Valuation Effect of Institutional Ownership: The Case of Corporate Takeovers

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ABSTRACT

We examine the relation between institutional ownership of acquiring firms and their post takeover stock returns. We find that negative long-run abnormal returns appear to decline (in economic and statistical terms) as the extent and persistence of institutional ownership increase, after accounting for the size, book-to-market and method of payment effects. Given the unusually high uncertainty surrounding takeovers, such evidence implies that the degree of short sale constraints serves as an important determinant of acquiring firms' short-run overpricing (Miller, 1977). It appears that the presence of institutions mitigates and in most cases eliminates, through effective arbitrage, any short-run overpricing that may be responsible for the long-run underperformance of acquirers, preserving in this way efficiency in the takeover market.

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1. Introduction

The stylised fact emerging from a large number of studies of long-run (up to five years) shareholders' wealth effects from takeovers is a significant pattern of negative abnormal returns to acquiring firms. However, there is still much debate on what are the sources that result in such underperformance. This paper explores the relation between institutional ownership (here-after IO) and long-run acquiring firms' post takeover stock returns. The motivation for examining this relationship stems from the notion of overpricing as developed by Miller (1977). In a corporate takeover framework, it may be expected that the extent of IO in acquirers conveys important information about the degree of their short-run overpricing, as it reflects the severity of short sale constraints for these stocks[1]. Our proposition is in the same spirit with Diether (2004) that long run post event underperformance is attributed to short run overvaluation due to severe short constraints and high investor disagreement.

If we assume that opinion dispersion for all acquirers is generally large given the unusually high uncertainty surrounding takeovers[2], then as implied by Miller, the

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[1] D'Avolio (2002) and Nagel (2004) suggest that IO is negatively related to shorting costs and Gopalan (2003) constructs a model where 'institutional holding' is a main determinant of the actual severity of short sale constraints. Given Chen, Hong, and Stein's (2001) argument that short interest may well be an insufficient and problematic proxy for short constraints we suggest that IO is the best possible path to capture differentials in short supply and short selling fees between stocks.

[2] Miller (1977) and Doukas, Chansog, and Pantzalis (2003) explain why wide opinion dispersion implies great uncertainty. We assume that unusually high disagreement (and thus uncertainty) about

severity of short sale constraints (as measured by the degree of IO) should affect acquirers' short-run stock prices. Along these lines, short-run overpricing and subsequent underperformance of acquiring firms should be more pronounced in segments where IO is inferior (i.e., higher level of short sale constraints) both in terms of extent and persistence[3].

We find both an economically and statistically significant role of IO in determining acquirers' post takeover stock returns. Specifically, we document that acquirers subject to a low level of IO underperform those subject to a higher level of IO by a significantly large margin of 0.8% a month for a three-year post event window. Negative post takeover abnormal returns are in most cases economically and statistically more significant for acquirers subject to low or non-persistent IO rather than for largely and for persistently held ones. Such differentials meet the prediction of our hypotheses that IO is a major determinant of acquirers' post takeover stock returns. Further, our results are robust after controlling for a range of variables such as the method of payment, firm size, and book-to-market ratio.

Our study contributes to the existing literature by showing that institutional ownership may help us understand one of the major puzzles in corporate finance, i.e. the long-run post takeover underperformance of merged firms. Our findings implicitly suggest

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acquirers' equity on the days surrounding takeovers replicates a situation where uncertainty is higher than normal for all acquirers and decays through time.

[3] 'Persistence' accounts for the effectiveness of the short sale constraint effect during the post takeover event window under examination and hence for the speed of adjustment of stock prices to equilibrium.

that institutions may enhance arbitrage through facilitating short sales and therefore preserve efficiency in the takeover markets.

The rest of the paper is organised as follows. Section 2 briefly reviews the evidence of acquirers' post takeover stock performance and lays a theoretical ground for the role of IO in driving any patterns in stock returns. Section 3 presents our testable hypotheses. Section 4 describes the data and methodological procedures used in our empirical investigation. Section 5 presents and discusses the empirical results. Concluding remarks are provided in section 6.

2. Literature Review

The significant post-takeover negative abnormal returns to acquiring firms is a widely accepted fact[4]. Rational attempts to explain the phenomenon suggest that size and book-to-market value proxy for the risk involved in each case, and these attempts have failed to detect any extrapolation from past performance leading to overpricing. On the other hand, method of payment effects[5], slow adjustment of prices to

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[4] For US evidence of underperformance see, for example: Asquith (1983), Malatesta (1983), Jensen and Ruback (1983), Magenheim and Mueller (1988), Agrawal, Jaffe, and Mandelker (1992), Anderson and Mandelker (1993), Loughran and Vijh (1997), and Rau and Vermaelen (1998). For UK evidence of underperformance see, for example: Firth (1980), Franks and Harris (1989), Limmack (1991), Kennedy and Limmack (1996), and Gregory (1997). However, the following studies report no pattern in returns: Mandelker (1974), Langetieg (1978), Bradley and Jarrell (1988), Franks, Harris, and Titman (1991), and Loderer and Martin (1992).

