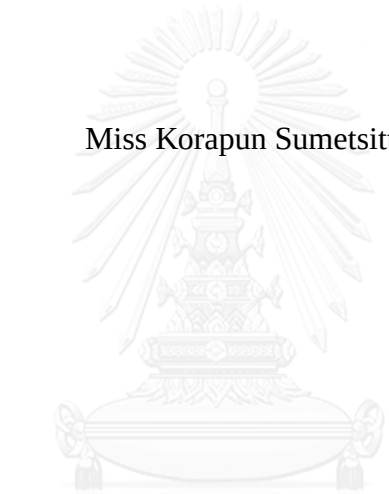
TAKEOVER REGULATIONS AND THE MEDIUM OF EXCHANGE

Miss Korapun Sumetsittikul



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วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาวิทยาศาสตรมหาบัณฑิต
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กรพรรณ สุเมธสิทธิกุล : กฎข้อบังคับของการควบรวมกิจการและสื่อกลางในการแลกเปลี่ยน (TAKEOVER REGULATIONS AND THE MEDIUM OF EXCHANGE) อ.ที่ปรึกษาวิทยานิพนธ์หลัก: ผศ. ดร. มนพล เอกโยคยะ, 103 หน้า.

วิทยานิพนธ์ฉบับนี้ศึกษาปัจจัยที่มีผลต่อการตัดสินใจเลือกสื่อกลางในการแลกเปลี่ยนของการควบรวมกิจการ โดยศึกษาในแง่มุมของความแตกต่างด้านกฎข้อบังคับของการครอบงำกิจการ ซึ่งเปรียบเทียบระหว่างประเทศสหรัฐอเมริกาและประเทศสหราชอาณาจักรตั้งแต่ปี พ.ศ. 2533 ถึงปี พ.ศ. 2557 สองสมมติฐานหลักที่ใช้ในการศึกษานี้คือการมีส่วนร่วมในความเสี่ยงและการประเมินค่าที่ผิดของตลาด ในที่นี้หมายความว่าระดับของความเสี่ยงและการประเมินค่าที่ผิดของทั้งบริษัทที่จะเข้าควบรวมกิจการและบริษัทที่จะถูกควบรวมกิจการมีผลต่อการตัดสินใจเลือกสื่อกลางในการแลกเปลี่ยน

หลักฐานของประเทศสหรัฐอเมริกาสนับสนุนสมมติฐานทั้งหมดนี้ เนื่องจากบริษัทที่จะเข้าควบรวมกิจการจะเลือกสื่อกลางในการแลกเปลี่ยน หลังจากนั้นจะเสนอให้บริษัทที่จะถูกควบรวมกิจการพิจารณา บริษัทที่จะถูกควบรวมกิจการจะตัดสินใจว่าจะรับข้อเสนอหรือไม่ อย่างไรก็ตามความสัมพันธ์นี้มีความชัดเจนน้อยกว่าสำหรับการซื้อขายที่มีความเกี่ยวข้องกับบริษัทที่จะถูกควบรวมกิจการของประเทศสหราชอาณาจักร เพราะผู้ถือหุ้นของบริษัทที่จะถูกควบรวมกิจการสามารถทำการตัดสินใจในการเลือกสื่อกลางในการแลกเปลี่ยน ดังนั้น ผลการวิจัยของวิทยานิพนธ์ฉบับนี้เมื่อนำมารวมกันแล้วชี้ให้เห็นว่า ความแตกต่างของกฎข้อบังคับมีผลต่อการตัดสินใจเลือกสื่อกลางในการแลกเปลี่ยนแตกต่างกัน

ภาควิชา การธนาคารและการเงิน ลายมือชื่อนิสิต .....

สาขาวิชา การเงิน ลายมือชื่อ อ.ที่ปรึกษาหลัก .....

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This thesis examines the determinants that affect payment method decisions in mergers and acquisitions in the aspect of takeover regulatory differences between the US and the UK during 1990 to 2014. Two main hypotheses are tested; the risk sharing and the market misvaluation. Meaning that the level of uncertainty and misvaluation (both bidder and target) affect the payment method decisions.

The US evidence broadly lends support to these hypotheses because the bidders are the ones who choose the medium of exchange, then offer to the targets. The targets decide whether to take it or leave it. However, these relations are less pronounced in deals involving the UK target as target shareholders have the right to make payment method decisions. Thus, the findings of this thesis taken together suggest that regulatory differences affect payment method decisions diffently.

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Student's Signature .....
Advisor's Signature .....

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CONTENTS

Page

Page

LIST OF TABLES

Page

CHAPTER I
INTRODUCTION

1.1 Background and Problem Review

Over the last decades, the medium of exchange in mergers and acquisitions has been an interesting area of corporate finance research, especially determinants that influence the bidder's choice of payment method. Several studies have showed theoretically that private information held by both the bidder and the target about their own firm's values drives the payment method in acquisitions (Fishman (1989), Hansen (1987), and Eckbo et al. (1990)). Additionally, some theoretical papers have demonstrated that the mean of payment in acquisitions is motivated by the market timing (Shleifer and Vishny (2003), and Rhodes-Kropf and Viswanathan (2004)).

Considering an information asymmetry between the bidder and the target, the bidder offers stock financing to the target, when the bidder faces an uncertainty in evaluating the target's value (Hansen (1987)). This is due to the stock contingent pricing effect, meaning that the target is forced to share part of an overpayment's risk ex post. Nevertheless, this stock contingent pricing mechanism would be less valuable when there is an increased in the bidder's size relative to the target's size.

Many studies have investigated the risk sharing hypothesis from Hansen (1987) empirically. Martin (1996) shows that when the bidder and the target have high growth opportunities, the bidder chooses stock as a mean of payment in acquisitions. Chemmanur et al. (2009) find that if the target's uncertainty is higher than the acquirer's uncertainty, stock deal is more likely to happen than cash offer. Similarly, when the target's uncertainty is lower than the bidder's uncertainty, the likelihood of cash

transaction is higher than stock offer. Faccio and Masulis (2005) also find a negative and significant relation between the relative size of the target (when compared to the acquirer's size) and cash transaction in acquisitions.

Furthermore, Shleifer and Vishny (2003) offer another theoretical idea that market misvaluation drives merger activity and the method of payment in mergers and acquisitions. The model based on rational managers taking advantage from irrational markets. In their model, overvalued bidder acquires less overvalued target with stock financing since the bidder can exploit stock overpayment for the target firm. The target accepts this overvalued stock offer because managers of the target have short investment horizons. For cash acquisitions, less overvalued bidder only offers to undervalued target.

Several empirical researches have investigated market misvaluation hypothesis. Rhodes-Kropf et al. (2005) find that in overvalued sectors, overvalued acquirer buy less overvalued target with stock financing. And when the target has a negative firm-specific error (i.e. undervalued target), less overvalued only offer cash to undervalued target. Dong et al. (2006) find that on average, overvalued acquirer can benefit from market misvaluation by acquiring less overvalued target with stock financing. They also find that stock target is overvalued than the target of cash deal. Ang and Cheng (2006) find that the bidders in completed stock offers are more overvalued than the bidders in withdrawn stock deals. The targets that accept overvalued stock from the bidders have shorter investment horizons when compared the bidders.

Despite the fact that many literatures have mostly focused on the US market, little attention has been paid to non-US markets especially on the dimensions of takeover regulation differences. By studying non-US market, it helps us to understand

how the difference in takeover regulations affect determinants that influence the payment method in acquisitions. Regarding to regulations governing the takeover process, takeover regulations of non-US markets differ from the US. In this case, the UK is an interesting market since it has institutional features that are similar to the US. For example, the US and the UK markets are developed capital markets and large takeover markets (i.e. active M&A markets). The UK companies also have similar corporate governance (i.e. large companies and dispersed ownership) (Franks and Mayer, 1997; Short and Keasey, 1999; Leuz, Nanda, and Wysocki, 2003; Aguilera, Williams, Conley, and Rupp, 2006; and Armour and Skeel, 2007). However, the UK takeover regulation is different from the US in many ways. For instance, the US bidders choose the mean of payment in acquisitions, whereas the UK target shareholders are allowed to do so. This casts doubt on whether the determinants that drive the payment method in acquisitions would differ between the US and the UK. The risk sharing predictions from Hansen (1987) might not explain in the case of the UK since the UK target shareholders may require cash instead of stock financing straight away. Also, the market misvaluation might have less impact on the method of payment in the case of the UK as target shareholders can choose the medium of exchange. As a result, this study seeks to investigate empirically the determinants that influence the mean of payment in acquisitions between the US and the UK.

1.2 Statement of Problem/Research Question

The empirical results from several literatures have confirmed that the predictions from risk sharing and market misvaluation models. However, most of the prior evidence is based on single-country data (i.e. the US), so this study aims to investigate two different markets, the US and the UK. Furthermore, takeover regulation

differences must also be taken into consideration as they could differently drive determinants that influence the US bidder's and the UK target shareholders' financing choice in acquisitions. Thus, the purpose of this thesis is to answer the question "How does regulation affect payment method decisions?".

1.3 Objective of the Study

Owing to the divergent in takeover regulations between the US and the UK, the US acquirer is the ones who choose the medium of exchange, but the UK target shareholders are allowed to do so. This means that the hypotheses of risk sharing and market misvaluation might not be broad enough to explain other financial markets, the UK in this case. For example, under the risk sharing hypothesis, the UK target shareholders might not choose to accept stock financing from the bidder as they can require cash straight away. Likewise, the market misvaluation may affect the UK target shareholders' financing decision less than the US bidder's, since the UK target shareholders have more power to bargain with the acquirer. Thus, this study aims to investigate whether and how determinants differ between the US and the UK on the dimensions of risk sharing and market misvaluation.

1.4 Scope of the Study

This empirical study investigates how the differences in takeover regulations between the US and the UK affect the determinants that motivate the choice of payment method in mergers and acquisitions. The data of this thesis will be the US and the UK firms that involved in mergers and acquisitions in the periods of 1990 to 2014.

1.5 Contribution

Taking the risk-sharing and market misvaluation hypotheses into consideration, these insights are drawn from the US setting, and have been taken as explanations for payment method decisions for non-US markets. Due to the apparent lack of supporting scientific evidence, this study focuses on the differences in takeover regulations between the US and the UK markets, especially how would the differences affect the determinants that drive the payment method. In the US, the bidder normally chooses the medium of exchange, then makes an offer to the target. However, it will be different in the UK since target shareholders could choose the method of payment. The bargaining power of the acquirer in the US will be stronger than the target, but in the UK the bidder has less bargaining power when compared to target shareholders. This means that there will be different in economic impact on financing decision between these two markets. Therefore, this empirical study provides new evidence of how takeover regulation differences between the US and the UK affect determinants that drive the payment method in acquisitions. By taking the different takeover regulations into account, it helps shedding light on the relationship between determinants and the choice of payment method in acquisitions in these two different developed capital markets.

1.6 Organization of the Study

The remainder of this study is structured as followed. In chapter II, this paper provides the literature review and hypotheses development. Chapter III describes data and methodology.

CHAPTER II

LITERATURE REVIEW

Several studies have investigated determinants that influence the method of payment in mergers and acquisitions. Myers and Majluf (1984) claim that when the bidding firm offers stock as a transaction for acquisitions to the target, their stock is overvalued. More recent evidence has tried to prove why the target still accepts the stock deal. In this section, it offers the related reviews in several studies. Section 2.1 provides the reviews that how an information asymmetry affects the payment method in acquisitions. The discussion in market misvaluation and the mean of payment in acquisitions is in section 2.2. Meanwhile, the difference in takeover regulations between the US and the UK will be discussed in section 2.3.

2.1 An Information Asymmetry and the Medium of Exchange

Under perfect capital markets, the medium of exchange in mergers and acquisitions is irrelevant. However, several researchers prove theoretically that information asymmetry affects the acquirers' choice of payment method. Hansen (1987) was one of the first who offers the risk sharing hypothesis. In his model, the target knows its own firm's value better than the bidder, meaning that there is an uncertainty in target valuation. The "lemons" problem arises with cash offer because the target will accept the offer only when its values are less than the offer made from the bidder. The acquiring firm has to protect itself against this information asymmetry by basing its optimal offer on expected value conditional on the offer being accepted. As the target has private information about its own value, the offer made by the bidder will not always be accomplished. The acquirer could avoid a low trade activity (i.e. less

liquid) in markets by offering stock instead of cash. Unlike cash, stock can induce trade activity because it has a contingent-pricing mechanism, that is, the price depends on ex post. Hence, when the target's asset has high value, the target has an incentive to share part of the gains from post-merger. This implies that stock influences the target to sell more states than cash deal. In the bidder's point of view, they offer stock to the target since they are less informed about the target's value. As a result, they are afraid of overpayment in corporate acquisitions, so the target is forced to participate the risk if the bidder overpays in stock acquisitions. To put it differently, the acquiring firm chooses stock transaction when the target has high uncertainty, as the bidder expects that they could gain more than without any acquisitions, so they are better off. The implication of a lemons problem is that due to a stock contingent function, an uncertainty in target valuation is a key determinant, which influences the mean of payment in acquisitions. Given an acquirer's uncertainty, the greater (lower) the level of target's uncertainty, the higher the likelihood of stock (cash) trade.

Additionally, given an information asymmetry on both the acquirer and the target sides (i.e. a double lemons problem), the bidder will not prefer stock over cash financing when the target seriously underestimate the bidding firm's value. The bidder also has its own private information, thus the target will use the acquirer's choice of payment method as a signal of the bidding firm's value. The overvalued acquiring firm chooses stock as a payment method, whereas the undervalued bidder offers cash for acquisitions. This means that high private valuation acquirer offers cash over stock financing to avoid issuing undervalued stock, and low private valuation acquirer chooses stock instead of cash as a medium of exchange to avoid overpaying the target. The target firm still agrees to accept this deal structure since an uncertainty of the

bidding firm is considered this time, meaning that the level of an uncertainty between the acquirer and the target need to be compared. The higher (lower) the bidder's private information, the lower (higher) the extent of target's uncertainty when compared to the level of acquirer's uncertainty, the probability of cash (stock) trade should be more likely. Given two-sided asymmetric information, the nature of the target is that they accept any type of offer that exceeds the target's asset value. The deal is accomplished, given the target's strategy, because the bidding firm optimally chooses the mean of payment and offer size in the way that sustains the target's beliefs on the signal value relation. Hansen shows that the target also takes the size of stock deal into account as a signal of the acquiring firm's value. The stock trade is less likely to happen with an increased in the bidder's size relative to the target. This is due to the fact that a contingent mechanism of stock financing will be less valuable and it depends on the target's assets being a significant addition to the bidder. The implication of a double-lemons problem is that the levels of an uncertainty of both the acquirer and the target have to be considered since they affect the payment method in mergers and acquisitions. Considering the contingent-pricing mechanism of stock, after the bidding firm offers stock as a mean of payment and the target accepts the deal, they have to anticipate the gain and the risk after a merger. Conversely, they need to share no gain and risk ex post in cash acquisitions.

2.1.1 Empirical Evidences of an Asymmetric Information and the Payment Method

Many literatures have been investigated the risk sharing hypothesis and relative size between the acquiring firm and the target. They used different approaches, however, the results are in line with the predictions from Hansen (1987).

Martin (1996) tests the risk sharing hypothesis empirically, he uses investment opportunities (i.e. Tobin's q) as a proxy of asymmetric information. He explains that a high q-ratio denotes a firm with high growth opportunities, however, it might not be realized since the firm is not anticipated profitable investments yet. This means that the target firm with high q-ratio indicates a riskier investment, particularly when it is difficult to evaluate growth opportunities than asset-in-place. His results have confirmed that when both the bidder's and the target's q-ratios are high (i.e. high investment opportunities), the acquirer prefers to offer stock financing. This result is consistent with the risk sharing hypothesis in the aspect that the bidder tries to mitigate the risky investment by offering stock as a mean of payment for acquisitions to the target; this is due to the contingent-pricing effect of stock financing.

Chemmanur et al. (2009) examine the two-sided asymmetric information between the bidding firm and the target. They were the first who test an adverse selection between these two separately, not on how the relation between these two affects the method of payment. They make two assumptions that when the bidder (target) evaluates the target's (bidder's) value, the asymmetric information facing by the bidder (target) is related to outside investors in the markets. The number of analysts following the target (bidder), the standard deviation of analyst forecasts about the target (bidder), the analyst forecast error about the target (bidder) and the degree of relatedness between the target and the bidder are used as proxies to measure the level of asymmetric information. After running regressions, the results are consistent with the prediction, that is, when the bidder faces a higher level of information asymmetry (i.e. the target's valuation is more difficult to evaluate and an uncertainty of the target is high) result in the greater the probability of stock deal. Likewise, if the target faces

the higher extent of adverse selection when evaluating the bidding firm's value (i.e. the acquirer's valuation is more difficult to evaluate and an uncertainty of the bidder is high), the likelihood of cash deal is greater.

Furthermore, Martynova and Renneboog (2009) test the risk sharing hypothesis empirically by focusing on three variables: the market value of the acquiring firm calculated as 60 days prior to the bid announcement, the transaction value measured by the total amount the bidder pays to buy shares of the target (excluding assumed liabilities), and the relative size of the transaction calculated by the transaction value divided by the sum of the transaction value and the bidder's market capitalization. The results indicate that the value of equity transaction for mergers and acquisitions is higher than 10 times the value of cash and mixed deals. This is consistent with the prediction from Hansen (1987) in the sense that the bidding firm chooses stock acquisition when the level of the target's uncertainty is high, that is, the target is forced to share the risk of the bidder's overpayment. Target misvaluation (i.e. an uncertainty of the target) will be even more severe when the transaction value of takeover is high and the size of the target is larger relative to the bidder's size, as a result, takeover's premium of stock financing will be larger.

Martynova and Renneboog also consider the relative size of the takeover, they show that the ratio of the transaction value to the bidding firm's market value is 32.9% when the acquirer acquired with stock, and 18.8% when the bidder buys with cash. These are in line with the prediction that an increased in the bidder's size relative to the target, the probability of stock offer is less likely. In other words, the likelihood of stock financing for acquisitions is more likely with an increased in size of the target. Their results are consistent with the empirical work from Faccio and Masulis (2005), who

investigate relative deal size between the acquiring firm and the target, which is calculated by the ratio of deal offer size (excluding assumed liabilities) divided by the sum of the deal's offer size and the bidder's pre-offer market capitalization at the year-end prior to the bid. The results come up with the supportive of Hansen (1987) theory, they find that the relative size of the target has a negative and significant relation with the level of cash financing being used as a medium of exchange. Meaning that, the higher (lower) the relative size of the target when compared to the bidding firm, the likelihood of cash deal is less (more) likely, but the probability of stock offer is higher (lower).

2.2 Market Misvaluation and the Choice of Payment Method

More recent theoretical research has offered different assumption by assuming inefficient financial markets; there will be firms that value incorrectly. Shleifer and Vishny (2003) derive their model from the market timing, that is, rational managers of the acquiring firm exploit less rational markets. The method of payment signals investment policy rather than capital structure, meaning that the benefit of making acquisitions is not only the positive perceived synergies, but also contribute to the growth in earnings of the firm, and then justify the high valuations. In their market misvaluation hypothesis, overvalued bidder buys less overvalued target with stock financing. In other words, the higher the bidder's overvaluation when compared to the less overvalued target, the higher premium that the bidder pays to the target with overvalued stock. This means that the bidder have a room in their stock price to overpay for the target firm. Thus, the bidder earns higher positive returns on the target's equity after the bid announcement, and they could gain more than without acquisitions in the long run. Meaning that the bidding firm takes advantages from overvalued stock

markets, mergers could be driven by misvaluation and can occur even in the absence of synergies. In the target side, they accept this overvalued stock deal since they have short investment horizons, meaning that they expect the long-run bidder's stocks could be sold before the market corrects itself. For cash acquisitions, less overvalued bidder (when compared to stock bidder) only offers to undervalued target at prices below fundamental value. The higher level of target's undervaluation, the higher cash premium that the target expects from the bidder. However, if the acquiring firm wishes to make a profit, the amount of cash premium might not be compensated for the target's undervaluation, which resulting in the target's resistance to some cash tender offer. Consequently, cash financing will be more likely to occur in hostile takeovers when compared to stock acquisitions. The model also yields that the cash acquirer must face low returns prior to being acquired and gain positive long-run returns as a result of the target's undervaluation rather than any synergies.

2.2.1 Empirical Evidences of Market Misvaluation and the Choice of Payment Method

There are several methods that examine the market misvaluation hypothesis. Rhodes-Kropf et al. (2005) yield several empirical results, which are consistent with the predictions from Shleifer and Vishny (2003). They break market-to-book ratio (M/B) into three components to proxy for misvaluation: 1.) firm-specific error (the difference between observed price and a valuation measure that reflects time-t fundamentals); 2.) time-series sector error (the difference between valuation conditional on time-t fundamentals and a firm-specific valuation that reflects long-run value; and 3.) long-run value to book (the difference between valuation based on long-run value and book value). The results show that the bidding firms have a greater firm-

specific error than the targets in stock mergers. In other words, overvalued bidders acquire less overvalued targets when both firms are in overvalued sectors with stock financing. They also find that firms involving stock mergers have higher firm-specific and time-series sector errors, implying that both the acquiring firms and the target share a common misvaluation component. For cash acquisitions, the result shows that the targets have a negative firm-specific error, which means that the less overvalued bidders only offer cash to undervalued target. The results are also consistent with the prediction that an increased in misvaluation on the acquirer and the target influences the stock trade, that is, increasing firm-specific error raises the likelihood of stock merger activity.

