failure, implying rejection of hypothesis H4.

Turning to the impact of acquirers' bidding experience, the results are mixed in that the impact is positive in some cases and negative in others. In general, acquirers with prior experience ought to have greater expertise in ensuring deal success, although this does not automatically mean that they make efficient decisions. The hubris or over-optimism motives of mergers, which stands in contrast to the rational, synergy-based theories, suggest that serial acquirers tend to destroy rather than improve shareholder value (Roll, 1986). Taking these considerations into account, it is not surprising that acquirers' prior experience has an impact, albeit mixed, on the probability of deal success/failure, implying rejection of hypothesis H5.

As for the effect of the control variables, both target size and acquirers *Pre-beta* have a negative impact on the probability of deal failure. This implies that larger target size higher pre-merger risk of acquirers increase the chances of deal success, both these effects being consistent with greater synergy gains normally expected from larger or riskier deals. The influence of *Pre-beta*, however, becomes insignificant in after controlling for the effects of market-to-book ratio and bidder size whose influences are statistically significant (models 9-11). The negative influence of bidder size is consistent with the expectation of greater synergy from completion, thus reducing the prospect of failure. Larger deals are likely to incur higher costs and require specialist resources (e.g. financial advisors) to which big acquirers are better able to commit, implying greater chances of deal completion. Among the country-level factors, higher GDP per capita for both bidder and target countries decreases the probability of deal failure, as bigger economies have larger markets for corporate control with more financial resources to complete deals. Also, stronger legal and institutional quality in both bidder and target countries reduce the probability of deal failure due to better provisions for property rights protection. On the other hand, stronger investor protection in common law countries has the effect of increasing the prospect of deal failures. Anderson *et al.* (2009) argue that strong investor protection in a target country affords higher bargaining power to targets, and Hagendorff *et al.* (2008) argue that investors in relatively unprotected environments may require compensation for these lower governance standards and face a higher risk of expropriation by insiders. These considerations are more likely to adversely affect the chances of deal success and may be one of the reasons for a similarly positive effect of diversified deals.

## 5 Conclusion

This paper investigates whether the likelihood of deal success/failure in M&A transactions is influenced by four main deal characteristics that typically influence shareholder wealth upon merger announcements: method of payment, target status, diversification, and acquirers' prior bidding experience. Our study makes a contribution by providing robust evidence using a very large and diverse sample of M&A deals and investigating not only the impact of the aforementioned characteristics on the probability of deal failure, but also whether market reaction at the time of deal announcement reflects an expectation regarding subsequent deal completion. To our best knowledge, such issues have not been previously examined in the literature.

Using a worldwide sample of 45,758 deal announcements, comprising both completed and failed deals, covering 180 countries and 88 industries between the years 1977 and 2012, we carry out both event study and probit regressions to address our objectives. The event study and univariate tests results reveal no significant differences in acquirer returns from successful and unsuccessful deals, suggesting that market reaction upon deal announcements is consistent with the efficient market hypothesis since the returns are not impacted by uncertainty about eventual deal completion or cancellation.

Results from probit regressions suggest that payment method (cash/stock), target status (public/private), diversification (focussed/diversified deals) and acquirers' prior experience (serial/non-serial) are all relevant considerations in ensuring the eventual completion of deals following merger announcements. In particular, focussed deals are more likely to succeed than diversified deals, given greater levels of uncertainty associated with the latter. As diversified deals are more costly, their chances of successful completion are generally lower than focussed deals.

The results also reveal that cash payment deals reduce the probability of deal failure, while the impact of stock payment deals are insignificant. This finding can also be associated with information asymmetry surrounding bidder/target valuation, since cash deals tend to be more favourable for target companies as a way of distinguishing high-value bidders from low-value bidders. With regard to target status, we find that deals involving public targets increase probability of failure compared to deals involving private targets. These findings also make sense in light of theory suggesting that private targets, which tend to have more concentrated shareholders, have more negotiating power to aid in eventual deal completion. As for acquirers' prior experience, the findings are mixed.



The results of our study offer some practical implications for managers and regulators. The most relevant inference from our analysis can be drawn from the diversification perspective, particularly if viewed in connection with our evidence regarding target status and payment method. While M&As play an important role in the corporate world by facilitating the reallocation of the merged companies' assets for potential synergy gains, there is persistent 'home country bias' in that most M&A deals tend to be focussed rather than diversified, even though the former may yield relatively lower returns for acquirers. To facilitate greater integration of corporate assets across the world, regulators would be interested in identifying barriers to cross-industry or cross-border consolidation which could lead to improved welfare for all stakeholders. Our results indicate that such integration can be aided by multinationals using cash payments for purchasing private/subsidiary targets abroad, as such deals are more likely to be successfully completed.