[5] For evidence on such explanation see, for example, Travlos (1987), Huang and Walking (1987), Amihud, Lev, and Travlos (1990), Agrawal, Jaffe, and Mandelker (1992), Loughran and Vijh (1997),

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information associated with takeovers and size/book-to-market peculiarities leading to investors extrapolating from past performance and hence short-run overpricing, have been the most prevailing behavioral explanations.

On the methodological ground, many authors argue that the observed underperformance is merely due to the variation of the estimation method used or generally the result of a flawed test of abnormal returns generating spurious findings[6]. Accordingly, the resolution of such efficient market anomaly remains a challenge to the profession.

We contribute towards the resolution of this puzzle by examining the role of institutional funds in determining post takeover long run stock performance. Over the past two decades institutional funds have become increasingly prominent. Institutions in the UK held £2,477 billion of funds in 1999, nearly three times the 1990 total accounting for over 85% of the total funds under management. Insurance and pension schemes account for the bulk of UK institutional funds, although unit trusts and money market funds are also a growing market (IFSL 2001). Fund managers invest funds on behalf of institutions. Their primary task is to invest the flow of cash from pension contributions, insurance premiums and personal savers in portfolios of financial assets that will best meet clients' needs. In the UK, a substantial proportion of institutional funds are invested in equity, some 60% in 1999 (IFSL 2001).

Rau and Vermaelen (1998). On the other hand, Dong, Hirshleifer, Richardson, and Hong (2003) and Mitchel and Stafford (2000) find no evidence of poor returns following acquisitions financed by equity.

[6] See, for example, Barber and Lyon (1997), Kothari and Warner (1997), Lyon, Barber, and Tsai (1999), Fama (1998), and Mitchell and Stafford (2000).

Given the predominance of these institutions in the stock market, surprisingly the 'efficiency role' of institutional ownership is not widely documented within corporate takeovers. Nevertheless, its monitoring benefits in general have been explained and the size of institutional stakes has been linked (through the monitoring hypothesis) to managerial efficiency, the quality of corporate decision-making and consequently firm performance[7]. In the light of the "passive voting hypothesis", claiming that in general larger IO does not necessarily improve performance through more active monitoring[8] given the prevalence of agency problems associated with institutions, we suggest that further examination of the 'facilitative' functions of IO is required. Hence, we focus on the 'Miller's-overpricing link' between IO and post takeover stock returns.

Along these lines, it is possible that long-run underperformance of acquiring firms can be attributed to short-run overvaluation. Miller (1977) postulates that wide opinion dispersion among investors about a stock's value leads to a steeper demand curve and hence higher than fundamental price for this stock, especially when short sale constraints that deteriorate the creation of new supply and prevent arbitrage are imposed. Figlewski (1981) argues that negative information is not initially impounded into prices because pessimistic investors are kept out of the market due to restricted short sales, hence resulting in short run inefficiency that is corrected through time.

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[7] For a review of the role of institutions in improving efficiency and performance through active monitoring refer to, for example, Nesbitt (1994), Smith (1996), Carleton, Nelson, and Weisbach (1998), Del Guercio and Hawkins (1999), Gompers and Metrick (2001), and Wahal and McConnell (2000).

[8] See, for example, Admati, Pleiderer, and Zechner (1994), Wahal (1996), Karpoff, Malatesta, and Walkling (1996), Duggal and Millar (1999), Faccio and Lasfer (2000), and Gillan and Starks (2001).

More recently, D'Avolio (2002), Jones and Lamont (2002) posit that short sale fees are high and hence limits to arbitrage strict when IO is low. It is therefore easier to short stocks subject to large IO and in this case only effective arbitrage is actually feasible. Chen, Hong, and Stein (2002) find that the role of breadth of ownership is important in explaining the degree of overpricing. Nagel (2004) proves by using residual institutional ownership[9] that short sale constraints help explain various cross sectional return anomalies. The fact that shorting acquirers is generally more expensive, according to Geczy, Musto, and Reed (2002), further induces the need of examining the effects of short sale constraints in a corporate takeover framework.

In such framework, uncertainty, due to the creation of a new combined firm, is relatively high and hence a takeover sample may capture what Miller refers to as a situation of high opinion dispersion. As a result, some acquirers may be overpriced due to both high uncertainty about their future prospects and the severe short sale constraints they are subject to. After the completion of a takeover, uncertainty continuously diminishes as some first results for acquirers become public. Consequently, long-run post takeover underperformance should be more pronounced for acquirers subject to severe short sale constraints relative to others that may be easier to short. This effect should be more obvious the stricter the short sale constraints and the longer they are present, as proxied for by the extent and the persistence of IO in acquirers respectively.

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[9] Nagel (2004) finds that the correlation between size and IO in his sample is 52%. He therefore employs residual institutional ownership to control for the size effect. We do not find significant positive correlation between size and IO in our takeover sample, which already consists of relatively large firms, and therefore employ raw IO data.

