The Selection and Consequences of Selling Processes in Takeovers: Evidence from the U.S. and U.K. Takeover Markets

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Executive Summary

There are various selling mechanisms applied to facilitate takeovers. What determines a seller's choice of a specific selling mechanism? And what are the consequences of selecting a particular mechanism on takeover outcomes? These are important questions, both theoretically and practically. This thesis investigates two important datasets from the U.K. and U.S. markets, respectively.

The first empirical chapter examines two important selling processes in the U.K. market: tender offers and schemes of arrangement. Under tender offer, an acquirer purchases the shares of a target firm directly from the market, without the need of approval from the target's board. A scheme of arrangement is a court-approved agreement between a company and its shareholders/creditors on the takeover by a potential acquirer. Scheme of arrangement require 75% approval from target's shareholders with voting powers. Compared with tender offers, schemes are a relatively safe, yet prolonged, way to implement takeovers.

This thesis attempts to answer the two questions raised above. To correctly identify the treatment effect of selecting a specific selling process, the selection bias problem need to be addressed. Here the propensity score of matching (PSM) has been adopted to deal with the consequences of self-selection problem into the group that choose scheme of arrangement. Using a sample from takeovers within the U.K. market between 1995 and 2015, this study shows that deals structured through tender offers generate significantly higher premiums for the target's shareholders in comparison to those structured through schemes. The logit regression results show that the probability of choosing schemes increases if the target firm is larger and more established, or if the target's termination fees increase, and so on. The results of this study were found to be stable after various robustness tests.

The second empirical chapter investigates the two selling mechanisms of auction and negotiation on takeovers using data from the U.S. market. Auction has an obvious advantage in terms of increasing competition when compared to one-on-one negotiation processes. And, therefore, auction is more attractive for a seller; competition between bidders may require the winning bidder to effectively overpay for the target —a phenomenon known as the 'winner's curse'. This second chapter investigates the existence of the 'winner's curse' in the context of the U.S. takeover market, with the PSM method applied. Using a sample from the U.S. takeover market during the period between 1984 and 2014, the auction process was found to have a negative impact on bidder returns during the short-event period in comparison to takeovers structured through negotiations. Therefore, the empirical results support the theoretical prediction that the "winner's curse" exists within U.S. takeover markets. However, the overbidding results become less clear when examined over the long-event period. The logit regression results collected show that the probability of a firm choosing an auction transaction increases if the target initiates the deal, has higher levels of leverage, more tangible assets, faces bankruptcy, or if the bidder already has a 'toehold' stake in the target firm.

In summary, this thesis studies the determinants of selecting different selling mechanisms in takeovers within U.S. and U.K. markets, and it evaluates the exact effects of selecting a specific mechanism on the outcomes of a takeover by using PSM method to control the self-selection problem.

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Contents

List of Tables

List of Figures

Declaration

No part of this thesis has been submitted elsewhere for any other degree or qualification in this or any other university. It is all my own work unless referenced to the contrary in the text.

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Chapter 1. Introduction

Chapter One

Introduction

"Winning is not everything: it's the only one thing"

Vince Lombardi[1]

1.1. Background and Research Questions

The impact of bidding strategies between counterparties in the takeover process is an area of increased attention in economics and finance. Bidding theory addresses all the details related to the takeover process from the initiating of bids by either target or acquirer firms to the final contest outcomes (Eckbo, 2009). This is hardly surprising; takeovers have increasingly become an almost routine corporate strategy and the complex nexus of economic imperatives; market dynamics and psychological drives are fertile ground for research.

Each action by either sellers or bidders throughout the takeover process has costs and consequences, particularly with agents that have different motivations for securing a deal. Target firms prefer to discriminate between potential bidders, by raising the cost of entry to the negotiation process. According to Bruner (2004a, p.782) preparing for a takeover negotiation is considered a costly process in terms of acquiring information about a bidder and hiring financial advisors and law firms, in order to help with reaching agreement on particular issues related to financial and legal affairs. Therefore, it is optimal for target firms to raise the cost of negotiation by encouraging other bidders to bid in case they reject the offer price of initial bidders. However, Hansen (2001a) argued that target firms always face a trade-off in raising the competition between bidders and the cost of information where target firms must, as both a matter of strategy and, to different degrees in the U.S. and the U.K., to satisfy regulatory requirements provide full disclosure of sensitive information to a wide range of potential bidders that could include competitors, customers or suppliers. This is not so much a cost-

[1] Vince Lombardi was an American football player but more famous as the coach of Green Bay Packers (Anandalingam & Lucas Jr, 2004, p.193). Regarded as one of the greatest sports coaches of all time he coached his teams to win five of the first seven Super Bowls.

benefit analysis as an all-or-nothing commitment to the process where merely showing a bit of ankle is not an option.

Bidder firms, however, will seek to deepen their commitments with a target firm in order to reduce the costs of negotiation throughout, setting deadlines for due diligence and requesting for termination fees. Bidders might use different forms of bidding strategies such as tender offers, negotiation a merger, or even aggressive acquisition techniques such as hostile bids. Bidder firms could build a stake in a target firm (referred to as a toehold hereafter) in order to pay a lower premium or jump the initial offer price in order to deter other rival competitors. However, Offenberg & Pirinsky (2015) argue that bidders also face a trade-off between the cost of bidding in the form of tender offer for example, and the fast execution of the bid. If the bidders choose to ask the shareholders directly to tender their shares that could signal that the target has a high value for them and therefore the target shareholders could raise the reservation price. For either target or bidder firms, the choice always matters.

Creating values and making successful deals is an important issue in business practice. In general, target firms on average significantly gain large and positive returns around the date of announcement while the performance of bidder firms vary between negative, positive and insignificant results.[2] The performance of bidder and target firms in the long-term analysis is less clear and it is largely influenced by the choice of methodological approach used to measure firm's performance (Betton, Ekbo &Thorburn, 2008a). More specifically, around 61% of US acquirers' shareholders endure significant losses in M&A. The buyer's share price typically loses 25% points, while sellers create an extra value for their shareholders of on average 19% in comparison with their industry peers (Anandalingam & Lucas Jr, 2004,p.68-69).[3] The total value generated in M&A activity in the U.S. market increased sharply from US$ 87.75 billion in 1984 to US$2.2 trillion in 2016.[4] Yet, despite the rapidly increased volume of M&A activity, outcomes were notably mixed, ranging from successes such as Disney and Pixar in 2006, to

[2] In the Betton, Eckbo, and Thorburn (2008a) survey that includes most recent empirical literature for the US takeover bids over the period 1980-2005, concludes that bidders tend generally to significantly lose returns if the size of bidders is large and if target firm is publicly-traded, while positive returns are associated with small bidder size and if target firm is private. Using a large sample for the U.K. takeover bids over the period 1981-2001,(Draper & Paudyal, 2006) find that bidders enjoy significantly large returns if target firms are private and the method of payment for those firms is cash deals. Moreover, bidders create significantly positive returns when the relative size ratio (bidder/target size) is low.

[3] This statistical information comes from a study by *BusinessWeek, (*2002) that investigates 301 US deals over the period 1998-2000 with the total deal value US $ 4 Trillion. The study concludes that M&A activity does not pay to bidders particularly if the size of bidders is large.

[4] Thomson Reuters, 2016.

failures that resulted in heavy losses and financial drains such as Daimler Benz and Chrysler in 1998, and AOL and Time Warner in 2001 (DePamphilis, 2012a).[5]

Being a winner in an M&A contest *is not everything*. Indeed, it is as often a grotesquely pyrrhic victory accompanied by a 'curse' on the acquirer firms. One possible explanation for the negative returns to bidder firms in M&A empirical research is that bidders overpay to win a deal. Overbidding and paying for the target's assets that could and often has led to huge financial drains. This overpayment in M&A activity is termed "the winner's curse".

Most of the theoretical explanations and empirical works for the possibility of the winner's curse in M&As are based potentially more on realistic behavioural assumptions rather than the traditional rationality assumptions. For example, Roll's hubris-based hypothesis (1986) is considered the first work that focuses on the 'emotional' motivations for merger and tender offers. Roll (1986a) argues that hubristic motivations of the boards lead them simply to overbid for the target. While in a fully rational equilibrium, bidders are less aggressive, and the offer price is more likely to reflect the underlying financial value of the target, rationality should not permit expected overbidding. Jensen's agency-based hypothesis (1986) argues that if the board of the bidder firm has an excessive level of cash, then an agency conflict issue could emerge between the shareholders and the board. And the board, instead of paying out cash to their shareholders, chooses to invest it on wasteful vanity projects, of which the destruction of the shareholder value by overbidding could be a symptom.

On the other side of the Atlantic, Brummer (2012, p.79-80) argues that takeover activities in the U.K. in general are unprofitable, and the shareholders of target firms are the only beneficiaries from such activities.[6] Based on a study conducted on behalf of the U.K. government in 2014, takeover activities pay for short-term shareholder gains, more specifically the benefits of positive returns mostly generated by the large size deals. However, in the longer-term analysis the result is far less clear (Faelten, Driessen, & Moeller, 2016, p.xiv).[7]

[5] In the book of "*Beware the Winner's Curse: Victories that Can Sink You and Your Company"* by Anandalingam & Lucas Jr, 2004, There is an informative discussion about the timeline of implementing each deal; Daimler Benz – Chrysler, and AOL – Time Warner, and the main events that lead bidders to overpay for such activities.

[6] Brummer (2012) built his argument based on a survey by Meloria M. Meschi at London's South Bank University in 1997.

[7] The UK government asked Cass Business School's Merger and Acquisition Research Centre (MARC) in 2014 to provide an empirical work that investigated what exactly was the effect of M&A activities in the UK arket. The MARC use a sample of public target and acquirer firms over the period 1997 - 2007 (Faelten, Driessen & Moeller, 2016, p.xiv).

The outcomes in the UK takeover market are also quite mixed, with successful deals such as Diageo and Centrica and notoriously unsuccessful deals like Royal Bank of Scotland (RBS) and ABN Amro in 2007 and HBOS and Lloyds TSB in 2008.[8] The UK takeover market is considered one of the most active markets in the world after the US and Chinese markets. The value generated in the UK for takeover activities increased from UK £26[9] billion in 1984 to around £321.5 and £ 144.5 billion in 2015 and 2016 respectively.[10]

Companies in the UK are vulnerable to another source of risk arising from tender offer as one of the main methods of takeover. In tender offer an acquirer offers to purchase outstanding shares directly from the target's shareholders, which offer may or may not be endorsed by the directors of the target company.[11] The U.K. company law in this respect favours this type of takeover due to the primacy it grants shareholders and the decision-making that they ultimately exercise. However, most of the highly important, indeed totemic firms in the U.K. have been taken over by overseas predator acquirers who now control many of the most important British brands. Selfridges (founded 1909) was acquired by Canada's Galen Weston in 2003, Boots (founded 1849) was acquired by the U.S. private equity firm, KKR and the Italian tycoon Stefan Pessina's company in 2006, and Cadbury (founded 1824) was acquired by the U.S. food company, Kraft's (Brummer, 2012, p.121-122)

Nevertheless, a bidder can acquire the target company by using scheme of arrangement which is a "cheap" and "easy" method in comparison to using the tender offer process. Scheme of arrangement requires the involvement of a court and the approval of a majority of the target's shareholders, representing a minimum of 75% of the target company's voting rights.[12] Bidders therefore are more certain of obtaining the approval of shareholders in acquiring all of the target's shares, while in tender offer a bidder needs to acquire 90% or more of the target's shares, in order exercise a "squeeze-out" procedure.[13] Moreover, Offenberg & Pirinsky (2015) shows that a tender offer in the U.S. market is considered a fast process in comparison to merger in case of implementing a takeover bid, however, it is an expensive method requiring bidders to offer a high premium to obtain sufficient control of the target firms.

[8] Indeed, RBS's share price was driven upwards largely because of an aggressive and astonishingly irrational takeover corporate strategy in which – channelling their inner-Lombardi – RBS acquisition of rivals became an end in itself, far removed from the notion of being part of any wider strategy of growth.
[9] Thomson Reuters, 2016
[10] Thomson Reuters,2016
[11] [UK] Companies Act 2006, s.979
[12] [UK] Companies Act 2006, s.895 and 899(1)
[13] [UK] Companies Act 2006, s.979

Equally, schemes of arrangement necessitate longer periods for completion than tender offers due to their complex structures and requirements. Therefore, there is always a trade-off between the cost of using a tender offer and the fast execution of a bid.

There are various selling mechanisms applied in takeovers. Yet, far few studies in the field of economics and finance that investigate the cost and consequences of the choice to bid in the various aspects of selling mechanisms. The main objective of this study is, therefore, to estimate the causal impact of bidding upon target and bidder returns within specific selling mechanisms. Moreover, this thesis will investigate what determines the choice of a specific selling mechanism by a bidder. And what are the consequences of selecting such a mechanism on takeover outcomes. They are very important questions of both theoretical and practical importance. This thesis investigates two important cases in the U.K. and the U.S. markets respectively.

This thesis therefor will study two separate empirical works. The first empirical work studies the causal impact of selecting a specific selling method (tender offers versus scheme of arrangements) upon the bid premiums in the U.K. takeover market. The main motivation of this study is to examine whether there is a significant difference in bid premium between tender offer and scheme of arrangements.

The frequent use of scheme of arrangements to implement takeover deals has recently become an issue for debate both in the press and among U.K. regulators. Particularly those schemes involving large companies and the concomitant financial worth of such companies. These debates have focused on whether bidders can acquire the target company for a low premium in comparison with tender offer. This concern arises because of the low threshold of the value of the shares voted that is required for schemes, which then allow the bidder more certainty in the acquisition of all the issued shares of the target firm. Yet, there is no evidence in the empirical works show that the shareholders of target companies who accept schemes of arrangement obtain a lower premium in comparison to tender offers.

Using a comprehensive sample that is sourced by Thomson One Banker - the SDC Merger and Acquisition Database for the U.K. takeover market between the period 1995 and 2015, this study answers two important questions. First, what are the main target and deal characteristics that determines the choice of scheme of arrangements and tender offers.

The empirical results reveal that the targets that adopt schemes are typically larger and older than those that choose tender offers. Target termination fees are higher for schemes. Both

methods are likely to be financed using cash as the means of payment, but tender offers are more likely to be conducted using cash payments. Schemes were found to be a favoured takeover method during the financial crisis, and remain the mainstay of the U.K. takeovers. Bidders use scheme of arrangements to make private bids, and are less likely to use a stake-building strategy before the announcement date.

Second, this study investigates whether scheme of arrangements have a causal impact upon bid premium. However, the target or bidder firms self-select their takeover methods. Therefore, a simple comparison or regression applied to the mean difference in the bid premium between scheme of arrangements and tender offers subsamples would result in a biased estimate. This study will, then, address the issue of self-selection by employing the propensity score matching (PSM) method. Therefore, this study is the first in the empirical literature to examine the impact of using scheme of arrangement as method for takeover in the U.K. market upon the bid premium, using PSM techniques to control for the consequence of self-selection problem into the treatment group.

Propensity score matching is based on the seminal work of Rosenbaum & Rubin (1983a). The basic idea of their framework to correct the selection-bias problem is that, the choice of treatment is determined by a certain set of observable covariates, and in consequence, when we condition on the set of covariates, we can regard the treatment (for example scheme of arrangement) as being essentially randomly-assigned, and therefore the potential outcomes are independent of the treatment choice.

After correcting the selection-bias problem, the empirical investigations show that deals that are structured through tender offers generate significantly higher premiums than those structured through schemes. The results are robust in case of applying alternative measures of the bid premium.

The second empirical work studies the causal impact of bidding in a specific selling method (auctions versus negotiations) upon bidder cumulative abnormal returns in the U.S. takeover market. The main motivation of this study is to examine whether the event of the winner's curse exists in the takeover activates, particular with the high level of competition exists between bidders.

There is much theoretical literature which highlights that the number of competitors that bid for the same target firms is one of the important factors that may exacerbate the winner's curse problem. Bazerman & Samuelson (1983) and Kagel & Levin (1986) argue that bidders will be

more aggressive when there are a large number of bidders bid for a target firm, and that this makes negative the winner's consequent payoff. Bulow & Klemperer (1996a) argue that increasing the number of bidders in a standard auction will lead to an increase in the competition between bidders (and thus) raising the profit for the seller rather than engaging in one-to-one negotiation procedure.

However, most deals in the real market are structured using one-to-one negotiations, where there is only one buyer negotiating with the target firm. Boone & Mulherin (2007a) is considered the first empirical work that examined such puzzling observations in the real market by investigating the private-phase competition of the takeover processes, before the public announcement of the deal. They concluded that the private stage is not free from competition, even if there is only one buyer revealed at the announcement stage. This means that even publicly observed non-competitive negotiation deals are not free from competition.

Boone & Mulherin (2008b) tested whether selecting a different selling mechanism would induce different abnormal returns to target and acquirer firms. They define deals as an auction if there is more than one bidder bid for a target firm during the private selling process, while negotiation deals determine if there is only one bidder bid for a target firm. Boone & Mulherin (2008b) show that there is no significant difference between negotiation and auction upon target and bidder returns. Therefore, increase in competition between bidders does not increase a target firm payoff. Moreover, the possibility of the winner's curse does not exist in the U.S. takeover market.

Since the publication of Boone & Mulherin (2007a), many recent empirical works have moved to measure the exact competition level between bidders in auction and negotiation, and how the competition levels would affect different returns for the acquirers or target firms. The most prominent of these are Betton, Eckbo, & Thorburn (2009b),Aktas, De Bodt, & Roll (2010a),and Fidrmuc, Roosenboom, Paap, & Teunissen (2012).

In order to assess the impact of competition between bidders on bidder returns, this study measures the level of competition between bidders in takeover bidders based on the number of bidders who publicly bid for the same target firm. Because the level of competition is related to the bidders' characteristics, where the presence of a strong bidder would create or at least heighten the prospect of the winner's curse for other possible bidders, scuttling gains that might be expected to be generated through auction (Bulow & Klemperer, 2002b). Moreover, Boone & Mulherin (2007a) built their arguments using unrepresentative samples that included

only large firms with a deal size above $100 million. But a large number of M&As are conducted between small firms, which has drawn much attention in the press recently. According to Moeller, Schlingemann, & Stulz (2004) small firms generally outperform large firms in the market of acquisition, because bidders in larger firms are more to prone to hubris and therefore to overbid for target firms. Moreover, Boone & Mulherin (2008b) have found that the size of the bidder firm is inversely related to the level of competition when there is more than one bidder for the same target. More precisely, the mere presence of a large firm presents an opportunity to deter small bidders and, consequently, it is therefore more beneficial for the target to avoid conducting a full-scale auction when the size of the bidders is markedly different.

As such, measuring the level of competition based on the public competition phase could reflect the type of bidders, which represents a substantial source of competition that has an enormous impact on the selling process.

Using a sample from the U.S. takeover market during the period between 1984 and 2014, the second empirical chapter will answer two main questions. The first of these is what are the main bidder and deal characteristics that determines the choice of bidding in auction and negotiation bids.

The main empirical results show that bidders who chose to conduct takeovers using auction frameworks have high levels of leverage and tangible assets, while bidders are more likely to bid using an auction if either the target initiates the deals, or is facing bankruptcy, or if the bidders already have a stake "toehold" in the target. Bidders are also more likely to bid using an auction if they use (or their target uses) an investment bank with a high reputation. Auctions are, then, associated with tender offers, hostile techniques, and, most surprisingly, with 100% stock offers. Bidders are less likely to bid in auctions for private firms.

Second, this study will investigate whether bidding in auctions have a causal impact on the bidder cumulative abnormal returns because if bidders has a negative return, this is evidence for the event of winner's curse. Again, target firms self-select their selling mechanisms, therefore PSM will be used to correct the problem of self-selection.

The empirical investigation reveals that the auction process has a negative impact on bidder returns during the short-event period when compared to takeovers structured through negotiations. This seems to confirm the theoretical prediction that auction, as a selling

mechanism, is less beneficial to bidders than negotiation due to increasing competition. Therefore, this research finds the existence of the winner's curse in such activates. However, the results are less clear across the long-event period.

The emphasis of this thesis therefore is to bridge the gap between rational choice of bidding strategy in takeover market and its real-effects on the shareholder's wealth. Moreover, this thesis will investigate how the selecting of different bidding strategies could determine the exact factors that affect takeover deals. As mentioned before, the choice always matters for either target or bidder firms whereby buyers face a trade-off between the cost of selecting a particular selling mechanism and the fast execution of the bid. From the other side, sellers face a trade-off in raising the competition between bidders and the cost of information. Each movement from buyers and sellers is a matter in different degrees in the U.S and the U.K takeover markets whereby both parties must satisfy regulatory requirements to protect target shareholders and to ensure that they obtain a good price for the sale of their shares. It will be instructive therefore to explore the bidding behavior and contest outcomes of selecting different selling mechanisms in different markets in order to address the broader debate about whether bidder and target firms are rational about the consequences of bidding strategies.

This thesis is not however a comparative analysis of business practice in two markets. Rather, two markets have been chosen to allow the consideration of variables which – although hidden – might distort the findings of the research. The U.S. and the U.K. were chosen because they are markets where M&A activity is a prominent factor in commercial practice. Indeed, in the U.K. M&A activity it can be argued is sometimes a managerial exercise to create value through artifice with increases in the size of the balance sheet achieved not through the diligent building up of an enterprise but from simply buying size. The U.S. and the U.K. are linguistically and culturally sufficiently similar to provide robust base-level consistency necessary in any research. Nevertheless, they are, at the same time, sufficiently different in terms of M&A acquisition to highlight some of the key findings of this research. This is especially pertinent in the socio-economic analyses provided in this research which underpins the purely economic findings and provides an extra tier of 'control group' rigour.

1.2. Potential Contribution

There have been several contributions in this thesis to the existing literature. The main contribution of the first empirical study (Chapter Two) is that the chapter introduces the relation between the choice to bid in different legal forms (scheme of arrangement versus tender offers) and acquisition premium in the U.K takeover market. The debate on this matter in the U.K., both in the regulatory authorities and in the press, is very narrow and defined in terms of the 'cheapness' or 'ease' of the scheme of arrangement in comparison with the tender offer process. Further to this, even by these measures the previous analyses have focused on highly limited timeframes which places the 'process' not just above outcomes but, in so doing, excludes almost all contextual analysis, both before, but particularly in the mid- to long-term aftermath of the takeover process. This research addresses those lacunae and, in so doing, provides evidence which is the first in the literature that confirms a significant difference between bid premium across scheme of arrangement and tender offer, whereby the former significantly reduces the gain of target shareholder in comparison to tender offer. This research and the evidence presented demonstrates a far more sophisticated analysis and new insight into the absolute and relative understanding of what is truly 'cheap' or 'easy'.

Further to this, the second contribution in this chapter is to analyse the main determinants of the choice of a specific selling method in takeover activates. Such an investigation is important to explore why schemes became a preferable takeover method to a certain company at a given time. This research however examines the ramifications of this change, using more varied factors and synthesising them to provide significant new insights into the processes.

Any analysis of changing trends in the corporate world cannot overlook the notion that trends, or changes of approach uncomfortably describe a fashion that is simply the new look and keeping up with the Joneses Plc and actually nothing more than the wisdom of the herd. However, as predicted, the results show that choosing scheme to implement takeover is not random: bidder firms that adopt schemes are typically larger than those adopting tender offers. This is consistent with the conjecture that bidders prefer schemes to takeover large target firms because schemes are commonly thought of as a friendly process, and it is more controlled by target directors who produce the documents, and it will only be completed by the recommendation of target directors. Larger firms have larger numbers of tendered shares, and

this increases the uncertainty for a bidder in obtaining 100% share ownership, if this is necessary to the bidder. Therefore, adopting scheme of arrangement, which is a friendly takeover agreed between bidder, target shareholders and directors, will increase the likelihood that a bidder obtains the full control of the target.

Relatively speaking, bidders could reduce the difficulty in financing large transactions by adopting a scheme as the takeover method. Under a scheme, a bidder can more easily achieve 100% control of the target shares, which can then be used as collateral for loans, or alternatively, can be used to obtain financial assistance by re-registering the target as private firm. In summary, the size of a target firm is one of the key determinants for bid premiums and for the selection of the specific takeover methods: schemes versus tender offers. This is could clarify as well why are a favored takeover method during the financial crisis, and schemes remain the mainstay of the U.K. takeovers, although the amendment in the takeover regulations give more power for a target firm to negotiate a deal.

The second empirical study which forms the core of Chapter Three distinguishes itself from prior empirical works by measuring the impact of increasing the competition between bidders on their shareholders wealth during the public phase of takeover process whereby there are more than one public bidder bid for the same target. Constructing the competition proxy based on the interaction between public bidders provides a significantly better understanding of the consequences of bidding in a competitive deal where the presence of a strong or an aggressive bidder would create or at least heighten the prospect of the winner's curse for other possible bidders. The main results show that comparing with negotiation, bidding in auction induces a negative impact on acquirer's shar price in the short-term analysis which means that the winner's curse issue exists in U.S. takeover activities. Proposing such relation between bidder returns and bidding in auction at public stage could answer the question of why auction is not a popular mechanism in corporate finance, because simply bidders avoid bidding in a competitive bid in order to avoid the high possibility of the winner's curse. Rational bidders might (it could be argued) observe that the mechanism of competitive bidding leads them to be more aggressive and overbid for target's assets, so, naturally they lose confidence in bidding in this kind of purchasing format.

The second significant contribution in this chapter is to explore the main determinants of bidder's choice to bid in a competitive deal in takeover activates. Such an investigation is an

important to understand whether bidders' bidding strategies in corporate takeover are related to the psychological behaviour of humans rather than on entirely rational motives for bidders who bid in a competitive deal. The main results show that the larger size of bidder firms motivate them to engage in competitive selling procedures, where the larger bidder could deter other competitors as a result of the tendencies of management empire building or hubris, and this could reduce the level of competition and scuttle the possible gain for target firms from conduction an auction. While what is usually described as 'insight' or 'instinct' is as often post-rationalisation for decisions which are not entirely grounded in sound commercial reason. This chapter combines two distinct academic disciplines – the psychology of human motivations and the rigours of economic data – in a unique way and provides new insight into the particulars of the U.S. takeover market which can provide evidence of far more useful and general application to future takeovers.

1.3. Thesis Structure

In addition to the chapter of introduction, there are three more chapters which form the structure of this thesis. The next chapter (Chapter 2) will explore first the main legal differences between schemes of arrangement and tender offers as the two main takeover methods in the U.K. market. Then the chapter will discuss regulatory issues that may affect the completion time of tender offers and scheme of arrangements. Later, the chapter will discuss how the legal structure of scheme of arrangements and tender offers could affect the final bid premium. The following empirical part describes the datasets and the methods of constructing the samples. It also provides some discussion of the theoretical motivations for choosing the variables that will be used in order to estimate propensity scores. The empirical methodology section will discuss the main motivations of using propensity score matching to estimate the causal impact on bid premium of using scheme of arrangements; then the section will provide some theoretical background of the matching model. Moreover, the empirical methodology section will discuss different methods to measure the bid premium, matching strategy and how to evaluate the selection strategies. The last section will present and discuss the main empirical results for t-test, OLS and PSM.

Chapter 3 will explore the significance of winner's curse in takeover, particularly when the competition exists between potential bidders in the US market. The first part will discuss the main theories concerned with auction and negotiation processes and the main explanations for the possibility for the winner's curse to occur in takeover activates. The thesis will then show how the empirical works are different in terms of measuring the competition between potential bidders during the selling process. Later, chapter 3 will discuss the main empirical works that investigate the impact of the level of competition between bidders upon bidder returns practically after the publication of the earlier work of (Boone & Mulherin, 2007a). The empirical part will discuss the sample and the main explanatory variables that will be used in the model to calculate the propensity score matching. Then, the methodological analysis will be discussed. Finally, the last section will present the empirical results for t-test, OLS and PSM.

Chapter 4 will present the conclusion section that includes the significant results of this thesis, and the main contribution to the existing literature.

Chapter 2. The Selection and Consequences of Selling Processes in Takeovers: Schemes of Arrangement vs. Tender Offers

Chapter Two

The Selection and Consequences of Selling Processes in Takeovers: Schemes of Arrangement vs. Tender Offers

"*[T]ender offers are the one area where the British acted before the Americans"*

Fundamentals of Securities Regulation 572 (1983)[14]

2.1. Introduction

Tender offers and schemes of arrangement are the two main methods for M&As in the U.K. A *tender offer* is a form of public takeover bid, where an acquirer offers to purchase outstanding shares directly from the target's shareholders. The directors of the target company may or may not endorse the tender offer by an acquirer. Under tender offer, if the bidder acquires 90% or more of the target's shares, it can exercise a "squeeze-out" procedure and compel the unwilling minority shareholders to sell their shares anyway.[15] A s*cheme of arrangement* (hereafter "scheme"), which is less common and more cumbersome, requires the involvement of a court and the approval of a majority of the target's shareholders, representing a minimum of 75% of the target company's voting rights. It normally represents *"*a compromise or arrangement proposed between a company and its creditors or its members*"*.[16] Nevertheless, under a scheme of arrangement, bidders are more certain of obtaining the approval of shareholders in acquiring all of the target's shares. Normally, there are two ways to implement a scheme, through either a cancellation or a transfer scheme. Under a cancellation scheme, the shares of the target company are cancelled, and new ones issued to the bidder.[17] Under a transfer scheme, the existing target shares are simply transferred to the bidder.[18]

[14] For more information about the history of tender offers, see (Kenyon-Slade 2004)
[15] [UK] Companies Act 2006, s.979
[16] [UK] Companies Act 2006, s.895 and 899(1)
[17] [UK] Companies Act 2006, pt.17, s.641(1)
[18] [UK] Companies Act 2006, pt.28, s.895 - 901

Schemes of arrangement, in one form or another, have been recognised in English law for nearly 150 years, and were recognised formally in statute in 1862 (Companies Act 1862).[19] Schemes are used commonly in debt restructuring for insolvent companies, and for takeovers and mergers, as "*a compromise or arrangement is proposed between a company and... its members"*.[20] In recent years, there has been a significant growth in the use of schemes in takeover transactions in the U.K. (Payne, 2014a, p.2). For example, in 2007, six of the largest takeovers in the U.K. were structured through schemes, with an average deal value of £8 billion (Shikha, 2013) In 2011, among the fifteen takeovers with announced deal values of more than £50 million, nine were structured through schemes (O'Dea, Long, & Smyth, 2012, p.203). And in 2014, around 65% of all takeovers in the U.K. were conducted through schemes, with eight out of the ten largest takeovers receiving the assistance of the English courts (Green, 2015). This growing trend is somehow due to the flexibility of English courts in providing the requisite terms and documents, to ensure reasonable prices for various schemes of arrangement (Shikha, 2013). Moreover, in 2007, the U.K. Takeover Panel[21] issued an Appendix 7, which further clarifies the rules of implementing schemes in the U.K. market

Nevertheless, there are growing debates on the frequent use of schemes to implement takeover deals, both in the press and among U.K. regulators. These debates focus on whether bidders can acquire a target company "cheaply" and "easily" in comparison to using the tender offer process.[22] This concern arises because schemes allow for low threshold of target company's shares for voting, which may reduce the bidder's risk of acquiring all the issued shares of the target company. However, there is no empirical evidences suggest that shareholders of target companies who accept schemes obtain a lower premium in comparison to tender offer.

The academic research on takeover regulations suggests some advantages of using schemes. These include the avoidance of stamp duty on the target company's shares when using cancellation schemes. Stamp duty is paid on transfers of shares and tender offers, at 0.5% of

[19] That such statutory provision were passed by parliament so soon after the statutory recognition of limited liability companies (Limited Liability Act 1855) and protection of shareholders (Joint Stock Companies Act 1856), show that the legislative was alive to the fact that the very existence of such companies would awaken the interest of acquisitive buyers.

[20] [UK] Companies Act 2006, s.895(1)(b)

[21] The City Code ("the code") in U.K. takeover regulations includes a set of statutory rules that are used by the Takeover Panel ("the Panel"), which is an independent body of the U.K. government that supervises and controls all matters related to takeover activities. For more information see: http://www.thetakeoverpanel.org.uk/.

[22] (Payne, 2014a) in terms of discussing the main disadvantages of schemes as a method to implement takeovers has used these two expressions "cheaply" and "easily". And the two expressions appear in the most LexisNexis U.K. articles that discuss the disadvantages of schemes.

the target consideration shares. Such raised concerns have encouraged the U.K. government to ban transactions by cancellation schemes in March 2015, in order to address this problem of tax loophole.[23] The prohibiting on the cancelation scheme could affect the choices of the takeover mechanisms, which could shift back towards tender takeover offers that is relatively quicker than schemes.

Nevertheless, scheme transactions still significantly outnumber tender offers. In early 2015, there were around 23 transactions announced, of which 14 were structured as schemes and only 9 as tender offers (61% versus 39%). Moreover, in the first half of 2016, there were 20 takeovers announced, of which 13 were structured as schemes and 7 as tender offers (65% versus 35%). [24]

In the early 1950s, the U.K. regulators first introduced and employed the tender offer method. The rationale behind tender offers is that acquirers should have access to a wide scope of strategies and actions to process takeovers. In order to protect the benefits of the shareholders of target companies, English law puts the discretion and allows the shareholders to usurp executive decisions from the board. Although it is expected that shareholders will seek counsel from the board, the final decision lies with the shareholders, and the board are strictly prohibited from taking defensive actions such as 'poison pills' against any bids.[25] These regulations make tender offers a favourite method for bidders, and significantly shorten the time to complete takeover transactions. However, they also induce the emerging of hostile takeovers in the markets (Armour & Skeel Jr, 2007).[26]

According to Kenyon-Slade (2004, p. 51-53) bidders by using tender offer have evolved highly aggressive and effective takeover techniques to implement a takeover in the U.K. and U.S. For example, if bidders in the U.S. seek to takeover a target firm, they need only to offer premium bids for the controlling interest (or 51% of target shares) and then simply hoover up what is left through a technique known as a "long-form freezeout merger". In order to able the acquirer

[23] The Companies Act 2006 (Amendment of Part 17) Regulations 2015, amended s.641 substituting s.641(2A).
[24] LexisNexis report, 2015, 2016.
[25] "Shareholders' rights plans" are known as a 'poison pill' because they are one of the most frequently used preventive antitakeover strategies employed by target firms. The target firms issue new shares at a discounted rate of the actual share price for current shareholders, increasing the amount of existing shares. This increases the cost of the takeover for the bidder, whereby the acquirer needs to buy a huge amount of shares in order to gain control of the target (Rauch, Wahrenburg, Baker, & Kiymaz, 2011)
[26] Tender offers were introduce later in the U.S., and it was only in the 1960s that the tender offer strategy started to be formally used (Armour & Skeel Jr, 2007). Tender offer is therefore considered one of methods where the British acted before the Americans.

to eliminate the remaining minority shareholders. This is clearly representing a significant degree of pressure on shareholders seeking to obtain the best deal for themselves and the devil takes the hindmost.

The problem of coercion (or, more accurately, distorted choice) presents as a result of the differences between the offer prices before and after announcing the takeover. Although there is no statutory merger mechanism to eliminate the minority shareholder by the way of freezeout merger in the U.K. as opposed to the U.S. law. Nevertheless, as in the U.S., Kenyon-Slade (2004, p.516) argues that shareholders do suffer from the problem of coercion in the U.K. even though the power to "long-form freezeout merger" the minority does not formally at least exist. Shareholders in the U.K. however, could face a dilemma in a tender because they might not agree with the offer or might not be part of the offer (if it is a partial offer) and then be left as a minority shareholder and with devalued shares for not taking part on the tender. This fear creates a subliminal pressure at least for shareholders to take part in tender offers. This pressure would realistically and logically increase where a scheme of arrangement is used; the approach considered most analogous with the US statutory merger.

One key difference between tender offers and schemes is about the threshold for squeezing-out minority shareholders. If both the shareholders (at least 75% of the voting shares of the target company) and the courts approve a scheme, then the scheme is binding on all the target shareholders, and the bidder can exercise a "squeeze-out" measure on the unwilling minority shareholders to sell their shares.[27] However, in a tender offer, the offer is only binding on those shareholders who agree with the offer. If the bidder intends to own 100% of the target firm, the bidder must receive acceptances of at least 90% of target voting share, such that it can squeeze-out the remaining minority shareholders.[28] Therefore, if the offer cannot reach the 90% "squeeze-out" threshold, this means that the bidder does not take 100% control of the target company. In the light of the above, schemes endow the bidders with more bargaining power, and they are more certain to obtain 100% of the target shares.

[27] [UK] Companies Act 2006, s.899(3)
[28] [UK] Companies Act 2006, s.979

Both takeover methods are used to transfer ownership of a target firm in the U.K. market; however, there are a number of important differences between tender offers and schemes of arrangement that could affect the final bid premium. Therefore, it will be interesting to investigate whether the choice of different takeover methods (schemes vs. tender offers) would affect shareholder premiums in the U.K. takeovers. In addition, this study is also interesting to investigate what are the determinants for the selection of different mechanisms.

This chapter studies a sample of 759 takeover deals for listed- target firms in the U.K. over the period 1995-2015, as sourced by Thomson One Banker - the SDC Merger and Acquisition Database. Of them, 201 were structured as schemes and 558 as tender offers. The main objectives of this chapter are twofold. First, this chapter investigates how the choices of different selling mechanisms (tender offers vs. schemes) are related to various target and deal characteristics. As predicted, the results show that target firms that adopt schemes are typically larger and older than those adopting tender offers. Target termination fees are higher for schemes. Acquisitions through tender offers and schemes are both likely to be financed using cash as a means of payments; yet the frequency of using cash in tender offers is higher. Schemes of arrangement are a favoured takeover method during the financial crisis, and schemes remain the mainstay of the U.K. takeovers. Acquisitions by schemes of arrangement prevail when the bidders are private, and bidders are less likely to use a stake-building strategy.

Secondly, this chapter examines the causal effect of selecting a specific selling method (tender offers vs. schemes) on the bid premiums of takeover transactions. Obviously, the choice of a specific selling method is self-selected by bidder firms or selected based on deal characteristics, and this study will address that self-selection problem by employing the propensity score matching (PSM) method.

As normal in the literature, the analysis will apply logit regression to estimate the propensity scores, the probabilities for a target company to choose schemes as the selling method. The key co-variants in the logit estimation include target size, a dummy of financial crisis, payment methods, whether the bidder is private or not, whether there are termination fees, whether the bidder owns a stake in the target firm.

The main results, after implementing the matching strategies, show that deals structured through tender offers generate significantly higher premiums than those through schemes. The bid premium is defined as the difference between the actual offer price that is paid by the bidder

(*the final price* data in SDC), and the target closing price at one, two, and three months prior to the initial public announcement date and the SDC announcement date. The analysis applies various greedy matching strategies: nearest neighbour matching and caliper matching. In case of bid premium measured by one, two, and three months before the initial announcement date, where each target firm in the treatment group (schemes) matches with two or three nearest neighbours in the control group (tender offers). The main result shows that schemes of arrangement strongly reduce the target shareholder's premium by on average -11% (0.000). Similar results are also reported in the case of using caliper matching.

In case of measuring bid premium by two, and three months before the SDC announcement date, where each target firm in the treatment group matches with two or three nearest neighbours in the control group. The main result shows that schemes of arrangement still strongly reduce the target shareholder's premium by on average -9% (0.000).

This study is the first in the empirical literature to examine the impact of using scheme of arrangement as method for takeover in the U.K. market upon the bid premium, using PSM techniques to control for the consequence of self-selection problem into the treatment group.

One possible explanation could be that schemes are more amenable to the establishment of a firm and provide more certainty to the bidder of obtaining 100% of the target's stock shares. This is particularly true in acquiring large-sized target firms. The empirical evidences in the literature, such as Officer (2003),Bargeron, Schlingemann, Stulz, & Zutter (2008), and Betton et al., (2009b), normally report a negative relationship between bid premium and the target size. Another explanation may lie in the observation that a majority of the deals of schemes (66.17%) are associated with private acquirers, which may also lower the bid premiums. Bargeron et al., (2008) and Fidrmuc et al., (2012) found that private acquirers pay normally less for the target, compared to the public acquirers, because the latter could gain from the expected synergies with the target from the transaction.

The remaining parts of this chapter are organised as follows: **Section 2.2** discusses the main differences between tender offers and schemes in terms of legal structure and time to execute. Further, it also presents the existing literature and empirical results on the main determinants of bid premium in takeovers. **Section 2.3** describes the datasets and the methods of constructing the samples. It also provides some discussion over the main variables to be used in the estimation of propensity scores. **Section 2.4** is about the empirical methodology, and **Section 2.5** presents the main empirical results of this chapter. Finally, **Section 2.6** is a short conclusion.

2.2. Literature Review

2.2.1. Tender Offers vs. Schemes in the U.K.

How to balance the power between participants involved in the tender offer process has been under public debate in the U.K. since 2010. A recent example is the U.S. food company, Kraft's, acquisition of the U.K.-listed chocolate maker, Cadbury. Although, to some extent, it is an emotional debate, as Cadbury is a long-established firm whose range of chocolate and confectionary products were recalled by all from their childhoods, the takeover did prompt a legitimate examination of the rights and responsibilities of the parties as well as the public interest in takeovers.[29] The commentators found that the current takeover regulations in the U.K. unduly and perhaps unfairly favoured any bidder over the target company; that the mere act of a takeover bid favoured a bidder company while a target company was automatically disadvantaged as a passive subject of a takeover bid.[30] It was felt that such an imbalance should be addressed (Bismarck, 2013, p.151). As a result, in September 2011, the amendments to the Takeover Code has strengthened the hand of the target firms and given them the right to request information about all the financial or economic impact that could affect the future growth and direction of the firm, particularly any plans could affect the workers.

Moreover, the recent amendments to the Takeover Codes give the target board more power to control the scheme process as well. Previously, the process of scheme was an "offer-related arrangement" between a bidder and target firm allowing the bidder to obtain some control over the scheme process. Now, such implementation agreements are prohibited.[31] These changes

[29] Most recently, in February 18, 2017 the debate comes back to the press practically after the announcement of the American company -Kraft Heinz to acquire Unilever, one of the biggest Britain companies that operates in the food and drink industry with 7,000 employees across the country. And if the acquisition is successfully completed, it would be the second-largest takeover in history which could affect the economy if the biggest brand controlled by the American hand (The times, 2017). However, the deal fails as a result of political unease that related to British jobs

[30] Alex Brummer in his book" *Britain for Sale: British Companies in Foreign Hands - The Hidden Threat to Our Economy"* discusses how the tender offer process in the U.K. as main method of implementing a takeover transaction allowed for overseas predator acquirers to control the most important Britain brands. Such as the U.K.-high end department stores -Selfridges (began life in 1909) was acquired by Canada's Galen Weston in 2003. Moreover, in 2006- the US private equity firms KKR and the Italian tycoon Stefan Pessina company, acquired the UK-listed high street chemist, Boots (began life in 1849).

[31] [UK]Takeover code, Rule 21.2(a)

are broadly in line with the wide decision-making powers the common law and statute grant directors in all other circumstances. However, in practical terms such mitigation is indeed illusory. The board of a target company can simply withdraw its recommendation of the offer in order to avoid implementing the scheme. Nevertheless, ascertaining a board's true purpose can be factually difficult. However, in such cases, bidders can protect themselves by using long-stop dates[32], whereby bidders can only withdraw an offer if certain agreements have not been reached in a scheme Bismarck (2013,p.129). If boxes are not ticked, the protection for the bidders is then triggered. This approach seems to defeat sound commercial decision-making. Even if the main objective of the takeover regulations is to balance the powers between the participants, in both schemes and tender offers, it seems that a target board still has significant power to control the process in schemes, which might not serve the shareholders of either target or bidder.[33]

The change in control power associated with M&As will normally create an interest conflict between a target board and the shareholders, if such activities affect negatively their jobs and perquisites (Jensen, 1986). The legal provisions on takeover law are used to control the transaction process, and may mitigate the managerial agency problem. It is also important to understand the motivations of the involved parties to choose either schemes or tender offers as the selling method. The board of target firms may use different defensive strategies to obstruct the takeover process, even if these actions are not in the interest of the shareholders. Target boards may also manipulate the takeover processes such that some incumbent shareholders turn into minority shareholders, and this may enable acquirers to exploit the benefits of the minority shareholders (Martynova & Renneboog ,2011).

Historically, the main feature of U.K. takeovers is the *self-regulatory institution*, which allows an acquirer to purchase shares directly from target's shareholders, so as to protect the shareholders and to ensure that they obtain a good price for the sale of their shares (Kenyon-Slade, 2004, p.496). This approach may be suitable in normal market conditions, yet no longer, so in an era of large-scale or widespread acquisition by takeovers that happened over the last few decades. However, there is a serious issue with schemes, that is, a target board has a significant control over the implementation process and in persuading various classes of shareholders to approve a takeover offer.[34] This is in contrast to tender offers whereby

[32] [UK]Takeover code, Appendix 7,s3(b)
[33] This conclusion is to suggest that the law and regulations offer only a superficial protection to counterparties, which hardly surprising because the takeover law in the U.K. supports a laissez-faire approach
[34] [UK] Companies Act 2006, s.895(1)(b)

acquirers ask the shareholders directly to buy their shares. It seems that, a target board has more controls and more opportunities in schemes, to act based on their own interest even if the transaction does not create values for the shareholders. Of course, interest conflict between the shareholders and target board can also arise in tender offers, as a target board retains the discretion to circulate their opinions on the transaction,[35] but a target board does not have the power to control the tender process.

From the discussion above, it then becomes clear that, to better understand the incentives of choosing different selling method in takeovers, it is very important to examine and understand the legal provisions behind each selling process. It is commonly agreed that, a target board under schemes have less restricted power and more control over the takeover process, which means that the managerial agent problem may be more serious in schemes.

This section next will investigate the important differences between tender offers and schemes from various perspectives, such as the level of threshold of the shares votes that are required to implement the two methods, completion timelines, method of payment, and finally, inducement fee and stake building and stealthy takeovers.

One important difference between tender offers and schemes is that, under schemes, the threshold for a bidder to acquire 100% control of a target firm is lower than that under tender offers. A scheme is approved by the court if a majority of the target's shareholders, representing a minimum of 75% of the target company's voting rights, accept the offer. Moreover, if both the shareholders and the court approve the scheme, the offer becomes binding on *all* the shareholders of the target firm.[36] As a result, the acquirer obtains 100% of the target ownership if the scheme is approved, and therefore scheme is considered as an *"all or nothing"* transaction, which means that there is no risk that the minority shareholders retain influence (O'Dea et al., 2012, p.217). In contrast, under tender offers, the acquirer purchases shares directly from the shareholders, and the offer is binding only on those shareholders who accept it. The shareholders, who do not accept the offer, are not bound, and they retain their shares and any rights those shares entitle them to. This means that the tender offer could involve acquisitions of less than 100% of the voting rights of the target, in contrast to a scheme. Therefore, bidders in scheme are more certain of acquiring the target firm without any remaining minority shareholders, while in the tender offer there is a possibility of remaining

[35] [UK] Takeover Code, Rule 25.1.
[36] [UK] Companies Act 2006, s899(3)

minority shareholders. Under tender offers, if it is necessary to bidders to acquire 100% of the target shares, they have to achieve 90% of acceptances by the shareholders, and the law then can force the remaining minority shareholders to sell their shares.[37] This is known as the statutory "squeeze out" procedure, which reduces the bidders' risk to some degree.

Being able to automatically achieve 100% control is a key advantage of schemes, as it ensures that the acquirer does not have to deal with the issue of minority shareholders following the takeover. From the other side, the legal structure of implementing a scheme needs more cooperation from the target company's board to persuade the shareholders to vote in favour of scheme. It seems that, the interaction between an offeror and a target board is a *cooperative game* when a takeover is in the form of friendly process as it is in the scheme. The facilitation of information requests between the parties is more likely, as both parties are working towards the same goal and they both want a takeover to go ahead. By scheme, acquirers and target boards can reach their agreement and they are certain to complete the transactions at the minority shareholders' expense in case if the later does not accept the offer price. In contrast, the communication and cooperation between acquirers and target boards are likely to be less forthcoming in case of using tender offer.

Such cooperation between target boards and buyers could increase when a target firm is large. Larger firms have larger numbers of tendered shares, and this increases the uncertainty for a bidder in obtaining 100% of the target company. The board of the acquirer firm needs greater collaboration from a target board, which is less likely to be in the case of the tender offer. Gorton, Kahl, & Rosen (2009) state that the likelihood of a target's acquisition decreases with the increase in target size, because of the difficulty in financing such large transactions. To some extent, this is self-evident as difficulty will increase almost inevitably as financial leverage or exposure increases. For these transactions, however, the associated risk comes from two sources: the intrinsic risk of rising leverage and, more significantly, the extrinsic risk of a lack of control when the takeover is incomplete, and the effective control of a target firm is not yet obtained. However, bidders under a scheme can effectively reduce the intrinsic risk, as they can more easily achieve 100% control of the target firm, which can then be used as collateral for loans, or alternatively, can be used to obtain financial assistance by re-registering a target as a private firm.[38] The main motivation to do this is that a public target cannot assist a bidder either by lending it money or providing security to finance the acquisitions. The prohibition

[37] [UK]Companies Act 2006, s979
[38][UK] Companies Act 2006, s.681(2)(e)

on various forms of financial assistance in takeovers applies to both schemes and tender offers. However, bidders can obtain financial assistance from a target firm if the court allows the assistance.[39] Target size is a fundamental determinant on the choice of different selling methods, that is, schemes or tender offers. Therefore, adopting a scheme as a method of takeover can effectively reduce extrinsic risk and the concomitant uncertainty that a bidder could face.

A further issue is that a public bidder is more likely to have stronger incentives to complete a takeover because failure carries more risk. This can be an internal risk with corporate governance and decision-making being challenged or even an external risk that a public bidder having overreached itself might in turn become a target Offenberg & Pirinsky (2015). Target boards enjoy more control powers in schemes. They produce documents required by disclosure rules and make recommendations to shareholders. Large firms typically have a highly diffusive ownership structure, and the board has less ownership in comparison to small firms. Consequently, the interest of large firms boards are therefore less aligned with their shareholders Demsetz & Lehn (1985). Moreover, the public companies in the UK typically do not have a single shareholder with control power of the company, and the shareholding is dispersed (Payne, 2011b). In the friendly process, target boards will inevitably have greater opportunity to discuss their private, post-acquisition benefits such as compensation or whether to they keep their jobs. A conflict of interest problem is more likely to arise in a scheme whereby bidders and target boards are aligned in seeking a successful takeover; the later will be less aggressive in seeking to extract a high premium in order to obtain private benefits in post-takeover. This collaboration between bidders and target boards could increase as well, when the transaction is a leveraged buyout.[40] According to Bayar (2011) in private equity firms, target boards obtain a large equity (stock and options) upside to the extent that these upsides dictate their behaviour, especially when they cannot readily sell their equity until the value is materialised in an exit transaction. Such incentive problems are is considered to be a key differentiating factor when compared with a typical public company ownership structure (Pearl & Rosenbaum, 2013, p. 205-206), Therefore, adopting scheme of arrangement, which

[39] [UK] The Companies Act 2006, s.681(2)(e) allows that a court can approve transactions which would otherwise constitute unlawful financial assistance where such assistance is '*done in pursuance of an order of the court under Part 26 (order sanctioning compromise or arrangement with members or creditors)*'.

[40] Leveraged buyout (LBO) is defined as transactions in which private investors in order to meet the cost of takeover activities; they use a significant amount of debt to acquire other firms or division (Palepu, 1990).

is effectively a friendly takeover agreed between bidder, target shareholders and directors, will increase the likelihood that bidders obtain the full control of the large target.

The other main difference between the two methods is the time needed to complete a takeover transaction and transfer a target ownership to the bidder. Acquirers typically prefer tender offers in the U.S. market because it is substantially quicker than mergers.[41] This is particularly true when there are more than one bidders bid for the same target or when there are a fewer external impediments on execution of the offer such as the existence or prospect of anti-trust reviews from regulators. However, there is an obvious trade-off between the cost of using a tender offer and the fast execution of the bid. If the bidders choose to ask shareholders directly to tender their shares that could signal that the target has a high value for them and therefore the target shareholders could raise their reservation prices (Offenberg & Pirinsky, 2015). In general, schemes require longer periods for completion than tender offers, due to their complex structures and requirements. The process of schemes will inevitably require the involvement of the courts. In contrast, the process of tender offers does not require the involvement of the courts, which normally implies a shorter time of completion. For instance, if no complications (e.g. competition law issues) arise during the tender offer process, the minimum timescale required to complete unconditional transfer is twenty-one days.[42] However, if a scheme proposal is approved by the high English court, it will normally take 7-8 weeks to complete the target ownership transformation (Payne, 2014a, p.96). In addition, the high English courts close during the summer holiday and Christmas times, which may lead to a longer waiting time.

The difference in completion time between the two processes sheds important implications on the choice between tender offers and schemes. For example, if a target firm is strategically important to the bidder, or there are other potential bidders interested in the same target, the bidder normally prefers using the quicker method of tender offers, that would certainly lead to an increase of a target firm reservation price (Offenberg & Pirinsky, 2015). On the other hand, schemes are considered as an *"all or nothing"* transaction, which implies lower risk for acquirers if they want to have full control of the target firm. Schemes also have longer time for completion than tender offers, and the longer completion time also implies that the risk of another bid to arise during the scheme process is higher (O'Dea et al., 2012, p.211). Consequently, the high level of competition could lead to an increase in the offer price, which

[41] In merger; the acquirer and the target's board of directors agree on a price, and the target's shareholders then vote on whether or not to approve the proposal (Offenberg & Pirinsky, 2015).
[42] [UK] Takeover code, Rule 31.1

would be beneficial for all shareholders of the target. The difference in the timescale to implement the two methods is therefore a significant factor to understand why bidder, target boards and shareholders prefer to choose one particular method over the other.

The method of payment is another key factor that affects the choice between schemes and tender offers. In the U.S., there is no obligation for an acquirer to have unconditional confirmed access to the funds at the time it makes offer (Kastiel, 2014). In the U.K., however, the Panel is unlikely to accept a precondition in the offer, stating that the offer is conditional on the bidder's ability to raise the cash, as this creates unacceptable uncertainty for the target and its shareholders. The bidder therefore needs to ensure that it is able to raise the funds before it makes the formal offer.[43] Consequently, the choice between cash and securities as payment methods may greatly affect the completion time and takeover costs for the bidders. For example, if the bidders choose cash payment, it means that they have access to a large amount of cash, e.g., their own liquid assets or access to debt finance. However, the access to debt finance largely depends on the bidder's credit record and their relationship with the banks. In addition, banks usually require some evidences of the viability of the proposed takeover before issuing loans, and applying for the required loans will also take time, due to investigation by and negotiation with banks.

After access to the required funds is confirmed, the timetable runs as normal for a scheme and tender offer. Where shares are used, a bidder will often need to issue more shares, which requires approval from the bidder's shareholders and compliance with various company law procedures specified by the Companies Act 2006. These procedures themselves have certain time stipulations such as minimum notice periods required for shareholder meetings which adds time to the whole takeover process.

If raising the cash through borrowing is difficult and acquiring a 100% of the target is important, the bidder could choose a scheme to implement the takeover. Moreover, the acquirer can use a scheme to obtain financial assistance by re-registering the target as private firm.[44] However, using cash as method of payment could increase the cost of the transactions. Because target shareholders with cash offers will generate more tax liabilities in respect of capital gains, in comparison to security offers. The natural corollary of this is that target boards will ask or

[43] General Principle 5 of the Takeover Code states that '*An offeror must announce a bid only after ensuring that he/she can fulfil any cash consideration, if such is offered, and after taking all reasonable measures to secure the implementation of any other type of consideration.*'
[44] [UK] Companies Act 2006, s.681(2)(e)

even require the bidder to increase their offer in order to be compensated for the taxes (Huang & Walkling, 1987). Therefore, there is a trade-off between raising a cash by using loan and impose a cost on the bidder in case of using cash as method of payment. However, a target manager could be less aggressive to extract the high premium from the bidder in order to maximise their private benefits, which could arise as a result of choosing scheme process. From the other side, this cost of using cash as means of payment may be increased in case of using tender offer, whereas the likelihood of minority shareholders to remain is high. In the case of schemes, if there are minority shareholders does not accept the scheme offer, cash schemes could help them to obtain the desirable offer price.

Another important factor, which could affect the choice between schemes and tender offers, is the inducement fee. The inducement fee (otherwise known as a "break fee") is where the target agrees to pay the acquiring company a sum of money if certain events happen which effectively prevents a deal from going ahead, or from being completed. However, in order to balance the negotiation power between the parties involved in the transaction and to protect the target's shareholders, the inducement fee has been prohibited in the U.K. since 2011.[45] In the U.S., however, target firms must pay break fees to the bidder when a transaction is not successfully produced or if a target firm accepts a competing bid, with fees up to 6% of the size of the transaction agreed (Kastiel, 2014). The Panel in the U.K. does not like *inducement fees* as they have the effect of locking a target firms into a deal, which may not be in the best interests of the target's shareholders. In light of this, bidders may prefer using schemes over tender offers to offset the prohibition of the inducement fee, because bidders in scheme is more certain to complete the transaction if the courts approve the process. However, the risk of other bids arising is high in the process of schemes because of the long completion time. Therefore, if the probability of other bid is high and if it is important for the bidder to acquirer the target firm, tender offer then is a probable method to implement the transactions.

Finally, scheme is a less attractive mechanism if a bidder already owns a stake in a target firm (a toehold), and scheme bidders do not usually seek to build a stake in the target, as that stake will not be counted towards the threshold of 75% voting power. In contrast, tender offer bidders can use the stake building strategy to reach the majority level of 50% of the target's

[45] This is one of the major change in the UK takeover regime particularly in the shadow of the public debt that following the takeover of Cadbury by Kraft (Kastiel, 2014).

shares, and thus gain control of the firm. Therefore, stake-building strategy is an attractive technique for bidders in tender offers.

In conclusion, bidders will use a scheme if a target firm is large because they are more certain to obtain the 100% control of the target, if it is important. Particularly, target mangers are less aligned with their shareholders in large firm because they have less concentrated managerial ownership. Moreover, target boards can increase their benefits in the post- acquisition periods. However, if the probability of other competing bids to be exist is high, bidders will prefer to use a tender offer because it is quicker.

If it is important for bidders to control 100% of target shares and if it is difficult to raise the cash, bidders will use scheme in order to obtain financial assistance by re-registering target firms as private firms.[46] The probability of choosing tender offer increases with a toehold. Because there is always a trade-off between costs and speed in case of choosing between tender offer and scheme, the next part will discuss the main regulatory reasons that could affect the completion time line in the scheme and tender offer.

2.2.1.1 Completion Timelines

The completion time of a takeover process is defined as the time between the formal announcement of a deal and its completion, and it is largely determined by various regulation rules (Bismarck, 2013, p.162-164). Yet, in general, restructuring through schemes normally requires longer time for completion than tender offers, due to their complex structures and requirements. This section will discuss regulatory issues that may affect the completion time of tender offers and schemes.

This section will first discuss the ways in which these deals are instigated. Initially, the bidder's board or financial advisors will present an informal offer to the target company in order to discuss basic details such as the offer price and the due diligence process. If the key conditions and the offer price are agreed upon, then the due diligence process begins. Once the acquirer makes the required public announcement of "a firm's intention to make an offer", the acquirer

[46] Companies Act 2006, s.681(2)(e)

needs to post the offer documents to the target's shareholders within 28 days.[47] In schemes, a target board has the responsibility to send the scheme document to the shareholders.

There are several regulatory issues that can affect how long a takeover takes *after* the formal offer has been made. First, the City Code timetables for tender offers and schemes are different. For tender offers, strict timetables and deadlines are specified. For example, for a tender offer, after the announcement, the offeror needs to post the offer documents within *28 days*, and in most cases, once the offer document has been posted, the offer must become unconditional within *81 days*. In this period, if competition issues arise and competition authorities wish to investigate the case, the Panel may pause proceedings while the authorities investigate the offer.[48]

Moreover, if a competing offer (from other bidders) has been announced, the Panel will force the timetable to accommodate the competing bidder. According to Note 4 of Rule 31.6, under these circumstances, the Panel will normally allow the initial offeror to extend their offer, even when their offer has not become unconditional. This means that both offerors will be bound by the timetable initiated by the publication of the competing offer document. Thus, it is likely that there will be changes to the offer timetable in the event of another competing offer being made. Conversely, if there is only one offeror, the timetable will not be altered.