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**Table 1: Variable Definitions**

$DAF_i$  : dummy variable equal to 1 for deal  $i$  if the acquirer and target are located in the same country and operate in the same industry, 0 otherwise.

$DCI_i$  : dummy variable equal to 1 for announcement  $i$  if the acquirer and target are located in the same country but operate in different industries (according to the initial two digits of their four-digit SIC codes), 0 otherwise.

$CBF_i$  : dummy variable equal to 1 for announcement  $i$  if the acquirer and target operate in the same industry but are located in different countries, 0 otherwise.

$CBCI_i$  : dummy variable equal to 1 for announcement  $i$  if the acquirer and target are located in different countries and operate in different industries (according to the initial two digits of their four-digit SIC codes), 0 otherwise.

$CSH_i$  : dummy variable equal to 1 for announcement  $i$  if the acquirer paid by cash only, and 0 otherwise.

$STC_i$  : dummy variable equal to 1 for announcement  $i$  if the acquirer paid by stock only, 0 otherwise.

$Pub_i$  : dummy variable equal to 1 for announcement  $i$  if the target is a public company, 0 otherwise.

$Priv_i$  : dummy variable equal to 1 for announcement  $i$  if the target is a private company, 0 otherwise.

$Subs_i$  : dummy variable equal to 1 for announcement  $i$  if the target is a subsidiary company, 0 otherwise.

$Exp_i$  : cumulative number of takeovers by the same acquirer during a three-year period. In regressions, for brevity, we only present results for experience for the three-year period, although univariate analysis we present results for three-year and five-year periods.

$VT_i$  : logarithm of value of transactions for deal  $i$  (in US \$mil, i.e. total value of consideration paid by the acquirer excluding fees and expenses) to represent target size. Source: Datastream

$GDP_j$  : logarithm of GDP per capita of country  $j$ , which includes both target and acquirer countries. Source: Datastream

$M/B_i$  : acquirer's market-to-book ratio on announcement day. Source: Datastream

$AS_i$  : logarithm of market value in US \$mil of acquirer  $i$  (calculated by multiplying the total number of bidder shares times its stock price four weeks prior to the announcement date), to represent Acquirer's size. Source: Datastream

$LIQ_j$  : quality of institutions represented by the legal institutional quality indicator. (Source: Kuncic 2014)

$IP_j$  : dummy variable equal to 1 if the target is located in a country that applies common law (investor protection), 0 otherwise. Source: ?

$CAR_i$  : cumulative abnormal return for deal  $i$  for a three-day window (-1,+1), calculated using an event study method and market model. Source: Authors calculation using equation 4.

$Pre\_Beta_i$  : acquirer's 'beta before deal' calculated from -110 to -11 working days before the announcement day. Source: Authors calculation (Tanna and Yousef, 2019)

**Table 2: Announcement Period Returns for Acquirers**

Abnormal returns (ARs) and cumulative abnormal returns (CARs) have been calculated using the market model, i.e. by subtracting the actual returns made during the event window from the expected returns based on the projections of the market model during the event period. The AR results are presented for event windows up to ten days before and after the announcement date (-10,+10). Deal announcement date is day 0. The sample consists of 46,758 initial bids announced in 180 countries covering 88 sub-industries over the period 1977-2012, where 36,489 deals were completed and 10,269 were cancelled. The symbols \*\*\*, \*\*, and \* denote statistical significance at the levels of 1%, 5%, and 10%, respectively.

Day	All Sample (n= 46,758)		Successful Deals, n=36,489	Failed Deals, n=10,269
	ARs %	CARs%	CARs %	CARs %
-10	0.03	0.03	0.01	0.09
-9	0.07***	0.1***	0.07**	0.2**
-8	0.02	0.12***	0.11***	0.14
-7	0.02	0.14***	0.12**	0.22*
-6	0.08***	0.22***	0.17***	0.39***
-5	0.12***	0.34***	0.26***	0.63***
-4	0.11***	0.45***	0.37***	0.75***
-3	0.13***	0.59***	0.49***	0.92***
-2	0.18***	0.76***	0.64***	1.2***
-1	0.31***	1.07***	0.87***	1.79***
<b>0</b>	<b>0.83***</b>	<b>1.9***</b>	<b>1.66***</b>	<b>2.75***</b>
1	0.44***	2.34***	2.13***	3.06***
2	-0.03***	2.31***	2.16***	2.82***