Finally, we note that although both divergence of opinion and short sale constraints, in Miller's setting, are determinants of the degree of overpricing, we would argue that when examining unusually uncertain events such as corporate takeovers, opinion dispersion may actually be less relevant given the level of short sale constraints that eventually oil the wheels of overpricing. This argument is partly supported by Boehme, Danielsen, and Sorescu (2002b) who suggest premiums or discounts depend on the presence of short sale constraints. Furthermore, Gopalan (2003) derives a model in which short constraints bind with opinion dispersion among other factors, hence suggesting that the two notions are usually correlated and that the most short constrained stocks should be expected to be subject to much opinion dispersion. We argue that the unusually high uncertainty (i.e. investor disagreement) about the future prospects of acquiring firms at days surrounding takeovers is an unambiguous fact, and this alone could help us generate a reliable test of Miller's joint hypothesis of overpricing by using only the short sale constraint proxy (i.e. the IO).

3. Hypotheses

Based on the discussion above we develop the following testable hypotheses.

Hypothesis 1

The extent of institutional ownership determines acquirers' long run post takeover stock returns since it reflects the level of short sale constraints that in a situation of high uncertainty explains the degree of short run overpricing.

Hypothesis 2

The persistence of institutional ownership also determines acquirers' long run post takeover stock returns as it reflects the time horizon within which short sales may be effectively practiced.

This latter hypothesis accounts for the magnitude of the short sale constraint effect during the 3-year post takeover window under examination and hence for the speed of adjustment of stock prices to equilibrium. If IO in some acquirers lasts for the entire examination period then arbitrage may be expected to be more effective for these stocks.

According to the above, we examine the valuation effects of IO on corporate takeovers by studying a UK sample of acquiring firms' three-year post takeover stock returns. For each event year (in the 1993-1998 period) we sum up all (above 3%[10]) holdings by institutions in each acquirer to obtain the overall amount of IO. Acquirers located in the High-IO group are those that have one or more institutions each owning at least 3% stake at the takeover year t. On the other hand Low-IO acquirers are either not held at all or are subject to less than 3% holding by each institution owning a stake. Furthermore, acquirers in the Excessive-IO group are subject to High-IO of more than 10%[11] while ones in the Moderate-IO group of less than 10% at the event year t. Finally, acquirers in the Persistent-IO portfolio are subject to at least three-year

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[10] The Companies Act (1985) (sections 198 and 199) requires that if a holding reaches or exceeds 3% of the company's market value it must be declared. We posit that any holding of 3% or above is sufficiently large.

[11] 10% is the median IO value for all acquirers in our sample that belong to the High-IO portfolio.

(post event) High IO while the ones in the Non-Persistent-IO group are subject to at most three-year High IO.

In particular we investigate: (i) Whether acquirers subject to High-IO (at the event year t) outperform ones with Low-IO, and (ii) whether acquirers subject to Excessive-IO and/or Persistent-IO outperform their peers that are subject to Moderate-IO and/or Non-Persistent-IO respectively.

4. Data and Methodology

Yearly IO data[12] are collected from a unique database of UK institutional holdings from 1993 to 2001, provided by Hemscott Plc (a London Stock Exchange listed data company). Studying three-year post-event stock performance requires that we collect event data up to 1998. We thus examine a sample of UK successful public takeovers (i.e., public target and acquirer) with deal value above one million pounds from 1993 to 1998[13]. We identify all UK public acquirers excluding financial and utility firms

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[12] Hemscott's IO current percentage ownership is reported either due to transactions or due to year ends for each firm. We calculate the average annual ownership by each firm in each acquirer but we ensure ownership data are reported before the takeover effective dates in order to realistically reflect short constraints around the takeover. This was achieved by allowing some takeover observations with effective dates near the start of year to match with IO data in the mid or end of the previous year. Consequently, when referring to IO at the event year, in some cases this may have been shaped by IO at the previous year.

[13] We employ a one million dollars cut-off point to avoid results being generated by very small deals. Similarly, studies like Fuller, Netter, and Stegemoller (2002), Moeller, Schlingemann, and Stulz (2004a,b) in the US use a cut-off point of one million dollars.

and other related information from the Securities Data Corporation (SDC). Acquirers' monthly stock prices, size (market value), and book-to-market ratios are obtained from Thomson Financial Datastream. Following Lyon, Barber, and Tsai (1999), firms with negative book value of equity, though this is relatively rare, are excluded from the analysis. 164 UK acquiring firms are finally selected from the intersection of the above three databases; a rather small sample but still sufficient if we consider that the examination period is only six years as the UK IO data (from Hemscott) are not available prior to 1993.

Institutional holding statistics each year for the period under examination (1993-1998) along with the allocation of the 164 acquirers in sub-samples formed on the basis of IO are reported in Table I. It is evident that the number of takeovers taking place each year is similar in most cases and averages to 27 deals per year with 33 being the highest in 1995 and 22 the lowest in 1996. It is hence unlikely that our results are subject to more weight being given to specific trends in takeovers occurring at any peculiar year. We observe that takeover activity in the Low-IO sample varies each period and is concentrated mainly in the first two years (1993 and 1994). On the other hand, takeover activity in the High-IO sample is mainly concentrated in the last two years (1997 and 1998).

