What Determine Payment Methods in Mergers and Acquisitions?

by

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Abstract

Payment methods chosen in corporate mergers and acquisitions are of major concern to both academics and practitioners in this field. This study enquires into the determinants of the choice of payment methods in mergers and acquisitions by analyzing a data sample of UK cases of mergers and acquisitions in the 1990s. Employing multinomial logistic analysis and descriminant analysis, it has been found that the choice of payment methods is dependent on corporate financial factors and characteristics, with which reasonable predictions may be made under pertinent circumstances.

Mergers and acquisitions (M&As) are among the most important investment decisions made by acquiring firms and, consequently, have attracted immense attention from academia and professionals alike. Over years, many studies have been carried out to examine motivations for, and transactions of, M&As One of the vital issues is how to finance the acquisitions, without which a proposed acquisition will not proceed beyond its good intentions. Much work, though overwhelmingly the US based, has been carried out from both the perspective of individual countries and that of international dimensions, which have considerably enriched the M&A literature. An offer to exchange shares may signal that the bidding firm's management believes its own shares to be overvalued, while cash offer may suggest its own shares are undervalued. Thus, under the conditions of information asymmetry, share exchange conveys negative news about the bidding firm while cash offer sends a positive message to the market place. These explanations have been widely documented and accepted by a large number of studies, for example, Myer and Majluf (1984), Hansen (1987), Fishman (1989), and Amihud, Lev and Travlos (1990), among others.

Previous studies have examined various hypotheses in relation to the determinants of payment methods in M&As. Stulz (1988), Amihud, Lev and Travlos (1990), Song and Walkling (1993), and Ghosh and Ruland (1998) have advocated the proposition that associates payment methods with managerial ownership. The managerial ownership hypothesis states that acquiring firms' managers with a relatively large fraction of shares would prefer to offer cash rather than share exchange in order not to dilute their control after the completion of the acquisitions. Grullon, Michaely and Swary (1997) test the

hypothesis concerning the relationship between the relative size of the target to the bidder and the payment methods in M&As. They claim that the bigger the target firm's size relative to the acquirer's, the more preferable the use of share exchange. Jensen (1987) suggests that management usually has incentives to use excess free cash for M&As when right opportunities exist, to avoid sending a negative message to outsiders associated with share exchange. In addition, the use of cash offer in M&As can avoid paying cash dividends that are subject to substantial taxes. Thus the tax implication theory is raised and assessed by Wansley, Lane and Yang (1983), Hansen (1987), Harris, Franks and Mayer (1987)[1], and Davidson and Cheng (1997). This theory suggests that when an acquisition is financed by cash, it will imply that the acquiring firm is willing to pay a higher premium than share exchange would due to the tax status of cash offer in the transactions. Although the asymmetric information theory proposed by Myers and Majluf (1984) suggests a negative signaling effect by share exchange, Miller and Rock (1985) find that share exchange generally produces positive market expectations for high growth firms, further boosting their share prices. Therefore, alternatives of payment methods convey different information under the framework of asymmetric information in the stock market. The choice of payment methods may be linked to business cycles and firms' stock market performance as well. In this regard, Moore (1980) and Martin (1996) claim that share exchange is preferred to cash offer in the expansionary phase of business cycles or a booming stock market.

[1] In the article "Means of payment in takeovers: Results for the United Kingdom and the United States", Franks, Harris and Mayer (1988) find that the capital gains tax is not related to payment methods chosen in the United Kingdom.

It can be observed in the discussion of the literature and empirical evidence of Section 1 that controversies in payment method determination remain unsolved, despite that many aspects of the issue have been extensively examined in the past. This may be attributed to time specific, industry specific or market specific features of the studies. Moreover, the vast majority of the research has been in the US where corporate institutional structure, regulation, taxation and other aspects of influence on corporate practice differ from other countries including the UK. Lack of non-US evidence and inconsistencies in previous research in the determination of payment methods raise an obvious question to answer: do US findings still hold for an M&A market in a different country, namely, the UK? Meanwhile, inconsistent empirical evidence found in the previous literature has brought about concerns as to what extent the findings are meaningful and useful in guiding corporate practice. It thus motivates and provides us with a new opportunity to re-examine and further test those controversial conclusions in order to reach a better understanding of the issues of payment method determination. Our new findings are expected to provide a further empirical assessment of the payment method issues in M&As. In particular, those findings which are obtained on the basis of UK M&A markets will provide UK practitioners with direct guidance when dealing with the choice of payment methods in M&As.

This study investigates what really determine payment methods in M&As in the UK. To establish what determine the choice of payment methods, the study extends previous empirical research by employing powerful analytical techniques of multinomial logistic regression analysis supplemented by discriminant analysis. As it will be shown later, the

determinants of payment methods are assumed to be highly related to the financial characteristics of the companies involved. Therefore, we analyze these financial characteristics represented by relevant accounting and financial variables in a sample of successfully completed M&As taking place in the UK in the 1990s. The models used in the study reflect the multi-dimension nature of our investigation and help achieve our objectives.

In this study, the relevant characteristics of bidders and targets, which are generally proposed to be the key factors in determining the payment methods in corporate M&As, are set as follows: the relative size of the target firm to the bidder, the managerial ownership of both target and bidder, the bidding firm's conditions of free cash flow (as measured by dividend payout), and the target and bidder's prior-acquisition performance. The firms employed in this study are restricted to those which are listed on the London Stock Exchange in that the relevant data relating to the testable hypotheses can be accessible.

To investigate which factor among those defined variables is significant in determining the choice of payment methods in M&As, we firstly perform a univariate descriptive analysis to test for the differences between the means of the ratios among three different payment alternatives. We, therefore, obtain a tentative result by descriptive analysis. Then, we use discriminant analysis and multinomial logistic analysis to classify the payment methods. By simultaneously employing these two methods, we aim to compare and then confirm the empirical results since the former requires more assumptions about

the normality of the variables than the latter. In this regard, multinomial logistic regression analysis is more appealing than discriminant analysis for examining our propositions.

The rest of the paper is organised as follows: Section 1 reviews the M&A literature in general and payment methods in M&As in particular, which documents theoretical issues and empirical evidence in the areas. Discussion, analysis and synthesis of the literature lead to the proposed hypotheses of this study, where we propose that payment methods in M&As are dependent upon a number of financial characteristics of the companies which are involved in M&A activity. Section 2 presents sample selection and data, describes variable specifications and provides descriptive statistics of M&A activities, to portray a broad picture of payment method determination. Section 3 reports the empirical results from executing multinomial logistic regression and discriminant analysis for the determination of payment methods in M&As. It is found that the choice of payment methods in M&As is highly related to the relative size of the target to the bidder, the bidder's free cash flow, and the bidder's share performance on the stock market prior to acquisitions. Finally, Section 4 summarizes this study with concluding remarks.

1. Theoretical Issues and Empirical Evidence on Payment Methods in M&As, and Testable Hypotheses of This Study

In previous studies, a number of hypotheses have been advanced to explain the choice of payment methods given some alternatives in M&As. The suggestions presented by these previous empirical studies indicate that the payment methods chosen in M&A transactions might be related to information asymmetry, taxation, M&A regulations, accounting treatment, and some other factors in terms of financial performance of both acquirer and target. However, these key elements which are generally considered as the determinants of payment methods do not always hold in varied circumstances. Moreover, empirical results from testing the hypotheses are quite different among the prior research. The inclusiveness in this respect, therefore, provides support for further scrutiny in this study – some key elements will also constitute the foundation for related studies. By summarising the literature and considering the current state of research in the area, we propose to consider the following factors and test a set of respective hypotheses with specific reference to the choice of payment methods in M&As. We feel that to organize and test the hypotheses in a systematic way based on UK corporate features will help shed new light on payment method determination in M&As.