3	-0.12***	2.18***	2.07***	2.59***
4	-0.12***	2.06***	1.99***	2.33***
5	-0.12***	1.94***	1.92***	2.04***
6	-0.09***	1.85***	1.81***	2.0***
7	-0.1***	1.75***	1.75***	1.75***
8	-0.1***	1.65***	1.69***	1.53***
9	-0.13***	1.52***	1.57***	1.34***
10	-0.11***	1.4***	1.5***	1.07***

**Table 3: Tests of mean differences in CARs: Completed versus Failed Deals.**

An independent samples t-test and a Mann-Whitney U Test are employed to compare the differences in the CARs of completed and terminated deals. Since the CARs are not usually normally distributed, both the t-test and the U test are applied for consistency checks. Tests are shown for event windows of: (-5,+5), (-3,+3), (-2,+2), and (-1,+1). Of the overall sample of 46,789 deals, 36,489 were completed, and 10,269 were cancelled. ‘Yes’/‘No’ indicates the number of deals completed/cancelled. The symbols \*\*\*, \*\*, and \* denote statistical significance at the levels of 1%, 5%, and 10%, respectively.

of 1%, 5 %, and 10 %, respectively.									

**Table 4: Pearson’s Chi-Squared Tests for Deal Categories.**

This table shows the results of Pearson’s chi-squared test and the phi and Cramer’s V statistics which have been used to assess the independence of the association between two groups of categorical variables (hence 2x2). The first categorical (dependent) variable distinguishes between failed (1) and completed (0) deals. The second categorical variable is one of the dichotomous (1/0) independent variables listed in the table. These variables are 1) public: when the bidder acquires public target. 2) Priv: when the bidder acquires private target. 3) Sub.: when the bidder acquires an unlisted subsidiary target. 4) Cash-only: when the bidder used cash only for payment of the deal. 5) Stock-only: when the bidder used stock only as payment method. 6) Domestic and focussed deals (DAF): bidder and target are located in the same country and operate in the same industry. 7) Domestic cross-industry deals (DCI): bidder and target are located in the same country but operate in different industries (according to the initial two digits of their four-digit SIC codes). 8) Cross-border focussed deals (CBF): bidder and target operate in the same industry but are located in different countries. 9) Cross-border cross-industry deals (CBCI): bidder and target are located in different countries and operate in different industries. 10) Exp. 5Y: when the same bidder has two or more completed deals over the five preceding years. 11) Exp. 3Y: when the same bidder has two or more completed deals over the three preceding years. In each of these categories, Yes denotes failed deals, No otherwise (completed). The symbols \*\*\*, \*\*, and \* denote statistical significance at the levels of 1%, 5%, and 10%, respectively.

Failed Deal	Pearson Chi-square frequencies								Chi-Square statistics			
	Actual Count		Expected Count		% within X (Actual)		% within X (Expected)		Value	p-value	Phi & Cramer's V	p-value
	Yes	No	Yes	No	Yes	No	Yes	No				
Public	2698	11315	3078	10935	19.3%	80.7%	22%	78%	85.65	.000***	-.043	.000***
Priv.	5413	16609	4836	17186	24.6%	75.4%	22%	78%	52.41	.000***	.033	.000***
Sub.	3058	7665	2355	8368	28.5%	71.5%	22%	78%	348.95	.000***	.086	.000***
Cash Only	2591	10668	2912	10347	19.5%	80.5%	22%	78%	63.27	.000***	-.037	.000***
Stock Only	2371	9310	2565	9116	20.3%	79.7%	22%	78%	25.16	.000***	-.023	.000***
DAF	3708	14762	4056	14414	20.1%	79.9%	22%	78%	63.38	.000***	-.037	.000***
DCI	4041	13024	3748	13317	23.7%	76.3%	22%	78%	46.28	.000***	.031	.000***
CBF	1297	4924	1366	4855	20.8%	79.2%	22%	78%	5.19	.023**	-.011	.023**
CBCI	1223	3779	1099	3903	24.5%	75.5%	22%	78%	20.23	.000***	.021	.000***
Exp. 5-Y	5058	20005	5504	19559	20.2%	79.8%	22%	78%	99.96	.000***	-.046	.000***

Exp. 3-Y	4398	17111	4724	16785	20.4%	79.6%	22%	78%	53.33	.000***	-.034	.000***
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**Table 5: Probit Estimates for Probability of Deal Failure**