Such results point out to a significant increase in institutional funds invested in UK acquirers during the last decade. The observation that in 1999, UK institutions held £2,477 billion of assets, nearly three times the 1990 total (IFSL 2001), confirms this argument and suggests that our sample is also representative of the general institutional investment activity throughout the UK. In addition it reflects the need to

study thoroughly the role of institutions in corporate takeovers in the last decade where IO is more extreme than prior to the 1990s. Table I also reveals that the Persistently and the Excessively held acquirers have both been increasing through time. The gradual increase of IO in UK acquirers is represented diagrammatically in Figure I.

The entire sample is initially split into the High-IO and Low-IO samples to examine the overall role of institutions in determining acquirers' post takeover stock returns. Note that the High-IO sample is subdivided into two different ways in order to capture the effects of both extent and persistence of IO on acquirers' stock returns. We subsequently calculate long run abnormal returns for each of the sub-samples identified.

We use calendar time portfolio regression to mitigate the problem of cross-sectional dependence in stock returns. In each calendar month, a portfolio is formed by including all acquirers that have completed a takeover in the past 36 months[14]. We rebalance our portfolios each month to include acquirers that have just completed an event and to disregard the ones that have just fulfilled 36 months in the calendar approach. We use equal and value weighted approaches to calculate the calendar portfolios' returns. We then estimate the Fama-French three-factor model by using the

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[14] The motivation to use 36 months holding period sources from the need to capture the slow adjustment of prices to equilibrium and is advocated by the use of persistence of IO as a proxy for this adjustment.

UK three-factors following Dimson, Nagel, and Quigley (2001)[15]. We note that the intercept (alpha) in this regression is the mean monthly abnormal return for each portfolio over the estimation period. For robustness we also estimate CAPM intercepts that are however not reported in our empirical discussion for space purposes. We note though that when focusing on CAPM alphas results more strongly support our hypotheses.

The above procedure is repeated for all portfolios. To an extent, any statistically and economically important differentials in abnormal returns between the paired-samples will be driven by differentials in characteristics of IO. We use zero investment portfolios to assess return differentials between paired samples to ensure that the actual observed differentials are not products of the uneven calendar months between these samples. Lastly, in order to establish that method of payment, size and/or book-to-market characteristics are not the source of such return differentials we also conduct a robustness check at the end of section 5.

5. Empirical Results

In table II we report estimates of monthly average abnormal returns (i.e., the intercept alpha) for the calendar time portfolios formed on the basis of IO in acquiring firms using the Fama-French 3-factor model. For the full sample, we find a negative (-1%) and highly statistically significant (t-stat: -4.58) alpha when equal-weighted portfolio

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[15] Dimson, Nagel, and Quigley (2001) use different breakpoints to those of Fama and French (1993) to construct size and book-to-market portfolios in order to account for UK size and book-to-market peculiarities.

returns are used. For the value-weighted portfolio the negative abnormal return declines (0.57%) but is still statistically significant (t-stat: -5.16). This finding confirms the negative pattern of acquiring firms' post takeover stock returns in the UK.

In general, value and equal-weighted returns address different research questions. Value-weighted returns indicate whether an investor holding the value-weighted portfolio of event firms will earn abnormal returns while equal-weighted returns reflect whether on average event firms experience abnormal returns. In any case, we will refer to both value and equal-weighted results as complementary when examining shareholders wealth effects.

Subsequently, the entire sample is dividend into High-IO and Low-IO subsamples as defined earlier. For the Low-IO portfolio, negative abnormal returns are economically and statistically significant for both equal (-1.71% significant at the 1% level) and value weighted (-0.62% significant at the 1% level) calendar portfolios. Overall, acquirers in the Low-IO sample underperform the benchmark in the long run regardless of the weighting scheme. Note that alphas in this case imply a -62% 36-month abnormal return under equal weighting and -22% under value weighting that are substantially more negative than in any other sub-portfolio subsequently examined.

For acquirers in the High-IO sample the picture is clearly different. Abnormal returns are still negative but their economical significance is weaker relative to the Low-IO sample for both equal- and value-weighted portfolio returns. On an equal-weighted

basis alpha (-0.86%) is 50% smaller than in the Low-IO sample and statistically significant (t-stat: -4.78) while on a value-weighted basis alpha (-0.51%) declines considerably but is still statistically significant (t-stat: -4.70). Overall, even though inferences from equal-weighted returns may be considered as more reliable in a small sample, still the High-IO portfolio significantly outperforms the Low-IO one by a statistically and economically important margin regardless of the weighting scheme applied. Note that the High-Low IO (i.e. high minus low) monthly percentage differential from a zero-investment portfolio (Table III) is a statistically significant 0.8% when equally weighting (0.22% when value weighting). This to a great extent reflects the importance of institutional ownership in eliminating overpricing