1.1 Relative size

Empirical evidence on the relation between the choice of payment methods and the relative size can be found in a number of studies. Martin (1996), Grullon, Michaely and

Swary (1997), and Ghosh and Ruland (1998) have linked the choice of payment methods to the relative size of the target to the acquirer. However, their empirical results are mixed. Martin's (1996) descriptive statistics show that the relative size is an important factor in determining payment methods, while his multinomial logistic model does not yield the same result as his descriptive statistic analysis. Eventually, based on the result of logistic model, Martin (1996) concludes that the relative size has no clear and closed association with the choice of payment methods in M&As. By examining US bank mergers, Grullon, Michaely and Swary (1997) document the results contrary to Martin's (1996). They use the similar multinomial logistic model in the study and find that the relative size of target banks to acquiring banks is one of the most important determinants in choosing payment methods. Their results indicate that the bigger the relative size of the target to the acquirer, the more probably the merger is financed by share exchange rather than cash offer. Ghosh and Ruland (1998) report the same findings as Martin's (1996). When examining the effects of the relative size on the choice of payment methods, Ghosh and Ruland (1998) find that the results from both descriptive statistics and multinomial logistic model show no significant difference in the three payment methods with regard to the relative size variable. Accordingly, they conclude that there is no direct association between the choice of payment methods and the relative size of the target to the acquirer. The inconsistent results of these studies might be attributable to some specific factors such as sample, time or undertakings. Whatsoever, the previous literature does not provide a clear-cut inference for the issue with respect to the effect of the relative size on the choice of payment methods.

To empirically investigate the determinants of payment methods, we constitute the relative size variable and expect that the relative size may be one of the major factors in determining the choice of payment methods. Theoretically, it is often argued that if the target firm is relatively large compared with the acquirer, share exchange is more probably used than cash offer. The possible explanation on this view is that if the target is relatively large, the acquirer may not have sufficient cash to finance the acquisition. This, therefore, suggests the following hypothesis:

> *Hypothesis 1: The Relative Size Hypothesis – the larger the size of the target relative to the acquirer, the more likely share exchange will be employed*

In the study, we define the relative size as the ratio of total assets of the target to that of the acquirer. The value of total assets is measured at the fiscal year end just prior to acquisition announcement.

1.2 Managerial ownership and ownership structure

Managerial ownership refers to the percentage of equity held by the firm's management who are the insiders of the firm. The relationship between managerial ownership and the choice of payment methods has been extensively examined in previous studies, though empirical findings are not always conclusive and sometimes contradictory. Stulz (1988) investigates the association between target managerial ownership and payment methods in M&As. His finding suggests that the larger the fraction of ownership held by target

management, the more likely the transaction will be financed by cash. Amihud, Lev and Travlos (1990) look into the relationship between acquirer managerial ownership and the choice of payment methods, and show that the bidding firm with a larger fraction of management share ownership is more likely to use cash offer than share exchange. Consistent with result of Stulz's (1988), Grullon, Michaely and Swary (1997) find that cash offer is a positive function of target managerial ownership. By inspecting the association between both acquirer and target managerial ownership and payment methods, they find that cash offer is more likely to be used when a large fraction of assets is held by target management. However, they fail to observe a direct link between acquirer managerial ownership and payment methods. Ghosh and Ruland (1998) present their results in respect of the relationship between acquirer and target managerial ownership and the payment methods. In contrast to Stulz (1988) and Grullon, Michaely and Swary (1997), they find that the larger the fraction of equity held by target management, the more likely share exchange is used. Meanwhile, their result shows that cash offer is associated with higher managerial ownership of the acquirer.

The above prior studies either focus on target firms or acquirers. Grullon, Michaely and Swary (1997) and Ghosh and Ruland (1998) have provided more detailed empirical results based on the study of both acquirer managerial ownership and that of the target. Nevertheless, they do not produce consistent results regarding the effect of managerial ownership on the choice of payment methods. Thus, the relationship between managerial ownership and the choice of payment methods seems to remain ambiguous. Regardless of the controversies in the issue, managerial ownership, in theory, can have impact on the

choice of payment methods. From the acquirer's point of view, a larger fraction of ownership by management may lead them to use cash offer in order not to dilute their ownership after the completion of the acquisition. As far as the target firm is concerned, if the fraction of managerial ownership is large, the management may have more power in negotiations and prefer share exchange in order to retain their positions, influence or interests in the combined firm. The argument leads to the following hypothesis:

> *Hypothesis 2: The Managerial Ownership Hypothesis – The greater the share ownership by the acquirer's management, the more likely cash offer will be used; While the greater the share ownership by target management, the more likely share exchange will be used.*

In the study, we collect the managerial ownership fraction of both parties as reported just prior to the announcement of M&As.

1.3 Free cash flows and tax considerations

There are generally two ways for a firm to distribute cash to its shareholders – one is paying cash dividends and the other is repurchasing shares from the stock market. Cash dividend payouts are liable to immediate tax, the size of which is also effectively larger than that due to capital gain. Two implications arise consequently. First, paying dividends may not be desirable in the interest of shareholders as well as management. An alternative way to use generated cash is to engage in acquisition activities, provided that

there is sufficient cash in hand but few profitable investment opportunities exist. Second, as suggested by Wansley, Lane, and Yang (1983), acquirers may be prepared to pay a higher premium for target shareholders in order to compensate for their additional tax payment when cash offer is employed. However, even if cash offer requires the acquirer to pay a higher premium under the tax consideration, share exchange remains unfavourable for a number of reasons. Cash offer generally takes a shorter time to complete the deal compared with share exchange. Meanwhile, share exchange rather than cash offer inevitably increase the number of outstanding shares, and therefore dilute the reported earnings after the deal is completed. Therefore, it is the amount of free cash in hand and its tax implications, but not tax itself, that influence the choice of payment methods in a definite way. Moreover, it is the amount of free cash flows of the acquirer, not that of the target, that influences the choice of payment methods.

Jensen (1987) notes that management usually has incentives to use excess free cash flow when there are acquisition opportunities. In addition to the above discussed advantages, cash offer has positive effect on the stock market. Generally, when cash offer is announced, it may reveal positive intrinsic information to the outsiders and signal asset undervaluation of the acquirer. Myers and Majluf (1984) have argued that market participants often take cash offer as good news with regard to the value of bidding firms' assets and shares. While investors consider share exchange as bad news since it implies that the acquirer is overvalued. Thus, we postulate the following hypothesis:

Hypothesis 3: Free Cash Flow Hypothesis – Sufficient free cash flows in hand by acquiring firms lead the acquisition to be financed by cash

The acquirer's free cash flow could be obtained from its free cash flow account. In the study, we use dividend payout ratios as a proxy for free cash flow. The dividend payout ratio is measured by dividend yields divided by earnings – a higher payout ratio may signal a higher level of free cash flow. Thus, we can assume that a large amount of free cash flow in hand by the acquirer leads it to possess a greater propensity to use cash offer than share exchange in acquiring the target firm.[2]

1.4 Corporation performance and growth opportunities

The choice of payment methods in M&As may also be linked to the pre-acquisition performance of both acquirers and targets. Generally, a firm with bad performance is liable to be attacked, thereby being an acquisition target. In contrast, when a firm performs well and given it has ambitions to expand its business, it is prone to be an acquirer. There are several proxies to measure the performance of a firm: market value to book value, Tobin's Q, dividend yields, and return on equity, with different perspectives. In a sense, Tobin's Q and market value or the market to book ratio share the same insight about corporate performance with reference to firm growth. While return on equity and dividend yields focus on return to shareholders. We employ return on equity for the

[2] Smith and Watts (1992) provide empirical evidence which shows that the amount of dividends paid is negatively associated with the firm's investment opportunities. In more detail, see Smith, C., and R. Watts, 1992, "The investment opportunity set and corporate financing, dividend and compensation policies", Journal of Financial Economics, 32, pp263-292

measurement of pre-acquisition performance in the interest of shareholders and the market to book ratio as an indication of firm growth in this study.