The dependent variable is binary, representing the probability of deal failure/success (coded as ‘0’ for successful deals and ‘1’ for failed deals). The independent variables are: (1) logarithm of transaction values. (2) logarithm of the GDP per capita of the target country. (3) Domestic and focussed deals (DAF): bidder and target are located in the same country and operate in the same industry. (4) Cross-border cross-industry deals (CBCI): bidder and target are located in different countries and operate in different industries. (5) Cash-only: when the bidder used cash only for payment of the deal. (6) Stock-only: when the bidder used stock only as payment method; (6) public: when the bidder acquires public target. (7) Priv: when the bidder acquires private target. (8) ‘Exp. 3Y’ is the cumulative number of deals by the same acquirer during the preceding three years. (9) Legal Ins Quality (Target) : proxy for institutional environment. (10) Common Law : proxy for investor protection. (11) CARs (-1,+1): acquirers’ three-day CARs (-1,+1). (12) Pre-Beta: acquirer’s ‘beta before deal’ calculated from -110 to -10 working days before the announcement day; (12) Bidder size: the acquirer’s market capitalisation four weeks prior to announcement day. Models 1-9 are estimated using available data for all countries. Models 10 and 11 are estimated on data available for deals involving U.S. acquirers and non-U.S. acquirers only, respectively. Estimation is by maximum likelihood with p-values shown in parentheses. All estimations include year and industry effects, as well as country effects where possible (subject to avoidance of multicollinearity).

Probit	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
No. obs	45631	45631	45631	45631	45631	45631	45631	39393	25938	10816	15122
McFadden R2	0.062	0.060	0.062	0.065	0.067	0.068	0.074	0.103	0.127	0.078	0.117
Adjusted R2	0.062	0.060	0.062	0.065	0.067	0.068	0.073	0.102	0.125	0.073	0.115
Constant	2.128	2.106	2.128	2.246	2.247	2.305	2.102	2.037	2.572	1.437	2.073
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Value of Trans.	-0.048	-0.048	-0.047	-0.068	-0.067	-0.071	-0.071	-0.080	-0.025	0.048	-0.040
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
GDP (Target)	-0.559	-0.567	-0.556	-0.576	-0.545	-0.557	-0.559	-0.502	-0.578	-0.362	-0.483
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
DAF			-0.031	-0.046	-0.040	-0.044	-0.063	-0.053	-0.051	-0.091	-0.011
			(0.035)	(0.002)	(0.007)	(0.003)	(0.000)	(0.001)	(0.012)	(0.010)	(0.670)
CBCI			0.059	0.063	0.060	0.066	0.057	0.086	0.123	0.042	0.089
			(0.006)	(0.004)	(0.006)	(0.004)	(0.007)	(0.002)	(0.001)	(0.068)	(0.013)
Cash-Only	-0.148		-0.149	-0.166	-0.166	-0.168	-0.158	-0.174	-0.104	-0.031	-0.119
	(0.000)		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.473)	(0.000)
Stock-Only		0.055	0.005	-0.018	0.004	-0.002	-0.006	0.037	-0.072	-0.024	-0.053
		(0.001)	(0.756)	(0.295)	(0.802)	(0.919)	(0.736)	(0.047)	(0.003)	(0.535)	(0.102)
Public				0.219		0.103	0.082	0.218	0.180	0.441	0.038
				(0.000)		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.302)
Private					-0.224	-0.173	-0.182	-0.098	-0.159	-0.085	-0.102
					(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.145)	(0.000)
Exp. 3-Y						-0.018	-0.018	-0.016	0.012	0.021	0.003
						(0.000)	(0.000)	(0.000)	(0.009)	(0.001)	(0.715)
Legal Ins Quality (Target)								-0.293	-0.284	-0.257	-0.283
								(0.000)	(0.000)	(0.000)	(0.000)
Common Law (Target)							0.284	0.292	0.268	-0.068	0.366
							(0.000)	(0.000)	(0.000)	(0.416)	(0.000)
CARs(-1,+1)	-0.047	-0.037	-0.050	-0.011	-0.023	-0.017	-0.023	-0.043	-0.303	-0.308	-0.260
	(0.363)	(0.468)	(0.327)	(0.835)	(0.652)	(0.748)	(0.649)	(0.439)	(0.000)	(0.009)	(0.015)
Pre-Beta	-0.032	-0.034	-0.032	-0.030	-0.033	-0.029	-0.028	-0.022	0.012	-0.020	0.063
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.016)	(0.336)	(0.291)	(0.000)
M/B Ratio									0.000	0.001	0.000
									(0.659)	(0.662)	(0.596)
Bidder Size									-0.091	-0.158	-0.063
									(0.000)	(0.000)	(0.000)
Country Dumm.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Industry Dumm.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