Table II also presents the results by dividing the High-IO sample into acquirers exhibiting 3-10% IO and acquirers subject to more than 10% IO during the event year t. In this case we aim to examine whether there is significant return differential between the Moderate-IO (3-10%) and Excessive-IO (>10%) groups of acquirers. For equal-weighted and value weighted returns, the Excessive-IO portfolio's alphas indicate statistically insignificant monthly average abnormal returns of -0.58% (t-stat: -1.34) and –0.28% (t-stat: -1.64) respectively. On the other hand alphas for the Moderate-IO group are statistically significant for both weighting schemes (0.89% with -4.26 t-stat when equally weighting and 0.51% with t stat -4.43 when value weighting). The monthly return differential (Table III) of Excessive-Moderate IO (i.e. excessive minus moderate) is 0.27% (0.18% when value weighting) and even though statistically insignificant, is still sufficient in order to eliminate overpricing for the excessively held group (Table II). Such results further enhance our hypothesis about the importance of IO in corporate takeovers as they suggest that not only large but

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also excessive ownership (at the event year) contributes in more effectively eliminating overpricing through facilitating short sales.

We finally split the High-IO sample into two other subsamples in order to examine the importance of the persistence or duration of IO (i.e., the time-window during which short sales are constrained) and further enrich our evidence. Table II reports the results from both the Non-Persistent and the Persistent-IO samples. Clearly, negative abnormal returns decline in economic and statistical terms when moving from the former sample to the latter for equally weighted alphas. In this case alphas are respectively –0.87% (t-stat: -3.96) and –0.62% (t-stat: -1.45) for the two samples and indicate that persistently held acquirers, on average, outperform the non-persistently held ones. When value-weighted returns are considered, negative average abnormal return is higher for the Persistent-IO group (-0.45% with t-stat –2.21) rather than for the Non-Persistent one (-0.38% with t-stat -5.85). Note that there exists only one large firm in the Persistent-IO portfolio (Table V). It is therefore possible that giving more weight to firms that are in reality small (in our entire sample) has generated this result. To an extent value weighting here reflects a peculiarity and we may only draw fruitful conclusions by referring to the equal weighting scheme. Hence, on average, Non-Persistently held acquirers underperform Persistently held ones suggesting that continuous 3-year post event ownership implies consistently less constrained short sales that effectively eliminate overpricing.

Table III reports actual percentage differentials in alphas as well as abnormal returns from zero-investment portfolios for the groups of interest in this study. The latter alphas are obtained by regressing mean calendar portfolio return differentials on the

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FF-3 factors. The findings suggest that investors experience less loss when investing in acquirers subject to High IO rather than Low. In addition, investing in acquirers subject to Excessive IO rather than simply High, results in even less loss. The 0.25% equally weighted economic differential in alphas (0.26% in the zero-investment portfolio) between persistently and non-persistently held acquirers confirms our predictions expressed in the second hypothesis. The 0.73% Excesive–Low IO and the 1% Persistent–Low IO (both statistically significant at the 1% level) equally weighted zero investment portfolio alphas demonstrate that both the extent and persistence of IO can play a vital role in eliminating overpricing.

Nonetheless, such statistical and/or economic differentials in alphas may be driven by the majority of acquirers in some samples being tiled towards some characteristics (for instance method of payment, size and book-to-market ratio[16]) identified as performance determinants in previous studies. We need therefore to address the concern that the abnormal return differentials obtained may be generated by such distinctive characteristics.

Table V[17] may help resolve to an extent such concerns. It reveals that cash, averaging to 50% across all portfolios, is generally the prevailing method of payment in our

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[16] Evidence on the monitoring role of institutional investors is generally ambiguous and it is clear that when monitoring is costly it is usually avoided. Since data on passive and active monitoring do not exist, the true role of monitoring in determining any performance differentials detected may not be articulately assessed.

[17] The 164 takeovers in the sample were ranked according to i) Method of Payment, ii) Size and iii) Book-to-Market Ratio. We follow each acquirer when allocated into different portfolios, formed on the

sample. The largest differential between cash and stock payments of 38% (51% for cash and 13% for stock payments) is evident for the Low-IO group even though post takeover stock underperformance is more pronounced in this particular division. In general, stock payments that average to just 26% among all portfolios, do not seem to be the reason for the economically and/or statistically significant abnormal return differentials detected.

Furthermore, small/large and value/glamour stocks in the entire sample are in some cases not equally spread among the subsequent three sample-pairs. The positive High-Low IO abnormal return differential is great although small firms are mainly concentrated in the High-IO portfolio rather than the Low[18]. One could argue that the higher concentration of value acquirers in High IO portfolio cancels out the effect of the small-firm concentration, suggesting that our results survive any book-to-market and size joint effect. Note that there only exists one acquirer in the largest size quartile of the Persistent-IO group and this suggests better performance (in economic and statistical terms), on average, even for small acquirers that are persistently held; a confirmation of our second hypothesis and an indication that IO is relevant in addition to size when addressing misvaluation issues. In the rest of the cases small/large and value/glamour firms are to an extent equally split in the quartiles suggesting that our results are free of any potential bias involving such characteristics. Finally, opposite

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basis of institutional ownership, to examine in which method of payment, size and BE/ME ratio group was allocated originally (i.e. in the All-acquirers portfolio).