In contrast, there are no formal deadlines for completing schemes, but there are a few timing requirements specified by the Code. In general, the indicative timetable gives the parties an estimate of completion times, although these estimates are not strictly enforceable, unlike those relevant to tender offers. Once the bidder announces that they intend to make an offer that will proceed as a scheme of arrangement, and this is "recommended" by the target's board, the target manager must '*ensure that the scheme circular is sent to shareholders and persons with information rights within 28 days of that announcement*'.[49] The scheme circular document must contain details of the scheme, certain information required by the Takeover Code (Rules 24 and 25, as for a tender offer), notice of the court meeting, and an *expected* timetable for the scheme.[50] Nevertheless, the scheme's timeline is contingent on arranging a date for the court hearing, which can result in delays depending on the availability of court time. To implement

[47] [UK] Takeover Code, Rule 24.1.
[48] [UK] Takeover Code, Note 3 to Rule 31.6.
[49] [UK] Takeover Code, Appendix 7, para 3(a).
[50] [UK] Takeover Code, Appendix 7, para 3(d).

a scheme, two meetings should be approved by the court: a shareholder meeting and a sanction meeting.

The type of schemes chosen can also affect the completion time. A cancellation scheme normally takes longer time to complete than a transfer scheme. There are some tax advantages to cancellation schemes, but there are also additional company law procedures need to be followed. For instance, cancelling shares (in order to re-issue new ones) requires a temporary reduction in share capital. Transfer schemes, however, have fewer procedural requirements (namely, because they do not involve any alterations to the total share capital; ownership of the shares is simply transferred), Therefore, in general, Transfer schemes can be carried out more quickly than cancellation schemes.

Completion timelines can be further prolonged by the need to revise the scheme after the offer documents have been sent out. Once the bidder has made an offer, it is possible for this offer to be revised. However, any changes must be made no later than 14 days before the date of the shareholder meetings.[51] If changes are made within this 14-day period, the consent of the Takeover Panel is also required. Moreover, the consent of the court must be obtained if it becomes necessary to send a new scheme document after revisions, which can result in further delays. In the case of a tender offer, however, the offeror can revise the document at any time up to the 46th day following the announcement without waiting for another shareholder meeting or court approval.[52]

2.2.2. Takeover Methods and Shareholders Value, and Hypotheses Development

There has recently been debate in both press and among U.K. regulators about whether takeover transactions should be legitimately facilitated by way of schemes, particularly those schemes involving large companies. The debate is not new, nor is it uniquely English. Other common law jurisdictions which take similar legal and regulatory approaches such as Australia, New Zealand, Canada, Hong Kong, and India, all operate under legal structures of schemes akin to Part 26 of the Companies Act 2006 (Payne, 2014a, p.139 and p.325). These debates focus on whether bidders can acquire the target company "cheaply" and "easily" by using schemes in comparison to tender offers. One major concern is the approval threshold of the number of shares representing three-quarters (75%) in value of total shares, to allow a bidder

[51] Takeover Code, Appendix 7, para (7)
[52] Takeover Code, Rule 32.1.

to be more certain of ultimately acquiring full control of a target firm. This clearly marginalises minority shareholders, whose views can effectively be overridden easily. For tender offers, the same issue arises; but it is normally more expensive and more complicated to achieve the same goal. A bidder needs to achieve 90% of the target's shares in order to squeeze out the minority shareholders, at which point the minority is much smaller.

Although the scheme process is usually considered a recommended bid, that is with the scope for a target board to be involved, this does not mean that the bargaining power of a bidder does not increase. For example, target mangers may collaborate with bidders in order to maximise their interests, yet at the expense of the shareholders. In cases where the majority of the target shareholders approve a scheme, bidders gain immediate 100% of the target company. This naturally puts pressure on minority shareholders (25 % of the shareholders by value who do not vote in favour of the offer) whose interests and concerns might be wholly legitimate. This is not amount to coercion, duress or undue influence, but does present a fait accompli affecting the shareholders' interests.

Payne (2011b) however, argues that tender offer process could be more subtly inimical and more oppressive to target shareholders, because it does not prevent a strategy of divide and conquer by a bidder in respect of offer price or other inducements. Target firms cannot take any defence actions that would frustrate a transaction. Therefore, bidders can set up an offer based on his interest even if the design of the bid price or the nature of the overall bid is predicated on different inducements to different interests of particular shareholders. This effect would become more pronounced in companies where ownership is more diffusive. Under schemes, concerns about distorted choice do not arise because there is no opportunity for bidders to control a bid (there is no divide and conquer) and there is no realistic opportunity for the collective action problem to exist. Therefore, there is no problem in respect of the minority shareholders, because oppression can only be exerted in respect of whether to accept or reject the deal, and the role of the Panel and the courts is to ensure the price is fair for all classes of shareholder.

Even if tender offers could be controlled by bidders who are more able to divide and conquer the offer price, the threshold of 90% shareholder approval makes the approach of divide and conquer complex and probably financially prohibitive. For example, the mandatory offer is considered as one of the main rules to protect the minority shareholders in the U.K., but not in the U.S. (Betton et al., 2008a). The mandatory offer is applied through a mechanism triggered

when acquirers of shares are compelled to make a public bid once their total holding reaches or exceeds 30% of the company's voting rights or if the acquirer holds between 30% and 50% and is seeking to buy additional shares of the voting rights. This is clearly to prevent stake building and takeovers by stealth at the expense of other shareholders.

However, the level of protection that shareholders can exercise under schemes is low in comparison to tender offers, which weakens the power of the minority shareholders who do not accept the offer, but are obliged to accept it whatever they gain. Consequently, a bidder could bypass some legal requirements of schemes such as to what extent a bidder could satisfy the disclosure rules in the Takeover Code to protect minority shareholders. Under the scheme, the mandatory offer cannot be made without informing in advance the Panel and obtaining their consent. Of course, a bidder with a stake in the target firms (a toehold) gains a competitive advantage over rival bidders, who do not possess such control. However, this can lead to a lower bid premium because a toehold imposes a cost on the target. As a result, target boards in the U.S. refuse to negotiate merger deals with bidders who own a stake in the target firms (Betton et al., 2009b). It is arguable that schemes could protect target shareholders from the cost of the toehold whereby a bidder prefers not to build a stake in the target, as the stake will not be counted towards the threshold of 75% voting power. However, it should be noted that this formal requirement does not make any such toehold tactically advantageous for bidder firms. An acquiring firm, that already owns 10-15% of target shares, retains many advantages over outside bidders. Moreover, once having obtained a further 75% approval, acquiring firms are left with a very small number of minority shareholders who do not agree on the offer.

Another concern related to schemes is that they do not facilitate auctions for target control, and, therefore, might not maximize the wealth of the target's shareholders (which is the English system prioritises). Bulow & Klemperer (1996a) have shown that when a seller in a friendly transaction has the opportunity to invite an extra, serious bidder to an English auction, this will generate an extra revenue in comparison to negotiating just with the winning bidder. Therefore, to achieve the best possible terms for the sale process, it is better for a seller to invite competing offers in a bid. However, the announcement of a scheme does not prevent a competing bidder making a rival offer. A scheme is a long process in comparison to a tender offer and this would increase the probability of a rival bidder coming into play (O'Dea et al., 2012, p. p.211). In this regard, schemes may not necessarily result in lower premium levels.

Although, the two takeover methods, schemes and tender offers, have different effect on bid premiums, there is no evidence in the empirical works show that there is a significant difference in bid premium between tender offer and scheme takeovers. Particularly, it is arguable that bidder in tender offers are more able to divide and conquer, whereby they can use potentially wide bidding strategies that allow them to gain at the expense of target shareholders, particularly if the structure of target ownerships is dispersed. Therefore, shareholders could face a dilemma in a tender offer because they might not agree with the offer or might not be a part of the offer (if it is a partial offer) and then be left as a minority shareholder and with devalued shares for not taking part on the tender. This fear creates a subliminal pressure at least for shareholders to take part in tender offers. This pressure would realistically and logically increase where a scheme of arrangement is used. scheme is considered as an "all or nothing" transaction, which means that there is no risk that the minority shareholders retain influence. Therefore, target shareholders in scheme transactions could face a high degree of coercion or distorted choice, which could lower the target shareholders wealth. This advantage of schemes leads the research to test the proposition:

Hypothesis 1: Schemes of arrangement have lower acquisition premiums than tender offers.

2.3. Data and Variables

2.3.1. Sample Construction

We construct a sample of U.K. acquiring firms using the Thomson One Banker, Thomson DataStream and LexisNexis databases. Thomson One Banker provides the acquisition data from the SDC U.K. Merger and Acquisition Database, and the relevant information on deal characteristics, such as the target name, acquirer and target status, and deal types (i.e. fields acquisition technique, synopsis and history file event) that help to define tender offers and schemes of arrangement. The SDC provides information related to the classification of the target and acquirer's advisors that are most used in the sample. Moreover, all the information related to the calculation of bid premium such as the share price paid by the acquirer for target shares (filed HOSTPR) and deal values, the SDC announcement dates and the dates of completion, and the calculated SDC premiums (filed PREM4WK) have been taken from the SDC. Thomson DataStream provides the data on share prices, market value, and various variables related to target characteristics, such as total assets, returns on assets, market-to-book values, total debt to total assets and cash holdings. Finally, the Lexis Nexis U.K. database is

used[53], first, to find the final offers paid by bidders for target shares in cases where this data is missing in the SDC, and second, to check whether the deal has been implemented by a scheme of arrangement or tender offer, as, in some cases, the SDC acquisition technique file indicates both when cataloguing single deals.

Table 1 shows the main steps for the construction of the sample. The whole sample of 67,471 includes all the completed deals for the U.K. target firms between 1 January 1984 and 31 December 2015. In step one, the original sample is restricted to meet the following criteria:

- Targets are publicly listed firms trading on the London Stock Exchange.
- The acquirers are UK firms in order to guarantee that both the target and acquirer are subject to UK takeover regulations. This will ensure complications that arise from differing foreign tax and legal regimes are avoided—as recommended by (Offenberg & Pirinsky, 2015)

- The acquirers should be either private or public companies, or subsidiaries.
- The deal value must be at least £1 million to control for the size effect (Alexandridis, Fuller, Terhaar, & Travlos, 2013)[54]
- The sample is limited to deals where the acquirer holds more than 90% of the target's shares and the acquirer must hold less than 50% of the target's shares before the announcement date. This section chooses to examine a tender offer deal that exercised a "squeeze-out" of the remaining minority shareholders in order to achieve sufficient compression on the scheme of arrangement, without the pressure that tender offers have to achieve a certain level of shares to eliminate the remaining shareholders.
- Self-tender, recapitalisation, exchange offer, repurchase, privatisation and creditor's scheme of arrangement transaction are excluded, because they are not catered for by scheme of arrangement takeover regulations.[55]

[53]All the information that is taken from the Lexis Nexis database should be published by *London Stock Exchange PLC*

[54] Moreover, in order to sustain the appropriate compression between tender offers and schemes, the latter tends to be the main choice for the bidder if the transaction is large.

[55] This thesis chooses not to exclude uitility and finacial industries as suggested by the the most most prominent research that investigate the impact of bidding in a specific selling mechanism on bidder or target shareholders wealth such as Boone & Mulherin (2007:2008), Fidrmuc et al., (2012), Aktas, De Bodt & Baker (2010:2011): and Akts, Xu & Yurtoglu (forthcoming). Of course, it is true that utility and fanatical industries have different capital structure and book to market ratio which could affect the final results. However, studying the impact of bidding on schemes or tender offers on the shareholders wealth aims to investigate how the selecting of different *bidding strategies* could determine the shareholder wealth, and this is does not relate to the capital structure and

- The form of payments is cash, stock or a combination of both.[56]
- The selected transactions do not include deals that switch from tender offers to scheme of arrangement, or vice versa, in order to study the observed effect of each takeover method.

After step one, there are 1,404 observations. In step two, we next divide them into two subgroups according to the takeover methods (scheme of arrangement versus. tender offer). Here this section uses the SDC provided information for each deal on *acquisition technique, synopsis* and *the history file event*, which are related to the specific takeover methods, the parties involved in the transaction, and a summary of bid history.

SDC and Takeover Code define a transaction as a scheme of arrangement if the transaction requires the involvement of a court, while tender offer is conducted without the involvement of the courts. The field of *acquisition technique* provides information on the bidding strategies that are used to implement the takeover. That information may be used to determine whether the takeover is implemented by the schemes or tender offers. Sometimes the field of *acquisition technique* reports a deal as both scheme and tender offers.[57] In this case, we then exploit further information in the fields of *synopsis* and *the history file event* to determine the main takeover method of the deal. These two fields summarise the event history of the transaction, such as whether the court is involved in the transaction procedures, and other relevant transaction information i.e. the defensive tactics, the target attitude with the challenging bid. After this step, we construct a sample of 230 deals by schemes and 1,174 deals by tender offers. Moreover, as SDC does not report sufficient information on scheme

book to market ratio which is more related to the accounting studies. In other words, there is no core reasons in the litureture works to exclude exclude utility and financial industries.

[56] One of the main regulation changes that reduces the complexity of using schemes is the availability of scheme documents that ensure a reasonable and fair price — particularly for "hybrid" schemes that use cash and non-cash offers (Shikha, 2013). In order to study the impact of the means of payment on the choice between the two methods, this analysis restricts data to only include transactions where payment information is known.

[57]For example, deal number 2252525040 in the SDC database –the takeover between the BH Acquisitions Ltd (BH) and Northern Foods PLC (Northern Foods)— was implemented by the way of a tender offer. However, the filed acquisition technique states that a tender offer and scheme of arrangement were the takeover methods. Moreover, the information in the filed Synopsis shows that BH Acquisitions Ltd (BH) offered GBP 0.73 in cash per Northern Foods PLC share, or a total value of GBP 342.124 million, via a scheme of arrangement. Back to the documents published by the *London Stock Exchange PLC* in the LexisNexis U.K. database about the deal: the transaction is stated as implemented by the way of a tender offer, and the offer documents were sent to the shareholders as a tender offer. In the offer documents there is a provision stating that the offeror has the right to implement the transaction by the way of scheme in case the tender offer was not completed. The deal was implemented without the involvement of the court. Therefore, the deal is classified as a tender offer.

deals prior to 1995, this analysis then removes all the observations before 1995 and focus just on those in the period of 1995-2015. Then this step has a sample consisting of 228 deals by schemes and 890 by tender offers.

In step three, this analysis further uses the information of the LexisNexis database to verify the actual takeover methods of the deals. The LexisNexis U.K. database provides information about all the significant events from the offers date to the completion date, such as updating the offer price, regulatory approval, whether other competitors exist, and the methods of takeover whether the deal is implemented by the way of schemes or tender offers. After step three, we have a sample of 222 scheme deals and 700 tender offer deals. Finally, step three further downsizes the sample by imposing some additional requirements on deal information, after which the sample ends up with 201 schemes and 558 tender offers.[58]

Figure 2 shows the trend and distribution of the scheme and tender offers in the UK market in the period of 1995-2015, and the number of schemes is measured by the right vertical axes. In the 1990s, both the U.K. and U.S. markets have experienced a significant fall in the number of hostile takeovers, yet there was no significant growth in the number of schemes, as it is commonly considered as a friendly process. Since 2005, there has been a significant growth in the number of schemes, which have now become one of the main takeover methods in the UK market. Between 2006 and 2007, seven of the largest takeover transactions in the UK were structured by schemes with an average value of £8 billion, such as Scottish Power, Alliance Boots, Reuters Group, Gallaher, Course and Hanson (Shika, 2013). In addition, about 30% scheme deals in the period of 1995-2015 are processed during the period of financial crisis of 2007-2010. The popularity of schemes as method to implement takeover deals during the period of the financial crisis could be related to that bidders are typically interested in obtaining 100% share ownership, any they may face difficulties in raising enough money to finance that. The scheme is a preferable method for takeovers during finical difficulties, as it is easier for

[58] Transaction data was deleted if it did not have DataStream codes, or if it did not have information related to bid premium calculations (such as the share price paid by the acquirer for target shares (failed *HOSTPR*) and the stock price in the selection period). Transactions that have the same name for the target and acquirer were deleted. All data for transactions without sufficient information related to the main control variables, such as total assets, sales, intangible assets and leverage and market-to-book value, was deleted. This section chooses not to delete transactions that do not have information related to profitability, cash holding and stock performance in order to not to reduce the sample size. The main reason for this, because there are no academic papers that have been used in this research, was to find a strong relation between these variables and the bid premium. This section will use these variables as control variables

the bidders, if compared with tender offers, to use the 100 % of the target shares as collateral for debt-financing.

2.3.2. Variables and Summary Statistics

2.3.2.1. Dependent Variables

Bid premium is considered one of the main observable outcomes of takeovers. The bid premium can be defined as the difference between the offer price that is paid by the bidder and the target closing price before the date of public announcement (Aktas et al., 2010a) and (Fidrmuc et al., 2012). This chapter therefore aims to investigate whether the choice of mechanisms (tender offers and schemes of arrangements) has a significant impact on the level of bid premiums. **Section 2.4.1** set out in details how this chapter calculates the bid premium and the relative theoretical literature.

2.3.2.2. Explanatory Variables

Table 2 presents the summary statistics of target firms and deal characteristics, for the takeover methods of schemes and tender offers. It contains a set of variables that are considered in the literature to be relevant to the variation in bid premiums or to the selection of takeover methods (schemes vs. tender offers). **Table 2** provides more detail about the rationales for the decision procedure for selecting some covariates to be included in the model to calculate the propensity score. The final column presents the p-value for the mean based on t-test that test the difference between scheme and the tender offer subsamples. Most of the variables such as target's size, earnings before interest; taxes; depreciation and amortization over total assets (EBITDA/Assets); cash holding; stock performance; total debt-to- total assets; and tangible assets are measured for the period of twelve months before the announcement date.[59]

Panel A presents the main variables about the target characteristics. There are number of important differences between the target with tender offer and scheme of arrangement. The first is the size of target firm. There has been much debate in the field, as covered in the

[59] This research decides to measure the effect of target characteristic upon the level of bid premium or the choice between tender offers and schemes twelve months prior to the date of the announcement date because scheme of arrangement takes longer sales procedure to be organised and completed than tender offer.

literature review, as to whether the acquirer might overpay for a large target because the bargaining power of the target increases with its size. The large target can negotiate the offer price and extract a higher price from the acquirer that could lead to pay more which will be worse when there are another competitor exist (Dutta & Saadi, 2011). Bidder firms could pay a lower premium, however, if the target is larger. It is well documented in the literature that there is a negative relationship between target sizes and bid premiums. See :Officer (2003), Bargeron et al., (2008), Betton et al., (2009b),and Boone & Mulherin(2011c) regardless the measurements of the premium either by using the actual offer price to calculate the premium or the target announcement returns.

The *causes* of the lower premium paid for the large target could be related to the degree of certainty about the true value of the target's assets. For example: acquirers could be more certain about the accurate value of the target because they own a high value stake in the large target's firms, which, therefore, could lead the acquirer to offer a low premium. However, the complexity of integrating the asymmetric size firms (whereby the target is larger than the acquirer) could heighten uncertainty regarding the expected synergies. As a result of this, acquirers are more reluctant to offer a high premium for the target in order to mitigate the additional potential complexity costs. In similar vein, the complexity of the integration between a small size acquirer and a large target could reduce the number of potential acquirers who compete for the same target. This could mitigate the possibility of the winner's curse, and this could lead to a lower bid premium. Along similar lines, the larger sized firms tend to be subject to more insider shareholders and less managerial ownership, which could lead the former to accept a small premium (Alexandridis et al., 2013)

However, there has been no deep discussions in the literature about how the bidders would choose the takeover methods in order to buy the large target with regard to the bid premium. In this section will try to answer this question by analysing the characteristics of target size that are acquired by a scheme and tender offer practically if the bidder is more certain to obtain the target firms regardless it sizes.

This paper uses the natural logarithm of the total sales (relative to total assets and market capitalisation) to measure target sizes.[60] Target firms adopting schemes are typically larger than those adopting tender offers. A scheme is commonly thought of as a friendly process, and it is more controlled by target directors who produce the documents, and it will only be completed by the recommendation of target directors. Larger firms have larger numbers of tendered shares, and this increases the uncertainty for a bidder in obtaining 100% share ownership, if this is necessary to the bidder. Therefore, adopting scheme of arrangement, which is a friendly takeover agreed between bidder, target shareholders and directors, will increase the likelihood that the bidder obtains the full control of the target.

Relatively speaking, acquiring large targets associate with the risk of rising the debt according to (Gorton et al., 2009). Bidders could reduce the difficulty in financing the large transactions by adopting a scheme as the takeover method. Under a scheme, a bidder can more easily achieve 100% control of the target shares, which can then be used as collateral for loans, or alternatively, can be used to obtain financial assistance by re-registering the target as private firm.[61] In summary, the size of a target firm is one of the key determinants for bid premiums and for the selection of the specific takeover methods: schemes versus tender offers.

The targets adopting tenders offers are normally younger than those adopting schemes whereby the age of the firm is measured in year since DataStream holds information about the target. This result consistent with Offenberg & Pirinsky (2015) who find that targets adopting tender offers tend to be both younger and smaller. Typically, younger and smaller firms have greater scope for growth (Jovanovic, 1982), and this might explain why bid premiums are normally higher in tender offers. This section obtains similar results by using total assets and market value of target firm as alternative measures for firm size. In this model, target firms that accept schemes must have substantially larger total assets and market value in comparison to target firms that accept tender offers.

Market-to-book value (M/B ratio) is considered on of the main variables that could determine the bide premium (Eckbo & Thorburn, 2009a). M/B ratio is used as a proxy for the probability of firm growth, whereby target firms with high M/B ratio indicates high growth opportunity

[60] The analysis will use the total sales as measure for firm size in order to avoid the correlation between market capitalisation as a proxy of firm size with the bid premium and performance variables. See for example (Dang & Li, 2015)
[61] [UK] Companies Act 2006, s.681(2)(e)

(Harford, Klasa, & Walcott, 2009). Therefore, target firms that have low growth opportunities obtain low bid premium. Moreover, target firms could earn a lower bid premiums in case if the M/B ratio of the target firms exceeds the industry medium of the same ratio (Eckbo & Thorburn, 2009a)

Boone & Mulherin (2008b) use M/B ratio as a proxy for uncertainty whereby there is a positive relation between M/B ratio and the uncertainty of bidders about the value of target's assets. Therefore, they argue that target firms with a high M/B ratio could obtain high premium, because bidders are overpaying for target's assets. However, Boone & Mulherin (2008b) conclude M/B ratio does not support the prediction of overpayment.

Table 2 shows that target firms adopting tender offers have a smaller M/B ratio than those adopting schemes.[62] This may indicate that the target firms adopting schemes have higher probability of growth, despite of their larger sizes and ages. However, this difference in M/B ratio between these two groups is not significant. The difference is also insignificant in case of calculating an industry-adjusted M/B by subtracting the yearly median of M/B of the target firms in the same two-digit SIC code as suggested by (Bargeron et al., 2008)

The sales growth rate is also used as a proxy for growth opportunities. It is defined as the difference between the sales level 12 months ($t_{-12\ months}$) and 24 months ($t_{-24\ months}$) prior to the date of announcement, that is, the sales growth ratio of ($Sales_{t_{-12\ months}}$ - $Sales_{t_{-24\ months}}$)/ $Sales_{t_{-24\ months}}$. **Table 2** shows that target firms adopting schemes have a higher sale growth rate than those adopting tender offers, yet, as in the case of M/B ratio, the difference is not significant.

The variables of total debt-to-total assets and tangible assets ratios are also included in **Table 2**. Total debt-to-total assets (TD/TA) is used as a proxy for the target's bargaining power. A target with a high level of debt cannot deter the takeover attempt by using defence tactics, such as restructuring and recapitalisation strategies, and this can affect the bid premium. Alternatively, target firms of a high level of debt could gain more because of such highly leverage firms have a highly concentrated ownership which could force the winner to pay more (Bargeron et al., 2008). Regardless the relation between the level of target debt and bid

[62] M/B ratio is measured one month before the date of announcement.

premium, the difference of TD/TA ratio between the two subsamples is insignificant.[63] Tangible assets ratio (or collateral) is determined as the ratio of plant, property, and equipment to assets. Targets adopting tender offers tend to have significantly higher collateral ratio than those adopting schemes. This 'credit slack' is essentially a form of internal leveraging where the necessary financing is obtained through the unused 'asset' of the target firm's available credit. This means that the acquirer can use the target firm's tangible assets to increase the level of unused debt at tender offer targets where there is a positive relation between tangible assets and leverage, as indicated by Jensen & Meckling (1976). This information begs the question of why tender offer targets choose not to be involved in friendly negotiation processes through schemes of arrangement when they often occupy excellent positions for negotiation. Such targets could help the acquirer to access more debt. It will be interesting to add TD/TA and tangible assets variables to the model in order to understand whether the level of target debt influences variations in bid premiums.

Schwert (1996a) finds a positive relation between target run-ups and bid premiums. The main cause of this relationship is that the run-up may reflect an increase in the target's *stand-alone* value, and, consequently, acquirers respond to this information by updating their bid with a mark-up. **Panel A** provides the data for the target run-up as a cumulative target abnormal return from -42 to -1 days prior to the announcement date (day 0). Here the average tender offer run-up is shown to be significantly higher than that of schemes.[64]

Panel A also provides the relevant financial indicators for target firms related to target profitability and performance. These include earnings before interest, taxes, depreciation, and amortization over total assets EBITDA/Assets ratio, cash holding, past stock performance. It

[63] Offenberg & Pirinsky (2015) use a dummy variable to differentiate between firms that have significantly high debt levels to investigate whether the high level of debt could affect the choice of selling mechanisms between merger and tender offers. The high debt dummy takes the value of 1 if leverage (the ratio of total debt to total assets) exceeds 0.5, and 0 if below this figure. In this study, tender offer targets, significantly, have higher debts than scheme targets (84.69 % versus 78.21%). A high debt of a target firm in a tender offer is more likely to weaken their bargaining powers during the takeover process, and, therefore, target shareholders could obtain a lower premium in comparison to schemes.

[64] For an analysis of robustness, the target run-up is extended from day -63 though day -1, and finds that the tender offer run-up is still higher than the target run-up for schemes.

is natural that a target firm's financial status could influence both the choice of takeover method and bid premiums.[65]

First, there is a negative relation between target performance in the period prior to the announcement date and the bid premium; poor target performance is associated with a high acquisition premium. The prediction of this relationship is based on Manne's hypothesis, (1965) which proposes that if a manager fails to use a firm's resources efficiently, stock prices will fall, and this will indicate whether a firm is an attractive target (Offenberg & Pirinsky, 2015). Consequently, removing an inefficient manager who has caused this poor performance prior to takeover could therefore increase the bidder's likelihood of improving the target performance after the acquisition is completed. This can, therefore, increase the target shareholders' chance of enjoying a high premium (Bugeja & Walter, 1995). As a profitability measurement, a scheme target has a lower EBITDA/Assets ratio than a tender offer target, but the difference between them is not statistically significant.

Second, Fidrmuc et al., (2012) finds a negative relation between the past stock performance of the target and bid premiums, which, in part, explains the poor stock performance associated with large premiums. Such findings however, add to the puzzle of the bid premium variations between tender offers and scheme of arrangement, where the tender offer has a higher stock performance than the scheme. However, Fidrmuc et al., (2012) states that using previous stock performance to study bid premium variations in the literature review is still puzzling, and is has not yet explained in relevant studies. Tender offer targets tend to have stronger levels of stock performance than scheme targets, though these differences are also not significant. Moreover, it could be that using a past stock performance is could be imperfect measure of the true value of the company based not so much on it is worth but on what someone is prepared to pay for it.

Finally, although there is a relationship between the target's cash level and the probability of a takeover (where a high level of cash at the target firm, as shown on the balance sheet, indicates that the target is more likely to be acquired) there is no link between levels of the target's cash and the bid premium, as has been shown by Fidrmuc et al., (2012) and Pinkowitz (2000). This study will use control variables to investigate whether an acquirer's choice of a scheme can be attributed to the quality of target firms. It will be demonstrated later in this study that the

[65] This section chooses not to delete the missing DataStream information relating to the EBITDA/Assets ratio, cash holding, past stock performance. This is because such ratios will be used as proxies for the target's preferences.

majority of the buyers in the scheme subsample are, on average, 64.85% private equity firms. A nexus between target's cash level, private equity buyers and the choice of the scheme, can be predicted, at least in broad terms, in the following manner: a target with high cash is more likely to be acquired by private equity, as shown by Fidrmuc et al., (2012), in order to either pay out cash or finance the acquisition by using the target as collateral for the necessary loans particularly if the target has substantial fixed assets. Further, private equity will ensure the acquisition of the full target ownership by using scheme of arrangement. The cash level is measured by the ratio of cash over total assets at twelve months prior to the announcement date. The target firms adopting schemes have a much higher cash level, but the difference between the two groups is not statistically significant.[66]

Panel B provides summary statistics of the deal characteristics. The first observation is that the transaction values of scheme deals are larger than those of tender offer deals. It is not surprising that the value of scheme transactions is significantly greater than those under tender offers, as the scheme involve transactions of larger targets. This consistent with the expectation of that scheme of arrangement is a preferable method with large transaction deals.

Second, takeovers facilitated through tender offers are much faster than those run through schemes, by an average of 53 days. This may be due to the more complicated regulatory rules for larger firms (Moeller et al., 2004), or as a result of the length of scheme of arrangement procedures in comparison to tender offers.

Part B also reports bidder and target termination fees. Officer (2003) reports a positive relationship between bidder termination fees and bid premiums. In the sample used in this study, bidder termination fees are lower in tender offers. This could be as a result of bidders signalling their intents to ensure the quick completion of the deal, rendering termination fess a redundant insurance, as pointed in Offenberg & Pirinsky (2015). However, the difference in bidder termination fees across the scheme and tender offer groups is not significant. Target termination fees are more common in takeovers. In the sample used here, 109 target firms have paid termination fees in case transaction is uncompleted. Target termination fees are much higher in scheme deals than in tender offer deals (10.989% versus 1.404%), and the difference is statistically significant. This could suggest that the bargaining power of target firms is lower

[66] This analysis will not use the ratio of cash over sales as an alternative measure for cash holdings because the aim of the acquirer is to obtain 100% control of the target.

for schemes than tender offers. These results run in contrast to Offenberg & Pirinsky (2015) who found that there is no significant difference between the size of target termination fees between tender offers and mergers. However, Offenberg & Pirinsky (2015). state that the effect of target termination fees on the selection of takeover methods is ambiguous. It could be that, however, the bidder knows that scheme of arrangement as a takeover method gives them a certainty about the acquisition completion, but corollary is that such a process takes a long time to insure the target intent to complete the deal over the long period to process the scheme, bidder therefore ask for higher termination fees. Consequently, the bargaining power of the bidder increase in the schemes, which can affect the bid premium. The target will then be in a trade-off position between accepting their current offer, which could be lower than the predicted, and being required to pay the cost of terminations if offers are rejected. Target termination fees, therefore, are obliquely associated with bid premium valuations and the selection of takeover methods, with risk apportioned as per agreements between parties.

The cost of transactions is an important determinant in leading the target company to choose between reducing the competition level between bidders or selling the company using more competitive procedures to extract a higher premium. Aktas et al., (2010a) and Offenberg & Pirinsky (2015) use the cost of waiting proxies to investigate whether the level of competition can impact the choice of takeover methods, and, therefore, the bid premium. The cost of waiting proxies measures unobservable competition before the announcement date particularly when the target is under pressure to sell. For example: if the target initiates the bid it signals their willingness to sell, which weakens their bargaining powers during negotiation. Moreover, if searching for potential bidders and organising auctions are costly procedures, the target might prefer to negotiate with one bidder. The trade-off between competition and transaction costs is still figures in this context and such information is useful in investigating the choice of selling mechanisms and, therefore, the level of premium that targets will receive across schemes of arrangement and tender offers.

Negotiation and auction are related to the level of competition in takeover transactions. In this chapter, an auction is defined as a transaction where there is more than one public bidder bidding for the same target within a month from or before the announcement date. Accordingly, negotiation is defined as a transaction where there are no other public bids for the same target within a month from or before the announcement date.[67] One observation gleaned from the

[67] Betton et al., (2009b) defines the period for the second bid in order to classify the bid as an auction or not as six months. During this period the target board has a fiduciary responsibility to consider any rival offers until the

sample is that most of the deals, roughly 94.6%, are structured through negotiations, regardless of the exact takeover methods of either a scheme or tender offer.

The majority of takeover transactions, say 95.5%, are initiated by bidders. Among deals initiated by the target firm, it is interesting to observe that the majority are structured through schemes. For bidder-initiated deals, however, the majority are structured through tender offers. This may indicate that tender offers are more likely to be initiated by bidders, while schemes of arrangements are more likely to be initiated by target firms.

Aktas et al., (2010a) uses a target debt ratio as a proxy for waiting costs. The target debt ratio is defined as long-term debt plus current liabilities over total assets. This means that such indicator of debt gives more weight for the debt that should be paid at the end of the year, but, at the same time, this ratio does not necessarily indicate the poor financial situation of the company. Aktas et al., (2010a) seeks to show that a high target debt ratio may signify that the target is under pressure to sell, because a high debt level will lead to a longer selling procedure. Therefore, target firms with a high level of debt ratio generally prefer to use a fast procedure, such as tender offers. Our sample also shows that the target debt ratio is higher for tender offer deals than for scheme deals at 51.246% versus 46.191%.[68]

The means of payment is one of the main elements that could explain bid premium variations, where the higher bid premium is associated with cash payment (Betton et al., 2008a). Offenberg & Pirinsky (2015) use the percentage of cash paid by the acquirer as the main variable that could explain the variation in bid premiums across tender offers and meagre, because target shareholders with cash offers owe more taxes on capital gains in comparison to stock offers. This will lead the target to increase their offer in order to be compensated for the immediate taxes that due with the cash offers Huang & Walkling (1987). Across the groups of tender offers and schemes, tender offers are more likely to be met through cash payment (76% vs 70%), and the difference is significant at 10% significance level. In addition, use 100% of cash is the dominant means of payment (around 75%), compared with 100% of equity and mixed offers.

arrangement is finally approved by the shareholders under the Williams Act (which amended the Securities Exchange Act 1968) in the US. Under English law, the target board responds to the offer at day 28 after the announcement date, and this is the first day on which the offer may close (Rule 22.3).

[68] The information available in the DataStream to calculate the target debt ratio covers around 87% of the sample. This section chooses not to delete the missing variables based on this ratio because it will not be included in the propensity score matching model. The research uses the ratio as a proxy to obtain more information about the cost of waiting, rather than using it as indictor of the financial health of the company.

Over our sample period of 1995-2015, relatively few deals (about 1/6) happened in comparison to the period of global financial crisis from 2007-2009. Yet, across the two takeover methods, a significantly higher proportion of scheme deals (say, 29%) happened in this period, in comparison to only 13% of tender offer deals. It seems that schemes become a more popular takeover method during economic downturns. The high usage of schemes during this period seem to be due to bidders becoming more familiar with the judicial process and the forum of the courts to effect takeovers, especially with the amendments that were, by then, added to the scheme practice. For example, there is now no need to petition the court to commence a scheme (Payne, 2014a, p. 84).

The change of regulation rules certainly influences the choices of takeover methods and bid premiums. There was a major regulatory change in 2011, and a dummy variable is introduced here, taking the value of 1 if the transaction occurred during the period of 2012-15, and 0 otherwise. As mentioned before, this crucial regulatory change to the City Code came into effect after the Kraft/Cadbury takeover in December 2011. The change entails that a scheme is entirely in hands of the target, allowing previous bidders to lose some control over the process. After this regulatory change, the number of scheme transactions remained significantly higher than tender offers. Around 23% of deals in the data sample organised through schemes occurred after 2011, while only 3% of transactions conducted through tender offer deals were affected in the same period. The difference between the two samples is statistically significant. Payne (2014a, p. 84) also documents that, after the changes to regulations in 2011, around 15 of the takeovers announced in 2012 were structured as schemes, with only 4 as tender offers. Moreover, around 39 of the transactions announced in 2015 were structured as schemes, and only 19 as tender offers.

on average, 28.855% of scheme bidders employed banks with a high reputation, while tender offer bidder firms employed 18.279 % of investment banks with a high reputation.[69] The statistical information shows that there is a difference in the tendency to employ banks with a high reputation between tender offer and scheme. This result predicts that bidder firms that hire top-tier investment banks to negotiate scheme deals, and they encourage bidders to overbid for a target firm in order to guarantee completion of the bid, as in Rau (2000)'s argument. Rau

[69] This section follows Boone & Mulherin (2008b) method of modelling the usage of investment banks. Top-tier banks are classified here using a dummy variable that takes the value of 1 if the bank is Rothschild &Co, UBS, JP Morgan, PricewaterhouseCoopers, HSBC Holdings PLC, the five banks that appear most often in the sample, all others take 0.

(2000) reports that bidders have positive returns in tender offer with a high reputation investment bank, while in merger, employing such banks lower bidder returns. Moreover, the author documents that in tender offer, there is a positive relationship between bidders that are supported by more prestigious bank advisors and target bid premium. In these scenarios the top-tier investment banks seem are more concern about deal completion than the stock price of client firms, as a result of this they advise their bidder to pay more for their target in order to motivate their shareholders to accept the offer.

Moreover, on average, 29.353% of scheme bidder firms employ banks with a high reputation, while negotiation target firms employ 17.921% of investment banks with a high reputation. There is a difference in case target firms use of top-tier advisors between tender offer and schemes. This result predicts that scheme target firms that hire advisors with greater reputations increase their bargaining power, which increase their bid premiums— as suggested by (Kale, Kini, & Ryan, 2003).

Another deal characteristic that may be related to differences in bid premiums is the public status of the acquirer, say, whether it is a listed or an unlisted firm. Bargeron et al., (2008) found that private acquirers pay less for their targets in comparison to public firms, as the latter could gain more from the expected synergies with the target. Moreover, Offenberg & Pirinsky, (2015) found that public bidders have a stronger incentive to complete deals than private bidders do. As a result, tender offers are the preferred method for public bidders. This preference seems to stem from the fact that the impact of an acquisition failure has more adverse consequences for public than private acquirers.[70] As shown in **Table 2**, public acquirers are associated with a higher percentage of tender offer deals. This may also indicate why bid premiums for scheme deals are lower than those of tender offers. For example, private bidders acquire around 66% of scheme targets, while only 55% of tender offer targets are acquired by private bidders.

The percentage of shares owned by the acquirer six-months before the announcement date is used as the proxy for toehold in this study. The statistics indicate that tender offer bidders normally own a larger share of the stake in the target firm than scheme bidders. This is unsurprising given that scheme bidders do not usually seek to build a stake in the target, as that stake will not be counted towards the threshold of 75% voting power. In contrast, tender offer

[70] Fidrmuc et al., (2012) also finds a similar result: private equity pays a premium of 11% lower than strategic bidders, after controlling for target and deal characteristics.

bidders can use the stake building strategy to reach the majority level of 50% of the target's shares, and thus gain control of the firm. Therefore, tender offer bidders have more incentives to obtain a stake in the target before the transaction than scheme bidders do. Moreover, Betton et al., (2008a) have observed a negative relationship between stake building in the target before acquisition and bid premiums. As Betton et all note, the greater the toehold the acquirer has before the announcement date, the lower bid premium the target shareholder could gain. However, in **Panel B,** the difference in the stake owned before the announcement, across the two groups, is not significant.

In summary, target firms that are associated with scheme takeovers are normally larger and older, in comparison to those of tender offers. There is no significant difference between the two groups in terms of M/B ratio, growth, and leverage levels. Moreover, there are no differences between covariates that measure prior target performance and profitability in tender offers and schemes.

Acquisition by tender offer is faster than through a scheme. Target termination fees are significantly higher for schemes; the measurements for the cost of waiting, associated with auction, negotiation and bidder or target initiated the deal do not sufficiently explain the differences between bid premiums across tender offers and schemes. Nevertheless, a firm engaged in a tender offer is under significant pressure to sell using a target debt ratio. Acquisitions through tender offers and schemes are more likely to be financed using cash as a means of purchasing the target; the frequency of using cash in tender offers is higher. Schemes of arrangement are a favoured takeover method during a financial crisis, and although the regulations have changed over time, schemes still remain the mainstay of U.K. takeovers. Acquisitions by schemes of arrangement prevail when the bidders are private, and are less likely to use a stake-building strategy.

The main objective of this chapter is to estimate the treatment effect of selecting a specific takeover method (schemes vs. tender offers) on bid premiums. For this purpose, propensity score matching will be applied to address the possible endogeneity problem. To enable the

estimation of the relevant propensity scores, the relevant variables in **Table 2** will be applied, as suggested by Imbens & Rubin (2009).[71]

2.4. Methodology

The main aim of this chapter is to investigate whether selecting different selling methods (tender offers vs. schemes) may result in significantly different premium levels. This potential self-selection issue arises, because the choice of a specific selling method may be correlated to factors that also affect bid premiums. Therefore, a simple comparison or regression on the mean difference in bid premiums (between the two sub-groups of tender offers and schemes) would result in biased estimate. To address the self-selection problem, we apply the method of propensity score matching in this chapter.

This section will provide a review of the theoretical background of the matching method, which is first introduced by Rubin (1974, 1977).[72] Let us introduce some notations first, following the guideline of of (Angrist & Pischke, 2009) and (Wooldridge, 2010). This section denotes $premium_{ji}$ as the potential premium for target firm i that would be attained via the takeover method of j, where $j = T, S$, representing tender offer and scheme of arrangements respectively. Let D_i be a treatment dummy, which takes the value of 1, if a target firm i is structured through scheme, and 0 if through tender offer. $Premium_{1i}$ then represents the potential premium level of firm i if it chooses scheme, and $premium_{0i}$ represents the potential premium level of firm i if it chooses tender offer. Our main interest is to estimate the average treatment effect of using schemes as the takeover method.

The exact treatment effect for a target firm i is $\tau_i = \text{Premium}_{1i} - \text{Premium}_{0i}$, and the average treatment effect, denoted by τ_{ATE}, and can be written as:

$$\tau_{ATE} = E(\text{Premium}_{1i}) - E(\text{Premium}_{0i}).$$

[71] However, the target run-up will be excluded to avoid the correlation with the bid premium, as measured by using the final offer price. The effect of the target run-up will be investigated later using Schwert's (1996) Abnormal Return (AR) Premium that takes into consideration the target run-up.

[72] The Rubin Causal Model that is developed based on the work of Rubin (1974,1977) and Holland (1986) and is considered fundamental to modern research on casual effects (Angrist & Pischke, 2009, p.14)

Where E is the expectation operator. The difficulty in estimating τ_{ATE} is that it is not possible to observe the both outcomes of Premium_{1i} and Premium_{0i} for a single target firm i; there is only one state of the world. If we, in a naïve way, estimate the difference in mean outcomes between the scheme and tender offer sub-groups, what we actually get is

$$E(\text{Premium}_{1i} \mid D_i = 1) - E(\text{Premium}_{0i} \mid D_i = 0)$$

By manipulating the above formula, we obtain,

$$E(\text{Premium}_{1i} \mid D_i = 1) - E(\text{Premium}_{0i} \mid D_i = 1) + E(\text{Premium}_{0i} \mid D_i = 1) - E(\text{Premium}_{0i} \mid D_i = 0),$$

where the first part: $E(\text{Premium}_{1i} \mid D_i = 1) - E(\text{Premium}_{0i} \mid D_i = 1)$ is the causal effect of treatment on the group that are treated, denoted by τ_{ATT}. The second part of this expression is what is known as the "selection bias'' (SB), which represents the difference in bid premium for a potential tender offer that exists between the groups. The SB term implies that a simple estimation of the mean difference across the two groups with different treatment is not equal to either the τ_{ATE} or the τ_{ATT}, and therefore is biased. Ignoring the self-selection problem would consequently lead to bias (and inconsistent) estimates.

There are a broad range of strategies used to correct the selection bias problem, for example, the Heckman two-stage estimator and instrumental variables (IV) estimation. More recently, propensity score matching has been widely used to estimate the casual treatment effect, in different forms: propensity score sub-classification, matching estimators, propensity score weighting, kernel-based matching estimators and finally dosage analysis of multiple treatment Guo & Fraser (2015, p.342).

The seminal work of Rosenbaum and Rubin (1983a) proposes the method of propensity score matching (PSM). The basic idea of their framework is that, the choice of treatment is determined by a certain set of observable covariates, $\boldsymbol{X}_i$, and in consequence, when we condition on the set of covariates, $\boldsymbol{X}_i$, we can regard the treatment are being essentially randomly-assigned. This assumption is termed the "conditional independence assumption (CIA)", and is represented mathematically as,

$$\text{Premium}_{1i}, \text{Premium}_{0i} \perp\!\!\!\perp (D_i \mid X_i)$$

To see how the conditional independence assumption removes the treatment effect, consider the selection bias this section derived before, except now conditioned on $\boldsymbol{X}_i$,

$$\begin{aligned} SB &= E(\text{Premium}_{0i} \mid D_i = 1, X_i) - E(\text{Premium}_{0i} \mid D_i = 0, X_i) \\ &= E(\text{Premium}_{0i} \mid X_i) - E(\text{Premium}_{0i} \mid X_i) \\ &= 0, \end{aligned}$$

where this analysis has used the conditional independence assumption (CIA) to go from the first line to the second, since the potential outcome in the presence of covariates is independent of the treatment.

In practice, this would require that we stratify the sample according to the covariates, and match individual firms across the two treatment groups according to this. This results in an estimator of the form,

$$PSM_{\tau_{ATE}} = E(\text{Premium}_i \mid D_i = 1, X_i) - E(\text{Premium}_i \mid D_i = 0, X_i),$$

where $PSM_{\tau_{ATE}}$ is the estimated causal treatment effect using the approach of matching. However, the difficulty in implementing an equivalent estimator in practice is due to the covariate matching. As the dimensionality of the covariate vector increases, it becomes increasingly difficult to find reasonable matches across the two groups, meaning that we are unable to estimate a treatment effect for some unpaired individuals in our sample. This lack of overlap in covariates between the two treatment groups motivates the use of propensity scores as an alternative matching criterion. This analysis supposes that, for each firm in our sample, there is a probability of choosing the treatment of $D_i = 1$, and this probability $P(D_i = 1 \mid X_i)$ is a function of the aforementioned covariates in **Table 2**. The conditional independence assumption (CIA) states that the potential outcomes of a treatment are independent of the treatment decision given an appropriate vector of covariates. The propensity score theorem extends this assumption, such that the potential outcomes of a treatment are independent of the treatment decision conditional on the probability of $P(D_i = 1 \mid X_i)$ which is known as the propensity score (Wooldridge, 2010,p.908). This can be written mathematically as,

$$\text{Premium}_{1i}, \text{Premium}_{0i} \perp\!\!\!\perp (D_i \mid P(D_i = 1 \mid X_i))$$

which is essentially equivalent to saying that conditional on the propensity score, the treatment is randomly assigned. Compared with multivariate matching, the matching of propensity score is univariate. This property is favourable because it becomes much easier to find matches in both treatment groups along a univariate score. The collapse from a multivariate matching space to a univariate one therefore makes propensity score matching an attractive alternative to covariate matching.[73]

An important requirement of using propensity score matching to estimate causal effects is the "overlap'' assumption. The overlap assumption states that there must exist individuals in both treatment groups that have similar propensity scores (Rosenbaum & Rubin, 1983a). For example, if there is a firm from the treatment group (schemes), but no one from the control group (tender offers) that has similar propensity score, the estimated treatment effect will not apply over the entire sample of observations. The overlap assumption implies that, for all possible value of X_i, it follows $0 < P(D = 1 \mid X_i) < 1$.

2.4.1. Measures of Bid Premiums

Bid premiums can be measured by a variety of different methods. In this chapter, two different methods will be adopted. First, this section will use the SDC database to calculate the actual offer premium (Officer, 2003) and the four-week premium. Second, following the event study approach, we will also calculate the cumulative abnormal return (CAR) premium (Schwert, 1996a:2000b)

[73] In relation to estimate the treatment effect of implementing the propensity score matching, there is a concern can be made against any piece of work that uses matching (or other method such as multivariate regression). The main concern is that the estimated treatment effect will be biased in the case of using matching method because of there are unobservable variables that determine selling mechanism or bid premiums, and this would consequently lead to violate the conditional independence assumption upon which matching depends on. In this research, however, it is unlikely to be such unobservable variables whereby there are many variables that have been investigated as main determines either for the selection of takeover methods or bid premiums based on the literature review which are observed, not unobserved. Moreover, to know how large the effect of the unobservable variables affects the result of propensity score matching, **section 2.4.2.3** will test the sensitivity of the results to the presence of omitted (hidden) variables that may affect the choice of takeover methods and bid premiums.

The target's cumulative abnormal returns (CARs) around the date of announcement have been used extensively in previous literature to measure bid premiums in takeovers. The researchers adopted the CAR measurements, because, until recently, SDC did not provide relevant information to calculate other alternative measurement of bid premiums. However, the CAR measurement can be problematic, as it is prone to being skewed by market rumours over the takeover procedure and the probability of bid failures. The SDC offer price database tends to reduce the rumour effect, as the target short-term run-up is included, and the pre-offer price should reflect all of the relevant information from various public resources about the takeover transaction (see: Eckbo & Thorburn (2008b),Betton et al., (2009b),and Aktas et al., (2010a)). The other main differences between the SDC offer prices and CAR measurement is that the later could be more sensitive to misspecification when the market model abnormal returns are used as benchmark returns to estimate the expected return over a long period (Kothari & Warner, 2007)

2.4.1.1. SDC Premiums

Based on the SDC database, two different measurements for bid premiums are provided: 1) the actual offer premium (Goeree & Offerman, 2003) and 2) the reported four-week offers premium as in (Aktas, De Bodt, & Roll, 2010a:2011b)

The actual offer premium is defined as the ratio of the bidder's offer to the target market value of equity before the date of announcement (Goeree & Offerman, 2003). The bidder's offer is divided into two parts by the SDC price offers database: "*component*" data and *"price"* data. The *component* data defines the bidder's offer as the aggregate value paid by the bidder for each payment method (i.e. cash or equity) , and the *"price"* data defines the offer price of P_{int} and P_{fin} , where the subscripts indicate "initial" and "final" prices per target share, respectively.

Goeree & Offerman (2003) calculates the bid premium using target stock prices at 42 days before the date of announcement as the base. In this chapter, however, a longer pre-offer period is selected, in order to help decrease the influence of either takeover rumour or bid (Eckbo, 2009)

The selection of the length of pre-offer periods also depends on the specific takeover methods (tender offers vs. scheme of arrangements), as they have different time scales for completion. Commonly, takeovers using schemes take longer time to complete than tender offers, and longer completion time may increase the likelihood of information leaking, before the relevant announcement dates. There are two important dates relevant to the publication of the takeover information: the SDC announcement date and the initial (original) public announcement date (filed DAO in SDC).[74]

Given the above discussion, we calculate actual bid premium as the difference between the aggregate value of all the payments (cash, stock and other securities), taking into account the percentage of shares acquired, and the market value of target either one, two, and three months before the initial public announcement date, or the SDC announcement date. This is given by the following formula;

$$Actual\ \text{Offer Premium}_i = \frac{(\text{Total consideration offered}_i\ f\ \ \%acquired_i)'\ 100}{\text{Target market value of equity}_{i,t=\text{either -A or -E}}}$$

Where, t is the event date and i is the target firm. $\text{Total consideration offered}_i$ is reported by SDC as the aggregate value (£ million) of the total consideration of each method of payment paid by the acquirer (cash, stock or debt, etc.) to each individual target firm, excluding fees and expenses. The $\%acquired_i$ (filed PCTOWN in SDC) is the percentage of target shares acquired by the bidder after the transaction has been completed. The $\text{Target market value of equity}_{\text{i,t=either}-\text{Aor}-\text{E}}$ is the value of target equity (stock price × shares outstanding) in £ millions either one, two or three months before the SDC announcement

[74] Scheme of arrangement takes usually longer time in compression to tender offer to be organised, to decrease the effects of information leakage on the stock prices, in this paper, we will choose to calculate bid premiums by selecting target firms' stock prices before the initial public announcement date as the base, following Aktas et al., (2010)and Fidrmuc et al., (2012). As will be seen later, a tender offer is faster from announcement to completion than a scheme of arrangement, by an average of 45 (Around 2 months) days and the latter needs around 98 (on average three months) days to be completed. Moreover, scheme needs long time to prepare the legal document, meeting the shareholders in different classes, and book the court, etc. Consider this; the calculation of the bid premium will be as the difference between the offer price and the stock price one month, two, and three months before the initial public date of announcement and the SDC announcement date. In order to consider all the possible pre-offer time of target stock price before the initial public announcement date or the SDC announcement date.

date as indicted by $-A$, or one/two and three months before the initial public announcement date as denoted by $-E$.

The actual bid premium based on the *price* data will be calculated either by p_{int} or p_{fin}. However, the initial prices that bidders offered to the target per share are not all available, because SDC only provides such information for deals where the terms are amended, and the price is in US dollars. Because of this, the final price offered per share indicated in the SDC database by (filed HOSTPR in SDC) will be used to calculate the premium. This section then calculates the final actual offer premium as a ratio of the final offer paid by the bidder to the target stock price, adjusted for splits and dividends and measured at one,two and three months before the SDC announcement or the initial public announcement date, as follows:

$$\text{The Final Offer Premium}_i = \left(\frac{P_{fin}}{P_{i,t=\text{either -A or -E}}}\right) - 1$$

where $P_{i,t=\text{either -A or -E}}$ is the target stock price one/two or three months before the SDC announcement date or the initial public announcement date, (adjusted for splits and price).

Next, this section considers the reported four-week offer premium (filed PREM4WK) as another bid premiums measure, based on the SDC database. PREM4WK is reported as percentage ratio of the final offer price (failed HOSTPR) to the closing price of the target stock at four weeks before the initial public announcement date (filed HOSTC4WK), as follow;

$$\text{PREM4WK} = \frac{(HOSTPR - HOSTC4WK)}{HOSTC4WK} \cdot 100$$

2.4.1.2. Event Study Premium

Schwert (1996a) calculates the Abnormal Return (AR) Premium as target cumulative abnormal stock returns (CAR) over the event window, [-42,126] or until the target's delisting date, adjusted using market model parameters. The event window [-42,126] divides into two parts: "*runup"* and "*markup*". The *runup* part is calculated as the target's cumulative abnormal return (CAR) from day -42 through to day -1 relative to the day of announcement (day 0) as follows:

$$CAR_{i,t} = \sum_{t=-42}^{-1} AR_{it}$$

The *markup* is calculated as target cumulative abnormal returns (CAR) from the day of announcement (t= 0) through to day 126, or until the day of the target's delisting, if before day 126. As bellow;

$$CAR_{i,t} = \sum_{t=0}^{\min\{126,\text{delisting}\}} AR_{it}$$

where AR_{it} is the daily abnormal returns and is calculated as the difference between the target's daily return R_{it} and the expected market return $E(R_{it})$ over the sample period (Brown & Warner, 1985) as follows:

$$AR_{it} = R_{it} - E(R_{it})$$

Here R_{it} is using the normal return using daily price data as a logarithmic return to avoid any statistical problems based on the formula:

$$R_{it} = \ln\left(\frac{P_t}{P_{t-1}}\right)$$

where P_t is the initial target daily stock price and P_{t-1} is the ending stock price $E(R_{it})$ for each day over the estimation window [-242, -43], calculated by using the estimated value of market model regression parameters α_i and β_i as follows:

$$E(R_{it}) = \alpha_i + \beta_i R_{mt} + \varepsilon_i$$

The total bid premium is the sum of the cumulative abnormal return for *runup* and *markup* periods, adjusted for market movement as follows:

$$\text{Abnormal Return premium}_{i,t} = \sum_{t=-42}^{\text{Min}[126,\text{delisting}]} \text{CAR}_{i,t}$$

2.4.2. Implementing Propensity Score Matching

This section aims to explain the main steps used to calculate the propensity score, following the practical guidance of Caliendo & Kopeinig (2008), Imbens & Donald (2009),and Guo and Fraser (2015). There are generally three main steps in implementing propensity score matching: estimating the propensity score, matching strategies, and calculating the treatment effect. Below is a summary of the main three steps of propensity score matching.

2.4.2.1. Estimating Propensity Score

Estimating the propensity score involves a two-step decision: the choice of models, and the choice of covariates. As the choices of treatment method are binary choices, we will use either logit or probit models, both of which usually yield similar results in the case of binary treatment (Caliendo & Kopeinig, 2008). In this paper, specifically, we adopt logit model to estimate propensity scores.[75]

Regarding the inclusion or exclusion of relevant variables in the regression, it is important to identify the covariates that, as suggested by both theory and empirical evidence, could affect the outcomes and treatment decisions. There has been much debate in recent literature regarding the procedures and rules of selecting co-variates. For example, Sianesi (2004), and Smith and Todds (2005) argue that only variables that have been thoroughly studied in both theoretical and empirical studies, should be included. Meanwhile, Rubin and Thomas (1996) argue that it is preferable to include all the observed covariates in the analysis, and to exclude only those that, by consensus in previous studies, have been shown to be unrelated to the treatment outcomes.

Researchers have proposed different approaches to the inclusion or exclusion of the relevant covariates in the propensity score estimation. For example, Rosenbaum and Rubin (1984b) choose to select variables by applying stepwise logistic regressions. According to this method,

[75] The results remain the same in case of using a probit model to estimate the propensity score.

only the variables that are significant based on t-statistics are included. If the linear terms are not sufficient, the propensity scores can still be adjusted by including high-order polynomial terms, interaction terms and stepwise logistic regression (Rosenbaum and Rubin, 1984b: 1985c), or as Deheji and Wahba, (1999) who add a stratification in order to determine the terms of high-order polynomial terms and interaction.

Recently, Imbeds and Rubin (2009) have introduced useful automatic procedures to include or exclude the relevant covariates in the estimation of propensity scores. Their procedures aim to calculate the propensity score in the logit model by including variables with different functional forms. The procedures start adding variables that are more likely to be associated with outcomes and the treatment assignment based on the literature review, in the simple linear form to estimate the propensity score. This step calculates the likelihood ratio of logit model for the test of the null hypothesis that the coefficient on the additional covariate is equal to zero. Then, the remaining linear covariates that are a prior viewed as other important factors for either the outcomes or the treatment assignment are added. Imbeds and Rubin (2009)'s procedure excludes variables that have likelihood ratio statistic exceeds than present constant C_L = 1, corresponding to t-statistics of 1.645.[76] Adding the variables in the linear form would be not sufficient to estimate the propensity score particularly with more control variables. As a result, the last step is to add these variables in the form of logarithm, or using higher order terms. However, the new forms of variables will not be included in this model if its likelihood ratio exceeds than some predetermine constant C_Q = 2.71, corresponding to a t-statistical of 1.645 (10% level). Finally, the propensity score will be estimated using a selection of linear variables and a selection of different functional forms.

As shown above, **Table 2** provides a relatively comprehensive list of the variables that may be related to takeover outcomes and the selection of takeover mechanisms. These variables include the target size, M/B ratio, leverage ratio, and dummy variables that take the value of 1 if target should pay termination fees, acquirer status (public vs. private), toehold, method of payment (cash vs. stock), whether a target initiated the deal, the period of financial crisis, whether the target and bidder hire a prestigious investment bank, auction, and other variables related. This section will apply logit model to estimate the propensity score in line with Imbeds

[76] The likelihood ratio statistic is double the difference in log likelihood values between the basic model and the model with extra variables

and Rubin (2009). **Table A2** shows the results of estimation the propensity scores using the logit model.

2.4.2.2. Matching Strategies

This step matches the treatment and untreated groups according to the estimated propensity scores. These matched samples have the same probability of being treated, and it is hoped that the differences in the outcome variable just reflect the causal effect of the treatment. There are different algorithm matching methods that have been discussed in the literature review, and can be divided into three groups: greedy matching, optimal matching and fine balance procedures Guo & Fraser (2015, p.132).

First, let us introduce some notations that is summarised by Smith and Todd (2005) about the matching estimators that is represented as;

$$\hat{\alpha}_M = \frac{1}{n_1} \sum_{i \in I_1 \cap S_p} \left[\text{Premium}_{1i} - \hat{E}(\text{Premium}_{0i} \mid D_i = 1, P_i) \right]$$

where,

$$\hat{E}(\text{Premium}_{0i} \mid D_i = 1, P_i) = \sum_{j \in I_0} W(i, j)\ \text{Premium}_{0i}$$

The indictors I_1 and I_0 denote the set of firms that choose scheme of arrangement and tender offer respectively. S_P is the common support of the covariates, and n_1 presents the number of acquired firms in the set $I_1 \cap S_P$. The expected premium is constructed as a weighted average, where the weights *W(i,j)* depend on the distance between P_i and $P_{j,}$ where p_i and p_j are the propensity score for scheme of arrangement target and tender offer target respectively.