Investigating the relationship between growth opportunities and payment methods in M&As, Martin (1996) finds that acquiring firms with greater growth opportunities, i.e., higher Tobin's Q values, are more likely to employ the share exchange method. The reason behind this phenomenon is that excess cash can be reversely proportional to growth. More matured and slower growing firms possess more free cash in hand; while faster growing firms, endowed with more investment opportunities and being short of cash, have to resort to share exchange. The analysis leads to the following hypothesis:

> *Hypothesis 4: The Growth Opportunities Hypothesis – The greater the growth opportunities of the acquirer, the more likely share exchange will be employed.*

It is an intuitive notion that bad performance of a firm means it is poorly managed, which can be characterised by a low level of return on equity. Under such circumstances, the well-performed firm (acquirer) is likely to acquire its less-performed rival (target) and prefers using cash offer in the transaction. By doing so, the acquirer can totally eliminate the inefficient management team of the target firm. While under the situations that the target has good performance which might be reflected by its high level of return on equity, acquirer is more willing to use share exchange in the acquisitions in order to share the interests of the target firm. From the acquirer's perspective, it is more likely to use

cash offer than share exchange when its level of return on equity is higher. On the other hand, if the acquirer has a lower return on equity, which indicates that the acquirer has no sufficient cash in hand, it would choose share exchange as payment method. Therefore, we put forward the relevant testable hypothesis as follows:

> *Hypothesis 5: The Target and Acquirer Prior-acquisition Performance Hypothesis – The good (bad) performance of the target gives rise to share exchange (cash offer); While the good (bad) performance of the acquirer leads to cash offer (share exchange).*

1.5 Stock market performance and business cycles

Stock market performance may be strongly related to the choice of payment methods in corporate M&As. In fact, the merger wave has, globally and historically, coincided with stock market booms. The reason for this phenomenon is intuitive and straightforward. In the expansionary phase of the economy, which is generally characterized by high share prices of firms, using share exchange as the medium of payment could be extremely attractive to the shareholders of target firms. Moore (1980) analyzes the linkage between corporate investment financing patterns and business cycles. He documents that share exchange is more frequently employed than cash offer in the expansionary phase of business cycles. Martin (1996) claims that share exchange in acquisitions is positively associated with the performance of the stock market. He uses Standard and Poor's 500

(S&P's 500) index to measure the performance of the stock market. By inspecting the relationship between the choice of payment methods and business cycle variables of S&P's 500, Moody's BAA bond yields and a few other variable, he finds that only stock market performance as measured by S&P's'500 is significantly and positively related to the choice of share exchange in M&As. Vasconcellos and Kish (1998) do not report the linkage between share exchange and stock market performance, but they find that firms with higher share prices are more likely to acquire foreign firms whose share prices are relatively low.

A booming stock market means buoyant profitability for firms. Under such circumstances, the shares of potential acquirers seem to be more attractive than cash when offered for consideration. Therefore, Martin's (1996) findings that associate share exchange with overall stock market performance in general could be a reflection on the performance of acquirers instead. We feel that analyzing the association between acquirers' share performance on the stock exchange and the choice of payment methods can be more powerful in this perspective. Consequently, we develop the following testable hypothesis:

> *Hypothesis 6: Stock Market Performance Hypothesis – Good performance of the acquirer's shares on the stock market makes share exchange more likely.*

In the study, we compute the ratio of market value per share to book value per share as the measurement of acquirer's share performance. A higher value for the ratio implies the

good performance of the firm on the stock exchange, therefore making share exchange more attractive than cash offer.

1.6 Discussion and summary of the hypotheses

A number of hypotheses have been developed to explain the determinants of payment methods in corporate M&As. Some of the hypotheses overlap with, differ from, or similar to, those in the previous studies, but are tested under different circumstances and using different approaches. The predicted effect of the factors associated with the hypotheses on the choice of payment methods are summarized and presented in Table 1.

{Table 1 about here}

It is noted that the hypotheses do not appear to indicate a definite effect of a few factors on the choice of the mix payment method. The mix of cash and shares may be an outcome of merger negotiations, a compromise between the shareholders who prefer cash offer and those who prefer share exchange. From some specific hypotheses' perspectives, for instance, the relative size hypothesis, we can conjecture that the acquirer may use the mix method when the target is relatively large, since the acquirer has insufficient cash to make a full cash offer. Franks, Harris, and Mayer (1988) have examined bid premiums among three alternative payment methods and found that the bid premium of the mix method appears to be in the middle. Therefore, the predicted effect of some factors on the choice of the mix method can be ambiguous.

2. Sample, Variable Specifications and Descriptive Analysis of M&A Activities

2.1 Sample selection and features

The research design requires the estimation of the choice of payment methods in corporate M&As based on the relevant propositions. Testing the determinants of payment methods requires, in our study, a list of completed M&As, targets matched with acquirers, and proxy variables. To compile the sample of the study, we search an initial list of acquisitions from Excel's publications on Takeovers, Offers and New Issues and the various issues of Acquisitions Monthly for all London Stock Exchange listed companies that successfully completed M&As from the period 1 January 1990 to 31 December 1999. These data sources together report 867 completed M&As taking place in the UK during this period. This initial sample includes M&As of both publicly and privately held companies as well as acquirers that are foreign companies. We confirm the announcement dates of M&As and check whether the case was consummated among UK companies by cross reference to *the Financial Times*.

In order to satisfy the research design, the initial sample has to be adjusted by the following requirements. Firstly, we delete a total of 137 lapsed bids from the initial sample. That is, all of the M&As had to be successfully consummated to be included in our sample. We limit the data sample to completed M&As because we feel that only such M&As can reflect the effect of the identified factors on the choice of payment methods.

Secondly, a total of 178 bids unavailable of payment methods are excluded in our sample even if they are successfully completed. Practically, there are a few other payment methods in M&As. Franks, Harris, and Mayer (1988) categorize them into all-cash, all-share, cash or debt, all debt, cash plus share, convertible, and cash or equity. Since methods of all-cash, all-share, and the mix of cash and shares are most widely used, we restrict our research design to the study of these three main payment methods. Thirdly, additional 106 bids are removed from the initial sample because they are either private companies or non-UK public companies. That means that both targets and bidding firms must be listed on the London Stock Exchange during the sample period to be included in our sample. Finally, 343 bids have to be dropped due to unavailability of relevant data. The design of payment method determination in our study requires that the sample data of the acquirer be matched by that of the target. Even if data of acquiring firms are mostly available, data of target firms are not recorded in a number of cases due to withdrawal from the listing after successfully completed bids. Thus, the final sample consists of 103 cases – all targets being matched by acquirers in every explanatory variable in our study. Most financial data for the final sample are retrieved from Datastream. However, since Datastream does not provide all of the financial data required, we obtain additional information and data from other reference books and materials: various issues of Price Waterhouse's "*Corporate Register*", Crawford's *Directory of City Connections*, and the Macmillan's *Stock Exchange Yearbook*. All accounting variables and financial data in our study are selected or calculated for the financial year immediately prior to the bid announcement. Table 2 presents the final sample by payment method and time spread.

{Table 2 about here}

Observations in Table 2 show that cash offer constitutes 37% of the sample, share exchange and the mix of cash and share account for 41% and 22% respectively. It is worthy to note that the percentage of the above data with reference to the three payment methods does not mean that some specific forms of payment, for instance, share exchange is most popularly used in this period. As described in the procedures of selecting sample above, merger pairs in the final sample are those that satisfy our selection criteria, which imply that they may not mirror the population of payment methods in this period. In addition, since cash offer is usually characterized by hostile bid, a bid with cash offer is prone to be blocked. Huang and Walkling (1987) find that hostile bids are more likely to be unsuccessful. Thus, the smaller percentage of cash offer in the sample does not mean it is less likely to be used in M&As. Cash offer in our sample includes pure cash offer and cash plus debt, since debt is normally referred to a source of cash from outsiders.