Dong et al. (2006) use two approaches together to investigate misvaluation theory: the M/B method and price to residual income model (M/V). They argue that misvaluation could be correlated with growth for two reasons; 1.) psychologically, mispricing proxy of measurement error may by correlated to growth opportunities 2.) investor misperceptions may be related to growth (i.e. inherent confounding). Hence, M/B ratio is used as a proxy for expected growth or managerial effectiveness, and calculated as a ratio of market value of equity to book value of equity. They use equity rather than total asset values in their study, since it is equity rather than total misvaluation that affects takeover decision. The components of book value of equity (i.e. par value, retain earnings, and reserves) could not only reflect growth of the company, but also could lead to mismeasurement. As a result, Dong et al. use the M/V model to capture mismeasurement confounding (i.e. growth effects). Residual income value (V) includes book value of equity and an adjustment to reflect the value of the firm's forecasted excess income. Excess income is calculated by using analysts'

forecasts of future earning prospects. After running tests, they find that the bidding firms, on average, have higher both M/B and M/V than the targets in stock deals (i.e. bidders are overvalued than targets). This implies that when overvalued acquirers choose stock as a mean of payment, they can make profits from misvaluation by acquiring less overvalued target. On the target side, stock targets have higher M/B and M/V than cash targets, meaning that targets of stock offers have higher valuation than targets of cash offers (i.e. an increased in target's overvaluation induces the acquirers to offer stock instead of cash). Dong et al. also show that targets with low valuation are associated with hostility, a cash tender offer, and a lower chance of bid success. This is in line with the prediction from Shleifer and Vishny (2003), the bidding firms offer cash to undervalued target since they have an incentive to profit by offer the price below true target value. However, the targets expect the higher cash premium from the bidders, so the likelihood of bid success is reduced.

Ang and Cheng (2006) test the misvaluation hypothesis by using two approaches: M/B and M/V. Under both methods, they find that acquiring firms in stock acquisitions are statistically more overvalued than targets before the bid announcement and the bidders are more overvalued in completed stock deals than in withdrawn stock mergers. Implying that the higher stock valuation induces the acquiring firms to participate a stock merger activity. Then, Ang and Cheng try to find the answer of why do targets still accept overvalued stock deals from the bidding firms. Owing to Shleifer and Vishny (2003) who claim that target shareholders still accept overvalued stock because they have shorter investment horizon when compared to bidders, as a result Ang and Cheng analyse the investment horizon of investors by using daily share turnover as a proxy. Share turnover is measured by the number of shares traded divided

by the total number of shares outstanding. They also calculate the average daily share turnover during two years before the stock merger announcement month for targets and their bidders. The results show that the targets' average daily share turnover is higher than the bidders' average daily share turnover. Meaning that the results have confirmed the prediction from Shleifer and Vishny (2003) that target shareholders have shorter stock holding periods than bidders. Target shareholders accepting overvalued stock offers from the bidders could be in line with maximizing the utility of short-horizon.

2.3 Takeover Regulations and the Mean of Payment

It is well known fact that each country has unique takeover regulation due to the difference in institutional feature. This section emphasizes the difference in takeover regulations between the US and the UK and the payment method in acquisitions.

2.3.1 Takeover Regulation in the US

The US takeover regulation has both at the federal and state levels; the federal laws administer the procedure of a tender offer and the disclosure of information to shareholders, while the state laws supervise originally the target board's response to an offer. The Securities Exchange Act of 1934 is the foremost securities law for mergers and acquisitions, which is mainly amended by the Williams Act. The Williams Act is designed to regulate tender offers. Moreover, there are two distinct types in the US offer, merger and tender offer. A merger (i.e. friendly deal) occurs when there is an achievement in negotiations between the management of two firms, acquirer and target. Conversely, in a tender offer, the bidder makes an offer directly to target shareholders; there is no need to negotiate with the target managers and target management ex ante.

The Williams Act does not specify the mean of payment in any particular type of offer, meaning that the acquirer can offer any mean of payment to the target.

The bid keeps opening for a minimum of 20 days; the objective of this law is to give the target more time to consider alternative bidders. The bidder has to take all shares from the target shareholders that are tendered during this period or at the end of the period. In addition to this, if the tender offers are oversubscribed because the acquiring firm offers to buy only partial of shares in the target company, the bidder must accept tendered shares from the target on the pro rata basis (Rule 14(d)(6)). The regulation requires the bidders to pay the same price for all shares and is to ensure that all target shareholders get equal treatment: Best Price Rule (the SEC Rule 14d-10) and Section 14(d)(7). Nevertheless, target shareholders may consider other competitors, which may result in extending more time. In the US, the majority threshold is commonly held 51% of shares. Prior evidence from Betton, Eckbo, and Thorburn (2008) have confirmed that the majority of payment methods of mergers and tender offer are obviously different; pure stock is commonly used by mergers, whereas cash or other mixed method are more preferred from tender offers.

2.3.2 Takeover Regulation in the UK

The conduct of the UK takeovers and mergers is subjected to the principles and rules of the City Code; the Takeover Panel is an independent body, which is also a major function that governs the City Code. The UK takeover rules are drove by the community of investment bankers and institutional investors, and they were designed to protect the interest of all shareholders. When the bidder holds 30% or more of the target shares (i.e. these will enable the acquirer to have effective control), the City Code will be applied to acquisitions. This also triggered a mandatory offer (Rule 9), which is

specially designed to protect minority shareholders. The bidder must make the comparable offers for different classes of share since the bidder needs to treat all target shareholders equally. If the acquirer purpose is to have an effective control, the acquirer will negotiate with target shareholders about the premium and the medium of exchange. This means that the bidder needs to follow the requests from target shareholders if the bidder wants the deal to be accomplished; target shareholders can now choose the medium of exchange. Nonetheless, the Takeover Panel's consent will be granted for any partial offer when the bidder holds less than 30% of the target shares (Rule 36.1); the bidder does not have control over the target firm. This implies that there will be no intervention from the Takeover Panel and the City Code when the bidder holds less than 30% of the target shares, and the bidder can acquire target shares either by private negotiation or partial offer. This implies that the acquirer can buy shares from any target shareholders who aims at selling shares.

Adequate time and information must be given to the target shareholders (General Principle 2), as they are the ones who decide whether to accept a takeover offer (General Principle 3). The City Code does not define the meaning of takeover bid, however, it refers the terminology to an "offer". Under Rule 1(a), the bidder will notify the target board about the intention to make an offer. If target shareholders decide to be acquired for cash or any element of cash (for example, corporate commercial paper and other money market instruments), the offeror must have a confirmation by a financial advisor or by another qualifiable third party that the offeror has an ability to satisfy full acceptance of the offer (Rule 2.7(d)). Afterwards, the bidder must send an offer document to target shareholders within 28 days of the announcement of a firm intention to make an offer (Rule 24.1(a)). The bidder must make a comparable offer for each

class of shares (Rule 14), meaning that all target shareholders of the same class must be treated equally (General Principle 1); each class of share (for example, ordinary share, voting share and management share) has different rights and privileges.

If the acquirer buys 10% or more of the target's voting rights from the target; in that class of shares during the offer period and within 12 months preceding the commencement (i.e. acquisitions within 12 months prior to an offer), and that class of target shares chooses to be acquired for cash, the offer for that class should to be in cash or accompany with a cash alternative (e.g. options over shares and outstanding derivatives) (Rule 11.1). Besides, target shareholders in that same class can still choose different methods of payment (i.e. securities or a mixture of cash and securities) at the same period as mentioned in Rule 11.1 (Note 5 on Rule 11.1); the value of securities are based on the time that the bidder purchases. When the bidder buys 10% or more of the target's voting rights from the target; in that class of shares during the offer period and in 3 months prior to the commencement (i.e. acquisitions in 3 months prior to an offer), and that class of target shares elects securities as a medium of exchange, the bidder must offer securities to all target shareholders of that class (Rule 11.2). Additionally, if the acquirer buys 10% or more of the target's voting rights from the target; in that class of shares during the offer period and acquisitions within 12 months prior to an offer, and a mixture of cash and securities is selected as a payment method by a class of target shares, the acquirer must consult with the Panel (Notes 5 on Rule 11.2).

The bid remains opening for 21 days (Rule 31.1). It may keep opening for further 14 days when no target shareholders could make a decision (Rule 31.2). More importantly, the mandatory bid rule is one of the significant rules in the City Code that

is triggered when the acquirer carries voting rights of target firm reaching 30% (Rule 9.1(a)). In determining the offer whether it is success or not, the bidder must obtain sufficient acceptance level which shares are carried over 50% of the target's voting right (Rule 10). According to General Principle 1, General Principle 3, Rule 11, and Rule 14, the UK City Code emphasizes target shareholders' rights in the sense that they are the ones who choose the payment method for acquisitions and decide whether to accept the deal. Meaning that, if the bidder wants the deal to be accomplished, they have to negotiate with target shareholders and do as target shareholders' requirements.

2.3.3 Summary of Regulatory Differences and Institutional Features

Table I presents a summary of regulatory differences and institutional features between the US and the UK. Number 1-6 shows the differences in regulations, and number 7-10 demonstrates the similar institutional features.

Table I

Summary of Regulatory Differences and Institutional Features

Aspect	The US	The UK
1. Regulation	The Williams Act	The City Code
2. The acquirer chooses the payment method.	✓	✓
3. Target shareholders choose the payment method.	×	✓

(continued)

Table I—*Continued*

4. Merger	To accept a merger deal, 51% of target shareholders' votes are required.	To accept a merger deal, 75% of target shareholders' votes are required.
5. Tender offer	A tender offer means takeover. And the bidder makes an offer directly to target shareholders.	The bidder acquires a non-controlling stake of less than 30% of target's shares.
6. Mandatory offer	-	The bidder acquires 30% or more of target's shares. Target shareholders have the right to choose the payment method.
7. A majority threshold	Holding more than 50% of shares	Holding more than 50% of shares
8. Price	Same price for all shares	Same price for all shares
9. Institutional features	Developed financial markets	Developed financial markets
10. Corporate governance	Large companies and disperse ownership	Large companies and disperse ownership

In a nutshell, the US acquirer chooses the method of payment in takeovers (i.e. pure cash, pure securities, or a mixed payment), whereas the UK target shareholders

are the ones who elect the medium of exchange. In other words, the US Williams Act gives more power in making a decision to the bidder, whereas the UK target shareholders have more bargaining power than the acquiring firm. The puzzle between these two markets arises when the market reactions are the same; there will be a negative market reaction for stock deals and more positive reaction in cash acquisitions. How could the UK market react like the US market when they both have similar institutional features, however, the takeover regulations are different? Giving that the UK target shareholders select the medium of exchange for acquisitions by themselves. This means that whether the determinants that contributing to the choice of payment method would differ between the US and the UK. Owing to this, this study would examine the M&A characteristics that leads to the election of payment method between these two countries.

2.4 Hypotheses Development

2.4.1 Risk Sharing and the Mean of Payment combined with Takeover Regulation

Theoretically, the risk sharing hypothesis proposes that if the target is better informed about their own firm value than the bidder, the bidder faces a higher level of information asymmetry when evaluating the target's value. Consequently, there will be an uncertainty in target valuation. The acquirer would rather choose stock as a method of payment in acquisitions in this case, meaning that the target is forced to share the risk of an overpayment ex post (i.e. this is due to the stock contingent pricing effect).

A. Target-side uncertainty

In the US, the bidder chooses the medium of exchange, then offers the acquisition's deal to the target. The bidder offers stock financing to the target when the target's value is difficult in evaluating (i.e. an uncertainty of the target firm is high). This is because stock has contingent pricing mechanism, which means that the target has to share the risk of overpayment post-merger. Hence, an uncertainty of the target firm is an important issue that influences the bidder's choice of payment method. This analysis leads to the following hypothesis:

H1A: *In the US, the probability of stock financing increases with the level of the target's uncertainty.*

In the UK, the City Code heavily emphasizes on target shareholders' rights. Target shareholders have more bargaining power than the acquirer, as target shareholders are the ones who choose the medium of exchange. Thus, an uncertainty of the target firm should be less important, which leads to this hypothesis:

H2A: *The relation predicted in H1A should be less pronounced for transactions involving the UK target.*

B. Bidder-side uncertainty

In The UK, the acquirer can firstly choose the medium of exchange, and then make an offer to target shareholders. However, if target shareholders aim to require different payment method, they can bargain with the bidder. The price of shares

depends on the bargain between the bidder and target shareholders. The deal will be successful if the acquirer can do as target shareholders requested.

The City Code allows target shareholders to elect the mean of payment, implying that the bidder has no right to force target shareholders to share the risk of their overpayment in acquisitions. The level of bidder's uncertainty is, therefore, an important determinant that influences target shareholders' choice of payment method. When the level of bidder's uncertainty is high, the target might not want to participate the risky investment (e.g. if the target choose stock financing, they need to share part of gain and loss post-merger due to the contingent pricing effect of stock). Target shareholders are, therefore, expected to choose cash over stock acquisitions. Nonetheless, if the offer security to target shareholders is still preferred, the bidder might increase the amount of stock premium to induce target shareholders in order to accept stock instead of cash financing. This means that the premium variable needs to be controlled in this study, leading to the following hypothesis:

H1B: *In the UK, the likelihood of cash transaction increases with the level of the acquirer's uncertainty.*

In the US, Hansen (1987) posits that the acquirer optimally chooses the payment method and offer size in acquisitions depending on the acquiring firm's value and in the way that sustains the target's beliefs on the signal value relation. The bidder offers stock financing to the target when the target's asset is being significant addition to the bidder. In other words, cash deal will be more likely with an increased in the acquirer's

size relative to the target. The target accepts any type of offer that exceeds the target's asset value.

Considering an uncertainty of the bidder, when the bidder has higher level of an uncertainty relative to the target, the bidder has incentive to offer cash instead of stock financing. The probability of stock offer will be lower because the lower the uncertainty of the target, the smaller the gain that the bidder expects ex post. Put differently, given the target firm's value, the higher the bidding firm's value, the smaller the gain the bidder expects from stock acquisition, so this study hypothesizes:

H2B: *In the US, the relation predicted in H1B should also be pronounced. Thus, cash transaction should be observed more frequently than stock acquisition.*

2.4.2 Market Misvaluation and the Medium of Exchange combined with Takeover Regulation

The predictions from Shleifer and Vishny (2003) assume that rational and informed managers exploit an inefficient stock market. This means that managers from both the acquirer and the target know precisely with respect to their own firms, and the prospective merger partners how the short-run valuation deviates from efficiency, what the perception of synergies is, and what the long-run valuation will be. As a result, they maximize their own personal wealth given their horizons and their knowledge of market efficiencies. Nevertheless, shareholders of both firms are assumed to be irrational. They do not fully understand about market inefficiency, so shareholders have random investment preference. The bidder managers act in the interest of acquirer shareholders

by making the acquisition. Target shareholders agree to the deal since they get a premium and they can sell shares they obtain in exchange, so they are better off.

The market misvaluation hypothesis from Shleifer and Vishny also predicts that when markets are in the periods of overvaluation, overvalued bidder acquires less overvalued target by using their overvalued stock. This is due to the fact that overvalued stock gives the bidding firm (i.e. long-run acquirer) a room in their stock price to overpay for the target.

C. Bidder-side and target-side misvaluations

After the acquirer makes an offer to the US target (this includes the payment method and the premium), target shareholders (who agree with the deal) will tender their shares during the bidding period. The Williams Act requires the bidder to pay the same price for all shares. Unlike the UK, target shareholders' bargaining power will be weaker in the US.

In the US market, Shleifer and Vishny (2003) posit that overvalued bidder offers stock as a mean of payment to the target since the bidder has an incentive to exploit the market overvaluation. Also, the higher premium of stock financing induces the target to accept the deal. This implies that given the bidder's overvalued stock, the acquirer will prefer stock deal to cash offer, so mixed deal should line in between stock and cash offers, leading to the following hypothesis:

H1C: *In the US market, overvalued bidder buy less overvalued target with overvalued stock. The probability of stock offer is greatest. Since mixed payment contains cash and stock, the probability of mixed deal lies between cash and stock financing. Cash acquisition is least likely.*

In the UK, the conditions in the misvaluation hypothesis will be different because the UK target shareholders do not need to accept overvalued shares and sell shares to get cash post-merger. This means that if target shareholders prefer cash as a medium of exchange, they can require it to the acquirer. Thus, market misvaluation should have less impact on the UK target shareholders' choice of payment method.

Taking the payment method into consideration, when the bidder's equity is overvalued, the bidder will definitely want to offer stock as a mean of payment. Thus, they will certainty negotiate and recommend target shareholders to accept overvalued stock, which could induce target shareholders to accept stock offer. In target shareholders point of view, they do not know about market misvaluation and they have random investment preferences. These random investment preferences depend individually on both risk and expected return. Meaning that, target shareholders who expect higher return and could accept the risk from accepting equity offer post merger, will elect stock financing. In contrast, target shareholders who do not want to accept stock and sell equity to get cash ex post, will prefer cash financing. So there will also be the probability that target shareholders would choose cash instead of stock financing. As a result, the likelihood of mixed financing should be largest. Moreover, there is no guarantee that target shareholders will prefer cash over stock financing since they do not know about bidder's overvaluation and they have random investment preference. This leads to the following hypothesis:

H2C: *The relation predicted in H1C should not hold for transactions involving the UK target. As a result, the likelihood of mixed deal is greatest, and the probability of stock and cash financing is the same.*

D. Bidder-side and target-side undervaluations

The misvaluation hypothesis from Shleifer and Vishny (2003) predicts that undervalued bidder (its market value is higher than undervalued target) only offers cash to undervalued US target. Given that the target is undervalued, if undervalued bidder offers stock to the target, the bidder will have to issue more shares than it would have to without undervaluation; which resulting in wealth dilution of bidder shareholders. Moreover, there is no incentive for undervalued bidder to buy overvalued target in the first place since the expected future price of the target's asset value will be declined, regardless of whether the payment is in cash or stock. So this study hypothesizes:

H1D: *Undervalued acquirer is more likely to offer cash than stock as a mean of payment to undervalued US target. Since mixed payment contains cash and stock, the probability of mixed deal lies between cash and stock financing. Stock acquisition is least likely.*

Aforementioned, undervalued acquirer prefers to offer cash to undervalued target. Consequently, the UK target shareholders are recommended to accept cash financing, which could motivate target shareholders to choose cash over stock financing. Nonetheless, target shareholders have random investment preference as mentioned above. This means that stock financing could also be preferred, which result in the highest probability of mixed financing. Furthermore, there is no guarantee that target shareholders will prefer pure cash over pure stock as they have random investment preference and they do not know about bidder's undervaluation. This leads to the following hypothesis:

H2D: *The relation predicted in H1D should not hold in transactions involving the UK target. The likelihood of mixed deal is highest, and the probability of cash and stock offer is the same.*

E. Investment horizons

In the US, Shleifer and Vishny (2003) argue that the target accepts overvalued stock from the bidder, since the target managers have short investment horizons. Shleifer and Vishny expect that target managers want to sell all retirement or ownership of illiquid stock options. Additionally, it can be the case that target managers get paid for agreeing to the deal, or the bidder offers top positions to target managers. Target managers also expect that overvalued stock from long-run acquirer could be sold while their stock is overvalued. From target shareholders point of view, they have random investment preference. Implying that if target managers recommend target shareholders to accept stock financing, target shareholder preference will surely lean toward to stock financing. And as long as target shareholders get a premium, they can sell shares they obtain in exchange, they are better off.

This study will follow Ang and Cheng (2006) research to find investment horizon. Ang and Cheng use daily share turnover as a proxy, and the average daily share is calculated during two years before the stock merger announcement month for targets and their bidders. Hence, this analysis leads to the following hypothesis:

H1E: *In overvalued stock offers, the US target's average daily share turnover is higher than the acquirer pre-merger.*

Owing to the fact that the UK target shareholders are the ones who choose the mean of payment, they might not choose overvalued stock as a method of payment from the acquirer. This is because target shareholders could require cash as a medium of exchange from the bidder straight away. Implying that, the prediction from Shleifer and Vishny (2003) might not hold in the case of the UK since target shareholders do not have to choose stock financing, then sell overvalued stock to get cash post-acquisitions (i.e. before the market corrects itself). This is unlike the US target as mentioned in H1E, leading to the following hypothesis:

H2E: *The relation predicted in H1E should not hold for acquisitions involving the UK target.*

CHAPTER III

DATA AND METHODOLOGY

3.1 Data and Sample

The initial sample of the US and UK takeover bids is obtained between publicly traded bidders and targets listed on the Mergers and Acquisitions Database of the Securities Data Company (SDC) between January 1990 and December 2014. This sample includes both completed and withdrawn offers from domestic takeovers and intra-US and intra-UK cross-border acquisitions.