In this paper, we will use the greedy matching methods, which is the most commonly used matching algorithm in empirical work. Greedy matching methods involve various strategies, such as Mahalanbobis metric matching with or without including the propensity score, nearest neighbour matching with or without restrict the distance between P_i and P_j,or matching with

using predetermined tolerance (ε) or caliper for matching either if the control participant is nearest neighbor or not Guo & Fraser (2015, p.145-147). Here this section will adopt two greedy matching strategies: *nearest-neighbour matching* and *caliper matching.* First, the nearest single neighbour matching is based on the use of the smallest absolute difference of propensity score between all the possible pairs as follows;

$$C(P_i) = \min_j \| P_i - P_j \| \quad , j \hat{I} I_0$$

where, C(P_i) is neighbourhood for each i in the control participant j, and ($j \in I_0$).

The nearest-neighbour matching strategy allows for the unit i to be matched to n participants who fall into $C(P_i)$. Here this section will match each treatment unit i to one, two and three possible neighbours that fall into $C(P_i)$. *Nearest-neighbour matching* can be applied in matching with replacement, which allows each target firms in the control group to be matched to more than one target firm in the treatment group. On the other hand, matching without replacement does not allow the use of the untreated firms more than once. For example if j is matched with i, j will not be used again and it will be removed from the set of untreated participant I_0. (Dehejia & Wahba, 2002) and Smith and Todd (2005) argue that matching the *Nearest-neighbor* with replacement or without replacement has a trade-off between bias and variance. The equality of matching is increased on average by using the untreated units more than one as a result of increasing the set of possible match. However, matching with replacement reduces the number of matched observation, particularly if the distribution of propensity score is very different between the two groups (treatment and untreatment), therefore the variance of the estimator will increase. – it is essentially a bias-variance trade-off. In contrast, matching without replacement could force the treatment unit to be matched with the nearest neighbour in the control group that are quite different in terms of the value of propensity score, risking a higher level of bias. Moreover, estimating the treatment effect by using matching without replacement is also sensitive to the order of propensity score.[77]

[77] The estimation of treatment effect will use matching with replacement as a common method in the empirical works.

Second, *caliper matching* implies matching the nearest neighbour with using different size of calipers. It could help to avoid poor matching practically when the distance between the matched unites is large Smith and Todd (2005). Although there is uncertainty about which level of caliper should be used, it is considered a way of imposing the condition of common support. Matching by caliper means that j will be selected based on an absolute distance of propensity score between all possible pairs by using predetermined calipers, where the target firm *i* is selected only if $\| P_i - P_j \| < \varepsilon, J \epsilon I$ and the neighbourhood in control group that is matching to *i* within caliper is;

$$C(P_i) = \left\{ P_j \mid \| P_i - P_j \| < \varepsilon \right\}$$

Where, e is a pre-specified caliper. [78]

2.4.2.3. Post-Matching Analysis

Post-matching analysis is divided into two steps to evaluate the matching strategy and sensitivity analysis to the hidden bias. First, after applying different matching strategies, it is important to evaluate how well the treatment and comparison group are balanced in the matched sample. The main aim of the PSM estimator is to make the outcome of a bidding strategy conditionally independent of the selected treatment. Therefore, if the estimator is well specified, this means that the covariates that are used to estimate the propensity score are balanced. Imai & Ratkovic (2014) show that the covariates are well-balanced if their standardized difference is zero and the variance ratio is one.[79] This section will use tebalance as a technique in STATA to calculate the standardized difference and variance ratio in order to test the balance of covariates after each matching strategy.

Second, this section will test the sensitivity of the results to the presence of omitted variables that may affect schemes and bid premium because of the bias is removed from the observable variables but it is important to know how large the effect of the unobservable variables affects the result of PSM. The basis for propensity score method is that the potential outcomes of a

[78] Applying a quarter of standard deviation (i.e., $\varepsilon \leq 0.25\partial_P$) of the estimated propensity is suggested by (Rosenbaum & Rubin, 1985) as size of caliper, where ∂_P is the standard deviation of the estimate propensity score.

[79] Imai and Ratkovic (2014) introduce the *covariate balancing propensity score* (CBPS) model to check the balance of covariates. Moreover, this section will use histograms to check the balance between covariates as suggested by Guo & Fraser (2015, p.198-200)

treatment are independent of the treatment decision conditional on a propensity score. However, the results depend on unbiased estimation of propensity scores, which may not be true in practice. Suppose an omitted variable is correlated with both the probability of treatment and the outcome variable. In this case, the differences in outcome between two matched individuals will reflect the composite of the treatment effect and the effect of the omitted factor. Such a problem that is created by the omitted factor is called "hidden bias" problem Guo & Fraser (2015, p.375-359). Therefore, it is important to test the sensitivity of the results to the presence of omitted variables that may affect the treatment and outcome. This section will follow the guidelines of Guo & Fraser (2015) and Becker & Caliendo (2007) to provide the appropriate theoretical background to the test.

The test is best described using Rosenbaum bounds. This section assumes that the probability an individual participates in a treatment is a function of observed covariates X (a vector) and unobserved covariates U (also potentially a vector)

$$P(D_i = 1 | X_i, U_i) = F(\beta X_i + \gamma U_i)$$

Where, for this analysis it is assumed that F(.) is the logistic sigmoid, and γ is the effect of the unobservable covariates on the decision to practice the treatment.

This section supposes that P_i and P_j are the probabilities that individual *i* and individual *j* receive treatment after applying the matching strategy. We can then calculate the odds ratio of two individuals receiving treatment,

$$\frac{\mathrm{Pi}/(1-\mathrm{Pi})}{\mathrm{Pj}/(1-\mathrm{Pj})} = \frac{\mathrm{Pi}(1-\mathrm{Pj})}{\mathrm{Pj}(1-\mathrm{Pi})} = \frac{\exp(\beta X_i - \gamma u_i)}{\exp(\beta X_i - \gamma u_i)}$$

If two individuals are matched according to their propensity score, then we have that,

$$\beta X_i = \beta X_j$$

And the odds ratio becomes $exp[\gamma (ui - uj)]$.

Propensity score of matching will yield unbiased estimates of the treatment effect if either γ = 0, or (*ui* −*uj*) = 0, meaning that either the observed factor does not affect the probability of treatment or the unobserved factors influence the probability of treatment in the same way for both individuals. If either of the above hypotheses is not true, then the odds ratio can be assigned boundaries,

$$\frac{1}{\exp(\gamma)} \leq \frac{\mathrm{Pi}(1\ -\ \mathrm{Pj})}{\mathrm{Pj}\ (1\ -\ \mathrm{Pi})} \leq \exp(\gamma)$$

Using the null hypothesis, γ = 0, the probability that the matched pair, *i* and *j*, will receive treatment is the same.

In order to explain how to test the sensitivity of the estimated treatment effect to unobserved covariates, this analysis introduces a test for treatment effect significance either if the outcome variable is a binary dummy.

Guo & Fraser (2015, p.342) suggests a way of testing for significance of treatment effects for a binary outcome variable using the non-parametric Mantel and Haenszel statistic, Q_{MH} (Mantel and Haenszel, 1959). The null hypothesis of this test is that there is no effect of treatment. This means that the outcome of scheme of arrangement is not affected by whether a company chooses scheme of arrangement or a tender offer. However, to implement a test we require a binary outcome variable, while $premium_i$ is a continuous variable. This analysis therefore requires that to convert $premium_i$ into a binary outcome variable. The STATA program (rbounds) can test the sensitivity to the hidden variables regardless if the outcome variable is a binary dummy or continuous.

Under the null hypothesis of no treatment effect, the distribution of Y follows a hypergeometric distribution (Becker and Caliendo, 2007), with a mean of ($N_D\ Y_1$ /N), where N_D is the number of treated individuals in a sample, N is the total sample size and Y_1 is the number of matched pairs in the sample. The test statistics Q_{MH} is calculated as,

$$Q_{MH} = \frac{|Y_1^D - \sum_{S=1}^{S} E(Y_{1S}^D)| - 0.5}{\sqrt{\sum_{S=1}^{S} var(Y_{1S}^D)}} = \frac{|Y_1^D - \sum_{S=1}^{S} (N_{1S}\ Y_{1S}\ /N_S)| - 0.5}{\sqrt{\frac{N_{1s}N_{0s}Y_s(N_S - Y_s)}{{N_S}^2(N_S - 1)}}}$$

where Y_{1S} , Y_{0S} and Y_S represent respectively the total number of successful target firms that received a treatment and the number of successful target firms from the control group, and the total number of all the successful units in sample stratum *s*.

The Q_{MH} statistic above assumes that we have correctly matched individuals in the treatment and untreated groups. However, it is possible to modify the above statistic to account for unobserved covariates (Rosenbaum, 2002) Specifically there are two bounds of the test statistic, as we vary exp (γ),: a lower (Q_mh^-) and upper (Q_mh^+) bound. The upper bound represents the test statistic given that we have overestimated the treatment effect, and the lower bound is the statistic if we underestimated the effect. In examining the sensitivity of a significant estimated treatment effect to unobserved omitted variables we accordingly examine the upper bound. As exp (γ) increases these boundaries move apart to reflect the increased uncertainty of the test statistics when a hidden bias is present since these bounds are calculated for a given level of exp(γ), the results of this sensitivity test are reported across a range of exp(γ). The exp (γ) represents the odds of differential assignment due to omitted factors that we will called Γ. In particular, we consider the p value from the upper bound of the test statistic. If $p<0.05$ at a given level of exp (γ) then we reject the null of no-treatment effect (at the 5% level) in the presence of an observed variable that increases the odds of treatment by a factor of exp(γ).

2.5. Empirical Results

2.5.1. Bid Premium to Target Shareholders for Scheme of Arrangements and Tender Offers

Table 3 presents the summary statistics of bid premiums offered for target shareholders of schemes and tender offers. The bid premium measures are the actual bid premiums based on the *final price* data before the initial public announcement date and the SDC announcement date. Later, different bid premium measurements will be used in **Table 4.** These include the actual bid premium based on *component* data, the four-week premium (field PREM4WK) calculated by the SDC four week relative to the original date of public announcement, and the abnormal return (AR) premium. The final column denotes the p-value of means test that tests

the null hypothesis based on t-tests of whether there are no differences between the schemes of arrangement and tender offer.

Panel A shows the actual gain of the target shareholders measured by the target's stock price at one/two and three months prior to the initial public announcement dates, based on *the final price* data and classified by the takeover methods. First, the bid premium is calculated from the price offered at one month before the initial public announcement date, which shows that the scheme deals earn on average 34.96% (0.000), the tender offer deals earn 42.90% (0.000), and the difference between the two-subsamples is a statistically significant. If this section takes the stock price two months prior to the announcement dates as the base, then the premium level of tender offer deals is 43.50% (0.000), and that of scheme deals is 35.36 % (0.000), and the difference is significant difference between the two sub-samples. Similar results are also reported in the case of three-month premium.

Panel B reports the premium levels, where this analysis takes stock prices prior to the SDC announcement date, rather than the initial public announcement dates, for calculation. For the one-month period before the SDC announcement date, the premium level of scheme deals is on average 33.72% (0.000), and that of the tender offer deals is 34.39% (0.000). On average, the premium level of scheme deals is 0.668% lower than that of tender offers, yet the difference is not significant.

When selecting the target's stock price two months before the SDC announcement date as the base, the premium of scheme deals is 34.705% (0.000), and that of tender offer deals is 39.208% (0.000). Again, the difference is not statistically significant. Similar results are also reported in the case of using stock price three-month before the SDC announcement date.

Table 4 reports results that are obtained using different bid premium measurements: the actual bid premium based on *component* data, the four-week premium that is calculated by the SDC at four weeks respectively to the initial public announcement, and, finally, the abnormal return (AR) premium. The sample sizes of the last two measures depend on the availability of (field PREM4WK) in SDC for the four-week premium and the target stock price in DataStream for the AR premium. The final column denotes the p-value of means test that tests the null hypothesis based on t-tests of whether there are no differences between the schemes of arrangement and tender offer.

Panel A shows the actual gain of the target shareholders measured by the target's stock price at one/two/three months prior to the initial public announcement dates, based on the *component* data and classified by the takeover methods. The one-month premium for scheme deals is on average 35.000 % (0.000) premium, and for tender offer deals is 41.015 %(0.000). On average, the gain of target schemes is less than that of tender offers by 6.014%, yet the difference is not significant. **Panel A** also reports the results for two-month and three-month premium levels. The similar results are reported that the premium levels of tender offer deals are higher than those of scheme deals, yet the premium differences are not significant.

Panel B reports the bid premium calculations based on the *component* data during a pre-offer period before the date of the SDC announcement. For the one, two and three-month premium levels, we receive similar results as in Panel A. That is, the premium levels of tender offer deals are higher than those of scheme deals, yet the difference across the two sub-groups are not significant. The other observation is that, the bid premium levels of Panel B are generally lower than their counterparts of Panel A.

Panel C shows the bid premiums using two alternative bid premium definitions: the four-week premium (field PREM4WK) and the abnormal return (AR) premium. The four-week premium indicates a significant gain of 33.637 % (0.000) for scheme deals, and that for tender offer deals is 42.733 % (0.000). The difference between them is significant. Panel C also reports the AR premium levels.

From the univariate analyses in **Table 3** and **4**, we find that, for various calculations of the bid premiums, the premium levels of scheme deals are lower than those of tender offer deals, by 5%. The differences are statistically significant in the case of **Panel A** in **Table 3**, where we calculate the bid premiums using *the final price* data and the initial public announcement date, and in the case of four-week offer premium in **Table 4.**

2.5.2. OLS Analysis

We next move on to the multivariate analysis, to see whether the observable target and deal characteristics that are found in the literature review and that have been discussed in **Table 2** could affect the bid premium. Specifically, this section runs the simple OLS regression, and

the results would be compared to those in the next section, where the matching method is applied.

Tables 5 and **6** report the OLS regression results. In **Table 5**, the calculation of the bid premiums is based on the initial public announcement dates. In **Table 6**, the calculation is based on the SDC announcement dates. We consider the cases for one, two and three-month bid premiums, and for each case, model (1) and (2) correspond to different sets of covariates. In the regression, this analysis uses a dummy variable to indicate the corresponding selling process, i.e., it is equal to 1 if a scheme mechanism is applied. The selection of covariates in model (1) and (2) is based on the existing literature, as the bid premium or the selection of the takeover methods determinants. These variables include target size, M/B ratio, target termination fees, acquirer status (public versus private), toehold, and method of payment (cash versus stock), the period of financial crisis, and the regulation shock.[80] Moreover, both models also include other variables that are related to the transaction environment or to the bidding strategy such as auction, target initiated the deal, whether the bidder and targets hire top investment bank. Finally, the other control variables that relate to the targets' financial health status such as EBITDA/AT, ROA, cash holding, and stock performance will be included.

Tables 5 shows the results for the cross-sectional of the bid premium that is calculated at one /two and three months prior to the initial public announcement date. After controlling the target and deal characteristics, the results show that the bid premium of scheme deals is roughly 8% lower than that of tender offer deals, which is, not surprisingly, consistent with the results of univariate test. However, the results are statistically significant only at 10% level in Model (1).

Table 5 shows that the bid premium increases with the size of the target, yet the result is not significant. In the literature, there are two opposite opinions about the relation between the target size and bid premium. One is that bidders may overpay for large targets, because the later have strong bargaining powers, which could lead to higher premium levels (Dutta & Saadi, 2011). The other is that large targets could obtain lower bid premiums for many reasons. For

[80] There is a correlation between the variables of the two variable *public bidders* and using 100 % of stock, because a private bidder is less likely to offer stock as a method of payment for a target firm. The sample consists of 446 private bidders, and only 5 firms offer non-cash offers. However, the sample consists of 313 public bidders offering all cash (all stock) as the payment method in 129 (109) of the sample transactions. As a result, this analysis decides to separate the two variables in the model as (1) and (2).

example, bidders may not be certain about the resulting synergies with large targets. Moreover, the bidders pay less for large targets, because the competition for large targets is commonly low, and this mitigates the winner's curse problem (Alexandridis et al., 2013).

The result also shows that a higher M/B ratio is associated with lower bid premiums, yet it is not significant. Higher M/B ratios are normally associated with low growth opportunities Harford et al., (2009) and Eckbo (2009). This section observes the same result by using Industry-adjusted M/B ratio as alternative measure for the growth opportunities.

The regression result shows a negative relationship between bid premium and target termination fees, and the result is not significant either. Normally, scheme transactions are associated with high levels of termination fees, that the target firm needs to pay to the acquirer if the transaction is not complete eventually. Offenberg & Pirinsky (2015) state that the relationship between target termination fees and the bid premium is ambiguous.

Next, when the bidders are public listed firms, the bid premium levels are significantly lower. This is surprising in the light of Bargeron et al., (2008), who finds that public bidders pay higher premiums for the target shareholders than private bidders. One plausible explanation for higher bid premiums by public bidders could be that the managers of public firms have a strong incentive to successfully complete the transaction Offenberg & Pirinsky (2015), and therefore pay more. Public bidders choose to structure the transaction by using scheme of arrangement, which gives them a more certainty to obtain the 100% of the target shares and this is consequently help them to avoid the additional cost of losing the target compare to the target firms, resulting in lower premium.

About payment method, using 100 % of stock as a method of payment significantly reduces the bid premium in all the models. For stock offers, target shareholders do not need to pay more taxes on capital gains, which is different from cash offers whereby the target shareholders ask for a higher price to cover the extra tax costs Huang & Walkling (1987). For mixed offers, where the payments are mixed between cash and stock, the results are ambiguous.

Next, toehold is associated with lower bid premium. When the bidder obtains a stake (toehold) in the target firm six- months before the announcement date, the target shareholders will receive lower bid premium. This finding is consistent with that of Betton et al., (2008a). However, the

negative relation between toehold and bid premium is statistically significant only in the models for one-month premiums.

The other main explanatory variables are related to the transaction environment, for example, whether the transaction occurred in the financial crisis period or in the time of the regulation shock. The results show that the effect of the financial crisis appears to have a significantly positive impact at 10% level on the one-month premium. Moreover, there is a negative relation between the regulation shock and bid premiums across all the models, yet such result is not statistically significant.

Another important explanatory variable that could affect the bid premium is whether the transaction is target initiated or not. The result shows that the bid premiums are significantly lower across all the models if the transactions are initiated by target firms. Furthermore, the bid premium decreases with the high level of leverage and tangible assets. This is consistent with Bargeron et al., (2008), who argues that a high level of leverage could weaken a target firm's bargaining power during the takeover process, and, therefore, the target shareholders will obtain a low premium. However, this result is not statistically significant.

Consistent with Boone & Mulherin (2008b),using prestigious banks do not cause bidder firms to overbid for target firms. Using auctions significantly increases the target bid premium in most of the models, which is consistent with Bulow & Klemperer (1996a). The high level of competition between bidder firms who compete for the same target firm will raise up the offer price of the winner bidder. This result confirms the argument of Roll (1986a) winner's curse problem exists in the takeover market and rejects Boone & Mulherin (2008b) who find auction as a proxy for winner's curse does not encourage the bidder to overpay for the target. Finally, if the bidder aims to delist the target from the market, the target shareholders significantly obtain a lower premium.

In relation to other control variables related to the targets' financial information, targets with poor stock performance significantly reduces the target shareholder's premium. Such results are in line with Fidrmuc et al., (2012) who found that the bid premium is higher when there is poor past stock performance. The variables that measure the target profitability and the level of cash do not have a significant impact upon the bid premium.

Table 6 reports the similar regression results, where the analysis uses the SDC announcement date in calculating the bid premium. Remember in **Table 5**, the analysis uses the initial public announcement date for calculation the bid premium instead. The scheme of arrangement decreases the target's premium at one/two/and three months in all the models before the SDC announcement date, which is consistent with the univariate test. However, in model (1) in case of using a target stock price three-months before the SDC announcement date show a negative effect for scheme upon the bid premium at 10% level.

Moreover, the larger the target size, the less the premium shareholders obtain. Again, there is no significant effect for the target size on the bid premium. The effect of M/B ratio appears as it has a significant negative relation on the bid premium in case of using a target stock price three -month before the SDC announcement at 10% level. The sign of the coefficient that shows whether the termination fees exist is shown as sometimes negative or positive. However, the statistical test of the variables is not significant. The bid premium is significantly negative if the acquirer is public listed firm. Accepting 100 % of stock as the method of payment significantly lowers the bid premium as measured at one/two and three months before the SDC announcement date. Model (2) shows that accepting mixed offer between cash and stock is significantly lower the premium in case of using a target stock price one/ two and three months before the SDC announcement date to calculate the premium.

Moreover, accepting the offer from the bidder who owned a stake in the target tends to be insignificantly lower the bid premium. Still the transaction that happened in the period of finical crisis positively affects the wealth of target shareholder wealth. The regulation shock has a mixed between positive and negative impact on the premium. However, the effect is statistically not significant. Initiated the deal by the target has a negative impact upon the bid premium and the result is statistically not significant. The more tangible assets the targets have, the less premium is significantly obtained. There is a negative relation between the levels of leverage and bid premium, however, the effect of leverage has no statistically significant impact upon the bid premium.

In addition, there is no significant effect on bid premium either if the target or bidder use top-tier investment banks to advise them in the deal process. Auction has a significantly positive impact on the shareholder's premium which means that bidder overpay to the target in case if

there is another acquirer bid for the target. Finally, the poorer past stock performance of a target tends to have a significantly high bid premium.

In conclusion, the linear regression estimates the effect of using schemes as a dummy variable upon the bid premium with taking into consideration the other determinants of the bid premium and the selection of takeover methods. The result shows that there are some variables that have significantly negative impact on the bid premium such as if the bidder is public listed firm, if the bidder uses a 100% stock to pay for the target shareholders, if the target is delisted from the stock market and the target with poor stock performance. From the other side, if the target initiated the deal, if the deal occurred in the time of financial crisis period and if there are more than one bidder bid for the same target, target obtains a significantly high bid premium.
However, self-selection in the treatment still exists in the estimate of linear regression where the assignment of the takeover methods is a self-selection decision made by the preference of bidder, target firms or the deal characteristics. To correct the self-selection problem, this analysis applies the method of propensity score matching to address the selection bias problem, and estimate the average treatment effect. The OLS result is discussed in the previous section in order to compare it later with the matched sample after controlling the bias selection problem.

2.5.3. Choice of Takeover Method

One of the main objectives of this chapter is to explore the determinants on the choice of a specific selling method in takeovers. **Table 7** models the choices of the selling mechanism in the U.K. market using the marginal effects from a logit model of the probability for a deal to structure as auction on the selective covariates. In model (1) we start with the main explanatory variables that are deemed in the literature to be the main determinants for bid premium or the selection of takeover methods. These variables include target size, market-to-book value, target termination fees, acquirer status (public versus private), toehold, and, the percentage of cash that used by the bidder to pay for the offers, the period of financial crisis, and the time of regulation shock, tangible assets and the level of leverage. In model (2), we further include a set of variables related to the transaction environment or the transaction characteristics, such as auction, target initiated the deal, whether the bidder and targets hire top investment bank. Finally, model (3) further includes the control variables such as whether the target is delisted

from the exchange market, and the variables related to the targets' financial characteristics such EBITDA/AT, ROA and ROE, cash holding and stock performance.

In Model (1), most of the observable explanatory variables strongly affect the choice of takeover method and have the expected signs. Only the ratios of M/B and leverage do not show significant impact on the choice between schemes and tender offers. As predicted, target firms that are sold in schemes are more likely to be large firms, which confirm the conjecture that larger firms have larger numbers of tendered shares, which increases the uncertainty for a bidder in obtaining 100% share ownership in case of using tender offer. Using a friendly process like a scheme could increase the likelihood that the bidder obtains the full control of the target.

Table 7 also shows some results on the impact of payment methods on the choice of selling method in takeovers. For example, using cash decreases the probability of choosing schemes as the selling methods.

It is also shown that private acquirers are more likely to choose schemes as the takeover methods. Termination fees also matters. This result is consistent with the conjecture that a bidder knows that a scheme of arrangement as a takeover method gives them an amount of certainty about the completion of the acquisition. However, the corollary is that such a process takes a long time to ensure the target's intent to complete the deal, and necessitates a long period to process the scheme. The bidder, therefore, asks for higher termination fees.

Consistent with the conjecture that bidder do not usually seek to build a stake in the target, as that stake will not be counted towards the threshold of 75% voting power in terms of using scheme. The result shows that targets are less likely to be sold in scheme when the bidder owns a stake in the target firms.

Target firms are more likely to be sold in scheme of arrangement in the period of financial crisis. It may reflect the facts that bidders becoming more familiar with the judicial process and the forum of the courts to affect takeovers, especially with the amendments that were added to the scheme practice. For example, there is now no need to petition the court to commence a scheme (Payne, 2014a, p 84). This might explain why schemes became a preferable takeover method in the UK during the financial crisis. Although the U.K. government prohibits the cancelation scheme to prevent the acquirer from avoiding the stamp duty, scheme of arrangement is still a preferable method to implement the takeover transactions.

The trend of using schemes in the takeover market is confirmed by the results whereby target firms are more likely to be sold by scheme even after the regulation shock because it could be that bidder is more certain to obtain 100% share ownership, if this is necessary by using a scheme. Moreover, target firms that are rich in tangible assets are less likely to be sold in schemes. Model (2) shows that the target is more likely to be sold in scheme when the bidder and target use prestigious investment or when the target initiates the deal. Model (3) shows that the control variables that could indicate the financial health of the target do not have affect the choice between the takeover methods.

In conclusion, this section shows that most of the covariates have the expected signs that have been predicted as main explanatory variables that could affect the bid premium or the choice between schemes and tender offer and they are significant at the 5% level or stronger. Such as, the size of the target, the percentage of cash, the bidder public status (public versus target), the exist of target termination fess, if the bidder owned a stake before the announcing of the transactions, the tangible assets, and if the target happened during the crisis time or after the regulation shock. Moreover, other variables related to the transactions environment such as the characteristic of the target and bidder advisors and if the target initiated a deal affect the choice between scheme and tender offer. The next part will estimate the casual impact of using schemes upon the target bid premium by using only the variables are significant.

2.5.4. Matching

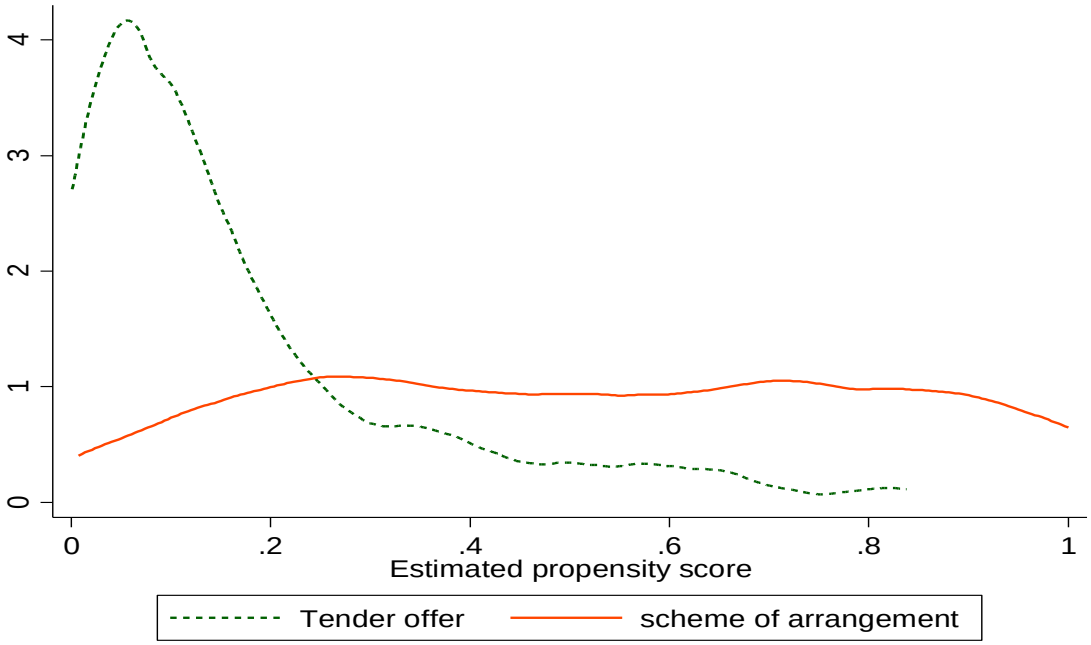
2.5.4.1. Propensity Score Estimation

The first step of implementing the propensity score of matching is to estimate the propensity scores. Here the analysis will run a logit regression to estimate the propensity scores, while just keeping the statistically significant variables. **Table A2** in the Appendix A shows the results of estimating the likelihood of choosing scheme of arrangement by using the selective covariates that appears in the linear, higher order terms and interaction terms, as suggested by Imbeds & Rubin (2009).

After estimating the propensity scores, it is essential to examine whether the overlap assumption is satisfied or not. According to Guo & Fraser (2015), the overlap assumption is violated when there are mass propensity score distributions at zero or one. **Figure 1** shows the

distributions of the propensity scores, based on the logit model in **Table A2** It is clear that, the quality of propensity score distribution satisfies the overlap assumption, as there are no values for the propensity scores that have zero or one in either tender offer (control group) or scheme of arrangement (the treatment group).[81]

Figure 1 Estimated propensity score



2.5.4.2. Treatment Effects

Tables 8 reports the results of the treatment effects, after implementing the matching strategies. Each row provides the results for both the average treatment effect (ATE) and the average treatment effect of the treated (ATT). This section applies various greedy matching strategies here: nearest neighbour matching (in **Panel A**) and caliper matching (in **Panel B**). The columns are stratified based on the selection of the pre-offer price periods that are used to calculate the bid premium: one /two and three months before both the initial announcement date and SDC announcement date, respectively. **Tables 8** provides results for both ATE and ATT based on the marginal effects in **Table A2**. The scheme of arrangement, in line with the general expectation, tends to generate significantly lower premium levels than tender offers.

[81] In number, The distribution of the estimated propensity score is between 0.0009 and 999

Panel A estimates the treatment effects by matching the target firms choosing schemes (the treatment group) to one, two and three target firms that choose tender offers (the control group). The first row matches each target firm in the treatment group with the nearest neighbour in the control group, and there are 102 schemes targets matching with 99 tender offer targets. In the first column, ATE and ATT are estimated by using a bid premium measured by one month before the initial announcement date. In the estimation of ATE, the coefficient on the scheme dummy is negative and statistically insignificant.

In the case of estimate ATT, scheme targets still lose a premium in comparison to the tender offer by on average by - 6.437% through matching 201 treated targets with 99 untreated units, that the coefficient of ATT is statically insignificant.

In the second and third columns, ATE and ATT are estimated by using a bid premium measured by two and three months before the initial announcement date, where each target firm in the treatment group matches with a signal nearest neighbour in the control group. The ATE shows that the target firms that accept scheme of arrangement to implement the takeover will lose a premium in comparison to tender offer by on average -7.822% and -6.382% respectively. However, the result is not significant. The estimation of ATT shows that using the scheme of arrangement to implement the takeover reduces the premium by on average -5.918% and -3.316% respectively; however, the result is not significant.

The last three columns use to calculate the bid premium at one /two and three months before the SDC announcement date to estimate ATE and ATT. Both estimations show that using the scheme of arrangement leads the target shareholders to gain significantly less compared with the tender offer. However, the result remains insignificant

The analysis now moves to estimate ATE and ATT based on the pre-offer periods that are before the initial date of announcement and SDC announcement date by matching each target that accepts scheme of arrangement to two nearest neighbours that accept the tender offer. These strategies of matching use 133 scheme of arrangement and 158 tender offer observations to estimate the treatment effect. In the first column, the estimation of ATE shows that the scheme of arrangement strongly reduces the target shareholder's premium by on average -11.228%. The estimation of ATT shows that the target shareholders who actually accept to implement the takeover by using scheme of arrangement lose a premium by on average -7.192%. The results are robustness by using different periods to select the target share price in

order to calculate the bid premium. In the second and third columns, in case of estimate ATE, scheme of arrangement strongly reduces the premium of the target shareholders by on average -11.939% and -10.708% respectively. In case of estimate ATT, the second column shows that target shareholders who actually accept scheme of arrangement gain less than the target firms using tender offer by - 8.942% on average. However, the result is statistically not significant. The third column shows that; the premium is significantly reduced for the target who actually accepted the scheme of arrangement by on average -6.546%.

The fifth and sixth columns report that, in case of estimate ATE, scheme of arrangement significantly reduces the shareholder premium by on average -9.541% and -9.432%, respectively. In case of estimate ATT, the targets who actually accepted scheme of arrangement strongly lose a premium by on average 6.738% and 5.317% respectively in the fifth and sixth columns. It is important to note that the percentage of losing wealth become large in the case of estimate ATE in comparison to ATT. This means that a target manger should require higher premiums to help the shareholders to cover the losing in wealth that the sachems due.

Next, the analysis will use the implication of nearest neighbour matching strategies by defining three participants in the control groups to be match with a treatment unit. This strategy uses 147 schemes of arrangement units and 205 tender offer observations to estimate the treatment effect. In general, the estimate of ATE has a strong significantly negative impact upon the bid premiums regardless across most of the columns. The estimate of ATT shows that; scheme of arrangement significantly reduces the target firms' premiums by on average - 5.779% and -4.433% in the first and third columns respectively.

Panel B provides information related to the application of matching schemes by using the nearest neighbour with specify a size of caliper. In general, this section chooses to implement caliper ($\varepsilon = 0.02$) in order to estimate ATE and ATT. These strategies of matching with caliper uses 75 schemes and 77 tender offer observations to estimate the ATE and it uses 158 schemes and 96 tender offer targets to estimate the ATT. In the first and second columns, the coefficients of ATE are significantly negative which means that using scheme to implement takeover reduces the premium by on average -11.416% and -13.195% respectively. In the third columns, scheme of arrangement significantly reduces the shareholder's premium by on average -10.460% at 10% level. The last three columns show that in general scheme of arrangement reduces the target premium. However, the result is only significant in the fifth column at 10%. The coefficients of ATT show that scheme of arrangement has a negative

impact on the shareholder's premium who actually accept to implement the takeover by schemes. However, the results are not statistically significant.

2.5.4.3. Robustness Test

Robustness test is divided into two steps: evaluate the matching strategy and sensitivity analysis to the hidden bias. First, after applying different matching strategies, it is important to evaluate how well the treatment and comparison group are balanced in the matched sample. Second, this section will test the sensitivity of the results to the presence of omitted variables that may affect schemes and bid premium because of the bias is removed from the observable variables but it is important to know how large the effect of the unobservable variables affects the result of PSM.

This section first will show the results that related to the matching evaluation. The preferred results of this section is the estimation of ATE and ATT by using the strategy matching of one unit from the treatment group to two or three unites in the control group. Therefore, the evaluation matching will be presented with one of the preferred result, which is matching one-target firms in the scheme group to two target firms in the tender group.[82] **Table 9** reports results of the comparison of covariate balance after estimating ATE by applying nearest neighbour 1-to-2 matching strategy without caliper. In the raw sample, the covariates seem to be balanced compare to the treatment unites. For most of the variables that have been used to estimate ATE, the standardised difference is close to zero and the variance ratio is close to one. **Table 10** shows the comparison of covariate balance after estimating ATT by applying nearest neighbour 1-2 matching strategy without caliper. Most of the variables have a standardise difference that is close to zero and a variance ratio that is close to one, except some variables. For example, the mean of the firm target size and toehold in the raw unit look differ from the matched one. The standardised difference is far from zero and the variance ratio is not close to one. Because of this, it is important to check the balance for firm size and cash holding by using histogram as suggested by Guo & Fraser (2015). **Figure 3** show the comparison of estimated propensity scores generated by **table A2** across target size. It can be seen that; the matched

[82] The main reason to do that to avoid presenting too many tables for each matching strategy and the results are available upon request

sample is balanced in term of firm size. Thus, there is no need to increase the quality of matching.

This second section concerns the sensitivity of the results to the presence of omitted variables that may affect schemes and bid premium. Using matching method removes the problem of selection bias between the schemes and tender offer. However, the bias does not remove from unobservable. This section will use the test that is suggested by Becker and Caliendo (2007) in **section 2.4.2.3** that test how large the effect of the unobservable or "hidden bias" needs to be in order to reverse the results found by PSM. **Tables 11** shows the result of the sensitivity analysis for 1-to-2 strategies that are used in **Table 8**. In case of match one target firm from the scheme group to two target firms in the tender offer group to study the effect of using scheme on bid premium at one/two and three months before the initial announcement date. Under $\Gamma=1$, there is no hidden bias and the scheme of arrangement has a significant impact upon the bid premium.

2.5.5. A Comparison of Estimated Models of the Impact of Schemes of Arrangement upon Bid Premiums

All of the methods (t-test, OLS and PSM) conclude that the average treatment effect of using scheme generate significantly lower premiums than those structured through tender offers. However, this result is more stable in case of calculating the bid premiums by using stock prices in the period before the initial announcement date.

The normal linear regression analysis as discussed before apparently may involve the self-selection problem, as the selection of a specific takeover method would be self- decision of the bidder firms, which may in turn depend on its specific characteristics. If the self-selection problem is not properly addressed, the regression will render biased estimates. Because of this, the analysis use PSM. It is worth to establish a comparison between the average treatment effect before and after controlling the selection-bias problem. **Table 12** shows a comparison of findings across models estimating the impact of schemes of arrangement upon bid premiums. First, the t-test shows that schemes significantly reduce the bid premium at, on average, -7,941% (0.023),-8.132% (0.023) and -7.814% (0.000), when the bid premium is measured by the target's stock price at one/two/three months prior to the initial public announcement dates,

based on *the final price* data, respectively. However, the result is statistically insignificant when using the period before the SDC announcement date to calculate the premiums.

In OLS, the results show that the bid premium of scheme deals stands at roughly 8% lower than that of tender offer deals, and the results are statistically significant only at the 10% level, in cases when the bid premium is measured by the target's stock price at one/two/three months prior to the initial public announcement dates. However, in cases using the period before the SDC announcement date to calculate the premiums, the result is statistically insignificant.

The effect of schemes remained significant after controlling the selection-bias problem, whereby schemes, in general, significantly reduce bid premiums, using the period before the date of the initial SDC announcement date to calculate the premiums. The ATE and ATT were estimated using a regression-adjusted model, too. Schemes still lower the bid premium in takeover deals. However, the results were significant when using the period before the initial announcement date to calculate the premiums.

2.6. Conclusion

Scheme of arrangements has become a main choice in the U.K. market to implement the takeover transactions in recent years. This maybe because scheme of arrangement allows bidders to be certain if it is essential to obtain 100% of the target shares, whereby the law only requires a minimum of 75% of the target company's voting rights to approve the transaction particularly with larger companies and the concomitant financial worth of such companies.

However, there has been much debate among the UK takeover regulators and articles in the popular press about whether the takeover transactions should be allowed to be implemented by the way of scheme of arrangement because bidders can acquire a target company "cheaply" and "easily" in comparison to using the tender offer process. The debate is raised without evidence from the empirical research that could confirm or reject that scheme of arrangement is cheapest method in comparison to tender offer.

The main aim of this chapter is to estimate the casual impact of using the scheme of arrangement to implement a takeover on target's bid premium as main observable outcome of

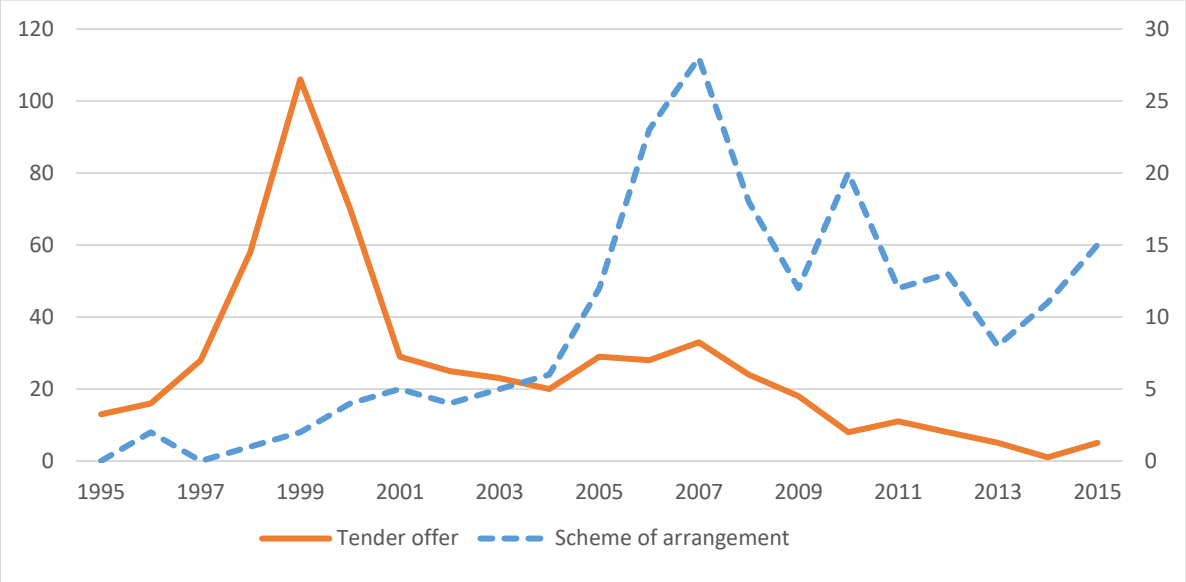
the bidding strategy. The self-selection bias is solved by employing the propensity score matching (PSM) methodology because the choice of scheme of arrangement is self-selected that maybe related to the target, acquirer or deal characteristics, which are different from the tender offer deals. Therefore, a simple comparison or regression on the mean difference in bid premiums between the scheme of arrangement and tender offer deals would be biased. This chapter uses a sample of the UK takeover transaction between the period 1995-2015 for listed target firms and the sample is split into two sub-groups; deals that are implemented by the way of scheme of arrangement and deals that are implemented by the way of tender offer. The main result shows that scheme of arrangement significantly reduces the target shareholders gain relative to the tender offer.

Table 1 Sample Construction

The table shows the main steps that are used to construct the sample, and steps drop the number of deals, as listed below. Thomson One Banker provides all the acquisition data from Thomson One Banker (SDC) UK M&A Database over the periods 1995-2015. The original sample is restricted to meet step one criteria. Deals are subdivided in step two as schemes of arrangement and tender offers, based on the files *acquisition technique, synopsis* and *the history file event* in SDC database, which provide information about the specific takeover methods that are used to implement a deal, details about the parties involved in the transaction, and a summary of a bid history. Step three utilises information from the LexisNexis U.K. database to verify the actual takeover methods of deals in cases where this information is missing in SDC, and, second, to check whether a deal has been implemented by a scheme of arrangement or tender offer, as, in some cases, the SDC acquisition technique file indicates both when cataloguing single deals. The final sample consists of 201 scheme of arrangement deals and 558 tender offers after deleting deals that do not have DataStream codes or information related to the bid premium calculations in SDC or LexisNexis U.K. databases such as the share price paid by the acquirer for target shares (filed HOSTPR) and the calculated SDC premiums (filed PREM4WK). Moreover, the analysis deletes a deal that does not have DataStream information related to the main variables; sales, total assets, market to book value and leverage ratio in order to have sufficient data that measures the impact of accepting scheme of arrangement offer on target shareholder wealth. Finally, hostility offers are excluded. For more details about the steps that are used to utilise the final sample please see section 2.3.1.

Steps	**Total observations**
-The Target firm belongs to the U.K. with completed merger and acquisitions announced between January 1, 1984 and December 31, 2015	67,471
Steps (1) the main criteria	
-Target is a public firm on the London Stock Exchange	6,050
-The bidders are from the U.K.	4,047
-Bidder is a public firm, private and subsidiary	3,967
-Deal value > £1m	2,860
-Before owned less than 50%	2,768
-After owned at least 90 %	1,732
-Self-tender, recapitalisation, exchange offer, repurchase, privatisation and creditor's scheme of arrangement transactions are excluded	1,718
- Payment method is known (i.e. cash, stock or mixed).	**1,404**
Steps (2) two sub-samples are created using acquisitions techniques, synopsis and the history file event	
A) Scheme of arrangement offers are included	230
B) Excluded Step (A) and only tender offers are included	1,174
-There are no sufficient scheme takeovers that have been covered by the SDC before 1995. Therefore, the new sample period starts from 1995-2015	**1,118**
Scheme of arrangement	228
Tender offers	890
Steps (3) using Lexis Nexis database	
The Total sample	**922**
Scheme of arrangement	222
Tender offers	700
Deals lost because:	
No DataStream codes or no information related to the bid premium calculations	-196
No DataStream information related to the main variables sales, total assets, market to book, leverage	-142
Hostility offers are excluded	-17
Delete the deals that have the same name for target and acquirer	-4
The final sample	**759**
Scheme of arrangement	201
Tender offers	558

Figure 2 The Distribution of selling mechanisms (Scheme of arrangement - Tender offers), U.K. market, 1984-2014



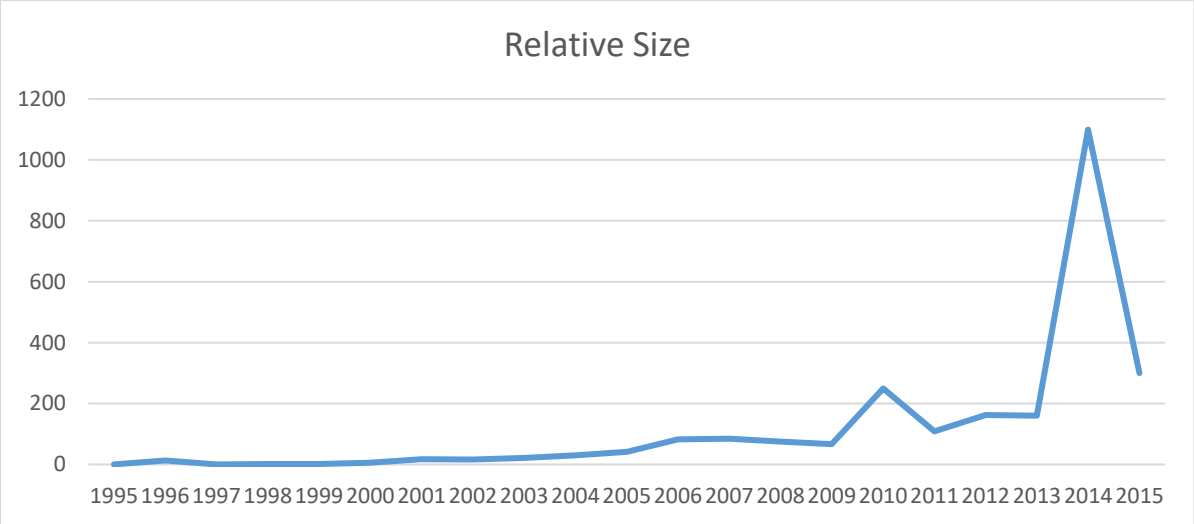


Table 2 Summary Statistics Sorted by the Sales Process (Scheme of arrangement -Tender offer), U.K. Market, 1995-2015

Scheme of arrangement versus tender offers. This table reports summary statistics on target firms and deal characteristics of the sample consisting of 759 U.K. takeover deals. The statistical information is reported for the whole sample and for deals that are implemented by scheme of arrangements and tender offers. Of these 201 deals are classified as scheme deals and 558 deals are tender offers. Schemes refer to a takeover method that requires the involvement of the court and the approval of a majority number of shareholders— 75% of the target company's voting rights. Tender offers refer to cases in which an acquirer firm offers to purchase outstanding shares directly from target's shareholders. **Panel A** presents the mean value for the target's characteristics, as sourced by Thomson DataStream. **Panel B** reports the mean value for the proportion of deal characteristics, as sourced by Thomson One Banker (SDC). **Table A1** in the Appendix A reports all the definitions and database sources of variables that have been presented in **Panel A and B**. The final column shows the differences in the means between the scheme of arrangement and tender offer sub-samples and its significantly levels are denoted by p-value of the means that tests the null hypothesis based on t-tests, ascertaining whether there are differences between schemes of arrangement and tender offers. The statistical significances between schemes of arrangement and tender offers at the 1% level, 5% level and 10% level are denoted ***, **, *.

	Full Sample		Scheme of arrangement		Tender Offer		Difference in means
	Mean	N	Mean	N	Mean	N	
Panel A: Target characteristics							
Ln (Sales)	11.050	759	11.534	201	10.876	558	0.657***
Age (Year)	15.181	759	16.916	201	14.556	558	2.360**
M/B	2.136	759	2.917	201	1.860	558	1.061
Target M/B > industry median	0.569	759	1.376	201	0.278	558	1.098
Sales growth	35.791	743	44.369	198	32.68	545	11.694
Leverage	20.311	759	20.323	201	20.307	558	0.016
Collateral	30.480	759	21.997	201	33.536	558	-11.538***
Run-up (-1, -42)	0.125	755	0.085	199	0.140	556	-0.055***
Run-up (-1, -63)	0.153	755	0.103	199	0.170	556	-0.067***
EBITDA/TA	0.088	740	0.067	196	0.095	544	-0.028
Cash holding	12.197	738	13.151	192	11.862	546	1.288
stock performance	16.465	751	2.492	199	21.503	552	-19.01
Book assets (UK£, millions)	162,907	759	5,336	201	293	558	5,043**
MV (UK£, millions)	350.97	753	881.793	200	158.986	553	722.807***
Panel B: Deal characteristics							
Transaction value (UK£, millions)	399.885	759	999.271	201	183.977	558	815.294***
Days to completion	59.076	759	98.582	201	44.845	558	53.736***
Bidder Termination Fee	16.224	14	24.263	8	5.506	6	18.756
Target Termination Fee	6.196	109	10.989	54	1.404	55	9.584***
Negotiation (%)	94.598	718	93.034	187	95.161	531	-2.126
Auction (%)	4.743	36	5.970	12	4.301	24	1.669
Target-Initiated (%)	4.479	34	6.965	14	3.584	20	3.380**
Bidder-Initiated (%)	95.520	725	93.034	187	96.415	538	-3.380**
Target debt ratio	49.902	658	46.191	175	51.246	483	-5.055**
Percent of Cash (%)	93.383	647	91.863	165	93.904	482	-2.041
Percent of equity (%)	81.900	189	83.749	59	81.062	130	2.686
Pure cash deals (%)	75.098	570	70.702	142	76.702	428	-6.055 *
Pure equity deals (%)	14.756	112	17.910	36	13.620	76	4.290
Mixed offers (%)	10.144	77	11.442	23	9.677	54	1.765
Crisis (%)	17.523	133	28.855	58	13.440	75	15.414***
Regulation Shock (%)	8.695	66	23.383	47	3.405	19	19.978***
Bidder hires top bank (%)	21.080	160	28.855	58	18.279	102	10.576***
Target hires top bank (%)	20.948	159	29.353	59	17.921	100	11.432***
Public bidder (%)	41.238	313	33.830	68	43.906	245	-10.075**
Private bidder (%)	58.761	446	66.169	133	56.093	313	10.075**
Owned directly before (%)	23.894	108	22.457	14	24.108	94	-1.651

Table 3 Bid Premium Measure for Different Acquisition Methods, U.K. Market, 1995- 2015

Scheme of arrangement versus tender offers. This table reports summary statistics of bid premiums offered for the target shareholders of schemes and tender offers of the sample consisting of 759 U.K. takeover deals. The statistical information is reported for the whole sample and for deals that are implemented by scheme of arrangements and tender offers. Of these 201 deals are classified as scheme deals and 558 deals are tender offers. Schemes refer to a takeover method that requires the involvement of the court and the approval of a majority number of shareholders— 75% of the target company's voting rights. Tender offers refer to cases in which an acquirer firm offers to purchase outstanding shares directly from target's shareholders. **Panel A** reports the mean value for the actual bid premiums based on the *final price* data at one, two, and three months before the initial public announcement date. **Panel B** reports the mean value for the actual bid premiums based on the *final price* data at one, two, and three months before the SDC announcement date. The table uses the formula $\left(\frac{P_{fin}}{P_{i,t=either-A\ or-E}}\right) - 1$ to measure the final offer premium. The final column shows the differences in the means between the scheme of arrangement and tender offer sub-samples and its significantly levels are denoted by p-value of the means that tests the null hypothesis based on t-tests, ascertaining whether there are differences between schemes of arrangement and tender offers. The p-value is reported in brackets. The statistical significances between schemes of arrangement and tender offers at the 1% level, 5% level and 10% level are denoted ***, **, *.

Premium definitions	Full Sample		Scheme of arrangement		Tender Offer		Difference test
	Mean	N	Mean	N	Mean	N	
Panel A: Bid premium measures for the General Offer versus Scheme of arrangement by the initial public announcement date							
One month -Premium	40.799%***	759	34.961%***	201	42.902%***	558	-7.941% **
	(0.000)		(0.000)		(0.000)		(0.023)
Two months -Premium	41.342%***	759	35.363%***	201	43.495%***	558	-8.132% **
	(0.000)		(0.000)		(0.000)		(0.023)
Three months -Premium	41.227%***	759	35.481%***	201	43.296%***	558	-7.814%**
	(0.000)		(0.000)		(0.000)		(0.032)
Panel B: Bid premium measures for the General Offer versus Scheme of arrangement by the SDC announcement date							
One month -Premium	34.209%***	759	33.717%***	201	34.386%***	558	-0.668%
	(0.000)		(0.000)		(0.000)		(0.835)
Two months -Premium	38.016%***	759	34.705%***	201	39.208%***	558	-4.503%
	(0.000)		(0.000)		(0.000)		(0.183)
Three months -Premium	40.337%***	759	36.231%***	201	41.816%***	558	-5.585%
	(0.000)		(0.000)		(0.000)		(0.108)

Table 4 Alternative Bid Premium Measure for Different Acquisition Methods, U.K. market, 1995- 2015

Scheme of arrangement versus tender offers. This table reports summary statistics of different bid premium measurements of the sample consisting of 759 U.K. takeover deals. The statistical information is reported for the whole sample and for deals that are implemented by scheme of arrangements and tender offers. Of these 201 deals are classified as scheme deals and 558 deals are tender offers. Schemes refer to a takeover method that requires the involvement of the court and the approval of a majority number of shareholders— 75% of the target company's voting rights. Tender offers refer to cases in which an acquirer firm offers to purchase outstanding shares directly from target's shareholders. **Panel A** reports the mean value for the actual bid premiums based on the *component* data at one, two, and three months before the initial public announcement date. **Panel B** reports the mean value for the actual bid premiums based on the *component* data at one, two, and three months before the SDC announcement date. This table uses the formula $\left(\frac{(\text{Total consideration offered }_i/\%\ \text{acquired}_i)\text{X }100}{\text{Target market value of equity}_{i,t=\text{either}-\text{A or}-\text{E}}}\right)$ to measure the final offer premium. **Panel C** reports the mean value of the four-week premium (field PREM4WK) that are calculated by The Thomson One Banker (SDC) at four weeks relative to the initial date of public announcement. The SDC database uses the formula $\frac{(\text{HOSTPR}-\text{HOSTC4WK})}{\text{HOSTC4WK}}\text{X}100$ to measure the final offer premium. The abnormal return (AR) premium is reported in **Panel C** by using the formula $\sum_{t=-42}^{\text{Min }[126,\text{ordelisting}]} \text{CAR}_{i,t}$. The final column shows the differences in the means between the scheme of arrangement and tender offer sub-samples and its significantly levels are denoted by p-value of the means that tests the null hypothesis based on t-tests, ascertaining whether there are differences between schemes of arrangement and tender offers. The p-value is reported in brackets. The statistical significances between schemes of arrangement and tender offers at the 1% level, 5% level and 10% level are denoted ***, **, *.

Premium definitions	Full Sample		Scheme of arrangement		Tender Offer		Difference test
	Mean	N	Mean	N	Mean	N	
Panel A: Return measures based on component data for the General Offer versus Scheme of arrangement by the initial public announcement date							
One Month-Premium	39.428%***	758	35.000%***	200	41.015%***	558	-6.014%
	(0.000)		(0.000)		(0.000)		(0.180)
Two months -Premium	42.821%***	758	35.788%***	200	42.821%***	558	-4.410%
	(0.000)		(0.000)		(0.000)		(0.529)
Three months -Premium	43.496%***	758	36.233%***	200	46.099%***	558	-9.865%
	(0.000)		(0.000)		(0.000)		(0.147)
Panel B: Return measures based on component data for the General Offer versus Scheme of arrangement by the SDC announcement date							
One Month-Premium	34.213%***	758	36.089%***	200	33.540%***	558	2.548%
	(0.000)		(0.000)		(0.000)		(0.637)
Two months -Premium	38.586%***	758	35.609%***	200	40.019%***	558	-4.410%
	(0.000)		(0.000)		(0.000)		(0.529)
Three months -Premium	43.207%***	758	37.596%***	200	45.217%***	558	-7.620%
	(0.000)		(0.000)		(0.000)		(0.281)
***Panel C: Return measures for the General Offer versus Scheme of arrangement by using* filed PREM4WK in SDC and Event study**							
Four-week offer premium (PREM4WK)	40.281%***	716	33.637%***	193	42.733%***	523	-9.096%***
	(0.000)		(0.000)		(0.000)		(0.006)
Abnormal Return (AR) Premium	1.812%***	758	2.297%***	200	1.638%***	558	0.658%
	(0.000)		(0.000)		(0.000)		(0.237)

Table 5 Ordinary Least Squares (OLS) regressions analysis with a Takeover Method, Target and deal variables.

This table presents the results of OLS regressions, in which the dependent variable is the actual bid premium based on the final price data at one, two, and three months before the initial public announcement, respectively. The table uses the formula $\left(\frac{P_{fin}}{P_{i,t=either-A\ or-E}}\right) - 1$ to measure the final offer premium. This table regresses the dependent variables on a set of selective covariates in columns (1) and (2) because there is a correlation between the two variables public bidders and using 100 % of stock. **Table A1** in the Appendix A reports all the definitions and database sources of variables. Robust standard errors are reported in brackets. The statistical significances between schemes of arrangement and tender offers at the 1% level, 5% level and 10% level are denoted ***, **, *.

	One- month		Two- months		Three- months	
Variables	(1)	(2)	(1)	(2)	(1)	(2)
Scheme	-8.398*	-5.266	-7.995*	-4.891	-8.372*	-5.355
	(4.512)	(4.364)	(4.397)	(4.268)	(4.416)	(4.334)
Ln(Sales)	0.237	0.142	0.192	0.00544	0.321	-0.0441
	(0.866)	(0.839)	(0.906)	(0.874)	(1.031)	(1.001)
Market to book	-0.0434	-0.0473	-0.00837	-0.00706	-0.0554	-0.0437
	(0.135)	(0.123)	(0.117)	(0.102)	(0.125)	(0.128)
Target Termination Fee	-7.155	-7.921	-2.050	-3.236	-0.0546	-2.052
	(5.713)	(5.776)	(5.604)	(5.687)	(5.010)	(4.784)
Public bidders	-21.03***		-18.11***		-12.22***	
	(4.764)		(4.866)		(4.608)	
Stock		-25.41***		-25.67***		-25.95***
		(4.732)		(4.853)		(5.176)
Mixed	4.517	-10.48**	4.593	-9.300	4.595	-7.000
	(5.114)	(4.936)	(5.864)	(5.701)	(6.575)	(6.219)
Toehold	-8.382**	-8.461**	-6.234	-6.402	-0.750	-1.092
	(4.162)	(4.200)	(4.716)	(4.752)	(5.444)	(5.463)
Crisis	10.86*	11.38*	7.373	7.570	9.586*	9.148*
	(5.986)	(6.068)	(5.550)	(5.626)	(5.427)	(5.375)
Regulation Shock	-3.601	-3.424	-5.054	-5.361	-1.851	-3.103
	(5.548)	(5.566)	(5.728)	(5.636)	(6.955)	(6.938)
Target-Initiated	-23.67***	-23.44***	-26.42***	-26.51***	-24.47***	-25.17***
	(9.115)	(8.850)	(9.033)	(8.884)	(9.322)	(9.193)
Tangible assets	-6.742	-6.950	-6.642	-7.025	-6.764	-7.486
	(6.432)	(6.425)	(6.095)	(6.073)	(6.026)	(5.988)
Leverage	-0.0600	-0.0412	-0.0137	0.00741	-0.0565	-0.0310
	(0.0865)	(0.0846)	(0.0922)	(0.0902)	(0.0953)	(0.0929)
Bidder hires top bank	-1.558	0.0792	-0.293	1.140	-2.330	-1.311
	(3.866)	(3.791)	(3.736)	(3.650)	(3.694)	(3.651)
Target hires top bank	0.178	-0.588	1.404	0.742	4.035	3.583
	(3.283)	(3.242)	(3.675)	(3.649)	(3.983)	(3.950)
Auction	23.34***	20.92***	23.93***	21.45**	25.24***	22.63**
	(7.257)	(7.494)	(8.444)	(8.610)	(8.944)	(8.948)
Taken Private	-16.52***	-11.16***	-15.03***	-11.44***	-13.47***	-13.37***
	(4.674)	(3.554)	(4.763)	(3.575)	(4.143)	(3.551)
EBITDA/TA	0.263	-2.614	5.548	2.541	8.613	5.378
	(6.941)	(6.728)	(7.292)	(7.136)	(8.031)	(7.779)
stock performance	-0.002***	-0.002***	-0.003***	-0.003***	-0.001***	-0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Cash holding	-1.675	-0.454	3.278	3.977	0.937	0.605
	(12.71)	(12.39)	(13.03)	(12.89)	(12.24)	(12.15)
Constant	60.10***	54.61***	56.60***	54.18***	51.36***	54.98***
	(11.06)	(9.996)	(11.83)	(10.76)	(12.48)	(12.18)
Observations	723	723	723	723	723	723
R-squared	0.081	0.086	0.069	0.081	0.073	0.096

Table 6 Ordinary Least Squares (OLS) regressions analysis with a Takeover Method, Target and deal variables

This table presents the results of OLS regressions, in which the dependent variable is the actual bid premium based on the final price data at one, two, and three months before the SDC announcement date, respectively. The table uses the formula $\left(\frac{P_{fin}}{P_{i,t=either-A\ or-E}}\right) - 1$ to measure the final offer premium. This table regresses the dependent variables on a set of selective covariates in columns (1) and (2) because there is a correlation between the two variables public bidders and using 100 % of stock. **Table A1** in the Appendix A reports all the definitions and database sources of variables. Robust standard errors are reported in brackets. The statistical significances between schemes of arrangement and tender offers at the 1% level, 5% level and 10% level are denoted ***, **, *.