2.2 Variable specifications

As stated in Section 1, previous empirical evidence shows that a number of factors may influence the choice of payment methods in M&As. In light of the present inconsistency of the empirical evidence, we define and examine the relationship between the dependent variables above and the following explanatory variables. RES refers to the relative size of the target to the acquirer. The measurement of the relative size variable is the ratio of

total assets of the target to those of the acquirer, in terms of the book values of both parties in the financial year immediately prior to the bid announcement. As suggested by the hypothesis, the relative size and the choice of the share exchange method is expected to be positively related and the relative size and the choice of the cash offer method is expected to be negatively related. OWN stands for the fraction of share ownership held by both target and acquirer's management, with OWN(A) and OWN(T) representing the ownership variable of the acquirer and the target respectively. The fractions of managerial ownership in both target and acquiring firms include shares held by managers, directors, and the insiders. Previous empirical evidence does not arrive at a consistent conclusion regarding the relationship between managerial ownership and the choice of payment methods. This study expects that there could be a positive relationship between cash offer and acquiring firms' managerial ownership and a negative relationship between cash offer and target firms managerial ownership. Meanwhile, the use of share exchange and acquiring firms' managerial ownership is expected to be negative related, and the use of share exchange and target firms' managerial ownership is expected to be positively related. ROE, standing for return on equity, serves as a proxy for firms' performance with regard to return to shareholders. In the study, we use ROE(A) and ROE(T) to represent return on equity of acquirers and targets respectively. According to our hypothesis, ROE(A) is expected to be positively related to cash offer and ROE(T) is expected to be negatively related to cash offer. DIV is the dividend payout ratio of acquirers, an indication of acquirers' free care flows in hand. Consistent with the free cash flow hypothesis, DIV is expected to be positively related to the choice of cash offer and negatively related to share exchange. MBR is the ratio of market value to book

value of acquirers. This variable is defined as a proxy for the acquirers' performance on the stock market as well as acquirers' growth. Following Denis (1994), we compute market-to-book ratio as the sum of the market value of equity and the book values of long-term debt and preference shares, divided by the book value of total assets. It is worth noting that all of the relevant values are based on the dates (financial years) immediately before the bid announcement is publicly made. As one of the important variables for the determination of payment methods, MBR is expected to be positively related to share exchange and negatively related to cash offer.

2.3 Descriptive statistics and their interpretations

Before embarking on multivariate analysis, it is beneficial to inspect the differences among the payment methods based on the relevant explanatory variables. We present the summary descriptive statistics for the sample in terms of payment methods in Table 3, which presents the mean and standard deviation for each of the variables by payment method. Broad pictures about payment alternatives are discernible from Table 3. Overall, the mean values for the three payment methods – cash offer, share exchange offer and the mix of cash and share, are noticeably different in RES, ROE(A), DIV, and MBR. The descriptive statistics further reveal the following characteristics. Firstly, on average, the smaller the relative size of the target to the acquirer, the more probable the transaction is financed by cash. In contrast, the larger the relative size, the more likely the share exchange method is employed. Secondly, the mean values of acquirers' return on equity (ROE(A)) are much higher in the cases of cash offer than those of share exchange and the

mix of cash and share. Therefore, our hypothesis, which states that sufficient cash flows in hand by acquirers will lead to cash financing, is supported by this result. Thirdly, it can be observed that the larger the share ownership of the target management (OWN(A)), the more likely the cash offer method is adopted. However, the descriptive statistics fail to show the expected relationship between target managerial ownership and the use of share exchange. Fourthly, the mean value of the dividend payout ratio of the acquirer is the highest in the cases of cash offer, followed by the mix of cash and share, and is the lowest for share exchange, which support the claim that the higher the dividend payout ratio, the more likely the cash offer method is employed. Finally, it is demonstrated that the higher the ratio of acquirer's market-to-book value (MBR), the more likely the share exchange method or the mix method is adopted. This result is in line with our hypothesis that good performance of the acquirer's share on the stock market makes its share more attractive when offered for consideration in the transactions.

{Table 3 about here}

2.4 Independent sample tests

Having conducted these descriptive analyses, we further proceed to the comparison of the effects of explanatory variables on the payment alternatives based on *t*-test statistics. Tables 4 to 6 report the results of the independent sample test that scrutinize the differences in means of different variables with regard to cash offer versus share

exchange, cash offer versus the mix of cash and share, and share exchange versus the mix of cash and share.

2.4.1 Cash v. share

Table 4 presents the independent sample test results with reference to cash offer versus share exchange. As the results reveal, the mean values of RES by cash offer and share exchange are significantly different at the 5% level. The results confirm the pertinent hypothesis that the relative size is one of the influential factors for the choice of payment alternatives in M&As. Regarding the effect of firms' performance in return to shareholders on the choice of payment methods, the *t* – statistic shows that ROE(T) is not significantly different between cash offer and share exchange. However, the mean of ROE(A) is significantly different between cash offer and share exchange. This result implies that the good performance of acquirers before the acquisition makes it more likely to employ cash offer. Similarly, as revealed by the values of DIV, a higher dividend payout ratio in the acquirer result in a higher probability of choosing cash offer. Finally, the mean values of MBR are highly significantly different at the 1% level, cash offer versus share exchange. The results confirm that MBR is one of the major factors for payment method determination in M&As. The above empirical results and analysis endorse that these variables under consideration are well defined for the classification of cash offer against share exchange in M&As.

{Table 4 about here}

2.4.2 Cash v. mix

Table 5 provides the independent sample test results for the differentiation between the choice of cash offer and the choice of the mix of cash and share. It is shown that the mean of the RES variable is statistically significantly different between the cash offer method and the mix method at the 1% level. Thus, the observed association between cash offer and the relative size is supported by our results. Inspecting the mean values of ROE(A) for the two payment methods indicates that ROE(A) is also a discriminating variable, and the result confirms a positive relationship between the performance of the acquirer and the choice of cash offer in M&As. Table 5 also shows that MBR is significantly different between the two payment methods, suggesting that good stock market performance is in favor of the mix method. All of the above results appear to be in line with the prediction of our hypotheses except for one variable – managerial ownership of the target firm (OWN(T)). As shown in the table, the mean of OWN(T) for cash offer is higher than that for the mix of cash and share at the 10% level, contradicting the prediction of the hypothesis. This ambiguity about the effect of ownership of target management on the choice of cash offer will be further examined in our multinomial logistic model. However, this result might be alternatively interpreted as follows: when the two methods are compared in acquisition financing, the target management with higher ownership prefers receiving pure cash given that the mix of cash and share does not assign them a sufficient number of shares to keep their interest in the combined firm and retain their

jobs. Under such circumstances, cash offer with a higher premium can be more attractive to them that a mix of cash and share.

{Table 5 about here}

2.4.3 Share v. mix

The independent sample test results for the differentiation between share exchange and the mix of cash and share are reported in Table 6. It appears that no significant difference exists between the two payment methods in terms of the means of the defined variables except the target managerial ownership variable, OWN(T). It can be observed that the means of OWN(T) are significantly different at the 10% level between the two methods and the mean for share exchange is higher than that for the mix of cash and share as expected, confirming the prediction of the pertinent hypothesis. Given the overall results however, no clear patterns emerge for the differentiation between these two payment methods.