Owing to a mandatory offer (Rule 9) in the City Code, when the bidder holds 30% or more of the target shares, it will enable the acquirer to have effective control. As a result, the acquirer will negotiate with target shareholders about the premium and the mean of payment. This implies that the bidder needs to follow the requirements from target shareholders if the bidder wants the deal to be accomplished; target shareholders can then choose the method of payment. To have a majority control, the acquirer commonly held 51% of shares. Thus, the data in this study covers corporate transactions involving acquisition of at least 30% ownership of the target, and the bidder must hold less than 50% of equity before acquisition. To remain in the final sample, a firm must subjects to the following requirements:

1. SDC is used to collect the two M&A partners' identities, country, and industry (2-digit SIC Code) and determine whether their stocks are publicly traded, the initial announcement date, payment method, dollar value, and whether it is friendly or hostile deal.

2. Worldscope identifies the bidder's and the target's financial statements for the last month of the fiscal year prior to the bid announcement.
3. The data of bidder's and target's stock prices for a year ending one-month preceding the bid announcement must be reported in Datastream.
4. The sample of analyst forecasts and actual earnings data are reported on the Institution Brokers Estimate System (IBES) for the last month of the fiscal year before the bid announcement.
5. All M&A deals have to finance with cash, stock, or a combination between cash and stock.
6. The value of the transaction is $5 million or more.

3.2 Methodology

In this section, I show how to prepare the data, and describe the set of test to prove whether and how determinants differ between the US and the UK on the dimensions of risk sharing and market misvaluation.

3.2.1 The Risk Sharing Hypothesis

The level of information asymmetry (i.e. an uncertainty) faced by the acquirer and the target needs to investigate separately. In this section, I show how to test *H1A*, *H2A*, *H1B* and *H2B.* The descriptions are as follows:

1) Proxies for Information Asymmetry

There is no consensus on which variable is the best proxy for information asymmetry. Thus, I choose six variables as proxies: the number of analysts following, the analyst coverage, the standard deviation of analyst forecasts, the analyst forecast error, the volatility of stock returns, and the degree of firm diversification between the

target and the bidder. This is also for robustness checks; the results should be consistent across proxies if the evidence is strong. The explanations of each proxy are as follows:

1.1) Number of analysts following

The analyst forecast reflects vital information to investors about the firm's performance they follow. Previous researches use the number of analysts following as a proxy for asymmetric information. For example, Brennan and Subrahmanyam (1995) propose that the greater analysts following tends to reduce the level of adverse selection costs. Chang et al. (2006) suggest that the analysts following is negatively related to asymmetric information, meaning that the higher (lower) number of analysts following, the lower (greater) the degree of information asymmetry will be. The level of information asymmetry can be reduced since the analysts provide the information that is not publicly known to stock market. This implies that the more the analyst coverage, the more transparent the firm will be. Hence, this study uses the number of analysts following as the first parameter to proxy information asymmetry. The number of analyst will be available in IBES for the last month of the fiscal year prior to the bid announcement. To measure the level of information asymmetry faced by the acquirer (target) when evaluating the target (acquirer), the measure of the number of analysts following the target (acquirer) will be used.

1.2) Analyst coverage

The analyst coverage is based on the number of analysts following in previous section (proxies for information asymmetry section 1.1). Firms with the analyst coverage has the lower extent of information asymmetry (compared to firms with no analyst coverage) because the firms' information will be more transparent to the public.

To measure the acquirer-side (target-side) uncertainty by using the analyst coverage, it takes a value of one, if there is the number of analysts following the acquirer (target), and zero otherwise.

1.3) Standard deviation of analyst forecasts

The standard deviation of analyst forecast indicates the dispersion among analysts about a consensus estimate of the forecast. Prior evidence chooses the standard deviation of analyst forecasts as one of proxies for asymmetric information (Krishnaswami and Subramaniam (1999) and Thomas (2002)). They posit that disagreement among analysts indicates the lack of available about a firm. The greater standard deviation means the higher disagreement among analyst forecasts, so the extent of information asymmetry will be larger. The standard deviation of analyst forecasts will be obtained from IBES for the last month of the fiscal year prior to the bid announcement. To measure the level of information asymmetry faced by the acquirer (target) when evaluating the target (acquirer), the measure of the standard deviation of analyst forecasts about the target (acquirer) will be used.

1.4) Analyst forecast error

Krishnaswami and Subramaniam (1999) and Thomas (2002) use the analyst forecast error as another proxy for information asymmetry. They find that the higher forecast error reflect the greater level of information asymmetry between managers and outsiders. In other words, when the degree of information asymmetry is high, outside investors face the difficulty in obtaining any firm information used for forecasting earnings performance, which resulting in the greater forecast errors. The analyst forecast error is calculated by the absolute value of the difference between the analyst

earnings forecast reported by IBES (for the last month of the fiscal year preceding to the bid announcement) and the realized value of the earnings, divided by the stock price. To measure the level of information asymmetry faced by the acquirer (target) when evaluating the target (acquirer), the measure of the analyst forecast error about the target (acquirer) will be used.

1.5) Volatility of stock returns

The last proxy for information asymmetry in this study is the volatility of stock returns. This proxy covers the wider range of firms than proxies involving analyst forecasts because it can be the case that firms with no analyst coverage have a low or high level of uncertainty. The volatility in stock returns reflects an uncertainty about the firm's value (Dierkens (1991), Krishnaswami and Subramaniam (1999) and Thomas (2002)). Meaning that, the higher (lower) return volatility indicates the greater (lower) level of uncertainty about the firm, also the larger (lower) level of information asymmetry among investors. The return volatility is measured by the standard deviation of the daily returns for a year ending one-month preceding the bid announcement. To measure the level of information asymmetry faced by the acquirer (target) when evaluating the target (acquirer), the measure of the volatility in stock returns of the target (acquirer) will be used.

1.6) Degree of firm diversification

When the target and the acquirer are in the related industry, it decreases the level of information asymmetry that the bidder faces in evaluating the target, compared to outsiders in the stock market (Chemmanur et al. (2009)). Likewise, if the bidder has to evaluate unrelated target, there will be a larger level of information asymmetry in

evaluating the target. Thus, I follow Chemmanur et al. by using the degree of firm diversification between the target and the bidder as another proxy for information asymmetry. It takes a value of one when the target and the bidder have different primary 2-digit SIC industries (this data can be obtained from SDC), and zero otherwise.

2) Analysis of the Target-side and Bidder-side Uncertainties

To test the effect of the target-side and the bidder-side uncertainties on the payment method, I use the general regression framework below:

$$PMT_i = f\left(UNCER_{T,i}, UNCER_{B,i}, X_i\right), \quad (1)$$

where i is takeover i. The dependent variable (i.e. PMT) is the payment method in acquisitions. $UNCER_T$ is the target-side uncertainty, and $UNCER_B$ is the bidder-side uncertainty. X is a vector of control variables. Eq. 1 shows that controlling for the specific variables, the method of payment depends on the function of both the target- and the bidder-side uncertainties. Therefore, I estimate Eq. (1) by using logit and tobit regressions. The descriptions are as follows:

2.1) Logit regression

The logit regression is used since this section is an analysis for binary data. Meaning that, there will be only two outcomes for dependent variable. The OLS cannot be chosen because the OLS estimation cannot guarantee that the conditional probability of *y* will lie between 0 and 1. Thus, the logit model is used and can be estimated as follows:

$$log\left[\frac{P(y=1)}{1-P(y=1)}\right] = \beta_0 + \beta_1 UNCER_{T,i} + \beta_2 UNCER_{B,i} + \sum_{j=3}^{5} \beta_j X_{j,i} + \varepsilon_i, \quad (2)$$

where j is the order of control variables. The dependent variable is equal to one for stock financing, and zero for cash transaction. For $UNCER_T$ and $UNCER_B$, I adopt several proxies of information asymmetry as mentioned in section 1. This is for robustness checks; there is still no evidence, which one is the best proxy. Additionally, there are three control variables (X) in the regression: the leverage constraint of the acquirer, premium (i.e. the price paid to obtain the target shares), and the relative deal size. The leverage is chosen since cash can be obtained primarily by issuing new debt. The acquirer with a high leverage is constrained in its ability to issue debt, so the bidder will use stock financing more frequently (DeAngelo and Masulis (1980)). It is clear that leverage can influence the acquirer behavior in choosing the payment method. Hence, it needs to be controlled in this study. The acquirer's financial leverage is calculated by the sum of the bidder's face value of debt at the end of the fiscal year prior to the bid announcement plus the deal value (including assumed liabilities) divided by the sum of the book value of total asset at the end of the fiscal year prior to the bid announcement plus the deal value (including assumed liabilities).

Another control variable is premium. Under the risk sharing hypothesis, target shareholders accept any type of offer that exceed the target's asset value. Also, target shareholders have random preference in the market misvaluation hypothesis. Taking these two hypotheses together, if the bidder prefers to offer a specific payment method (for example, overvalued stock), the acquirer might increase the premium to induce target shareholders to accept the deal. This means that premium can affect the method

of payment, so it needs to be controlled in this study. Premium is measured by the target's cumulative stock return (CAR) at (-10, 5) event window; CAR is the aggregate amount that an investment has gained or lost over time. The event window at (-10, 5) is used because Schwert (1996) and Draper and Paudyal (1999) show that the target's excess returns are noticeably increased 10 days before the bid announcement; after the announcement date, excess returns are very small.

The last control variable is the relative size, the empirical evidence has confirmed that relative size of the target influences the bidder's choice of payment method (Faccio and Masulis (2005) and Martynova and Renneboog (2009)). They argue that an increased in size of the target is positively correlated with the proportion of stock being used as a mean of payment. However, it is negatively correlated with the proportion of cash financing. The relative sizes of the bidder and the target are obviously correlated with the medium of exchange, so it needs to be control in this study. The relative size is computed as the log of the ratio of the acquirer market value of equity to the target market value of equity.

2.2) Tobit regression

In section 2.1, the dependent variable in the logit regression is discrete, which takes on only two values. I also employ a continuous measurement (i.e. the tobit regression) for testing Eq. (1). The interest of using the tobit model is in finding out the amount of stock that the acquirer pays for obtaining the target's share in relation to independent variables. The dependent variable in the regression is censored; some information is missing for the dependent variable. However, the corresponding information for the independent variables is present. If both the dependent and independent variables are missing, the dependent variable is described as truncated.

Also, both the acquirer and the target preferences are expected to affect the stock price and the mean of payment, thus I use Tobit regression to capture the preferences between these two parties. The dependent variable is the stock portion of the M&A consideration, which must be in the interval [0, 100]. I use two-boundary Tobit estimator as in Faccio and Masulis (2005). The general Tobit formula is as follows:

$$y_i^* = \beta_0 + \beta_1 UNCER_{T,i} + \beta_2 UNCER_{B,i} + \sum_{j=3}^{5} \beta_j X_i + \varepsilon_i, \quad (3)$$

where ε_i is an independently distributed error term assumed to be normal with zero mean and variance σ^2. The independent and control variables will be the same as Eq. (2). For the dependent variable, it has both left and right censoring, which leads to the following:

$$y_i^* = \begin{cases} 0 & \text{if } y_i^* \leq 0, \\ y_i^* & \text{if } 0 < y_i^* < 100, \\ 100 & \text{if } 100 \leq y_i^*, \end{cases} \quad (4)$$

where 0 and 100 are the censoring points. $y_i^* \leq 0$ when the level of target's uncertainty is extremely low, meaning that, the bidder prefers to pay negative amount of stock (i.e. the bidder prefers cash financing), but the amount of stock cannot be negative. Hence, I assume that $y_i^* = 0$ in this case. For $0 < y_i^* < 100$, the portion of stock is expected to reflect the preferences of the acquirer and the target, which is line in the range of 0 to 100. $100 \leq y_i^*$ when the level of target's uncertainty is extremely high. The acquirer prefers to offer pure stock or more than pure stock, however, the amount of stock cannot be more than 100. Thus, y_i^* is assumed to be 100 in this case.

2.3) Expected signs of the coefficient

The expected signs of the coefficient are as follows. For *H1A* (i.e. the US target-side uncertainty), I expect the coefficients of the degree of firm diversification between the target and the bidder, and the number of analysts following the target to be negative. The standard deviation of analyst forecasts, the analyst forecast error, and the volatility of the target's stock returns are expected to be positive. This reflects a positive relationship between the level of the target-side uncertainty and the probability of a stock deal. If *H2A* (i.e. the UK target-side uncertainty) is true, the coefficients as mentioned in *H1A* would be weaker in the case of the UK.

If *H1B and H2B* (i.e. the UK and the US bidder-side uncertainty, respectively) are true, I expect the coefficients of the standard deviation of analyst forecasts about the acquirer, the analyst forecast error about the acquirer, and the volatility of the bidder's stock returns to be negative. The degree of firm diversification between the target and the bidder, and the number of analysts following the bidder is expected to be positive. This reflects a negative relationship between the level of the bidder-side uncertainty and the probability of stock being offer. Meaning that, when the acquirer has greater level of information asymmetry than the target, the likelihood of cash being offer is larger.

2.4 Pseudo-R^2 for non-linear models

There is no statistical result in R^2 when analyzing the data in non-linear regressions. R^2 is a statistic generated in a linear model (i.e. ordinary least squares or OLS), which describe how well the data fitted to a regression line. The range of the R^2 is between 0 and 100%; the higher magnitude of R^2 means the results are more precise.

In non-linear models, the models are fitted by using maximum likelihood process. This models differ from the linear models in the way that they are not calculated to minimum variance; this implies that pseudo-R^2 cannot use to compare with R^2. However, many researchers try to evaluate the goodness-of-fit of non-linear models, so they come up with several pseudo-R^2. This thesis reports McFadden's pseudo-R^2 as reported in Stata. The calculation is determined as follows:

$$Pseudo - R^2 = 1 - \frac{\ln(L_{Full})}{\ln(L_{intercept})}, \quad (5)$$

where L_{Full} indicates the maximum likelihood value of model with predictors. $L_{intercept}$ denotes the model with an intercept and no covariates. The range of pseudo-R^2 lies between 0 and 1. The greater values of pseudo-R^2 indicate the better model fit.

3.2.2 The Market Misvaluation Hypothesis

In this section, I will investigate the relation between the market misvaluation and the payment method. The testing for market misvaluation is used to test *H1C, H2C, H1D* and *H2D,* and the testing for investment horizons is used to investigate *H1E* and *H2E.* The explanations are as follows:

1) Measurement of Under- or Overvaluation

There are two proxies to test an under- and overvaluation in this study.

1.1) Market-to-book ratio

Many previous researches have been using *M/B* as a proxy of misvaluation. Barberis and Huang (2001) and Daniel et al. (2001) models (i.e. psychology-based theoretical models) suggest that *M/B* is a proxy for misvaluation, which could help to

predict subsequent abnormal returns. Empirical-based models are also used *M/B* as a proxy for misvaluation since its variation derives from risk and misvaluation (Dong et al. (2006), and Rhodes-Kropf et al. (2005)).[1] Daniel et al. (2001) claim that market values reflect misvaluation, risk, and differences in true unconditional expected cash flows. And book value can filter out irrelevant scale differences, so a noisy measure for mispricing will be less. Daniel et al. (2002) find that *M/B* are significant and robust predictors of the cross-section of subsequent one-month returns. Dong et al. (2006) study misvaluation hypothesis by computing *M/B* as a ratio of equity rather than total asset values, since it is equity rather than total misvaluation that affects the takeover decisions. Following Dong et al. (2006), this study uses *M/B* as the first proxy to measure the bidder and the target misvaluations:

$$\frac{M}{B} = \frac{Market\ value\ of\ equity}{Book\ to\ value\ of\ equity}, \tag{6}$$

where market value of equity is measured at the end of one month preceding the bid announcement. Book value of equity is the values at the end of the fiscal year prior to the bid announcement.

1.2) Stock price run-up

Many literatures study the relation between stock price and misvaluation. For instance, Travlos (1987) shows that there are much larger negative M&A announcement effects in stock deals when compared to cash offers. This is because investors perceive that when the bidder offers stock financing, their stock is overvalued.

[1] However, *M/B* is also used as a proxy for information asymmetry and growth opportunities in empirical research (Faccio and Masulis (2005) and Martin (1996)).

Faccio and Masulis (2005) find that the acquirer in all stock offers has the largest stock price run-up in the year preceding the bid announcement and the lowest for all cash deals. Implying that, the greater (lower) level of stock price run-up reflects the higher (lower) level of an overvaluation. Therefore, I use stock price run-up as another proxy for under- and overvaluation, which is calculated as a bidder's cumulative stock return during one year ending one month before the bid announcement date.[2] The cumulative stock return (CAR) is the aggregate amount that an investment has gained or lost over time. This leads to the following calculation:

$$CAR_{it} = \sum_{t=1}^{250} AR_{it} = \sum_{t=1}^{250} [R_{it} - (\alpha_i + \beta_i R_{mt})] = \sum_{t=1}^{250} [R_{it} - R_{mt}], \quad (7)$$

where abnormal return (AR) is measured as a regression error calculated out of sample. R_i is the bidder's return on day t, and R_m is the bidder's expected return on day t. α_i is the regression coefficient, and β_i is a vector of the intercept coefficient of the bidder's expected return. The term ($\alpha_i + \beta_i R_{mt}$) is the benchmark return. Notably, there is no need to estimate alpha and beta since some bidders make acquisitions before the given announcement (many bidders acquire many times); the long estimation period are not fully free from the event. Brown and Warner (1980) also claim that the beta does not significantly improve estimation in the short period.

[2] CAR in this long period should not be true growth. It should contain a big element of misvaluation, however, it might also contain a small effect of growth. As a result, CAR is used as another proxy for misvaluation.

2) Analysis of Market Misvaluation

To test for the effect of the target-side and the bidder-side misvaluation on the method of payment, I use the general regression framework below:

$$PMT_i = f\left(MISVAL_{B,i}, MISVAL_{T,i}, X_i\right),$$

(8)

The dependent variable (i.e. PMT) is the payment method in acquisitions. $MISVAL_B$ is a proxy for the bidder-side misvaluation, and $MISVAL_T$ is a proxy for the target-side misvaluation. X denotes as a vector of control variables. Eq. 8 shows that controlling for the specific variables, the method of payment depends on the function of both the bidder- and the target misvaluations. Therefore, I estimate Eq. (8) by using the multinomial logit regression. The descriptions are as follows:

2.1) Multinomial logit regression

The multinomial logit regression is chosen since the dependent variable of mixed payment between cash and stock needs to be included in the test. Implying that, this regression can result more than two discrete outcomes. The model is determined as follows:

$$log\left[\frac{P(y_i = j)}{1 - P(y_i = j)}\right] = \beta_0 + \beta_1 MISVAL_{B,i} + \beta_2 MISVAL_{T,i} + \sum_{k=3}^{5} \beta_k X_{k,i} + \varepsilon_i,$$

(9)

where i is takeover i. j is possible outcomes, which is equal to two for mixed financing, one for stock transaction, and zero for cash acquisition. I use two proxies of misvaluation for robustness checks: market-to-book ratio and stock price run-up. And k is the order of three control variables; these control variables are the same as Eq. (2).

3) Analysis of Investment Horizons

Ang and Cheng (2006) test investment horizons between the acquirer and the target on the medium of exchange by using daily share turnover as a proxy. The relationships of the difference between the target's and the bidder's share turnover are as follows:

Equity: $$TURN_{T,i} - TURN_{B,i} > 0, \quad (10)$$

Cash: $$TURN_{T,i} - TURN_{B,i} = 0, \quad (11)$$

where $TURN_B$ is bidder's share turnover, and $TURN_T$ is the target's share turnover. In stock deal, the target is expected to have shorter investment horizons than the acquirer. Implying that, the greater (lower) extent of investment horizons, the lower (higher) the share turnover will be. Thus, the results of the difference between the target's and the bidder's share turnover in Eq. 10 should be greater than zero. However, share turnover of the target and the bidder are expected to be similar in cash offer, leading to Eq. 11.

To test investment horizons on the medium of exchange, I use the general regression framework below:

$$DIFF_i = f(PMT_i, X_i), \quad (12)$$

where DIFF (i.e. the dependent variable) is the difference between the target's and the bidder's share turnover. The dummy variable (i.e. PMT) is equal to one for stock financing, and zero for cash offer. X indicates as a vector of control variables. Eq. 12 shows that controlling for the specific variables, the share turnover depends on the

function of payment method. Therefore, I estimate Eq. (12) by using the multivariate regression.

The multivariate model is used because I want to find the relationships between a dependent variable and the vectors of independent variable, which leads to the following model:

$$DIFF_i = \beta_0 + \beta_1 PMT_i + \sum_{j=2}^{4} \beta_j X_i + \varepsilon_i \,, \tag{13}$$

where the dependent variable is the difference between the target's and the bidder's share turnover. Share turnover is computed by the number of shares traded divided by the total number of shares outstanding. The average daily share turnover is measured during the two years ending one month before the bid announcement date for the targets and their bidders in stock mergers. The US target shareholders in stock merger are expected to have shorter investment horizons pre-merger when compared to the bidder, whereas such relationship should not hold for the UK target shareholders.