	One- month		Two- months		Three- months	
Variables	(1)	(2)	(1)	(2)	(1)	(2)
Scheme	-3.465	-0.950	-6.599	-3.782	-7.641*	-4.881
	(4.376)	(4.231)	(4.206)	(4.083)	(4.281)	(4.200)
Ln(Sales)	0.216	0.108	0.0452	-0.0964	-0.00194	-0.333
	(0.789)	(0.771)	(0.860)	(0.826)	(0.980)	(0.953)
Market to book	-0.130	-0.131	-0.126	-0.126	-0.197*	-0.187*
	(0.138)	(0.125)	(0.121)	(0.107)	(0.104)	(0.0985)
Target Termination Fee	-4.183	-4.944	0.944	-0.00292	2.450	0.637
	(5.622)	(5.664)	(5.511)	(5.558)	(4.849)	(4.604)
Public bidders	-15.95***		-17.27***		-11.26**	
	(4.581)		(4.610)		(4.436)	
Stock		-20.57***		-23.15***		-23.72***
		(4.592)		(4.466)		(4.893)
Mixed	-3.779	-15.49***	0.0804	-12.83**	-0.699	-11.33*
	(4.443)	(4.215)	(5.665)	(5.513)	(6.221)	(5.901)
Toehold	-4.055	-4.150	-5.181	-5.306	-1.635	-1.945
	(3.854)	(3.876)	(4.199)	(4.263)	(5.129)	(5.199)
Crisis	16.29***	16.60***	11.17**	11.44**	9.993*	9.603*
	(5.905)	(5.970)	(5.346)	(5.425)	(5.279)	(5.205)
Regulation Shock	3.703	3.681	-0.955	-1.087	0.664	-0.467
	(5.225)	(5.227)	(5.316)	(5.257)	(7.012)	(7.018)
Target-Initiated	-10.74	-10.66	-8.517	-8.499	-6.872	-7.507
	(6.870)	(6.510)	(6.869)	(6.614)	(7.462)	(7.188)
Tangible assets	-10.82*	-11.05*	-11.15*	-11.44**	-11.82**	-12.48**
	(5.905)	(5.889)	(5.679)	(5.676)	(5.604)	(5.607)
Leverage	-0.0390	-0.0231	-0.0349	-0.0165	-0.0526	-0.0294
	(0.0747)	(0.0731)	(0.0840)	(0.0823)	(0.0917)	(0.0899)
Bidder hires top bank	-0.688	0.562	-2.084	-0.726	-0.918	0.0197
	(3.561)	(3.445)	(3.606)	(3.529)	(3.589)	(3.540)
Target hires top bank	-1.050	-1.632	0.878	0.248	3.071	2.653
	(2.938)	(2.916)	(3.473)	(3.450)	(3.880)	(3.830)
Auction	15.36***	13.38**	24.99***	22.76***	25.96***	23.58***
	(5.735)	(5.759)	(7.829)	(7.977)	(8.766)	(8.790)
Taken Private	-18.52***	-14.81***	-17.55***	-13.76***	-15.73***	-15.59***
	(4.409)	(3.185)	(4.487)	(3.339)	(3.951)	(3.351)
EBITDA/TA	-3.604	-5.968	3.490	0.807	4.164	1.211
	(7.360)	(7.142)	(6.333)	(6.142)	(8.362)	(8.111)
stock performance	-0.001***	-0.001***	-0.002***	-0.002***	-0.002***	-0.002***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Cash holding	-11.20	-10.39	-7.094	-6.304	-5.050	-5.337
	(10.98)	(10.75)	(12.30)	(11.95)	(12.04)	(11.83)
Constant	51.59***	48.21***	57.07***	53.95***	56.01***	59.23***
	(10.15)	(9.184)	(11.13)	(9.995)	(11.68)	(11.53)
Observations	723	723	723	723	723	723
R-squared	0.084	0.090	0.075	0.084	0.062	0.083

Table 7 Choice of takeover method regressions.

This table reports the calculation of the marginal effects from logit regressions of the probability for a deal in the U.K. takeover market to be structured as a scheme of arrangement on Ln(Sales), Percent of Cash, Private Acquirer, Market to book, Target Termination Fee, Toehold, Crisis, Regulation Shock, Tangible assets, Leverage, Bidder hires top bank, Target hires top bank, Target-Initiated, Auction, taken private, EBITDA/TA, stock performance, Cash holding. Dependent variable is a dummy variable that takes the value of one if a target firm accepts scheme of arrangement to implement a takeover deal. **Table A1** in the Appendix A reports all the definitions and database sources of variables. The p-value are reported in bracket. Each regression in the last rows reports the total number of observations and and pseudo-Rsquared.The statistical significances between schemes of arrangement and tender offers at the 1% level, 5% level and 10% level are denoted ***, **, *.

Variable name	(1)	(2)	(3)
	0.037***	0.028***	0.024**
Ln(Sales)	(0.000)	(0.003)	(0.017)
	-0.002***	-0.003***	-0.002***
Percent of Cash	(0.002)	(0.000)	(0.000)
	0.191***	0.165***	0.165***
Private Acquirer	(0.000)	(0.002)	(0.002)
	-0.000	-0.000	-0.000
Market to book	(0.839)	(0.852)	(0.872)
	0.192***	0.182**	0.184***
Target Termination Fee	(0.000)	(0.000)	(0.000)
	-0.155***	-0.156***	-0.161***
Toehold	(0.005)	(0.005)	(0.004)
	0.158***	0.153***	0.149***
Crisis	(0.000)	(0.000)	(0.000)
	0.446***	0.452***	0.440***
Regulation Shock	(0.000)	(0.000)	(0.000)
	-0.196***	-0.215***	-0.178***
Tangible assets	(0.002)	(0.001)	(0.006)
	0.000	0.000	0.000
Leverage	(0.280)	(0.335)	(0.595)
		0.078**	0.086**
Bidder hires top bank		(0.036)	(0.021)
		0.081**	0.082**
Target hires top bank		(0.035)	(0.037)
		0.121*	0.146**
Target-Initiated		(0.077)	(0.037)
		0.040	0.024
Auction		(0.597)	(0.760)
		0.045	0.044
Taken private		(0.597)	(0.280)
			-0.070
EBITDA/TA			(0.244)
			-0.000
stock performance			(0.828)
			0.042
Cash holding			(0.725)
	-3.269***	-2.844***	-2.779***
Constant	(0.000)	(0.000)	(0.000)
N	759	759	723
Pseudo R-squared	0.221	0.236	0.234

Table 8 Estimated Treatment Effects from Propensity Score Matching based on Logistic Model in Table A2 using different numbers of 'neighbours' and calipers

This table reports the results of estimated parameters on the scheme of arrangement dummy from propensity score matching based on the logistic model in Table A2. The results of estimate the average treatment effect of using scheme upon bid premiums (ATE) and the average treated effect of scheme upon bid premiums for target firms that actually used scheme method (ATT) are reported using the actual bid premiums based on the *final price* data at one, two, and three months before the initial announcement date and the SDC announcement date, respectively. The table uses the formula $\left(\frac{P_{fin}}{P_{i,t=either-A\ or-E}}\right) - 1$ to measure the final offer premium. **Panel A** reports the ATE and ATT results by matching target firms that accept scheme of arrangement to implement a takeover deal (the treatment group) to the one, two and three target firms that accept tender offers (the untreated group). **Panel B** reports the ATE and ATT results by matching a target firm that accept scheme of arrangement to implement a takeover deal (the treatment group) to the one nearest neighbour firm that accept tender offer (the untreated group) with caliper size ($\varepsilon = 0.02$). Each row reports the total number of observations in treated and untreated groups. Robust standard errors are given in brackets. The statistical significance of at the 1% level, 5% level and 10% level are denoted ***, **, *.

A: Neighbours		**Before the initial announcement date**			**Before the SDC announcement date**		
Number of Matches		One -Month	Two- month	Three -month	One -month	Two -month	Three- month
1	Average Treatment Effect (ATE)	-7.781%	-7.822%	-6.382%	-1.753%	-6.040%	-5.247%
		(5.780)	(5.402)	(5.726)	(5.657)	(5.396)	(5.643)
	Treated Observation	102	102	102	102	102	102
	Untreated Observations	99	99	99	99	99	99
	Average Treatment Effect for the Treated (ATT)	-6.437%	-5.918%	-3.316%	-1.394%	-3.955%	-1.599%
		(6.086)	(6.294)	(4.849)	(5.984)	(5.923)	(4.669)
	Treated Observation	201	201	201	201	201	201
	Untreated Observations	99	99	99	99	99	99
2	Average Treatment Effect (ATE)	-11.228%***	-11.939%***	-10.708%***	-5.929%	-9.541%***	-9.432%**
		(3.873)	(3.576)	(4.015)	(3.676)	(3.613)	(3.859)
	Treated Observation	133	133	133	133	133	133
	Untreated Observations	158	158	158	158	158	158
	Average Treatment Effect for the Treated (ATT)	7.192%**	-8.942%	-6.546%**	-4.045%	-6.738%***	-5.317%***
		(3.532)	(8.334)	(3.267)	(3.461)	(2.282)	(1.573)
	Treated Observation	201	201	201	201	201	201
	Untreated Observations	158	158	158	158	158	158
3	Average Treatment Effect (ATE)	-11.179%***	-11.384%***	-9.909%***	-6.093%*	-9.242%***	-8.668%**
		(3.575)	(3.226)	(3.621)	(3.212)	(3.229)	(3.415)
	Treated Observation	147	147	147	147	147	147
	Untreated Observations	205	205	205	205	205	205
	Average Treatment Effect for the Treated (ATT)	-5.779%*	-6.143%	-4.433%**	-3.355%	-5.012%	-3.531%
		(3.248)	(7.143)	(1.931)	(3.096)	(6.862)	(5.840)
	Treated Observation	201	201	201	201	201	201
	Untreated Observations	205	205	205	205	205	205

Continued Table 8

B: Caliper		Before the initial announcement date			Before the SDC announcement date		
0.02	Average Treatment Effect (ATE)	-11.416%**	-13.195%**	-10.460%*	-6.260%	-9.922%*	-8.378%
		(5.497)	(5.447)	(5.553)	(5.458)	(5.481)	(5.477)
	Treated Observation	75	75	75	75	75	75
	Untreated Observations	77	77	77	77	77	77
	Average Treatment Effect for the Treated (ATT)	-11.314%	-8.651%	-3.655%	-5.554%	-5.182%	-0.722%
		(10.605)	(10.588)	(7.390)	(10.091)	(10.024)	(6.704)
	Treated Observation	158	158	158	158	158	158
	Untreated Observations	96	96	96	96	96	96

Table 9 Comparison of covariate imbalance after estimating ATE by applying nearest neighbour 1-to-2 matching strategy without caliper

This table shows the results of the test that check the balances of the covariates after applying the strategy that matches a target firm that accept scheme of arrangement to implement a takeover method to two nearest neighbour target firms that accept tender offer (1-2) to estimate the average treatment effect of using scheme of arrangement upon bid premiums (ATE). This table uses tebalance as a technique in STATA to calculate the standardized difference and variance ratio for the sample before (raw) and after applying the matching strategy whereby the covariates are well-balanced if matched sample has zero standardized difference and the variance ratio close to one in comparison to row sample. The standardized difference ratio and the variance ratio are reported for the sample before and after applying the matching strategy. The last row shows the total number of treated and untreated (control) observations. **Table A1** in the Appendix A reports all the definitions and database sources of variables.

Variable	Standardised Differences		Variance Ratio	
	Raw	Matched	Raw	Matched
ln(Sales)	0.333	0.177	2.271	0.801
Tangible assets	-0.413	-0.007	0.801	1.136
Percent of Cash	-0.148	-0.112	1.232	1.083
Private Acquirer	0.207	-0.005	0.911	1.002
Target Termination Fee	0.449	-0.023	2.218	0.949
Toehold	-0.308	-0.062	0.464	0.890
Crisis	0.383	-0.072	1.770	0.883
Regulation Shock	0.612	0.074	5.464	1.229
Bidder hires top bank	0.250	0.116	1.378	1.184
Target hires top bank	0.271	0.163	1.414	1.248
Target-Initiated	0.151	0.024	1.881	1.108
Ln(Sales)*Tangible assets	-0.341	0.018	0.969	1.247
Ln(Sales)*Bidder hires top bank	0.300	0.133	1.738	1.286
Target Termination Fee* Crisis	0.293	-0.021	2.447	0.927
Private Acquirer *Crisis	0.296	-0.072	1.833	0.860
Private Acquirer *Regulation Shock	0.388	0.100	3.853	1.424
Private Acquirer *Bidder hires top bank	0.131	0.056	1.320	1.126
Ln(Sales)2	0.403	0.163	2.424	1.047
N	759	1,518		
Treatment observation	201	759		
Control observation	558	759		

Table 10 Comparison of covariate imbalance after estimating ATT by applying nearest neighbour 1-2 matching strategy without caliper

This table shows the results of the test that check the balances of the covariates after applying the strategy that matches a target firm that accept scheme of arrangement to implement a takeover method to two nearest neighbour target firms that accept tender offer (1-2) to estimate the average treated effect of scheme upon bid premiums for target firms that actually used scheme method (ATT). This table uses tebalance as a technique in STATA to calculate the standardized difference and variance ratio for the sample before (raw) and after applying the matching strategy whereby the covariates are well-balanced if matched sample has zero standardized difference and the variance ratio close to one in comparison to row sample. The standardized difference ratio and the variance ratio are reported for the sample before and after applying the matching strategy. The last row shows the total number of treated and untreated (control) observations. **Table A1** in the Appendix A reports all the definitions and database sources of variables.

Variable	Standardised Differences		Variance Ratio	
	Raw	Matched	Raw	Matched
ln(Sales)	0.333	0.532	2.271	0.651
Tangible assets	-0.413	0.068	0.801	1.436
Percent of Cash	-0.148	-0.335	1.232	1.611
Private Acquirer	0.207	-0.214	0.911	1.222
Target Termination Fee	0.449	0.080	2.218	1.096
Toehold	-0.308	-0.348	0.464	0.431
Crisis	0.383	-0.171	1.770	0.910
Regulation Shock	0.612	0.029	5.464	1.039
Bidder hires top bank	0.250	0.234	1.378	1.339
Target hires top bank	0.271	0.195	1.414	1.254
Target-Initiated	0.151	-0.191	1.881	0.938
Ln(Sales)*Tangible assets	-0.341	0.103	0.969	1.483
Ln(Sales)*Bidder hires top bank	0.300	0.264	1.738	1.563
Target Termination Fee* Crisis	0.293	0.052	2.447	1.126
Private Acquirer *Crisis	0.296	-0.224	1.833	0.771
Private Acquirer *Regulation Shock	0.388	0.074	3.853	1.183
Private Acquirer *Bidder hires top bank	0.131	0.006	1.320	1.012
Ln(Sales)2	0.403	0.523	2.424	1.000
N	759	408		
Treatment observation	201	201		
Control observation	558	201		

Figure 3 The Distribution of Propensity Score of the size of target firm before and after Matching by Applying Nearest Neighbour 1-to-2 Matching Strategy without Caliper

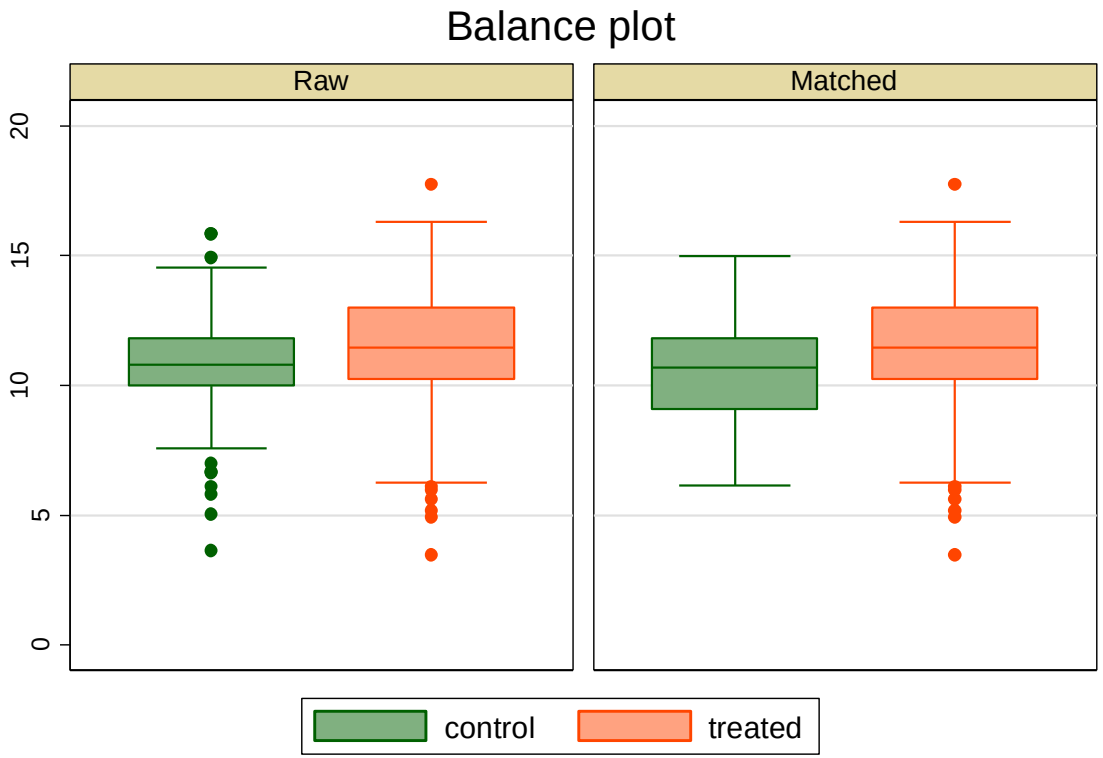


Table 11 Result of sensitivity analysis to hidden bias

This table shows the results of the sensitivity analysis for the impact of schemes of arrangement upon bid premiums in the case of applying the matching strategy that matches that matches a target firm that accept scheme of arrangement to implement a takeover method to two nearest neighbour target firms that accept tender offer (1-2) to estimate the average treatment effect of using scheme of arrangement upon bid premiums (ATE) and the average treated effect of scheme upon bid premiums for target firms that actually used scheme method (ATT). The bid premium is calculated based on the *final price* data at one, two, and three months before the initial public announcement and SDC announcement date, respectively. The table uses the formula $\left(\frac{P_{fin}}{P_{i,t=either-A\ or-E}}\right) - 1$ to measure the final offer premium. Γ starts at 1, with increments (Γ=1.25, 1.5, 1.75, 2, 2.25, 2.5, 2.75, 3). This table provides statistical information that shows the minimum and maximum of the p-value by using STATA command (rbounds).

			Before the initial announcement date						Before SDC announcement date					
Matching Strategy			One-Month		Two-Month		Three -month		One-Month		Two-Month		Three -month	
		Γ	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
1-to-2	Average Treatment Effect (ATE)	1	0.011	0.011	0.004	0.004	0.025	0.025	0.540	0.540	0.022	0.022	0.022	0.022
		1.25	<0.0001	0.646	<0.0001	0.506	<0.0001	0.759	0.005	0.997	<0.0001	0.742	<0.0001	0.742
		1.5	<0.0001	0.994	<0.0001	0.985	<0.0001	0.998	<0.0001	1	<0.0001	0.997	<0.0001	0.997
		1.75	<0.0001	0.999	<0.0001	0.999	<0.0001	0.999	<0.0001	1	<0.0001	0.999	<0.0001	0.999
		2	<0.0001	1	<0.0001	1	<0.0001	1	<0.0001	1	<0.0001	1	<0.0001	1
		2.25	<0.0001	1	<0.0001	1	<0.0001	1	<0.0001	1	<0.0001	1	<0.0001	1
		2.5	<0.0001	1	<0.0001	1	<0.0001	1	<0.0001	1	<0.0001	1	<0.0001	1
		2.75	<0.0001	1	<0.0001	1	<0.0001	1	<0.0001	1	<0.0001	1	<0.0001	1
		3	<0.0001	1	<0.0001	1	<0.0001	1	<0.0001	1	<0.0001	1	<0.0001	1
	Average Treatment Effect for the Treated (ATT)	1	0.181	0.181	0.411	0.411	0.377	0.377	0.022	0.022	0.537	0.537	0.650	0.65
		1.25	0.676	0.011	0.874	0.054	0.855	0.045	<0.0001	0.740	0.929	0.100	0.961	0.162
		1.25	0.942	0.0002	0.988	0.003	0.985	0.002	<0.0001	0.997	0.995	0.007	0.998	0.017
		1.75	0.994	<0.0001	0.999	<0.0001	0.999	<0.0001	<0.0001	0.999	0.999	0.0003	0.999	0.001
		2	0.999	<0.0001	0.999	<0.0001	0.999	<0.0001	<0.0001	1	0.999	<0.0001	0.999	<0.0001
		2.25	0.999	<0.0001	0.999	<0.0001	0.999	<0.0001	<0.0001	1	1	<0.0001	1	<0.0001
		2.5	0.999	<0.0001	1	<0.0001	1	<0.0001	<0.0001	1	1	<0.0001	1	<0.0001
		2.75	1	<0.0001	1	<0.0001	1	<0.0001	<0.0001	1	1	<0.0001	1	<0.0001
		3	1	<0.0001	1	<0.0001	1	<0.0001	<0.0001	1	1	<0.0001	1	<0.0001

Table 12 Comparison of Finding across Models Estimation the Impact of Scheme of Arrangement upon the Bid Premium

This table shows a comparison of findings across models that estimate the impact of schemes of arrangement upon bid premium. The table reports the average treatment effect of using scheme upon bid premiums (ATE) and the average treated effect of scheme upon bid premiums for target firms that actually used scheme method (ATT) before the initial announcement date and the SDC announcement date across independent-sample t-test, Ordinary Least Squares (OLS), propensity score matching (PSM) and Regression adjustment. The estimate average treatment effect of using scheme upon bid premium in case of applying OLS regression is reported by using regression (1) in Table 5 and 6. The estimate average treatment effect of using scheme upon bid premium in case of applying PSM is reported by using matching strategy that matches a target firm that accept scheme of arrangement to implement a takeover method to two nearest neighbour target firms that accept tender offer (1-2). Bid premiums are calculated based on the actual bid premiums based on the *final price* data at one, two, and three months before the initial announcement date and the SDC announcement date, respectively. The table uses the formula $\left(\frac{P_{fin}}{P_{i,t=either-A\ or-E}}\right) - 1$ to measure the final offer premium. Robust standard errors are reported in brackets. The statistical significances between schemes of arrangement and tender offers at the 1% level, 5% level and 10% level are denoted ***, **, *.

Model	Estimated Average											
	ATE						ATT					
	Before the initial announcement date			Before the SDC announcement date			Before the initial announcement date			Before the SDC announcement date		
	One -Month	Two- month	Three -month	One -month	Two -month	Three- month	One -month	Two- month	Three -month	One -month	Two -month	Three- month
Independent -sample t test (Difference test)	-7.941% **	-8.132% **	-7.814%**	-0.668%	-4.503%	-5.585%						
	(0.023)	(0.023)	(0.032)	(0.835)	(0.183)	(0.108)						
OLS regression Model (1)	-8.398*	-7.995*	-8.372*	-3.465	-6.599	-7.641*						
	(4.512)	(4.397)	(4.416)	(4.376)	(4.206)	(4.281)						
propensity score matching (1-to-2)	-11.228%***	-11.939%***	-10.708%***	-5.929%	-9.541%***	-9.432%**	7.192%**	-8.942%	-6.546%**	-4.045%	-6.738%***	-5.317%***
	(3.873)	(3.576)	(4.015)	(3.676)	(3.613)	(3.859)	(3.532)	(8.334)	(3.267)	(3.461)	(2.282)	(1.573)
Regression adjustment	-10.325***	-8.621%**	-6.345%	-.4.435%	-6.404%	-5.085%	-9.102%*	-10.202%**	-7.488%**	-5.462%	-9.085%**	-8.259%*
	(3.993)	(4.190)	(4.308)	(3.704)	(3.967)	(4.148)	(4.712)	(4.694)	(4.785)	(4.529)	(4.503)	(4.727)

Appendix A

Table A1 variables definitions and Sources

The variables	Definitions	Sources
Panel A: Target characteristics		
Ln (Sales)	The natural logarithm of target firm total sales twelve months before the date of announcement.	DataStream
Age (Year)	The age of the firm, which is measured in year since DataStream holds information about target firms to the date of announcement.	DataStream
Market to book	The market value of assets divided by the book value of assets one month before the date of announcement.	DataStream
Target M/B > industry mean	is calculated by subtracting the yearly mean of target's market to book from the mean of the target firms in the same two-digit SIC code.	DataStream
Sales growth	The level of sales at the end of year t–12 minus sales at the end of year t–24, scaled by the sales at the end of year t–24, where t–12 and t–24 are twenty and twenty-four months before the announcement date (*t=0).*	DataStream
Leverage	The ratio of the book value of total debt to total assets as measured twelve months before the date of announcement.	DataStream
Collateral	The ratio of property, plant, and equipment over the target's total asset, all is measured twelve months before the date of announcement.	DataStream
Run-up (-1, -42), (-1,-63)	Target's cumulative abnormal returns (CAR) over the period immediately before the acquisition announcements particularly from days -1 to -41 and -63, respectively.	DataStream
EBITDA/TA	The ratio of target's operating income before interest, taxes, depreciation, and amortization divided by total assets, all is measured twelve months before the date of announcement.	DataStream
Cash holding	The ratio of target's cash plus tradable securities over total assets, all is measured twelve months before the date of announcement	DataStream
stock performance	Target's stock-price performance twelve months before the date of announcement.	DataStream
Book assets (UK£, millions)	Target's total assets in millions of pounds twelve months before the date of announcement	DataStream
MV (UK£, millions)	The market value of equity (stock price multiplied by the number of shares outstanding in millions of pounds) twelve months before the date of announcement immediately prior to the announcement date.	DataStream
Panel B: Deal characteristics		
Transaction value (UK£, millions)	The pound value of a deal and it is defined in SDC (filed VAL) as the total value of consideration (UK**£**, millions) paid by bidders, excluding fees and expenses.	Thomson One Banker
Days to Completion	The average number of days a transaction needs to be successfully completed	Thomson One Banker
Bidder Termination Fee	The amount of money that must be paid by an acquirer to a target firm if the acquirer does not complete the bid	Thomson One Banker

Continued Table A1

The variables	Definitions	Sources
Target Termination Fee	The amount of money that must be paid by a target firm to an acquirer if the target does not allow the acquirer to successfully complete the purchase of the target's assets	Thomson One Banker
Negotiation	A dummy variable that takes the value of one if there are only one public bidder bid for the same target within a month from or before the date of announcement, and zero otherwise.	Thomson One Banker
Auction	A dummy variable that takes the value of one if there are more than one public bidder bid for the same target within a month from or before the date of announcement, and zero otherwise.	Thomson One Banker
Target (bidder)-Initiated	A dummy variable that takes the value of one if a target (bidder) firm initiated the deal, and zero otherwise.	Thomson One Banker
Target debt ratio	The ratio of target's long-term debt plus current liabilities divided by total assets, all is measured twelve months before the date of announcement.	DataStream
Percentage of cash(equity)	The percentage of cash (equity) paid for the transaction value by acquirers	Thomson One Banker
Pure cash (equity)deals	A dummy variable that takes the value of one if an acquirer firm paid 100% of the consideration by cash (equity), and zero otherwise	Thomson One Banker
Mixed offers	A dummy variable that takes the value of one if an acquirer firm paid 100% of the consideration by a mixed of cash and equity, and zero otherwise.	Thomson One Banker
Crisis	A dummy variable that takes the value of one when a transaction occurs between the period of January 1, 2007, and December 31, 2009, and zero otherwise.	Thomson One Banker
Regulation Shock	A dummy variable that takes the value of one when a transaction occurs between the period of January 1, 2012, and December 31, 2015, and zero otherwise.	Thomson One Banker
Bidder (Target)hires top bank	A dummy variable that takes the value of one if an investment bank that are used by acquirers (targets) as its advisors are classified as top-tier if they are used Rothschild &Co, UBS, JP Morgan, PricewaterhouseCoopers, HSBC Holdings PLC, the five banks that appear most often in the sample, all others take 0., which are the five banks.	Thomson One Banker
Public bidder	A dummy variable that takes the value of one if a bidder firm is listed in London Exchange Market, and zero otherwise.	Thomson One Banker
Private bidder	A dummy variable that takes the value of one if a bidder firm is unlisted in London Exchange Market, and zero otherwise.	Thomson One Banker
Owned directly before	The percentage of target firm's equity that held by a bidder six month before the date of announcement.	Thomson One Banker

Table A2: Variables Means & Parameter Estimates used to estimate Propensity Scores

This table reports the calculation of logit regressions of the probability for a deal in the U.K. takeover market to be structured as a scheme of arrangement on Ln(Sales), Percent of Cash, Private Acquirer, Market to book, Target Termination Fee, Toehold, Crisis, Regulation Shock, Tangible assets, Leverage, Bidder hires top bank, Target hires top bank, Target-Initiated, Auction, taken private, EBITDA/TA, stock performance, Cash holding. Dependent variable is a dummy variable that takes the value of one if a target firm accepts scheme of arrangement to implement a takeover deal. **Table A1** in the Appendix A reports all the definitions and database sources of variables. The p-value are reported in bracket. Each regression in the last rows reports the total number of observations. The statistical significances between schemes of arrangement and tender offers at the 1% level, 5% level and 10% level are denoted ***, **, *.

Variable name	Logit Estimates
Target Characteristics	
Ln(Sales)	-1.850***
	(0.496)
Tangible assets	2.458
	(2.243)
Deal Characteristics	
Percent of Cash	-0.024***
	(0.004)
Private Acquirer	2.949***
	(0.482)
Target Termination Fee	2.125***
	(0.350)
Toehold	-1.175***
	(0.401)
Crisis	2.585***
	(0.529)
Regulation Shock	6.331***
	(1.070)
Bidder hires top bank	-1.446
	(1.519)
Target hires top bank	0.558**
	(0.254)
Target-Initiated	0.496
	(0.523)
Interactions and Squares	
*Ln(Sales)*Tangible assets*	-0.368*
	(0.204)
*Ln(Sales)*Bidder hires top bank*	0.283**
	(0.128)
Target Termination Fee* Crisis	-1.956***
	(0.556)
Private Acquirer *Crisis	-1.559***
	(0.582)
Private Acquirer *Regulation Shock	-4.199***
	(1.131)
Private Acquirer *Bidder hires top bank	-1.837***
	(0.512)
Ln(Sales)2	0.096***
	(0.021)
Constant	6.769**
	(2.812)
Observations	759
Pseudo R-squared	0.329

Chapter 3. Does Winner's Curse Matter in Takeovers: Auction vs. Negotiation?

Chapter Three

Does Winner's Curse Matter in Takeovers: Auction vs. Negotiation?

"[W]e don't want to waste our time ...*We don't participate in auctions*"

Warren Buffett [83]

3.1. Introduction

There are two major selling mechanisms in takeovers: negotiation and auction. As the above quote from the sage of Omaha shows, the choice matters.[84] It is therefore necessary to explore and analyse the effects of choosing different selling mechanisms on the possible differentiated outcomes in takeovers. In their theoretical study, Bulow & Klemperer (1996a) show that an optimal auction with n bidders is strictly dominated by an auction with $(n + 1)$ bidders, even when no reserve prices is imposed. This result shows that, compared with *negotiating* the existing buyers, it is typically better to invite one more bidder and run an *auction*, even without setting an optimal reserve price. In some respects, this would be expected. At its most basic and reductive level, it is clearly advantageous in terms of cost and manpower for a company to avoid involving itself in a negotiation which does not even guarantee any kind of positive outcome. Far better and more cost-effective to simply bait the line and let interested buyers circle around. A further positive outcome also partly explained by these results is that auctions increase competition, something which in negotiation would require multiple simultaneous negotiations which, in addition to basic costs would also generate immense logistical and strategic complexities for companies. A direct implication of this theoretical conclusion is that auctions, as a selling mechanism, are preferred by sellers, while negotiations are preferable to buyers.

[83] This well-known statement by Warren Buffett, and it is cited in his business annual report for Berkshire Hathaway Inc in the section; Acquisition Criteria Bulow & Klemperer (2009c)
[84] Buffett is sometimes called the sage of Omaha.

A number of empirical studies on M&As have investigated and aimed to establish the exact effects of selecting a specific selling mechanism – auction versus negotiation – on the possible outcomes of takeovers for both targets and acquirers. The most prominent of these are Boone & Mulherin (2007a:2008b),Aktas et al., (2010a),Fidrmuc et al., (2012). One somewhat puzzling observation relating to the real practise of takeovers is that most deals are structured using one-to-one negotiations, where there is only one buyer negotiating with the target firm. Boone & Mulherin (2007a) investigate private-phase competition of the takeover processes, before the public announcement of the deal. This research has shown that the private stage is not free from competition, even if there is only one buyer revealed at the announcement stage. This means that even publicly observed non-competitive negotiation deals are not free from competition. Boone and Mulherin's sample was constructed to take into account competition at the private stage, and shows that there is no significant difference in target returns between negotiation and auction.

In their following study, Boone & Mulherin (2008b) tested whether selecting a different selling mechanism would induce different abnormal returns to the acquirers, or put another way, whether auctions gives rise to the 'winner's curse' (overpay) in the U.S. takeover market. The negative bidder returns have been used as an evidence to examine whether the winner's curse exists in takeover competition, see: Kagel & Levin (1986), Moeller et al., (2004), and Boone & Mulherin (2008b).

Boone and Mulherin concluded that using auction does not push bidders to overbid, and that there is no significant difference in the announcement returns of target and bidder firms between the two mechanisms of auction and negotiation.

Since the publication of Boone & Mulherin (2007a), many recent empirical works have moved to measure the exact competition level between bidders in auction and negotiation, and how the competition levels would affect different returns for acquirers or target firms.

Betton et al., (2009b) and Aktas et al., (2010a) investigate why bid premium on average is no significantly different in auction and negotiation deals. They argue that negotiation is actually under the threat of a potentially possible auction, therefore presence of latent competition drives up the negotiation premium. More specifically, Aktas et al., (2010a) examine whether the cost of auction (such as searching for bidders and advertising expenses) could affect directly the choice of target firms between auction and negotiation mechanisms. They find that if latent

competition induced bidder firms in negotiation deals to increase the bid premium, anticipated auction costs served to reduce the premium. Fidrmuc et al., (2012) study whether the choices between selling mechanism (auction versus negotiation) and buyer type (private equity versus strategic buyer) could affect the bid premium.[85] But they found that the difference in bid premiums is statically insignificant.

Gorbenko & Malenko (2014) show that strategic bidders on average value the assets of target firms higher than financial bidders in auction deals. The main reason is that target firms with specific characteristics attract different type of bidders. For example: they find that financial buyers pay significantly more for mature and poorly performing target firms. Schlingemann & Wu (2015) document positive and significant returns for both target and bidders in auction compared to negotiated deals, particular for relatively small targets. Aktas, Xu, & Yurtoglu, (forthcoming) investigate whether the choice of a bidder firm to announce the deal before signing the definitive agreement at the private selling process could tend a bidder to overpay. They find that, although the earlier deal announcement is associated with a higher public competition, winner's curse does not exist in bidder announcement returns.

As Boone & Mulherin (2007a) discuss, prior to the public announcement of a bid, there is usually a period of highly competitive private negotiations between a target firm and bidders. However, Boone & Mulherin (2007a) model raises some concerns. First of all, this model overlooks the levels of competition during public takeover procedures, when rival bidders are attracted to participate in a public takeover battle which can, then, affect the initial offer price and any further gains made through the auction process. Bazerman & Samuelson (1983) and Kagel & Levin (1986) argue that bidders are more aggressive when there are a large number of competitors jostling to acquire a target firm, which can lead to the winner overpaying for the targets' assets.

Boone & Mulherin (2007a) private process model is constructed using the number of confidential bidders as a proxy for competition. The weaknesses of this approach can perhaps be explained, at least in part, by its essentially quantitative rather than qualitative analysis. This disregards the fact that auction should mimic the actual environment of bidding competitions, where each bidder can extract useful information about the object's value for themselves from

[85] Private equity firms (or financial bidders) refer to bidders who are from outside target firm's industry, while strategic bidders refer to firms that are from inside the industry of target firms, and they could be competitors, customers or suppliers for a target firm.

the bids of other bidders. Based on the standard definition, the auction process can be seen as a Bayesian game in which players act on beliefs that are reached after observing the distribution of other types of bidders (Gibbons, 1992, p.149-150). Bearing this definition in mind, each bidder's beliefs can be seen to be shaped by the type of other peer bidders. As such, the types of bidders, which represent a substantial source of competition, have an enormous impact on the selling process. Therefore, bidder firms will be more aggressive when there is more than one public bidder bidding for the same target.

Bulow & Klemperer (2002b) and Boone & Mulherin (2008b) argue that levels of competition are related to bidder characteristics, where the presence of a strong bidder would create or at least heighten the prospect of the winner's curse for other possible bidders. As a result, bidder asymmetry suggests that there are gains to be made for bidder firms when a takeover competition is limited and, to an extent, when market failures or inefficiencies are removed from the takeover process. Therefore, it is fundamental to identify the differences between bidder characteristics, in auction and negotiation transactions in order to explore whether these distinctions can critically influence, or even dictate, the bidding behaviours of acquiring firms, or even drive bidders to pay more for their targets.

Therefore, the main objective of this chapter is to examine whether auction bidding has a causal impact upon bidder returns during takeovers, and, therefore, this chapter also aims to test whether an increase in competition between bidders during the public phase of takeover competition could induce the winner's curse problem.

A further issue in studies conducted by Boone & Mulherin (2007a) and Aktas et al., (2010a) is that both use unrepresentative samples, examining only large firm acquisitions with deal sizes over $100 million. However, a significant number of M&As are conducted between small firms, and the outcomes for a small firm could be quite different to those of large firms. According to Moeller et al., (2004), small firms generally outperform large firms in acquisition markets. This seems to be because large firms are more prone to the hubris effect, as outlined in Roll's hypothesis (1986a). Moreover, Boone & Mulherin (2008b) have found that the size of the bidder firm is inversely related to the level of competition when there is more than one bidder for the same target. More precisely, the mere presence of a large firm presents an opportunity to deter small bidders and, consequently, it is therefore more beneficial for the target to avoid conducting a full-scale auction when the size of the bidders is markedly different.

Therefore, this chapter will examine whether firm sizes affect an acquirer's announcement return for the two selling mechanisms of auction and negotiation, used as a main proxy for bidder asymmetry. Influenced by Moeller et al., (2004) arguments, this study thus divides bidder firms into two subgroups: small and large firms. The bidder firm is deemed larger (smaller) if its equity market value is greater (equal or less) than the market value of the 25th percentile of NYSE firms during the year of the announcement date.

Using a comprehensive M&A data taken from the U.S. markets for listed-bidder firms over the period 1984-2014, as sourced by Thomson One Banker-the SDC Merger and Acquisition Database. Of them, 286 were structured as an auction deal if there is one more public bidder bidding for the same target firm, and 14,360 deals as negotiation if there is only one public bidder bidding for the same target firm. Therefore, we construct a sample of 14,646 deals, of which only about 2% bidder firms use auctions, and about 98% adopt negotiations. The main objective of this chapter is twofold. First, this chapter investigates how the choices to bid in different selling mechanisms (auctions vs. negotiations) are related to various bidder and deal characteristics.

As predicated, bidder firms that are large, have high levels of leverage and tangible assets typically are more likely to bid in auction. Moreover, bidders are more likely to bid in auction if a target firm initiated a takeover deal or it is in bankruptcy, if bidders own a toehold in a target firm. Bidder firms also bid in auction if they or target firms use an investment bank with a high reputation. Auctions are associated with a tender offer, hostile technique, and most surprisingly with all-stock offers. However, bidder firms are less likely to bid in auction for a private firm, and less likely to complete a bid.

Second, to estimate the treatment effect of selecting a specific selling mechanism on bidder returns, it necessarily to address the obvious self-selection problem, as the choice of selling mechanism is self-decision made by target or bidder firms. To identify the treatment effect of selecting an auction, the method of propensity score matching is applied in this chapter. This chapter examines the short-run performance of bidder firms using a narrow window (-1, +1) centred on the announcement date and different models and indexes. Meanwhile, it also studies the long-term performance over the (-20, +20) and (-63, +126) windows, as suggested by Boone and Mulherin (2007a: 2008b). The study applies the Market Adjusted Returns model, using a CRSP value-weighted index in order to estimate the cumulative abnormal return (CAR).

This chapter calculates the propensity score by using logit regression on a set of key covariates that include bidder size, a dummy if a target firm initiated a deal or it is in a bankruptcy, if bidder firm own a toehold in a target firm, if a bidder or target firm hire an investment bank with a high reputation, if a deal is a tender offer, a hostile deal, if a target is a private, all-stock offers, and successful deals

The main results, after implementing the matching strategy, confirm that, compared with negotiation, using auction induces a negative impact on acquirer's share prices in the short run. However, the results of estimate the treatment effect over the longer windows are not clear. The analysis applies various greedy matching strategies: nearest neighbour matching and caliper matching. Over the (-1, +1) window, the negative impact of using auctions upon the cumulative abnormal return is high in cases of structured the matched sample by using the nearest neighbour with different sizes of caliper, in general either for ATE and ATT. It could be argued that treatment effect result is influenced by the length of the selected window, and this finding valid only for the short-value analysis.

This seems to confirm the theoretical prediction that auction, as a selling mechanism, is less beneficial to bidder firms, than negotiation due to increasing competition. This may also an advance for the existence of the winner's curse in takeover markets: bidders tend to overbid in takeover auctions. This results consistent with Bazerman & Samuelson (1983) and Kagel & Levin (1986) who argue that bidder firms are more aggressive and overbid in case there are other bidders bidding for the same target.

The remaining parts of this chapter are organised as follows: a literature review, which is related to the previous explanation of this thesis's motivation and research questions, will be undertaken in **Section 3.2**. **Section 3.3** will discuss the sample and the main explanatory variables that will be used in the model to calculate the propensity score matching. **Section 3.4** will define the methodological analysis. **Section 3.5** will present the empirical results. Finally, the conclusion will discuss the main results in **Section 3.6**.

3.2. Literature Review

Auction theory is considered a useful method to determine the uncertain value of auctioned items. This theory is predicated on a notably transparent market and one where rivals have full knowledge of competitors. Nonetheless, and notwithstanding these virtues, auctions are notoriously speculative markets which sometimes defy rationality. Although it is impossible to ascertain the precise factors of bidders in auction, outcomes are measurable. Some competitors win auctions with bids that are higher than the true value of target's assets. These winners are uncertain about the value of the assets that are being sold and have made the estimation with the largest positive error, and consequently overpay which incur a loss or at least forego some profits for the bidders. This event is termed, somewhat melodramatically, the "winner's curse" (Dasgupta & Hansen, 2007). Examinations of the winner's curse hypothesis have become an increasing focus of both the theoretical and empirical works since the first paper that described the phenomenon (Wilson, 1969). The possibility of the existence of winner's curse is considered a real example in the real world, which confirms that bidders are irrational and subject to making systematic errors. That this runs contrary to rationality as one of the main assumptions of the economic theory. In a fully rational equilibrium, bidders are less aggressive, and the offer price is more likely to reflect the underlying value when the number of bidders increases. Therefore, there is a sense in which psychological momentum drives the error estimation (Thaler, 1988) and (Hong & Shum, 2002).

The winner's curse is more likely to exist in a common-value auction where acting rationally can be even more difficult. In a common-value auction, all bidders have equal knowledge of the value of an item, and gain further information as other offers are tendered. A common-value auction bid can produce the winner's curse as a result of over-estimating value during the bidding process. In a private-value auction (such as an auction for antiques) the value of an object is equal to the value estimated by individual bidders, without insight from other competitors: the bidder sets his or her value according to his or her own information about the object (Rasmusen, 2007, p.414). For example, the absence of perfect information in a common-value auction, such as the distribution of future cash flow, can lead to errors in estimating a company's value, and can potentially result in a winner's curse (Varaiya &Ferris, 1987). As a result, bidders for the target company could over-value shares if they are only consulting

publicly available information, and thus firms can encourage bidders to spend money in order to acquire additional information.

One industry that fits the situation of common-value auction is the auction for oil and gas leases, where the bidders are uncertain about the amount of oil in tract of land, and have different estimation about the value of the tract. (Capen, Clapp, & Campbell, 1971) show that winners in the U.S. government auctions for oil leases suffered from unexpectedly lower rates than the market rate of return during 1960s, even in land where oil was discovered, because they had overpaid for low value items.

The phenomenon of the winner's curse raises the debate in behaviour finance, on whether the bidders' bidding strategies in corporate takeover are related to psychological behaviour of humans rather than to rational behaviour previously regarded as the corporate mind-set, as well as the efficiency of the corporate control market. Particularly, there has been a growth trend to test for the presence of winner's curse as one of the possible explanation for the negative returns to bidder firms in M&A empirical research. In general, around 61 % of US acquirers' shareholders endure significant losses in M&As (Bruner, 2005b,p.15). The total value generated in M&A activity in the U.S. market increased sharply from US$ 87.75 billion in 1984 to US$2.2 trillion in 2016.[86] Yet, despite the rapidly increased volume of M&A activity, outcomes were normally mixed, ranging from success such as Disney and Pixar in 2006, to failures such as Daimler Benz and Chrysler in 1998, and AOL and Time Warner in 2001(DePamphilis, 2012a). Most pertinently, approximately 70–80% of U.S. market mergers failed to create a significant value above their annual costs (Clayton, 2010).

There are various explanations for the possibility for winner's curse to occur in takeovers. Roll's hubris-based hypothesis (1986a) is considered the first work that focuses on the 'emotional' motivations for merger and tender offers. He argues that the hubris motivation of the boards leads them simply to overbid for the target, and then suffer the resulting winner's curse that is usually associated with hubris.

There are other explanations based on rational decisions of the boards of the acquiring companies. For example, in some cases, although an acquisition would destroy the wealth of shareholders, the board might still prefer to invest in order to gain power and prestige, as indicated by Jensen's agency-based hypothesis (1986). Jensen (1986) argues that if the board

[86] Thomson Reuters, 2016.

of the bidder firm has an excessive level of cash, then an agency conflict issue could emerge between the shareholders and the board. And the board, instead of paying out cash to their shareholders, chooses to invest it on wasteful vanity projects, of which the destruction of the shareholder value by overbidding could be a symptom.

One important factor that may exacerbate the winner's curse problem is the number of competitors in the auction. Kagel & Levin (1986) show that the number of bidders in auction is a root cause for the winner's curse. Bidders will be more aggressive when there are a large number of bidders bid for the target, and this makes negative the winner's consequent payoff. Bazerman & Samuelson (1983) find that the likelihood of the winner's curse increased as the number of bidders increased particularly if bidders are uncertain about the value of target assets.

In any event and irrespective of psychological analysis, it seems that raising the competition between bidders could generally increase the profits for sellers. Bulow, Huang, & Klemperer (1999) show that when the seller engaged in a friendly transaction has the opportunity to invite one more serious bidder $(n+1)$ to an English auction bidding with n players, this will generate an extra revenue- in comparison to negotiating with the winning bidder. This means that target firms should normally prefer auction to negotiation. In the financial world, an auction can be defined as an economic mechanism that is used to transfer the entire assets of a firm (both in and out of bankruptcy) between multiple buyers and the seller. In contrast, a negotiation is generally regarded as dealing with a single bidder (Dasgupta & Hansen, 2007).

However, most of the takeover transactions in the markets are through negotiations. In Bulow and Klemperer's model, sequential negotiation is more efficient than auction. In the negotiation process, bidders are encouraged to bid with a high valuation, particularly when the previous bidders had a low valuation. However, bidders will make a "jump bid" simply in order to deter other competitors, therefore bidders can benefit from negotiation at the seller's expense. Conversely, auction is inefficient, predicated as it is on bidders making their estimation about the value of a target being sold without information regarding the other competitors' value.

Collusion can, however, be a useful strategy for bidders to gather more information and reduce the cost of acquiring the asset. For example, in common value auctions collusion can help some bidders acquire more information about deals, which leads to asymmetric bidding taking place during the auction. Bajari & Ye (2001)showed that in procurement auctions, there are crucial sources which help to create an asymmetric information exchange between bidders such as;

when there are different types of bidder firms with different managerial efficiency or when the location of bidder firms are close to the targeted contracts. For example, around 75% of the bidders who win the contracts of highway construction are those closest to the highway location. Asymmetries may also occur where certain bidders operate in rings or cartels to pool more information about procurement auctions.

Waehrer (1999) argues that the level of revenue of bidders who are outside of the cartel does not tend to be impacted by bidding rings that are created to reduce competition and acquire information. However, he concluded that this is not the same for all types of auction. The auctioneer, Waehrer (1999) points out, should consider how to eradicate collusion and to attract more potential bidders. This should be self-evidently true and the notion that members of the same trade getting together to reduce costs was noted piquantly by Adam Smith. Nevertheless, it is important that the auctioneer does not simply follow previously successful auction designs as auctions are not suitable for a 'one size fits all' mentality (Klemperer, 2002). Thus, the outcomes of past auctions are not necessarily suitable models for the next auction deal.

Some studies have examined whether bidders who own a stake in the target company (referred to as a toehold hereafter) could affect the efficiency and revenue across both the negotiation and auction mechanisms. For example, (Loyola, 2012) find that, in the absence of a reserve price, negotiations in the context of a takeover with asymmetric toeholds outperformed both first-price and second-price auctions. Even when sellers fixed a reserve price, negotiations only performed to a high enough degree for toehold asymmetry. This result addresses the issue of the breakdown in revenue of conventional auction formats, and as a result, the behaviour of bidders with toeholds becomes more aggressive.

One of the key arguments in support of applying auction strategies to mergers is that it is a good method for controlling the toehold problems. Some researchers suggest that there are distinct advantages for companies who use toeholds to attract other companies into the merger auction. Toehold auctions can motivate other firms to use the takeover auction as a strategy to value their share price in the target firms and sell it to other bidders afterwards for a higher price. Carroll and Griffith (2010) offer an example in which hostile bidders who had a toehold in an auction withdrew after encouraging other companies to bid. The company with the toehold was able to obtain abnormal returns of around 4.98%, whereas they would only have achieved a 0.06% return without the toehold. Therefore, toehold bidders can attract other bidders to enter an auction and, thereby, can increase the number of competitors.

Moreover, a toehold offers advantages for bidders in case they decide to engage in auction and deter other competitors. With a toehold, bidders will not pay the full price, and the value of the initial stake will be extracted from the total value to be paid. Furthermore, even with a small toehold of around 5–10%, bidders can still win the company with only a minimum of actual bidding price (Georganas & Nagel, 2011). However, some target companies refuse to negotiate with toehold companies, and there is evidence to show that toehold tender offers have been decreasing in U.S. mergers—occurring relatively rarely since the 1980s: among 10,000 initial bids, only 13% were placed by toehold companies as shown by Betton et al., (2009b). The decline in toehold bidders is due to the disadvantages associated with toeholds that can affect the outcome of the takeover. For example, in 1999, four weeks before the public announcement of the attempted takeover of Warner-Lambert by Pfizer, the latter obtained a 1% stake of the former, which saved Pfizer $246 million of the final acquisition value (Bris, 2002). From the bidder side, toeholds can lead companies to bid aggressively, increasing the probability of the winner's curse, especially if there are a number of bidders with different stakes in the target company (Bulow et al., 1999).

It seems that there are benefits to be a shareholder in the target firm, including being able to encourage other bidder to bid aggressively or obtain a target at a lower price in case bidder with a toehold engage in auction. However, a toehold can change a bidder's behaviour during auctions, which can also lead to overpaying for shares being sold.

In conclusion, target firms elicit the amount of money that the acquirer is willing to pay, by using different selling mechanisms, e.g. one-to-one negotiation or competitive auction. A deal can only happen if the acquirer's willingness to pay is higher than the seller's willingness to accept. And the main cause of the acquirer's shareholders' wealth being destroyed is when the acquirer pays significantly more than the actual economic value of the target firm (Varaiya and Ferris, 1987). The coining of the term 'curse' in this context is more instructive than perhaps was intended. With its connotations of mysterious external forces or influences, the word curse gives the impression of malign forces operating on us but beyond our control and to whose whims we must bow. However, the research noted above suggests that any curse brought down upon winners in auction is a result of basic human emotions, a particularly stylised and unique transaction method and a willingness to put internal beliefs ahead of expert evidence. Returns for companies bidding in M&A as noted above are hardly suggestive of a market where discretion and discernment are valued traits. This section has however focussed on bidders

inter se. It is important to assess the interaction between sellers and bidders in the context of selling mechanisms. This is crucial particularly, given that over-bidding tends to occur more frequently in an auction than a negotiation context, due to the increased competition among bidders

The next part will explain in detail the main theories and empirical tests that have been used in the literature to measure the level of competition between bidders, to examine how the selling mechanisms (auction versus negotiation) affect the M&A outcomes, in terms of share prices in both the short and relatively long runs.

3.2.1 Selling Mechanisms and Competition Proxy: An Overview

'All the business of war, and indeed all the business of life, is to endeavour to find out what you don't know by what you do; that's what I called "guessing what was at the other side of the hill."'[87]

Before discussing the concept of the selling mechanisms and its implications, it is necessary to understand the importance and role of the acquisition process for corporate control activities. The acquisition process is a concurrent and interrelated set of phases that enable the transfer of assets ownership from a seller to buyers (DePamphilis, 2012a, p.138). This definition is accurate but does not fully convey the complex nature of acquisition processes. This is a matter of both strategy and tactics, where the process is not a simple facilitation of exchange but rather a matter of fundamental strategic importance, which will thereafter dictate the tactics employed by the parties. As Sir Arthur Wellesley (a master of choosing not just his battles but also his battlefields), well understood choices made throughout and particularly at the beginning of any campaign are as significant as the number of battalions that can be brought to the battlefield. Process in acquisitions can better be understood in this light as integral to outcome as much, if not more so, than the capital or leverage which can be deployed or post-acquisition plans which can be implemented.

[87] Sir Arthur Wellesley, 1st Duke of Wellington, cited in *The Croker Papers: The Correspondence and Diaries of the Late Right Honourable John Wilson Croker, LL.Dm F.R.S, Secretary of the Admiralty from 1809 to 1830* (1884), edited by Louis J. Jennings, Vol.III, p. 276.

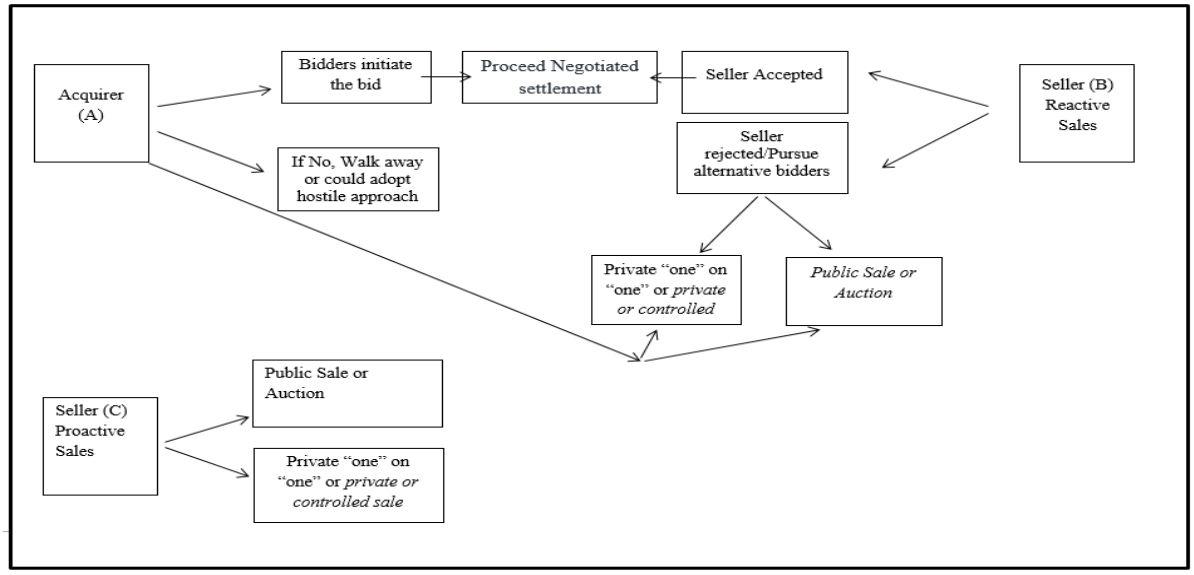
This process starts by preparing business and acquisition plans, to then searching for, screening and contacting appropriate candidates, to negotiating the purchase decision, and, finally, either integrating and closing the deal, or walking away using alternative techniques, such as a hostile tender offer (DePamphilis, 2012a, p.138). Firms usually attempt to use a well-designed acquisition process in order to ensure success, and to avoid mistakes, at all phases of the acquisition process (Rankine & Howson, 2006, p.3). However, throughout any acquisition process, there is a concern about which selling mechanism target firms should adopt.

Both parties, the seller and the bidders, may hire financial advisors and law firms to help with reaching a consensus on particular issues related to financial and legal affairs. The participation of advisors helps acquirers to define a competitive initial offer price, financing source and assess the target' assets valuation based on their knowledge of what lies the other side of the hill in a process which can never be assumed to be based on wholly transparent or complete information. Advisors play an important role in helping target firms to figure out which selling mechanism to adopt, prospective bidders to contact and perform due diligence and valuation analysis (Pearl & Rosenbaum, 2013, p.316-321). Target firms and their advisors should act as auctioneer and choose the selling method according to certain criteria, such as maintaining a high level of confidentiality, creating a high level of competition between bidders, preventing information leakage, minimising impact on employees, political concerns (in certain countries and industries), and whether they occupy a weak negotiation position. For example, in order to achieve a high price by creating a high level of competition, a target might organise an auction with multiple bidders, rather than negotiating the transaction with just one bidder. However, if a target company prefers to control the level of information leakage, it will select the private negotiation process rather than a public auction (Ernst and Häcker 2012, p. 25).

The selling process in general is composed of two main stages: the pre-negotiation stage and the negotiation stage. **Figure 4** illustrates the selling process that will be discussed in greater detail in the next part. The pre-negotiation stage could be a reactive or a proactive sales process (DePamphilis, 2010b, p. 584-585). Reactive sales begin when a prospective acquirer initiates contact with a potential target to express his/her interest in acquiring either full or part of the target's assets. If the potential target accepts the offer, the two parties then start one-to-one negotiations and the process ends. However, if the target rejects the offer, a second stage of either public or private process will be pushed forward (see Figure 4: A&B). In *a public sales*

or auction[88], the target or their advisors announce the selling opportunity to the market in order to attract bidders, whereas a *private or controlled sale*[89] involves confidential negotiation with either one or more bidders. Even if there is more than one bidder, the target still negotiates with each bidder privately. The second way of instigating the pre-negotiation stage occurs when a target intends to sell their assets (a proactive sales process) by either *a public sales or auction* or a *private or controlled sale* (see Figure 4: C).