## Appendix 1: M&A Deals According to Country of Target

Target Country								
Country	No	%	Country	No	%	Country	No	%
Albania	5	.011	Greenland	1	.002	Panama	18	0.038
Algeria	4	.009	Guam	1	.002	Papua N Guinea	23	0.049
Antigua	5	.011	Guatemala	10	.021	Paraguay	4	0.009
Argentina	137	.293	Guernsey	16	.034	Peru	91	0.195
Armenia	5	.011	Guyana	10	.021	Philippines	179	0.383
Aruba	1	.002	Haiti	1	.002	Poland	261	0.558
Australia	2089	4.468	Honduras	1	.002	Portugal	89	0.190
Austria	65	.139	Hong Kong	914	1.955	Puerto Rico	18	0.038
Bahamas	8	.017	Hungary	33	.071	Qatar	7	0.015
Bahrain	1	.002	Iceland	15	.032	Rep of Congo	7	0.015
Bangladesh	6	.013	India	455	.973	Reunion	1	0.002
Barbados	7	.015	Indonesia	287	.614	Romania	52	0.111
Belarus	5	.011	Iran	1	.002	Russian Fed	239	0.511
Belgium	160	.342	Iraq	7	.015	Rwanda	1	0.002
Belize	4	.009	IrelandRep	154	.329	Saudi Arabia	20	0.043
Bermuda	46	.098	Isle of Man	14	.030	Senegal	1	0.002
Bolivia	10	.021	Israel	192	.411	Serbia	9	0.019
Bosnia	7	.015	Italy	409	.875	Serbia & Mont.	10	0.021
Botswana	3	.006	Jamaica	4	.009	Seychelles	4	0.009
Brazil	547	1.170	Japan	2968	6.348	Sierra Leone	2	0.004
British Virgin	84	.180	Jersey	11	.024	Singapore	489	1.046
Brunei	3	.006	Jordan	12	.026	Slovak Rep	15	0.032
Bulgaria	31	.066	Kazakhstan	24	.051	Slovenia	20	0.043
Burkina Faso	5	.011	Kenya	3	.006	Solomon Is	1	0.002
Burundi	1	.002	Kuwait	27	.058	South Africa	445	0.952
Cambodia	6	.013	Kyrgyzstan	17	.036	South Korea	1222	2.613
Cameroon	2	.004	Laos	6	.013	Spain	383	0.819
Canada	3127	6.688	Latvia	7	.015	Sri Lanka	10	0.021
Cape Verde	1	.002	Lebanon	5	.011	Sudan	3	0.006
Cayman Islands	14	.030	Liberia	2	.004	Surinam	1	0.002
Chile	135	.289	Lithuania	21	.045	Swaziland	2	0.004
China	3087	6.602	Luxembourg	34	.073	Sweden	477	1.020
Colombia	86	.184	Macau	4	.009	Switzerland	194	0.415
Costa Rica	6	.013	Macedonia	6	.013	Syria	1	0.002
Croatia	23	.049	Madagascar	2	.004	Taiwan	269	0.575
Cuba	1	.002	Malaysia	1190	2.545	Tajikistan	3	0.006
Cyprus	40	.086	Mali	6	.013	Tanzania	9	0.019
Czech Republic	73	.156	Malta	7	.015	Thailand	287	0.614
Czechoslovakia	3	.006	Marshall Is	2	.004	Togo	1	0.002
Dem Rep Congo	3	.006	Mauritania	3	.006	Trinidad&Tob	8	0.017