{Table 6 about here}

2.5 Summary and discussion

In this section, we present descriptive statistics and comparative statistics for our defined independent variables. It has been evidently shown that the mean values of these

variables are overwhelmingly, statistically significantly different between the choice of cash offer and that of share exchange. RES, ROE(A), DIV, and MBR are all expectedly in line with the prediction of our hypotheses, endorsing our conjecture that these variables play an important role in the determination of payment methods in M&As. Yet, although the majority of our hypotheses are supported by the descriptive statistics and analysis, there still exist few cases where the results are not consistent with what suggested by theoretical conjectures. In particular, the role of OWN(T) in the cases of cash versus share and cash versus the mix of cash and share and that of ROE(T) appear to be ambiguous. Nevertheless, these ambiguities and inconsistencies are similar to those in Ghosh and Ruland (1998) who find that there is no direct relationship between the acquirer's managerial ownership and the choice of payment methods.

The results derived from descriptive statistics provide an intuition on the determinants of payment methods based on our defined variables. However, convincing conclusions cannot be reached based on the analysis of descriptive statistics alone. To achieve our objectives effectively, we employ the approaches of descriminant analysis and multinomial logistic analysis to examine the relationship between these defined variables and the choice of payment methods in the next section.

3. Empirical Evidence, Analysis, and Interpretations

The univariate analysis in Section 2 has provided us with the evaluation of discriminating power of each of the defined variables. There is no guarantee, however, that a variable that is not significant in univariate analysis can not make an important contribution in a multivariate context. Therefore, two robust multivariate analysis methods, multinomial logistic analysis as well as discriminant analysis, are called for in this study in the analysis of payment method determination. In this section, we briefly introduce the two modelling approaches first. We then present empirical evidence which is derived from these two approaches and provide discussions and comparisons with regard to the models' predictive power and validation in applications. The final empirical results are presented on the basis of the more robust and appealing method – multinomial logistic analysis.

3.1 Modelling strategies

3.1.1 Discriminant analysis methodology

Discriminant analysis is a statistical technique used to classify individual variables into one of two or more alternative groups based on several variable measurements. The groups are assumed to be distinct, therefore, each individual belongs to one of them. Besides the classification of variables into the relevant groups, discriminant analysis also enables us to find the most powerful discriminators in distinguishing groups. That is,

given a set of individual variables, then by using discriminant analysis methods, these variables can be classified into a specific group of its own. The relationship between discriminating variables and groups is demonstrated in Figure 1. As shown in Figure 1, discriminant analysis is used to predict what variables discriminate between two or more groups.

{Figure 1 about here}

Discriminant analysis technique was first introduced by Fisher (1936), who applied this technique to solve problems in physical anthropology and biology. One of the important discriminant analysis functions, the Fisher discriminant function, is thus derived from the Fisher's study (1936). Generally, when discriminant analysis technique is employed to discriminate among groups, the Fisher discriminant function is used. In addition, this function can be applied to measure the direction and degree to which each variable contributes to the classification. The purpose of utilizing discriminant analysis in our study is to make it possible to identify those explanatory variables that significantly contribute to the dependent groups such as cash payment, share exchange and the combination of the two. By doing so, we can also drop the others which seem insignificant from the discriminant functions.

3.1.2 Multinomial logistic models

Basically, there are two types of nomial logistic models, one of which is the simple nomial logistic model and the other is the multinomial logistic model. The simple nomial logistic model is binomial logistic model, which, as it is termed, involves only two outcomes for the dependent variable. Since the binomial regression provides only two different treatment outcomes – whether the event of interest occurs or not, the logistic function can be, therefore, written as:

$$P = \frac{\exp(\alpha + \boldsymbol{\beta}'\mathbf{X})}{1 + \exp(\alpha + \boldsymbol{\beta}'\mathbf{X})} \tag{1}$$

where P is the probability of the event occurring, α is a constant, $\mathbf{X}$ is a vector of independent variable and $\boldsymbol{\beta}$ is a vector of corresponding coefficients. Deriving from equation (1), the probability of the event not occurring is:

$$1 - P = 1 - \frac{\exp(\alpha + \boldsymbol{\beta}'\mathbf{X})}{1 + \exp(\alpha + \boldsymbol{\beta}'\mathbf{X})} = \frac{1}{1 + \exp(\alpha + \boldsymbol{\beta}'\mathbf{X})} \tag{2}$$

Accordingly, odds of an event occurring is $P/(1\text{-}P)$, the ratio of the probability of the event occurring to the probability of the event not occurring. The logarithm of the odds is the log odds ratio. The term "logit" is consequently adopted. The logarithm of the odds ratio is presented in the form of:

$$Ln\left[\frac{P}{1-P}\right] = Ln(P) - Ln(1-P) = \alpha + \boldsymbol{\beta}'\mathbf{X} \tag{3}$$

If a dependent variable is a categorical response with more than two categories, the logistic model can be termed multinomial logistic model. That is, a multinomial logistic model is the extension of binomial logistic model. To construct a multinomial logistic

model, one baseline category should be selected. In our case, there are three payment methods in M&As, cash offer, share exchange and the mix of cash and share, and the mix of cash and share is set to be the baseline category. The probabilities of the three payment methods are used in M&As are:

$$P_C = \frac{\exp(\alpha + \boldsymbol{\beta}'\mathbf{X})}{1 + \exp(\alpha + \boldsymbol{\beta}'\mathbf{X}) + \exp(\lambda + \boldsymbol{\gamma}'\mathbf{X})} \tag{4}$$

$$P_S = \frac{\exp(\lambda + \boldsymbol{\gamma}'\mathbf{X})}{1 + \exp(\alpha + \boldsymbol{\beta}'\mathbf{X}) + \exp(\lambda + \boldsymbol{\gamma}'\mathbf{X})} \tag{5}$$

$$P_M = \frac{1}{1 + \exp(\alpha + \boldsymbol{\beta}'\mathbf{X}) + \exp(\lambda + \boldsymbol{\gamma}'\mathbf{X})} \tag{6}$$

where P_C, P_S and P_M are the probabilities of cash offer, share exchange and the mix of cash and share being used as the method of payment in M&As; α and λ are constant, $\mathbf{X}$ is a vector of independent variable and $\boldsymbol{\beta}$ and $\boldsymbol{\gamma}$ are vectors of corresponding coefficients. To investigate the determinants of payment methods categorized by these three types, we regress the dependent variable of the multinomial logistic model on the proxies for financial factors and characteristics which are suggested by our hypotheses. Our dependent variables and their corresponding regression specifications are as follows:

$$Ln\left[\frac{P_C}{P_M}\right] = \alpha + \boldsymbol{\beta}'\mathbf{X} \tag{7}$$

$$Ln\left[\frac{P_S}{P_M}\right] = \lambda + \boldsymbol{\gamma}'\mathbf{X} \tag{8}$$

$$Ln\left[\frac{P_C}{P_S}\right] = (\alpha + \boldsymbol{\beta}'\mathbf{X}) - (\lambda + \boldsymbol{\gamma}'\mathbf{X}) \tag{9}$$

3.2 Results from discriminant analysis

Multivariate discriminant analysis is used to assess the collective discrimination achieved by our variables. In the meantime, it will help us to find out which variables are of most importance in a multivariate context. Thus, empirical results obtained by using discriminant analysis can identify which explanatory variables significantly contribute to the specific dependent groups of cash offer, share exchange and the mix of cash and share. The discriminant analysis results in terms of the effects of the independent variables on the choice of the method of payment and the relevant statistical test are presented in Table 7 and Table 8.

{Table 7 about here}

The discriminant analysis output produces Fisher's classification function coefficients as shown in Table 7. In discriminant analysis, Fisher's classification coefficients are used directly for classification in which either the discriminating variables or the canonical discriminant functions are used to predict the group to which a case most likely belongs.

Table 8 reports the classification results, which indicate the success rate for the prediction of group membership. As shown in the table, over 70% cases in the two major categories, i.e., cash offer and share exchange, can be correctly classified by using this method. Nevertheless, discriminant analysis does not have any prediction power for the third

payment method, the mix of cash and share, with more than two-thirds being wrongly classified as cash offer or share exchange. Clearly, the mixed attributes of the mix of cash and share make the classification rather difficult for this group that shares the characteristics of cash offer and share exchange. In addition, the number of cases in this group is fairly small. Overall the results demonstrate that the procedure has sound explanatory power for payment method classification.