[18] Since small acquiring firms in general underperform large ones in our sample then we should expect larger negative abnormal returns with higher small acquiring firm concentration (i.e for the High-IO group).

to what Chen, Hong, and Stein (2001), Diether, Malloy, and Scherbina (2002) and Reed (2002) suggest, we observe that firm size and IO are in most cases not positively related, reflecting that size may actually proxy for other things apart from the amount of shortable shares or shorting costs as usually assumed in empirical work and that as Hussain (2000) posits institutional portfolio managers in the UK may have had incentives to concentrate their focus on smaller firms in the past decade.

6. Conclusion

This study empirically investigates whether we observe Miller's valuation effect of short sale constraints (as proxied for by institutional ownership) on corporate takeovers, where uncertainty is relatively high.

Overall, our results show that the Low-IO, Moderate-IO and Non-Persistent-IO groups of acquirers underperform their High-IO, Excessive-IO and Persistent-IO peers in the long run. The economic differentials obtained between the portfolios of interest show that IO, both in terms of extent and persistence appears to determine to a major extent the degree of the negative drift in stock returns as originally hypothesized. Our findings suggest that the overall negative post takeover stock returns may be largely attributed to the group of acquirers exhibiting low and/ or non-persistent institutional investment rather than to size, book-to-market or method of payment peculiarities. The fact that monthly average abnormal returns decay in statistical and/or economic terms as the extent and persistence of IO increase indicates that indeed this variable is a key factor explaining the degree of acquirers' overpricing. This evidence is consistent with the continuously growing literature

postulating that short sale constraints can induce overpricing and hence subsequent negative abnormal returns. Thus the presence of institutions is vital in preserving market efficiency.

To summarize, if IO is indeed an accurate proxy for the severity of short sale constraints, and uncertainty (i.e. opinion dispersion) is unusually high for all takeovers, as originally hypothesized, then our evidence can be considered as consistent with the prediction of Miller (1977). Severe short sale constraints lead to overpricing and subsequent long-run underperformance of acquiring firms while IO may enhance and preserve efficiency in the takeover market and significantly deteriorate the negative abnormal returns to acquirers reported in the literature. The latter statement is in line with the most recent evidence by Nagel (2004) that short sale constraints drive most common cross sectional anomalies documented in the literature. Finally, we hope our study will form the basis for more extensive future examinations on the valuation effects of IO related to corporate takeovers and other event studies and on the general role of institutions in preserving efficiency in financial markets through facilitating short sales.
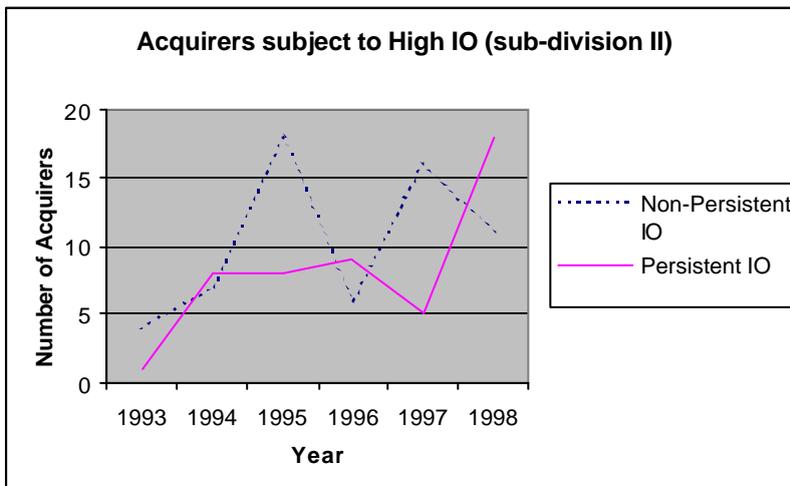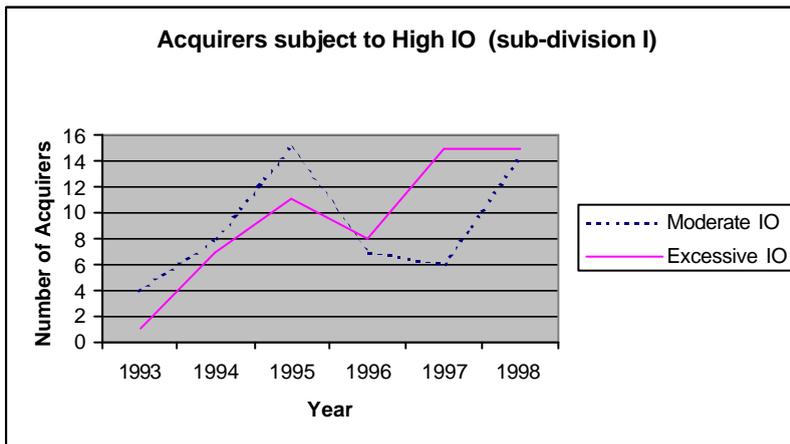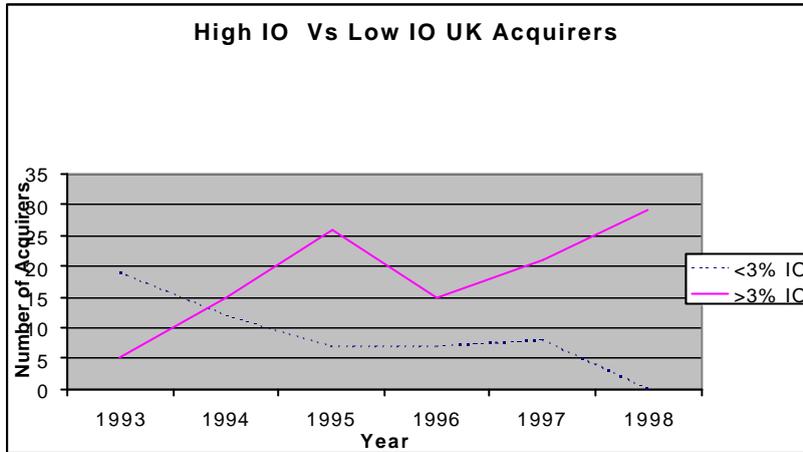
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Figure I: Institutional Ownership in the UK (1993-1998)