Denmark	166	.355	Mauritius	10	.021	Tunisia	4	0.009
Dominican Rep	9	.019	Mexico	168	.359	Turkey	125	0.267
Ecuador	14	.030	Moldova	3	.006	Turkmenistan	2	0.004
Egypt	42	.090	Monaco	9	.019	Turks/Caicos	1	0.002
El Salvador	3	.006	Mongolia	16	.034	Uganda	3	0.006
Eritrea	1	.002	Montenegro	2	.004	Ukraine	52	0.111
Estonia	13	.028	Morocco	11	.024	United Kingdom	4376	9.359
Ethiopia	3	.006	Mozambique	7	.015	United States	17376	37.162
Falkland Is	2	.004	Namibia	19	.041	Uruguay	12	0.026
Faroe Islands	1	.002	Nepal	1	.002	Utd Arab Em	27	0.058
Fiji	6	.013	Neth Antilles	4	.009	Uzbekistan	3	0.006
Finland	227	.485	Netherlands	327	.699	Vanuatu	1	0.002
Fr Polynesia	1	.002	New Zealand	148	.317	Venezuela	25	0.053
France	737	1.576	Nicaragua	11	.024	Vietnam	39	0.083
Gabon	1	.002	Nigeria	11	.024	Western Samoa	1	0.002
Georgia	5	.011	Niue	2	.004	Yemen	1	0.002
Germany	606	1.296	North Korea	2	.004	Yugoslavia	5	0.011
Ghana	11	.024	Norway	341	.729	Zambia	9	0.019
Gibraltar	2	.004	Oman	6	.013	Zimbabwe	5	0.011
Greece	126	.269	Pakistan	13	.028	Total	46758	100

## Appendix 2: M&A Deals According to Country of Acquirer

Acquirer Country								
Country	No	%	Country	No	%	Country	No	%
Argentina	51	.109	Hong Kong	1089	2.329	Papua N Guinea	5	.011
Australia	2168	4.637	Hungary	28	0.060	Peru	32	.068
Austria	73	.156	Iceland	35	0.075	Philippines	159	.340
Bahamas	7	.015	India	504	1.078	Poland	201	.430
Bahrain	3	.006	Indonesia	167	0.357	Portugal	73	.156
Belgium	159	.340	IrelandRep	197	0.421	Puerto Rico	10	.021
Belize	6	.013	Isle of Man	17	0.036	Qatar	12	.026
Bermuda	72	.154	Israel	205	0.438	Romania	4	.009
Brazil	373	.798	Italy	323	0.691	Russian Fed	159	.340
British Virgin	6	.013	Japan	3314	7.088	Saudi Arabia	15	.032
Bulgaria	9	.019	Jersey	11	0.024	Singapore	579	1.238
Cambodia	1	.002	Jordan	6	0.013	Slovak Rep	2	.004
Canada	3813	8.155	Kenya	1	0.002	Slovenia	15	.032
Cayman Islands	9	.019	Kuwait	38	0.081	South Africa	417	.892
Chile	72	.154	Latvia	1	0.002	South Korea	1282	2.742
China	2483	5.310	Lebanon	4	0.009	Spain	395	.845
Colombia	35	.075	Liechtenstein	1	0.002	Sri Lanka	5	.011
Croatia	8	.017	Luxembourg	29	0.062	Sweden	555	1.187
Cyprus	31	.066	Malaysia	1279	2.735	Switzerland	248	.530
Czech Republic	13	.028	Malta	4	0.009	Taiwan	279	.597
Denmark	141	.302	Mexico	94	0.201	Tanzania	1	.002
Egypt	28	.060	Morocco	5	0.011	Thailand	249	.533
Estonia	9	.019	Namibia	1	0.002	Togo	1	.002
Faroe Islands	1	.002	Neth Antilles	5	0.011	Turkey	77	.165
Finland	279	.597	Netherlands	311	0.665	Ukraine	6	.013
France	713	1.525	New Zealand	80	0.171	United Kingdom	5157	11.029
Germany	483	1.033	Nigeria	2	0.004	United States	17434	37.286
Ghana	4	.009	Norway	321	0.687	Uruguay	1	.002
Gibraltar	4	.009	Oman	5	0.011	Utd Arab Em	19	.041
Greece	169	.361	Pakistan	4	0.009	Venezuela	7	.015
Guernsey	33	.071	Panama	2	0.004	Vietnam	20	.043
Total							46758	100.0

### Appendix 3: M&A Deals According to Years of Study

Year	No	%	Year	No	%
1977	1	0.002	1995	1331	2.847
1978	18	0.038	1996	1651	3.531
1979	10	0.021	1997	1937	4.143
1980	46	0.098	1998	2021	4.322
1981	242	0.518	1999	2214	4.735
1982	273	0.584	2000	2633	5.631
1983	356	0.761	2001	1942	4.153
1984	401	0.858	2002	1571	3.360
1985	203	0.434	2003	1743	3.728
1986	304	0.650	2004	2274	4.863
1987	358	0.766	2005	2589	5.537
1988	425	0.909	2006	3071	6.568
1989	520	1.112	2007	3512	7.511
1990	371	0.793	2008	2898	6.198
1991	471	1.007	2009	2376	5.081
1992	634	1.356	2010	2628	5.620
1993	866	1.852	2011	2708	5.792
1994	1134	2.425	2012	1026	2.194
Total				46758	100