{Table 8 about here}

{Table 9 about here}

In Table 9, we present the tests of equality of group means for each variable. The function values and their significance can be used to test the hypothesis that all group means are equal. The table clearly shows that the group means under the variables RSIZE, ROE(A), and MBR are different with their significance level being less than 5%. While variable DIV only shows modestly related to the payment methods, with the significance level being 8% (larger than 5%), we leave this variable to be further tested later.

By observing the classification functions, we can find that there is a noticeable difference between cash offer and share exchange in terms of the following variables, namely MBR, RSIZE, ROE(A), and DIV. With regard to the mix of cash and share, we can see the difference between the mix and share exchange is not significant with respect to variables

MBR and DIV, but there is a difference in other variables. Similarly, we can find remarkable difference between the mix and cash offer. However, the difference as well as the similarity between the mix and share exchange or between the mix and cash offer is difficult to be observed from these functions. Thus, the discriminant classification functions suggest that the characteristics of M&As in terms of payment methods are significantly different between cash offer and share exchange, but those of the mix of cash and share are less clearly defined.

3.3 Results from multinomial logistic analysis

In light of the limitations of these two basic statistical techniques, our empirical results based on them may have biased errors. To further test our hypotheses and fine-tune the results, we apply a more advanced econometric model – the multinomial logistic model. The corresponding empirical results from the logistic analysis are presented as follows.

{Table 10 about here}

In addition, we present the output of multinomial logistic classification results in the following Table 11, which give the success rate for predictions of membership as demonstrated in our multinomial logistics regression.

{Table 11 about here}

As shown in Table 11, the successful classification rate for the two major categories, i.e., cash offer v. share exchange, and cash offer v. the mix of cash and share is over 83%. That is, the multinomial logistics regression can successfully differentiate the cash offer from share exchange and cash offer from combination financing with regard to the defined variables in our sample. Nevertheless, this technique does not have a powerful prediction for discriminating share exchange from the combination of cash and share exchange financing, with nearly two-thirds being wrongly classified as shown in the table. Taken together, the overall correct classifications are nearly three quarters, as against 61% by discriminant analysis. The multinomial logistics method as applied to analyze the choice of payment methods in this study is a preferred and ideal one.

Table 12 presents the likelihood ratio tests of the sample. It is quite clear in Table 12 that the log likelihood ratio test statistic is significant in variables RSIZE, ROE(A), and MBR. This result suggests that these three variables are the main factors in determining the payment methods.

{Table 12 about here}

3.4 Analysis of empirical results

In order to interpret the results and findings obtained from multinomial logistic regression, we have to bear in mind the meanings of the coefficients. Unlike the coefficients of OLS models, the multinomial logistic regression coefficients represent the

impact of a one-unit change in the independent variable in concern (while holding the other independent variables constant) on the log of the odds of a given choice, not on the impact on the probability itself. We present and analyze these findings in detail as follows.

Effect of relative size. Let us firstly consider the impact of relative size of the target to acquirer on the choice of payment methods. As shown in Table 10, acquisitions in which the target has a larger size in relation to the acquirer are less likely to be financed by cash. When facing a larger target in an acquisition, the acquirer generally has no sufficient cash to finance the deal. In this situation, the acquirer has to use share exchange or a mix of cash and share. Table 10 clearly shows that the relative size variable is a significant discriminator to distinguish cash offer from the other two payment methods (coefficients are negatively significant at the 1% level, with t values equal – 4.244 and – 4.085, respectively). In addition, the results reported in Table 10 suggest that there is no clear relationship between share exchange and the mix of cash and share under the relative size proposition. Thus, this result is consistent with our hypothesis 1, which states that the larger the relative size of the target to acquirer, the less likely cash offer would be to be used.

Effect of return on equity. Next, we discuss the effect of the acquirer's return on equity on the choice of payment alternatives. From the output of multinomial logistic regression, we can learn that the coefficients of ROE(A) are all positive in three regressions. With the exception of the regression in which the dependent variable is the log odds ratio of

share exchange to the mix of cash and share, the coefficients of ROE(A) in the log odds ratio of cash to the other two payment methods are positively significant at the 1% level and 5% level, respectively. These results suggest that the higher the return on equity of the acquirer, the more likely the acquisition would be financed by cash. The effect of the return on equity of the acquirer in this regard could be explained as that the higher return on equity implies the good performance of the acquirer and also the availability of cash flows in hand. Under such circumstances, cash offer is more likely to be employed in the acquisition. This result highly supports our hypothesis 5, which states that the higher return on equity of the acquirer makes it more likely to use cash offer to finance the M&A transactions.

Managerial ownership effect. We now turn to the analysis of the third factor in our regression analysis, share holdings of the management and insiders of both target and acquirer. As shown in Table 10, there is no significant difference with regard to the log odds ratio between cash offer and the mix of cash and share, or cash offer and share exchange. These results imply that the percentage of holdings of the management of both parties has no significant effect on the choice of payment methods between cash offer and the other two payment methods. Payment methods are not dependent upon the management ownership of the firms involved in the M$As. A possible interpretation to the results can be made from both parties' perspective. From the target firm's point of view, the shareholders may want to be paid by cash in order to realize their assets immediately with a higher premium paid by the acquirer due to the tax status. While the target management may wish to accept share exchange in order to retain their positions

after the acquisition is completed. As a consequence, there seem to exist unsolvable arguments between the target shareholders and management with a view to the choice of payment methods. An interpretation in this regard can also be made on the basis of the viewpoint of the acquirer. Generally, given that the acquirer's management wants to get rid of the influence of the target firm's management after the acquisition, they often prefer cash offer to share exchange. On the other hand, employing cash offer has to provide a higher premium for the target due to additional tax costs, the acquirer may prefer using share exchange in order to avoid this burden. Consequently, the effect of managerial ownership on the choice of payment methods is also ambiguous from the acquirer's perspective. Based on the above analysis, it appears to be reasonable for the study to find no associations between managerial ownership and the choice of payment methods in M&As.

In summary, the results for the effect of management ownership on the choice of payment methods are not in line with our pertinent hypothesis, which states that the greater the share ownership in both parties, the more probably cash offer would be employed. Note that, our multinomial logistic regression results in terms of the effect of managerial ownership on the choice of payment are consistent with those of discriminant analysis of this study. Moreover, there is still no clear-cut evidence in the existing literature. Therefore, in light of that the conflicting empirical evidence in this respect has existed in the literature for a long time, we leave this argument for further study in the future.

We can find, however, that managerial ownership does have impact on the choice of share exchange and the mix of cash and share. As measured by OWN(T), our multinomial logistic regression results show that the larger the target management ownership, the more probably the acquisition would be financed by share exchange when compared with the mix of cash and share (coefficient is significant at the 5% level). A possible explanation can be that the target management prefers accepting share exchange to retain the interest and influence in the combined firm given that the payment choice is only limited to share exchange and the mix of cash and share. Likewise, OWN(A) also appears to have an effect on the choice of share exchange and the mix of cash and share. The results from multinomial logistic regression show that the larger the acquirer's management ownership, the more likely the acquisition would be financed by share exchange. The results can be interpreted as that choosing share exchange implies that the acquiring firm either does not have sufficient cash in hand or its leverage ratio is already high. In such circumstances, paying cash will worsen the present leverage conditions. However, as shown in Table 10, the regression results with reference to the acquirer's management ownership do not attribute too much to the preference for share exchange (coefficient is significant only at the 10% level). That means managerial ownership of the acquirer has less effect on the choice of payment methods than the target managerial ownership.