There are three control variables in this regression: the acquirer's volatility of returns, the bidder's firm size, and the market-to-book of the bidder. The first control variable is the volatility of acquirer's returns. Domowitz et al. (2001) posit that higher volatility can induce more trading as it is related to a larger dispersion in beliefs. Alternatively, risk averse investors might reduce their trading volatile markets. Griffin et al. (2007) claim that after controlling for volatility, they find a greater and more positive relation between returns and share turnover than without controlling for volatility. Hence, the acquirer's volatility of returns is used as another control variable since it is positively correlated with share turnover. The volatility of bidder's returns is

measured by the bidder's standard deviation of the daily returns for a year ending one-month preceding the bid announcement.

Another control variable is the bidder's firm size. Bae et al. (2004) find that small firms are more volatile than large firms, resulting in a positive correlation with the turnover, but negatively correlated with stock return volatility. Dey (2005) claims that after running several regressions, firm size is one of the important determinants that affects turnover. Thus, the acquirer's firm size needs to be controlled in this study since I do not prefer the bidder's firm size to have any impact on the difference in share turnover between the US and the UK. The acquirer's firm size is measured by the bidder's market value of equity at the end of one month before the bid announcement date.

The market-to-book of the bidder is the last control variable in this section. Miller and Sholes (1982) determine that there is a positive relation between turnover and growth. This means that choosing a high growth stocks in a portfolio could lead to an increased in turnover. This is because high growth stocks are riskier than valued stocks, therefore, expected return will be higher. Bae et al. (2004) and Dey (2005) also find the consistent result, that is, growth rate is a significant determinant of share turnover. Market-to-book ratio will be used as a proxy for growth rate. The market-to-book of the acquirer is the bidder's market value of equity at the end of one month preceding the bid announcement to the bidder's book value of at the end of the fiscal year prior to the bid announcement

4) Expected signs of the coefficient

For *H1C* (i.e. the bidder-side and the target-side misvaluations), the coefficients of market-to-book and stock price run-up of both the acquirer and the target are

expected to be positive and significant in stock financing. This is because the greater level of valuation error, the larger probability of stock deal will be. As a result, the likelihood of stock being offer is greater than mixed payment, which are also more frequent than cash deal. Nevertheless, the effect as mentioned in *H1C* should not hold in *H2C* since the UK target shareholders can negotiate with the bidder about the payment method. Hence, the likelihood of mixed payment is expected to be largest. The coefficients of stock and cash deal are expected to be the same in *H2C*. Thus, the coefficients of market-to-book and stock price run-up of both the acquirer and the target are expected to be positive and significant in mixed payment method.

I expect the coefficients of both the acquirer and the target in *H1D* (i.e. the bidder-side and target-side undervaluations) to be negative and significantly different from zero in cash financing. This reflects a negative relation between valuation error and the likelihood of cash offer. Implying that, when both the acquirer and the target face the lower extent of valuation error, the probability of cash deal is greater. So the likelihood of cash offer is expected to be higher than mixed deal, which are also more frequent than stock transaction. However, the coefficient effect in *H2D* is expected to not hold for the UK target shareholders, since they have random investment preference and can choose the medium of exchange. The coefficients of both the bidder and the target are expected to be negative in mixed financing. This means that the lower level of valuation error, the larger likelihood of mixed deal will be. Thus, the probability of mixed offer is expected to be greatest. The expected signs of cash and stock acquisition are the same.

If *H1E* is true, the coefficient of stock financing is expected to be positively correlated with DTURN for the US target. This is because the higher extent of share

turnover, the greater probability of stock offer will be. However, deals involving the UK target (*H2E*) are expected to find insignificant in such relation.

3.2.3 Analysis of the differences between the US and the UK

After running all regressions of the US and the UK separately, I now add dummy variable into the regressions to test the difference between the US and the UK. The descriptions are as follows:

1) Testing the target-side and the bidder-side uncertainties

To test the effect of the differences of the target-side and the bidder-side uncertainties between the US and the UK on the payment method, I use the general regression framework below:

$$PMT_i = f\left(\beta_1 UNCER_{T,i}, \beta_2 UNCER_{B,i}, X_i\right), \tag{14}$$

where β_1 is the differential effect of the target-side uncertainty, and β_2 is the differential effect of the bidder-side uncertainty. Eq. 14 shows that controlling for the specific variables, the method of payment depends on the function of both the target- and the bidder-side uncertainties.

$$H_o: \quad \beta_{1,US} = \beta_{1,UK}$$
$$\beta_{2,US} = \beta_{2,UK}, \tag{15}$$

For null hypothesis, I propose that there is no statistical significance exists in this set of observations (Eq. 15). Implying that, there will be no such relationship in the differential effects of both the target-side and the bidder-side uncertainties between the US and the UK as mentioned in Eq. 15.

Eq. 16 is applicable both logit and tobit regressions, leading to the following model:

$$PMT_i = \beta_0 + \beta_1 Var_i + \beta_2 UK_i + \beta_3 (Var \cdot UK)_i + \sum_{j=4}^{6} \beta_j X_i + \varepsilon_i, \quad (16)$$

where Var is the US variable of the interest. UK stands for the interest variable in the UK. β_3 is the differential effect of the interaction term, which is expected to be significant if there is the difference between the US and the UK. And there will be control variables (i.e. X) as in Eq. 2.

1.1) Expected signs of the coefficient

For *H1A* (i.e. the target-side uncertainty), the higher the US target-side uncertainty, the larger probability of stock financing will be. However, this relation should be weaker for the UK target. So the coefficient of the US target should be positive (*H1A*), whereas the coefficient of the UK target is expected to be negative (*H2A*) in stock deal. Consequently, the differential of the interaction term (i.e. β_3) is expected to be negative and significant.

For *H1B* (i.e. the bidder-side uncertainty), the greater extent of the US bidder-side uncertainty, the higher likelihood of cash deal will be. This prediction should also hold in the deal involving the UK target (*H2B*). Subsequently, β_3 is expected to be insignificant.

2) Testing the bidder-side and the target-side misvaluations

To test the effect of the differences from the target-side and the bidder-side misvaluations between the US and the UK on the payment method, I use the general regression framework below:

$$PMT_i = f\left(\beta_1 MISVAL_{B,i}, \beta_2 MISVAL_{T,i}, X_i\right), \tag{17}$$

where β_1 is the differential effect of the bidder-side misvaluation, and β_2 is the differential effect from the target-side misvaluation. Eq. 17 shows that controlling for the specific variables, the method of payment depends on the function of both the bidder- and the target-side misvaluations.

For null hypothesis, I propose the same relation as in Eq. 16. Implying that, there will be no such relationship in the differential effects of both the target-side and the bidder-side misvaluations between the US and the UK as mentioned in Eq. 16.

2.1) Expected signs of the coefficient

For *H1C* (i.e. the bidder- and the target-side misvaluations), overvalued bidder acquires less overvalued US target with overvalued stock. So the coefficients of the acquirer in the US deal and the US target should be positive in stock offer. Nevertheless, the coefficients of the bidder in the UK offer and the UK target are expected to be negative (*H2C*). Consequently, β_3 is expected to be negative. Given the mixed financing, the coefficients of the acquirer in the UK deal and the UK target are expected to be positive, whereas the coefficients of the bidder in the US deal and the US target are expected to be negative. Thus, β_3 is expected to be negative. Turning into cash

acquisition, the coefficients of both the US and the UK should be similar. Thus, β_3 is expected to be insignificant.

For *H1D* (i.e. the bidder-side and target-side undervaluation), undervalued bidder only offers cash to undervalued target. Hence, the coefficients of both the acquirer in the US deal and the US target should be negative in cash financing. But the coefficients of both the acquirer in the UK deal and the UK target are expected to be negative (*H2D*). Consequently, β_3 is expected to be negative. Given the mixed transaction, the coefficients of the bidder in the US deal and the US target are expected to be negative. However, the coefficients of both the acquirer in the UK deal and the UK target are expected to be positive. Thus, β_3 is expected to be negative.

For *H1E* (i.e. investment horizons), the US target has shorter investment horizons than the bidder. Implying that the US target has higher level of share turnover than the acquirer. Nonetheless, this relation should not hold in the UK (*H2E*). Hence, the coefficient of the difference between the US target's and the bidder's turnover in the US deal is expected to be positive in stock acquisition. But I expect the coefficient of the difference between the UK target's and the acquirer's turnover in the UK offer to be negative. As a result, β_3 is expected to be negative and significant.

3.2.4 Model discussions

After proposing the hypothesis and methodology for this study, this section discuss the suspected topics about the models.

1) The use of the models

In the risk-sharing hypothesis, there is no predictions for mixed financing due to the theoretical framework. Hansen (1987) predicts that the bidders choose stock (cash) financing to deal with the higher level of target-side (bidder-side) uncertainty

when compared to the bidder (target). The bidders might offer a combination of cash and stock financing, but the economic implication of Hansen theory is the use of all equity and all cash financing. Thus, the logistic regressions are tested since there can be only two outcomes; the multinomial logit model is not investigated in this main hypothesis as mixed financing is not included. Furthermore, tobit models also use to check for the robustness as there might be the case that bidder may not prefer to offer pure stock or pure cash; the interest of using the tobit regressions is in finding out the amount of stock that the bidder pays to buy the target's share.[3] Meaning that the results should be robust even mixed financing is included in the regressions.

The predictions of payment method decisions is different in the market misvaluation hypothesis. Mixed acquisitions can be included because the probability of systematic bias for pure equity or pure cash should be less (basing on the theoretical framework) when compared to the risk-sharing prediction. This is due to the fact that Shleifer and Vishny (2003) assume that target shareholders have random investment preference, so the predictions go for all three types of payment method; the payment method decisions depend on their expected return and risk. Subsequently, the multinomial logit regressions are tested in this main hypothesis.

2) Variables in models

The choice of variables is driven by theoretical framework underlying the hypothesis being tested as mentioned in section 3.2.1 and 3.2.2. The control variables of two main hypotheses are the same, this casts doubt on why all variables cannot

[3] Based on the theoretical framework, the multinomial logit regression is not tested since it can be only three cases (pure cash, pure stock, and mixed financing). In mixed financing, when the level of target-side uncertainty is high, the proportion of stock financing might be higher than cash financing. Consequently, it is more suitable to use tobit regression.

include in the same model. First of all, the risk-sharing and the market misvaluation have different setup. Hansen (1987) assumes market efficiency in the risk-sharing hypothesis, while the market misvaluation model from Shleifer and Vishny (2003) assumes market inefficiency. Secondly, by the structure of predictions, the risk-sharing hypothesis does not predict mixed offer, whereas the market misvaluation prediction goes for all three type of payment method (i.e. pure cash, pure stock and the mixture of cash and stock). For these reasons, variables (that are included) are not necessarily the same across all regression models; for example, the market-to-book ratio is not part of the risk-sharing model.

3) Robust standard errors

This thesis uses White standard errors to adjust for heteroscedasticity in all models; the robust method is used to estimate the variance under model misspecification. In non-linear models, the maximum likelihood technique is used to estimate the parameter, meaning that if heteroscedasticity is not adjusted, the maximum likelihood estimator of the parameter vector will be biased and the statistical interferences can be inconsistent. In a linear model (i.e. ordinary least squares), when heteroscedasticity is occurred, the standard errors are biased, leading to bias in statistical tests of the OLS estimator (β). For this reason, heteroscedasticity needs to be adjusted to satisfy the assumptions of both non-linear and linear model, this is because the unbiased and consistent results can be obtained.

CHAPTER IV

RESULTS AND DISCUSSION

4.1 Summary Statistics

Table II presents distributions of the final US and UK samples across years and the payment method. The US (UK) sample includes 3,499 (739) transactions, which contains 44.33% (54.13%) pure cash offers, 32.12% (26.11%) for pure stock deals, and 23.55% (19.76%) for mixed between cash and stock financing. Cash financing is most frequently used in acquisitions; the proportion of all cash offers in the UK is higher than

Table II

Sample Distributions of Mergers and Acquisitions

Year	Number of transaction		Cash		Stock		Mixed	
	US	UK	US	UK	US	UK	US	UK
1990	30	8	18	6	7	1	5	1
1991	40	24	10	12	18	5	12	7
1992	28	23	10	13	12	4	6	6
1993	36	11	14	6	16	3	6	2
1994	67	17	40	12	18	3	9	2
1995	87	25	37	15	40	2	10	8
1996	79	25	34	13	24	7	21	5
1997	180	43	64	29	74	9	42	5
1998	302	66	97	34	152	17	53	15
1999	378	86	146	41	165	22	67	23
2000	325	70	123	40	142	18	60	12
2001	239	28	86	18	93	8	60	2
2002	140	22	63	14	38	6	39	2
2003	158	22	60	8	51	10	47	4
2004	161	30	67	15	46	9	48	6
2005	159	45	81	24	26	11	52	10
2006	166	35	99	18	28	9	39	8
2007	179	32	106	18	26	7	47	7
2008	115	25	68	13	19	7	28	5
2009	96	26	42	11	24	12	30	3
2010	128	27	73	17	23	6	32	4
2011	77	15	36	10	15	4	26	1
2012	113	14	70	6	17	7	26	1
2013	93	10	51	4	18	2	24	4
2014	123	10	56	3	32	4	35	3
Total	3,499	739	1,551	400	1,124	193	824	146

in the US. In both countries, the second highest percentages are fully financed with stock, and mixed deals are least popular; the US sample has greater proportions in both stock and mixed transactions when compared to the UK sample.

Table III indicates the descriptive statistics between the US and the UK samples. It compares the mean and median values of proxies for risk-sharing and market misvaluation hypotheses across three methods of payment: pure cash, pure stock, and the combination of cash and stock financing. In both countries, the level of target-side information asymmetry is larger than the bidder. The US (UK) targets are followed by a smaller number of analysts; on average, 2.68 (1.10) analysts followed targets in cash deals, 0.92 (1.19) analysts followed targets in stock acquisitions, and 2.60 (1.40) analysts followed targets in mixed offers, whereas 6.59 (3.02) analysts followed bidders in cash deals, 1.65 (1.85) analysts followed bidders in stock offers, and 4.09 (2.17) analysts followed bidders for mixed transactions. This is consistent with the lower mean analyst coverage about the US (UK) target; the mean analyst coverage about targets was 0.35 (0.20) compared to about bidders of 0.38 (0.25) in cash transactions, 0.13 (0.22) compared to about bidders of 0.16 (0.26) in stock deals, and 0.27 (0.23) compared to about bidders of 0.33 (0.26) in mixed offers.

The greater extent of information asymmetry about the US (UK) target is also associated with larger analyst forecast errors; on average, the analyst forecast errors about targets was 35% (12%) compared to about bidders of 5% (6%) in cash offers, the analyst forecast errors about targets was 15% (21%) compared to about bidders of 6% (9%) in stock acquisitions, and the analyst forecast errors about targets was 22% (11%) compared to about bidders of 14% (4%) in mixed deals. Moreover, firm diversification is used to find the relation between bidder and target. The US and UK results show that

Table III

Mean and Median Values of All Variables

NUMA and ANUMA refer to the numbers of analysts following the target and acquirer as reported by IBES for the last month of the fiscal year prior to the bid announcement, respectively. COVER and ACOVER are the analyst coverages about the target and acquirer, respectively. It is equal to one, if there is the number of analysts following, zero otherwise. STDFOR and ASTDFOR are the standard deviations of analyst forecast about the target and acquirer as obtained from IBES for the last month of the fiscal year prior to the bid announcement, respectively. FORER and AFORER are the target's and acquirer's analyst forecast errors as calculated by the absolute value of the difference between the analyst earnings forecast reported by IBES (for the last month of the fiscal year preceding to the bid announcement) and the realized value of the earnings, divided by the stock price, respectively. VOLA and AVOLA are the target's and acquirer's return volatilities as measured by the standard deviation of the daily returns for a year ending one-month preceding the bid announcement, respectively. DIVER is the firm diversification; it is equal to one if the target and acquirer have different primary 2-digit SIC industries, zero otherwise. AMB and TMB are the acquirer's and target's market-to-book ratios, respectively. Market value of equity is measured at the end of one month preceding the bid announcement and book value of equity is the values at the end of the fiscal year prior to the bid announcement. ARUNUP and TRUNUP are the acquirer's and target's stock price run-ups as calculated by a cumulative stock return during one year ending one month before the bid announcement date, respectively. DIFF is the difference between the target's and the bidder's share turnovers; it is equal to one if the difference is greater than zero, zero otherwise. Share turnover is measured by the number of shares traded, divided by the total number of shares outstanding. LEVERAGE is the leverage constraints of the acquirer as calculated by the sum of the bidder's face value of debt at the end of the fiscal year prior to the bid announcement plus the deal value (including assumed liabilities) divided by the sum of the book value of total asset at the end of the fiscal year prior to the bid announcement plus the deal value (including assumed liabilities). PREMIUM is the price paid to obtain the target shares as computed by the target's cumulative stock return over (-10, 5) event window. RELSIZE is the relative deal size of the bidder and target as calculated by the log of the ratio of the acquirer market value of equity to the target market value of equity at the end of one month preceding the bid announcement. ASIZE is the bidder's firm size as measured by the bidder's market value of equity at the end of one month before the bid announcement date. The sample period is 1990-2014.

Explanatory variables	Cash		Stock		Mixed	
	US	UK	US	UK	US	UK
	Averages and *medians* for variables					
NUMA	2.68	1.10	0.92	1.19	2.60	1.40
	0.00	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*
COVER	0.35	0.20	0.13	0.22	0.27	0.23
	0.00	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*
STDFOR	0.15	2.33	0.09	2.05	0.14	2.14
	0.04	*1.06*	*0.04*	*1.27*	*0.06*	*1.26*
FORER	0.35	0.12	0.15	0.21	0.22	0.11
	0.02	*0.03*	*0.02*	*0.03*	*0.02*	*0.02*
VOLA	0.04	0.03	0.04	0.03	0.03	0.02
	0.03	*0.02*	*0.03*	*0.02*	*0.03*	*0.02*
ANUMA	6.59	3.02	1.65	1.85	4.09	2.17
	0.00	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*
ACOVER	0.38	0.25	0.16	0.26	0.33	0.26
	0.00	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*
ASTDFOR	4.72	1.68	0.42	1.65	4.86	1.50
	0.05	*0.31*	*0.03*	*0.66*	*0.05*	*0.82*
AFORER	0.05	0.06	0.06	0.09	0.14	0.04
	0.01	*0.02*	*0.01*	*0.01*	*0.02*	*0.02*
AVOLA	0.02	0.02	0.03	0.03	0.03	0.02
	0.02	*0.02*	*0.02*	*0.02*	*0.02*	*0.02*
DIVER	0.74	0.59	0.52	0.47	0.72	0.57
	1.00	*1.00*	*1.00*	*0.00*	*1.00*	*1.00*
AMB	4.90	6.07	14.5	3.68	9.46	7.29
	2.87	*2.50*	*3.05*	*2.49*	*2.52*	*2.65*
ARUNUP	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*
TMB	2.91	3.02	11.3	1.86	7.37	1.83
	1.85	*1.84*	*1.95*	*1.20*	*1.89*	*1.31*

(continued)

Table III—*Continued*

TRUNUP	0.00	-0.00	0.00	-0.00	0.00	-0.00
	0.00	*-0.00*	*0.00*	*-0.00*	*0.00*	*-0.00*
DIFF	0.41	0.40	0.52	0.36	0.42	0.39
	0.00	*0.00*	*1.00*	*0.00*	*0.00*	*0.00*
LEVERAGE	1.03	0.80	1.16	1.14	1.05	0.88
	0.64	*0.63*	*0.88*	*0.72*	*0.89*	*0.78*
PREMIUM	0.02	0.02	0.01	0.01	0.01	0.01
	0.02	*0.01*	*0.01*	*0.01*	*0.01*	*0.01*
RELSIZE	0.75	0.56	1.35	1.06	0.88	0.59
	0.66	*0.48*	*1.28*	*1.00*	*0.75*	*0.54*
ASIZE	9.63	9.20	9.23	8.39	9.40	8.79
	9.62	*9.23*	*9.28*	*8.19*	*9.42*	*8.78*

when the bidder and target are in different industry, the probability of cash acquisitions is highest and the likelihood of stock offers is lowest; this is consistent with Faccio and Masulis (2005).

Table III also shows the bidder and target market-to-book ratios at the end of one month preceding the bid announcement for the market misvaluation hypothesis. On average, bidders have higher market-to-book ratios compared to the US target. In the US, the bidder (target) market-to-book ratios are highest for 14.5% (11.3%) of stock acquisitions, 9.46% (7.37%) of US mixed deals, and lowest for 4.90% (2.91%) of US pure cash offers. Unlike the US, bidder market-to-book ratios at the end of one month before the bid announcement are greater in UK mixed transactions (7.29%), than UK pure cash deals (6.07%) and UK stock acquisitions (3.68%). For the UK target, market-to-book ratios are highest for cash offers (3.02%), then stock acquisitions (1.86%), and least for mixed financing (1.83%).

Moreover, the likelihood of the US target having higher share turnovers than the bidders is greatest in stock offers (52%), and lowest in cash deals (41%). This is inconsistent with the UK evidence, the probability of the UK target having higher share turnovers than the bidders is highest in cash acquisitions (40%), and least in pure stock deals (36%).