Figure 4 The Selling process



In the negotiation stage, strategic interactions are conducted differently between sellers and bidders throughout either a private phase or a public phase. At the private phase, agents are utilised for decision-making activities by interacting and exploring the possibility of closing the deal successfully. Such negotiations are of necessity often quite sophisticated because this negotiation process is more than mere pourparlers but can, and ideally should, include all the main interdependent activities related to the purchase decision, such as refining the target valuation, the method of payment, due diligence and developing projections and a robust financial plan (DePamphilis, 2010b, p. 138-179).

At the public-phase, where a target initiates the bid by public announcement, bidders are able to observe the initial price offer and the number of rival bidders, the players will start to interact, depending on the move or moves of one's opponent, and will finally end the deal with

[88] A broad auction in (Pearl & Rosenbaum, 2013)
[89] A targeted auction (Pearl & Rosenbaum, 2013)

integration with the winner, and closing the deal. These conscious interactions can impact the behaviour of players and the tactics that will be used such as collusion and bluffing (Bruner, 2004a,p. 793). Moreover, Bulow & Klemperer (2002b) and Boone & Mulherin (2008b) argue that the level of competition is related to the bidders' characteristics, where the presence of a strong bidder would create or at least heighten the prospect of the winner's curse for other possible bidders, scuttling gains that might be expected to be generated through auction. For example, bidders could deter other competitors if they are prone to agency problems of free cash flow (Jensen, 1986), or to a collective hubris (Roll, 1986a) which leads them simply to overbid for the target' assets. As such, the type, nature and relative strength of bidders, which represents a substantial source of competition, has a profound effect on the selling process.

Regardless of whether takeover bids are negotiated in a public-phase or in a private-phase, the negotiation stage consists of consecutive steps directed by different rules and deadlines in auction and negotiation. For example, auction is governed by clear rules and deadlines. Theoretically, (McAfee & McMillan, 1987) show four types of auction are available to the parties: English auctions; Dutch auction; first-price sealed-bid auctions and second-price sealed-bid auctions.

English auction is open publicly to all bidders and it starts at the setting of the reservation price of the seller. Thereafter, potential bidders raise the bid price until no other bids are made. The bidder with a highest price win the auction. This is a conceptually straightforward auction process and arguably highly transparent at least in respect of knowing (if not necessarily understanding) the imperatives and limits of the other bidders. Dutch auction begins with an arbitrarily high price which is then lowered until the shareholders accept the offer. This indicates that the firm seeks to get the lowest possible price, while obtaining the desired number of shares. These types of auction are both highly tactical and also require bidders to have a clear and unusually precise idea of what they are ultimately willing to pay to succeed (to a maximum bid in English auctions and a minimum in Dutch). Bidders in the sealed-bid auction submit the bid price with each bidder having one chance to bid, however, in the first-price sealed-bid auctions, the winner pays the highest price, while in the second-price sealed-bid auctions, the winner pays the second-highest price. In actual practice, sealed bid auctions and Dutch auction are more commonly used in M&As. However, this research will not investigate the impact of Dutch auction upon bidder returns because such mechanisms are used for

repurchasing activates which is not the main focus of this study. The next part will explain the mechanism of sealed-bid auctions in a public and private-phase competition.

Public sales or auction are designed to heighten a competitive environment between bidders, where target firms or their investment banks open the target' assets publicly for sale, in order to solicit bids from as many potential public bidders as possible. Before bidders are given access to the target firms' information not publicly available, they are asked to sign a confidentiality agreement (non-disclosure agreement). The auction is then held by a target firm until all interested buyers have submitted their bids with the winner being the one who offers the best value (Pearl & Rosenbaum, 2013,p. p.315) and (DePamphilis, 2011c, p. 14)

In *private or controlled sale*, there are many negotiation rounds before announcing the auction winner as described by Bruner (2004a, p.798) and Hansen (2001a). The target firm's advisors may prepare a list of bidders' contact information, or as it is called *selling memorandum*, which includes either strategic players (e.g. peer competitors) or financial players (e.g. leveraged buyout, LBO). Following this stage, the targets or their advisors begin to contact members on the list.

Bidders who are interested in buying the target firm sign a confidentiality agreement and receive a non-public information book. Occasionally, bidders might also sign standstill agreements that prohibit them from making unsolicited offers for target shares. Signing the confidentiality agreement marks the end of the *initial contact* round**.** During this phase it seems only the sellers observe the type of bidders. In the preceding *indication of interest* phase, the sellers or their advisors request the bidders to submit non-binding indications of their interest, which may disclose both their method of payment and their price offer.

At the end of this stage, the reserve price is offered and the non-binding proposals will be observed for the seller and their advisors, and the seller will start to invite bidders, based on the indicative offers made, to conduct additional due diligence, and, thereafter, the *second round* begins**.** In this round, the target's management gives a presentation and bidders are given access to a data room for more detailed information. At the end of this round, the seller thoroughly reconsiders the selected bidders' offers from various positions, for example, the payment method (i.e. cash versus equity) will be considered. In the *third round*, the seller accepts the highest bid. Finally, the winner of the auction is announced, and the seller begins to negotiate with the winner during the *final negotiations* stage.

For the other side, the negotiation mechanism consists of consecutive steps directed by limiting rules and deadlines. First, the acquirer initiates a takeover offer to the target board. If the target accepts the offer, both parties will proceed with negotiation settlements, otherwise; if the offer is rejected, the acquirer might adopt an aggressive approach. If the target board recommends the offer, the acquirers will be invited to sign a confidentiality agreement**.** By reviewing the private information, bidders will update their preliminary target valuations and, afterwards, the two parties will start negotiating the deal structure. The deal structure includes factors that determine the risk share of both parts, such as the form of payment, tax considerations and post-closing arrangements that allow the final organisational form to be defined, i.e. whether it is corporate or divisional. The final step is to develop the accounting and finance plans for the combined firms. If the two parties process the negotiation successfully they will integrate; otherwise, the acquirer will "walk away" (DePamphilis, 2011c, p. 15-18)

In conclusion, there is always a trade-off between the cost of disclose information and increasing the competition between bidders as shown in the theoretical work of (Hansen, 2001a). However, if the cost of information is high and could affect the value of the selling firms, the optimal choice for target firms (rationally) to negotiation the bid with only a signal bidder.

Researchers differ in term of modelling the sales process, with studies focussing on either the number of bidders in a private or public phase competition. However, there are two basic approaches currently being adopted to model the sales process. The first is Boone and Mulherin's 11-Step Model, and the second is Betton, Eckbo, and Thornburg's Two-Stage Approach.

Boone and Mulherin's 11-Step Model is based on a theoretical framework suggested by (Hansen, 2001a). This model divides the takeover process into eleven steps, as shown in **Figure 5** The first seven steps are labelled as a private process, while the remaining steps are made after the public announcements. The private takeover process covers the period beginning from the initiation of the deals, whether by the acquirer or target, and includes the various stages of choosing the appropriate selling procedure, signing the confidentiality agreement, to the submission of nonbinding offers, to the disclosure of the method of payment and the price offer. After the deal is announced, the bid might attract other bidders, then if target firms accept one of the offers, they announce the winner and wait for shareholders and regulatory agencies to

approve the deal. If the transaction is approved, the deal is completed. The 11-Step Model defines the private process deal when there is more than one bidder at an auction, while if the target negotiates the process with a single bidder, the deal is defined as negotiation (Aktas, De Bodt, Baker, & Kiymaz, 2011)

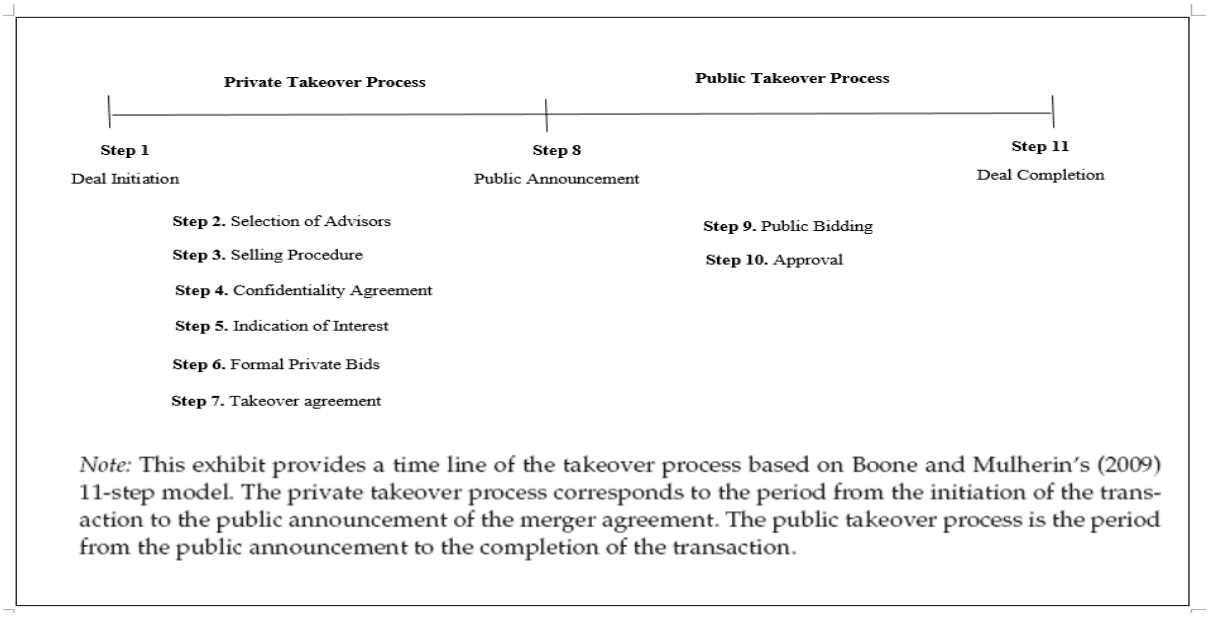
Boone and Mulherin's 11-Step Model collect details of the sales process for each takeover from the EDGAR system of the Securities and Exchange Commission (SEC)[90], particularly from the background section of 14A and S-4 filings (for mergers) and 14D filings (for tender offers).

The 11-Step Model however overlooks levels of competition during public takeover procedures. These steps are significant as they include the public announcement of the winning bidders, when other rival bidders are attracted to participate in a public takeover battle which could affect the initial offer price and the gain from conducting an auction.

The second possible model is Betton, Eckbo and Thornburg's Two-Stage Approach, which has been used to investigate the disappearance of takeover bids with a toehold in the US market. According to this framework, the first stage shows the bargaining mechanism that the bidders use to make their initial offer to the potential target firm. If the potential target accepts the offer, the two parties progress to one-to-one negotiations, and the game ends. However, if the target rejects the offer, they will organise a second stage: either private or public auction. This means that merger negotiations are carried out under the threat of an open auction. This approach classifies the level of competition between bidders based on the public-phase competition. Under the Williams Act 1968 (which amended the Securities Exchange Act 1934) the target board has a fiduciary responsibility to consider any rival offers within a certain period until the arrangement is finally approved by the shareholders. This fact is used to classify a deal as auction or negotiation whereby a deal is classified as negotiation if there is only one public bidder for the same target over the preceding or following six months, and the auction subsample will detail whether there were additional public bidders during that period (Betton et al., 2009b)

[90] Securities and Exchange Commission (SEC) is an independent body in the U.S. federal government to supervise and control securities industry. EDGAR system is a free database in the SEC that provides files that include information about all the registered firms in the U.S stock markets. Find more in https://www.sec.gov/

Figure 5 Timing of Takeover Process



Source: Aktas , De Bodt (2011, Figure 15.1)

Although private process has a significant role in informing the seller about a target firm value, however; it can be argued that strategic interaction activities are best seen in the public- phase competition. Modelling the competition level in M&As based on the public phase creates a context of Bayesian game in which players act on beliefs that are reached after observing the distribution of other types of bidders (Gibbons, 1992, p.149-150). More specifically, the level of competition is related to the bidders' characteristics, where the presence of a strong bidder would create or at least heighten the prospect of the winner's curse for other possible bidders, and reduce gains that might be expected to be generated through auction (Bulow & Klemperer, 2002b) and (Boone & Mulherin, 2008b). However, most of the empirical research that followed Boone & Mulherin's approuch highlighted the number of bidders in private process where bidders do not observe each other, and then apply a static regression. Yet, this method disregards the significance of the outcomes of the interactions between bidders. This is can be seen as one of the weaknesses of how these ideas have been investigated in empirical research, as it stands.

The next part will discuss the main empirical works that investigate the impact of the level of competition between bidders upon bidder returns practically after the publication of the earlier work of (Boone & Mulherin, 2007a)

3.2.2. Empirical work

There are many empirical papers which study why all firms are not sold in auctions given the apparent advantage of competition in auctions. These empirical works are motivated by the theoretical framework of Bulow & Klemperer (1996a) who argue that increasing the number of bidders in a standard auction will lead to increase the competition between bidders and then raising the profit for the seller rather than engaging in one-to-one negotiation procedure.

However, Hansen (2001a) argues that there is always a trade-off between the cost of information and competition in deciding between competitive auction and negotiation. Sellers have an incentive to expose the ranges values of their companies in a competitive auction procedure because they are attempting to maximise shareholder revenue, while the full disclosure of sensitive information to potential bidders that include competitors, customers or suppliers could destroy the value of the selling firms. As a result of this, if the cost of information is high and could affect the value of the selling firms, the optimal choice for target firms (rationally) is to negotiate the bid with only a signal bidder.

Boone & Mulherin (2007a) investigate what could drive the choice between auction and negotiation: the information cost hypothesis or the agency cost hypothesis, in order to answer why a competitive auction is not a dominating selling process in the US takeover activities. They argue that if information costs are found to drive the choice of selling mechanisms, there is no difference between shareholders' wealth in auction and negotiation, because an auction is costly, and it has always been unable to dominate negotiation. While if the shareholders' wealth in auction is greater than in the negotiation, this means that agency costs are found to drive the choice between the two mechanisms because a target manager prefers to negotiate a deal with a certain bidder in order to gain power and prestige at the expense of the shareholders. Therefore, the wealth of target shareholders will be destroyed in the case of a target manager decides not to conduct a competitive auction.

Boone & Mulherin (2007a) apply the event study approach to examine the impact of the selling process upon target returns based on the theoretical analysis of (Hansen, 2001a). They use a sample of 400 US-based target firms that were acquired by US-based bidder firms with a deal value of at least $100 million over the 1989 to 1999 period. Based on Boone and Mulherin's 11-step model, the sample comprises 202 auctions and 198 negotiation deals. The event study approach calculates the target cumulative abnormal returns and reports that target firms gain

positive returns in auction and negotiation subsamples. However, there is no significant difference in target returns between auction and negotiation. The selection bias problem between the choice of the sales procedure and target returns is controlled by performing a standard two-stage IV regression.[91] The research concludes that agency costs do not explain the choice between auction or negotiation choices, while the trade-off between competition and information costs actually drive the argument for choosing between auction and negotiation. This conclusion is consistent with the model of Hansen (2001a). Moreover, this research has shown that the private stage is not free from competition, even if there is only one buyer revealed at the announcement stage. This means that even publicly observed non-competitive negotiation deals are not free from competition.

In the following study, Boone & Mulherin (2008b) examine whether the event of a winner's curse exists in auction takeover based on the framework of Thaler (1988) and Roll (1986a) who argue that if bidders create negative returns around the date of announcement, this event is considered as evidence of the winner's curse. The main motivation for this paper is to essentially answer one of the fundamental questions in the field of corporate finance, which is *why bidders significantly lose in M&As.* The authors compare the winner's curse hypothesis and the competitive market hypothesis in order to test whether bidders overbid for target firms by using two proxies: intangible assets and the number of bidders that bid for the same target firms. The intangible assets ratio is a proxy of uncertainty, whereby if bidders are uncertain about the value of the target's assets that are being sold, they will overpay, as suggested by Bazerman & Samuelson (1983). The winner's curse therefore exists if there is a significant and negative relation between bidder returns and uncertainty proxy. Moreover, the number of bidders is used as a proxy to ascertain whether there is a significant, negative relationship between bidder returns and the level of competition between takeover bidders at auction and negotiation as suggested by Kagel & Levin (1986). Bidders will be more aggressive when there is a large number of bidders bidding for the target and this consequently destroys bidder returns.

Boone & Mulherin (2008b) look at 308 US-based bidder firms with a deal value of at least $100 million between the periods 1989 to 1999. Based on Boone and Mulherin's 11-step model, the sample comprises of 145 auctions and 163 negotiation deals. Boone & Mulherin find that

[91]Boone & Mulherin (2007) use a ratio of relative size of target firms to bidder firms as an instrumental variable in their model in order to correct the self-section problem

there is a negative relation between the dummy variable auction as a measurement for the level of competition in takeover activities and bidder cumulative abnormal returns, but that such relation is not statistically significant. Moreover, there is a positive and significant relation between intangible assets and bidder returns. Again, this paper controls for the selection bias problem between the choice of bidding in auction or negotiation and bidder returns by performing a standard two-stage IV regression. There is still no statistically significant relation between auction and bidder returns. These results lead the authors to conclude that the event of winner's curse is not presented in takeovers, while the negative bidder returns in the US market occur mainly due to the high level of competition in the private competition phase.

One of the main factors that could affect bidding strategies is toehold, although bidders with a toehold may yield a strategic advantage over other competitors regardless of whether they win the bid or not. However, there is evidence in the empirical literature showing that toehold bidding has decreased in the US market since the 1980s. To investigate the toehold puzzle, Betton, Eckbo, and Thornburg's examine an original Two-Stage Approach in which merger negotiation is carried out under the threat of an open auction. Betton et al., (2009b) use a sample that exceeds 10,000 US-target firms over the period 1973 to 2002. Of these, 7,750 bids are classified as merger bids and 3,056 as tender offers. They find that bidding with a toehold exists in the US takeover market, only if bidders own on average 20% of target' assets. A likely explanation for such phenomena is that bidding with a toehold could impede negotiation takeover. With optimal bidding, rational target managers should reject bids with a toehold because bidders obtain a target at a lower premium compared with non-toehold bidders. On the other hand, the optimal bidding strategy with a toehold for bidders, is to bid with a zero toehold to avoid the cost of rejection or to bid with a toehold size that exceeds the threshold because the toehold benefit offsets the cost of rejection. This strategy of avoiding bidding with a toehold is an evidence for that bidder firms are rational, and this is the main reason why bidding with a toehold has decreased in the U.S. takeovers.

The study of Aktas et al., (2010a) follows the two-stage takeover process to explain why firms do not organise competitive auctions to sell their assets. However, the research follows Boone & Mulherin (2007a) model to define auction and negotiation deals. They argue that even friendly bidding, which proceeds under the format of a one-on-one negotiation, is not insulated from competitive pressure, whereby if latent competition induces bidders in negotiation deals (the first-stage) to increase the bid premium, anticipated auction costs reduce the premium (the second-stage). (Aktas et al., 2010a) examine their argument by using 1,774 US samples of

public target firms during the period from 1994 to 2007. Of these, 927 bids are classified as auction bids and 847 as negotiation bids. The authors use different proxies to measure latent competition and the cost of conducting an auction. First, they use the liquidity index, private buyout fund activity and recession times of economies as proxies for latent competition. They predict that bidders face latent competition even in a deal with only one bidder with a high liquidity index and private buyout fund activity and less in times of recession. The target debt ratio and whether target firms initiated the deal are used as proxies for the cost of the auction. Target firms are under pressure to sell if the debt ratio is high and if they initiated the deal, which could affect their bargaining power to extract a high bid price from bidders. Aktas et al., (2010a) document that even in a deal with only one bidder, competition still exists from latent, potential competition, which increases the bid premium. However, an auction in the second stage could be organised by the target if negotiations fail and the auction cost reduces the premium.

Fidrmuc et al., (2012) study whether the choice of selling mechanisms could help reflect bidder types: whether the firm is sold to a private equity firm or a strategic bidder.[92] The authors classify selling process as a *controlled auction* and private negotiation based on the private-competition phase, and *formal auction* as being based on the public-competition phase whereby target firms organise the selling process with highly pre-set rules. The sample consists of 410 takeover bids of listed US targets. Of these, 205 target firms were sold to private equity bidders and 205 target firms were sold to strategic bidders. After controlling for self-selection problem between the selling mechanisms, buyer types and bid premium by conducting a simultaneous model, there is no significant effect for bidder types and the choice of selling mechanism on the takeover premium. Moreover, the research finds that a private equity firm prefers to hold an auction rather than a negotiation for the deals that are initiated by the target firm. Gorbenko & Malenko (2014) agree that private equity and strategic bidders are attracted to different target firms with specific characteristics, because of that there is a significant difference in target values between the two different types of bidders. They document that strategic bidders on average value the assets of target firms higher than financial bidders in auction deals. For

[92] Different type of bidders has different motivations to acquire a potential target. Strategic bidders usually aim to integrate target assets to their existing operations in order to gain from the possible synergies between the two firms, while private equity buyers need to hire specialists in order to run target firms for them. Private equity buyers will avoid overpaying for target firms because they do not have full information about the value of firm's assets (Fidrmuc et al., 2012).

example: They show that financial buyers pay significantly more for mature and poorly performing target firms. To examine their argument, they use a sample of 349 US auctions of only cash and completed takeovers, whereby 211 target firms sold to strategic bidders and 138 target firms sold to financial bidders. The auction deals define if there is more than one bidder signing a confidentiality agreement.

Schlingemann & Wu (2015) re-investigate the effect of selling mechanisms upon bidder and target returns, particularly when the size of target firms is relatively small. This work is based on the theoretical framework of Hansen (2001a), which argues that the trade-off between the cost of information and competition is the main determinant of the choice between auction and negotiation. Schlingemann & Wu (2015) predict that that the costs of disclosure proprietary information are inversely related to the size of target firms and during the post-acquisition integration, larger bidders are able to absorb and cover these costs. Therefore, small target firms prefer to conduct auctions in order to increase the level of competition between bidders and maximise shareholders' wealth because the costs of disclosure are small. Large target firms prefer to engage in a one-to-on negotiation process because the cost of disclosure is high. If the above prediction is true, this could suggest that the decision of target firms to choose between auction and negotiation is consistent with rational behaviour.

Schlingemann & Wu (2015) use a US sample of 575 completed takeover transactions with a deal value of at least more than $10 million, over the period 1998 to 2012. If the number of bidders contacted is more than one, the sale process is defined as an auction and if there is only one bidder contacted, the sale process is defined as a negotiation. The sample contains 313 auctions and 262 negotiation deals. In the analysis of univariate and OLS regression, there is no significant relation between auctions and target returns either in cases of using Boone and Mulherin (2007a) model or the number of bidders contacted to define the takeover bids to auction and negotiation. After controlling for the self-selection problem between target returns and selling mechanisms by using a series of two-stage IV regression and the variables, target sales growth and deal volume are used as instruments for auction. The research finds that there is a positive and significant relation between auction and target cumulative abnormal returns, particularly when the size of target firms is small. Moreover, the event of a winner's curse does not exist as there is no significant relation between auction and bidder cumulative abnormal returns. Overall, the relative size of target firms plays an important role in the choice between competitive auctions and negotiations.

Akts,Xu & Yurtoglu (forthcoming) examine whether the event of overpayment exists in cases of bidders announcing the deal earlier, before signing the definitive agreement during the private selling process. They argue that if bidder firms announced their intentions to acquire a target firm, this could attract other competitors to bid, which could increase the level of competition between potential bidders. They use a U.S. sample of 269 takeover deals that were announced in the period of 1990 to 2013. They define auction and negotiation deals based on the level of competition in a private process. They show that, although the earlier deal announcement is associated with a higher public competition, a winner's curse does not exist in bidder announcement returns.

Most of the previous research controls the selection-bias problem between the choices for a sales procedure and target or bidder returns by performing a two-stage regression. Under the Heckit model, the solution for the self-selection problem is to use the z vector that meets two conditions; the z vector is not correlated with ε ((Cov (z, ε) =0), and at the same time is predictive of the selling process which means that z is correlated with $X1$.

Therefore, if the vector met these conditions, then it is a good candidate for an instrumental variable (IV)(Guo & Fraser, 2015, p.63 and p.98-101). This estimator consists of two stages: in the first we regress the endogenous variable $X1$ on the instrument (and any other exogenous variables), and use the fitted regression to obtain the predicted $X1$; in the second we then regress the dependent variable (the target returns, for example) on the exogenous variables and the predicted $X1$. This procedure is essentially a way to filter out the endogenous part of $X1$, leaving only the variance that is due to exogenous factors; which should not be correlated with the error term.

In general, the set of exogenous variables includes deal characteristics that could affect returns, or characteristics of target firms that predict the choice of auction and negotiation in the takeover.

According to Bound, Jaeger, & Baker (1993), instrumental variables estimation results in an estimator that is biased but consistent. Its variance depends crucially on the degree of correlation between the instrument and the endogenous covariate. If this correlation is weak then the resultant estimator may not be consistent, and will likely have a high variance. Therefore, it is crucial to check for significant correlation between the instrument and the exogenous covariate in the first stage regression.

Although instrument variable estimation is a good method, there is still a big challenge in finding such an instrumental variable z, which meets the two conditions. Because of this, using propensity score matching is an alternative method to address the self-selection problem (Wooldridge, 2010, p. 937)

3.2.3 Hypotheses Development

There have been several empirical studies on M&As have investigated and aimed to tested whether selecting a different selling mechanism would induce different abnormal returns to acquirers, or put another way, whether auctions gives rise to the winner's curse (overpay) in the U.S. takeover market. Kagel & Levin (1986) show that the number of bidders in auction is a root cause for the winner's curse. Bidders will be more aggressive when there are a large number of bidders bid for the same target firm, and this makes negative the winner's consequent payoff. Bazerman & Samuelson (1983) find that the likelihood of the winner's curse increased as the number of bidders increased particularly if bidders are uncertain about the value of target assets. Theoretically , Bulow, Huang, & Klemperer (1999) show that when a seller engaged in a friendly transaction has the opportunity to invite one more serious bidder to an English auction bidding with number of players, this will generate an extra revenue- in comparison to negotiating a deal with the winning bidder. Therefore, bidders will be more aggressive when there is a large number of bidders bidding for the same target firm and this consequently increase the target shareholders wealth.

However, most of takeover deals in the real world are structured using one-to-one negotiations, where there is only one buyer negotiating with a target firm. Such puzzling observation motivates many research to investigate why all firms are not sold in auctions given the apparent advantage of competition in auctions. The most prominent works such as Boone & Mulherin (2007a:2008b) and (Aktas et al., 2010a) measure the exact competition level between bidders in auction and negotiation, and how the competition levels would affect different returns for acquirers or target firms. As Boone & Mulherin (2007a) discuss, prior to the public announcement of a bid, there is usually a period of highly competitive private negotiations between a target firm and bidders. This research has shown that the private stage is not free from competition, even if there is only one buyer revealed at the announcement stage. This means that even publicly observed non-competitive negotiation deals are not free from competition. Although competition is high in the private negotiation, Boone & Mulherin

(2007a:2008b) and (Aktas et al., 2010a) conclude that using auction does not push bidders to overbid, and that there is no significant difference in the announcement returns of target and bidder firms between the two mechanisms of auction and negotiation. Therefore, the event of the winner curse does not exist in the U.S. takeover activities.

However, Boone & Mulherin (2007a)'s model raises some concerns. First of all, this model overlooks the levels of competition during public takeover procedures, when rival bidders are attracted to participate in a public takeover battle which can, then, affect the initial offer price and any further gains made through the auction process. Particularly, Bazerman & Samuelson (1983) and Kagel & Levin (1986) argue that bidders are more aggressive when there are a large number of competitors jostling to acquire a target firm, which can lead to the winner overpaying for the targets' assets.

Boone & Mulherin (2007a) private process model is constructed using the number of confidential bidders as a proxy for competition. The weaknesses of this approach can perhaps be explained, at least in part, by its essentially quantitative rather than qualitative analysis. This disregards the fact that auction should mimic the actual environment of bidding competitions, where each bidder can extract useful information about the object's value for themselves from the bids of other bidders. Based on the standard definition, the auction process can be seen as a Bayesian game in which players act on beliefs that are reached after observing the distribution of other types of bidders (Gibbons, 1992). Bearing this definition in mind, each bidder's beliefs can be seen to be shaped by the type of other peer bidders. As such, the types of bidders, which represent a substantial source of competition, have an enormous impact on the selling process. Therefore, bidder firms will be more aggressive when there is more than one public bidder bidding for the same target.

Relatively speaking, Bulow & Klemperer (2002b) and Boone & Mulherin (2008b) argue that levels of competition are related to bidder characteristics, where the presence of a strong bidder would create or at least heighten the prospect of the winner's curse for other possible bidders. As a result, bidder asymmetry suggests that there are gains to be made for bidder firms when a takeover competition is limited and, to an extent, when market failures or inefficiencies are removed from the takeover process. Therefore, it is fundamental to identify the differences between bidder characteristics, in auction and negotiation transactions in order to explore whether these distinctions can critically influence, or even dictate, the bidding behaviours of

acquiring firms at a public stage, or even drive bidders to pay more for their targets. It can be argued that the winner's curse is more likely to exist in a public stage when there is more than one public bidder bid for the same target where acting rationally and less aggressive can be even difficult, and this argument lads this thesis to test the second proposition as follows:

Hypothesis 1: the event of winner's curse exists in the U.S. takeover market between bidders during the public-phase competition, where there is more than one public bidder bid for the same targets assets.

A further issue in studies that investigate the impact of the competition between bidders on their shareholders wealth such as Boone & Mulherin (2007a:2008b) and Aktas et al., (2010a) is that both use unrepresentative samples, examining only large firm acquisitions with deal sizes over $100 million. However, a significant number of M&As are conducted between small firms, and the outcomes for a small firm could be quite different to those of large firms. According to Moeller et al., (2004), small firms generally outperform large firms in acquisition markets. This seems to be because large firms are more prone to the hubris effect, as outlined in Roll's hypothesis (1986a). Moreover, Boone & Mulherin (2008b) have found that the size of the bidder firm is inversely related to the level of competition when there is more than one bidder for the same target. Schlingemann & Wu (2015) document positive and significant returns for both target and bidders in auction compared to negotiated deals, particular for relatively small targets.

The size of bidder firms, therefore, seems to hint that firm size might be inversely associated with average abnormal returns and the level of competitions. The larger the bidder size, the more negative returns for bidder shareholders there are because of large firms are more susceptible to the tendencies of management empire building or hubris. Moreover, the larger size of bidder firms motivates them to engage in competitive selling procedures, where the larger bidder could deter other competitors and overpay for target assets.

Therefore, this chapter will examine the second hypothesis of whether firm sizes as a main proxy for bidder asymmetry could affect an acquirer's announcement return for the two selling mechanisms of auction and negotiation. Particularly, large firms are more likely to be aggressive when there is more than one public bidder bid for the same targets assets because of the tendencies of management empire-building or hubris.

Hypothesis 2: there are a positive relation between winner's curse and the size of bidder firms whereby the larger the bidder size, the more negative returns for bidder shareholders there are because the larger size of bidder firms motive them to engage in a competitive selling procedure and overbid for a target firm because of management empire building or hubris.

3.3. Data and variables

3.3.1. Sample construction

The data is drawn from Thomson ONE Banker and Wharton Research Data Service (WRDS). Thomson ONE Banker provides core information on M&As through the Securities Data Company's (SDC), the U.S. Mergers and Acquisitions Database. The SDC provides the sample of U.S. acquiring firms that were announced from 1/1/1984 to 31/12/2014, and the relevant information on deal characteristics such as acquirer and target name, date of announcement, deal status, deal value, acquisition technique, synopsis and history file and the form of transactions. Secondly, the Wharton Research Data Service (WRDS) provides the yearly accounting data and daily stock prices relevant to the period covered by the event study. The WRDS uses files from COMPUSTAT and the Centre for Research in Security Prices (CRSP) to obtain accounting and stock price information, respectively. The most pertinent characteristics of the U.S. acquiring-firm (i.e. market capitalisation, total assets, total debt to total assets, cash holding, return on assets (ROA) and Tobin's q) are necessary to provide the narrow context of the particular M&A transactions are taken from COMPUSTAT database. The CRSP is used to provide the daily stock prices during the event window, while also providing the broader context to investigate the effect of the selling mechanisms (auction versus negotiation) on the acquirer's return. Since the data that underpins this element of this study has been taken from two different data sources (the SDC and the WRDS), a common identifier is necessary to facilitate the full and accurate merging of the data in order to provide consistent results. To this end, the Acquirer's CUSIP is used to match the datasets; the CUSIP master file on SDC provides the 8-character CUSIP to match with the firms' NCUSIP on COMPUSTAT.

To estimate the causal effect of using auctions on the acquirer's wealth level, a number of strategies have been adapted to define the sales process as either auction or negotiation by using

a sample from US takeover market. **Table 13** shows the three-steps as applied to the sample in order to define transactions as either auctions or negotiations. Step one, indicates that there were 289,163 deals involving U.S. transactions for domestic acquirers between 1 January 1984 and 31 December 2014. The sample of U.S. acquiring firms has been taken from the SDC using the following general criteria:

- The acquiring firms chosen are public listed companies, as indicated later by the share codes (10, 11) on the CRSP and COMPUSTAT.[93]
- Targets are US firms, in order to guarantee that the both buyers and sellers are subject to the Securities and Exchange Commission (SEC) regulations.[94]
- The target could be a private, subsidiary or public firm.
- The acquiring firm forms part of a completed or unsuccessful M&A deal where the transaction is completed when the acquirers gain control of more than 50% of the target company. Transactions that are flagged by the SDC as "withdrawn" will be defined as unsuccessful. In order to avoid obtaining biased results, the withdrawn deals are included, as suggested by Boone & Mulherin (2007a:2008b);Fidrmuc et al., (2012), and Akts,Xu & Yurtoglu (forthcoming). In addition, the percentage of the shares held by the acquirer six months prior to the date of announcement should be less than 50%.
- Transactions that are flagged as privatisations will be excluded because such deals are subject to special regulations in terms of organising competition between bidders.
- Repurchases or buybacks, self-tender offers, exchange offers, and recapitalisation deals are excluded.
- Only deals that have a minimum value of $1 million are included, in order to study the size effect as suggested by (Moeller et al., 2004)

[93] This thesis chooses not to exclude uitility and finacial industries as suggested by the the most most prominent research that investigate the impact of bidding in a specific selling mechanism on bidder or target shareholders wealth such as Boone & Mulherin (2007:2008), Fidrmuc et al., (2012), Aktas, De Bodt & Baker (2010:2011): and Akts, Xu & Yurtoglu (forthcoming). Of course, it is true that utility and fanatical industries have different capital structure and book to market ratio which could affect the final results. However, studying the impact of auction on the shareholders wealth aims to investigate how the selecting of different *bidding strategies* could determine the shareholder wealth, and this is does not relate to the capital structure and book to market ratio which is more related to the accounting studies. In other words, there is no core reasons in the previous emprical works to exclude exclude utility and financial industries.

[94] Under the Williams Act (which amended the Securities Exchange Act 1968) the target board has a fiduciary responsibility to consider any rival offers within a certain period until the arrangement is finally approved by the shareholders. This fact will be used later to classify a deal to auction or negotiation.

The above criterion that is implemented on the sample generates 37,680 transactions that will be used to classify auctions and negotiations. Step two uses the information about the main characteristics of the transactions from acquisition technique (field RANK_MENUACQTECH in the SDC database), which reports on a subset of deals, whether they are conducted through *Auction* or *Privately Negotiated Purchase.* Such information motivates this study to extract auction and negotiation subsamples because of the SDC definitions of such selling mechanisms are consistent with the adopted definitions of the auction and negotiation in this study. The SDC defines auction as a sealed-bid auction made on a specific day between multiple bidders, while the private negotiation purchase is defined as a negotiation process between a seller and buyer in order to obtain a percentage of shares in the target. After implementing step two, a sample of 134 deals remains (77 auction and 57 negotiation), which satisfies these requirements and helps with the data integrity—from which conclusions and analysis may be drawn. All the auction sub-samples here are structured as a *formal auction*, whereby target firms organise the selling process with highly pre-set rules.

Back to the main sample: after excluding the step two subsamples, the third step follows the criteria proposed by Moeller et al., (2004) and Betton et al., (2009b) whereby a deal is classified as negotiation if there is only one public bidder for the same target, and as auction if there are two or more public bidders. More specifically, Betton et al., (200b9) limit the period for the second bid (in order to classify the bid as an auction) at six months, whereby, under the Williams Act the target board has a fiduciary responsibility to consider any rival offers until the arrangement is finally approved by the shareholders.

In this light, the negotiation subsample will include deals made with only one public potential bidder for the same target over the preceding or following six months, and the auction subsample will detail whether there were additional public bidders during that period. To do this, the sample in step three will be divided into steps; step three-A, and step three-B. Step three-A defines a new negotiation subset that are labelled by SDC, as including deals that are not related to another existing deal (in field RD) and that, at the same time, have only one public bidder as shown (in field BIDCOUNT).

Step three-B will include all the related deals (based on field RD) to define extra auction and negotiation deals. Transactions in this sub-step are classified as auctions if there are one or more public bidders competing for the same target over the preceding or over the following six months, and as negotiations if there is only one public bidder over the preceding or over the

following six months. One more condition will be applied to the step three-B: offers from all public competitors should be in the form of ''M'' (merger) or ''AM'' (acquisition of majority interest). The forms "M" and "AM" present transactions where the acquirer held less than 50% and is seeking to acquire 50% or more of the target company's stock, which is consistent with the main criteria. By doing this, this analysis is able to compare apple-to-apple, as different types of forms that are reported by SDC sought different percentages from their target's assets, and this could affect the compressions.[95] The subset of 34,187 deals are classified as negotiations based on step 3a, while step 3b adds about 308 transactions as auctions and about 95 as negotiations.

It is necessary for bidders' names to be disclosed in order that these qualify as auctions on step three-B because if the competitor's name and characteristics are confidential, this will not consistent with the definition of auction as Bayesian game. Therefore, this section chooses not to include 11 transactions whereby that the names of competitors appear as undisclosed.

The initial total sample sizes are around 726 for auction and around 34,830 for negotiation. After acquiring the sufficient information about the daily stock prices and the accounting information from CRSP and COMPUSTAT, the size of the sub-samples was lowered to around 286 deals for auction and around 14,360 for negotiation. There is more shrink process on the size sample is caused by several reasons. First, the transactions that do not have return information around the announcement date to allow for short and long-term analysis are deleted. Relatively speaking, all the deals that have multiple announcement dates within five days are deleted.

Moreover, the transactions that do not have sufficient information related to the acquirer characteristic such as market capitalisation, total assets, leverage, cash holding, return on assets (ROA) and Tobin's q as measured at the end of the fiscal year prior to the date of announcement are excluded. Finally, this research eliminates the sample where the deal value relative to the market value of the acquirer is measured at the end of the fiscal year prior to the date of announcement is less than 1% in order to study the size effect as suggested by Moeller et al., (2004) and Masulis, Wang, & Xie (2007). At the end of this process, the auction sub-sample includes 286 transactions, while the negotiation sub-sample includes 14,360 transactions.

[95] For example;"AC" form includes acquisition of certain assets occur in which the acquirer holds less than 50% and is seeking to acquire shares in the target that are less than 50%.

Figure 7 shows the annual auction and negotiation frequency announced between 1984 and 2014. The level of takeover distribution across auction and negotiation varies over this period, with more acquisitions by negotiation than by auction. This could suggest that, generally, the negotiation mechanism is a dominant strategy in takeover activities. The auction frequency in M&As activities increases in 1984-1988 and then starts declining. Boone & Mulherin (2007a) report that the fewest auction transaction deals took place at the end of the 1980s. However, the statistics confirm that the auction frequency peaks in the 1980s and again in 1992 to 1997. This indicates that auction was an important activity in the M&As market in the 1980s and the 1990s. It is interesting to note that a large number of auction activities in the 1980s are recorded. However, this is not surprising given that Rhodes-Kropf & Viswanathan (2004)point out that the 1990s are considered to be a period rich in merger and acquisition activities practically the hostile takeover and corporate raiders.

Regarding negotiation deals, there was an enormous growth in deals processed by negotiation at the beginning of the 1990s. This could be related to the. Com bubble, which resulted in a large wave of mergers and acquisitions. The negotiation frequency, meanwhile, increases in 1992-1998 and then falls steadily towards 2002.

3.3.2. Variables and Summary Statistics

3.3.2.1 Dependent Variables

Bidder returns are considered as one of the main observable outputs of bidding strategies that could be used to evaluate the effect of using different methods of selling process. More specifically, the negative bidder returns have been used as an evidence to examine whether the winner's curse exists in the U.S. takeover activates, see for example; Kagel & Levin, (1986), Moeller et al., (2004),and Boone & Mulherin (2008b). This chapter therefore aims to measure the difference in the average cumulative abnormal return of acquirer shareholders with and without bidding in auction as potential outcomes of each individual firm, in the short and longer event period. **Section 3.4.1** set out in details how this chapter calculates the average abnormal returns and the relative theoretical literature.

3.3.2.2. Explanatory Variables

This section explains the various factors that the empirical research has revealed to be the potential determinants of either acquirer's abnormal returns or the selling procedure. This analysis will support the rationale for the decision procedure in terms of selecting the important covariates based on substantive ground that will be used to calculate the propensity score in order to control for confounding influences. **Table 14** provides a useful insight, demonstrating in visual form the main characteristics of the deals and acquirer firms as a statistical analysis. This section reports the information for the whole sample, as well as for firms that used auction and negotiation. The final column presents the mean value based on t-test that tests the difference between the auction and negotiation subsamples.

Panel A presents variables that illustrate the main differences between bidder characteristics across auction and negotiation transactions. There are number of theories and empirical findings that posit that variables such as firm size, cash holdings, and Tobin's q, leverage and market-to-book ratio can be used as proxies for bidder asymmetries.

Among these characteristics, firm size has been used by most empirical studies as a key covariant to explain the variation in shareholder wealth. This received wisdom seems rather complacent, as there is no clear explanation in these studies. One article from Moeller et al., (2004) cited nearly 1,700 times[96], finds a significant negative correlation between bidder size and the average shareholder returns. Regardless of how the acquirers have financed the deal (whether by cash or stock), or the nature of ownership of the target firm (public or private), small firms generate 2.24% of abnormal returns around the announcement date in comparison to larger firms. Moeller et al., (2004) argue that such a relatively significant difference is founded on the imponderables of human nature and large firms are more susceptible to the tendencies of management empire-building or hubris based on Roll's hypothesis (1986a)-this might well be the case in smaller firms but the 'empire' would remain considerably smaller of course.

Boone & Mulherin (2008b) argue that the winner's curse does not exist in takeover activities when the competition between bidders increases in the private selling process, or when there

[96] Based on Google Scholar

is no certainty about the value of the target. However, although there is no evidence for the winner curse, Boone and Mulherin find that firm size as a proxy for bidder asymmetries is not only inversely related to the shareholders' wealth, but could be also inversely related to the level of competition when there is more than one bidder bid for the same target. More precisely, the mere presence of large firms presents an opportunity to deter any other small bidders and, consequently, it is therefore better for the target not to conduct a full-scale auction when the size of the bidders is markedly different Bulow & Klemperer (2002b). In this light, it will be interesting to include bidder's size as a proxy for bidder asymmetries among the covariates, whereby the firm size is inversely related to the bidder shareholders' wealth as a result of hubristic behaviour, or inversely related to the level of competition whereby the larger bidder could deter the others.

Panel A' investigates in detail the effect of bidder's size across auction and negotiation subsamples. **Panel A'-1** shows that auction deals dominate where large firms are present. Here large firms are classified according to the natural log of market value of equity (stock price multiplied by the number of shares outstanding in billions of dollars) at the end of the fiscal year immediately prior to the announcement date.[97] This is not surprising because as Moeller et al., (2004) note, large firms are more frequently in competition for the same target in situations where there is another public bidder. Consequently, a larger bidder has a greater motivation to engage in an auction, and, at the same time, a larger bidder is more prone to hubris and, as a result, is more likely to overpay for target firm's assets, and to possibly decrease the return for their shareholders.

Any negative in the shareholders return arising from the auction process could be evidence for the winner's curse. However, such a result is contrary to the Boone and Mulherin's findings (2007, 2008) and Aktas et al., (2010a) who find that small firms tend to use auctions and large firms use negotiations. These differences in the firm sizes between this analysis and others could, however, be related to the nature of the auction selling process in this study compared with the results of Boone and Mulherin (2007a:2008b) and (Aktas et al., 2010a) where, in the later studies focus on the private selling process. In the private process, a target firm or its advisors design in advance a list of contact bidders and are, therefore, aware of the distribution

[97] Such a result is confirmed by using the natural log of the market value of equity 42- days before the announcement date to measure the bidder size. However, this research measures the firm size by selecting the market value at the end of the fiscal year immediately prior to the year relative to the announcement date as auction procedure sales take longer than negotiation.

of the acquirer's size. Therefore, if the targets note that the size of the bidders is markedly different, they could prefer not to conduct auction because large bidder could reduce the level of competition, which could affect the target premium. It seems a way of controlling bidder asymmetries. From the other side, it could be that if a target firm is small and aim to obtain benefits from a merger deal, the small target firm would prefer to contact small bidders who have greater scope for growth (Jovanovic, 1982), and this might explain why target and bidder firms are small in auction sub-samples in the previous studies.

While the auction bidders in this study are classified as large firms in the level of public selling process. The reason could be that controlling the bidder symmetric is limited in cases where the large bidder could deter a small firm and, because of this, in this study large firms are structured as auction firms. This could lead to a negative relation between the level of competition and firm size in the public selling process because lager bidders who control the process while in private selling process target mangers and their advisors who control the process.[98]

As discussed in the context of the extant research Moeller et al., (2004) there is a difference between the wealth that is generated by small firms, relative to large firms, where small bidders significantly outperform the larger. When it comes to increasing the level of competition, it is interesting to investigate whether there is a difference between the returns created for shareholders by small and large bidders. Practically, auction bidders are structured as large firms which could lead to a suspicion of the winner's curse event.

For a deeper and more complete understanding of the size effect and, consequently, its relationship to the winner's curse, or overconfident behaviours, bidder firms are divided into two groups: small and large firms, following (Moeller et al., 2004) classification. **Panel A'-2** and **A'-3** show respectively that a bidder firm is larger (smaller) if its equity market value is greater (equal or less) than the market value of the 25th percentile of NYSE firms during the year of the announcement date. This research will classify bidder firms as small and large based on their size relative to all of the firms listed on the NYSE. It is expected that this broader contextual analysis should lead to results that are more precise and will allow for a more

[98] Another difference between this study and the others is that the researchers that have largely focused on the private selling process, have chosen to investigate deals with values above $100 million. Perhaps in order to consider the relative size effect and, this had, therefore, led them to classify small firms of large firm samples as a main characteristic of auction deals.

comprehensive and telling analysis than would be provided by a classification based only on the firms presented in the sample. Auction deals are splits between 25.524% of deals conducted by small firms and 74.475% conducted by large firms and the mean market value in millions is $181.915 (USD) and $5063.041(USD) respectively. The percentage of small firms that use negotiation stands at 44.763 %, while around 55.236% involves large firms, with the mean market value in millions at $168.994(USD) and $3393.899(USD), respectively.

The majority of firms using auctions in this study are large, which lead to suggest that auction firms are more likely to be prone to the hubris effect. This, in turn, might be expected to increase with a large bidder size based on Moeller Schlingemann, and Stulz's argument and therefore the negative effect on auction shareholders' returns would not be a surprise. Such explanations could be appropriate for bidder firms who engage in one-to-one negotiations where more than half of the negotiation sub-sample are classified as being large firms. However, bidder firms who choose to bid in auctions are significantly larger than bidders who prefer to negotiate one-to-one with sellers. This section obtains similar results by using the total assets of the bidding firms and the level of sales as alternative measures for firm size.[99] In this model, auction bidders must have substantially larger total assets and sales levels in comparison to negotiation bidders.

The size of bidder firms, therefore, seems to hint that firm size might be inversely associated with average abnormal returns and the level of competitions. The larger the bidder size, the more negative returns for bidder shareholders there are because of large firms are more susceptible to the tendencies of management empire building or hubris. Moreover, the larger size of bidder firms motivates them to engage in competitive selling procedures, where the larger bidder could deter other competitors, and this could reduce the level of competition and scuttle the possible gain for target firms from conduction an auction. These predictions are based fundamentally on Bulow & Klemperer (2002b), Moeller et al., (2004) and Boone & Mulherin, (2008b). These studies led to the inclusion of bidder size as one of the main covariates necessary to control the confounding influences.

There has been much empirical research into Jensen's agency-based hypothesis (or the free cash flow hypothesis) and its relation to bidder behaviour and shareholder wealth. For example, Lang, Stulz, & Walkling (1991a) find that there is a negative and significant relationship

[99] Total assets is (item6) in COMPUSTAT, and sales is (item 12), all measured at the end of the fiscal year immediately prior to the announcement date.

between the ratio of cash flow to assets and bidder returns in tender offers as a result of managerial discretion over cash flow, and this relationship becomes more pronounced for low Tobin's q. One can infer from these results that cash-rich acquirers might be more likely to pay more for poor acquisitions. The same outcome was observed by Schlingemann (2004) who examine the relationship between the source of financing decision (the actual cash available for the acquisition opportunity) and bidder returns, after controlling the method of payment. He documents another evidence for the free cash flow hypothesis whereby an acquirer with rich cash flow could destroy shareholder wealth practically with low level of Tobin's q.

Harford (1999a) argues that cash-rich firms are more likely to be active acquirers in the merger market; however, they could destroy their shareholder wealth. He examines the relationship between cash-rich bidders and levels of competition, and suggests that cash-rich bidders could deter other bidders. To do this, Harford measures the bid premiums received by target firms of cash-rich and cash-poor bidder subsamples in order to investigate whether the presence of cash-rich bidders consequently lowered levels of competition and, therefore, lowered the target premiums. The author found that there is no difference between the averages of the cumulative abnormal return (CAR). Moeller et al., (2004) document that the free cash flow hypothesis fails to explain the variations in the average abnormal returns between small and large firms by using the ratio of cash to total assets as indicator for free cash flow.

Cash reserves will give bidder firms more financial flexibility to engage in takeover activates. However, cash reserves could compound the agency problem particularly with empire-building mangers who promote their personal interest on the expense of shareholders. Therefore, Jensen's agency-based hypothesis (1986) allows the inclusion of cash reserve variable in the model as a further proxy for bidder asymmetries.

This section uses the ratio of the acquirer's cash and short-term investments (item 1) in COMPUSTAT all divided by the book value of total assets (item 6) as a measure for cash reserves at the end of the fiscal year immediately prior to the date of announcement. There is a significant difference in the level of cash reserves between acquirers using auction and negotiation; acquirers who choose to engage in one-to-one processes are significantly a cash richer. This would point to that bidder firms are asymmetric in terms of cash reserves which could be a hint for an agency conflict whereby bidder firms in negotiation process maybe

overbid for those transactions and could also lead to the bidder's shareholders obtaining a negative return because mangers are more likely to make poor acquisitions instead of pay-outs the cash for the shareholders.

However, Offenberg & Pirinsky (2015) argue that access to the cash is more important in terms of deciding between different bidding strategies (merger versus tender offer) in the U.S. market than possession of cash. They investigate whether the acquirer's financial impediments (i.e. cash and leverage levels) can affect the choices between tender and merger. They find that bidders are more likely to pay by cash (using the percentage of actual cash) in case they bid in tender offer while there is not significant effect for the acquirer's cash reserves variable. Moreover, they use a dummy variable to differentiate between firms that have significantly high debt levels. The high debt dummy variable takes the value of 1 if the leverage ratio (total debt to total assets) exceeds 0.5, and 0 if it is below this figure in order to assess whether a high level of debt can affect the choice between merger and tender offers. The main results are that acquirers that have less cash and high level of leverage ratio are the more acquirers attempt to bid in the form of merger.

It could be argued that bidder firms with high level of leverage might be expected to have less hubris, perhaps with high level of competition when they are more than one bidder bid for a target firm and this would prevent the possibility of winner's curse. Particularly, bidders with high level of leverage are less likely to engage in acquisitions (Uysal, 2011). Moreover, such firms with high level of leverage generate a high level of abnormal return as documented by Maloney, McCormick, & Mitchell (1993). Discussion on this issue in empirical literature motivate this analysis to include the level of firm leverage among the covariates that could control the conflicts that would be likely to exist between shareholders and the board, particularly with a high level of cash.

Leverage is rightly considered to be an important mechanism for corporate governance in particular but not exclusively to control the conflict between the board and the shareholders in terms of free cash flow expenses. High levels of debt serve to depress levels of future cash flow in the mid- to long-term, while the day-to-day servicing of debt inhibits, or at least limits, the scope for executive discretion. Any significant degree of leverage acts positively, and serves to provide incentives (both carrot and stick) for the board to improve a firm's performance,

since directors will often have to cede significant control to creditors, and often lose their jobs if their firms, weakened by highly leveraged positions, fall into financial distress (Robert & Sufi (2009); Gilson (1989, 1990)). It is, perhaps, a law of unintended consequence that, in this respect, high levels of extant debt in a firm will restrict hubristic or cavalier management, which will reduce the firm's probability of making poor acquisitions. It might appear scant consolation to shareholders of highly leveraged companies, but, in this context, indebtedness at least possesses the virtue of restricting opportunities for the board to make a bad situation qualitatively worse, thereby positively impact on shareholder wealth. In order to examine the effects of different levels of leverage on the bidding offer price, this analysis will include leverage variables as explanatory variables for wealth variations.

Relatively speaking, leverage is positively related to the level of tangible assets because bidders can have a great debt capacity by using their assets as collateral for loans (Jensen & Meckling, 1976). It should be noted that this study will factor the firms' tangible assets as one of the control variables as useful identifiers of total or manageable debt capacity.

The leverage ratio is measured as the ratio of long-term debt plus debt in current liabilities (item 9+ item 34) all scaled by the book value of the total assets (item 6) at the end of the fiscal year prior to the date of announcement. For negotiations, the level of leverage tends to be low in comparison to auction processes. The same result is obtained in case of using the debt dummy variable as suggested by Offenberg & Pirinsky (2015) to differentiate between the bidders who have high levels of debt. Auction firms have significantly higher levels of debt than those going through negotiations at 13.286% versus 10.181%, respectively at 10% level. Negotiation bidder firms have high level of cash and low levels of leverage, which could suspect that mangers are more likely to make poor acquisitions. Therefore, the possibility of the winner's curse could be high in negotiation subsample.

However, auction firms have more tangible assets. This means that acquirers could have a high securitised borrowing capacity, and a high ability to pay back their debt, although they have high levels of leverage. High level of leverage could help bidder firms who engage in auction to generate a gain for the bidder's shareholders as shown by Maloney et al., (1993) and this could be an evidence of that the winner's curse does not exist in auction as in Boone & Mulherin (2008b). In general, the above results are contrary to Offenberg & Pirinsky

(2015)who document that acquirers that have less cash and high levels of leverage ratio are the more acquirers attempt to bid in the form of merger

Again, it will be interesting to control for confounding influences by including the acquirer's cash, the level of leverage and tangible assets among covariates as explanatory variables for the variation in the acquirer's abnormal return, and for explanations for the selection between the selling processes (auction versus negotiation).

The inclusion of Tobin's q among the covariates will control for the possibilities of obtaining a negative abnormal return as a proxy for poor acquisitions. More specifically, some researchers who examine the free cash flow hypothesis find that overbidding behaviour might be greater if the bidders have low growth opportunities as measured by low Tobin's q and high level of free cash (Lang et al., 1991a) and (Schlingemann, 2004).

However, a debate has been raised as to whether Tobin's q can accurately capture how well bidders manage their firms and, consequently, whether poorly managed firms could have a negative abnormal return. For example, Lang, Stulz & Walkling (1989b) and Servaes (1991) test Jovanovic & Rousseau's Q theory (2002), which has been considered to be the paradigmatic neoclassical explanation for merger activities. These studies have found that the probability of a successful synergy between target and bidder firms (where the latter gains financially) increases with acquirers with high Tobin's q and decreases with targets that have low Tobin's q. However, some empirical work has documented that the q dispersion fails as an explanation for variations in bidder abnormal returns particularly across small and large firm. For instance, in (Moeller et al., 2004), where the bidders with a high Tobin's q have a negative abnormal return or, as in Dong, Hisrshleifer, Richardson, and Teoh (2006), where market-to-book value is used as closer measurement to Tobin's q. In light of the conflicting evidence as to whether the q dispersion (Q hypothesis) can explain the variations in bidder shareholders' wealth, it was felt legitimate to include Tobin's q as a further proxy for the bidder asymmetries.

Here Tobin's q is measured as the market value of assets over the book value of assets (item 6—item 60+item25-item 199)/item 6). It is significant that auction bidders have a low Tobin's q, at 10% level, which is consistent with statistical information of market-to book value ratio as close surrogates to Tobin's q. The low level of Tobin's q is inversely correlated with acquirer

shareholder wealth, based on the Q hypothesis and documented by, Lang, Stulz & Walkling (1989b) and Servaes (1991). This could be used as evidence for that auction firms could be more likely to conduct poor acquisitions. Such results run contrary to Lang et al., (1991a) and Schlingemann (2004) who show that cash-rich acquirers are more to have lower Tobin's q levels. Negotiation bidders are rich in terms of cash reserve levels, but they have a high Tobin's q ratio.

The overvaluation hypothesis could explain the negative relationship between bidders with high market valuations and their returns. Researchers such as Shleifer & Vishny (2003a), Dong, Hisrshleifer, Richardson, & Teoh (2006), and Ang & Cheng (2006) suggest that market-to-book (MV) ratio, as reliable measured for overvaluation hypothesis, can be used to explain, or at least to better comprehend, the takeover waves and financial behaviours for each payment method. These studies have concluded that market misevaluations can drive merger activities, whereas an acquirer with an overvalued issue has an incentive to sell their equity to less overpriced companies. The preference for paying with stock therefore reflects that the assets of the acquirers are overvalued. Harford (2005b) considers whether the overvaluation hypothesis can really drive acquisition activities in this way and he concludes that the main drive for M/B ratios and the activities of mergers is, rather, market liquidity. Dong et al., (2006) find that, typically, the acquirer announcement returns are worse when firms have a higher M/B ratio. The analysis of these results might highlight the proposition that acquirers have communicated with the market that the variables given were not warranted by the fundamental and underlying financials of the target firm; simply put, that the firm was *de facto* incorrectly overvalued (Moeller et al., 2004). An alternative, more cynical analysis would posit that this might be because the M&A activity was being conducted on thin ice, acquiring less valuable (or valued) assets with highly overvalued equity. Such acquisitions are a way of buying growth (Jensen, 1986). Therefore, the average abnormal return reacts negatively to acquirer equities that have high valuations based on the M/B ratio.

It could be argued that, the high M/B ratio would affect the acquisition decision, but the high MV ratio might exacerbate hubris and bidder could overbid for the target. This ratio therefore is also investigated and used among the covariates as a proxy for firm valuation. The M/B ratio is firm book value of equity scaled by market value of equity at the end of the fiscal year immediately prior to the date of announcement. Auction firms have a lower M/B ratio, from which we can reasonably extrapolate the finding that auction firms could generate a higher

returns than the negotiation bidders. The negotiation acquirer tends to have a larger M/B ratio in comparison to auctions, which indicates that the former may be overvalued, and have an incentive to market more optimistic acquisitions, or might at least be more open to such activities.

Finally, this section provides some information related to the bidder firm's performance level which is considered a partial control for hubris. Hayward & Hambrick (1997)show that hubristic behaviour can be exacerbated if bidder firms have a strong performance by using acquirer's return on assets (ROA), whereby the greater a bidder firm's performance in the prior year, before the date of announcement, the more overconfident they will be. The authors find that there is a positive relation between the size of bid premium the target shareholders receive and performance of bidder firms. Moeller et al., (2004) use the ratio operating cash flows (OCF) scaled by total assets as an indicator of a bidder firm's performance to show whether bidder firms can create value by returning free cash flow to shareholders. They find that there is no evidence to show that a bidder firm's level of performance affects shareholder wealth. In light of the conflicting evidence, ROA will be used as a proxy for the bidder firm's performance; ROA is defined as earnings before interest, taxes, depreciation, and amortization over total assets at the end of the fiscal year immediately preceding the announcement date. Auction bidders show significantly better performance than negotiation bidders, which might be expected that managers of auction firms might have greater hubris.[100]

This section further considers information that relates to deal characteristics, such as transaction values, completion rates, and days to be completed in the case of a transaction successfully completed, method of payments, target status, and the percentage of the shares acquired by negotiation and auction acquirers before and after completing the transactions.