Effect of the acquirer's share performance. The acquirer's share performance on the stock market measured by market-to-book value has a significant impact on the choice of payment methods. Table 10 clearly shows that the coefficients of cash offer relative to

the other two payment methods are significantly different under the market-to-book value measurement (both are highly significant at the 1% level). Generally, a higher value of the market-to-book ratio indicates better performance of the acquirer's shares on the stock market. Thus, the shares are more attractive to the target shareholders when offered as a consideration of the payment medium. By examining the logistic regression results above, we find that there exist negative coefficients with a high value of the *t*-statistic in the log odds ratios of cash offer to the other two payment methods The results indicate that the higher the value of the acquirer's market-to-book ratio, the more likely the mix of cash and share or share exchange would be adopted as against cash offer. The results are highly supportive of our hypothesis 6, which states that good performance of the acquirer's share on the stock market makes share exchange more likely to be used in M&As.

Share exchange v. mix. It is worth noting that the results of our multinomial logistic regression do not clearly demonstrate a significant difference between choosing share exchange and the mix of cash and share with regard to the explanatory variables. This has been clearly demonstrated in Table 11. To confirm this result, we further apply the cluster analysis technique to cluster these three groups into homogeneous ones. Cluster analysis uses the proximities or similarities between examined groups as the basis for producing clusters. Generally, the more similar the groups are, the more likely they are in the same cluster. Since the results as shown in Table 11 indicate that there is no clear difference between choosing share exchange and the mix of cash and share as measured by our explanatory variables, we, therefore, predict that they are clustered in the same group. On

the basis of our multinomial logistic results, cluster technique gives the proximity matrix as shown in the following Table 13.

{Table 13 about here}

Generally, the larger the Squared Euclidean Distance is, the more heterogeneous between the groups. Clearly, $\ln\frac{P_{cash}}{P_{mix}}$ and $\ln\frac{P_{share}}{P_{mix}}$, and $\ln\frac{P_{share}}{P_{mix}}$ and $\ln\frac{P_{cash}}{P_{share}}$ are quite different, with the squared Euclidean distance being 302.953 and 322.128, respectively. Whereas there is nearly no difference between $\ln\frac{P_{cash}}{P_{mix}}$ and $\ln\frac{P_{cash}}{P_{share}}$, with a fairly short squared Euclidean distance of 1.132. This result suggests that, as predicted, there are only two clusters on the basis of the multinomial logistic results, one of which is cash offer, and the other one is share exchange and the mix of cash and share. This result indicates that, based on the multinomial logistic results, those explanatory variables can successfully differentiate cash offer from share exchange, and cash offer from the mix of cash and share. However, it shows much weak powers of those explanatory variables for distinguishing share exchange from the mix of cash and share. Consequently, the cluster results are in line with those of our multinomial logistic regression which do not demonstrate a clear difference between share exchange and the mix of cash and share.

Taken together, the results by cluster analysis along with discriminant analysis confirm one of our multinomial logistics results that those defined explanatory variables cannot play the role of the discriminators for share exchange from the mix of cash and share

properly. With reference to this result, the possible explanations can be as follows. On the one hand, when only these two payment alternatives are available, the target shareholders, for instance, prefer pure share exchange rather than the mix of cash and share given that they want to retain their interests in the combined firm. On the other hand, from the viewpoint of the acquirers, they may have their own considerations when choosing the mix of cash and share but not share exchange. That is, they may prefer part of the transaction to be financed by cash in order to eliminate the influence of the target management in the combined firm, and part of the transaction to be financed by share exchange due to shortage of cash flows on hand. Thus, the bargain in this regard between these two parties may result in ambiguous outcome to distinguish the two payment methods in M&As. In this context, choosing one of the two payment methods in reality might not depend on our defined variables only but additionally depend on the joint effects of managerial ownership, bargaining power of the participants, accounting treatment considerations and other aspects of M&As.

4. Conclusions

This study provides empirical evidence on the hypotheses that the choice of payment methods in M&As is dependent on corporate financial factors and characteristics. In the empirical study, we analyze a data sample of UK M&A activities in the 1990s to examine the determinants of payment methods in M&As, employing univariate descriptive analysis, descriminant analysis and multinomial logistic regression. Our empirical results

from these methods are overall consistent. The discriminant analysis method is employed to classify the effects of different variables on the specific dependent groups. Results from discriminant analysis are consistent with those of comparative descriptive statistics. In light of the limitations in these two analytical methods, we apply multinomial logistic models to examine the relationship between the choice of payment methods and the defined variables in detail and with greater accuracy. The empirical results from multinomial logistic regression are in line with those of the above methods, with the parameters having more straightforward meanings and being more reliable. The study renders a number of findings.

Firstly, the relative size of the target to the acquirer is one of the main determinants in the choice of payment methods. As expected, the empirical evidence shows that the larger the relative size, the more likely share exchange would be adopted in M&As. This result is similar across the three methods, conforms to our hypothesis, and is also consistent with the previous studies. Secondly, return on equity of the acquirer is another main discriminator in distinguish share exchange from cash offer. Generally, the higher the acquirer's return on equity prior to the acquisition announcement, the more likely cash offer would be employed. This result implies that the acquirer is more probably to offer cash for the acquisition given cash is in hand. Thirdly, our results do not provide clear-cut evidence on the management ownership hypothesis which states that the percentage of share holdings by the management of the bidder (target) is positively (negatively) associated with cash offer. A number of trades-off and interactions between various factors may contribute to these results. Fourthly, the empirical results highly support our

hypothesis that the better the performance of the acquirer's shares on the stock market the more probably the share exchange method would be adopted. Under such circumstances, the acquirer's share seems considerably attractive to the shareholders of the target firm. Finally, the results suggest that cash offer is more likely to be chosen in the acquisition given the acquirer has a higher dividend payout ratio – an indication of more cash in hand.

Our empirical evidence also demonstrates that there is no significant difference between share exchange and the mix of cash and share as measured by our defined variables. We pursue a further investigation into this result by applying the cluster analysis technique in this study. The cluster analysis results show that these two payment methods can be clustered in one group, which suggests that in reality it is difficult to discriminate share exchange from the mix of cash and share.

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Table 1. Predicted effect of factors on the choice of payment methods in M&As under the five hypotheses

Hypothesis		Predicted effect on the choice of		
		Cash offer	Share exchange	Cash + share
Relative size		-	+	+
Free cash flow		+	-	-
Share performance (of acquirer)		-	+	?
Managerial ownership	acquirer	+	-	?
	target	-	+	?
Corporate performance	acquirer	+	-	?
	target	-	+	?

Table 2. Distribution of M&As by payment method (1990 –1999)

	Cash offer	Share exchange	Mix of cash + share	Total
1990	4	3	1	8
1991	2	3	4	9
1992	3	1	0	4
1993	4	1	0	5
1994	2	4	1	7
1995	3	7	4	14
1996	3	6	2	11
1997	5	5	3	13
1998	6	4	1	11
1999	6	8	7	21
Total	**38**	**42**	**23**	**103**

Table 3. Descriptive statistics of variables by payment method (1990 – 1999)

	Cash offer		Share exchange		Mix of cash + share	
	mean	std	mean	std	mean	std
RSIZE	0.13	0.14	1.06	2.56	0.53	0.58
ROE(T) (%)	14.03	21.84	13.71	13.08	12.13	25.37
ROE(A) (%)	25.16	23.01	16.47	15.97	6.73	46.65
DIV (%)	50.58	28.60	36.85	23.75	45.84	21.78
OWN(T) (%)	13.17	20.62	1.10?	14.79	4.59	8.92
OWN(A) (%)	4.07	9.52	3.70	6.40	5.89	9.85
MBR	0.70	3.88	3.36	2.98	3.50	6.60