Bidders with financial constraints often chooses stock acquisitions in both the US and the UK deals, and cash-financed offers are least likely. In the US and the UK, premium paid in cash financing over (-10, 5) event window to obtained target shares have the highest percentage (2%), whereas equity and mixed offers have similar and lower percentage than cash deals (1%). The average size of the acquirer relative to the US (UK) target is highest for 135% (106%) of stock acquisitions and lowest for 75% (56%) of cash offers.

Comparing the proxies between the US and the UK, proxies in both the risk sharing and market misvaluation hypotheses have different mean and median. This means that each proxy affects the payment method decision in M&A differently. For example, when the US (UK) target has high level of uncertainty (e.g. lower mean analyst coverage), stock (cash) financing is preferred. However, when the bidders in the US (UK) deal have overvalued equity (i.e. high market-to-book ratio), stock (mixed) financing is preferred.

4.2 Evidence of Risk Sharing and the Mean of Payment combined with Takeover Regulation from the Logistic Regressions

Table IV.A, IV.B, IV.C, and IV.D report results from the binomial logistic regressions for the risk-sharing hypothesis. The dependent variable is equal to one for pure stock acquisitions, and zero for pure cash deals. Six proxies are used for information asymmetry in this part: the number of analysts following, the analyst coverage, the standard deviation of analyst forecast, the analyst forecast error, the return volatility, and the firm diversification.[4]

[4] The final full US (UK) sample has 3,499 (739) transactions. The sample size will be different in each regression due to the availability of the accounting data.

Table IV.A
Logistic Regressions for Risk Sharing (Target-side Uncertainty)

The dependent variable takes on a value of one if the payment method was pure stock, zero for payments made solely in pure cash. NUMA refers to the number of analysts following the target as reported by IBES for the last month of the fiscal year prior to the bid announcement. COVER is the analyst coverage about the target. It is equal to one, if there is the number of analysts following, zero otherwise. STDFOR is the standard deviation of analyst forecast about the target as obtained from IBES for the last month of the fiscal year prior to the bid announcement. FORER is the target's analyst forecast error as calculated by the absolute value of the difference between the analyst earnings forecast reported by IBES (for the last month of the fiscal year preceding to the bid announcement) and the realized value of the earnings, divided by the stock price. VOLA is the target's return volatility as measured by the standard deviation of the daily returns for a year ending one-month preceding the bid announcement. LEVERAGE is the leverage constraints of the acquirer as calculated by the sum of the bidder's face value of debt at the end of the fiscal year prior to the bid announcement plus the deal value (including assumed liabilities) divided by the sum of the book value of total asset at the end of the fiscal year prior to the bid announcement plus the deal value (including assumed liabilities). PREMIUM is the price paid to obtain the target shares as computed by the target's cumulative stock return over (-10, 5) event window. RELSIZE is the relative deal size of the bidder and target as calculated by the log of the ratio of the acquirer market value of equity to the target market value of equity at the end of one month preceding the bid announcement. Year fixed effects represent the year of M&A announcement. Industry fixed effects indicate acquirers' primary 2-digit SIC industries. The sample period is 1990-2014. Significance is corrected for heteroscedasticity. *p*-values are in parentheses.

Explanatory variables	Dependent variable (= 1 if stock, 0 otherwise)											
	(1)		(2)		(3)		(4)		(5)		(6)	
	US	UK	US	UK	US	UK	US	UK	US	UK	US	UK
NUMA	-0.681	-0.030	-0.280	-0.210								
	(0.000)	(0.821)	(0.001)	(0.294)								
COVER					-0.629	-0.341						
					(0.002)	(0.386)						
STDFOR							-0.347	0.084				
							(0.270)	(0.668)				
FORER									0.170	0.458		
									(0.355)	(0.458)		
VOLA											4.912	23.431
											(0.583)	(0.001)
LEVERAGE	0.003	0.025	0.040	0.041	0.041	0.040	0.214	0.083	0.298	0.499	0.025	0.012
	(0.009)	(0.160)	(0.518)	(0.026)	(0.511)	(0.029)	(0.000)	(0.710)	(0.180)	(0.340)	(0.623)	(0.416)
PREMIUM	-10.123	-16.174	-10.420	-15.932	-10.264	-15.688	-16.136	-33.768	-20.618	-25.662	-9.727	-13.862
	(0.000)	(0.034)	(0.004)	(0.071)	(0.004)	(0.079)	(0.035)	(0.020)	(0.002)	(0.025)	(0.012)	(0.097)
RELSIZE	-0.825	-0.968	-0.995	-1.184	-0.995	-1.182	-1.110	-1.803	-1.109	-1.191	-0.968	-1.121
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	1.080	0.234	-0.006	-14.132	-0.000	-14.131	0.628	-15.520	2.806	-13.406	-0.310	-14.521
	(0.000)	(0.167)	(0.991)	(0.000)	(0.999)	(0.000)	(0.399)	(0.000)	(0.013)	(0.000)	(0.589)	(0.000)
Year fixed effects			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R^2 (%)	12.54	9.31	25.46	19.23	25.44	19.17	33.38	30.99	30.48	21.82	25.24	15.66
No. Obs.	2482	527	2482	527	2482	527	1452	230	1390	319	2242	501
Proportion of stock (%)	42.10	32.64	42.10	32.64	42.10	32.64	41.74	30.00	44.65	25.82	40.68	31.74
Correctly classified (%)	66.55	69.98	76.27	73.24	76.43	73.06	77.69	79.57	77.92	80.67	76.10	71.81

4.2.A Target-side uncertainty

According to the target-side uncertainty hypothesis, it predicts that the likelihood of stock acquisitions should be increased with the level of target-side uncertainty in US deals (H1A). However, this relation should be less pronounced for deals involving the UK target (H2A) because target-side uncertainty should be less important; target shareholders have more bargaining power than the acquirers in the UK.

Table IV.A presents the results on the target-side information asymmetry.[5] In US, NUMA and COVER have negative and significant coefficients. Holding all other variables constant, the marginal effect of the probability of stock acquisitions is 8.88 percentage points lower for one person increase in the number of analysts following the target. And the marginal effect results show that deals with analyst coverage about the target have lower probability of stock offers by 14.96 percentage points than deals with no analyst coverage about the target.[6,7] Put differently, the likelihood of stock acquisitions increases with the level of target-side uncertainty.

On the UK target-side uncertainty, the coefficients of NUMA, COVER, STDFOR, and FORER indicate insignificant results, meaning that these proxies do not affect the payment method decision. Moreover, the evidence in model (6) shows that the coefficient of VOLA is significant in the UK sample, whereas it is insignificant in

[5] Model (2) includes year and industry fixed effects to control for unobserved industry characteristics. It can be seen that the adjusted R^2 is considerably larger than model (1). For this reason, these fixed effects are included in the rest of the models. The coefficients of interested variables remain significant and the signs remain unchanged.
[6] In logistic regressions, the marginal effect is determined to report the probability scale.
[7] To improve the model fit, data in this thesis is log-transformed except for the dummy variables.

Table IV.B
Logistic Regressions for Risk Sharing (Bidder-side Uncertainty)

The dependent variable takes on a value of one if the payment method was pure stock, zero for payments made solely in pure cash. ANUMA refers to the number of analysts following the acquirer as reported by IBES for the last month of the fiscal year prior to the bid announcement. ACOVER is the analyst coverage about the acquirer. It is equal to one, if there is the number of analysts following, zero otherwise. ASTDFOR is the standard deviation of analyst forecast about the acquirer as obtained from IBES for the last month of the fiscal year prior to the bid announcement. AFORER is the acquirer's analyst forecast error as calculated by the absolute value of the difference between the analyst earnings forecast reported by IBES (for the last month of the fiscal year preceding to the bid announcement) and the realized value of the earnings, divided by the stock price. AVOLA is the acquirer's return volatility as measured by the standard deviation of the daily returns for a year ending one-month preceding the bid announcement. DIVER is the firm diversification; it is equal to one if the target and acquirer have different primary 2-digit SIC industries, zero otherwise. LEVERAGE is the leverage constraints of the acquirer as calculated by the sum of the bidder's face value of debt at the end of the fiscal year prior to the bid announcement plus the deal value (including assumed liabilities) divided by the sum of the book value of total asset at the end of the fiscal year prior to the bid announcement plus the deal value (including assumed liabilities). PREMIUM is the price paid to obtain the target shares as computed by the target's cumulative stock return over (-10, 5) event window. RELSIZE is the relative deal size of the bidder and target as calculated by the log of the ratio of the acquirer market value of equity to the target market value of equity at the end of one month preceding the bid announcement. Year fixed effects represent the year of M&A announcement. Industry fixed effects indicate acquirers' primary 2-digit SIC industries. The sample period is 1990-2014. Significance is corrected for heteroscedasticity. *p*-values are in parentheses.

Explanatory variables	Dependent variable (= 1 if stock, 0 otherwise)													
	(1)		(2)		(3)		(4)		(5)		(6)		(7)	
	US	UK	US	UK	US	UK	US	UK	US	UK	US	UK	US	UK
ANUMA	-0.513	-0.012	-0.254	-0.238										
	(0.000)	(0.899)	(0.001)	(0.162)										
ACOVER					-0.198	-0.108								
					(0.420)	(0.819)								
ASTDFOR							-0.800	0.150						
							(0.004)	(0.241)						
AFORER									0.281	0.009				
									(0.551)	(0.995)				
AVOLA											25.167	29.021		
											(0.008)	(0.008)		
DIVER													-0.215	-0.394
													(0.057)	(0.086)
LEVERAGE	0.003	0.025	0.042	0.041	0.043	0.038	0.210	0.068	0.301	0.471	0.003	0.012	0.039	0.038
	(0.027)	(0.158)	(0.509)	(0.026)	(0.531)	(0.032)	(0.000)	(0.719)	(0.180)	(0.362)	(0.000)	(0.419)	(0.571)	(0.028)
PREMIUM	-10.129	-16.160	-10.452	-16.211	-10.338	-16.672	-18.052	-37.597	-20.420	-25.654	-12.087	-17.356	-10.598	-17.448
	(0.000)	(0.035)	(0.004)	(0.065)	(0.004)	(0.059)	(0.021)	(0.010)	(0.002)	(0.026)	(0.001)	(0.041)	(0.004)	(0.048)
RELSIZE	-0.723	-0.971	-0.945	-1.120	-0.979	-1.157	-1.126	-1.626	-1.095	-1.184	-0.728	-0.985	-0.963	-1.122
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	1.004	0.240	-0.058	-14.153	-0.018	-14.120	0.784	-15.443	2.760	-13.351	-0.698	-13.500	-0.139	-14.077
	(0.000)	(0.143)	(0.917)	(0.000)	(0.974)	(0.000)	(0.293)	(0.000)	(0.015)	(0.000)	(0.201)	(0.000)	(0.810)	(0.000)
Year fixed effects			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R^2 (%)	12.65	9.31	25.46	19.34	25.20	19.07	34.57	34.24	30.46	21.72	15.70	15.85	25.29	19.49
No. Obs.	2482	527	2482	527	2482	527	1452	230	1390	319	2242	501	2482	527
Proportion of stock (%)	42.10	32.64	42.10	32.64	42.10	32.64	41.74	30.00	44.65	25.82	40.68	31.74	42.10	31.68
Correctly classified (%)	66.27	70.35	75.79	73.43	75.79	74.00	79.06	80.70	77.12	81.33	70.07	73.87	75.95	74.00

the US results. The marginal effect of the likelihood of stock acquisitions is, on average, 10.34 percentage points greater for one percent increase in the volatility of target's stock return.

Overall, the US results in table IV.A show that the level of target-side uncertainty is positively correlated with the likelihood of stock financing. This is consistent with the evidence from Hansen (1987), Chemmanur et al. (2009) and the hypothesis H1A. The UK evidence is also in line with the prediction H2A that the relation predicted in H1A is less pronounced for transactions involving the UK target.

4.2.B Bidder-side Uncertainty

In the UK, the prediction on bidder-side uncertainty expects that cash financing should be increased with the extent of the bidder's uncertainty (H1B) since target shareholders might not want to participate the risky investment and they have the right to choose the method of payment. Also, in the US, the relation predicted in H1B should be pronounced (H2B) because there will be less gain that the bidder expects ex post from the target (i.e. the level of target-side uncertainty is lower than the bidder).

Table IV.B provides the results for the risk-sharing hypothesis on bidder-side uncertainty by using logistic regressions. In the UK, only the coefficient of AVOLA is positive and significant at 1% level; the marginal effect of the probability of stock acquisitions is 12.20 percentage points greater than cash deals for one percent increase in the volatility of bidder's stock return. Additionally, the results from four proxies for information asymmetry are insignificant, indicating that the relation between the level of bidder-side information asymmetry and payment method in deals involving UK target is less pronounced when compared to US transactions.

Table IV.C
Logistic Regressions for Risk Sharing

The dependent variable takes on a value of one if the payment method was pure stock, zero for payments made solely in purecash. NUMA and ANUMA refer to the numbers of analysts following the target and acquirer as reported by IBES for the last month of the fiscal year prior to the bid announcement, respectively. COVER and ACOVER are the analyst coverages about the target and acquirer, respectively. It is equal to one, if there is the number of analysts following, zero otherwise. STDFOR and ASTDFOR are the standard deviations of analyst forecast about the target and acquirer as obtained from IBES for the last month of the fiscal year prior to the bid announcement, respectively. FORER and AFORER are the target's and acquirer's analyst forecast errors as calculated by the absolute value of the difference between the analyst earnings forecast reported by IBES (for the last month of the fiscal year preceding to the bid announcement) and the realized value of the earnings, divided by the stock price, respectively. VOLA and AVOLA are the target's and acquirer's return volatilities as measured by the standard deviation of the daily returns for a year ending one-month preceding the bid announcement, respectively. DIVER is the firm diversification; it is equal to one if the target and acquirer have different primary 2-digit SIC industries, zero otherwise. LEVERAGE is the leverage constraints of the acquirer as calculated by the sum of the bidder's face value of debt at the end of the fiscal year prior to the bid announcement plus the deal value (including assumed liabilities) divided by the sum of the book value of total asset at the end of the fiscal year prior to the bid announcement plus the deal value (including assumed liabilities). PREMIUM is the price paid to obtain the target shares as computed by the target's cumulative stock return over (-10, 5) event window. RELSIZE is the relative deal size of the bidder and target as calculated by the log of the ratio of the acquirer market value of equity to the target market value of equity at the end of one month preceding the bid announcement. Year fixed effects represent the year of M&A announcement. Industry fixed effects indicate acquirers' primary 2-digit SIC industries. The sample period is 1990-2014. Significance is corrected for heteroscedasticity. *p*-values are in parentheses.

Explanatory variables	Dependent variable (= 1 if stock, 0 otherwise)													
	(1)		(2)		(3)		(4)		(5)		(6)		(7)	
	US	UK	US	UK	US	UK	US	UK	US	UK	US	UK	US	UK
NUMA	-0.351	0.051	-0.176	-0.074										
	(0.001)	(0.827)	(0.049)	(0.776)										
ANUMA	-0.288	-0.020	-0.156	-0.199										
	(0.000)	(0.906)	(0.107)	(0.363)										
COVER					-0.703	-0.347								
					(0.001)	(0.397)								
ACOVER					0.188	0.022								
					(0.469)	(0.964)								
STDFOR							-0.234	0.161						
							(0.206)	(0.407)						
ASTDFOR							-0.796	0.190						
							(0.004)	(0.169)						
FORER									0.157	0.460				
									(0.394)	(0.458)				
AFORER									0.226	-0.065				
									(0.634)	(0.964)				
VOLA											-3.163	16.923		
											(0.289)	(0.028)		
AVOLA											28.521	20.667		
											(0.019)	(0.070)		
DIVER													-0.215	-0.394
													(0.057)	(0.086)

(continued)

Table IV.C—*Continued*

LEVERAGE	0.003	0.025	0.041	0.042	0.041	0.040	0.204	0.058	0.302	0.498	0.004	0.011	0.039	0.038
	(0.020)	(0.160)	(0.503)	(0.027)	(0.520)	(0.029)	(0.000)	(0.755)	(0.174)	(0.341)	(0.000)	(0.454)	(0.571)	(0.028)
PREMIUM	-10.089	-16.213	-10.470	-16.045	-10.250	-15.664	-18.590	-34.104	-20.713	-25.655	-12.283	-15.354	-10.598	-17.448
	(0.000)	(0.034)	(0.004)	(0.068)	(0.004)	(0.081)	(0.020)	(0.024)	(0.002)	(0.025)	(0.001)	(0.076)	(0.004)	(0.048)
RELSIZE	-0.770	-0.962	-0.966	-1.135	-1.003	-1.184	-1.120	-1.803	-1.102	-1.192	-0.699	-1.051	-0.963	-1.122
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	1.063	0.233	-0.037	-14.153	0.006	-14.132	0.814	-15.561	2.779	-13.406	-0.720	-13.757	-0.139	-14.077
	(0.000)	(0.169)	(0.948)	(0.000)	(0.991)	(0.000)	(0.274)	(0.000)	(0.014)	(0.000)	(0.195)	(0.000)	(0.810)	(0.000)
Year fixed effects			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R^2 (%)	12.98	9.31	25.53	19.35	25.45	19.17	34.63	31.96	30.48	21.82	15.85	16.56	25.29	19.49
No. Obs.	2482	527	2482	527	2482	527	1452	230	1390	319	2242	501	2482	527
Proportion of stock (%)	42.10	32.64	42.10	32.64	42.10	32.64	41.74	30.00	44.65	25.82	40.68	31.74	42.10	31.68
Correctly classified (%)	66.63	70.17	75.95	73.62	76.47	72.87	78.93	80.44	77.92	82.67	70.12	72.84	75.95	74.00

On the US bidder-side uncertainty, the coefficient of ASTDFOR is negative and significant; the marginal effect results indicate that an increased in the standard deviation of analyst forecast about the bidder by one dollar per share drops the probability of stock deals, on average, by 62.09 percentage points. This lends support to Hansen (1987), Chemmanur et al. (2009), and the hypothesis H2B. Nevertheless, there are also some mixed evidence which contradict the hypothesis H2B. ANUMA has negative and significant coefficient and AVOLA has positive and significant coefficient. The results suggest that the marginal effect of the likelihood of stock financing is 52.81 (23.10) percentage points lower (greater) for one person (percent) increase in the number of analysts following the bidder (the volatility of the bidder's stock return). Meaning that the probability of stock transactions increases with the level of bidder-side uncertainty. Likewise, I find the relation between the acquirer and the target by using DIVER. The US result reports the negative and significant coefficient; the marginal effect evidence indicates that when the target and the bidder are in different industry, the probability of stock financing drops by 5.12 percentage points (compared to when they are in the same industry). Implying that when the acquirer and the target are in different industry, the probability of cash offers is higher. In other words, stock financing is preferred if the acquirer and the target are in the same industry. This also matches with Faccio and Masulis (2005) who claim that the probability of stock financing is higher when the target is in the same industry with the bidder, where the target is familiar with industry risks and prospects. Conversely, this effect is weaker in the UK.

In summary, the UK results are inconsistent with the prediction H1B since the level of bidder-side uncertainty has less impact on target shareholders' payment method

decisions. Moreover, the US evidence does not match with Hansen (1987), Chemmanur et al. (2009) and the prediction H2B since it is inconclusive; proxies for information asymmetry show the conflict results.

4.2.C Target-side and Bidder-side Uncertainties

In table IV.C, I rerun model (1) to (7) by combining proxies for information asymmetry on both target-side and bidder-side uncertainties. The coefficients remain significant and the signs remain unchanged. Consistent with table IV.A, when the bidders faced the high level of US target-side uncertainty (when evaluating the target), the bidders are more likely to offer stock to the targets; NUMA and COVER have negative and significant coefficients. This lend support to the hypothesis H1A. On the bidder-side information asymmetry in US deals, the results also indicate inconclusive evidence same as table IV.B. The coefficient of ASTDFOR is negative and significant; the marginal effect of the probability of stock acquisitions is 61.71 percentage points lower than cash deals for one dollar per share increase in the standard deviation about the target. However, AVOLA has positive and significant 5% level, meaning that the probability of stock offers is also high when the targets faced the high level of bidder-side uncertainty (when evaluating the bidders).