Panel B shows that the dollar value of auction deals, for example, is much larger than those for negotiation. This is not surprising because firms using auctions tend to be larger. The dollar value of a deal is defined in SDC (filed VAL) as the total value of consideration (US$, millions) paid by bidders, excluding fees and expenses. The total value paid by small and large auction

[100] Similar results are also reported in the case of using the ratio of operating cash flows (OCF) scaled by total assets as suggested by Moeller et al., (2004). The operating cash flow is defined as sales less the cost of goods sold less sales and general administration, and working capital change.

acquirers is significantly larger than the amount paid by negotiation bidders either classified as small or large firms.

The impact of the relative size of the target to bidder is considered to be an important variable that could help to explain the variation in the acquirer's shareholder returns, or the selection of the selling mechanism, particular if bidders acquire a relatively large target. The impact of relative size could be positive or negative. The negative impact on acquirer returns could be as a result of that with larger relative size, target firms have greater bargaining power in terms of negotiating the offer price and this will lead an acquirer paying more and consequently will be worse where there is a competitor Dutta & Saadi (2011). From the other side, although the positive impact on bidder returns as a result of merger activities is rare,(DePamphilis, 2012a, p. 40-41) states that the positive impact could be related to the synergy gain that is brought about from the combination of the value a target and acquirer.

For example, a larger relative size between the equity capitalisations of a public target firm to bidder, will lead to increase bidder returns as observed by Asquith, Bruner, & Mullins(1983), Jarrell & Poulsen (1989) and Moeller et al., (2004). Boone & Mulherin (2008b) document that relative size has a positive effect on bidder returns, although there is no significant difference in the relative size between auction and negotiation bidders.

Fuller, Netter, & Stegemoller (2002) show that the relationship between relative size and bidder returns is negative when a target firm is a publicly traded, and these relationships could be driven by using stocks as the method of payment. Further, this study reports that relative size has a positive effect on the bidder's shareholders' wealth when a target firm is private and subsidiary.

The relative size (transaction value (VAL)/market value of equity) in this study indicates that auction deals have a larger relative size compared to negotiation transactions, which is not surprising because firms using auctions is larger. However, the difference between the two subsamples is insignificant.

As suggested in many studies Boone & Mulherin (2007a:2008b) and Fidrmuc et al., (2012), in order to avoid obtaining biased results, this analysis incorporates both successful and unsuccessful transactions. The rates of completion for transactions using auctions and

negotiations stand at 51.748% and 95.612%, respectively. This statistical information shows that the possibility of completing the negotiation process is significantly higher than for auction deals. This is not surprising, because with auction there is one of the competitors will win the deal. Further to this, the average time a transaction needs in order to be completed in term of successful deals is 143 days, which is significantly longer than those using negotiation (69 days), and this effect could also be related to the size effect of auction firms. This is hardly surprising given that auction bidders will, typically, be a large firm with, characteristically, corresponding of inertia and administrative unwieldiness.

This, concomitantly, means that larger firms need more time to process deals, notwithstanding that larger firms take time to negotiate regulatory issues Moeller et al., (2004). Auction has been regarded as a long selling process, and usually made longer when bidders are larger. However, it could equally be the case that large firms prefer auction as suggested by Boone & Mulherin (2008b), because they can deter smaller competitors, as auction bidders gain from limiting competition. Almost half of auction deals ultimately fail, whereas only 4.87% negotiation deals fail. It could be concluded that auction is not a popular mechanism in corporate finance simply in order to avoid the high possibility of a failed transaction. Bidders might observe the likelihood of these types of process to fail and, so, natural lose confidence in this kind of purchasing format.

Most of the previous empirical works have understand auction as a long process that requires time and endeavour to organise, and carries related increases in process-related costs. As result of this research such as Aktas et al., (2010a) and Offenberg & Pirinsky (2015) measure unobservable competition before the announcement date particularly why a target firms accepts such costs when it is under pressure to sell, by using a dummy variable that is equal to the value of 1 if the target initiated the deal, and 0 otherwise.[101] Therefore, if a target firm initiates a bid it signals their willingness to sell, which weakens their bargaining powers during the

[101] This chapter will not discuss target motivations to initiate their own assets for sales. For example, target firms could initiate a deal if they suffer financial and competitive conditions whereby a target firms seeks a merger with a rich acquirer in order to avoid expected bankruptcy costs (Masulis & Simsir, 2015), or because of managerial motivations (Fidrmuc & Xia, 2017). The main aim of this section is to investigate whether target-initiated deals prevent winner's curse event.

negotiation process which would then, logically, affect the level of premium that the target will receive. This is could be true, and research, particularly Masulis & Simsir (2015), document that there is a significant difference in bid premiums between those deal-initiated by target firms compared to those deal-initiated by bidders. Anilowski Cain, Macias, & Sanchez (2009) use the variable target-initiated deal as a proxy for higher adverse selection risk and found that if a target initiated a deal, this would drive bidders to pay a lower premium. Therefore, the authors argue that acquirers pay lower premiums for target-initiated deals in compensation for adverse selection. However, the effect of adverse selection is mitigated on a premium if target mangers have high incentives such as ownership stakes and equity grants where there is a positive and significant correlation between bid premium and target-initiated deal (Fidrmuc & Xia, 2017).

To investigate whether target-initiated deals could prevent a winner's curse event, a dummy variable of target-initiated deals will be used as a proxy for a target adverse selection. The history events (failed HEVENT) descriptions and deal synopsis (field SYNOP) in SDC provides such information whereby the dummy variable takes the value of 1 if a target was searching for buyers, and 0 otherwise. Of the whole sample, only 1.276 % acquisitions are initiated by targets. In general, the number of deals that are initiated by target firms in auction and negotiation is larger in Aktas et al., (2010a) and Offenberg & Pirinsky (2015). By comparison, 11.538% of auction targets clearly signal their willingness to sell, which might well, indeed be likely to, weaken their bargaining power during negotiations while negotiation deals are target-initiated at on only 1.070%. This information could also help auction bidders to avoid the winner's curse, because the bargaining power of a bidder firm the target initiated a deal is higher.

Among the explanatory variables, a dummy variable that takes the value of 1 if a target frim is actually bankrupt is also included, since the bidder's outcome expects to be different when a target firm is in bankruptcy. A bankruptcy transaction diminishes target firms' bargaining power and this induces bidders to pay a price for a target' assets at a "fire-sale" discount. A fire-sale exists in corporate finance when target firm's assets are sold at a price below (usually far below) the value in the best use (the fundamental value of target firm's assets) (Shleifer & Vishny, 2011b). Empirically evidence, Hotchkiss & Mooradian (1998) show that in the same industry, bidders on average purchase bankruptcy targets at a 45% discount in comparison to prices paid for target firms outside bankruptcy. Moreover, Pulvino (1999) find that fire-sales

in the bankruptcy of aircraft industries, bidders purchased used planes from distressed airlines at a 10 % to 20 % discount in comparison to prices paid for healthy airlines. It is important to mention that, most of the used airlines transactions according to , Pulvino (1999) are processed through private negotiation, although there are some developed works which used auction in such transactions particularly in the mid-1990s. However, auction is not a successful process in used aircraft market.[102]

Applying auction theory in the context of bankruptcy is considered one of the most fruitful areas in corporate finance, because the theory resolves some issues related to the efficiency and welfare of the reallocation of target firm's assets to those who value them most(Dasgupta & Hansen, 2007). However, there is much debate in the theoretical and empirical literature as to whether auction in bankruptcy induces a fire-sale discount. Theoretically, Hansen & Thomas (1998) argue that there is an inverse relation between target firm's assets value and the auction price where if bidders are uncertain about the value of bankruptcy target firm's assets, the low auction price will be paid. Shleifer & Vishny (1992c) argue that fire-sales exist in auction bankruptcy particularly when industries suffer from financial distress which restrict bidders and even other competitors with high industry valuation to bid in auction because they are financially constrained, which in turn promotes offer discounts. On the empirical side, Eckbo & Thorburn (2008b) show that fire-sales exist in the Swedish auction bankruptcy, particularly if the bidders bid in auction that leads to *piecemeal liquidation* (bids for individual assets) but not in case of bidding for *going-concern sale* (bid for the entire firm).

Equally and further to this, bankruptcy auction attracts bidders from both inside and outside a target firm's industry and the latter while perhaps sniffing a bargain will be typically less informed about the true value of target firm's assets. A natural and obvious concomitant of this is that such bidders are far more likely to suffer from the winner's curse event that would less typically affect better- if not necessarily well-informed industry insiders (Povel & Singh, 2007). However, Hotchkiss & Mooradian (1998) argue that a "lemon problem" also faces insider bidders because only firms with poor future prospect put their assets in auction, therefore if

[102] There was no organised market to sell and buy used airplanes until the mid of 1990, because of that sellers could not find buyers with a high-value for their assets. They only way to discuss a deal was through the negotiation process. However, the author does not provide any information related to why the auction process failed in such market

firms with better future prospects choose to sell their assets in a market, the poor firms prospects will be pooled with the good ones.

Moreover, Eckbo & Thorburn (2009a) tested whether overbidding in Swedish auction bankruptcy exists where a target firm's bank provides the necessary funding for the bidding in order to improve bidder liquidity. They measured the final auction premium and found that such coalition-bidding strategy between a bidder and target firm's bank drives a bidder to bid a price that exceeds the bidder's private value (overbidding). The overbidding of the coalition winners could exclude efficient rival bidders who will cease bidding once the true or even sensible price has been exceeded.

In relation to the reaction of bidders stock price to bankruptcy, Hotchkiss & Mooradian (1998) show that bidders significantly have a positive return around the date of announcement. However, the non-bankruptcy bidders do not create gain for shareholders. Bidders with empire-building boards seem to prefer to bid for a non-bankruptcy firm through a complex negotiation process regardless of shareholder wealth.

According to this analysis, target firms in bankruptcy are around 11.888% of auction subsample, while only being 1% of negotiation deals. It seems that bidding for bankruptcy target is more likely to be within a high competition environment. In the light of Hotchkiss & Mooradian (1998) auction bidder could create a value for shareholders, in comparison to negotiation bidders. Equally, bidding for a bankrupt target could protect auction bidders from the event of the winner's curse in case if the target firms accept an auction price at a fire-sale discount as suggested by (Shleifer & Vishny, 1992c) and (Hansen & Thomas, 1998).

One of the main control variables in this study is using all-stock as method of payment. Although the highest price bid affects the ultimate agreement, the method of payment has an essential impact on sellers (and their advisor's) decisions to accept bidders' offers (Offenberg & Pirinsky, 2015). However, bidder firms significantly have negative announcement returns in instances where stock has been used as a method of payment ((Travlos ,1987;Heron & Lie ,2002 ; Boone & Mulherin ,2008b). The negative impact on bidder returns exists because bidders by using stock convey a negative signal that their shares are overvalued which is consistent with signalling hypothesis Travlos (1987), while the reaction of bidder firm's stock price is higher with all-cash offers Betton et al., (2009b). The negative impacts of using stocks

become even worse when a bidder firm takeover attempt fails after between one and three years following the announcement date Savor & Lu (2009).

Moreover, Dasgupta & Hansen (2007) argue that using the method of all-stock rather than all-cash offers generates a lower payoff for bidder firms using auctions. Under the information-asymmetry hypothesis, Hansen (1987b) argues that using stock as method of payment signals that bidders are uncertain about a target value, whereby a bidder firm's overpayment cost is reduced because bidders share it with a target firm. The choice of payment method therefore reveals more information about bidders: overvalued acquirers will use stock, while high quality acquirers will use cash. In terms of protecting bidder firm's confidential information, bidder firms in terms of using stocks usually prefer to use negotiation than auction (Boone & Mulherin, 2008b). Relatively speaking, deals that use all-stock as the method of payment require longer times to complete compared to the all-cash deals, because of the former offers need more valuation analysis (Offenberg & Pirinsky, 2015). Therefore, if there is more than one bidder bid for a target firm, it is perhaps the case that bidders prefer to use all-cash offers simply in order to accelerate the takeover process.

The percentage of cash that is paid to target firms when sold by auction is significantly higher than that paid by negotiation bidders (84.725% versus 77.643% respectively). However, there is no significant difference between the percentage of stock paid to target firms, whether it is sold by auction or negotiation. Auction and negotiation acquirers are more likely to use an all-cash offer (100% cash) and less likely to pay with all stock (100% of stock). However, auction is significantly more likely to use all-cash in comparison to the negotiation subgroup. It could be related to the nature of auction activities that need cash to accelerate the completion of the transaction, particularly in situations where there is another public bidder analysis (Offenberg & Pirinsky, 2015). However, bidders as suggested by Hansen (1987b) bear, by using cash offer, the entire cost of overpayment. Moreover, although the assets of negotiation firms are overvalued, negotiation bidders use cash more than stock for transactions.

The statistical information shows that the number of public targets acquired by auction and negotiation stands at around 76.223% and 18.043%, respectively. It has been shown that only 8.391% and 15.384% of auction deals are related to private and subsidiary targets. In terms of negotiation, 53.899% and 28.057% (respectively) of these targets are classified as private or subsidiaries.

It is interesting to note that most of the target firms in the sample that are acquired by auction bidder firms are public, and most private targets are acquired by negotiation bidders. This information cannot be ignored. The target firm's public status will be included as one of the control variables. Fuller et al., (2002) document that bidder returns are higher in cases where they acquire private firms or subsidiaries in comparison to acquiring public firms. As a result, acquirers using negotiation will create higher abnormal returns when compared to auction. Therefore, if acquiring private firms is more profitable than acquiring public firms, this could go some way to explaining the auction effect.

There are further elements used as control variables in the empirical literature that could have a significant impact on the return of the acquirers, or the selection of the selling mechanism. These are related either to deal type (i.e. such as whether a transaction is a tender offer, hostile, and whether the acquirer already has a toehold in a target firm) or could be related to the takeover regulation (i.e. whether a target firm is located in a state that has stringent anti-takeover regulations).

First, this section will include a dummy variable that takes the value of 1 if a transaction takes the form of a tender offer, as indicated by SDC (filed TEND). (Offenberg & Pirinsky, 2015) argue that an acquirer firm will typically prefer to use a tender offer in the U.S. market because it is substantially quicker than mergers.[103] Particularly, if there is more than one bidder bid for the same target firm and if there are fewer external impediments on the implementation of a tender offer.[104] However, there is always a trade-off between the cost of using a tender offer and the fast execution of the bid. If bidder firms ask target shareholders directly to tender their shares that could signal that a target firm has a high value for them and therefore target shareholders could raise its reservation price. Empirically, Offenberg & Pirinsky (2015) document that bidders pay more premium for target firm's assets in tender offer than in merger. However, Moeller et al., (2004) find that tender offers create value for bidder's shareholders. In relation to the reaction of bidder firm's stock price, Eckbo (2009) states that most of the empirical literature in corporate finance shows a positive albeit insignificant gain for the bidder firm's shareholders when an acquirer firm bids in the form of a tender offer.

[103] In merger; an acquirer firm and target firm's board agree on a price, and target firm's shareholders then vote on whether or not to approve the proposal (Offenberg & Pirinsky, 2015).
[104] The external impediments such as existence or prospect of anti-trust reviews from the regulators.

The percentage of auction and negotiation transactions that are bid in the form of a tender offer is 21.328% and 2.221%, respectively. In the light of Offenberg & Pirinsky (2015), this means that tender offer bidders are more likely to bid more in order to acquire quickly target firms essentially in an environment with high levels of competition. Because auction, as already noted, takes significantly longer to be completed. This section to predict that auction bidders will have a return that is likely to be less than negotiation which means that the event of winner's does not exist in auction. From the other side, bidder firms could generate significant and positive returns as in Moeller et al., (2004).

A dummy variable indicating hostility takes the value of 1 if the SDC flags the transaction as hostile is also included among explanatory variables. Schwert (2000b) shows that there is a negative relationship between a bid in the form of hostility and acquirer shareholders' wealth. Betton et al., (2009b) report that hostile deals raised takeover premiums, but such deals did not have any impact on bidder returns. It is not surprising to note that negotiation transactions are less likely to be hostile. In the light of Schwert (2000b), the statistical information predicts that the winner's curse could exist in auction.

Furthermore, this section will also include a dummy variable that takes the value of 1 if a target frim is in the one of the following U.S. states that have robust anti-takeover regulations: Idaho, Indiana, Maryland, Nevada, Ohio, Pennsylvania, South Dakota, Tennessee, and Wisconsin, as suggested by Boone & Mulherin (2008b). The main reason of using this variable is that in such states target firms have a high level of negotiating power, and therefore such target firms are less likely to conduct auctions. This is consistent with the statistical information of this section which provides that auction mechanisms are less likely to be organised in states with robust takeover laws in comparison to negotiations. However, the statistical difference between auction and negotiation is not statistically significant.

Finally, a dummy variable that takes the value of 1 if acquirers owned percentage of shares in target firms six months before initiating a takeover bid (a toehold) also included among other covariates. Bulow et al., (1999) argue that auction is not an attractive strategy for bidders who already have a toehold in target firms because toeholds lead bidders to bid aggressively and increase the probability of the winner's curse, especially if there are a number of bidders with different stakes in the target company. On the empirical side, Betton et al., (2009b) show that

if a bidder firm with a toehold bid for a target firm, they outperformance bidder firms without toeholds particularly when no bidders win (if target firms reject all the offers). Toeholds motivate significantly acquirer firms to choose negotiation in this study over auction. The average of toeholds in a negotiation subsample is about 20.735%, which is close to the percentage of toehold that is reported by Betton et al., (2009b) in negotiation deals. The result indicts that negotiation bidders are rational, they bid with a size of toehold that exceeds the threshold (only if bidders own on average 20% of target' assets), in order to avoid the cost of rejection.

The low percentage of bidders with toeholds bid in auction could be explained in the light of Bulow et al., (1999) the decision to bid in negotiation with respect to toehold is consistent with rational bidder behaviour. This section predicts that negotiation bidders will outperform auction bidders with respect to toehold as shown by Betton et al., (2009b).

Panel C details the use of advisors and their characteristics to reflect the impact of investment banks with a high reputation upon bidder returns. There has been much debate in the field as to whether hiring top-tier investment banks can give a rise to winner's curse (overpay) event. Yet, there is no clear evidence to show whether employing top-tier investment banks could affect bidder or target wealth, as most of the previous evidence is related to particular deal characteristics. For example, Rau (2000) reports that bidders have positive returns in tender offer with a high reputation investment bank, while in merger, employing such banks lower bidder returns. Moreover, the author documents that in tender offer, there is a positive relationship between bidders that are supported by more prestigious bank advisors and target bid premium. In these scenarios the top-tier investment banks seem are more concern about deal completion than the stock price of client firms, as a result of this they advise their bidder to pay more for their target in order to motivate their shareholders to accept the offer. This result could suggest that winner's curse exists with prestigious banks in case of bidding in the form of tender offer. However, there is no difference between bid premiums either with hiring top-tier investment banks or not in merger.

Kale et al., (2003) confirm that there is a positive relation between bidder returns and investment banks with a high reputation in tender offer deals. Moreover, they study the impact of target firms use top-tier investment banks to examine accordingly whether the target's top-

tier advisors could affect the bargaining power between bidder and target firms and help a target firm to extract the highest offer from bidders. They find that the wealth level of target firms (bidder firms) decreases (increases) as the reputation of the advisers that are hired by bidder firms increase, relatively to the advisers that are hired by target firms. Golubov, Petmezas, & Travlos (2012) document that using prestigious banks have a positive impact upon bidder returns in case of acquiring public firms, but this result is inconsistent in case of acquiring private and subsidiary firms.

In conclusion, hiring top-tier investment banks could mitigate the event of winner's curse in particular deals such as tender offer or if the target is publicly traded. The impact of using investment banks with a high reputation cannot be ignored and, therefore, to accommodate this, Boone & Mulherin (2008b) use such variables to investigate whether the winner's curse exists in takeovers when target and bidder firms are backed by blue chip banks. They have found, however, that a firm's use of prestigious banks does not promote overbidding.

Such debate on the relationship between the use of prestigious banks and the winner's curse has motivated this study to include covariates that help to investigate the impact of hiring top-tier banks bid premiums. This section follows Boone & Mulherin (2008b) method of modelling the usage of investment banks. Top-tier banks are classified here using a dummy variable that takes the value of 1 if the bank is Bank of America Merrill Lynch, Credit Suisse, Goldman Sachs & co, Jp Morgan, Citi.

In the whole sample, bidders use on average 31.578% investment banks, around 61.188% of auction firms choose to hire advisors, in comparison to only 30.988% of negotiation acquirers. However, on average 23.426% investment banks with a high reputation are employed by auction bidder firms, while only 7.200% investment banks with a high reputation are employed by negotiation bidder firms. The statistical information shows that there is a statistical difference in case of employing investment banks with a high reputation between auction and negotiation. This result suggests using top-tier investment bank in auction deals could prevent bidder from overbidding for the target assets as in Boone &Mulherin (2008b).

Moreover, the majority of target auction firms hire advisors with a high reputation, while only less than half of target negotiation firms use advisors with a high reputation. There is a difference in case of using top-tier advisors between auction and negotiation. This result predicts that scheme target firms that hire advisors with greater reputations increase their bargaining power, which increase their bid premiums— as suggested by (Kale et al., 2003).

In summary, there are statistical differences in bidder and deal characteristics between auction and negotiation firms. Auction bidders are larger, have less reserve cash, Tobin's q, and MV ratio, and they are highly profitable firms. Auction firms have high levels of leverage and intangible assets. Moreover, the rate of bidders who successfully completes takeover deals is low in comparison to negotiation deals, auction deals in general need longer time to be completed the deals. Target firms in auction are more likely to initiate a deal than in the negotiation process, pay in cash, acquirer publicly traded firms, bid in a tender offer form and more likely to use a hostile technique, bid for a target in a bankruptcy. Auction bidders are less likely to bid with a toehold, bidder and target firms are more likely to use investment banks practically with a high reputation more than negotiation bidders.

3.4 Methodology

In order to measure the casual effect of choosing to bid in auction upon the acquirer abnormal return, however it is essential to control for the self-selection problem between the choice of the selling process and bidder returns. This potential self- selection issue arises because the choice of selling mechanisms may be correlated to factors that can also affect the abnormal returns. Therefore, a simple comparison or regression on the mean difference in bidder returns (between the two sub-groups of auction and negotiation deals) would be biased. To address the self-selection problem, propensity score matching will be applied in this chapter to estimate the treatment effect.

This section will provide a review of the theoretical background of the matching method, which is first introduced by Rubin (1974, 1977).[105] Let us introduce some notations first, following the guideline of of (Angrist & Pischke, 2009) and (Wooldridge, 2010). First, let us introduce some notations. We denote CAR_{ji} as the potential cumulative abnormal returns for bidder firm i that would be attained via the selling mechanism of j, where $j = A, N$, representing auction and negotiation, respectively. And D_i is a treatment dummy which takes the value of 1, if the bidder firm i is bid in auction, and 0 if it bids in negotiation. Therefore, $\mathrm{CAR}_{1\mathrm{i}}$ represents the level of potential returns if the firm i chooses to bid in auction, and $\mathrm{CAR}_{0\mathrm{i}}$ represents the level

[105] [105] The Rubin Causal Model that is developed based on the work of Rubin (1974,1977) and Holland (1986) and is considered fundamental to modern research on casual effects (Angrist & Pischke, 2009, p14)

of potential returns if it chooses to bid in negotiation. The main interest of this chapter is to estimate the average treatment effect of bidding in auction.

The exact treatment effect for a target firm i is $\tau_i = \mathrm{CAR}_{1i} - CAR_{0i}$, and the average treatment effect, denoted by τ_{ATE}, and can be written as:

$$\tau_{ATE} = E(\mathrm{CAR}_{1i}) - E(CAR_{0i})$$

Where, E is the expectation operator. The difficulty in estimating τ_{ATE} is that it is not possible to observe the both outcomes of CAR_{1i} and CAR_{0i} for a single bidder firm i; there is only one state of the world. If we, in a naïve way, estimate the difference in mean outcomes between the auction and negotiation sub-groups, what we actually get is;

$$E(\mathrm{CAR}_{1i} \mid D_i = 1) - E(\mathrm{CAR}_{0i} \mid D_i = 0)$$

By manipulation, we obtain,

$$E(\mathrm{CAR}_{1i} \mid D_i = 1) - E(\mathrm{CAR}_{0i} \mid D_i = 1) + E(\mathrm{CAR}_{0i} \mid D_i = 1) - E(\mathrm{CAR}_{0i} \mid D_i = 0),$$

where the first part: $E(\mathrm{CAR}_{1i} \mid D_i = 1) - E(\mathrm{CAR}_{0i} \mid D_i = 1)$ is the causal effect of treatment on the group that are treated, denoted by τ_{ATT}. The second part of this expression is what is known as the "selection bias'' (SB), which represents the difference in the cumulative abnormal returns for a potential negotiation that exists between the groups. The SB term implies that a simple estimation of the mean difference across the two groups with different treatment is not equal to either the τ_{ATE} or the τ_{ATT}, and therefore is biased. Ignoring the self-selection problem would consequently lead to bias (and inconsistent) estimates.

There are a broad range of strategies used to correct the selection bias problem, for example, the Heckman two-stage estimator and instrumental variables (IV) estimation. More recently, propensity score matching has been widely used to estimate the casual treatment effect, in different forms: propensity score sub-classification, matching estimators, propensity score weighting, kernel-based matching estimators and finally dosage analysis of multiple treatment (Guo & Fraser, 2015) Guo and Fraser (2015, p.342).

The seminal work of (Rosenbaum & Rubin, 1983a) proposes the method of propensity score matching (PSM). The basic idea of their framework is that, the choice of treatment is determined by a certain set of observable covariates, $\boldsymbol{X}_i$, and in consequence, when we condition on the set of covariates, $\boldsymbol{X}_i$, we can regard the treatment are being essentially randomly-assigned. This assumption is termed the "conditional independence assumption (CIA)", and is represented mathematically as,

$$\mathrm{CAR}_{1i}, CAR_{0i} \perp\!\!\!\perp (D_i \mid X_i)$$

To see how the conditional independence assumption removes the treatment effect, consider the selection bias this section derived before, except now conditioned on $\boldsymbol{X}_i$,

$$\begin{aligned} SB &= E(\mathrm{CAR}_{0i} \mid D_i = 1, X_i) - E(\mathrm{CAR}_{0i} \mid D_i = 0, X_i) \\ &= E(\mathrm{CAR}_{0i} \mid X_i) - E(\mathrm{CAR}_{0i} \mid X_i) \\ &= 0, \end{aligned}$$

where this analysis has used the conditional independence assumption (CIA) to go from the first line to the second, since the potential outcome in the presence of covariates is independent of the treatment.

In practice, this would require that we stratify the sample according to the covariates, and match individual firms across the two treatment groups according to this. This results in an estimator of the form,

$$PSM_{\tau_{ATE}} = E(\mathrm{CAR}_i \mid D_i = 1, X_i) - E(\mathrm{CAR}_i \mid D_i = 0, X_i),$$

where $PSM_{\tau_{ATE}}$ is the estimated causal treatment effect using the approach of matching. However, the difficulty in implementing an equivalent estimator in practice is due to the covariate matching. As the dimensionality of the covariate vector increases, it becomes increasingly difficult to find reasonable matches across the two groups, meaning that we are unable to estimate a treatment effect for some unpaired individuals in our sample. This lack of overlap in covariates between the two treatment groups motivates the use of propensity scores as an alternative matching criterion. This analysis supposes that, for each firm in our sample,

there is a probability of choosing the treatment of $D_i = 1$, and this probability $P(D_i = 1 | X_i)$ is a function of the aforementioned covariates in **Table 14**. The conditional independence assumption (CIA) states that the potential outcomes of a treatment are independent of the treatment decision given an appropriate vector of covariates. The propensity score theorem extends this assumption, such that the potential outcomes of a treatment are independent of the treatment decision conditional on the probability of $P(D_i = 1 | X_i)$ which is known as the propensity score (Wooldridge, 2010). This can be written mathematically as,

$$\mathrm{CAR}_{1i}, \mathrm{CAR}_{0i} \perp\!\!\!\perp (D_i \mid P(D_i = 1 | X_i))$$

which is essentially equivalent to saying that conditional on the propensity score, the treatment is randomly assigned. Compared with multivariate matching, the matching of propensity score is univariate. This property is favourable because it becomes much easier to find matches in both treatment groups along a univariate score. The collapse from a multivariate matching space to a univariate one therefore makes propensity score matching an attractive alternative to covariate matching.[106]

An important requirement of using propensity score matching to estimate causal effects is the "overlap'' assumption. The overlap assumption states that there must exist individuals in both treatment groups that have similar propensity scores (Rosenbaum & Rubin, 1983a). For example, if there is a firm from the treatment group (auctions), but no one from the control group (negotiation) that has similar propensity score, the estimated treatment effect will not

[106] In relation to estimate the treatment effect of implementing the propensity score matching, there is a concern can be made against any piece of work that uses matching (or other method such as multivariate regression). The main concern is that the estimated treatment effect will be biased in the case of using matching method because of there are unobservable variables that determine selling mechanism or bidder returns, and this would consequently lead to violate the conditional independence assumption upon which matching depends on. In this research, however, it is unlikely to be such unobservable variables whereby there are many variables that have been investigated as main determines either for the selection of takeover methods or bidder returns based on the literature review which are observed, not unobserved. Moreover, to know how large the effect of the unobservable variables affects the result of propensity score matching, **section 2.4.2.3** will test the sensitivity of the results to the presence of omitted (hidden) variables that may affect the choice of takeover methods and bidder returns.

apply over the entire sample of observations. The overlap assumption implies that, for all possible value of X_i, it follows $0 < P(D = 1 | X_i) < 1$.

3.4.1 Event study

Empirical studies of M&A and bidding behaviours have documented evidence on abnormal stock returns to bidders and targets by using the event studies approach. This approach allows for an investigation of the effects of economic or regulatory events on stock market prices in both the short and long term. The event-time approach can be particularly useful to measure the impact of abnormal performances, at the time of an event, and provide a general *"one captures most, if not all"* measure, in order to quantify the effects of this type of event on a firm's value (Kothari & Warner, 2007). Seiler (2004, p.202) defines the abnormal return (AR), as a result of corporate events and it could be as anything over and above either the normal return or what could be reasonably predicted by the market.

Event study methodology consists of several steps in order to measure the abnormal or unexpected impact of an M&As event around a specific time-frame. This analysis will follow Brown & Warner (1985) and Seiler's (2004) guidelines in order to calculate the stock's abnormal return over the stated time frame.

The first step, in general, is to estimate the event window length, as either a "short horizon" or a "long horizon". The latter is generally used in order to study the performance of shares over a monthly data index of one year or more (Kothari & Warner, 2007). In contrast, Armitage (1995) defines the range of short estimation periods as between 100 to 300 days, and, for long estimation periods, 24 months to 60 months. However, although recent developments in event study methodology over the past 30 years have improved the level of accuracy available to long-horizon event studies—as seen in research conducted in the late 1990s, the short-horizon method is more reliable and straightforward (Brown & Warner, 1985;Kothari & Warner, 2007). Further, using a short-term event window such as (-1, +1), is capable of capturing accurate estimates of market reactions immediately after take over announcements (Fama, 1991).

Armitage (1995) states that there is always a trade-off between choosing the short or long-term estimation periods to measure the market's reaction to corporate events. In contrast, utilising a

longer window might be more precise, but will generally offer *"out of date data"*, is highly susceptible to the joint test problem, and can have lower power, as stated by Kothari & Warner (2007) with Lyon, Barber,& Tsai(1999) commenting that this method is even *"treacherous"* . Moreover, (Moeller et al., 2004) suggest that study the effect of M&As activities are unlikely to have significant long-term returns.

Due to the problems associated with choosing a long-horizon data period, this study will measure the abnormal returns based on the daily data index rather than monthly data in the short and long event period. With this in mind, this research will follow Boone & Mulherin, (2007a:2008b) by selecting a narrow window (-1, +1) to compare acquirer returns between auctions and negotiations. The (-20, +20) (-63, +126) windows have, in previous research, been used to calculate the long-run.

There are a number of methods that are capable of measuring abnormal returns (unexpected) by modelling normal expected returns, such as the Market Adjusted Abnormal Return approach, (MM) the capital assets pricing model, (CAPM) or Arbitrage pricing theory (APT). Most event studies choose the Market Adjusted Returns model to calculate ARs due to the restrictions that accompany the CAPM approach (Roll, 1977b). Moreover, Market Model, Fama-French model and Carhart (1997) four-factor model are use as alternative measures to model the expected returns in order to calculate acquirer-CAR.[107]

3.4.1.1. Market Adjusted Returns model

This study will calculate the abnormal returns over both the narrow and longer estimation periods using the Market Adjusted Returns Model as a benchmark with the CRSP value-weighted index returns. This research will compare market reactions that generated by M&As through the abnormal returns (ARs) of acquirers that do and do not use auctions over the short-run and long-run.

Let $t=0$ represents the announcement date and, for each sample, security i. The cumulative abnormal return of each firm is shown as the sum of the daily ARs over the sample as follows:

[107] This section will explain the Market Adjusted Abnormal Return approach as the main measure for the cumulative abnormal returns in this chapter, in order to save a space, the explanation of other methods is available upon request

$$CAR_i = \sum_{i=0}^{n} AR_i$$

As mentioned before, the abnormal return (AR_i) is calculated as anything over and above either the normal return or what could be reasonably predicted by the market (Seiler, 2004,p.202) as follows:

$$AR_i = R_i - R_m$$

Where,

R_i is the daily normal return of the security *i*

R_m is the daily normal return calculating by using CRSP value-weighted index, this research will use as alternative index to calculate the unexpected return: CRSP equally value-weighted index and S&P Composite index

The daily price data index is used to calculate the daily normal return of the security *i,* as follows:

$$R_i = \ln\left(\frac{P_t}{P_{t-1}}\right)$$

Where,

P_t is the security price on day t and P_{t-1} is the security price on day t-1

While the normal market return is calculated by using the daily CRSP value-weighted index on day t and day t-1 respectively over the sample period as follows:

$$R_m = \ln\left(\frac{P_t}{P_{t-1}}\right)$$

The univariate analysis will use the descriptive statistics based on T-test of the cumulative abnormal returns (CARs) in order to study the main differences between auction and negotiation subsamples, and the below formula is used to capture the T-test:

$$t = \frac{AR_t}{\sigma\,(AR_t)/\sqrt{n}}$$

Where,

AR_t here is the mean of the sample, and $\sigma\,(AR_t)$ is standers deviations for the sample.

Before applying propensity score matching, this analysis will extend the univariate analysis for short-run and long-run to a cross-sectional analysis that will assist in the explanation of any variation in bidders' returns. The cumulative abnormal returns (CARs) will be considered as the dependent variable across the short and long windows. The following multivariate framework will show the narrow event windows (−1, +1). Further, it will, in addition, examine the long-term performance of merger deals by adding the longer event (-20, +20) and (-63, +125)

$CAR_{(-2,+2)}$, $CAR_{(-20,+20)}$ or $CAR_{(-63,+126)}$ $= \alpha + \sum_{i=1}^{N} \beta X_i + \varepsilon_i$

Where:

$\alpha =$ the constant variable (The intercept)

$X_i =$ a vector of explanatory variables

ε denotes the residual term of the regression model

i denotes the acquiring firms' index

3.4.2. Implementing Propensity Score Matching

This section aims to explain the main steps used to calculate the propensity score, following the practical guidance Caliendo & Kopeinig (2008), Imbeds and Rubin (2009), and (Guo & Fraser, 2015). There are generally three main steps in implementing propensity score matching: estimating the propensity score, matching strategies, and calculating the treatment effect. Below is a summary of the main three steps of propensity score matching.

3.4.2.1. Estimating Propensity Score

Estimating the propensity score involves a two-step decision: the choice of models, and the choice of covariates. As the choices of treatment method are binary choices, we will use either logit or probit models, both of which usually yield similar results in the case of binary treatment Caliendo & Kopeinig (2008). In this paper, specifically, we adopt logit model to estimate propensity scores.[108] See ; **Section 2.4.2.1** for the main theoretical and empirical works that discuss the main methods that are used to estimate the propensity score.

As shown above, **Table 14** provides a relatively comprehensive list of the variables that may be related to takeover outcomes and the selection of selling mechanisms. The key covariates include bidder size, a dummy if a target firm initiated a deal or it is in a bankruptcy, if bidder firm own a toehold in a target firm, if a bidder or target firm hire an investment bank with a high reputation, if a deal is tender offer, hostile, if a target is private, all-stock offers, and successful deals. This section will apply logit model to estimate the propensity score in line with Imbeds & Rubin (2009). **Table B3** shows the results of estimation the propensity scores using the logit model.

3.4.2.2. Matching Strategies

This step matches the treatment and untreated groups according to the estimated propensity scores. These matched samples have the same probability of being treated, and it is hoped that the differences in the outcome variable just reflect the causal effect of the treatment. There are different algorithm matching methods that have been discussed in the literature review, and can be divided into three groups: greedy matching, optimal matching and final balance procedures (Guo & Fraser, 2015). See; **Section 2.4.2.2** for the main theoretical and empirical works that discuss the main matching strategies in this chapter, which are used to estimate the treatment effect of using auction.

3.4.2.3. Post-Matching Analysis

Post-matching analysis is divided into two steps to evaluate the matching strategy and sensitivity analysis to the hidden bias. First, after applying different matching strategies, it is

[108] The results remain the same in case of using a probit model to estimate the propensity score.

important to evaluate how well the treatment and comparison group are balanced in the matched sample. Second, this section will test the sensitivity of the results to the presence of omitted variables that may affect auction and bidder returns because of the bias is removed from the observable variables but it is important to know how large the effect of the unobservable variables affects the result of PSM. See; **Section 2.4.2.3** for the main theoretical and empirical works that discuss the main matching strategies in this chapter, which are used to estimate the treatment effect of using auction.

3.5. Empirical Results

The majority of empirical literature mentioned in this work argues that auctions do not induce bidders to pay more for target firms and that there is no significant difference between auction and negotiation returns either for target or for bidder firms. However, these works base their findings on the private selling process. The main aim of this chapter is to examine whether bidding in auctions has a causal impact upon bidder returns at the public-phase competition where bidders are more aggressive when there is more than one bidder bid for the same target firms. Therefore, the possibility for the winner's curse to exist is high.

3.5.1. Average Bidder Returns in the Short and Longer Event Windows

Table 15 reports the results of bidder returns in auction and negotiation sub-samples for a narrow CARs (-1, +1) window, and longer event periods: for (-20, +20) and (-63, +126) as suggested by (Boone & Mulherin, 2007a). The analysis applies the Market Adjusted Returns model by using the CRSP value-weighted index in order to calculate the estimate CARs. As a further robustness check, the results of the cumulative abnormal returns with CRSP equally value-weighted index and S&P Composite index will be reported. Moreover, the Market Model, the Fama-French model and the Carhart (1997) four-factor model are used as alternative measures to model the expected returns in order to calculate bidder returns.

Panel A reports the return of bidders for (-1, + 1) window in auction and negotiation subsamples. For robustness, this part calculates bidder returns for the (-2, +2) window. The

first row of **Panel A** reports the CARs, by using the Market Adjusted Returns model with the benchmark index CRSP value-weighted index of the whole, the auction and the negotiation sub-samples, respectively. For the full sample, bidders, on average, gain significantly positive abnormal returns from acquisitions at 1.669% (p value =0.000) for the (-1, +1) window. This finding is consistent with Moeller et al., (2004) who document that bidders obtain highly significant returns which means that bidders in this study benefit from acquisitions. From the other side, these findings are quite different from the results that show bidders do not gain from acquisitions, since the samples that are used in the previous research are restricted to acquisitions of public companies (Eckbo, 2009).

One observation of this simple statistical comparison is that auction bidders have negative returns at an average of -0.434% (0.000), compared to negotiation bidders who have positive returns at an average 1.711% (0.000). Boone & Mulherin (2008b) document that the average abnormal returns of auctions over the (-1, +1) window is -0.69%, the negative return of auctions is approximately close to the result obtained by this analysis. The differential result indicates an interesting result in the U.S. market, whereby negotiation bidders, on average, significantly outperform auction bidders in the short-term value. Such result could be an evidence confirms that a winner's curse exists in corporate finance and it is consistent with Thaler (1988),Kagel & Levin (1986),and Bazerman & Samuelson (1983). Furthermore, the gain of negotiation bidders increases by, on average, 2.017% (0.000) while the auction has less negative returns at an average of -0.389 % (0.000) in cases where the return over the (-2, +2) window is measured.

The same results have been achieved by using different market indexes: CRSP equally value-weighted index and S&P Composite index for the (-1, + 1) and (-2, +2) windows. Moreover, by using different models to calculate the expected return such as the Market Model, the Fama-French model and the Carhart (1997) four-factor model it is clear that auction has a significant negative impact upon the shareholder's wealth, while negotiation firm's shareholders gain a significantly positive return in the short-term windows. In conclusion, the results are consistent and in general not sensitive to using different indexes or models.

This finding refutes that of Boone & Mulherin (2008b) as they show that there are no statistically significant differences in the average abnormal returns between those bidders who participate in an auction and those who do one-to-one negotiation around the date of

announcement. Therefore, the winner's curse based on their findings does not exist in the U.S. takeovers. It is important to point out that there is a main difference between this study and Boone and Mulherin's study. This analysis focuses on the number of bidders who announce their intention to make a bid and mark deals as an auction when there is more than one bidder. On the other hand, Boone and Mulherin focus more on the private selling process. Modelling an auction at the level of the private selling process leads most of the empirical literature to conclude that increasing the level of competition in the takeover activities does not encourager a bidder firm to overbid for a target firm. However, the preliminary result of this chapter could confirm that bidders gain from reducing the competition level, which could answer the following question: "why is an auction not a popular selling process in a takeover?"

Panel B reports the impact of using different selling mechanisms (auction versus negotiation) upon shareholder's wealth by using longer event windows as suggested by Boone and Mulherin (2007:2008). This section examines the bidder's performance relative to the (-20, +20) and (-63, +126) windows using the Market Adjusted Returns model with the CRSP value-weighted index. For the full sample, bidders, on average, generate significantly positive abnormal returns at 4.009% (0.000) for the (-20, +20) window. Auction and negotiation bidders gain significantly positive abnormal returns at an average of 0.687% (0.000) and 4.075% (0.000) respectively. By comparison, negotiation bidders earn significantly positive abnormal returns at, on average, of 3.388% (0.000) more than auction bidders. Over the (-63, +126) window the gain of auction and negotiation bidders respectively increases to averages of 7.463% (0.000) and 11.966% (0.000) respectively. However, the differential information indicates that there is no significant difference between the generated returns in auction and the negotiation sub-samples. The results remain the same with the S&P Composite index.

However, in the case of estimate bidder returns with the CRSP equally value-weighted index, auction bidders have significantly negative returns by, on average, -0.777% (0.000) compared to negotiation bidders who significantly gain 2.464% (0.000) over the (-20, +20) window. The differential information indicates that bidder firms lose significantly returns when they bid in auction. Auction and negotiation bidders gain significantly positive abnormal returns at an average of 0.632% (0.000) and 4.804% (0.000) over the (-63, +126) window, respectively. However, there is no significant difference between the gains that are generated by either auction or negotiation bidders.

The following section will investigate the effect of using auction and negotiations upon bidder returns by applying alternative models to calculate unexpected returns, such as the Market Model, the Fama-French model and the Carhart (1997) four-factor model. Across all the models, auction bidders lose significantly returns, while negotiation bidders gain significantly positive returns over the (-20, +20) window. Once again, the differential information shows that there are significant differences between the average abnormal returns in auction and the negotiation sub-samples and that the negative returns of auction bidders is larger over the (-20, +20) window. Boone & Mulherin (2008b) report a positive and insignificant relation between auction and bidder returns over the (-20, 20) window. Over the (-63, +126) window, bidders of auction and negotiation lose returns with different models. However, there is no statistical difference in the average abnormal returns between auction and negotiations subsamples.
Some results in **Panel B** are sensitive to using different indexes and models. For example, the estimated returns with the CRSP equally value-weighted index and the S&P Composite index have opposite sign to returns with the CRSP equally value-weighted index and the other models.

In conclusion, auction bidders lose significantly returns, while negotiation bidders create significantly positive returns in the short event windows, irrespective of the CRSP indexes and models. This finding provides an evidence that show auctions increase the possibility of a winner's curse. If the unexpected returns are calculated by using the CRSP equally value-weighted index as in Boone & Mulherin (2008b), the auction and negotiation significantly create a value for their shareholders over the (-20, +20) window.

Table 16 reports information on bidder returns in auction and negotiation sub-samples for the (-1, +1) window, after controlling the size effect and the main deal characteristics. **Table 4** reports the CRSP value-weighted index abnormal retunes.[109]

Panel A presents the results of small and large firms in auction and negotiation sub-samples. In general, small firms have significantly positive abnormal returns irrespective of the selling process at, on average, of 2.537% (0.000). Around 73 small auction firms and 6,428 negotiation firms generate positive and significant returns at, on average, of 0.993% (0.000) and 2.554

[109] The results remain the same, irrespective the indexes or models are used to measure the unexpected returns. To save the space this section presents the results that are obtained from the CRSP value-weighted index as suggested by Boone & Mulherin (2007:2008)

(0.000), respectively. This finding is consistent with Moeller et al., (2004) who show that small firms earn positive and significant returns in the short event period. Although small negotiations earn more than double the small auction returns, there is no statistical difference on bidder returns across the small firm's sub-groups.

Large firms in general generate positive and significant returns. However, large auction firms significantly lose returns at, on average, of - 0.924% (0.000), while negotiation firms earn significant and positive returns at an average of 1.027% (0.000). The differential test shows that large negotiation firms significantly outperform large auctions.

Over the (-1, 1) window, the differential test shows that small firms outperform the large ones in general by an average of 1.560% (0.000), irrespective of the selling process. This result is consistent with Moeller et al., (2004) who show that when acquisitions are announced, small firms outperform significantly large firms. It is interesting to note that small negotiation firms generate significantly more value than large bidders. Moreover, although small auction firms earn significantly positive returns and large auction firms destroy the shareholders' wealth, there is no statistical difference between bidder returns in small and large auction firms. This finding concludes that engaging in one-to-one negotiation process is better for bidder firms than engaging in competitive processes, regardless of the firm's size. More specifically, small bidders enjoy higher returns in negotiation.

To capture the size effect more, **Panel A** displays the results that examine whether bidder returns differ between small auction and large negotiation firms, and vice versa. There is no statistical difference between small auction and large negotiation firms. However, small negotiation firms create a significant value for shareholders than large auction firms at an average return of 3.479% (0.000). This finding is again consistent with the fact that small bidders enjoy a significant and positive return with negotiations

In light of the above, the event of the winner's curse exists if large firms bid in auction. In cases where the competition level increases between bidders, there is a negative relation between bidder's size and returns. These results could evidence that a hubris effect plays a role when the firm is large, where the large bidders overbid for the target to deter other bidders, as argued by Bulow & Klemperer (2002b),Moeller et al., (2004), and Boone & Mulherin (2008b)

Panel B compares bidder returns in auction and negotiation sub-samples across deal characteristics. For the whole sample, acquisitions create significantly value for bidder's

shareholders if they successfully complete the transactions. However, 148 winners in auction lose significantly returns at an average of -0.677% (0.000), while 13,730 winners in negotiation create significantly positive returns at, on average, 1.718% (0.000). The statistical deferential test shows that there is a difference in bidder returns between auction and negotiation winners. These results seem once again to provide evidence that the winner bidders in auction could suffer from the winner's curse. Failure bidders in auction lose significant returns at, on average, of -0.174% (0.000); while failure bidders in negotiation create significant returns at, on average, 1.548% (0.000). However, there is no difference in the announcement returns if bidders failed in auction or negotiation.

111 auction firms use all-cash as the method of payment and such transactions generate a significantly negative return at only -0.019% (0.000), while a number of 3,671 negotiation firms create significant value for shareholders by, on average, 1.627% (0.000) in cases where they use all-cash. The statistical difference between the two sub-samples is significant. Moreover, an auction bidder loses substantially larger returns if they use all-stock offers compared to all-cash offers (-0.019% versus -1.942% respectively), while negotiation bidders gain significantly positive returns irrespective of the method of payment they use. This results consistent with Hansen (1987b)and Boone & Mulherin (2008b) who argue that using stock offers as a method of payment in auction transactions will have a negative impact on bidder returns.

The statistical information shows that negotiation bidders significantly outperform auction bidders, whether the former use all-stock or all-cash. This could once again provide evidence of the winner's curse in auctions whereby bidders who pay with all-stock perform even worse.

Generally, acquiring public targets creates significantly negative abnormal returns for auction and negotiation bidders. More specifically, bids for public targets in auction are worse than bids in negotiation. This is not a surprising result because publicly traded firms consider common -value items which could potentially increase the winner's curse (Boone & Mulherin, 2008b). On the other hand, acquiring private and subsidiary targets generates positive and significant returns for auction and negotiation bidders and this is consistent with Fuller et al., (2002). However, the organisational forms of target assets cannot explain the variation in the abnormal returns between auction and negotiation sub-samples.

In light of the empirical findings of Travlos (1987) and Fuller et al., (2002), there is a relation between payment method and the organisation's forms of target assets. For example, acquiring public targets and paying with equity are associated with lower the abnormal returns, while acquiring private firms and being paid with equity will result in higher bidder's returns. Therefore, it is important to continue to investigate the relation between the method of payment and the target status in auction and negotiation sub-samples.

85 auction bidders lose significant returns at an average of -0.277% (0.000), while 618 negotiation bidders gain significantly positive returns at, on average, 1.264% (0.000) in cases where there is an all-cash offer to publicly traded firms and the difference between the two sub-samples is statistically significant. On the other hand, 54 auction bidders who offer all-stock to bid for public targets lose significantly substantial returns at an average of -4.104% (0.000), while 1,133 negotiation bidders lose significantly at -1.833% (0.000). However, the difference in bidder returns between the two subsamples is not significant.

Once again, auction and negotiation bidders generate significant value for the shareholders in bids for private and subsidiary firms, irrespective of the method of payments. The highest significant abnormal returns are, , on average, , 8.182 % (0.000) when auction bidders bid for private targets and offer all-stocks, while negotiation bidders create the highest positive abnormal returns at an average of 3.038% (0.000), in the case of bids for subsidiary targets and the offer of all-stocks. However, the statistical information shows that there is no significant difference in bidder returns between auction and negotiation, irrespective of the organisation forms (privates or subsidiaries) of target assets and the method of payments (all-cash or all-stock). In conclusion, over the (-1, 1) window, bidding for private and subsidiary targets that are stratified by method of payments (cash versus stock), does not explain the wealth variations in the auction and negotiation sub-samples.

As predicted by Aktas et al., (2010a), if a target firm initiates a deal, this will weaken the target firm's position during the negotiation process which could affect the shareholders' wealth. Therefore, it is not surprising to find that initiating the deal creates significantly positive abnormal returns for the whole sample. However, 33 bidders lose significantly -0.472%(0.000) returns if they engage in an auction bid that is initiated by target firms, while 154 negotiation bidders create significantly 3.084%(0.000) value for the shareholders. A significant difference exists in bidder returns between auction and negotiation if target firm initiated the deal. This

could be further evidence that bidding in an auction could heighten the prospect of the winner's curse, irrespective of who initiates the deals.

In regards to the whole sample, tender offer acquisitions create significantly positive returns at, on average, 1.009% (0.000) and this consistent with (Moeller et al., 2004). However, bidding in the form of a tender offer in case of there are other public potential bidders bid for a target firm lead to reduce the acquirer returns by, on average, -1.037% (0.000). Bidding in the form of a tender offer in cases where there are no other public potential bids for a target firm generate positive returns for acquirers by, on average, 1.400%(0.000). By comparison, there is a significant difference in the abnormal returns between auction and negotiation if bidders bid in the form of a tender offer. Such results provide further evidence of the winner's curse in auctions. This results consistent with Offenberg & Pirinsky (2015) who argue that a bidder firm in a tender offer are more likely to bid more in order to acquire quickly a target firms, essentially when there are more than one bidder for the same target.

55 hostile bids generate negative and significant returns, 25 hostile deals do even worse when competition exists between bidders, while a number of 30 hostile deals create significant positive returns with negotiation. However, the statistical information shows that there is no difference between bidder returns between auction and negotiation if the acquirer's bid is hostile.

Moreover, bidding for a target in bankruptcy can create significant and positive returns at an average of 3.112% (0.000) and 2.34% (0.000) for auction and negotiation bidders respectively. By comparison, there is no significant difference in bidder returns between auction and negotiation. This result consistent with Shleifer & Vishny (2011b) and Hansen & Thomas (1998) who argue that bidder firms could obtain a target firm in a bankruptcy at a fire-sale discount. As predicted, bankruptcy transactions prevent bidder firms from the winner's curse event.

Moreover, although a target firm that is located in the U.S. state that has a heavily regulated anti-takeover, this could lead to the weakening of the power of the bidder's negotiation. It is surprising to find that, auction and negotiation bidders generate significant and positive abnormal returns at, on average, 0.835% (0.000) and 1.976% (0.000), respectively. However, there is no significant difference in bidder returns between auction and negotiation.

Bidders who bid in auction with a toehold lose significant returns at an average of -0.933% (0.000), while engaging in a one-to-one negotiation process with a toehold creates positive and significant at on average 1.196 % (0.000) returns for bidder firms. As predicted by Bulow et al., (1999), bidding in an auction with a toehold would make bidders more aggressive and lead them to suffer the winner's curse. However, the statistical differences in bidder returns between auction and negotiations are not significant.

Panel C reports results for the impact of investment banks on bidder returns for the (-1, 1) window in auction and negotiation. Out of the whole sample, hiring investment banks create significant value for the shareholders at, on average, 1.320% (0.000). However, auction acquirers who employ investment banks lose significant returns at, on average, -1.441% (0.000), while negotiation acquirers earn 1.429% (0.000). The statistical information shows that there is a significant difference in the abnormal return between auction and negotiation.

In cases of bidders employ prestigious investment banks, a number of 67 auction bidders again lose significant returns at, on average, -0.756%(0.000), while 1,034 negotiation bidders create value for the shareholders at, , on average, 1.119%. This finding is in line with Rau (2000) who documents that employing prestigious investment banks gives rise to the winner's curse in the auction takeover process. However, there is no statistical difference in bidder returns between auction and negotiation.

Bidders from the whole sample gain significant positive returns at an average of 0.781% (0.000) in cases where the target firms employ investment banks. The majority of auction bidders lose significant returns at, on average, -1.104% (0.000), whereas 5,646 negotiation bidders earn significant positive returns at, on average, 0.860% (0.000). The case is significantly worse for auction bidders if target firms employ prestigious investment banks where they lose -2.938% (0.000), while negotiations bidders enjoy significantly positive returns at an average of 1,516% (0.000). By comparison, there is a significant difference in the abnormal returns between auction and negotiation bidders if the target firms employ investment banks with a high quality.

These results emphasise that using an advisor has a fundamental impact on the acquirer's wealth and it is an important characteristic to explaining what determines takeover outcomes in terms of the selling processes (auction versus negotiation).

Table 17 presents information about how bidder returns differ between auction and negotiation depending on acquirer and deal characteristics for the (-2, +2) window. However, this section

will not discuss the results because the above discussion remains true for the (-2, +2) window. There are some significant results appeared in Table 17, small auction firms significantly outperform the large ones, bidder firms who fail in negotiation significantly outperform auction bidders, at 10% level. Moreover, both bidders in auction and negotiation create negative and significant returns at 10%, in cases where they bid for publicly traded targets and offer all-stock. However, auction bidders perform even worse than negotiation bidders.

In conclusion, there are significant influences from bidder and target characteristics upon bidder returns over the short-run analysis. For example, bidding in auction gives rise to the winner's curse if the bidder firm is large, has successfully completed a bid, offers all-cash or all-stock (does even worse with all-stocks), if bidders bid for publicly traded targets with cash, if the target initiated a deal, or if bidders bid in the form of tender offer. Finally, the winner's curse exists in auctions if the bidders or targets employ investment banks as advisors. More specifically, a bidder firm loses a substantial return if a target firm uses investment banks with a high quality.

This section will investigate how bidder returns differ between auction and negotiation over longer periods depending on acquirer and deal characteristics. **Tables 18** and **19** show information about bidder returns for (-20, +20) and (-63, +126) windows, respectively.

Out of the whole sample, and for both auction and negotiation, small firms still create significant and positive returns over the (-20, +20) and (-63, +126) windows. However, there is no statistical difference in the abnormal returns between small bidders in auction and negotiation. Over the (-20, +20) window, large auction firms create positive and negative returns at, on average, -0.113% (0.000), while negotiation bidders enjoy substantial positive returns at, on average, 3.514% (0.000). By comparison, large negotiation firms significantly outperform auction firms. From the whole sample, small bidders significantly outperform large ones. More specifically, small negotiation firms create more positive returns than the larger ones. However, there is no statistical difference between small and large auction firms. Small negotiation firms again significantly outperform large auctions.

Over the (-63, +126) window, large bidder firms create positive and significant returns on the whole sample; large auction and negotiation bidders enjoy a significantly positive abnormal return at, on average, 6.728%(0.000) and 13.473% (0.000), respectively. However, negotiation bidders create significantly more than double the value that is created by auction. It is

interesting to note that, large firms significantly outperform the small ones on the whole sample. Moreover, large negotiation bidders create positive and significant returns more than small ones. Although small auction bidders create a higher value for their shareholders than the large firms, there is no statistical significance in bidder returns between small and large auction bidders.

Over the (-20, +20) and (-63, +126) windows, auction and negotiation winners who successfully complete the transactions enjoy significantly positive abnormal returns. Failed bidders in auctions lose significant returns over the (-20, +20) window, while failed bidders in negotiation again create significant and positive returns. Over the (-63, +126) windows, bidders who fail in auction create positive and significant returns, while bidders who fail in negotiation lose the abnormal returns. By comparison, there are no statistical differences in bidder returns between auction and negotiation, regardless of whether or not bidders win or fail in the bid across the longer event windows. Bidders who offer all-cash create significant positive returns in auction and negotiation over the (-20, +20) window, and the percentage of positive returns substantially increases the (-63, +126) window. However, the difference in the abnormal returns between bidders who offer all-cash in auction or negotiations is not significant.

There is evidence for the event of a winner's curse in auction if a bidder offers all-stock over the (-20, +20) window, whereby auctions lose significant returns at, on average, -1.330% (0.000), while negotiation bidders enjoy significantly positive returns, at, on average, 4.985% (0.000). The statistical information shows that negotiation bidders significantly outperform auction bidders in instances where all-stocks are offered, at 10% level. This result again consistent with (Hansen, 1987b) who argue that it is better for bidder firms to engage in the negotiation process in case they pay by stocks in order to protect their confidential information.

Over the (-63, +126) window, it is interesting to note that auction and negotiation bidders in case they use all-stock create significant and positive abnormal returns at an average of 1.784% (0.000) and 17.513% (0.000), respectively. Negotiation bidders gain significantly substantial positive returns by, on average, 15.729% (0.024) more than auction bidders.

Over the (-20, +20) window, if bidders bid for a publicly traded target they lose significantly abnormal returns at an average of -1.312% (0.000), while negotiation bidders enjoy significant returns at an average of 1.407%. By comparison, negotiation bidder outperformance auction bidders in case they bid for a publicly traded target, at 10% level. However, auction create

significantly positive returns at, on average, 3.953% (0.000) over the (-63, +126) window, while negotiation again enjoy significant and positive abnormal returns at, on average, 9.498 %(0.000). The statistical difference between auction and negotiation bidders if they bid for public target firms shows that negotiation bidders enjoy significantly more positive returns than auction by, on average, 5.544% (0.078), at 10% level. Over the longer event periods, although all bidders create positive and significant positive abnormal returns in cases of bids for private and subsidiaries target firms, there are no statistical differences in bidder returns between auction and negotiation bidders

Offering all-cash for public target forms creates significant and positive abnormal returns for auction and negotiation windows over the longer event periods, and more specifically bidders create significantly substantial positive returns over the (-63, +126) window. However, the difference in bidders' returns between auction and negotiation bidders who bid for a public target firm with all-cash is not significant. There is another interesting finding that offering all-stock for public target forms destroys significantly returns in auction bid, while negotiation bidders enjoy significant and positive returns over the (-20, +20) and (-63, +126) windows. Negotiation bidders do even better by creating significant value for shareholders by, on average, 11.685% (0.000) over (-63, +126) windows. By comparison, negotiation bidders significantly outperformance auction bidders in case they bid for public target firms with all-stock.