#### Appendix 4: No of M&As based on Acquirer Industry

Acquirer Mid Industry					
Mid Industry	No.	%	Mid Industry	No.	%
Advertising & Marketing	535	1.14	IT Consulting & Services	1469	3.14
Aerospace & Defense	349	0.75	Legal Services	5	0.01
Agriculture & Livestock	262	0.56	Machinery	1118	2.39
Alternative Energy Sources	82	0.18	Metals & Mining	3530	7.55
Alternative Financial Investments	371	0.79	Motion Pictures / Audio Visual	389	0.83
Apparel Retailing	115	0.25	National Agency	1	0.00
Asset Management	578	1.24	Non Residential	106	0.23
Automobiles & Components	778	1.66	Oil & Gas	2362	5.05
Automotive Retailing	150	0.32	Other Consumer Products	910	1.95
Banks	3895	8.33	Other Energy & Power	223	0.48
Biotechnology	382	0.82	Other Financials	1574	3.37
Broadcasting	286	0.61	Other Healthcare	6	0.01
Brokerage	449	0.96	Other High Technology	69	0.15
Building/Construction & Engineering	1371	2.93	Other Industrials	945	2.02
Cable	167	0.36	Other Materials	130	0.28
Casinos & Gaming	145	0.31	Other Media & Entertainment	5	0.01
Chemicals	854	1.83	Other Real Estate	794	1.70
Computers & Electronics Retailing	122	0.26	Other Retailing	341	0.73
Computers & Peripherals	931	1.99	Other Telecom	91	0.19
Construction Materials	597	1.28	Paper & Forest Products	443	0.95
Containers & Packaging	288	0.62	Petrochemicals	152	0.33
Credit Institutions	152	0.33	Pharmaceuticals	1012	2.16
Discount and Department Store Retailing	256	0.55	Pipelines	67	0.14
Diversified Financials	16	0.03	Power	623	1.33
Ecommerce / B2B	135	0.29	Professional Services	1293	2.77
Educational Services	146	0.31	Public Administration	6	0.01
Electronics	1004	2.15	Publishing	583	1.25
Employment Services	249	0.53	Real Estate Management	229	0.49
Food & Beverage Retailing	576	1.23	Recreation & Leisure	154	0.33
Food and Beverage	1360	2.91	REITs	699	1.49
Government Sponsored Enterprises	2	0.00	Residential	27	0.06
Healthcare Equipment & Supplies	1016	2.17	Semiconductors	765	1.64
Healthcare Providers & Services (HMOs)	610	1.30	Software	1810	3.87
Home Furnishings	172	0.37	Space and Satellites	26	0.06
Home Improvement Retailing	40	0.09	Supranational	2	0.00
Hospitals	142	0.30	Telecommunications Equipment	602	1.29
Hotels and Lodging	230	0.49	Telecommunications Services	750	1.60
Household & Personal Products	235	0.50	Textiles & Apparel	666	1.42
Industrial Conglomerates	47	0.10	Tobacco	48	0.10
Insurance	789	1.69	Transportation & Infrastructure	897	1.92
Internet and Catalog Retailing	138	0.30	Travel Services	105	0.22
Internet Infrastructure	1	0.00	Water and Waste Management	349	0.75
Internet Software & Services	1008	2.16	Wireless	351	0.75
			Total	46758	100.00