On the UK target-side information asymmetry, the results in table IV.C indicate that information asymmetry faced by the acquirer (when evaluating the target) has less impact on the payment method decisions. Only VOLA that has positive and significant at 5% level; the marginal effect evidence shows that an increased in the volatility of target's stock return by one percent raises the probability of stock deals, on average, 12.07 percentage points. Other four proxies present an insignificant effect. These results are consistent with table IV.A and the hypothesis H2A. Additionally, the effect of

Table IV.D

US vs UK

Logistic Regressions for Risk Sharing

The dependent variable takes on a value of one if the payment method was pure stock, zero for payments made solely in pure cash. US country variable takes a value of one, and zero otherwise. NUMA and ANUMA refer to the numbers of analysts following the target and acquirer as reported by IBES for the last month of the fiscal year prior to the bid announcement, respectively. COVER and ACOVER are the analyst coverages about the target and acquirer, respectively. It is equal to one, if there is the number of analysts following, zero otherwise. STDFOR and ASTDFOR are the standard deviations of analyst forecast about the target and acquirer as obtained from IBES for the last month of the fiscal year prior to the bid announcement, respectively. FORER and AFORER are the target's and acquirer's analyst forecast errors as calculated by the absolute value of the difference between the analyst earnings forecast reported by IBES (for the last month of the fiscal year preceding to the bid announcement) and the realized value of the earnings, divided by the stock price, respectively. VOLA and AVOLA are the target's and acquirer's return volatilities as measured by the standard deviation of the daily returns for a year ending one-month preceding the bid announcement, respectively. DIVER is the firm diversification; it is equal to one if the target and acquirer have different primary 2-digit SIC industries, zero otherwise. LEVERAGE is the leverage constraints of the acquirer as calculated by the sum of the bidder's face value of debt at the end of the fiscal year prior to the bid announcement plus the deal value (including assumed liabilities) divided by the sum of the book value of total asset at the end of the fiscal year prior to the bid announcement plus the deal value (including assumed liabilities). PREMIUM is the price paid to obtain the target shares as computed by the target's cumulative stock return over (-10, 5) event window. RELSIZE is the relative deal size of the bidder and target as calculated by the log of the ratio of the acquirer market value of equity to the target market value of equity at the end of one month preceding the bid announcement. Year fixed effects represent the year of M&A announcement. Industry fixed effects indicate acquirers' primary 2-digit SIC industries. The sample period is 1990-2014. Significance is corrected for heteroscedasticity. *p*-values are in parentheses.

Explanatory Variables	Dependent variable (= 1 if stock, 0 otherwise)					
	(1) US vs UK	(2) US vs UK	(3) US vs UK	(4) US vs UK	(5) US vs UK	(6) US vs UK
US·NUMA	-0.320					
	(0.032)					
US·ANUMA	-0.283					
	(0.155)					
US	0.398					
	(0.071)					
NUMA	0.129					
	(0.592)					
ANUMA	0.040					
	(0.835)					
US·COVER		-0.863				
		(0.049)				
US·ACOVER		-0.653				
		(0.122)				
US		0.491				
		(0.028)				
COVER		0.125				
		(0.750)				
ACOVER		0.610				
		(0.126)				
US·STDFOR			-0.110			
			(0.584)			
US·ASTDFOR			-0.806			
			(0.002)			
US			0.681			
			(0.100)			
STDFOR			-0.064			
			(0.682)			
ASTDFOR			0.106			
			(0.274)			

(continued)

Table IV.D—*Continued*

US·FORER				-0.653		
				(0.182)		
US·AFORER				-0.763		
				(0.550)		
US				0.536		
				(0.184)		
FORER				0.770		
				(0.096)		
AFORER				0.982		
				(0.405)		
US·VOLA					-25.527	
					(0.002)	
US·AVOLA					-1.017	
					(0.947)	
US					1.020	
					(0.007)	
VOLA					22.436	
					(0.003)	
AVOLA					29.540	
					(0.006)	
US·DIVER						0.318
						(0.214)
US						0.255
						(0.347)
DIVER						-0.496
						(0.035)
US·LEVERAGE	0.027	0.023	0.100	0.095	0.010	0.041
	(0.663)	(0.707)	(0.221)	(0.810)	(0.480)	(0.566)
LEVERAGE	0.061	0.058	0.068	0.115	0.013	0.072
	(0.159)	(0.161)	(0.269)	(0.748)	(0.345)	(0.148)
US·PREMIUM	8.132	7.801	10.345	-2.590	6.829	12.355
	(0.373)	(0.396)	(0.522)	(0.832)	(0.467)	(0.188)
PREMIUM	-18.252	-17.638	-27.828	-15.927	-19.103	-22.455
	(0.032)	(0.039)	(0.059)	(0.142)	(0.028)	(0.011)
US·RELSIZE	0.253	0.233	0.326	0.238	0.318	0.198
	(0.195)	(0.226)	(0.357)	(0.372)	(0.108)	(0.296)
RELSIZE	-1.168	-1.194	-1.358	-1.237	-1.007	-1.117
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	-0.778	-0.828	-0.528	0.123	-1.862	-0.719
	(0.122)	(0.101)	(0.484)	(0.905)	(0.001)	(0.170)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R^2 (%)	22.51	22.49	29.72	25.68	15.02	21.81
No. Obs.	3009	3009	1682	1709	2743	3009
Proportion of stock (%)	40.13	40.13	38.93	36.20	39.04	40.13
Correctly classified (%)	74.81	75.17	77.76	78.02	70.54	75.27

bidder-side uncertainty in deals involving the UK target is also inconclusive; this is inconsistent with the prediction H1B. This is because only AVOLA that has positive and significant coefficient; the marginal effect of the likelihood of stock deals is, on average, 11.71 percentage points higher for one percent increase in the volatility of bidder's stock return. Implying that the acquirers tend to offer equity to the targets when

the level of the bidder-side uncertainty is high. But the other four proxies have insignificant coefficients, which means that the extent of bidder-side information asymmetry has a weaker effect on the payment method decisions.

Regarding for the control variables, the US and the UK results in table IV.A, IV.B, and IV.C have the same signs and significant coefficients. These are confirmed with the existing literature. The coefficients of LEVERAGE is positive and significant, implying that the likelihood of stock offers is greater when the acquirers have high level of financial constraints (Hansen (1987), DeAngelo and Masulis (1980), and Faccio and Masulis (2005). The results also show that the premium in cash deals is larger than stock offers (Fishman (1988, 1989) and Chemmanur et al. (2009)); PREMIUM has negative and significant coefficients. Furthermore, RELSIZE has negative and significant coefficients, indicating that the greater the acquirer size relative to the target, the greater the probability of cash financing, the lower the likelihood of stock offers being used. This result verifies the research from Hansen (1987), and Chemmanur et al. (2009) who claim that the contingent pricing mechanism is less important when the bidder size is larger relative to the target.

4.2.D Target-side and Bidder-side Uncertainties between US and UK

Table IV.D presents the differences between the US and the UK among six proxies of information asymmetry by using the interaction terms (i.e. country and interested variables). For US country variable, it takes the value of one for the US, and zero for the UK. US·NUMA and US·COVER results indicate negative and significant coefficients; compared to the UK, holding all other variables constant, the marginal effect of the probability of stock acquisitions is 15.27 percentage points lower than cash offers for one person increase in the number of analysts following the target. And the

marginal effect for deals with analyst coverage about the target have lower probability of stock offers of 16.65 percentage points than deals with no analyst coverage about the target. This result is different when compared to the UK data. In addition, the UK results support table IV.A and IV.C, which shows a weak pattern of payment method decision. Only US·VOLA coefficient that indicates a negative and significant at 1% level, meaning that there is the difference between the US and UK; when the UK target has high level of uncertainty, the likelihood of stock financing is greater.

For bidder-side uncertainty, the coefficient of US·ASTDFOR is negative and significant at 5% level, comparing to the UK offers, the marginal effect of the likelihood of stock offers is, on average, 1.08 percentage points lower for one dollar per share increase in the standard deviation of analyst forecast about the bidder in the US deals. This implies that the likelihood of cash transactions is greater when the level of bidder-side uncertainty in US deals is high. This result is in line with the existing literature and the hypothesis H2B.

The results of the control variables have confirmed the existing literature and table IV.A, IV.B, and IV.C, there is no significant effect in US·LEVERAGE, US·PREMIUM, and US·RELSIZE. This is because in both countries, when the acquirers have financial constraints, the probability of stock financing is high. The premium in cash offers is more likely to be higher than stock transactions. If the size of bidder is larger relative to the target, the probability of cash deals is high since the impact on the bidder's overall financial condition is smaller.

In summary, the results of target-side uncertainty are in line with table IV.A, IV.B, and IV.C. Given the high level of target-side uncertainty, the bidders in US deal are more likely to offer stock financing to the targets (the hypothesis H1A), but this

Table V.A
Tobit Regressions for Risk Sharing (Target-side Uncertainty)

The estimation is based on a two-boundary Tobit regression to reflect lower and upper bound constraints on the dependent variable. The dependent variable is the amount of stock that the acquirer pays for obtaining the target's share in relation to independent variables. NUMA refers to the number of analysts following the target as reported by IBES for the last month of the fiscal year prior to the bid announcement. COVER is the analyst coverage about the target. It is equal to one, if there is the number of analysts following, zero otherwise. STDFOR is the standard deviation of analyst forecast about the target as obtained from IBES for the last month of the fiscal year prior to the bid announcement. FORER is the target's analyst forecast error as calculated by the absolute value of the difference between the analyst earnings forecast reported by IBES (for the last month of the fiscal year preceding to the bid announcement) and the realized value of the earnings, divided by the stock price. VOLA is the target's return volatility as measured by the standard deviation of the daily returns for a year ending one-month preceding the bid announcement. LEVERAGE is the leverage constraints of the acquirer as calculated by the sum of the bidder's face value of debt at the end of the fiscal year prior to the bid announcement plus the deal value (including assumed liabilities) divided by the sum of the book value of total asset at the end of the fiscal year prior to the bid announcement plus the deal value (including assumed liabilities). PREMIUM is the price paid to obtain the target shares as computed by the target's cumulative stock return over (-10, 5) event window. RELSIZE is the relative deal size of the bidder and target as calculated by the log of the ratio of the acquirer market value of equity to the target market value of equity at the end of one month preceding the bid announcement. Year fixed effects represent the year of M&A announcement. Industry fixed effects indicate acquirers' primary 2-digit SIC industries. The sample period is 1990-2014. Significance is corrected for heteroscedasticity. *p*-values are in parentheses.

Explanatory	(1)		(2)		(3)		(4)		(5)		(6)	
variables	US	UK	US	UK	US	UK	US	UK	US	UK	US	UK
NUMA	-0.129	0.010	-0.054	-0.024								
	(0.000)	(0.754)	(0.000)	(0.546)								
COVER					-0.156	-0.042						
					(0.000)	(0.624)						
STDFOR							-0.066	0.081				
							(0.057)	(0.140)				
FORER									0.027	0.041		
									(0.447)	(0.727)		
VOLA											0.677	3.630
											(0.309)	(0.031)
LEVERAGE	0.000	0.007	0.000	0.011	0.001	0.011	0.024	0.010	0.003	0.147	0.001	0.009
	(0.000)	(0.135)	(0.000)	(0.020)	(0.000)	(0.022)	(0.024)	(0.026)	(0.945)	(0.233)	(0.000)	(0.058)
PREMIUM	-1.841	-2.096	-1.192	-1.231	-1.178	-1.215	-2.345	-1.492	-2.873	-1.611	-0.963	-1.107
	(0.001)	(0.218)	(0.027)	(0.471)	(0.028)	(0.481)	(0.025)	(0.533)	(0.001)	(0.460)	(0.089)	(0.547)
RELSIZE	-0.228	-0.329	-0.230	-0.343	-0.230	-0.342	-0.248	-0.359	-0.255	-0.316	-0.234	-0.341
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	0.510	0.308	0.204	0.119	0.203	0.119	0.225	0.128	0.379	0.286	0.136	0.075
	(0.000)	(0.000)	(0.081)	(0.753)	(0.083)	(0.752)	(0.128)	(0.748)	(0.013)	(0.575)	(0.257)	(0.838)
Year fixed effects			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R^2 (%)	10.48	8.32	19.31	14.92	20.00	14.91	26.29	22.67	25.16	16.60	19.86	15.59
No. Obs.	3273	681	3273	681	3273	681	1909	353	1887	444	2935	627

relation is less pronounced in UK transactions (H2A); therefore, these are in line with the hypotheses H1A and H2A. Unlike table IV.B and IV.C, the results of bidder-side uncertainty suggest that when the extent of bidder-side uncertainty is high, the probability of cash transactions is larger; the results from table IV.B and IV.C are inconclusive, but the evidence from this table is consistent with the prediction H2B and the existing literature. In UK, the results are not in line with the prediction H1B same as table IV.B and IV.C since they have a weak pattern of the payment method decisions.

4.3 Robustness Check for the Evidence of Risk Sharing and the Mean of Payment combined with Takeover Regulation from the Tobit Regressions

In this section, the robustness of the results is tested by using the tobit regressions.[8] The continuous dependent variable is the amount of stock that the bidder pays for obtaining the target shares in relation to independent variables. Six proxies are used for information asymmetry same as section 4.2: the number of analysts following, the analyst coverage, the standard deviation of analyst forecast, the analyst forecast error, the return volatility, and the firm diversification. The results from the tobit regressions are similar to those reported in section 4.2. The statistical significance of the US (UK) evidence is somewhat stronger (weaker) in the tobit regressions; these results are compared to those from the logistic regressions.

4.3.A Target-side uncertainty

The results from the tobit regressions are in line with the logistic regressions (table IV.A). Table V.A shows the results on target-side uncertainty. In US, the

[8] The sample size in tobit regressions is larger than the previous logistic regressions (section 4.2). This is because the data from logistic regressions includes only pure cash deals and pure stock offers. In tobit regressions, the continuous dependent variable is the proportion of equity, this allows us to include the transactions where the method of payment is the mixture of cash and stock.

Table V.B
Tobit Regressions for Risk Sharing (Bidder-side Uncertainty)

The estimation is based on a two-boundary Tobit regression to reflect lower and upper bound constraints on the dependent variable. The dependent variable is the amount of stock that the acquirer pays for obtaining the target's share in relation to independent variables. ANUMA refers to the number of analysts following the acquirer as reported by IBES for the last month of the fiscal year prior to the bid announcement. ACOVER is the analyst coverage about the acquirer. It is equal to one, if there is the number of analysts following, zero otherwise. ASTDFOR is the standard deviation of analyst forecast about the acquirer as obtained from IBES for the last month of the fiscal year prior to the bid announcement. AFORER is the acquirer's analyst forecast error as calculated by the absolute value of the difference between the analyst earnings forecast reported by IBES (for the last month of the fiscal year preceding to the bid announcement) and the realized value of the earnings, divided by the stock price. AVOLA is the acquirer's return volatility as measured by the standard deviation of the daily returns for a year ending one-month preceding the bid announcement. DIVER is the firm diversification; it is equal to one if the target and acquirer have different primary 2-digit SIC industries, zero otherwise. LEVERAGE is the leverage constraints of the acquirer as calculated by the sum of the bidder's face value of debt at the end of the fiscal year prior to the bid announcement plus the deal value (including assumed liabilities) divided by the sum of the book value of total asset at the end of the fiscal year prior to the bid announcement plus the deal value (including assumed liabilities). PREMIUM is the price paid to obtain the target shares as computed by the target's cumulative stock return over (-10, 5) event window. RELSIZE is the relative deal size of the bidder and target as calculated by the log of the ratio of the acquirer market value of equity to the target market value of equity at the end of one month preceding the bid announcement. Year fixed effects represent the year of M&A announcement. Industry fixed effects indicate acquirers' primary 2-digit SIC industries. The sample period is 1990-2014. Significance is corrected for heteroscedasticity. *p*-values are in parentheses.

Explanatory	(1)		(2)		(3)		(4)		(5)		(6)		(7)	
variables	US	UK	US	UK	US	UK	US	UK	US	UK	US	UK	US	UK
ANUMA	-0.100	0.001	-0.051	-0.053										
	(0.000)	(0.951)	(0.000)	(0.145)										
ACOVER					-0.051	-0.031								
					(0.175)	(0.776)								
ASTDFOR							-0.104	0.007						
							(0.000)	(0.897)						
AFORER									-0.013	-0.217				
									(0.881)	(0.557)				
AVOLA											4.164	1.991		
											(0.055)	(0.077)		
DIVER													-0.049	-0.083
													(0.018)	(0.104)
LEVERAGE	0.000	0.007	0.000	0.011	0.000	0.011	0.024	0.011	0.003	0.143	0.001	0.009	0.001	0.011
	(0.000)	(0.133)	(0.000)	(0.017)	(0.000)	(0.023)	(0.025)	(0.024)	(0.938)	(0.245)	(0.000)	(0.052)	(0.000)	(0.022)
PREMIUM	-1.785	-2.103	-1.185	-1.154	-1.126	-1.309	-2.409	-1.849	-2.841	-1.676	-1.016	-1.582	-1.143	-1.458
	(0.002)	(0.217)	(0.028)	(0.496)	(0.037)	(0.442)	(0.021)	(0.438)	(0.001)	(0.443)	(0.067)	(0.384)	(0.035)	(0.388)
RELSIZE	-0.206	-0.329	-0.219	-0.333	-0.226	-0.340	-0.242	-0.358	-0.254	-0.316	-0.210	-0.330	-0.223	-0.333
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	0.495	0.312	0.191	0.113	0.199	0.120	0.272	0.180	0.378	0.287	0.054	0.105	0.177	0.106
	(0.000)	(0.000)	(0.102)	(0.763)	(0.089)	(0.751)	(0.065)	(0.644)	(0.014)	(0.574)	(0.677)	(0.778)	(0.133)	(0.778)
Year fixed effects			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R^2 (%)	10.49	8.31	19.86	15.08	19.60	14.90	27.09	22.26	25.14	16.65	20.93	15.36	19.69	15.14
No. Obs.	3273	681	3273	681	3273	681	1909	353	1887	444	2935	627	3273	681

coefficients of NUMA and COVER are negatively correlated with stock financing; the likelihood of stock offers declines by 3.74% when the number of analysts following the target goes up by one person, and deals with analyst coverage increase the probability of cash offers by 15.60%.[9] In UK, four proxies suggest statistical insignificant results. Only VOLA has positive and significant at 5% level, implying that if the volatility of target's stock return increases by one percent, the probability of stock deals raises by 3.61%; in the US, VOLA should actually have this effect.

Overall, the US and the UK results support the hypothesis H1A and H2A. When the level of US target-side information asymmetry is high, the likelihood of stock transactions is greater (H1A). Conversely, the UK results are less pronounced when compared to the US data as predicted in the hypothesis H2A.

4.3.B Bidder-side Uncertainty

Table V.B presents the results of bidder-side information asymmetry from the tobit regressions. Consistent with the results with table IV.B, the coefficients of all proxies in UK are insignificant, meaning that the extent of information asymmetry about the bidders has no impact on the payment method decisions; this is contradict the hypothesis H1B. The US results show that the level of bidder-side uncertainty increases the likelihood of cash being used in acquisitions (the coefficient of ASTDFOR is negative and significant at 1% level, meaning that the probability of stock acquisitions drops by 7.20% when the standard deviation of analyst forecast about the bidder raises by one dollar per share). However, the results also show that the level of bidder-side uncertainty is positively related to the probability of stock transactions (ANUMA has

[9] To interpret the tobit regression coefficients, the similar way to OLS regression coefficients is applied. Nonetheless, the linear effect is on the uncensored variables, not the observed outcome.

Table V.C
Tobit Regressions for Risk Sharing

The estimation is based on a two-boundary Tobit regression to reflect lower and upper bound constraints on the dependent variable. The dependent variable is the amount of stock that the acquirer pays for obtaining the target's share in relation to independent variables. NUMA and ANUMA refer to the numbers of analysts following the target and acquirer as reported by IBES for the last month of the fiscal year prior to the bid announcement, respectively. COVER and ACOVER are the analyst coverages about the target and acquirer, respectively. It is equal to one, if there is the number of analysts following, zero otherwise. STDFOR and ASTDFOR are the standard deviations of analyst forecast about the target and acquirer as obtained from IBES for the last month of the fiscal year prior to the bid announcement, respectively. FORER and AFORER are the target's and acquirer's analyst forecast errors as calculated by the absolute value of the difference between the analyst earnings forecast reported by IBES (for the last month of the fiscal year preceding to the bid announcement) and the realized value of the earnings, divided by the stock price, respectively. VOLA and AVOLA are the target's and acquirer's return volatilities as measured by the standard deviation of the daily returns for a year ending one-month preceding the bid announcement, respectively. DIVER is the firm diversification; it is equal to one if the target and acquirer have different primary 2-digit SIC industries, zero otherwise. LEVERAGE is the leverage constraints of the acquirer as calculated by the sum of the bidder's face value of debt at the end of the fiscal year prior to the bid announcement plus the deal value (including assumed liabilities) divided by the sum of the book value of total asset at the end of the fiscal year prior to the bid announcement plus the deal value (including assumed liabilities). PREMIUM is the price paid to obtain the target shares as computed by the target's cumulative stock return over (-10, 5) event window. RELSIZE is the relative deal size of the bidder and target as calculated by the log of the ratio of the acquirer market value of equity to the target market value of equity at the end of one month preceding the bid announcement. Year fixed effects represent the year of M&A announcement. Industry fixed effects indicate acquirers' primary 2-digit SIC industries. The sample period is 1990-2014. Significance is corrected for heteroscedasticity. *p*-values are in parentheses.