Finally, over the (-20, +20) window, the winner's curse exists in auctions if a bidder or target firm employs investment banks as advisors whereby an auction destroys the shareholders' wealth by, on average, -1.267% (0.000), while negotiation bidders enjoy significant positive abnormal returns at, on average, 3.290% (0.000). Negotiation bidders significantly outperform auction bidders in cases where they use investment banks. However, there is no difference in bidder returns between an auction and negotiations in cases where investment banks with a high quality are used. From the other side, bidders who bid for target firms that use investment banks lose significantly abnormal returns at, on average, -0.416%(0.000), while negotiation bidders gain significantly positive returns at, on average, 2,671%(0.000). By comparison, negotiation bidders again significantly outperform auction bidders in cases where target firms hire investment banks as advisors. Moreover, auction bidders do even worse if a target firm uses investment banks with a high quality, while negotiation bidders enjoy significant and positive returns. The statistical difference in bidder returns between auction and negotiations is significant at a 10% level. Over the (-63, +126) windows, there is no statistical difference

in the abnormal returns between auction and negotiation, irrespective of the characteristics of investment banks for bidders or target firms.

In conclusion, there are significant impacts for some bidders and deal characteristics upon bidder returns in auction and negotiation sub-samples, over (-20, +20) window. The winner's curse exists in auction if bidder firms is large, offer all-stock, if a target firm is public, bid for publicly traded target firms with all-stock. Finally, the winner's curse exists in an auction if the bidders or targets employ investment banks as advisors. More specifically, a bidder firm loses significant returns if a target firm uses investment banks with a high quality. Over the (-63, +126) window, the winner's curse exists in auctions in cases where bidder firms bid for publicly traded target firms with all-stock.

3.5.2. OLS Analysis

The main objective of this chapter is to investigate whether bidding in auctions has a causal impact on bidder returns using the U.S. M&A Database. The univariate analysis answers such a question and reports that auctions reduce bidder returns over the (-1, +1) and (-2, +2) windows, regardless of the models and market indexes that are employed to calculate the abnormal returns. Auction and negotiation bidders earn a positive and significant return over the (-20, +20) window.[110]

In order to examine the relation between bidder returns and auctions, taking into consideration other observable bidder and deal characteristics that have been discussed in **Table 14,** a multiple regression will be estimated. OLS estimator will allow for the interaction between bidder cumulative abnormal returns and the main explanatory variables (such as firm size, cash holdings, and Tobin's q, leverage, intangible assets, deal outcome (successful or failed deals), the target's status (public, private or subsidiaries), the deal type (tender offer, hostile and conglomerate deals), method of payments (cash or stock), and takeover regulations. Specifically, this section runs the simple OLS regression, and the results would be compared to those in the next section, where the matching method is applied.

[110] In case of using CRSP value-weighted index as a main index to calculate the unexpected returns in this study, as suggested by Boone and Mulherin (2007:2008).

Table 20 reports the OLS results of a series of regressions from (1) to (2), stratified respectively by the abnormal returns for the short event (-1, +1) and (-2, +2) windows and the longer event (-20, +20) and (-63, +126) windows. The OLS results are reported by using CRSP value-weighted index abnormal retunes. The auction dummy variable in the (-1, +1) and (-2,+ 2) windows reflects a negative and significant relationship between bidding in auction and the returns experienced. These results are consistent with the univariate finding that confirms that auction reduces the bidder shareholder's wealth in the short event period. Therefore, bidding in auction increase the possibility of the winner's curse in the U.S. takeover market. This results consistent with Thaler (1988);Kagel & Levin (1986); and Bazerman & Samuelson (1983) who argue that the event of the winner's curse exists in takeover market.

These negative results however are contrary again to the earlier literature such as Boone & Mulherin (2008b) There is no significant impact for the auction dummy variable over the (-20, +20) and (-63, +126) windows, leading the studies to conclude that the winner's curse exists in the U.S. takeover market in the short-term period.

Model (1) includes the full sample with all the sets of covariates. As predicted, *Ln (size)* has a significant and negative impact upon bidder returns. It could argue that large firms are more susceptible to the tendencies of management empire-building or hubris Roll (1986a) and Moeller et al., (2004)

Model (2) uses a dummy variable that takes the value of 1 if a bidder firms is classified as a small firm and another dummy variable that takes the value of 1 if a bidder firm are a small firm and bid in auction in order to capture the size effect. After controlling for bidder and deal characteristics, the abnormal return is higher by on average 1.3% points if bidder firms are small and this consistent with Moeller et al., (2004). However, small firms that bid in auction earn positive but insignificant abnormal returns.

In Appendix B, the focus of models (1) and (2) in **Table B2** is the examination of firm size upon wealth creation separately for small and large firms. Although the result of using the full sample show that small bidder firms that bid in auction earn positive but insignificant abnormal returns, **Table B2** reports that auction reduces significantly bidder returns irrespective of whether bidders are classified as small or large firms over the (-1, +1) window. Bidding in auction reduces significantly large bidder returns over the (-2, +2) window. This is further evidence that show the winner's curse exists when a bidder firm engages in auction bids. However, it seems such result is valid only for the short-term period.

The coefficient of the variable cash holding has a positive but insignificant impact on bidder returns over the short-term windows and (-20, 20). This means that free cash flow hypothesis cannot explain the variation in bidder returns. However, there is positive and significant relation between the level of cash reserve and the abnormal return over the (-63, +126) window.

A high level of leverage tends to have a significantly positive impact on bidder returns in the short and longer windows, and this results consistent with Robert and Sufi (2009); Gilson (1989, 1990); and Maloney et al., (1993).Therefore, any significant degree of leverage acts positively with bidder return, and restrict managerial hubris and overpayment.

Although target firms that are located in anti-takeover states have more negotiation power, which could give rise to the winner's curse as suggested by Boone & Mulherin (2008b), such a variable does not have a significant impact on bidder returns. As predicted, in model (1) over the (-1, 1), (-2, 2) and (-20, 20) windows, the deal initiated by a target firm has a positive and significant impact on bidder returns. Aktas et al., (2010a) argue that target firms signal that they are under pressure to sell, if they initiated a deal for potential bidders and therefore this will weaken their bargaining power

If bidder firms own a stake in a target firm -six months before the date of announcement, there is a significant tendency to reduce bidder returns in the short-term window and model (2) in the (-20, 20) window. This result consistent with Bulow et al., (1999) who argue that bidder firms will be more aggressive in case they own a stake in a target firm, particularly when there are more than one bidder bid for the same target with different stakes. In the short and longer period windows, bidder returns significantly increase if target firms are experiencing bankruptcy. This means that bidder firms obtain a target firm at a fire-discount as suggested by Shleifer & Vishny(1992c) and Hansen & Thomas (1998).

For explanatory variables, ROA, Tobin's Q is shown to be negatively related to bidder returns for model (2) in the short period events and (-20, 20). However, the effect of Tobin's Q in the short analysis is economically trivial, consistent with Moeller et al., (2004) More intangible assets are associated with positive abnormal returns in the short and longer event windows.

There is a significant and positive impact on bidder returns in cases where bidder firms employ prestigious investment banks in model (1) over the short and longer period windows. On the other hand, if the target firms hire prestigious investment banks, this has a positive impact on bidder returns in model (1) over the short event period and the (-63, +126) window. However,

when the size effect is controlled by using a small dummy variable, hiring prestigious banks significantly reduces bidder returns over the longer window.

The relative size variable has a generally positive impact on the abnormal return. However, the effect over the short and longer windows is again economically trivial. Consistent with (Moeller et al., 2004), bidders gain more in cases where they bid in the form of a tender offer. However, the results are mostly valid for the longer windows. As expected by Schwert (2000b), hostile bids reduce bidder abnormal returns over the (-1, 1), (-2, 2) and (-20, 20), however, the results are not significant.

Moreover, the abnormal returns of acquirer firms who acquire private targets have a positive and significant impact mostly over the short and longer event windows. This is consistent with the results of Fuller at el (2001). Using all-stocks as a method of payment has, as predicted by Travlos (1987);Heron & Lie (2002) and Boone & Mulherin (2008b) a significant negative impact on bidder returns only over the (-1, +1) window in model (1). However, it is surprising that all-stock offers increase significantly bidder returns over the longer windows. Finally, there is a positive and significant relation between successfully completed a deal and bidder returns over the longer period windows.

3.5.3. Choice of Selling Mechanism

Bulow & Klemperer (2002b) argue that the level of competition is related to a bidder firm's characteristics, where the presence of a strong bidder (for example, large bidders or a bidder with a high cash reserve) would create or at least heighten the prospective of the winner's curse. As a result of this, investigating how the choice between the selling mechanisms of auctions and negotiations are related to various bidders and deal characteristics is one of the main concerns of this chapter.

Table 21 models the choices of the selling mechanism in the U.S. market using the marginal effects from a logit model of the probability for a deal to structure as auction. The analysis starts with the limited explanatory variables in model (1) that are typically viewed as potential determinants for bidder returns or the selection of selling processes**, in Table 14**. These variables include the firm's size (Ln (size)), its cash holding, leverage, target in antitakeover state, target-initiated deals, toehold, target in bankruptcy, return on assets (ROA), Tobin's q, intangible assets, bidder and target firm hire top-investment banks and relative size. Model (2)

further includes a set of control variables like tender offer, hostile deal, private target, all-stock as method of payment and completed deals.

There are observable bidders and deal characteristics in models (1) which affect the choice of selling mechanism. For example, bidders who choose to bid in auction are more likely to be large firms. As predicted, the larger size of bidder firms motivate them to engage in competitive selling procedures, where the larger bidder could deter other competitors, and this could reduce the level of competition and scuttle the possible gain for target firms from conduction an auction Bulow & Klemperer (2002b);Moeller et al., (2004); and Boone & Mulherin (2008b). Bidders with a high level of leverage are more likely to engage in the auction process, and the result is statistically significant at the level of 10 %. This result is contrary to (Offenberg & Pirinsky, 2015)who argue that acquirer firm with a high level of leverage are more likely to bid in the form of a friendly merger process.

It is hardly surprising; bidder firms are more likely to bid in a competitive process if a target firm has initiated a takeover deal. Bidders who have a toehold in target firms are more likely to engage in a competition process to acquire target firm's assets. This result is contrary to Bulow et al., (1999) who show that auction is not an attractive strategy for bidder firms that have a stake in a target firm, because bidder firms are more aggressive in auction with a toehold. However, it could be argued that bidder firms are more likely to bid in auction with a toehold that less than the threshold of a toehold in negotiation that is documented by Betton et al., (2009b). The average of toeholds in the auction subsample is 10%, which is less than the threshold (20%) that encourage bidder firms to bid in a negotiation process.

Bidders are more likely to bid in a competition process for a target firm in bankruptcy. In the light of Shleifer & Vishny (1992c) and Hansen & Thomas (1998) argument, bidder firms are encouraged to bid in a bankruptcy transaction in order to enjoy win a takeover deal at a fire-sale discount. The more tangible assets bidder firms have, the more likely they are to motivate bidders to bid in auction. It could be argued that bidder firm with a high level of leverage are less likely to engage in acquisition transactions as pointed by Uysal (2011). However, Jensen & Meckling (1976) argue that leverage is positively related to the level of tangible assets whereby bidders can have a great debt capacity by using their assets as collateral for loans. This result could explain why firms with a high level of leverage bid in a competitive auction. It is interesting to note that, the likelihood of bidders bidding in auction is increased if either the target or the bidder firms employ investment banks with a high quality.

In Model (2), the results remain the same for all of the above explanatory variables, except the level of leverage flips to be statistically not significant. In relation to the further explanatory variables, it is not surprising that if the competition level between bidders increases, bidders strongly prefer to bid in the form of a hostile or tender offer as shown by Offenberg & Pirinsky (2015). Bidders are less likely to bid in auction for private targets. In the light of Hansen (1987b) argument, bidder firms are less likely to use stock offers in auction in order to protect their confidential information , it is surprising to find that bidders are more likely to use stock in auction. As predicted before, an auction is less likely to be successfully completed. It could be concluded that auction is not a popular mechanism in corporate finance simply in order to avoid the high possibility of a failed transaction. Therefore, bidders might observe the likelihood of these types of process to fail and, so, natural lose confidence in this kind of purchasing format.

Finally, in model (1) and (2), the level of cash reserves, whether the target is in an antitakeover state, ROA, Tobin's q and the relative size do not determine the likelihood of bidding in auction.

In conclusion, the statistical results show that the choice of bidder firms to bid in auction or negotiation is not a random: bidder firms that are large, have high levels of leverage and tangible assets typically are more likely to bid in auction. Moreover, bidders are more likely to bid in auction if a target firm initiated a takeover deal or it is in bankruptcy, if bidders own a toehold in a target firm. Bidder firms also bid in auction if they or target firms use an investment bank with a high reputation. Auctions are associated with a tender offer, hostile technique, and most surprisingly with all-stock offers. However, bidder firms are less likely to bid in auction for a private firm, and less likely to complete a bid.

3.5.4. Matching

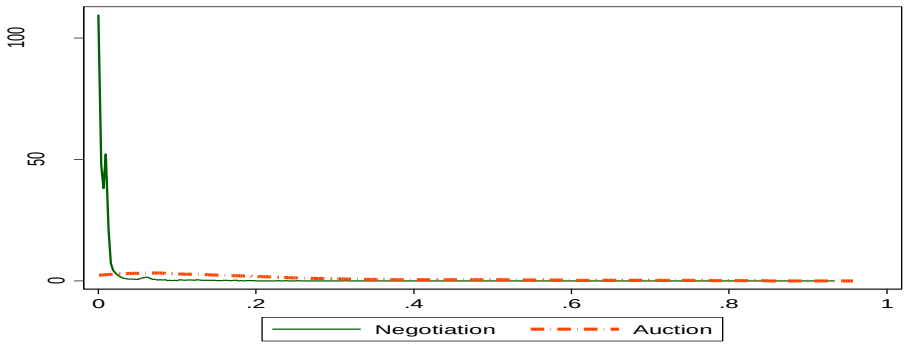
3.5.4.1. Propensity Score Estimation

The main objective of this study is to estimate the casual impact of bidding in competitive auction upon bidder returns. However, target or bidder firms are self-selected their selling methods. As discussed previously, a simple comparison or regression on the mean difference in the cumulative abnormal return (CARs) between the two sub-groups of bidders who choose to bid in auction and negotiation would be biased. To address the self-selection problem, propensity score matching will be applied. The analysis uses the logit regression model to

estimate the propensity score based on a broad range of conditioning variables that are associated with the observable bidder and deal characteristics. Here the analysis will run a logit regression to estimate the propensity scores, while just keeping the statistically significant variables, **in Table 21. Table B3** in **Appendix B** shows the results of estimating the likelihood of choosing scheme of arrangement by using the selective covariates that appears in the linear, higher order terms and interaction terms, as suggested by Imbeds & Rubin (2009).

Then, it is essential to examine whether the overlap assumption is not violated, after calculating the propensity score. According to Wooldridge (2010) the overlap assumption is violated when there are mass propensity score distributions of 0 or 1. **Figure 6** shows the distribution quality of the estimate propensity score by treatment status based on the logit model in **Table B3**. It can be seen that, the quality of propensity score distribution by treatment status satisfies the overlap assumption which means that there are no values for the propensity score that have 0 or 1 in either negotiation deals (the untreated group) or auction (the treatment group).[111] However, there is a poor mass overlapping between the two groups which could affect the choice of matching strategies, for example, if there is a large drop in the number of matched observations by using matching with caliper (Guo & Fraser, 2015, p.184-185). However, the narrow common support does not affect the choice of matching strategies as shown later **in Table 22.**

Figure 6 Estimated propensity score



[111] In number, the distribution of the estimated propensity score is between .00017 and 0.957

3.5.4.2. Treatment Effects

Table 22 reports the results of the treatment effects, after implementing the matching strategies. Each row provides the results for both the average treatment effect (ATE) and the average treatment effect of the treated (ATT). The main parameter of interest in this section is ATE. This section applies various greedy matching strategies here: nearest neighbour matching (in **Panel A**) and caliper matching (in **Panel B**). The columns are stratified respectively based on the short period windows that are used to calculate the cumulative abnormal return (CAR) :(-1, +1) and (-2, +2), and longer period (-20, +20) and (-63, +126) windows. In general, bidding in auction, in line with the general expectation, tends to reduce the wealth of shareholders compared with engaging in a negotiation process, for both ATE and ATT. Over the short-run analysis, the event of winner's curse exists in takeover competition, and this consistent with Thaler (1988);Kagel & Levin (1986);and Bazerman & Samuelson (1983). However, the overbidding results become less clear when examined over the long-event period.

Panel A estimates the treatment effect by matching the bidder firms that choose to bid in auction (the treatment group) to respectively either one, two or three bidder firms that choose to engage in one-to-one negotiation (the untreated group). In the first row, ATE and ATT are estimated by using the cumulative abnormal return over the (-1, +1) and (-2, +2) windows, where each target firm in the treatment group matches with the signal nearest neighbour in the untreated group. In the estimation of ATE, 238 bidders who choose to bid in auction match with 233 bidders who choose to engage in a negotiation process. Bidding in auction reduces significantly shareholder wealth by, on average, - 0.985% and -1.599% over the (-1, +1) and (-2, +2) windows, respectively. On average, bidder firms lose significantly more returns over the (-2, +2) window compared to the narrow one. This result suggests that the winner's curse exists in auctions. Boone & Mulherin (2008b) document that the average abnormal returns of auctions and negotiation bidders over the (-1, +1) window are -0.69% and -0.71%, respectively. The negative returns of auction are approximately close to the result obtained by this analysis. However, Boone & Mulherin (2008b) do not find a significant difference in bidder returns between auction and negotiation, and therefore auctions do not increase the chances of the winner's curse. Such results could suggest that the winner's curse exists in the public competition process, but not in the private process. It could be argued that, bidder firms are

more likely to be aggressive in a competitive auction whereby they are more than one public bidder bid for the same target firm.

In the case of estimating ATT, the match strategy uses 286 number of bidders who choose to bid in an auction to be matched with 233 negotiation firms. Bidding in auction reduces significantly the wealth of shareholders by, on average, -1.660% over the (-1, +1) window. However, although bidding in auction reduces the bidder abnormal return by, on average, -1.358% over the (-2, +2) window, the result is statistically insignificant.

Moreover, ATE and ATT is estimated by matching each treated target firm to the two nearest neighbours in the untreated group. In the case of estimate ATE, 247 bidders that choose to bid in auction match with 427 bidders who choose to engage in a negotiation process, and the result shows that a bidder firm that bids in auction (significant at a 10% level) reduces the shareholder wealth by, on average, -0.860% over the (-1,1) window. Bidders also lose significantly, on average, more returns over the (-2, +2). This result is further evidence that auctions give rise to the winner's curse. In the case of estimate ATT, all auction samples are matched to 427 negotiation bidders over the (-1, 1) and (-2, +2) windows, and the result shows that bidders lose returns in auction. However, the result is statistically insignificant.

Finally, if the matched sample is constructed by matching each bidder firm that chooses to bid in auction to three bidder firms that choose to bid in negotiation, 284 auction bidders are matched to 598 negotiation bidders when estimating ATE. On average, auction bidders lose respectively, on average, -0.676% and -0.159% over the (-1, +1) and (-2, +2) windows. However, the negative impact of an auction is statistically not significant. In case of estimate ATT, the average abnormal returns over the (-1, +1) window are significantly reduced by, on average, -1,125% at a 10% level. Over the (-2, +2) window, bidding in auction also reduces significantly shareholder wealth, on average, by -1.961% and the number of negative losses in the abnormal returns is larger over the (-2, 2) window.

Although using longer event periods to calculate the cumulative abnormal returns could introduce noise relative to the narrow event period (Fama, 1991), for further robustness, this section will estimate the effect of using auctions upon shareholder wealth over the (-20, +20) and (-63, +126) windows. The main reason for this is that, the longer event window could

capture more information that could be not reflected at the date of announcement as suggested by Boone & Mulherin (2007a:2008b).

Panel A presents the results of ATE and ATT on auctions over the (-20, +20) and (-63, +126) windows based on a different number of neighbours. The results for ATE can be quickly summarised as follows: bidding in auction has a negative impact upon the cumulative abnormal return in cases where each treatment firm is matched to one or two untreated firms. However, the impact of auctions upon bidder returns is positive in cases were each treatment firm is matched to three untreated bidders. Regardless of the impact of an auction on bidder returns and the matching strategies that are used, the results are statistically not significant over the (-20, +20) and (-63, +126) windows. The results for ATE show that auction has a negative impact on bidder returns over the (-20, +20) window, while auction has a positive impact on bidder returns over the (-63, +126) window. However, the results are not statistically significant.

In conclusion, the short run analysis of ATE show that the average abnormal return is inversely related to bidding in auctions, in cases where the structured of the matched sample is constructed by matching each bidder firm that choose to bid in auction to either one or two bidder firms that choose to bid in negotiation. Moreover, where ATT is estimated in the short run analysis, auction firms reduce significantly the average abnormal return of bidders mostly if the match sample is constructed by matching each auction bidder to one and three negotiation bidders. Such results suggest that the event of the winner's curse exists in the U.S. takeover market in case of bidding in a competitive auction. Moreover, the winner's curse does not exist in the long period analysis.

Panel B shows the implications of using different sizes of caliper to estimate the treatment effect of using auction on the level of shareholder's wealth. In case of estimate ATE, the number of treatment and untreated units respectively drops to 203 and 192 with the size of caliper ($\varepsilon = 0.001$). Over the (-1, 1) and (-2, +2) windows, it is also the case that the average of abnormal returns is significantly negative which means that an auction gives rise to the event of a winner's curse. Auction bidders lose more cumulative abnormal over the (-2, +2) window in comparison to the narrow one. In case of estimate ATT, 226 treated firms are matched to 192 untreated firms in order to structure the matched sample, and the results show that auction reduces significantly the cumulative abnormal return at a 10% level over the window (-1,+1).

However, the negative impact of auction on the bidder return is statistically not significant over the (-2, +2) window.

In cases where ATE is estimated with the size of caliper ($\varepsilon = 0.001$), the auction reduces the bidder by, on average, -4.500% and -5,972 % over the (-20, +20) and (-63, +126) windows, respectively. However, the negative impact of auction upon the cumulative return is statistically significant at a 10% level over the (-63, +126) window. In case of estimate ATT, the impact of an auction flips to positive upon bidder returns. However, the result is not statistically significant.

If the matched sample is constructed in case of estimate ATE by matching each bidder firm that chooses to bid in the auction to one bidder firm that chooses to bid in negotiation with the size of caliper ($\varepsilon = 0.0001$), the number of treated and untreated groups respectively drops to 121 and 125, respectively. The result shows that auction reduces significantly bidder returns by, on average, -1.272% over the (-1, +1) window at a 10% level and the negative impact of an auction is more and highly significant over the (-2, +2) window. In case of estimate ATT, 149 treated firms are matched to 125 untreated firms and the results show that auction reduces significantly the cumulative abnormal return by, on average, -2,317% and -2,894% over (-1, 1) and (-2, +2) windows, respectively.

In the case of estimate ATE with the size of caliper ($\varepsilon = 0.0001$), an auction has a negative impact over the (-20, +20) and (-63, +126) windows, but the result is only significant at a 10% level over the (-20, +20). In case of estimate ATT, the sign on the coefficient auction dummy is negative over the (-20, 20) and it flips to positive over the (-63, +126) windows. However, the result is statistically insignificant.

Finally, the matched sample is drawn with the size of caliper ($\varepsilon = 0.00001$) and 64 bidder firms that choose to bid in auction are matched to 60 bidder firms that choose to bid in negotiation. In case of estimate ATE, bidder firms lose their return in auction by, on average, -1,159% over the (-1, +1) window at a 10% level. The number of negative returns is larger and more significant over the (-2, +2) window. In case of estimate ATT,73 auction bidders are matched to 60 negotiation bidders and the results show that bidding in auction has a negative impact over the (-1,+1) and (-2,+2) windows. However, the results are statistically not significant.

In case of estimate ATE, auction has a significantly negative impact upon the cumulative abnormal return over the (-20, +20) and (-63, +126) windows if the control sample is structured by using the size of caliper($\varepsilon = 0.00001$). It is interesting to note that, the negative number of the cumulative abnormal returns increase in the longer event window. In case of estimate ATT, auction has a negative impact upon bidder returns but the results are not statistically significant over the (-20, +20) and (-63, +126) windows.

Over the (-1, +1) and (-2, +2) windows, the negative impact of using auctions upon the cumulative abnormal return is high in cases of structured the matched sample by using the nearest neighbour with different sizes of caliper, in general either for ATE and ATT. Over the (-20, +20) and (-63, +126) windows, there are few significant differences that show that auction has a negative impact upon bidder returns in the case of estimate ATE with different sizes of caliper. However, there is no significant impact of auction on bidder returns in the case of estimate ATT.

3.5.4.3. Robustness Check

This section uses evaluating the matching strategies and sensitivity analysis to the hidden bias as the main concern of the robustness check. First, after applying different matching strategies, it is important to evaluate how well the treatment and comparison group are balanced in the matched sample. Second, this section will test the sensitivity of matched pairs for the presence of omitted variables that may affect the selection of bidding in auction or bidder returns. In order to investigate how large the unobservable variables could affect the results of PSM that built under the assumption of no hidden bias.

The parameter of ATE have been calculated by suing different matching strategies with and without caliper, and the results always show that bidding in auction reduces significantly bidder returns over the short event periods in case of matching each single auction firm to a one or two negotiation firms. This negative impact of auction upon bidder returns remains also true irrespective the sizes of caliper. In case of estimate ATT, auction still has negative and significant impact in case of structure the control sample by matching each single auction firm to one or three negotiation firms, or with sizes of caliper ($\varepsilon = 0.001$) and ($\varepsilon = 0.0001$). Over the longer event periods, there are few significant differences that show auction reduce bidder

returns in the case of estimate ATE with different sizes of caliper. However, there is no significant impact of auction on bidder returns in the case of estimate ATT.

In the light of the above mentioned, there is an essential question about which set of results that obtained by different matching strategies are to be preferred. This section chooses to present a result that has a high quality of matching and that does not have a sensitivity to hidden bias.

This section firstly will show the results that related to the matching evaluation. The preferred results of this section are if the matched sample is constructed by matching each bidder firm that chooses to bid in the auction to one bidder firm that chooses to bid in negotiation (1-to-1 matching strategy).[112]

Table 23 and 24 reports the results of the comparison of covariate balance after the estimating of ATE and ATT, respectively, by applying nearest neighbour 1-to-1 matching strategy without caliper. In case of estimate ATE, in the raw sample, the covariates seems to be balanced compared to the treatment units based on Imai & Ratkovic (2014) test. For most of the variables that have been used to estimate ATE, the standardised difference is close to zero and the variance ratio is close to one. However, the mean of variance ratio of the dummy variables that takes the value of 1, if bidder firms bid in the form of hostile technique, if the target and bidder hire an investment bank with a high reputation in the raw unit look differ from the matched one. Therefore, it is important to check the balance for these dummy variables by using histogram as suggested by Guo& Fraser (2015, p.198-200). **Figure 8 s**how the comparison of estimated propensity scores generated by **Table B3** for bidders who bid in a hostile technique, and for a target and bidder who hire an investment bank with a high reputation. It can be seen that, the matched sample is balanced after matching. Thus, there is no need to increase the quality of matching. In case of estimate ATT, the variables have a standardise difference that is close to zero and a variance ratio that is close to one. This means that all the variables is perfectly matched.

[112] Although there are many matching strategies that have a high-quality matching and satisfy the hidden bias test, this section will present the result of the estimate ATE and ATT, if the matched sample is constructed by matching each bidder firm that chooses to bid in the auction to one bidder firm that chooses to bid in negotiation. The main reason to do that to avoid presenting too many tables for each matching strategy and the results are available upon request.

The second part of this section concern about the sensitivity of the results to the presence of omitted variables that may affect auction and bidder returns. Using matching method removes the problem of selection bias between auction and negotiation. However, the bias does not remove from unobservable. This section will use the test that is suggested by Becker and Caliendo (2007) and explained in **section 2.4.2.3** that test how large the effect of the unobservable or "hidden bias" needs to be in order to reverse the results found by PSM. **Table 25** shows the result of the sensitivity analysis for the result of ATE and ATT by applying nearest neighbour 1-to-1 matching strategy without caliper, over the short and longer event period. Under Γ=1, there is no hidden bias due to omitted factors in case of estimate ATE over the short and long windows. In case of estimate ATT, the result is not sensitive to hidden bias due to omitted factors over the short event windows.

3.5.6. Comparison of Estimated Models of the impact of auction upon bidder returns

All the methods (t-test, OLS and PSM) conclude that the average treatment effect of using auction is negative and significant. However, this result is influenced by the length of the selected window, and this finding valid only for the short-value analysis.

The normal linear regression analysis as discussed before apparently may involve the selection problem, as the selection of a specific selling mechanism would be a self- decision of the target firm or bidder firms, which may in turn depend on their specific characteristics. If the self-section problem is not properly addressed, the regression will render biased estimates. Because of this, the analysis use PSM. It is worth to establish a comparison between the average treatment effect before and after controlling the selection-bias problem. **Table 26** shows a comparison of findings across models estimating the impact of auction on bidder returns, over the short and longer window respectively. First, t-test shows that auction reduces significantly bidder returns at, on average -2,146% (0.001) and -2.406% (0.000).

In OLS, bidding in auction reduce significantly the cumulative abnormal returns -1.7% (0.007) and -1.8 %(0.007) over the short-value analysis. The effect of auction remained significant after controlling the selection-bias problem whereby auction reduces significantly bidder returns over the short-event analysis by, on average, -0.985%(0.004) and -1.599%(0.004) in the short event windows. The coefficient on the auction dummy is more negative before controlling the selection-bias problem. The ATE and ATT are estimated by using the

regression-adjusted model as well. Auction is still negative and significant over the short value analysis.

3.6. Conclusion

The choice of selling mechanisms is always matters. The majority of empirical literature mentioned in this work argues that auctions do not induce bidders to pay more for target firms and that there is no significant difference between auction and negotiation returns either for target or for bidder firms. However, these works base their findings on the private selling process. The main aim of this chapter is to examine whether bidding in auctions has a causal impact upon bidder returns at the public-phase competition, where bidders are more aggressive when there is more than one bidder bidding for the same target firms. Therefore, the possibility of the winner's curse to exist is high.

Moreover, Boone & Mulherin (2008b) have found that the size of the bidder firm is inversely related to the level of competition when there is more than one bidder for the same target. More precisely, the mere presence of a large firm presents an opportunity to deter small bidders and, consequently, it is therefore more beneficial for the target to avoid conducting a full-scale auction when the size of the bidders is markedly different.

The main empirical results show that bidders who chose to conduct takeovers using auction frameworks have high levels of leverage and tangible assets, while bidders are more likely to bid using an auction if either the target initiates the deals, or is facing bankruptcy, or if the bidders already have a stake "toehold" in the target. Bidders are also more likely to bid using an auction if they use (or their target uses) an investment bank with a high reputation. Auctions are, then, associated with tender offers, hostile techniques, and, most surprisingly, with all-stock offers. Bidders are less likely to bid in auctions for private firms.

The empirical investigation reveals that the auction process has a negative impact on bidder returns during the short-event period when compared to takeovers structured through negotiations. This seems to confirm the theoretical prediction that auction, as a selling mechanism, is less beneficial to bidders than negotiation due to increasing competition. Therefore, this research finds the existence of the winner's curse in such activates. However, the results are less clear across the long-event period.

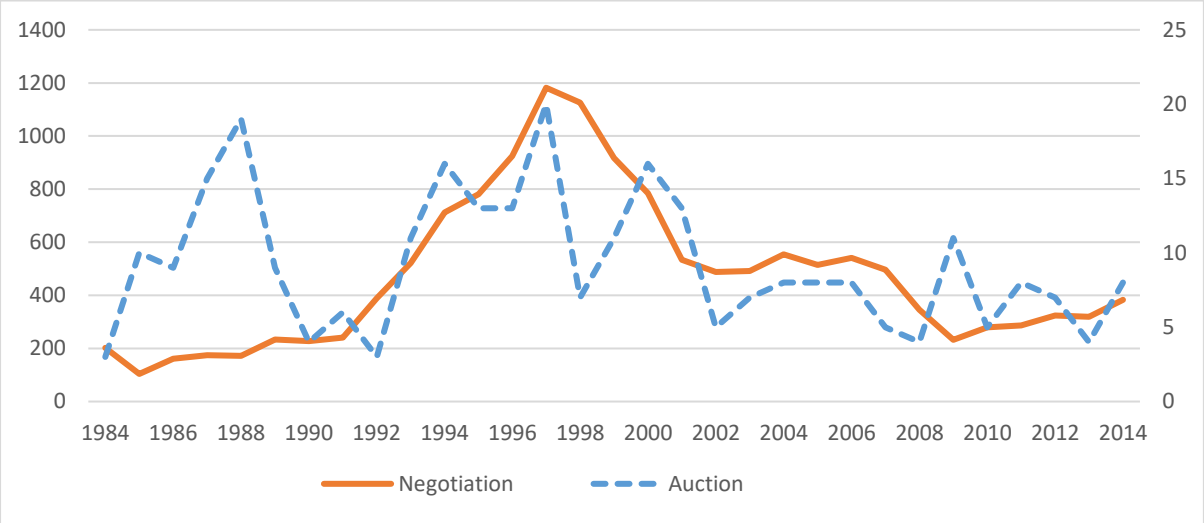
Table 13 Sample Construction

The table shows the main steps that are used to construct the sample, and steps drop the number of deals, as listed below. Thomson One Banker provides all the acquisition data from the (SDC) US M&A Database over the periods 1984-2014. The original sample is restricted to meet step one criteria. Deals are subdivided in step two as auction and negotiations, based on the information about the main characteristics of the transactions in the file of acquisition technique in the SDC database (based on field RANK_MENUACQTECH), which reports on a subset of deals, whether they are conducted through *Auction* or *Privately Negotiated Purchase.* Step three follows the criteria proposed by Moelle, Schlingeman,& Stulz (2004) and Betton, Eckbo, & Thorburn (2009b) , and a deal is classified as a negotiation if there is only one public bidder for the same target, and as an auction if there are two or more public bidders. The sample in step three is divided into steps; step three-a, and step Three-b. The Step. Three-a defines a new negotiation subset that are labelled by the SDC database as deals that are not related to any another existing deal (field RD) and that, at the same time, have only one public bidder as shown (field BIDCOUNT). The Step Three-b includes all the related deals (field RD) to define extra auction and negotiation deals. The final sample consists of 286 auction deals and 14,360 negotiations after deleting data that does not have observations for the event windows in the short and long terms, transactions that announced for the same acquirer five days around the date of announcement, transactions that are reported with disclosed bidders, transactions that do not have accounting information, and finally transactions that do not present 1% of the acquirer's size. For more details about the steps that are used to utilise the final sample please see section 3.3.1.

Steps	Total observations
Step one: The main criteria	
-The acquiring firm belongs to all M&As of a domestic acquirer announced between January 1, 1984 and December 31, 2014.	289,163
-Acquirer is a public firm	147,637
-Target are US firms	125,111
-Target is a public firm, private and subsidiary	124,024
-The deal status is flagged as "completed" and "withdrawn", and then restricted the completed deals to gain control of more than 50% of the target shares	74,627
-the acquirer should have owned before the date of announcement less than 50% of the target shares	73,809
-The deal is not privatization	73,786
- Repurchase or buyback, exchange offer, and recapitalisation deals are excluded	73,688
- Deal value at least $1m	37,680
Step two: two groups are created by using Acquisitions techniques	
only transactions that are reported as Auction or Privately Negotiation Purchase in the step (1) will be included	134
Auction	77
Privately Negotiation purchase	57
Step three: Moelle, Schlingeman, and Stulz (2004) and Betton, Eckbo, and Thorburn (2009b) classification	
Step 3a creates a new group of negotiation by using the sample that is created by step one and excluded the sub-sample that is created by step two	37,546
-The deal is not related to any other deals and the number of bidders should be one	34,187

Steps	Total observations
Steps Three-b using the deals that are flagged as related to each other’s to define another auction and negotiation groups	
Step three- b creates a new group of negotiation and auction by using the sample that is created by step one and excluded the sub-samples that are created by step two and step(3a)	
- The deal is related to other deals as flagged by SDC	3,359
-with transaction form ‘‘M’’(merger) or ‘‘AM’’ (acquisition of majority interest)	1,534
The deal is negotiation if there are only one potential bidder for the same target over the preceding and over the following 6 months.	308
The deal is auction if there are only one potential bidder for the same target over the preceding and over the following 6 months.	95
Total Samples before the matching with WRDS database	**35556**
Auction	**726**
Negotiation	**34830**
Process the Data	
Matching the firm NCUSIP's number of SDC with COMPUSTATA and CRSP	16,025
Deleting data that does not have observations for the event windows in the short and long terms	15,986
deleting the transaction of the same acquirer 5 days around the date of announcement data	15,842
deleting undisclosed bidders	15,831
deleting the deals that do not have accounting information	15,567
Deleting deals that does not present 1% of the acquirer's size	14,646
The final Sample	**14,646**
Auction	286
Negotiation	14,360

Figure 7 The Distribution of selling mechanisms (Auction-Negotiation), U.S. market, 1984-2014



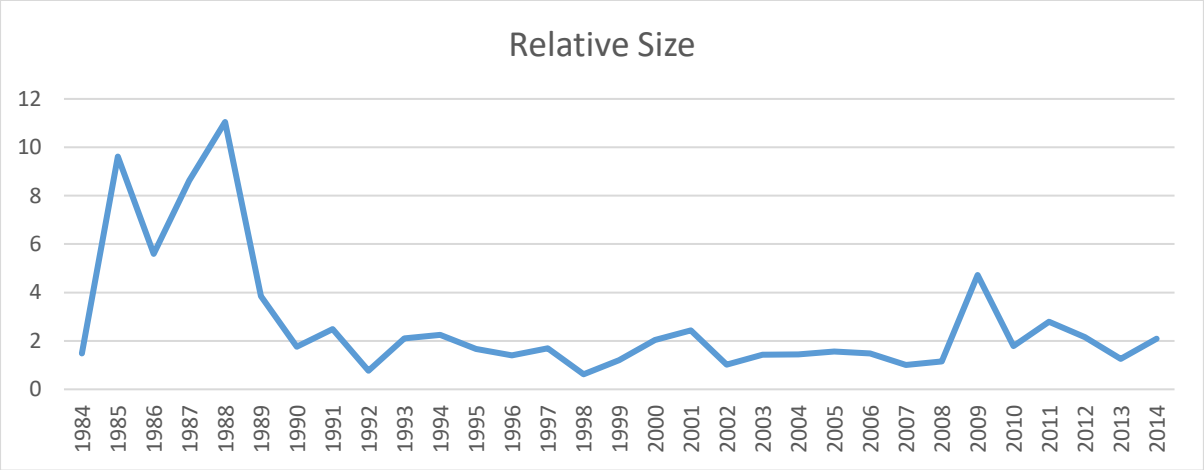


Table 14 Summary statistics sorted by the sales process (Scheme of arrangement -Tender offer), US market, 1984-2014

Auction versus negotiation. This table reports summary statistics on bidder firms and deal characteristics of the sample consisting of 14,646 U.S. takeover deals. The statistical information is reported for the whole sample and for deals that are implemented by auction and negotiations. Of these 286 deals are classified as auction deals and 14,360 deals are negotiations. Auction refer to a deal where there is more than one pubic bidder bidding for the same target, while negotiations deals refer to cases in which there is one public bidder bid for target firms. **Panel A** presents the mean value for the bidder's characteristics, as sourced by Thomson DataStream. **Panel B** reports the mean value for the proportion of deal characteristics, as sourced by Thomson One Banker (SDC). **Panel C** reports the mean value for the proportion of investment bank characteristics, as sourced by SDC. **Table B1** in the Appendix B reports all the definitions and database sources of variables that have been presented in **Panel A, B, &C**. The final column shows the differences in the means between the scheme of arrangement and tender offer sub-samples and its significantly levels are denoted by p-value of the means that tests the null hypothesis based on t-tests, ascertaining whether there are differences between schemes of arrangement and tender offers. The statistical significances between schemes of arrangement and tender offers at the 1% level, 5% level and 10% level are denoted ***, **, *.

	Full Sample		Auction		Negotiation		Difference test
	Mean	N	Mean	N	Mean	N	
Panel A: Bidder characteristics							
Panel A': size effect							
Panel A'-1: Overall							
Market value (US$, millions)	1986.782	14,646	3817.159	286	1950.328	14,360	1866.831***
Size (Ln MV)	5.736	14,646	6.563	286	5.720	14,360	0.843***
Panel A'-2: Small bidders							
Small bidders (%)	44.387	6,501	25.524	73	44.763	6,428	-19.238***
Market value of small bidders (US$, millions)	169.139	6,501	181.915	73	168.994	6,428	12.921
Small bidder Size	4.343	6,501	4.547	73	4.340	6,428	0.206
Panel A'-3: Large bidders							
Large Firm (%)	55.612	8,145	74.475	213	55.236	7,932	19.238***
Market value of large bidders (US$, millions)	3437.549	8,145	5063.041	213	3393.899	7,932	1669.141*
Large bidder Size	6.848	8,145	7.254	213	6.837	7,932	0.417***
Panel B': The Other Bidder characteristics							
Cash holding	0.198	14,646	0.157	286	0.198	14,360	-0.041***
Tobin's q	2.452	14,646	2.075	286	2.460	14,360	-0.384*
book-to-market value	2.146	14,646	1.754	286	2.153	14,360	-0.399*
ROA	0.082	14,646	0.110	286	0.082	14,360	0.028**
Leverage	0.207	14,646	0.266	286	0.206	14,360	0.059***
High Debt Dummy	10.241	1,500	13.286	38	10.181	1,462	3.105%*
Collateral	0.213	14,646	0.281	286	0.211	14,360	0.070***
Sales (US$, millions)	1,022.719	14,646	3,044.782	286	982.447	14,360	2,062.335***
Total assets (US$, millions)	2,682.314	14,646	8,694.638	286	2,562.57	14,360	6,132.067***
Panel B: Deal characteristics							
Transaction value (US$, millions)	229.957	14,646	1,799.455	286	198.698	14,360	1600.757***
Small bidder transaction value (US$, millions)	36.374	6,501	118.055	73	35.447	6,428	82.608***
Large bidder transaction value (US$, millions)	384.466	8,145	2,375.709	213	330.995	7,932	2044.714***
Relative Size	0.654	14,646	1.077	286	0.645	14,360	0.431
Successful rate	94.756	13,878	51.748	148	95.612	13,730	-43.864***
Days to completion	70.567	13,878	143.223	148	69.783	13,730	73.480***
Failed rate	5.243	768	48.251	138	4.387	630	43.864***
Target-Initiated	1.276	187	11.538	33	1.070	154	10.466**
Cash in payment (%)	77.816	7,070	84.725	172	77.643	6,898	7.082***
Stock in payment (%)	76.836	5,931	79.528	111	76.787	5,820	2.740
Pure cash deals (%)	25.822	3,671	38.811	111	25.564	3,671	13.247***
Pure Stock deals (%)	22.135	3,242	23.426	67	22.110	3,175	1.316
Public target (%)	19.179	2,809	76.223	218	18.043	2,591	58.180***
Private target (%)	53.011	7,764	8.391	24	53.899	7,740	-45.508***
Subsidiary target (%)	27.809	4,073	15.384	44	28.057	4,029	-12.672***
Tender offer (%)	2.594	380	21.328	61	2.221	319	19.107***
Hostile deals (%)	0.375	55	8.741	25	0.208	30	8.532***
Bankruptcy target (%)	1.522	223	11.888	34	1.316	189	10.571***
Target in antitakeover state	14.413	2,111	13.636	39	14.428	2,072	-0.792
Owned directly before (%)	19.607	151	10.091	16	20.7351	135	-10.644***
Owned directly after (%)	99.512	13,878	99.127	148	99.516	13,730	-0.389
Panel C: Advisor characteristics							
Bidder hires advisors (%)	31.578	4,625	61.188	175	30.988	4,450	30.199***
Bidder hires top IB (%)	16.226	1,101	23.426	67	7.200	1,034	16.226***
Target hires advisors (%)	40.154	5,881	82.167	235	39.317	5,646	42.850***
Target hires top IB (%)	7.414	1,086	29.720	85	6.970	1,001	22.749***

Table 15 Summary Statistics for Short and Longer-Term CARs Sorted by the Sales Process, US Market, 1984- 2014

Auction versus negotiation. This table reports summary statistics of cumulative abnormal return over different event windows in the short and longer period of the sample consisting of 14,646 U.S. M&A deals. The statistical information is reported for the whole sample and for deals that are implemented by auctions and negotiations. Of these 286 deals are classified as auction deals and 14,360 deals are negotiations Auction refer to a deal where there is more than one pubic bidder bidding for the same target, while negotiations deals refer to cases in which there is one public bidder bid for target firms. **Panel A** reports the mean value for the cumulative abnormal returns in the short analysis window CAR [-1, +1] and CAR [-2,2]. **Panel B** reports the mean value the cumulative abnormal returns in the short analysis window CAR [-20,20]and CAR [-63,126]. The table uses the formula $CAR_i = \sum_{i=0}^{n} AR_i$ to measure the cumulative abnormal returns by using the CRSP value-weighted index, CRSP equally value-weighted index, and S&P Composite index. The table calculates the cumulative abnormal returns by Market Model, the Fama-French model, and the Carhart (1997) four-factor model. The final column shows the differences in the means between the scheme of arrangement and tender offer sub-samples and its significantly levels are denoted by p-value of the means that tests the null hypothesis based on t-tests, ascertaining whether there are differences between schemes of arrangement and tender offers. The p-value is reported between brackets. The statistical significances between schemes of arrangement and tender offers at the 1% level, 5% level and 10% level are denoted ***, **, *.

	All		Auction		Negotiation		Difference tests (Auction-Negotiation)
	Mean DA	N	Mean DA	N	Mean DA	N	
Panel A: short- period window							
The Market Adjusted Returns							
CRSP value-weighted index							
CAR [-1,1]	1.669%***	14,646	-0.434%***	286	1.711%***	14,360	-2.146%***
	(0.000)		(0.000)		(0.000)		(0.001)
CAR [-2,2]	1.970%***	14,646	-0.389%***	286	2.017%***	14,360	-2.406%***
	(0.000)		(0.000)		(0.000)		(0.001)
CRSP equally value-weighted index							
CAR [-1,1]	1.586%***	14,646	-0.444%***	286	1.627%***	14,360	-2.071%***
	(0.000)		(0.000)		(0.000)		(0.001)
CAR [-2,2]	1.797%***	14,646	-0.476%***	286	1.842%***	14,360	-2.318%***
	(0.000)		(0.000)		(0.000)		(0.001)
S&P Composite index							
CAR [-1,1]	1.664%***	14,646	-0.448%***	286	1.706%***	14,360	-2.155%***
	(0.000)		(0.000)		(0.000)		(0.001)
CAR [-2,2]	1.966%***	14,646	-0.398%***	286	2.013%***	14,360	-2.412%***
	(0.000)		(0.000)		(0.000)		(0.001)
Market Model							
CAR [-1,1]	1.253%***	14,646	-0.371%***	286	1.286%***	14,360	-1.657%***
	(0.000)		(0.000)		(0.000)		(0.007)
CAR [-2,2]	1.302%***	14,646	-0.404%***	286	1.336%***	14,360	-1.740%***
	(0.000)		(0.000)		(0.000)		(0.009)
Fama-French model							
CAR [-1,1]	1.258%***	14,646	-0.364%***	286	1.291%***	14,360	-1.655%***
	(0.000)		(0.000)		(0.000)		(0.007)
CAR [-2,2]	1.294%***	14,646	-0.443%***	286	1.328%***	14,360	-1.772%***
	(0.000)		(0.000)		(0.000)		(0.007)
The Carhart (1997) four-factor model							
CAR [-1,1]	1.266%***	14,646	-0.376%***	286	1.298%***	14,360	-1.675%***
	(0.000)		(0.000)		(0.000)		(0.007)
CAR [-2,2]	1.305%***	14,646	-0.418%***	286	1.339%***	14,360	-1.757%***
	(0.000)		(0.000)		(0.000)		(0.008)

	All		Auction		Negotiation		Difference tests (Auction-Negotiation)
	Mean DA	N	Mean DA	N	Mean DA	N	
Panel B: Longer- period window							
The Market Adjusted Returns							
CRSP value-weighted index							
CAR [-20,20]	4.009%***	14,646	0.687%***	286	4.075%***	14,360	-3.388%**
	(0.000)		(0.000)		(0.000)		(0.018)
CAR [-63,126]	11.878%***	14,646	7.463%***	286	11.966%***	14,360	-4.503%
	(0.000)		(0.000)		(0.000)		(0.116)
CRSP equally value-weighted index							
CAR [-20,20]	2.400%***	14,646	-0.777%***	286	2.464%***	14,360	-3.242%**
	(0.000)		(0.000)		(0.000)		(0.021)
CAR [-63,126]	4.723%***	14,646	0.632%***	286	4.804%***	14,360	-4.172%
	(0.000)		(0.000)		(0.000)		(0.139)
S&P Composite index							
CAR [-20,20]	3.928%***	14,646	0.574%***	286	3.995%***	14,360	-3.420%**
	(0.000)		(0.000)		(0.000)		(0.018)
CAR [-63,126]	11.525%***	14,646	6.978%***	286	11.615%***	14,360	-4.637%
	(0.000)		(0.000)		(0.000)		(0.108)
Market Model							
CAR [-20,20]	0.740%***	14,646	-2.496%***	286	0.804%***	14,360	-3.300%**
	(0.000)		(0.000)		(0.000)		(0.011)
CAR [-63,126]	-5.395%***	14,646	-7.043%***	286	-5.362%***	14,360	-1.681%
	(0.000)		(0.000)		(0.000)		(0.612)
Fama-French model							
CAR [-20,20]	0.729%***	14,646	-2.437%***	286	0.792%***	14,360	-3.230%**
	(0.000)		(0.000)		(0.000)		(0.012)
CAR [-63,126]	-5.362%***	14,646	-7.395%***	286	-5.322%***	14,360	-2.073%
	(0.000)		(0.000)		(0.000)		(0.530)
The Carhart (1997) four-factor model							
CAR [-20,20]	0.724%***	14,646	-2.398%***	286	0.786%***	14,360	-3.185%**
	(0.000)		(0.000)		(0.000)		(0.013)
CAR [-63,126]	-5.153%***	14,646	-6.716%***	286	-5.121%***	14,360	-1.594%
	(0.000)		(0.000)		(0.000)		(0.632)

Table 16 Short-event [-1, +1] CARs sorted by the Sales Process, US market, 1984- 2014

Auction versus negotiation. This table reports summary statistics of the cumulative abnormal returns (CAR) in the short analysis window CAR [-1, +1] over bidder and deal characteristics of the sample consisting of 14,646 U.S. M&A deals. The statistical information is reported for the whole sample and for deals that are implemented by auctions and negotiations. Of these 286 deals are classified as auction deals and 14,360 deals are negotiations Auction refer to a deal where there is more than one pubic bidder bidding for the same target, while negotiation deals refer to cases in which there is one public bidder bid for target firms. **Panel A** reports the mean value of the cumulative abnormal returns in the short analysis [-1, +1] window over small and large bidders. **Panel B** reports the mean value for the cumulative abnormal returns (CAR) in the short analysis window CAR [-1, +1] over the deal characteristics; successful(failed) deals, pure cash(stock)deals, public (private or subsidiary) target, public bidders with cash (equity), private bidders with cash (equity), subsidiary bidders with cash (equity),target-initiated, tender offer, hostility, bankruptcy target, target in antitakeover states, and finally the percentage of shares that bidders owned directly before the announcement date. **Panel C** shows the mean value for the cumulative abnormal returns (CAR) in the short analysis [-1, +1] window over the advisor characteristics: if bidder (target) hires advisors and if bidder (target) hires top tier advisors. The table uses the formula $CAR_i = \sum_{i=0}^{n} AR_i$ to measure the cumulative abnormal returns by using the CRSP value-weighted index**. Table A1** in the Appendix A reports all the definitions and database sources of variables that have been presented in **Panel A, B, &C.** The final column shows the differences in the means between the auction and negotiation sub-samples and its significantly levels are denoted by p-value of the means that tests the null hypothesis based on t-tests, ascertaining whether there are differences between auction and negotiation deals. The p-value is reported between brackets. The statistical significances between schemes of arrangement and tender offers at the 1% level, 5% level and 10% level are denoted ***, **, *.

	All		Auction		Negotiation		Difference tests (Auction-Negotiation)
	Mean DA	N	Mean DA	N	Mean DA	N	
Panel A: Size Effect							
Small Size Bidder	2.537%*** (0.000)	6,501	0.993%*** (0.000)	73	2.554%*** (0.000)	6,428	-1.561% (0.327)
Large Size Bidder	0.976%*** (0.000)	8,145	-0.924%*** (0.000)	213	1.027%*** (0.000)	7,932	-1.952%*** (0.000)
Difference (small-large)	1.560%*** (0.000)	14,646	1.917% (0.116)	286	1.527%*** (0.000)	14,360	
Difference (small auction - large negotiation)	-0.034% (0.972)	8,005					
Difference (small negotiation -large auction)	3.479%*** (0.000)	6,641					
Panel B: Deal Characteristics							
Successful deals	1.693%*** (0.000)	13,878	-0.677%*** (0.000)	148	1.718%*** (0.000)	13,730	-2.396%*** (0.008)
Failed deals	1.238%*** (0.000)	768	-0.174%*** (0.000)	138	1.548%*** (0.000)	630	-1.722% (0.135)
Pure cash deals	1.579%*** (0.000)	3,782	-0.019%*** (0.000)	111	1.627%*** (0.000)	3,671	-1.646%** (0.019)
Pure Stock deals	1.143%*** (0.000)	3,242	-1.942%*** (0.000)	67	1.208%*** (0.000)	3,175	-3.151%** (0.043)
Public target	-0.700%*** (0.000)	2,809	-1.465%*** (0.000)	218	-0.637%*** (0.000)	2,591	-0.819% (0.215)
Private target	2.066%*** (0.000)	7,764	3.662%*** (0.000)	24	2.061%*** (0.000)	7,740	1.601% (0.468)
Subsidiary target	2.547%*** (0.000)	4,073	2.393%*** (0.000)	44	2.549%*** (0.000)	4,029	-0.155% (0.932)
Public with cash	1.078%*** (0.000)	703	-0.277%*** (0.000)	85	1.264%*** (0.000)	618	-1.542%** (0.045)
Public with stock	-1.936%*** (0.000)	1,187	-4.104%*** (0.000)	54	-1.833%*** (0.000)	1,133	-2.271% (0.141)
Private with cash	1.393%*** (0.000)	1,686	0.642%*** (0.000)	8	1.397%*** (0.000)	1,678	-0.755% (0.771)
Private with stock	2.908%*** (0.000)	1,808	8.182%*** (0.000)	11	2.876%*** (0.000)	1,797	5.306% (0.186)
Subsidiary with cash	2.056%*** (0.000)	1,393	0.906%*** (0.000)	18	2.071%*** (0.000)	1,375	-1.165% (0.517)
Subsidiary with stock	3.019%*** (0.000)	247	0.744%*** (0.005)	2	3.038%*** (0.000)	245	-2.293% (0.789)
Target-Initiated	2.457%*** (0.000)	187	-0.472%*** (0.000)	33	3.084%*** (0.000)	154	-3.557%** (0.021)
Tender offer	1.009%*** (0.000)	380	-1.037%*** (0.000)	61	1.400%*** (0.000)	319	-2.437%** (0.021)
Hostile deals	-0.185%*** (0.000)	55	-0.537%*** (0.000)	25	0.108%*** (0.000)	30	-0.645% (0.720)
Bankruptcy target	3.524%*** (0.000)	223	3.112%*** (0.000)	34	3.599%**** (0.000)	189	-0.486% (0.814)
Target in antitakeover state	1.955%*** (0.000)	2,111	0.835%*** (0.000)	39	1.976%*** (0.000)	2,072	-1.140% (0.625)
Owned directly before	0.076%*** (0.000)	151	-0.933%*** (0.000)	16	0.196%*** (0.000)	135	-1.130% (0.484)

	All		Auction		Negotiation		Difference tests (Auction-Negotiation)
	Mean DA	N	Mean DA	N	Mean DA	N	
Panel C: Advisor characteristics							
Bidder hires advisors	1.320%*** (0.000)	4,625	-1.441%*** (0.000)	175	1.429%*** (0.000)	4,450	-2.870%*** (0.007)
Bidder hires top IB	1.005%*** (0.000)	1,101	-0.756%*** (0.000)	67	1.119%*** (0.000)	1,034	-1.875% (0.404)
Target hires advisors	0.781%*** (0.000)	5,881	-1.104%*** (0.000)	235	0.860%*** (0.000)	5,646	-1.965%*** (0.008)
Target hires top IB	1.167%*** (0.000)	1,086	-2.938%*** (0.000)	85	1.516%*** (0.000)	1,001	-4.455%** (0.014)

Table 17 Short-event [-2, +2] CARs sorted by the Sales Process, US market, 1984- 2014

Auction versus negotiation. This table reports summary statistics of the cumulative abnormal returns (CAR) in the short analysis window CAR [-2, +2] over bidder and deal characteristics of the sample consisting of 14,646 U.S. M&A deals. The statistical information is reported for the whole sample and for deals that are implemented by auctions and negotiations. Of these 286 deals are classified as auction deals and 14,360 deals are negotiations Auction refer to a deal where there is more than one pubic bidder bidding for the same target, while negotiation deals refer to cases in which there is one public bidder bid for target firms. **Panel A** reports the mean value of the cumulative abnormal returns in the short analysis [-2, +2] window over small and large bidders. **Panel B** reports the mean value for the cumulative abnormal returns (CAR) in the short analysis window CAR [-2, +2] over the deal characteristics; successful(failed) deals, pure cash(stock)deals, public (private or subsidiary) target, public bidders with cash (equity), private bidders with cash (equity), subsidiary bidders with cash (equity),target-initiated, tender offer, hostility, bankruptcy target, target in antitakeover states, and finally the percentage of shares that bidders owned directly before the announcement date. **Panel C** shows the mean value for the cumulative abnormal returns (CAR) in the short analysis [-2, +2] window over the advisor characteristics: if bidder (target) hires advisors and if bidder (target) hires top tier advisors. The table uses the formula $CAR_i = \sum_{i=0}^{n} AR_i$ to measure the cumulative abnormal returns by using the CRSP value-weighted index**. Table A1** in the Appendix A reports all the definitions and database sources of variables that have been presented in **Panel A, B, &C.** The final column shows the differences in the means between the auction and negotiation sub-samples and its significantly levels are denoted by p-value of the means that tests the null hypothesis based on t-tests, ascertaining whether there are differences between auction and negotiation deals. The p-value is reported between brackets. The statistical significances between schemes of arrangement and tender offers at the 1% level, 5% level and 10% level are denoted ***, **, *.