High IO Vs Low IO UK Acquirers

Acquirers subject to High IO (sub-division I)

Acquirers subject to High IO (sub-division II)

Table I. Institutional Ownership Statistics Each Year and Allocation of Acquirers in Portfolios

The table presents total and year-by-year acquirers' allocation (for a sample of 164 takeovers) in each of the six sub-portfolios identified. The sample is divided in institutional ownership groups in three ways. Firstly, the entire sample is split in the Low IO (<3% at year t, the merger completion year) and High IO (>3% at year t) groups of acquirers. Secondly, the High IO group is divided into two sub-portfolios, one with acquirers subject to institutional holding of 3-10% (i.e. the Moderate IO group) at year t and one with acquirers subject to institutional holding greater than 10% at year t (i.e. the Excessive IO group). Finally, the same High IO group is divided in two different sub-portfolios. One with acquirers subject to institutional holding of >3% for a period of at most 2 years after the event year (i.e. the Non-Persistent IO group), and one with acquirers subject to institutional holding of >3% for at least 3 years after the event (i.e. the Persistent IO group). The total number of takeovers for each of the seven groups (including the all-acquirers portfolio) is in bold.

Year	All Takeovers	Low IO <3% at year t	High IO >3% at year t	Moderate IO 3-10% at year t	Excessive IO >10% at year t	Non-Persistent IO >3% at year(s) t, (t+1,t+2)	Persistent IO >3% at years t,t+1,t+2,t+3
1993	24	19	5	4	1	4	1
1994	27	12	15	8	7	7	8
1995	33	7	26	15	11	18	8
1996	22	7	15	7	8	6	9
1997	29	8	21	6	15	16	5
1998	29	0	29	14	15	11	18
Overall	**164**	**53**	**111**	**54**	**57**	**62**	**49**

Table II. Calendar Time Portfolio Monthly Average Returns in Excess of the CAPM and Fama and French 3-Factor Model

The table presents OLS estimates of monthly abnormal returns (alphas) to takeover portfolios for i) all 164 acquirers in the sample; ii) the Low IO group (i.e. <3% institutional holding at year t, the merger completion year); iii) the High IO group (>3% institutional holding at year t; iv) the Moderate IO group (ie 3-10% holding at year t); v) the Excessive IO group (ie > 10% holding at year t); v) the Non-Persistent IO group (ie >3% holding for at most 2 years and vii) the Persistent IO group (>3% holding for at least 3 years). Calendar-time regressions were performed for each of the seven portfolios formed on the basis of percentage IO. Acquirers enter the portfolio on the effective month of the takeover and remain for 36 months. Portfolios are rebalanced each month to include firms that have just completed a takeover. The monthly abnormal returns are intercepts a_p in the CAPM model and the Fama and French three factor model, respectively

$$R_{pt} - R_{ft} = a_p + b_p(R_{mt} - R_{ft}) + e_{pt}$$

$$R_{pt} - R_{ft} = a_p + b_p(R_{mt} - R_{ft}) + s_p SMB_t + h_p HML_t + e_{pt}$$

Where Rpt is the calendar time portfolio return, Rft is the return on a one month T-bill during month t, SMB is the difference in returns of value weighted portfolios of small firms and big firms during month t, HML is the return differential of value weighted portfolios of high and low book-to-market firms in month t, ßp, sp and hp are regression parameters specific to the portfolio and e_{pt} is the error term. T-statistics appear in brackets under each parameter. N is the number of acquirers in each portfolio and Cal Months the number of calendar months for each calendar regression. Heteroscedasticity and autocorrelation adjusted t-statistics are reported in brackets below each estimate.