Explanatory variables	(1)		(2)		(3)		(4)		(5)		(6)		(7)	
	US	UK	US	UK	US	UK	US	UK	US	UK	US	UK	US	UK
NUMA	-0.068	0.026	-0.033	0.024										
	(0.001)	(0.653)	(0.031)	(0.658)										
ANUMA	-0.054	-0.015	-0.030	-0.067										
	(0.001)	(0.732)	(0.100)	(0.173)										
COVER					-0.191	-0.037								
					(0.000)	(0.690)								
ACOVER					0.076	-0.013								
					(0.100)	(0.061)								
STDFOR							-0.053	0.081						
							(0.064)	(0.142)						
ASTDFOR							-0.103	0.004						
							(0.000)	(0.943)						
FORER									0.030	0.052				
									(0.422)	(0.660)				
AFORER									-0.034	-0.233				
									(0.721)	(0.538)				
VOLA											0.200	3.250		
											(0.703)	(0.054)		
AVOLA											4.065	1.444		
											(0.045)	(0.188)		
DIVER													-0.049	-0.083
													(0.018)	(0.104)

(continued)

Table V.C—*Continued*

LEVERAGE	0.000	0.007	0.000	0.011	0.001	0.011	0.023	0.010	0.003	0.146	0.001	0.009	0.001	0.011
	(0.000)	(0.131)	(0.000)	(0.019)	(0.000)	(0.021)	(0.032)	(0.026)	(0.934)	(0.236)	(0.000)	(0.057)	(0.000)	(0.022)
PREMIUM	-1.799	-2.116	-1.201	-1.195	-1.192	-1.222	-2.456	-1.494	-2.875	-1.640	-1.022	-1.111	-1.143	-1.458
	(0.002)	(0.213)	(0.026)	(0.481)	(0.026)	(0.478)	(0.019)	(0.532)	(0.001)	(0.453)	(0.064)	(0.546)	(0.035)	(0.388)
RELSIZE	-0.217	-0.325	-0.224	-0.329	-0.232	-0.342	-0.241	-0.358	-0.256	-0.318	-0.212	-0.337	-0.223	-0.333
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	0.508	0.308	0.197	0.112	0.206	0.119	0.280	0.125	0.381	0.283	0.052	0.059	0.177	0.106
	(0.000)	(0.000)	(0.092)	(0.765)	(0.078)	(0.752)	(0.057)	(0.755)	(0.013)	(0.579)	(0.685)	(0.873)	(0.133)	(0.778)
Year fixed effects			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R^2 (%)	10.73	8.33	19.93	15.09	20.05	14.91	27.16	22.67	25.16	16.67	20.95	15.69	19.69	15.14
No. Obs.	3273	681	3273	681	3273	681	1909	353	1887	444	2935	627	3273	681

negative and significant coefficient, and AVOLA has positive and significant coefficient). Thus, the US result is in line with table IV.B, which contradict to the prediction H2B.

Consistent with Faccio and Masulis (2005), table V.B shows that when the acquirers and the targets in the US deal are in the same industry, stock financing is preferred (DIVER has negative and significant coefficient, meaning that when the target and the bidder are in different industry, the likelihood of cash offers goes up by 4.90%). Put it differently, the probability of cash offers is larger when the bidder and the target are in different industry. The finding of this result is the relation between the bidder and the target. Nonetheless, this effect is less pronounced in deals involving UK target.

4.3.C Target-side and Bidder-side Uncertainties

Model (1) to (7) are rerun in Table V.C by combining proxies for information asymmetry about the acquirer and the target. Similar to table IV.C results, the signs remain the same and the coefficients remain significant. More importantly, the results in Table V.C provide the support for previous regressions as mentioned, that is, the likelihood of stock financing increase with the extent of US target-side information asymmetry (NUMA and COVER have negative and significant coefficients; the probability of cash offers raises by 2.29% when the number of analysts following the target increase by one person, and the likelihood of cash deals also goes up by 19.10% for deals with analyst coverage). This support the hypothesis H1A. On the bidder-side, the US results are still inconclusive since they conflict with each other. When the level of bidder-side uncertainty is high, the likelihood of cash financing is greater (ASTDFOR has negative and significant coefficient; if the standard deviation of analyst

Table V.D

US vs UK

Tobit Regressions for Risk Sharing

The estimation is based on a two-boundary Tobit regression to reflect lower and upper bound constraints on the dependent variable. The dependent variable is the amount of stock that the acquirer pays for obtaining the target's share in relation to independent variables. US country variable takes a value of one, and zero otherwise. NUMA and ANUMA refer to the numbers of analysts following the target and acquirer as reported by IBES for the last month of the fiscal year prior to the bid announcement, respectively. COVER and ACOVER are the analyst coverages about the target and acquirer, respectively. It is equal to one, if there is the number of analysts following, zero otherwise. STDFOR and ASTDFOR are the standard deviations of analyst forecast about the target and acquirer as obtained from IBES for the last month of the fiscal year prior to the bid announcement, respectively. FORER and AFORER are the target's and acquirer's analyst forecast errors as calculated by the absolute value of the difference between the analyst earnings forecast reported by IBES (for the last month of the fiscal year preceding to the bid announcement) and the realized value of the earnings, divided by the stock price, respectively. VOLA and AVOLA are the target's and acquirer's return volatilities as measured by the standard deviation of the daily returns for a year ending one-month preceding the bid announcement, respectively. DIVER is the firm diversification; it is equal to one if the target and acquirer have different primary 2-digit SIC industries, zero otherwise. LEVERAGE is the leverage constraints of the acquirer as calculated by the sum of the bidder's face value of debt at the end of the fiscal year prior to the bid announcement plus the deal value (including assumed liabilities) divided by the sum of the book value of total asset at the end of the fiscal year prior to the bid announcement plus the deal value (including assumed liabilities). PREMIUM is the price paid to obtain the target shares as computed by the target's cumulative stock return over (-10, 5) event window. RELSIZE is the relative deal size of the bidder and target as calculated by the log of the ratio of the acquirer market value of equity to the target market value of equity at the end of one month preceding the bid announcement. Year fixed effects represent the year of M&A announcement. Industry fixed effects indicate acquirers' primary 2-digit SIC industries. The sample period is 1990-2014. Significance is corrected for heteroscedasticity. *p*-values are in parentheses.

Explanatory variables	(1) US vs UK	(2) US vs UK	(3) US vs UK	(4) US vs UK	(5) US vs UK	(6) US vs UK
US·NUMA	-0.076					
	(0.016)					
US·ANUMA	-0.033					
	(0.417)					
US	0.065					
	(0.103)					
NUMA	0.043					
	(0.377)					
ANUMA	-0.012					
	(0.767)					
US·COVER		-0.220				
		(0.019)				
US·ACOVER		-0.062				
		(0.484)				
US		0.083				
		(0.039)				
COVER		0.025				
		(0.767)				
ACOVER		0.111				
		(0.192)				
US·STDFOR			-0.085			
			(0.126)			
US·ASTDFOR			-0.123			
			(0.036)			
US			0.148			
			(0.070)			
STDFOR			0.037			
			(0.450)			
ASTDFOR			0.021			
			(0.688)			

(continued)

Table V.D—*Continued*

US · FORER				-0.081		
				(0.475)		
US · AFORER				-0.025		
				(0.937)		
US				0.073		
				(0.352)		
FORER				0.111		
				(0.301)		
AFORER				0.014		
				(0.964)		
US · VOLA					-3.093	
					(0.046)	
US · AVOLA					1.271	
					(0.602)	
US					0.006	
					(0.942)	
VOLA					3.316	
					(0.020)	
AVOLA					3.071	
					(0.000)	
US · DIVER						0.038
						(0.448)
US						0.021
						(0.661)
DIVER						-0.085
						(0.064)
US · LEVERAGE	0.011	0.010	0.008	0.011	0.0123	0.022
	(0.087)	(0.103)	(0.505)	(0.910)	(0.038)	(0.056)
LEVERAGE	0.011	0.011	0.010	0.024	0.013	0.012
	(0.021)	(0.021)	(0.024)	(0.775)	(0.030)	(0.012)
US · PREMIUM	0.854	0.789	0.299	-1.988	0.840	1.559
	(0.599)	(0.630)	(0.901)	(0.354)	(0.633)	(0.342)
PREMIUM	-2.083	-1.985	-2.952	-1.096	-1.901	-2.728
	(0.172)	(0.196)	(0.170)	(0.575)	(0.253)	(0.076)
US · RELSIZE	0.082	0.079	0.081	0.061	0.113	0.076
	(0.095)	(0.136)	(0.174)	(0.230)	(0.307)	(0.144)
RELSIZE	-0.306	-0.313	-0.322	-0.312	-0.326	-0.301
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	0.102	0.094	0.052	0.258	0.043	0.122
	(0.362)	(0.399)	(0.737)	(0.145)	(0.719)	(0.290)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R^2 (%)	17.62	17.73	22.04	19.89	18.41	17.13
No. Obs.	3954	3954	2262	2331	3562	3954

forecast about the acquirer raises by one dollar per share, on average, the probability of stock offers goes up by 7.14%), however, stock transactions are also preferred (AVOLA has positive and significant coefficient; the likelihood of stock offers is, on average, 4.04% when the volatility of bidder's stock return raises by one percent). This contrasts the prediction H2B.

The UK results in table V.C indicate that the relation between the level of target-side information asymmetry and the payment method decisions is weaker when compared to the US data; among six proxies, only VOLA that has positive and significant coefficient; the likelihood of stock financing raises by 3.23% when the volatility of the UK target's stock return increase by one percent. This supports the hypothesis H2A. On the bidder-side, there is no variable that has significant coefficient, implying that the extent of bidder-side uncertainty has less impact on the medium of exchange; this contradicts the prediction H1B.

For control variables, the US and the UK have similar results as section 4.2. When the acquirers have a high level of financial constraints, stock offers are preferred; the coefficient of LEVERAGE is positive and significant. The results also indicate that the bidders pay greater premium in cash offers when compared to stock transactions; PREMIUM has negative and significant coefficient. Lastly, the results in table V.C show that when the acquirer size is larger relative to the target, the likelihood of the bidders using cash as a medium of exchange is higher; RELSIZE has negative and significant coefficient.

4.3.D Target-side and Bidder-side Uncertainties between US and UK

The interaction terms between country and interested variables are used to identify the differences between the US and the UK in table V.D. The US country variable takes a value of one, and zero for the UK. The results are in line with section 4.2 especially table IV.D; the US and UK evidence has confirmed that there are the differences between these two countries. Firstly, I find that the likelihood that the acquirers offer stock to the targets are larger when the extent of target-side information asymmetry is high. The coefficients of US·NUMA and US·COVER are negative and

Table VI.A
Multinomial Logit Model for Market Misvaluation (Bidder-side Misvaluation)

The financing category Stock includes the medium of exchange made in pure stock. The financing category Cash includes the medium of exchange made in pure cash. The financing category Mixed includes the medium of exchange consisting of cash and stock. AMB is the acquirer's market-to-book ratios; market value of equity is measured at the end of one month preceding the bid announcement and book value of equity is the values at the end of the fiscal year prior to the bid announcement. ARUNUP is the acquirer's stock price run-up as calculated by a cumulative stock return during one year ending one month before the bid announcement date, respectively. LEVERAGE is the leverage constraints of the acquirer as calculated by the sum of the bidder's face value of debt at the end of the fiscal year prior to the bid announcement plus the deal value (including assumed liabilities) divided by the sum of the book value of total asset at the end of the fiscal year prior to the bid announcement plus the deal value (including assumed liabilities). PREMIUM is the price paid to obtain the target shares as computed by the target's cumulative stock return over (-10, 5) event window. RELSIZE is the relative deal size of the bidder and target as calculated by the log of the ratio of the acquirer market value of equity to the target market value of equity at the end of one month preceding the bid announcement. Year fixed effects represent the year of M&A announcement. Industry fixed effects indicate acquirers' primary 2-digit SIC industries. The sample period is 1990-2014. Significance is corrected for heteroscedasticity. *p*-values are in parentheses.

Explanatory variables	1 if Stock 0 if Cash (1)		1 if Mixed 0 if Cash (2)		1 if Mixed 0 if Stock (3)		1 if Stock 0 if Cash (4)		1 if Mixed 0 if Cash (5)		1 if Mixed 0 if Stock (6)	
	US	UK	US	UK	US	UK	US	UK	US	UK	US	UK
AMB	0.632	0.320	0.412	0.248	-0.220	-0.072						
	(0.000)	(0.093)	(0.000)	(0.179)	(0.009)	(0.707)						
ARUNUP							0.562	0.101	0.111	0.056	-0.045	0.096
							(0.002)	(0.075)	(0.005)	(0.946)	(0.186)	(0.318)
LEVERAGE	0.207	0.069	0.126	0.110	0.081	0.041	0.040	0.039	0.036	0.022	0.003	0.017
	(0.000)	(0.354)	(0.030)	(0.372)	(0.142)	(0.751)	(0.412)	(0.034)	(0.439)	(0.183)	(0.065)	(0.279)
PREMIUM	-8.117	-22.264	0.150	10.352	8.268	32.616	-8.840	-17.610	-0.213	10.052	8.628	-27.663
	(0.022)	(0.022)	(0.956)	(0.236)	(0.023)	(0.004)	(0.010)	(0.053)	(0.933)	(0.252)	(0.018)	(0.008)
RELSIZE	-1.192	-1.335	-1.334	-1.197	-0.142	0.138	-1.045	-1.175	-1.273	-1.238	-0.227	0.063
	(0.000)	(0.000)	(0.000)	(0.000)	(0.126)	(0.563)	(0.000)	(0.000)	(0.000)	(0.000)	(0.011)	(0.781)
Constant	-0.303	-15.200	-0.717	0.242	-0.414	15.442	-0.101	-14.768	-0.607	0.523	-0.506	-15.291
	(0.569)	(0.000)	(0.307)	(0.825)	(0.598)	(0.000)	(0.848)	(0.000)	(0.368)	(0.642)	(0.515)	(0.000)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R^2 (%)	19.79	17.08	19.79	17.08	19.79	17.08	19.16	16.70	19.16	16.70	19.16	16.70
No. Obs.	3027	621	3027	621	3027	621	3039	640	3039	640	3039	640
Proportion of stock (%)	42.12	31.44			57.31	55.15	40.75	31.37			56.31	55.17
Proportion of mixed (%)			35.16	27.16	42.69	44.85			34.80	27.08	43.69	44.83
Correctly classified (%)	72.61	72.33	72.61	72.33	72.61	72.33	72.26	72.16	72.26	72.16	72.26	72.16

significant at 5% level, implying that an increased in one person of the number of analysts following the US target, compared to the UK, the likelihood of stock deals decreases by 5.27%. And offers with the analyst coverage about the US target (compared to the UK acquisitions) drop the probability of stock payment by 22%. In UK, the relation as shown in US acquisitions is less pronounced; five proxies indicate insignificant results. Only US·VOLA that has negative and significant coefficient, implying that if the acquirers faced a higher level of the UK target-side information asymmetry, the probability of stock offers raises by 3.08%.

On the bidder-side information asymmetry, the US result shows that when the target faced a high extent of the bidder-side uncertainty, the likelihood of cash acquisitions is greater; this is consistent with the prediction H2B. On the other hands, this US relation is weaker in deals involving the UK target; this contradicts the hypothesis H1B. Additionally, the results for the control variables (US·LEVERAGE, US·PREMIUM, and US·RELSIZE) provide the support for section 4.2 and the previous table in section 4.3. This evidence indicates insignificant coefficients, meaning that there is no difference between the US and UK acquisitions.

Overall, the evidence is in line with section 4.2 table IV.D. In US, when the level of the US target-side is high, the probability of stock offers is greater; this is line with the hypothesis H1A. In UK, the result show a weak relation when compared to the US acquisitions; this supports the hypothesis H2A. On the bidder-side in US deals, the level of bidder-side uncertainty positively affects the likelihood of cash offers; this result is in line with section 4.2 table IV.D and the hypothesis H2B. Lastly, the results on the bidder-side uncertainty in the UK offer have weaker relation, which is consistent with section 4.2 table IV.D.

Table VI.B
Multinomial Logit Model for Market Misvaluation

The financing category Stock includes the medium of exchange made in pure stock. The financing category Cash includes the medium of exchange made in pure cash. The financing category Mixed includes the medium of exchange consisting of cash and stock. AMB and TMB are the acquirer's and target's market-to-book ratios, respectively. Market value of equity is measured at the end of one month preceding the bid announcement and book value of equity is the values at the end of the fiscal year prior to the bid announcement. ARUNUP and TRUNUP are the acquirer's and target's stock price run-ups as calculated by a cumulative stock return during one year ending one month before the bid announcement date, respectively. LEVERAGE is the leverage constraints of the acquirer as calculated by the sum of the bidder's face value of debt at the end of the fiscal year prior to the bid announcement plus the deal value (including assumed liabilities) divided by the sum of the book value of total asset at the end of the fiscal year prior to the bid announcement plus the deal value (including assumed liabilities). PREMIUM is the price paid to obtain the target shares as computed by the target's cumulative stock return over (-10, 5) event window. RELSIZE is the relative deal size of the bidder and target as calculated by the log of the ratio of the acquirer market value of equity to the target market value of equity at the end of one month preceding the bid announcement. Year fixed effects represent the year of M&A announcement. Industry fixed effects indicate acquirers' primary 2-digit SIC industries. The sample period is 1990-2014. Significance is corrected for heteroscedasticity. *p*-values are in parentheses.

Explanatory variables	1 if Stock 0 if Cash (1)		1 if Mixed 0 if Cash (2)		1 if Mixed 0 if Stock (3)		1 if Stock 0 if Cash (4)		1 if Mixed 0 if Cash (5)		1 if Mixed 0 if Stock (6)	
	US	UK	US	UK	US	UK	US	UK	US	UK	US	UK
AMB	0.586	0.389	0.420	0.409	-0.165	0.021						
	(0.000)	(0.064)	(0.000)	(0.140)	(0.068)	(0.909)						
TMB	0.123	-0.226	0.025	-0.742	-0.149	-0.516						
	(0.074)	(0.282)	(0.174)	(0.004)	(0.089)	(0.074)						
ARUNUP							0.732	0.129	0.133	0.032	-0.041	-0.082
							(0.002)	(0.041)	(0.002)	(0.710)	(0.082)	(0.384)
TRUNUP							0.037	-0.113	0.047	-0.103	-0.010	0.055
							(0.187)	(0.111)	(0.071)	(0.140)	(0.731)	(0.445)
LEVERAGE	0.206	0.064	0.126	0.115	0.081	0.051	0.041	0.038	0.038	0.021	0.003	0.000
	(0.000)	(0.338)	(0.030)	(0.413)	(0.144)	(0.722)	(0.396)	(0.042)	(0.423)	(0.208)	(0.061)	(0.994)
PREMIUM	-7.902	-22.616	0.051	10.338	7.653	32.954	-9.358	-18.897	-0.715	8.430	8.643	25.162
	(0.032)	(0.021)	(0.985)	(0.225)	(0.036)	(0.003)	(0.007)	(0.039)	(0.795)	(0.343)	(0.021)	(0.010)
RELSIZE	-1.181	-1.337	-1.334	-1.227	-0.153	0.110	-1.045	-1.193	-1.273	-1.250	-0.228	-0.138
	(0.000)	(0.000)	(0.000)	(0.000)	(0.101)	(0.644)	(0.000)	(0.000)	(0.000)	(0.000)	(0.011)	(0.527)
Constant	-0.379	-14.982	-0.705	0.760	-0.326	15.742	-0.122	-14.905	-0.623	0.365	-0.501	12.400
	(0.477)	(0.000)	(0.316)	(0.495)	(0.679)	(0.000)	(0.817)	(0.000)	(0.352)	(0.745)	(0.518)	(0.000)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R^2 (%)	19.86	17.93	19.86	17.93	19.86	17.93	19.25	17.03	19.25	17.03	19.25	17.03
No. Obs.	3027	621	3027	621	3027	621	3039	640	3039	640	3039	640
Proportion of stock (%)	42.12	31.44			57.31	55.15	40.75	31.37			56.31	55.17
Proportion of mixed (%)			35.16	27.16	42.69	44.85			34.80	27.08	43.69	44.83
Correctly classified (%)	72.38	72.76	72.38	72.76	72.38	72.76	72.45	72.58	72.45	72.58	72.45	72.58

4.4 Evidence of Market Misvaluation and the Mean of Payment combined with Takeover Regulation from the Multinomial Logit Regressions

The market misvaluation hypothesis from Shleifer and Vishny (2003) claims that overvalued bidders acquire less overvalued targets with overvalued stock; the bidder has an incentive to exploit the market overvaluation. Thus, in the US the likelihood of stock deals should be greatest, the likelihood of mixed offers should lie between cash and stock transactions, and cash deals is least likely: the hypothesis H1C. This is not the case for the UK acquisition. In the UK, target shareholders can make the payment method decisions, meaning that this decision depends on their risk and expected return. Hence, the relation predicted in H1C should not hold for deals involving the UK target. The probability of mixed deal should be greatest since there will be target shareholders who prefer cash over stock financing, and the likelihood of stock and cash offers should be the same: the hypothesis H2C.

Shleifer and Vishny (2003) also argue that undervalued bidders only offer cash to undervalued targets. This is because if the acquirers pay stock to obtain the target shares in this condition, the bidder has to issue more shares than it would have to without undervaluation. Therefore, in the US, the probability of cash offers is greatest, the probability of mixed deals lies between cash and stock financing, and stock transactions are least likely: the prediction H2D. Nevertheless, this relation should not hold in acquisitions involving the UK target as target shareholders can choose the method of payment. There is no guarantee that target shareholders will choose pure cash over pure stock financing. Consequently, the probability of mixed offers is greatest and the probability of cash and stock is the same: the hypothesis H2D.