## Appendix 5: Number of M&As based on Target Industry

Mid Industry	Target Mid Industry		Mid Industry		
	No.	%		No.	%
Advertising & Marketing	546	1.17	IT Consulting & Services	1474	3.15
Aerospace & Defense	227	0.49	Legal Services	9	0.02
Agriculture & Livestock	302	0.65	Machinery	1091	2.33
Alternative Energy Sources	85	0.18	Metals & Mining	3504	7.49
Alternative Financial Investments	90	0.19	Motion Pictures / Audio Visual	373	0.80
Apparel Retailing	139	0.30	National Agency	1	0.00
Asset Management	552	1.18	Non Residential	352	0.75
Automobiles & Components	691	1.48	Oil & Gas	2372	5.07
Automotive Retailing	158	0.34	Other Consumer Products	986	2.11
Banks	3498	7.48	Other Energy & Power	196	0.42
Biotechnology	366	0.78	Other Financials	1989	4.25
Broadcasting	277	0.59	Other Healthcare	1	0.00
Brokerage	514	1.10	Other High Technology	26	0.06
Building/Construction & Engineering	1381	2.95	Other Industrials	886	1.89
Cable	152	0.33	Other Materials	217	0.46
Casinos & Gaming	91	0.19	Other Media & Entertainment	9	0.02
Chemicals	781	1.67	Other Real Estate	936	2.00
City Agency	1	0.00	Other Retailing	433	0.93
Computers & Electronics Retailing	141	0.30	Other Telecom	73	0.16
Computers & Peripherals	812	1.74	Paper & Forest Products	394	0.84
Construction Materials	521	1.11	Petrochemicals	138	0.30
Containers & Packaging	299	0.64	Pharmaceuticals	856	1.83
Credit Institutions	257	0.55	Pipelines	100	0.21
Discount and Department Store Retailing	134	0.29	Power	567	1.21
Diversified Financials	42	0.09	Professional Services	1893	4.05
Ecommerce / B2B	146	0.31	Public Administration	4	0.01
Educational Services	201	0.43	Publishing	501	1.07
Electronics	845	1.81	Real Estate Management & Development	243	0.52
Employment Services	235	0.50	Recreation & Leisure	263	0.56
Food & Beverage Retailing	604	1.29	REITs	398	0.85
Food and Beverage	1287	2.75	Residential	53	0.11
Government Sponsored Enterprises	8	0.02	Semiconductors	702	1.50
Healthcare Equipment & Supplies	1134	2.43	Software	2207	4.72
Healthcare Providers & Services (HMOs)	575	1.23	Space and Satellites	19	0.04
Home Furnishings	161	0.34	Telecommunications Equipment	533	1.14
Home Improvement Retailing	76	0.16	Telecommunications Services	660	1.41
Hospitals	164	0.35	Textiles & Apparel	577	1.23
Hotels and Lodging	298	0.64	Tobacco	31	0.07
Household & Personal Products	164	0.35	Transportation & Infrastructure	971	2.08
Insurance	831	1.78	Travel Services	133	0.28
Internet and Catalog Retailing	112	0.24	Water and Waste Management	346	0.74
Internet Infrastructure	1	0.00	Wireless	324	0.69
Internet Software & Services	1018	2.18	Total	46758	100.00

### Appendix 6: Number of M&As for Acquirer and Target Industries

		Macro Industry														
Acquirer	Target	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	Total	%
(1) Consumer Products & Services		1265	107	69	170	2	163	379	263	130	133	62	106	31	2880	6.16
(2) Consumer Staples		142	1600	43	124	0	75	53	137	163	41	58	125	10	2571	5.50
(3) Energy and Power		95	25	2822	180	0	15	96	301	196	29	27	36	36	3858	8.25
(4) Financials		264	103	139	6047	3	87	268	229	227	136	192	78	53	7826	16.74
(5) Government & Agencies		1	0	0	1	0	2	0	1	3	0	1	0	0	9	0.02
(6) Healthcare		300	38	16	86	0	2339	104	97	67	16	29	62	14	3168	6.78
(7) High Technology		516	38	99	263	0	127	4769	387	149	290	48	111	395	7192	15.38
(8) Industrials		360	106	268	249	1	107	463	3050	446	76	199	88	92	5505	11.77
(9) Materials		147	164	268	199	0	80	152	461	4170	54	90	31	26	5842	12.49
(10) Media & Entertainment		254	26	10	88	0	15	314	58	41	1488	52	80	68	2494	5.33
(11) Real Estate		60	21	24	213	0	40	39	111	54	91	1153	40	9	1855	3.97
(12) Retail		136	124	21	94	0	31	89	66	36	58	61	1012	10	1738	3.72
(13) Telecommunications		78	9	25	67	0	15	505	86	34	98	10	28	865	1820	3.89
<b>Total</b>		3618	2361	3804	7781	6	3096	7231	5247	5716	2510	1982	1797	1609	46758	100
<b>%.</b>		7.74	5.05	8.14	16.64	0.01	6.62	15.46	11.22	12.22	5.37	4.24	3.84	3.44	100	



# Probability of mergers and acquisitions deal failure

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2020-05-09

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Tanna S, Yousef I, Nnadi M. (2020) Probability of mergers and acquisitions deal failure. Journal of Financial Economic Policy, Volume 13, Issue 1, January 2021, pp. 1-30

<https://doi.org/10.1108/JFEP-09-2019-0182>

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