	All		Auction		Negotiation		Difference tests (Auction-Negotiation)
	Mean DA	N	Mean DA	N	Mean DA	N	
Panel A: Size Effect							
Small Size Bidder	2.872%*** (0.000)	6,501	1.590%*** (0.000)	73	2.886%*** (0.000)	6,428	-1.296% (0.466)
Large Size Bidder	1.250%*** (0.000)	8,145	-1.067%*** (0.000)	213	1.312%*** (0.000)	7,932	-2.380%*** (0.000)
Difference (small-large)	1.621%*** (0.000)	14,646	2.658%** (0.048)	286	1.574%*** (0.000)	14,360	
Difference (small auction - large negotiation)	0.277% (0.802)	8,005					
Difference (small negotiation -large auction)	3.954%*** (0.000)	6,641					
Panel B: Deal Characteristics							
Successful deals	2.002%*** (0.000)	13,878	-0.280%*** (0.000)	148	2.026%*** (0.000)	13,730	-2.307%** (0.022)
Failed deals	1.391%*** (0.000)	768	-0.506%*** (0.000)	138	1.806%*** (0.000)	630	-2.312%* (0.067)
Pure cash deals	1.674%*** (0.000)	3,782	-0.012%*** (0.000)	111	1.725%*** (0.000)	3,671	-1.737%** (0.032)
Pure Stock deals	1.651%*** (0.000)	3,242	-2.310%*** (0.000)	67	1.735%*** (0.000)	3,175	-4.045%** (0.026)
Public target	-0.606%*** (0.000)	2,809	-1.606%*** (0.000)	218	-0.522%*** (0.000)	2,591	-1.083% (0.130)
Private target	2.440%*** (0.000)	7,764	3.893%*** (0.000)	24	2.436%*** (0.000)	7,740	1.456% (0.568)
Subsidiary target	2.850%*** (0.000)	4,073	2.306%*** (0.000)	44	2.845%*** (0.000)	4,029	0.461% (0.815)
Public with cash	1.020%*** (0.000)	703	-0.306%*** (0.000)	85	1.203%*** (0.000)	618	-1.509%* (0.094)
Public with stock	-1.665%*** (0.000)	1,187	-4.481%*** (0.000)	54	-1.530%*** (0.000)	1,133	-2.950%* (0.072)
Private with cash	1.534%*** (0.000)	1,686	0.900%*** (0.000)	8	1.537%*** (0.000)	1,678	-0.637% (0.828)
Private with stock	3.573%*** (0.000)	1,808	8.475%*** (0.000)	11	3.543%*** (0.000)	1,797	4.931% (0.314)
Subsidiary with cash	2.174%*** (0.000)	1,393	0.972%*** (0.000)	18	2.189%*** (0.000)	1,375	-1.217% (0.563)
Subsidiary with stock	3.523%*** (0.000)	247	-0.300%* (0.058)	2	3.577%*** (0.000)	245	-6.582% (0.494)
Target-Initiated	2.517%*** (0.000)	187	-0.465%*** (0.000)	33	3.156%*** (0.000)	154	-3.621%** (0.041)
Tender offer	1.150%*** (0.000)	380	-1.038%*** (0.000)	61	1.568%*** (0.000)	319	-2.607%** (0.037)
Hostile deals	-0.934%*** (0.000)	55	-1.525%*** (0.000)	25	-0.442%*** (0.000)	30	-1.083% (0.598)
Bankruptcy target	4.441%*** (0.000)	223	4.784%*** (0.000)	34	4.379%**** (0.000)	189	0.405% (0.857)
Target in antitakeover state	2.099%*** (0.000)	2,111	0.727%*** (0.000)	39	2.124%*** (0.000)	2,072	-1.397% (0.566)
Owned directly before	0.023%*** (0.000)	151	-0.023%*** (0.000)	16	0.255%*** (0.000)	135	-2.630% (0.185)

* Statistically significant at the 1% level, 5% level and 10% level is denoted ***, **,*

	All		Auction		Negotiation		Difference tests (Auction-Negotiation)
	Mean DA	N	Mean DA	N	Mean DA	N	
Panel C: Advisor characteristics							
Bidder hires advisors	1.545%*** (0.000)	4,625	-1.321%*** (0.000)	175	1.658%*** (0.000)	4,450	-2.982%*** (0.009)
Bidder hires top IB	1.363%*** (0.000)	1,101	-1.727%*** (0.000)	67	1.563%*** (0.000)	1,034	-3.290% (0.159)
Target hires advisors	0.969%*** (0.000)	5,881	-1.110%*** (0.000)	235	1.056%*** (0.000)	5,646	-2.166%*** (0.006)
Target hires top IB	1.404%*** (0.000)	1,086	-3.349%*** (0.000)	85	1.808%*** (0.000)	1,001	-5.1581%*** (0.005)

Table 18 longer-event [-20, 20] CARs sorted by the Sales Process, US market, 1984- 2014

Auction versus negotiation. This table reports summary statistics of the cumulative abnormal returns (CAR) in the longer analysis window CAR [-20, +20] over bidder and deal characteristics of the sample consisting of 14,646 U.S. M&A deals. The statistical information is reported for the whole sample and for deals that are implemented by auctions and negotiations. Of these 286 deals are classified as auction deals and 14,360 deals are negotiations Auction refer to a deal where there is more than one pubic bidder bidding for the same target, while negotiation deals refer to cases in which there is one public bidder bid for target firms. **Panel A** reports the mean value of the cumulative abnormal returns in the longer analysis [-20, +20] window over small and large bidders. **Panel B** reports the mean value for the cumulative abnormal returns (CAR) in the longer analysis window CAR [-20, +20] over the deal characteristics; successful(failed) deals, pure cash(stock)deals, public (private or subsidiary) target, public bidders with cash (equity), private bidders with cash (equity), subsidiary bidders with cash (equity),target-initiated, tender offer, hostility, bankruptcy target, target in antitakeover states, and finally the percentage of shares that bidders owned directly before the announcement date. **Panel C** shows the mean value for the cumulative abnormal returns (CAR) in the longer analysis [-20, +20] window over the advisor characteristics: if bidder (target) hires advisors and if bidder (target) hires top tier advisors. The table uses the formula $CAR_i = \sum_{i=0}^{n} AR_i$ to measure the cumulative abnormal returns by using the CRSP value-weighted index**. Table A1** in the Appendix A reports all the definitions and database sources of variables that have been presented in **Panel A, B, &C.** The final column shows the differences in the means between the auction and negotiation sub-samples and its significantly levels are denoted by p-value of the means that tests the null hypothesis based on t-tests, ascertaining whether there are differences between auction and negotiation deals. The p-value is reported between brackets. The statistical significances between schemes of arrangement and tender offers at the 1% level, 5% level and 10% level are denoted ***, **, *.

	All		Auction		Negotiation		Difference tests (Auction-Negotiation)
	Mean DA	N	Mean DA	N	Mean DA	N	
Panel A: Size Effect							
Small Size Bidder	4.749%*** (0.000)	6,501	3.025%*** (0.000)	73	4.768%*** (0.000)	6,428	-1.743% (0.613)
Large Size Bidder	3.419%*** (0.000)	8,145	-0.113%*** (0.000)	213	3.514%*** (0.000)	7,932	-3.627%*** (0.005)
Difference (small-large)	1.329%*** (0.000)	14,646	3.138% (0.218)	286	1.254%*** (0.001)	14,360	
Difference (small auction - large negotiation)	-0.489% (0.826)	8,005					
Difference (small negotiation -large auction)	4.882%** (0.015)	6,641					
Panel B: Deal Characteristics							
Successful deals	4.190%*** (0.000)	13,878	2.088%*** (0.000)	148	4.213%*** (0.000)	13,730	-2.124% (0.280)
Failed deals	0.737%*** (0.000)	768	-0.815%*** (0.000)	138	1.077%*** (0.000)	630	-1.892% (0.457)
Pure cash deals	3.505%*** (0.000)	3,782	0.786%*** (0.000)	111	3.587%*** (0.000)	3,671	-2.801% (0.104
Pure Stock deals	4.854%*** (0.000)	3,242	-1.330%*** (0.000)	67	4.985%*** (0.000)	3,175	-6.316%* (0.082)
Public target	1.196%*** (0.000)	2,809	-1.312%*** (0.000)	218	1.407%*** (0.000)	2,591	-2.72%* (0.062)
Private target	4.749%*** (0.000)	7,764	9.854%*** (0.000)	24	4.733%*** (0.000)	7,740	5.121% (0.324)
Subsidiary target	4.539%*** (0.000)	4,073	5.597%*** (0.000)	44	4.528%*** (0.000)	4,029	1.069% (0.762)
Public with cash	2.180%*** (0.000)	703	0.494%*** (0.000)	85	2.412%*** (0.000)	618	-1.917% (0.346)
Public with stock	1.373%*** (0.000)	1,187	-4.952%*** (0.000)	54	1.675%*** (0.000)	1,133	-6.627%** (0.048)
Private with cash	3.724%*** (0.000)	1,686	2.888%*** (0.000)	8	3.728%*** (0.000)	1,678	-0.839% (0.895)
Private with stock	6.883%*** (0.000)	1,808	19.439%*** (0.000)	11	6.807%*** (0.000)	1,797	12.632% (0.183)
Subsidiary with cash	3.910%*** (0.000)	1,393	1.230%*** (0.000)	18	3.945%*** (0.000)	1,375	-2.714% (0.522)
Subsidiary with stock	6.733%*** (0.000)	247	-17.798%* (0.063)	2	6.933%*** (0.000)	245	-24.732% (0.340)
Target-Initiated	5.176%*** (0.000)	187	3.394%*** (0.000)	33	5.557%*** (0.000)	154	-2.163% (0.538)
Tender offer	3.312%*** (0.000)	380	1.581%*** (0.000)	61	3.643%*** (0.000)	319	-2.061% (0.410)
Hostile deals	-1.839%*** (0.000)	55	-1.398%*** (0.000)	25	-2.220%*** (0.000)	30	0.807% (0.813)
Friendly deals	4.024%*** (0.000)	14,462	-0.590%*** (0.000)	224	4.078%*** (0.000)	14,238	-3.488%** (0.031)
Bankruptcy target	7.948%*** (0.000)	223	10.474%*** (0.000)	34	7.493%**** (0.000)	189	2.981% (0.505)
Target in antitakeover state	3.766%*** (0.000)	2,111	2.210%*** (0.000)	39	3.795%*** (0.000)	2,072	-1.585% (0.664)
Owned directly before	0.951%*** (0.000)	151	1.340%*** (0.000)	16	0.905%*** (0.000)	135	0.434% (0.927)

Statistically significant at the 1% level, 5% level and 10% level is denoted ***, **,*

	All		Auction		Negotiation		Difference tests (Auction-Negotiation)
	Mean DA	N	Mean DA	N	Mean DA	N	
Panel C: Advisor characteristics							
Bidder hires advisors	3.117%*** (0.000)	4,625	-1.267%*** (0.000)	175	3.290%*** (0.000)	4,450	-4.557%** (0.013)
Bidder hires top IB	2.570%*** (0.000)	1,101	-0.585%*** (0.000)	67	2.775%*** (0.000)	1,034	-3.360% (0.284)
Target hires advisors	2.547%*** (0.000)	5,881	-0.416%*** (0.000)	235	2.671%*** (0.000)	5,646	-3.087%** (0.025)
Target hires top IB	1.794%*** (0.000)	1,086	-2.583%*** (0.000)	85	2.165%*** (0.000)	1,001	-4.749%* (0.076)

Table 19 . longer-event [-63,126] CARs sorted by the Sales Process, US market, 1984- 2014

Auction versus negotiation. This table reports summary statistics of the cumulative abnormal returns (CAR) in the longer analysis window CAR [-63, +126] over bidder and deal characteristics of the sample consisting of 14,646 U.S. M&A deals. The statistical information is reported for the whole sample and for deals that are implemented by auctions and negotiations. Of these 286 deals are classified as auction deals and 14,360 deals are negotiations Auction refer to a deal where there is more than one pubic bidder bidding for the same target, while negotiation deals refer to cases in which there is one public bidder bid for target firms. **Panel A** reports the mean value of the cumulative abnormal returns in the longer analysis [-63, +126] window over small and large bidders. **Panel B** reports the mean value for the cumulative abnormal returns (CAR) in the longer analysis window CAR [-63, +126] over the deal characteristics; successful(failed) deals, pure cash(stock)deals, public (private or subsidiary) target, public bidders with cash (equity), private bidders with cash (equity), subsidiary bidders with cash (equity),target-initiated, tender offer, hostility, bankruptcy target, target in antitakeover states, and finally the percentage of shares that bidders owned directly before the announcement date. **Panel C** shows the mean value for the cumulative abnormal returns (CAR) in the longer analysis [-63, +126] window over the advisor characteristics: if bidder (target) hires advisors and if bidder (target) hires top tier advisors. The table uses the formula $CAR_i = \sum_{i=0}^{n} AR_i$ to measure the cumulative abnormal returns by using the CRSP value-weighted index**.** **Table A1** in the Appendix A reports all the definitions and database sources of variables that have been presented in **Panel A, B, &C.** The final column shows the differences in the means between the auction and negotiation sub-samples and its significantly levels are denoted by p-value of the means that tests the null hypothesis based on t-tests, ascertaining whether there are differences between auction and negotiation deals. The p-value is reported between brackets. The statistical significances between schemes of arrangement and tender offers at the 1% level, 5% level and 10% level are denoted ***, **, *.

	All		Auction		Negotiation		Difference tests (Auction-Negotiation)
	Mean DA	N	Mean DA	N	Mean DA	N	
Panel A: Size Effect							
Small Size Bidder	10.101%*** (0.000)	6,501	9.607%*** (0.000)	73	10.107%*** (0.000)	6,428	-0.499% (0.940)
Large Size Bidder	13.297%*** (0.000)	8,145	6.728%*** (0.000)	213	13.473%*** (0.000)	7,932	-6.744%** (0.015)
Difference (small-large)	-3.195%**** (0.000)	14,646	2.878% (0.565)	286	-3.366%*** (0.000)	14,360	
Difference (small auction - large negotiation)	-3.866% (0.413)	8,005					
Difference (small negotiation -large auction)	3.378% (0.385)	6,641					
Panel B: Deal Characteristics							
Successful deals	12.516%*** (0.000)	13,878	11.883%*** (0.000)	148	12.523%*** (0.000)	13,730	-0.640% (0.871)
Failed deals	0.351%*** (0.000)	768	2.723%*** (0.000)	138	-0.167%*** (0.000)	630	2.891% (0.548)
Pure cash deals	9.090%*** (0.000)	3,782	11.779%*** (0.000)	111	9.009%*** (0.000)	3,671	2.77% (0.430)
Pure Stock deals	17.188%*** (0.000)	3,242	1.784%*** (0.000)	67	17.513%*** (0.000)	3,175	-15.729%** (0.024)
Public target	9.068%*** (0.000)	2,809	3.953%*** (0.000)	218	9.498%*** (0.000)	2,591	-5.544%* (0.078)
Private target	13.253%*** (0.000)	7,764	13.401%*** (0.000)	24	13.253%*** (0.000)	7,740	0.148% (0.988)
Subsidiary target	11.196%*** (0.000)	4,073	21.614%*** (0.000)	44	11.082%*** (0.000)	4,029	10.531% (0.27)
Public with cash	7.670%*** (0.000)	703	10.306%*** (0.000)	85	7.307%*** (0.000)	618	2.998% (0.477)
Public with stock	10.915%*** (0.000)	1,187	-5.251%*** (0.000)	54	11.685%*** (0.000)	1,133	-16.936%*** (0.009)
Private with cash	9.210%*** (0.000)	1,686	14.232%*** (0.000)	8	9.186%*** (0.000)	1,678	5.046% (0.698)
Private with stock	20.840%*** (0.000)	1,808	18.969%*** (0.000)	11	20.852%*** (0.000)	1,797	-1.882% (0.918)
Subsidiary with cash	9.662%*** (0.000)	1,393	17.644%*** (0.000)	18	9.557%*** (0.000)	1,375	8.086% (0.344)
Subsidiary with stock	20.607%*** (0.000)	247	97.235% (0.974)	2	19.981%*** (0.000)	245	77.254% (0.120)
Target-Initiated	10.270%*** (0.000)	187	14.363%*** (0.000)	33	9.393%*** (0.000)	154	4.969% (0.573)
Tender offer	9.953%*** (0.000)	380	14.218%*** (0.000)	61	9.138%*** (0.000)	319	5.080% (0.290)
Hostile deals	4.929%*** (0.000)	55	3.792%*** (0.000)	25	5.876%*** (0.000)	30	-2.084% (0.827)
Bankruptcy target	21.054%*** (0.000)	223	18.523%*** (0.000)	34	21.509%*** (0.000)	189	-2.986% (0.700)
Target in antitakeover state	10.336%*** (0.000)	2,111	1.862%*** (0.000)	39	10.495%*** (0.000)	2,072	-8.633% (0.192)
Owned directly before	10.725%*** (0.000)	151	10.346%*** (0.000)	16	10.770%*** (0.000)	135	-0.424% (0.966)

	All		Auction		Negotiation		Difference tests (Auction-Negotiation)
	Mean DA	N	Mean DA	N	Mean DA	N	
Panel C: Advisor characteristics							
Bidder hires advisors	9.938%*** (0.000)	4,625	7.058%*** (0.000)	175	10.051%*** (0.000)	4,450	-2.993% (0.374)
Bidder hires top IB	9.038%*** (0.000)	1,101	10.028%*** (0.000)	67	8.974%*** (0.000)	1,034	1.054% (0.843)
Target hires advisors	9.524%*** (0.000)	5,881	6.873%*** (0.000)	235	9.634%*** (0.000)	5,646	-2.761% (0.313)
Target hires top IB	8.420%*** (0.000)	1,086	3.747%*** (0.000)	85	8.420%*** (0.000)	1,001	-4.673% (0.310)

Table 20 Ordinary Least Squares (OLS) regressions analysis with a selling mechanism, Bidder and deal variables.

This table presents the results of OLS regressions, in which the dependent variable is the cumulative abnormal returns (CAR) over the short windows: [-1,1]; CAR [-2,2], and the longer event windows [-20,20], [63,126], respectively. This table regresses the dependent variables on a set of selective covariates in columns (1) and (2) in order to investigate the size effect of bidder firms. The table uses the formula $CAR_i = \sum_{i=0}^{n} AR_i$ to measure the cumulative abnormal returns by using the CRSP value-weighted index**. Table B1** in the Appendix B reports all the definitions and database sources of variables. Robust standard errors are reported in brackets. The statistical significances between auction and negotiation deals at the 1% level, 5% level and 10% level are denoted ***, **, *.

Variables	CAR[-1,1]		CAR[-2,2]		CAR[-20,20]		CAR[-63,126]	
	window							
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Auction	-0.017***	-0.020***	-0.018***	-0.023***	-0.009	-0.020	0.026	-0.003
	(0.005)	(0.006)	(0.006)	(0.006)	(0.012)	(0.012)	(0.024)	(0.024)
Size (Ln MV)	-0.008***		-0.010***		-0.021***		-0.042***	
	(0.000)		(0.000)		(0.001)		(0.002)	
Small		0.013***		0.013***		0.003		-0.048***
		(0.002)		(0.002)		(0.004)		(0.008)
Small Auction		0.003		0.009		0.009		0.032
		(0.015)		(0.016)		(0.032)		(0.064)
Cash holding	0.000	0.001	0.004	0.005	0.014	0.019	0.057**	0.072***
	(0.005)	(0.005)	(0.006)	(0.006)	(0.012)	(0.012)	(0.025)	(0.026)
Leverage	0.009*	0.011**	0.014**	0.016**	0.024**	0.026***	0.050**	0.049**
	(0.005)	(0.005)	(0.006)	(0.006)	(0.010)	(0.009)	(0.024)	(0.022)
Target in antitakeover state	0.003	0.003	0.002	0.002	-0.002	-0.002	-0.011	-0.012
	(0.003)	(0.003)	(0.003)	(0.003)	(0.005)	(0.005)	(0.009)	(0.009)
Target-Initiated	0.017**	0.012*	0.015**	0.010	0.037***	0.022	0.029	-0.007
	(0.006)	(0.006)	(0.007)	(0.007)	(0.014)	(0.014)	(0.035)	(0.034)
Toehold	-0.009*	-0.012**	-0.012*	-0.016**	-0.022	-0.032**	-0.007	-0.032
	(0.005)	(0.005)	(0.006)	(0.006)	(0.015)	(0.014)	(0.032)	(0.031)
Bankruptcy target	0.017**	0.018**	0.024***	0.025***	0.039**	0.045***	0.106***	0.122***
	(0.007)	(0.007)	(0.008)	(0.008)	(0.016)	(0.016)	(0.028)	(0.028)
ROA	-0.003	-0.017**	-0.001	-0.019**	-0.027	-0.078***	-0.048	-0.177***
	(0.007)	(0.007)	(0.009)	(0.009)	(0.022)	(0.023)	(0.034)	(0.038)
Tobin's q	-0.000	-0.000***	-0.000	-0.000***	-0.001	-0.003***	0.002	-0.002
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.002)	(0.002)
Collateral	0.010**	0.016***	0.013***	0.020***	0.016*	0.033***	0.060***	0.094***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.009)	(0.009)	(0.018)	(0.018)
Bidder hires top IB	0.017*	0.008	0.022**	0.011	0.036***	0.006	0.086***	0.0147
	(0.009)	(0.009)	(0.009)	(0.009)	(0.011)	(0.011)	(0.017)	(0.017)
Target hires top IB	0.012**	0.003	0.013**	0.002	0.013	-0.015*	0.031**	-0.037**
	(0.006)	(0.006)	(0.006)	(0.006)	(0.009)	(0.008)	(0.015)	(0.015)
Relative Size	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)	(0.000)	(0.000)
Tender offer	0.006	0.004	0.008	0.005	0.028***	0.019*	0.040**	0.017
	(0.004)	(0.004)	(0.005)	(0.005)	(0.010)	(0.010)	(0.019)	(0.019)
Hostile deals	-0.004	-0.005	-0.011	-0.013	-0.016	-0.022	0.042	0.026
	(0.009)	(0.009)	(0.010)	(0.010)	(0.018)	(0.018)	(0.049)	(0.050)
Private target	0.007***	0.009***	0.008***	0.010***	0.009**	0.016***	0.010	0.030***
	(0.001)	(0.001)	(0.002)	(0.002)	(0.004)	(0.004)	(0.008)	(0.008)
All Equity	-0.004**	-0.003	-0.001	0.000	0.015***	0.016***	0.073***	0.069***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.005)	(0.005)	(0.010)	(0.011)
Successful deals	0.006	0.002	0.008	0.003	0.049***	0.036***	0.169***	0.135***
	(0.004)	(0.004)	(0.005)	(0.005)	(0.010)	(0.010)	(0.020)	(0.020)
Constant	0.052***	0.000	0.056***	-0.001	0.098***	-0.009	0.133***	-0.042*
	(0.006)	(0.006)	(0.006)	(0.006)	(0.014)	(0.012)	(0.027)	(0.023)
N	14,646	14,646	14,646	14,646	14,646	14,646	14,646	14,646
Adj R-squared	0.024	0.010	0.026	0.010	0.032	0.010	0.036	0.016

Table 21 Choice of takeover method regressions.

This table reports the calculation of the marginal effects from logit regressions of the probability of a deal in the U.S. takeover market to be structured as auction deals on size (Ln MV), cash holding, leverage, target in antitakeover state, target-initiated, toehold, bankruptcy target, Tobin's q, collateral, bidder(target)hires top advisers, relative size tender offer, hostile deals, private target, pure equity deals, successful deals. Dependent variable is a dummy variable that takes the value of one if a bidder firm bids in a competitive process to implement a takeover deal. **Table B1** in the Appendix B reports all the definitions and database sources of variables. The p-value are reported in brackets. Each regression in the last rows reports the total number of observations and pseudo R-squared. The statistical significances between auction and negotiation deals at the 1% level, 5% level and 10% level are denoted ***, **, *.

Variables	(1)	(2)
Size (Ln MV)	0.001***	0.000***
	(0.000)	(0.005)
Cash holding	-0.000	-0.000
	(0.879)	(0.953)
Leverage	0.004*	0.001
	(0.092)	(0.106)
Target in antitakeover state	-0.000	-0.001
	(0.741)	(0.244)
Target-Initiated	0.021***	0.009***
	(0.000)	(0.000)
Toehold	0.024***	0.007***
	(0.000)	(0.000)
Bankruptcy target	0.029***	0.010***
	(0.000)	(0.000)
ROA	0.000	0.000
	(0.914)	(0.659)
Tobin's q	-0.000	-0.000
	(0.105)	(0.278)
Collateral	0.010***	0.010***
	(0.000)	(0.000)
Bidder hires top IB	0.016***	0.003***
	(0.000)	(0.000)
Target hires top IB	0.008***	0.001*
	(0.002)	(0.078)
Relative Size	0.000	0.000
	(0.467)	(0.555)
Tender offer		0.009***
		(0.000)
Hostile deals		0.004**
		(0.024)
Private target		-0.008***
		(0.000)
All Equity		0.002**
		(0.022)
Successful deals		-0.014***
		(0.000)
Constant	-5.278***	-2.638***
	(0.000)	(0.000)
N	14,646	14,646
Pseudo R-squared	0.113	0.342

Table 22 Estimated Treatment Effects from Propensity Score Matching based on Logistic Model in Table B3 using different numbers of 'neighbours' and calipers

This table reports the results of estimated parameters on auction dummy from propensity score matching based on the logistic model in Table A3. The results of estimate the average treatment effect of bidding in auction upon bidder returns (ATE) and the average treated effect of bidding in auction upon bidder returns for bidder firms that actually used auction method (ATT) are reported based on the calculated cumulative abnormal returns (CAR) over the short windows: [-1, +1]; [-2, +2], and over the longer windows [-20, +20]; [-63, +126]. This table uses the formula $CAR_i = \sum_{i=0}^{n} AR_i$ to measure the cumulative abnormal returns by using the CRSP value-weighted index**.** **Panel A** reports the ATE and ATT results by matching bidder firms that choose to bid in auction (the treatment group) to the one, two and three target firms choose to bid in negotiation (the untreated group). **Panel B** reports the ATE and ATT results by matching bidder firms that choose to bid in auction (the treatment group) to the one nearest neighbour firm that choose to bid in auction (the untreated group) with caliper size ($\varepsilon = 0.001, 0.0001, \& \, 0.0001$). Each row reports the total number of observations in treated and untreated groups. Robust standard errors are given in brackets. The statistical significance of at the 1% level, 5% level and 10% level are denoted ***, **, *.

Panel A: Neighbours *Number of Matches*		CAR [-1,1]	CAR [-2,2]	CAR [-20,20]	CAR [-63,126]
1	Average Treatment Effect (ATE)	-0.985%**	-1.599%***	-3.371%	-4.302%
		(0.004)	(0.004)	(0.040)	(0.034)
	Treated Observation	238	238	238	238
	Untreated Observations	233	233	233	233
	Average Treatment Effect for the Treated (ATT)	-1.660%**	-1.358%	-1.398%	2.441%
		(0.007)	(0.009)	(0.023)	(0.044)
	Treated Observation	286	286	286	286
	Untreated Observations	233	233	233	233
2	Average Treatment Effect (ATE)	-0.860%*	-1.406%***	-4.149%	-2.565%
		(0.004)	(0.004)	(0.038)	(0.034)
	Treated Observation	247	247	247	247
	Untreated Observations	427	427	427	427
	Average Treatment Effect for the Treated (ATT)	-1.057%	-0.017%	-0.660%	3.195%
		(0.006)	(0.010)	(0.018)	(0.033)
	Treated Observation	286	286	286	286
	Untreated Observations	427	427	427	427
3	Average Treatment Effect (ATE)	-0.676%	-0.159%	5.714%	3.891%
		(0.005)	(0.005)	(0.095)	(0.052)
	Treated Observation	284	284	284	284
	Untreated Observations	598	598	598	598
	Average Treatment Effect for the Treated (ATT)	-1.125%*	-1.961%**	-0.054%	3.292%
		(0.006)	(0.008)	(0.015)	(0.029)
	Treated Observation	286	286	286	286
	Untreated Observations	598	598	598	598
Panel B: Calipers					
		CAR [-1,1]	CAR [-2,2]	CAR [-20,20]	CAR [-63,126]
0.001	Average Treatment Effect (ATE)	-1.273%**	-1.879%***	-4.500%	-5.972%*
		(0.006)	(0.007)	(0.031)	(0.0034)
	Treated Observation	203	203	203	203
	Untreated Observations	192	192	192	192
	Average Treatment Effect for the Treated (ATT)	-1.679%*	-1.634%	1.883%	4.403%
		(0.008)	(0.009)	(0.022)	(0.043)
	Treated Observation	226	226	226	226
	Untreated Observations	192	192	192	192
0.0001	Average Treatment Effect (ATE)	-1.272%*	-1.791%***	-5.037%*	-4.688%
		(0.007)	(0.006)	(0.029)	(0.034)
	Treated Observation	121	121	121	121
	Untreated Observations	125	125	125	125
	Average Treatment Effect for the Treated (ATT)	-2.317%**	-2.894%**	-1.645%	1.645%
		(0.010)	(0.011)	(0.023)	(0.040)
	Treated Observation	149	149	149	149
	Untreated Observations	125	125	125	125
0.00001	Average Treatment Effect (ATE)	-1.159%*	-2.194%**	-5.692%**	-7.267%**
		(0.006)	(0.006)	(0.028)	(0.030)
	Treated Observation	64	64	64	64
	Untreated Observations	60	60	60	60
	Average Treatment Effect for the Treated (ATT)	-0.254%	-1.527%	-1.312%	-.0.851%
		(0.013)	(0.015)	(0.042)	(0.065)
	Treated Observation	73	73	73	73
	Untreated Observations	60	60	60	60

Table 23 Comparison of covariate imbalance after estimating ATE by applying nearest neighbour 1-to-1 matching strategy without caliper

This table shows the results of the test that check the balances of the covariates after applying the strategy that matches a bidder firm that chooses to bid in auction to one a nearest neighbour bidder firm that chooses to bid in negotiation tender offer (1-to-1) to estimate the average treatment effect of bidding in auction upon bidder returns (ATE). This table uses tebalance as a technique in STATA to calculate the standardized difference and variance ratio for the sample before (raw) and after applying the matching strategy whereby the covariates are well-balanced if matched sample has zero standardized difference and the variance ratio close to one in comparison to row sample. The standardized difference ratio and the variance ratio are reported for the sample before and after applying the matching strategy. The last row shows the total number of treated and untreated (control) observations. **Table B1** in the Appendix B reports all the definitions and database sources of variables.

Variable	Standardised Differences		Variance Ratio	
	Raw	Matched	Raw	Matched
Size (Ln MV)	0.443	-0.043	1.069	0.868
Target-Initiated	0.440	-0.014	9.654	0.875
Toehold	0.263	0.062	5.690	1.702
Bankruptcy target	0.435	0.040	8.092	1.336
Bidder hires top IB	0.532	-0.089	3.564	0.679
Target hires top IB	0.345	-0.106	2.854	0.593
Tender offer	0.619	0.105	7.751	1.725
Hostile deals	0.421	0.060	38.395	2.309
Private target	-1.127	0.047	0.310	0.992
All Equity	0.031	0.038	1.045	1.051
Successful deals	-1.146	-0.006	5.973	1.025
Size (Ln MV) x Tender offer	0.591	0.749	7.811	1.400
Private target x All Equity	-0.320	0.037	0.338	1.087
N	14,646			
Treatment observations	286			
Control observations	14,360			

Table 24 Comparison of covariate imbalance after estimating ATT by applying nearest neighbour 1-to-1 matching strategy without caliper

This table shows the results of the test that check the balances of the covariates after applying the strategy that matches a bidder firm that chooses to bid in auction to one a nearest neighbour bidder firm that chooses to bid in negotiation tender offer (1-to-1) to estimate the average treated effect of bidding in auction upon bidder returns for bidder firms that actually bid in auction (ATT). This table uses tebalance as a technique in STATA to calculate the standardized difference and variance ratio for the sample before (raw) and after applying the matching strategy whereby the covariates are well-balanced if matched sample has zero standardized difference and the variance ratio close to one in comparison to row sample. The standardized difference ratio and the variance ratio are reported for the sample before and after applying the matching strategy. The last row shows the total number of treated and untreated (control) observations. **Table B1** in the Appendix B reports all the definitions and database sources of variables.

Variable	Standardised Differences		Variance Ratio	
	Raw	Matched	Raw	Matched
Size (Ln MV)	0.443	0.007	1.069	0.958
Target-Initiated	0.440	0.056	9.654	1.155
Toehold	0.263	0	5.690	1
Bankruptcy target	0.435	-0.072	8.092	0.852
Bidder hires top IB	0.345	-0.076	2.854	1.069
Target hires top IB	0.532	0.050	3.564	0.868
Tender offer	0.619	0.034	7.751	1.051
Hostile deals	0.421	0.064	38.395	1.226
Private target	-1.127	0.109	0.310	1.455
All Equity	0.031	0.024	1.045	1.032
Successful deals	-1.127	-0.013	5.973	1.001
Size (Ln MV) x Tender offer	0.591	0.040	7.811	1.073
Private target x All Equity	-0.320	0.102	0.339	1.8
N	14,646			
Treatment observations	286			
Control observations	14,360			

Figure 8 The Distribution of Propensity Score for the variables if bidder (target) hires top investment banks and hostiles deals after Matching by Applying Nearest Neighbour 1-to-1 Matching Strategy without Caliper

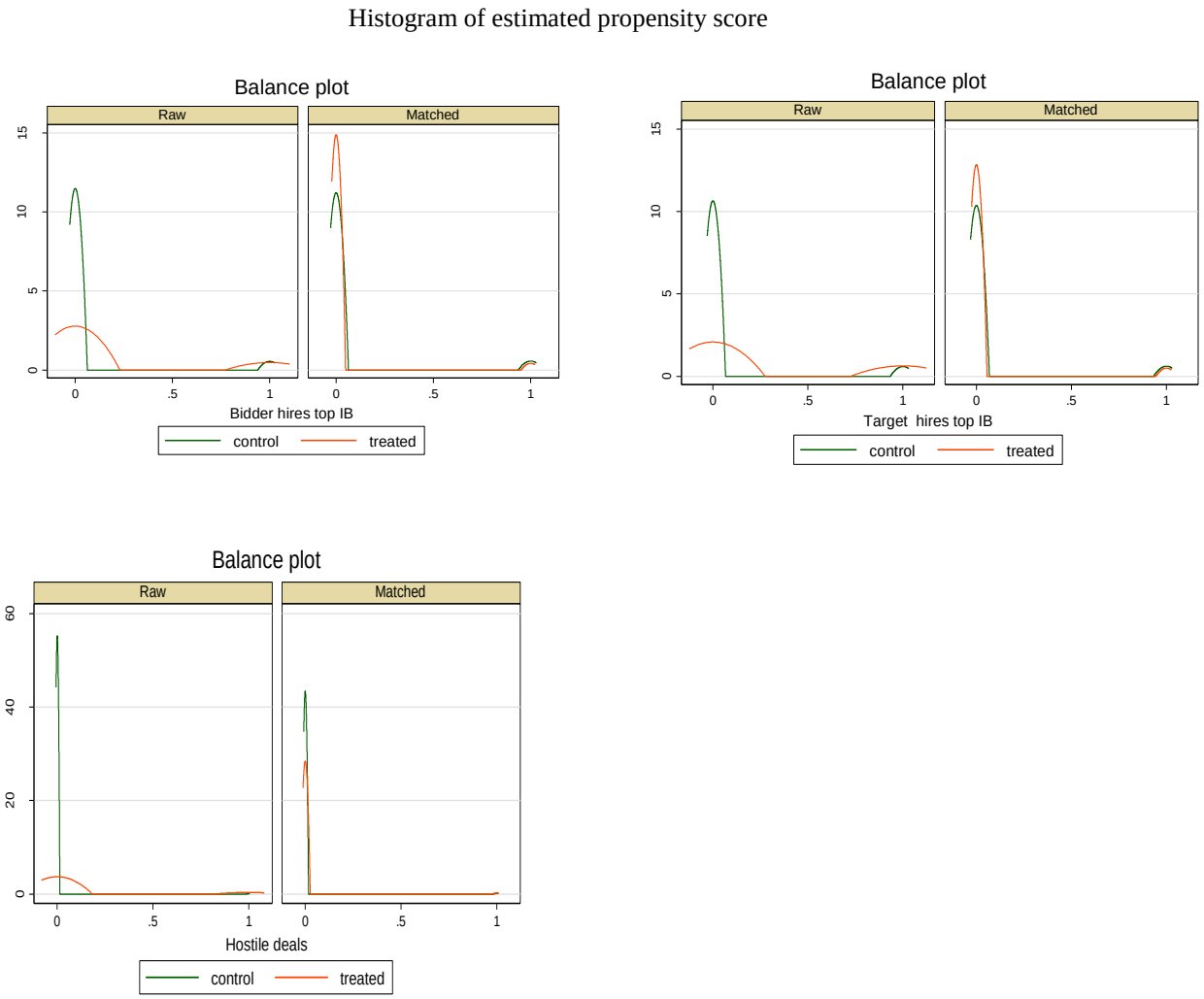


Table 25 Result of sensitivity analysis to hidden bias

This table shows the results of the sensitivity analysis for the impact of bidding in auction upon bidder returns in the case of applying the matching strategy that matches a bidder firm that chooses to bid in auction to a nearest neighbour bidder firm that chooses to bid in negotiation (1-to1) to estimate the average treatment effect of bidding in auction of upon bidder returns (ATE) and the average treated effect of bidding in auction upon bidder returns for bidder firms that actually bid in auction (ATT). The table uses the formula $CAR_i = \sum_{i=0}^{n} AR_i$ to measure the cumulative abnormal returns by using the CRSP value-weighted index**.** Γ starts at 1, with increments (Γ=1.25, 1.5, 1.75, 2, 2.25, 2.5, 2.75, 3). This table provides statistical information that shows the minimum and maximum of the p-value by using STATA command (rbounds).

Matching Strategy		Γ	CAR[-1,1] Minimum	CAR[-1,1] Maximum	CAR[-2,2] Minimum	CAR[-2,2] Maximum	CAR[-20,20] Minimum	CAR[-20,20] Maximum	CAR[-63,126] Minimum	CAR[-63,126] Maximum
1-to-1	Average Treatment Effect (ATE)	1	0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
		1.25	<0.0001	1	<0.0001	0.036	<0.0001	<0.0001	<0.0001	0.967
		1.5	<0.0001	1	<0.0001	1	<0.0001	0.221	<0.0001	1
		1.75	<0.0001	1	<0.0001	1	<0.0001	1	<0.0001	1
		2	<0.0001	1	<0.0001	1	<0.0001	1	<0.0001	1
		2.25	<0.0001	1	<0.0001	1	<0.0001	1	<0.0001	1
		2.5	<0.0001	1	<0.0001	1	<0.0001	1	<0.0001	1
		2.75	<0.0001	1	<0.0001	1	<0.0001	1	<0.0001	1
		3	<0.0001	1	<0.0001	1	<0.0001	1	<0.0001	1
	Average Treatment Effect for the Treated (ATT)	1	0.006	0.006	0.000	0.000	0.283	0.283	0.131	0.131
		1.25	0.196	<0.0001	0.042	<0.0001	0.013	0.856	0.002	0.696
		1.25	0.678	<0.0001	0.336	<0.0001	0.0001	0.991	<0.0001	0.967
		1.75	0.943	<0.0001	0.751	<0.0001	<0.0001	0.999	<0.0001	0.998
		2	0.994	<0.0001	0.949	<0.0001	<0.0001	0.999	<0.0001	0.999
		2.25	0.999	<0.0001	0.993	<0.0001	<0.0001	1	<0.0001	1
		2.5	0.999	<0.0001	0.999	<0.0001	<0.0001	1	<0.0001	1
		2.75	1	<0.0001	0.999	<0.0001	<0.0001	1	<0.0001	1
		3	1	<0.0001	0.999	<0.0001	<0.0001	1	<0.0001	1

Table 26 comparison of finding across models estimating the impact of auction on the CAR

This table shows a comparison of findings across models that estimate the impact of bidding on auction upon bidder returns. The table reports the average treatment effect of bidding on auction upon bidder returns (ATE) and the average treated effect of bidding on auction upon bidder returns for bidder firms that actually bid in auction (ATT) over the short event windows [-1, +1]: [-2,+2], and over the longer event windows [-20,+20]: [-63,+126] across independent-sample t-test, Ordinary Least Squares (OLS), propensity score matching (PSM) and Regression adjustment. The estimate average treatment effect of bidding in auction upon bidder returns in case of applying OLS regression is reported by using regression (1) in Table 20. The estimate average treatment effect of bidding in auction upon bidder returns in case of applying PSM is reported by using matching strategy that matches a bidder firm that chooses to bid in auction to a nearest neighbour bidder firm that bid in negotiation (1-to-1). The table uses the formula $CAR_i = \sum_{i=0}^{n} AR_i$ to measure the cumulative abnormal returns by using the CRSP value-weighted index**.** Robust standard errors are reported in brackets. The statistical significances between schemes of arrangement and tender offers at the 1% level, 5% level and 10% level are denoted ***, **, *.

Model	**Estimated Average**							
	ATE				**ATT**			
	Short event windows		**Longer event windows**		**Short event windows**		**Longer event windows**	
	CAR [-1,1]	CAR [-2,2]	CAR [-20,20]	CAR[-63,126]	CAR[-1,1]	CAR[-2,2]	CAR[-20,20]	CAR[-63,126]
Independent -sample t test (Difference test)	-2.146%***	-2.406%***	-3.388%**	-4.503%				
	(0.001)	(0.001)	(0.018)	(0.116)				
OLS regression Model (1)	-0.017**	-0.018**	-0.009	0.026				
	(0.007)	(0.007)	(0.015)	(0.0305)				
propensity score matching (1-to-1)	-0.985%**	-1.599%***	-3.371%	-4.302%	-1.660%**	-1.358%	-1.398%	2.441%
	(0.004)	(0.004)	(0.040)	(0.034)	(0.007)	(0.009)	(0.023)	(0.044)
Regression adjustment	-2.185%**	-2.196%**	-3.160%	-4.963%	-1.625%***	-1.729%**	-0.525%	3.246%
	(0.009)	(0.009)	(0.025)	(0.049)	(0.005)	(0.006)	(0.012)	(0.024)

Appendix B

Table B1 variables definitions and Sources

The variables	Definitions	Sources
Panel A: Bidder characteristics		
Panel A': size effect		
Panel A'-1: Overall		
Market value (US$, millions)	Acquirer's stock price multiplied by the number of shares outstanding in billions of dollars at the end of the fiscal year immediately prior to the announcement date	COMPUSTAT
Size (Ln MV)	The natural logarithm of acquirer's market value of equity.	COMPUSTAT
Panel A'-2 and Panel A'-3		
Large (Small) bidders	A dummy variable that takes the value of one if a bidder firm is larger (smaller) if its equity market value is greater (equal or less) than the market value of the 25th percentile of NYSE firms during the year of the announcement date.	COMPUSTAT
Market value of small(large) bidders (US$, millions)	The small (large) acquirer's stock price multiplied by the number of shares outstanding in billions of dollars at the end of the fiscal year immediately prior to the announcement date	COMPUSTAT
Small (large) bidder Size	The natural logarithm of the small (large) acquirer's market value of equity	
Panel B': The Other Bidder characteristics		
Cash holding	the ratio of the acquirer's cash and short-term investments (item 1) all divided by the book value of total assets (item 6) as a measure for cash reserves at the end of the fiscal year immediately prior to the date of announcement.	COMPUSTAT
Tobin's q	The ratio of the market value of assets over the book value of assets (item 6—item 60+item25-item 199)/item 6)	COMPUSTAT
Book- to -book value	The ratio of firm book value of equity scaled by market value of equity at the end of the fiscal year immediately prior to the date of announcement.	COMPUSTAT
ROA	The ratio of earnings before interest, taxes, depreciation, and amortization (EBITDA) over the acquirer's total assets at the end of the fiscal year immediately preceding the announcement date.	COMPUSTAT
Leverage	The ratio of long-term debt plus debt in current liabilities (item9+item34) all over the total assets (item 6) at the end of the fiscal year immediately prior to the date of announcement.	COMPUSTAT
High Debt Dummy	A dummy variable that takes the value of one if the leverage ratio (total debt to total assets) exceeds threshold 0.5, and 0 if it is below this figure.	COMPUSTAT
Collateral	The ratio of property, plant, and equipment (item 8) over the target's total asset (item 6), all is measured twelve months before the date of announcement.	COMPUSTAT
Sales (US$, millions)	The acquirer firm's total sales in millions of dollars at the end of the fiscal year prior to the date of announcement.	COMPUSTAT
Total assets (US$, millions)	acquirer's total assets in millions of dollars in millions of dollars at the end of the fiscal year prior to the date of announcement.	COMPUSTAT

Continued Table B1

The variables	Definitions	Sources
Panel B: Deal characteristics		
Transaction value (US$, millions)	The total value of consideration paid in millions of dollars by bidders, excluding fees and expenses.	Thomson One Banker
Small (large) bidder transaction value (US$, millions)	The total value of consideration paid in millions of dollars by small(large) bidders, excluding fees and expenses.	Thomson One Banker
Relative Size	The ratio of transaction value divided by market value of equity	Thomson One Banker
Successful rate	a dummy variable that takes the value of one if transactions that are flagged by the SDC as "completed".	Thomson One Banker
Days to completion	the average number of days a transaction needs to be successfully completed.	Thomson One Banker
Failed rate	a dummy variable that takes the value of one if transactions that are flagged by the SDC as "withdrawn".	Thomson One Banker
Target-Initiated	a dummy variable that takes the value of one if a target firm initiated the deal, and zero otherwise.	Thomson One Banker
Cash (stock) in payment	the percentage of cash (equity) paid for the transaction value by acquirers.	Thomson One Banker
Pure cash (stock) deals	a dummy variable that takes the value of one if an acquirer firm paid 100% of the consideration by cash (equity), and zero otherwise	Thomson One Banker
Public target	A dummy variable that takes the value of one if a bidder firm is flagged by the SDC as a public firm, and zero otherwise.	Thomson One Banker
Private target	A dummy variable that takes the value of one if a bidder firm is flagged by the SDC as a private firm, and zero otherwise.	Thomson One Banker
Subsidiary target	A dummy variable that takes the value of one if a bidder firm is flagged by the SDC as a subsidiary firm, and zero otherwise.	Thomson One Banker
Tender offer, Hostile deals and Bankruptcy target	a dummy variable that takes the value of one if transactions that are flagged by the SDC respectively as tender offer, hostile deals and target in bankruptcy, and zero otherwise.	Thomson One Banker
Target in antitakeover state	a dummy variable that takes the value of one if a target frim is in the one of the following U.S. states that have robust anti-takeover regulations: Idaho, Indiana, Maryland, Nevada, Ohio, Pennsylvania, South Dakota, Tennessee, and Wisconsin, and zero otherwise.	Thomson One Banker
Owned directly before	the percentage of target firm's equity that held by a bidder six month before the date of announcement.	Thomson One Banker
Owned directly after	the percentage of target firm's equity that held by a bidder directly after the date of announcement.	Thomson One Banker

Continued Table B1

The variables	Definitions	Sources
Panel C: Advisor characteristics		
Bidder (target) hires advisors	a dummy variable that takes the value of one if a bidder (target) hires advisors, and zero otherwise.	Thomson One Banker
Bidder (target) hires Top IB	Bidder (target) hires top IB (%) is a dummy variable that takes the value of one if an investment bank that are used by acquirers (targets) as its advisors are classified as top-tier if they are used Bank of America Merrill Lynch, Credit Suisse, Goldman Sachs & co, Jp Morgan, Citi, the five banks that appear most often in the sample, all others take 0., which are the five banks.	Thomson One Banker

Table B2 Ordinary Least Squares (OLS) regressions analysis with a selling mechanism, Bidder and deal variables.

This table presents the results of OLS regressions, in which the dependent variable is the cumulative abnormal returns (CAR) over the short windows: [-1,1]; CAR [-2,2], and the longer event windows [-20,20], [63,126], respectively. This table regresses the dependent variables on a set of selective covariates separately for small and large firms in columns (1) and (2) in order to investigate the size effect of bidder firms upon bidder returns. The table uses the formula $CAR_i = \sum_{i=0}^{n} AR_i$ to measure the cumulative abnormal returns by using the CRSP value-weighted index**. Table B1** in the Appendix B reports all the definitions and database sources of variables. Robust standard errors are reported in brackets. The statistical significances between auction and negotiation deals at the 1% level, 5% level and 10% level are denoted ***, **, *.

Variables	CAR[-1,1]		CAR[-2,2]		CAR[-20,20]		CAR[-63,126]	
	Small (1)	large (2)	Small (1)	large (2)	Small (1)	large (2)	Small (1)	large (2)
Auction	-0.025*	-0.014**	-0.026	-0.015**	-0.028	-0.006	0.011	0.000
	(0.015)	(0.006)	(0.016)	(0.006	(0.032)	(0.012)	(0.062)	(0.024)
Cash holding	0.003	-0.002	0.007	0.002	-0.034	0.074***	-0.108**	0.263***
	(0.009)	(0.006)	(0.011)	(0.006)	(0.021)	(0.014)	(0.042)	(0.034)
Leverage	0.021*	0.002	0.028**	0.004	0.025	0.024**	-0.001	0.079**
	(0.011)	(0.004)	(0.012)	(0.004)	(0.018)	(0.010)	(0.031)	(0.035)
Target in antitakeover state	0.007	0.0004	0.005	-0.000	-0.003	0.000	0.003	-0.021**
	(0.006)	(0.002)	(0.007)	(0.002)	(0.010)	(0.005)	(0.018)	(0.010)
Target-Initiated	0.013	0.012*	0.007	0.011	0.019	0.024*	-0.140***	0.031
	(0.015)	(0.007)	(0.014)	(0.007)	(0.034)	(0.015)	(0.043)	(0.041)
Toehold	-0.011	-0.012**	-0.017	-0.016**	-0.051*	-0.028	0.022	-0.055
	(0.009)	(0.006)	(0.013)	(0.007)	(0.028)	(0.017)	(0.060)	(0.037)
Bankruptcy target	0.018	0.017**	0.030**	0.019**	0.055**	0.035*	0.143***	0.102***
	(0.012)	(0.007)	(0.013)	(0.008)	(0.025)	(0.018)	(0.042)	(0.034)
ROA	-0.029***	0.000	-0.029**	-0.002	-0.138***	-0.008	-0.311***	-0.061
	(0.011)	(0.008)	(0.014)	(0.009)	(0.031)	(0.025)	(0.047)	(0.061)
Tobin's q	-0.003***	-0.000	-0.003***	-0.000	-0.011***	-0.001*	-0.020**	0.000
	(0.001)	(0.000)	(0.001)	(0.000)	(0.003)	(0.000)	(0.009)	(0.003
Collateral	0.027***	0.004	0.035***	0.006	0.042**	0.021**	0.114***	0.081***
	(0.007)	(0.004)	(0.009)	(0.004)	(0.017)	(0.009)	(0.033)	(0.021)
Bidder hires top IB	0.068	-0.002	0.072	0.000	0.047	-0.002	0.057	0.001
	(0.061)	(0.003)	(0.060)	(0.004)	(0.064)	(0.007)	(0.076)	(0.016)
Target hires top IB	0.039	-0.003	0.028	-0.002	-0.009	-0.019**	-0.030	-0.044***
	(0.038)	(0.003)	(0.037)	(0.004)	(0.046)	(0.007)	(0.059)	(0.015)
Relative Size	0.000	0.001	0.000	0.002	0.000	0.003	0.000	0.007**
	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.002)	(0.000)	(0.003)
Tender offer	0.012	-0.000	0.018	-0.001	0.043	0.005	0.000	0.009
	(0.013)	(0.004)	(0.016)	(0.004)	(0.033)	(0.009)	(0.046)	(0.020)
Hostile deals	0.000	-0.001	0.015	-0.014	-0.030	-0.004	0.055	0.041
	(0.027)	(0.010)	(0.034)	(0.010)	(0.047)	(0.020)	(0.176)	(0.044)
Private target	0.013***	0.006***	0.015***	0.007***	0.023***	0.010**	0.051***	0.008
	(0.003)	(0.001)	(0.003)	(0.002)	(0.007)	(0.004)	(0.014)	(0.009)
All Equity	0.010**	-0.014***	0.014**	-0.011***	0.036***	0.001	0.086***	0.056***
	(0.005)	(0.002)	(0.006)	(0.002)	(0.011)	(0.005)	(0.021)	(0.011)
Successful deals	-0.002	0.012**	-0.002	0.016***	0.0210	0.066***	0.128***	0.167***
	(0.007)	(0.005)	(0.008)	(0.005)	(0.017)	(0.011)	(0.031)	(0.023)
Constant	0.012	-0.002	0.010	-0.006	0.027	-0.051***	-0.015	-0.119***
	(0.009)	(0.005)	(0.010)	(0.005)	(0.020)	(0.012)	(0.037)	(0.028)
N	6,501	8,145	6,501	8,145	6,501	8,145	6,501	8,145
Adj R-squared	0.014	0.010	0.014	0.009	0.021	0.012	0.028	0.030
R-squared	0.017	0.012	0.017	0.011	0.024	0.014	0.030	0.032

Table B3: Variables Means & Parameter Estimates used to estimate Propensity Score

This table reports the calculation of logit regression of the probability of a deal in the U.S. takeover market to be structured as auction deals on size (Ln MV), cash holding, leverage, target in antitakeover state, target-initiated, toehold, bankruptcy target, Tobin's q, collateral, bidder(target)hires top advisers, relative size tender offer, hostile deals, private target, pure equity deals, successful deals. Dependent variable is a dummy variable that takes the value of one if a bidder firm bids in a competitive process to implement a takeover deal. **Table B1** in the Appendix B reports all the definitions and database sources of variables. The p-value are reported in brackets. Each regression in the last rows reports the total number of observations. The statistical significances between auction and negotiation deals at the 1% level, 5% level and 10% level are denoted ***, **, *.

Variable name	Logit Estimates
Acquirer Characteristics	
Size (Ln MV)	0.145***
	(0.0417)
Deal Characteristics	
Target-Initiated	1.864***
	(0.262)
Toehold	1.562***
	(0.361)
Bankruptcy target	2.218***
	(0.294)
Bidder hires top IB	0.394*
	(0.224)
Target hires top IB	0.761***
	(0.191)
Tender offer	3.192***
	(0.814)
Hostile deals	0.821**
	(0.409)
Private target	-2.043***
	(0.323)
All Equity	0.161
	(0.181)
Successful deals	-2.925***
	(0.160)
Interactions and Squares	
Size (Ln MV) x Tender offer	-0.199*
	(0.113)
Private target x All Equity	0.935**
	(0.466)
Constant	-2.645***
	(0.273)
Observations	14,646

Chapter 4. Conclusion

Chapter 4

Conclusion

4.1 Summary

There are various selling mechanisms which can be initiated or utilised in effecting takeovers. Further, the choice of selling mechanism always matters, for both target and bidder firms. The main objective of this thesis is to explore the impact of selecting a specific selling mechanism upon bidder and target returns. It has done so using two important data in the U.K. and the U.S. markets. respectively.

This thesis studies two separate empirical works that have contributed to the literature review in two significant ways. First, the thesis investigates how the choices of different selling mechanisms are eventually related to various target, bidder and deal characteristics. Second, this thesis examines the causal effect of selecting a specific selling method on target and bidder returns by using propensity score matching techniques to control for the consequence of self-selection problem into the treatment group.

The first empirical work in this thesis sets out to explore the impact of using scheme of arrangement to implement takeover bids in the U.K. market on the bid premium. The chapter investigates the main target and deal characteristics that determines the choice of scheme of arrangements and tender offers. As predicted, the results show that target firms that adopt schemes are typically larger and older than those adopting tender offers. Target termination fees are higher for schemes. Acquisitions through tender offers and schemes are both likely to be financed using cash as a means of payments; yet the frequency of using cash in tender offers is higher. Schemes of arrangement are a favoured takeover method during periods of financial instability or crisis, and schemes remain the mainstay of the U.K. takeovers, even after amendments to the Takeover Codes in 2011. Acquisitions by schemes of arrangement prevail when the bidders are private, and bidder firms are less likely to use a stake-building strategy to affect the takeover.

This study is the first empirical literature to provide evidence show that target firms who accept to implement a takeover bid by the way of scheme of arrangement gain premiums which are significantly less than target firms who accept tender offer, and using propensity score matching techniques to control for the consequence of self-selection problem into the treatment group. This evidence is consistent with the concerns expressed in the press and among U.K. regulators about schemes of arrangement. Particularly those schemes involving large companies with a concomitant financial worth which manifests a risk at more than merely at company or even market lever. These debates have focused on whether bidders can acquire a target firm for a low premium in comparison with tender offers. This concern arises because of the low threshold of the value of the shareholder votes required for schemes, which then allow the bidder more certainty in the acquisition of all the issued shares of the target firm.

One possible explanation for the low premium level in scheme bids could be that schemes are more amenable to the establishment of a firm and provide more certainty to the bidder of obtaining 100% of the target's stock shares. This is particularly true in acquiring large-sized target firms. The empirical evidence in the extant literature, such as (Officer, 2003), (Bargeron et al., 2008), and (Betton et al., 2009b) normally reports a negative relationship between bid premium and the target size. Another explanation may lie in the observation that a majority of the deals of schemes (66.17%) are associated with private acquirers, which may also lower the bid premiums. (Bargeron et al., 2008) and (Fidrmuc et al., 2012) found that private acquirers normally pay less for a target firm, compared to public acquirers, in part at least because the latter could be expected to gain from the expected synergies with the target from the transaction.

The main results in this chapter suggest that U.K. law should take into consideration the concerns raised in the press and among the regulators about implementing takeover bids by the way of schemes of arrangement. This concern increases particularly for shareholders in large target firms where accepting scheme offers could have a strong effect on their premium in comparison with tender offers. Larger firms have larger numbers of tendered shares, and this increases the uncertainty for a bidder in obtaining 100% of the target company. In particular, the likelihood of a target's acquisition decreasing with the increase in target size, because of the difficulty in financing such large transactions. Bidders under a scheme can effectively reduce the risk of rising leverage, as they can more achieve 100% control of the target firm, because schemes are considered an "all or nothing" transaction. Then bidder firms can use the target's assets as collateral for loans, or alternatively, can be used to obtain financial assistance by re-registering the target as private firm. However, if the bidders intend to own 100% of the

target firm under tender offers, they must receive approval of at least 90% of the target voting share, such that it can squeeze-out the remaining minority shareholders. Therefore, if the offer cannot reach the 90% "squeeze-out" threshold, this means that the bidder will fail to take 100% control of the target company. In light of the above, schemes endow the bidders with more bargaining power, and they are more certain to obtain 100% of the target shares, which could affect target shareholder wealth.

As in all such work, there are a number of limitations in this study. The concern about implementing schemes of arrangement it not uniquely English, other common law jurisdictions which take similar legal and regulatory approaches have the same concerns, such as Australia, New Zealand, Canada, Hong Kong and India. However, the main results of this chapter are truly valid for the U.K. takeover market because the legal provisions that control the takeover methods are different from jurisdiction to jurisdiction endowing each with unique facets. Moreover, the U.K. takeover law is based firmly on the *self-regulatory institution*, whereby a target's board is strictly prohibited by the Code from using certain defensive tactics such as 'poison pills' against any bids. The impact of a scheme of arrangement upon bid premium could, indeed likely would, be different in a country that employed the method of schemes and at the same time allowed for directors to engage in any activities which are deemed to help reduce their firm's attractiveness to potential offerors.

The second empirical work in this thesis sets out to explore the impact of bidding in a competitive auction in the U.S. market on bidder announcement returns. The main motivation of this study is to examine whether the event of the winner's curse exists in takeover activities, particular when a high level of competition exists between bidders. The chapter investigates the main bidder and deal characteristics that determines the choice of whether to bid in a competitive auction or whether to engage in a one-to-one negotiation process. As predicted, bidders who chose to conduct takeovers using auction frameworks have high levels of leverage and tangible assets, while bidders are more likely to bid using an auction if either the target initiates the deals, or is facing bankruptcy, or if the bidders already have a stake (a "toehold") in the target. Bidders are also more likely to bid using an auction if they use (or their target uses) an investment bank with a high reputation. Auctions are, then, associated with tender offers, hostile techniques, and, most surprisingly, with all- stock offers. Bidders are less likely to bid in auctions for private firms.

This study examines the evidence for the Bermuda Triangle of M&A, the fabled winner's curse, where bidders who bid in a competitive auction suffer a significant loss in returns in the short-analysis period. However, the results are less clear across the long-event period. This chapter uses the propensity score matching techniques to control for the consequence of self-selection problem into the treatment group. This results are consistent with (Kagel & Levin, 1986),and (Bazerman & Samuelson, 1983) who argue that one important factor that may exacerbate the winner's curse problem is the number of competitors in the auction with the likelihood of the winner's curse increasing as the number of bidders increases.

The main results in this chapter suggest that bidding in a competitive auction could be one of the main explanations for the negative impact of M&A activates upon bidder announcement return. This result could answer the question of *why auction is not a popular mechanism in corporate finance*, because simply bidders avoid bidding in a competitive bid in order to avoid the high possibility of the winner's curse. Rational bidders might (it could be argued, should) observe that the mechanism of competitive bidding leads them to be more aggressive and overbid for target's assets, so, naturally they lose confidence in bidding in this kind of purchasing format. This is consistent with the Warren Buffett, the Sage of Omaha who stated that "[W]e don't want to waste our time ...*We don't participate in auctions*"

It is important to clarify the parameters of this second part. This study is truly relevant to the U.S. market, because the legal and regulatory regimes that control the competition between bidders and the fiduciary requirements that give the right to target board a certain time to respond to rival offers.

This thesis sets out to explore the impact of schemes of arrangement on bid premium in the U.K. market, and the impact of bidding in auction upon bidder returns in the U.S. market. This study is grounded very firmly in what has been encountered in the real market either in the U.K. or .US. markets. An interesting adjunct to this study would be an investigation into how the media and news reporting could affect bidder and target returns, with a specific selling mechanism. Moreover, the legal structure of selling mechanisms are different from between jurisdictions. It will be interesting to compare the effect of a particular takeover method such as scheme of arrangement in different countries.

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