Table VI.C

US vs UK

Multinomial Logit Model for Market Misvaluation

The financing category Stock includes the medium of exchange made in pure stock. The financing category Cash includes the medium of exchange made in pure cash. The financing category Mixed includes the medium of exchange consisting of cash and stock. US country variable takes a value of one, and zero otherwise. AMB and TMB are the acquirer's and target's market-to-book ratios, respectively. Market value of equity is measured at the end of one month preceding the bid announcement and book value of equity is the values at the end of the fiscal year prior to the bid announcement. ARUNUP and TRUNUP are the acquirer's and target's stock price run-ups as calculated by a cumulative stock return during one year ending one month before the bid announcement date, respectively. LEVERAGE is the leverage constraints of the acquirer as calculated by the sum of the bidder's face value of debt at the end of the fiscal year prior to the bid announcement plus the deal value (including assumed liabilities) divided by the sum of the book value of total asset at the end of the fiscal year prior to the bid announcement plus the deal value (including assumed liabilities). PREMIUM is the price paid to obtain the target shares as computed by the target's cumulative stock return over (-10, 5) event window. RELSIZE is the relative deal size of the bidder and target as calculated by the log of the ratio of the acquirer market value of equity to the target market value of equity at the end of one month preceding the bid announcement. Year fixed effects represent the year of M&A announcement. Industry fixed effects indicate acquirers' primary 2-digit SIC industries. The sample period is 1990-2014. Significance is corrected for heteroscedasticity. *p*-values are in parentheses.

Explanatory Variables	1 if Stock 0 if Cash (1)	1 if Mixed 0 if Cash (2)	1 if Mixed 0 if Stock (3)	1 if Stock 0 if Cash (4)	1 if Mixed 0 if Cash (5)	1 if Mixed 0 if Stock (6)
	US vs UK	US vs UK	US vs UK	US vs UK	US vs UK	US vs UK
US·AMB	0.152	0.008	-0.160			
	(0.436)	(0.967)	(0.380)			
US·TMB	0.418	0.479	0.061			
	(0.070)	(0.031)	(0.814)			
US	-0.642	0.176	0.818			
	(0.053)	(0.611)	(0.029)			
AMB	0.425	0.400	-0.025			
	(0.016)	(0.025)	(0.877)			
TMB	-0.309	-0.516	-0.207			
	(0.163)	(0.012)	(0.402)			
US·ARUNUP				0.004	0.094	0.088
				(0.954)	(0.270)	(0.312)
US·TRUNUP				0.077	-0.063	-0.058
				(0.313)	(0.278)	(0.450)
US				0.062	0.558	0.496
				(0.793)	(0.011)	(0.037)
ARUNUP				0.171	0.046	-0.125
				(0.002)	(0.524)	(0.122)
TRUNUP				-0.120	-0.063	0.057
				(0.094)	(0.278)	(0.427)
US·LEVERAGE	0.009	0.011	0.003	0.053	0.004	0.057
	(0.943)	(0.919)	(0.984)	(0.437)	(0.915)	(0.252)
LEVERAGE	0.175	0.104	0.071	0.090	0.029	0.061
	(0.113)	(0.306)	(0.594)	(0.113)	(0.073)	(0.226)
US·PREMIUM	19.508	-2.659	-22.167	13.998	-4.536	-18.534
	(0.056)	(0.748)	(0.049)	(0.146)	(0.599)	(0.089)
PREMIUM	-27.296	2.067	29.363	-23.207	3.395	26.602
	(0.005)	(0.793)	(0.006)	(0.010)	(0.681)	(0.010)
US·RELSIZE	0.187	-0.046	-0.233	0.225	0.093	-0.132
	(0.391)	(0.832)	(0.327)	(0.275)	(0.657)	(0.567)
RELSIZE	-1.310	-1.247	0.062	-1.209	-1.318	-0.109
	(0.000)	(0.000)	(0.779)	(0.000)	(0.000)	(0.613)
Constant	-0.177	-0.700	-0.524	-0.499	-0.929	-0.430
	(0.747)	(0.278)	(0.478)	(0.321)	(0.108)	(0.527)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes

(continued)

Table VI.C—*Continued*

Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R^2 (%)	16.79	16.79	16.79	16.21	16.21	16.21
No. Obs.	3648	3648	3648	3679	3679	3679
Proportion of stock (%)	44.75		56.65	39.06		56.14
Proportion of mixed (%)		33.73	43.35		33.36	43.86
Correctly classified (%)	71.00	71.00	71.00	70.98	70.98	70.98

Table VI.A, VI.B, and VI.C report the results of the market misvaluation hypothesis by using the multinomial logit regressions. In regression (1) and (4), the dependent variable is equaled to one for stock offers, and zero for cash acquisitions. In regression (2) and (5), the dependent variable is equaled to one if transactions financed with mixed financing, and zero for cash deals. In regression (3) and (6), the dependent variable is equaled to one for the mixed forms, and zero for equity deals.

4.4.A Bidder-side Misvaluation

Table VI.A summarizes the results from the multinomial logit regressions relating the bidder-side misvaluation. In the US, the coefficient of AMB is positive and significant in regression (1) and (2), and negative and significant in regression (3). The marginal effect results from model (1) suggest that if the bidder's M/B increases by one percent, the likelihood of stock offers goes up by 6.99 percentage points; this compared to cash acquisitions. Hold other variables constant, the marginal effect results from model (2) indicate that an increased in the bidder's M/B by one percent raises the likelihood of mixed financing by 3.44 percentage points; this compared to cash acquisitions. The results from model (3) show that the marginal effect of the likelihood of stock financing is about 2.07 percentage points higher for one percent increase in the bidder's M/B; this compared to mixed acquisitions. And the results of ARUNUP also confirm this relation; ARUNUP has positive and significant coefficient in regression (4) and (5). This implies that the bidders with higher market-to-book value (i.e.

overvalued bidders) are more likely to offer stock financing, the probability of mixed deals lies between stock and cash offers, and cash transactions are least likely. To put it another way, the acquirers with lower valuation (i.e. undervalued bidders) are more likely to offer cash to the targets, the likelihood of mixed financing lies between cash and stock offers, and the probability of stock transactions is least likely.

On bidder-side misvaluation in the UK deals, the coefficients of AMB is positive and slightly significant in regression (1), and insignificant in regression (3); the marginal effect in model (1) indicates that the probability of stock deals raises by 0.05 percentage points when the bidder's M/B goes up by one percent. This implies that when the bidder's equity is overvalued, the likelihood of stock and mixed financing being used is the same, which is greater than cash transactions. Moreover, ARUNUP in regression (4) confirms that overvalued bidders are more likely to offer stock (compared to cash acquisitions) to the targets; the marginal effect of the likelihood of stock acquisitions is, on average, 38.65 percentage points higher than cash acquisitions when the acquirer's stock price run-up increases by one percent. Put differently, under the condition of undervalued bidders, the probability of cash transactions is greatest, and the likelihood of stock and mixed financing is the same.

4.4.B Bidder-side and Target-side Misvaluations

The objective of table VI.B is to compare the bidder-side and target-side misvaluations. The target-side variables are added in the multinomial regressions. The results of the bidder-side misvaluation are similar to table VI.A (after including the target-side variables), the coefficients remain significant and the signs remain unchanged. The findings in table VI.B are consistent with the results from table VI.A

and the univariate test (table II); the univariate test indicates that the acquirers are more overvalued than the targets.

The US results from AMB and TMB in regression (1), (2), and (3) imply that overvalued bidders acquire less overvalued targets with overvalued equity. In model (1), comparing to cash offers, the marginal effect of the probability of stock acquisitions is, on average, 0.10 (0.02) percentage points higher when the bidder's (target's) M/B increases by one percent. The marginal effect evidence in model (2) shows that if the bidder's (target's) M/B raises by one percent, comparing to cash deals, the likelihood of mixed financing goes up by 0.06 (0.01) percentage points. The marginal effect of probability of stock acquisitions is, on average, 0.03 (0.02) percentage points greater when the bidder's (target's) M/B increases by one percent. Put differently, the likelihood of stock transactions is greatest, mixed offers lie between stock and cash financing, and cash acquisitions are least likely; this is consistent with the prediction H1C. Also, the coefficients of ARUNUP and TRUNUP confirm the results of AMB and TMB. In other words, the bidders are more likely to offer cash to undervalued targets when the bidders' stock are undervalued, mixed deals lie between cash and stock financing, and stock transactions are least likely; this is in line with the hypothesis H1D. Overall, the results verify the predictions and the existing evidence.

Unlike the US results, the UK results have to interpret separately since the results of bidder-side and target-side misvaluations do not go in the same direction. On the bidder-side misvaluation in UK deals, the coefficient of AMB is positive and significant in regression (1) and (2), and insignificant in regression (3), suggesting that if the bidder's M/B goes up by one percent, compared to cash acquisitions, the marginal

Table VII

Logistic Regressions for Investment Horizons

The dependent variable takes on a value of one if the payment method was pure stock, zero for payments made solely in pure cash. DIFF is the difference between the target's and the bidder's share turnovers; it is equal to one if the difference is greater than zero, zero otherwise. Share turnover is measured by the number of shares traded, divided by the total number of shares outstanding. AVOLA is the acquirer's return volatility as measured by the standard deviation of the daily returns for a year ending one-month preceding the bid announcement. ASIZE is the bidder's firm size as measured by the bidder's market value of equity at the end of one month before the bid announcement date. AMB is the acquirer's market-to-book ratio. Market value of equity is measured at the end of one month preceding the bid announcement and book value of equity is the values at the end of the fiscal year prior to the bid announcement. Year fixed effects represent the year of M&A announcement. Industry fixed effects indicate acquirers' primary 2-digit SIC industries. The sample period is 1990-2014. Significance is corrected for heteroscedasticity. *p*-values are in parentheses.

Explanatory variables	Dependent variable (= 1 if stock, 0 otherwise)						
	(1)		(2)		(3)		(4)
	US	UK	US	UK	US	UK	US vs UK
DIFF	0.409	0.097	0.272	0.141	0.366	0.285	
	(0.000)	(0.654)	(0.003)	(0.546)	(0.000)	(0.295)	
US·DIFF							0.388
							(0.045)
US							1.897
							(0.086)
US·AVOLA							-16.118
							(0.251)
AVOLA			18.128	28.010	23.852	16.324	35.491
			(0.019)	(0.007)	(0.008)	(0.225)	(0.002)
US·ASIZE							0.132
							(0.097)
ASIZE			-0.232	-0.306	-0.200	-0.396	-0.335
			(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
US·AMB							0.179
							(0.353)
AMB			0.410	0.135	0.278	0.217	0.117
			(0.000)	(0.429)	(0.000)	(0.353)	(0.516)
Constant	-0.152	-0.723	3.768	4.704	2.772	-3.749	5.133
	(0.009)	(0.000)	(0.000)	(0.001)	(0.002)	(0.099)	(0.001)
Year fixed effects					Yes	Yes	Yes
Industry fixed effects					Yes	Yes	Yes
Pseudo R^2 (%)	0.74	0.04	7.41	11.66	11.31	21.32	11.92
No. Obs.	2263	409	2220	409	2220	409	2629
Proportion of stock (%)	41.58	33.50	41.58	33.50	41.58	33.50	40.34
Correctly classified (%)	58.42	66.50	64.41	70.90	66.49	73.26	67.17

effect of the probability of stock (mixed) deals increases by 0.05 (0.04) percentage points. This means that when the bidders' equity are overvalued, the probability of stock and mixed financing is greatest, and cash transactions are least likely. ARUNUP has positive and significant coefficient in regression (4); the marginal effect of the likelihood of stock offers is, on average, 4.95 percentage points higher than cash financing for one percent increases in the acquirer's stock price run-up. Implying that

overvalued bidders are more likely to offer overvalued stock in acquisitions; this confirms the result in regression (1). Put another way, undervalued acquirers are more likely to offer cash to the targets, mixed deals and stock acquisitions are least likely.

On the UK target-side misvaluation, TMB has negative and significant coefficient in model (2) and (3), and insignificant coefficient in model (1); meaning that comparing to cash (mixed) offers in model 2 (3), when the target's M/B raises by one percent, the marginal effect of cash (stock) financing goes up by 7.07 (0.15) percentage points. The result of TRUNUP cannot support TMB since the coefficient of TRUNUP is insignificant in all model (model (4) to (6)). This suggests that overvalued targets are more likely to choose stock and cash financing, and least likely to choose a combination between cash and stock financing. Put differently, undervalued targets are more likely to choose mixed financing, and least likely to choose cash and stock as a medium of exchange. In sum, the UK results are inconsistent with the predictions both H2C and H2D, and the existing theory. The takeover regulation does have an impact on the payment method decisions. Comparing to US market, explanations of bidder-side and target-side misvaluations are not hold in UK transactions because target shareholders have more bargaining power than the acquirers; UK target shareholders can choose the method of payment.

4.4.C Bidder-side and Target-side Misvaluations between US and UK

Table VI.C uses the interaction terms (i.e. country and interested variables) to explain the differences between US and UK. The coefficients of US·AMB and US·ARUNUP are insignificant in model (1) to (3), meaning that there is no difference between US and UK when the bidders' equity are overvalued. The probability of stock

and mixed transactions is greater than cash financing. US·TMB has positive and significant in regression (1) and (2), meaning that when the target shares are overvalued, the probability of stock and mixed deals is greater than cash offers in the US market (compared to the UK offer). The marginal effect results in model 1 (2) show that the likelihood of stock (mixed) acquisitions is, on average, 0.10 (0.11) percentage points higher than cash offers (comparing to the UK data) when the US target's M/B raises by one percent. In summary, the results are in line with table VI.B, that is, there is the differences in payment method decisions between the US and the UK transactions.

4.4.D Investment Horizons

Existing evidence claims that the targets accept overvalued stock from overvalued bidders since the targets have short investment horizons (Shleifer and Vishny (2003) and Ang and Cheng (2006)). This study uses average daily share turnover as a proxy of investment horizons. However, this relation should not hold in the UK transactions since target shareholders can choose the medium of exchange; target shareholders might not choose overvalued stock over cash financing.

The results in Table VII presents the relation between the payment method and investment horizons by using the logistic regressions. The dependent variable takes a value of one for pure stock offers, and zero for pure cash transactions. DIFF (the independent variable) is used to indicate the difference between the target's and the bidder's share turnovers, it takes a value of one if the difference is greater than zero, and zero otherwise. In US, DIFF has positive and significant coefficient in regression (3); the marginal effect results indicate that an increased in the different between the target's and the bidder's share turnover by one percent raises the likelihood of stock acquisitions by 10.72 percentage points; in overvalued stock deals, the US target has

higher average daily share turnover (i.e. shorter investment horizons) than the bidders before acquisitions. This support the prediction H1E. In the UK market, the coefficient of DIFF is insignificant, meaning that the relation predicted in H1E is not hold for deals involving the UK target; this is consistent with the hypothesis H2E.

The interaction terms (i.e. country and interested variables) in model (4) are also added in table VII to find the differences between the US and the UK results; this is to confirm the result in model (3). US·DIFF has positive and significant at 5% level; comparing to the UK market, the marginal effect results show that an increased in the different between the US target's and the US bidder's daily share turnover by one percent raises the probability of stock financing by 18.49 percentage points. This implies that takeover regulations of US and UK affect payment method decisions differently.

CHAPTER V

CONCLUSIONS AND AREA FOR FUTURE RESEARCH

Many researches study the determinants that influence the payment method in acquisitions, especially in the contexts of the risk-sharing hypothesis from Hansen (1987) and the market misvaluation hypothesis from Shleifer and Vishny (2003). Notably, these insights are drawn from the US setting, and have been taken as explanations for payment method decisions for non-US markets. It casts doubt on whether these insights are broad enough to explain other financial markets. Due to the apparent lack of supporting scientific evidence, this study focuses on the differences in takeover regulations between the US and the UK markets. This is because they share several institutional features, but differ noticeably in terms of takeover regulation. The mainly regulatory differences between the US and the UK are that the US acquirer chooses the payment method then offer to the target, however the UK target shareholders have the right to choose the medium of exchange. Hence, this study examines how the regulatory differences between the US and the UK that might affect payment method decisions by taking the risk-sharing and the market misvaluation hypotheses into consideration.

According to the risk-sharing hypothesis, this paper uses six proxies as information asymmetry since there is no evidence that which one is the best proxy and to check for the robustness. The logistic regressions are used to find the relation between the payment method and those proxies. I, firstly, test the target-side and bidder-side uncertainty separately. The US results from target-side uncertainty are consistent with the existing evidence, that is, when the level of target-side information asymmetry

is high, the likelihood of stock financing is larger (Hansen (1987) and Chemmanur et al. (2009)). Since the bidder makes a payment method decision, when the level of target-side uncertainty is high, the bidder wants to share part of the gain and risk ex post (i.e. stock has contingent pricing mechanism). In the UK, the results show that this US relation is less pronounced, and have confirmed that an uncertainty of the target is less important as target shareholders can choose the method of payment.

Secondly, the bidder-side uncertainty is tested. The US results are mixed (i.e. inconclusive) since they indicate that when the level of bidder-side uncertainty is high, the probability of cash and stock deals is greater. This relation also less pronounced in deals involving the UK target, implying that the extent of bidder-side information asymmetry also has less impact on the target shareholders' payment method decisions. Meaning that the UK target shareholders' payment method decisions depend on risk and expected return individually; the UK target shareholders can bargain about the payment method with the bidder. Then, the proxies of the bidder-side and target-side uncertainty are included in the same regression, the coefficients remain significant and the signs remain unchanged. The results also support the previous evidence (the separate test of target-side and bidder-side). Lastly, the interaction terms between country and the interested variables are used to check the differences between the US and the UK markets. The results are also in line with the previous regressions, which mean that there is the difference in payment method decisions between the US and the UK.

Afterwards, I rerun the regressions to check for the robustness by using the tobit models. Mixed acquisitions are also included this time since the interest of using the tobit regression is to find the proportion of stock that the bidders used to buy the target

shares; the logistic regressions have only pure cash deals and pure stock transactions. This implies that the size of the sample will be larger; the degree of precision will be higher. All results in the tobit regressions are in line with the logistic models (the statistical significance in the tobit regressions is stronger than the logit models).

Regarding to the market misvaluation hypothesis, Shleifer and Vishny (2003) claim that overvalued bidders buy less overvalued targets with overvalued stock. And undervalued bidders only offer cash to undervalued targets. All of the US results support these predictions, that is, under overvalued condition (both the acquirer and the target), the likelihood of stock transactions is greatest, mixed financing lies between stock and cash acquisitions, and cash deals are least likely. Put differently, when both bidder and target are undervalued, the probability of cash offers is largest, mixed financing lies between cash and stock deals, and stock transactions are least likely. These results verify the evidence from Shleifer and Vishny (2003), Rhodes-Kropf et al. (2005), Ang and Cheng (2006), Dong et al. (2006), and Chemmanur et al. (2009). Implying that the acquirers in the US deal will exploit the market misvaluation as they make the payment method decisions. These decisions depend on the market condition, for example, stock (cash) offer is preferred when both the bidder's and the target's equities are overvalued (undervalued).

Unlike the US market, the UK evidence is mixed. The overall results indicate that the likelihood of stock and mixed offers increases with the level of bidder-side overvaluation, and cash transactions are least likely. The probability of mixed financing is highest (same as stock deals), because target shareholders have the right to choose the medium of exchange (they can also elect cash over pure stock financing) and this decision depends on their own risk and expected return. Additionally, when the bidders'

stock are undervalued, the probability of cash offers is largest, and stock and mixed financing are least likely. Taking the target-side undervaluation into consideration, the results show that the UK target shareholders are more likely to choose stock and cash financing, and mixed deals are least likely. In sum, the level of overvaluation and undervaluation (both the bidder and the target) has less impact on the payment method decisions (compared to the US offer). This is because target shareholders can choose the method of payment. Thus, the US existing evidence cannot explain the UK market.

Shleifer and Vishny (2003) also argue that the targets have short investment horizons than the bidders in overvalued stock offers. This study uses the average daily share turnover as a proxy. The results show that the US target has higher average daily share turnover than the bidders. Nonetheless, this relation is not hold in the UK market since the coefficient is insignificant. This might be the case that target shareholders do not have to accept overvalued stock, then sell overvalued equity to get cash post-merger.

Finally, in the risk-sharing model, the level of information asymmetry influences the medium of exchange. The bidders will offer stock financing to the targets when the level of target-side uncertainty is high. This is because the bidders want to share part of the risk and gain ex post (i.e. contingent mechanism). And under the market misvaluation, misvaluation affects not only all mergers, but also the payment method. This study finds that these two theories could only explain the US market since regulatory differences affect financing choice differently. The framework of this study takes only the regulatory differences into account, it is interesting to examine further research about other factors that drive the payment method decisions in non-US market.

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APPENDIX

VITA

Korapun Sumetsittikul was born on February 6, 1989 in Lopburi, Thailand. She graduated from King Mongkut's Institute of Technology Ladkrabang in Bachelor's degree in Petrochemical Technology in March 2011. After that, she decided to continue pursuing her education in Master of Science in Finance at Chulalongkorn University as a full-time student in June 2013.