		ALL	Low	High	Moderate	Excessive	Non Persistent	Persistent
CAPM a	EW	-0.62	-1.53	-0.51	-0.61	-0.27	-0.45	-0.41
		[-1.78][c]	[-3.05][a]	[-1.49]	[-1.93][c]	[-0.50]	[-1.14]	[-0.82]
	VW	-0.55	-0.60	-0.48	-0.47	-0.23	-0.33	-0.44
		[-5.59][a]	[-5.16][a]	[-4.22][a]	[-3.89][a]	[-1.42]	[-4.01][a]	[-2.08][b]
FF a	EW	-1.02	-1.71	-0.86	-0.89	-0.58	-0.87	-0.62
		[-4.58][a]	[-3.73][a]	[-4.78][a]	[-4.26][a]	[-1.34]	[-3.96][a]	[-1.45]
	VW	-0.57	-0.62	-0.51	-0.51	-0.28	-0.39	-0.45
		[-5.16][a]	[-5.03][a]	[-4.70][a]	[-4.43][a]	[-1.64]	[-5.80][a]	[-2.20][b]
N		164	53	111	54	57	62	49
Cal Months		105	94	105	105	98	103	100

a,b,c indicate significance at the 1,5 ,10 percent level for two-tailed t-tests.

Table III. Zero-Investment and Economic Differentials between Calendar Time Portfolio Monthly Average Returns in Excess of the Fama and French 3-Factor Model

The table presents zero investment and economic percentage differentials between OLS estimates of monthly abnormal returns (alphas) to takeover portfolios involving: i) the Low IO group (i.e. <3% institutional holding at year t, the merger completion year); ii) the High IO group (>3% institutional holding at year t; iii) the Moderate IO group (i.e. 3-10% holding at year t; iv) the Excessive IO group (i.e. > 10% holding at year t); v) the Non Persistent IO group (i.e. >3% holding for at most 2 years and vi) the Persistent IO group (>3% holding for at least 3 years). For hedge portfolios mean calendar time portfolio return differentials are regressed on the FF 3-Factor model. The regression procedure is identical to that described in table II. Economic Differentials are the difference between the actual alphas obtained in table II. Both, economic differentials between actual alphas and hedge portfolios' alphas are formed on both equally and value weighted basis. Heteroscedasticity and autocorrelation adjusted T-statistics in brackets under zero investment portfolios' estimates are obtained from one-tail t-tests.

		High-Low	Excesive-Moderate	Persistent-Non Persistent	Excessive-Low	Persistent-Low
EW	**FF a** *zero-investment portfolios*	0.8 [2.01][b]	0.27 [0.55]	0.26 [0.51]	0.73 [1.51][c]	1.00 [2.02][b]
	FF actual a	0.85	0.31	0.25	1.13	1.09
VW	**FF a** *zero-investment portfolios*	0.22 [1.65][c]	0.18 [1.00]	0.01 [0.10]	0.36 [1.78][b]	0.34 [1.70][b]
	FF actual a	0.11	0.23	-0.07	0.34	0.17

a,b,c indicate significance at the 1,5 ,10 percent level for one-tail t-tests.

Table V. Distinctive Characteristics of Portfolios

The table reports method of payment, size and book-to-market data for all seven portfolios considered in the previous analysis. Method of payment data availability is reported along with the number of takeovers in each portfolio. Method of payment data is divided into 100% cash payments, 100% stock payments and mixed payments and are reported as a percentage of the available data for each portfolio. The 164 takeovers in the sample were also ranked according to i) Size and ii) Book-to-Market-Ratio. We follow each acquirer when allocated into different portfolios, formed on the basis of institutional ownership, to examine in which size and BE/ME value quartile was allocated originally (i.e. in the All-acquirers portfolio). Accordingly, the number of firms in each of the subsequent six sub-groups that belong to one of the four Size and Book-to-Market quartiles in the original portfolio are reported.

Characteristics / IO Portfolios	All	Low IO	High IO	Moderate IO	Excessive IO	Non-Persistentent IO	Persistent IO
Number of Acquirers	164	53	111	54	57	62	49
Method of Payment Data Available (for)	129	39	89	43	46	47	42
Cash Payments	48%	50%	48%	56%	43%	53%	41%
Stock Payments	24%	13%	28%	25%	33%	26%	33%
Mixed Payments	28%	37%	24%	19%	24%	21%	26%
Small Firms	41	16	25	17	8	13	12
2	41	3	38	14	24	13	25
3	41	11	30	10	20	19	11
Big Firms	41	23	18	13	5	17	1
High B/M Firms	41	11	30	14	16	14	16
2	41	9	32	14	18	21	11
3	41	15	26	16	10	13	13
Low B/M Firms	41	18	23	10	13	14	9