Table 4. Independent samples test – cash v. share

	Mean diff	Std err diff	Test stat	*t* - stat	Sig
RSIZE	-0.91	0.41	0.016	2.217**	0.029
ROE(T)	0.63	3.98	0.262	0.159	0.874
ROE(A)	8.67	4.38	0.136	1.980*	0.051
DIV	12.92	5.89	0.403	2.193**	0.031
OWN(T)	2.08	3.97	0.141	0.525	0.601
OWN(A)	0.45	1.79	0.374	0.251	0.803
MBR	-2.62	0.77	0.957	3.414***	0.001

* Significant at the 10% level, ** Significant at the 5% level, *** Significant at the 1% level

Table 5. Independent samples test – cash v. mix

	Mean diff	Std err diff	Test stat	*t* - stat	Sig
RSIZE	-0.40	0.00	0.000	4.089***	0.000
ROE(T)	1.90	6.13	0.865	0.309	0.758
ROE(A)	18.43	8.93	0.146	2.063**	0.044
DIV	4.73	6.94	0.390	0.682	0.498
OWN(T)	8.59	4.55	0.006	1.888*	0.064
OWN(A)	-1.82	2.55	0.234	0.714	0.478
MBR	-2.81	1.34	0.241	2.095**	0.040

* Significant at the 10% level, ** Significant at the 5% level, *** Significant at the 1% level

Table 6. Independent samples test – share v. mix

	Mean diff	Std err diff	Test stat	*t* - stat	Sig
RSIZE	0.51	0.54	0.195	0.953	0.344
ROE(T)	1.27	4.76	0.514	0.266	0.791
ROE(A)	9.77	7.88	0.020	1.240	0.220
DIV	-8.18	6.04	0.877	1.355	0.180
OWN(T)	6.50	3.35	0.036	1.942*	0.057
OWN(A)	-2.27	2.01	0.011	1.128	0.264
MBR	-0.19	1.19	0.161	0.157	0.876

* Significant at the 10% level, ** Significant at the 5% level, *** Significant at the 1% level

Table 7. Classification function coefficients of discriminant analysis

	Payment method		
	Cash	Share	Mix
DIV	8.833e-02	6.870e-02	8.014e-02
OWN(A)	7.216e-02	6.382e-02	0.113
OWN(T)	6.827e-02	5.639e-02	3.326e-02
ROE(A)	2.619e-02	1.457e-02	1.553e-03
ROE(T)	3.486e-02	5.061e-02	5.277e-02
RSIZE	1.708e-02	0.324	0.128
MBR	0.161	0.288	0.306
Constant	-4.560	-3.926	-4.240

Table 8. Classification results of discriminant analysis

Observed	Predicted			Percent correct
	Cash	Share	Mix	
Cash (38)	28 (73.7%)	10 (26.3%)	0 (0.0%)	73.7%
Share (42)	12 (28.6%)	29 (69.0%)	1 (2.4%)	69.0%
Mix (23)	8 (34.8%)	9 (39.1%)	6 (26.1%)	26.1%
Overall performance	$= \frac{38\times 73.7\% + 42\times 69.0\% + 23\times 26.1\%}{38+42+23} =$			61.2%

Table 9. Tests for equality of group means

	Function value	Significance
DIV	3.086	0.050
OWN(A)	0.067	0.936
OWN(T)	3.181	0.046
ROE(A)	2.075	0.131
ROE(T)	0.556	0.575
RSIZE	2.642	0.076
MBR	4.628	0.012

Table 10. Classification function coefficients of multinomial logistic models

Independent variable	Dependent variable		
	$\ln \frac{P_{cash}}{P_{mix}}$	$\ln \frac{P_{share}}{P_{mix}}$	$\ln \frac{P_{cash}}{P_{share}}$
Intercept	3.591	0.824	2.767
	(3.508)	(1.120)	(2.035)
RSIZE	-16.494***	0.661	-17.155***
	(-4.085)	(1.450)	(-4.244)
ROE(T)	0.027	-0.0045	0.031
	(1.070)	(-0.247)	(1.300)
ROE(A)	0.121***	0.0173	0.103**
	(2.750)	(1.438)	(2.341)
OWN(T)	0.053	0.078**	-0.025
	(1.297)	(2.060)	(-1.196)
OWN(A)	-0.059	-0.086*	0.027
	(-0.897)	(-1.833)	(0.421)
DIV	-0.006	-0.019	0.013
	(-0.336)	(-1.601)	(0.774)
MBR	-1.035***	-0.040	-0.994***
	(-3.224)	(-0.447)	(-3.126)

* Significant at the 10% level, ** Significant at the 5% level, *** Significant at the 1% level

Table 11. Multinomial logistic classification results

Observed	Predicted			Percent Correct
	$\ln\frac{P_{cash}}{P_{mix}}$	$\ln\frac{P_{share}}{P_{mix}}$	$\ln\frac{P_{cash}}{P_{share}}$	
$\ln\frac{P_{cash}}{P_{mix}}$ (38)	34 (89.5%)	0 (0.0%)	4 (10.5%)	89.5%
$\ln\frac{P_{share}}{P_{mix}}$ (23)	5 (21.7%)	7 (30.4%)	11 (47.8%)	30.4%
$\ln\frac{P_{cash}}{P_{share}}$ (42)	3 (7.1%)	4 (9.5%)	35 (83.3%)	83.3%
Overall performance	$= \frac{38\times 89.5\% + 23\times 30.4\% + 42\times 83.3\%}{38+23+42} =$			73.8%

Table 12. Likelihood ratio tests

	LR	χ^2	Significance
Intercept	131.585	6.977	0.031
RSIZE	175.199	50.591	0.000
ROE(T)	126.182	1.574	0.455
ROE(A)	145.132	20.524	0.000
OWN(T)	131.390	6.782	0.034
OWN(A)	128.673	4.065	0.131
DIV	127.262	2.654	0.265
MBR	151.111	26.503	0.000

Table 13. Proximity matrix

Cases	Squared Euclidean distance		
	$\ln \frac{P_{cash}}{P_{mix}}$	$\ln \frac{P_{share}}{P_{mix}}$	$\ln \frac{P_{cash}}{P_{share}}$
$\ln \frac{P_{cash}}{P_{mix}}$		302.953	1.132
$\ln \frac{P_{share}}{P_{mix}}$	302.953		322.128
$\ln \frac{P_{cash}}{P_{share}}$	1.132	322.128	

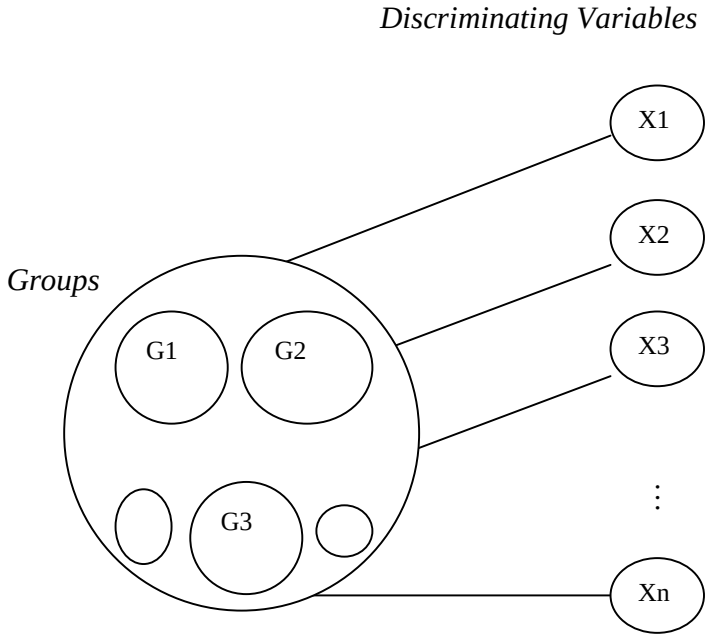

Figure 1. Relationship between groups and discriminating variables