CEO AGE AND FIRM PERFORMANCE POST ACQUISITIONS

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ABSTRACT

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I examine if firm performance following acquisitions is affected by CEO age. Younger CEOs have larger career concerns compared to CEOs closer to retirement which should better align their incentives with shareholders. Older CEOs closer to retirement are more likely to manipulate firms and make acquisitions that only benefit themselves. On the other hand, younger CEOs have less experience compared to older CEOs. Using a large sample of 1062 acquiring firms and a subsample of 480 public targets, I investigate the post-acquisition firm performance of acquiring firms over the CEOs' aging process. The empirical results show that the firms operated by younger CEOs (less than 50 years old) perform worse than the firms managed by older CEOs after the acquisitions, both in the short-term and long-term. Although younger CEOs are faced with less agency and horizon problem, and they have more career concerns, these factors do not contribute to better performance. An examination of target characteristics shows that younger CEOs acquire high growth targets. Cross-sectional tests show that the poor performance is related to CEO overconfidence and riskier targets acquired by younger CEOs.

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Contents

1. Introduction

Mergers and acquisitions are important long-term investments for corporations. While synergies and shareholder wealth maximization are often cited as reasons for acquisitions, not all acquisitions benefit shareholders. Firms' managers may be motivated by personal career concerns, among other things, when pursuing acquisition activities. Thus, agency and managerial hubris, along with synergy, have been studied as possible motives as to why firms use acquisition as a mechanism to realize their strategic growth objectives.

There is substantial body of empirical evidence that documents shareholder wealth losses for acquiring firms (Andrade et. al, 2011; Moeller et. al 2005). Some researchers suggest that the managers' agency and horizon problem contribute to the firms' bad performance (Hart and Mellor, 1970; Jensen and Meckling, 1976; Fama, 1980; Rhodes, 1983; Richard and Shelor, 2002; Christian and Niels, 2005). However other researchers turn to managers' characteristics to examine the cross-sectional variation in the performance of acquiring firms (Taylor, 1975; Child, 1974; Harman, 1991; Heaton, 2002; Roberts and Rosenberg, 2006; Roll, 1986; Forbes, 2005). For example, as managers get older, they are likely to take a more short-term view of their decisions. Firms with CEOs closer to the end of their careers are likely to have greater and more serious agency problems, emanating from the typical horizon problem facing their CEOs. These CEOs are likely to be motivated by their own welfare rather than shareholder wealth creation. Jensen and Meckling (1976) show that due to the high cost of writing sophisticated contracts, contracts made by corporations cannot completely control managers' behavior, which leads to the standard agency problems in large corporations.

Existing research has also found management age to be related to firm performance. Richard and Shelor (2002) find that top management age

heterogeneity has a curvilinear relationship with sales growth. Christian and Neils (2005) find a clear inverse U-shaped relation between the mean age of management and firm performance, and that medium aged workforces are associated with better firm performance. Compared to older CEOs, younger CEOs are more energetic and are more likely to be overconfident of their ability to take risks. Existing literature has found that managers' characteristics influence firm performance. Child (1970) indicates that younger managers have more energy, drive and willingness to accept changes, which contribute to companies' high growth rate. Taylor (1975) notes that older managers need more time to process information and reach decisions. In addition, when dealing with bad situations, older CEOs have more experience. Roll (1986) studies the hubris theory and finds that CEOs make mistakes about estimating the target firm's value and they are overconfident about their judgment and decision. Heaton (2002) argues that younger managers are more optimistic. The author suggests that the market underestimates their firms' value and firms' projects. Thus younger CEOs are inclined to be overconfident, making value-destroying investments. Although these studies highlight the relationship between management age and firm performance, they mainly focus on how management age affects firm performance, but they do not investigate how the management age affects firm performance specifically following takeover activities.

There is little evidence in the literature on the potential impact of management age on firm performance after acquisition activities. Gao (2010) is a recent study that empirically examines this relation. Using the 3-day cumulative abnormal returns, CAR(-1,+1), around the announcement day and the three-year BHARs (buy-and-hold abnormal returns) post acquisitions, he conducts a cross-sectional analysis of the firms' short-term and long-term performance after the acquisitions and finds that managers with long horizon and working in overvalued firms prefer using stock payment to acquire targets and focus on firm long-term

performance; on the contrary, managers with short horizon are inclined to pay for acquisitions with cash and care more about the firm short-term performance. Gao mainly studies responses and decision made by two different age-level CEOs from the angle of managerial horizon. He does not take the CEOs' characteristics and agency problem into account. However, besides the managerial horizon, these factors significantly affect the decisions made by CEOs. What's more, he mainly analyzes CEOs from two different age-level, CEOs with shorter horizon and CEOs with longer horizon. He ignores that CEOs' characteristics are changing during the full career lifespan, and does not reveal firm performance at more different CEO age levels. Yim (2013) demonstrates that the permanent increases in compensations create stronger incentives for younger CEOs than older CEOs to pursue acquisitions. In addition, this study also indicates that with the aging process, management heterogeneity affects managers' decisions. Yim studies CEO age and acquisitions behaviors through the angle of career concerns and agency problem. Nevertheless, this study primarily analyzes the incentives of CEOs in making acquisitions and does not show the firms' short-term and long-term performance after the acquisitions.

In this paper, I use a sample of 1062 acquisitions, 570 CEOs and 466 firms to study the relationship between CEO age and firm performance after acquisitions. I divide the sample into four groups based on the CEO's age. Similar to Yim (2013), I define younger CEOs as those less than 50 years old and older CEOs who are 50 years and older. It is commonly accepted that many CEOs retire around age 65 and CEO incentives likely shift around retirement. A number of studies usually use age 65 as a cut-off to divide their samples. Basing on Gibbons and Murphy (1992) and my data's characteristics, I use 60 and 65 as two points to further divide older CEOs into three groups; age 50 to 59, age 60 to 64, and age 65 and above. Younger CEOs usually have a much longer horizon relative to older CEOs. Therefore, when making decisions, they are likely to be more concerned

about their career and welfare in the long-term. Better firm performance both in the short run and long run should affect their career and compensation in a positive manner. On the other hand, older CEOs have shorter horizon and less career concerns. They are, thus, more likely to take a short-term view in their decisions. However, compared to older CEOs, younger CEOs have more energy, and they tend to take more risk and be overconfident. Thus, whether firms managed by younger CEOs perform better or worse compared to those managed by older CEOs will depend on whether career concerns dominate overconfidence and the risk taking disposition of younger CEOs. In this study, I use both short-term and long-term event studies to measure stock performance after the acquisitions. When analyzing the firms' long-term performance following the takeovers, I also use return on assets (ROA) to assess the firms' long-term operating performance. The firms' governance quality can also seriously impact firm performance. For example, both younger and older CEOs can be entrenched, leading to serious agency problems (Mock et al., 1988; Hill and Phan, 1991; Hambrick and Fukutomi, 1991; Ronald et al., 2007). Therefore, in addition to deal characteristics and CEO characteristics, I also control for corporate governance quality in my analysis.

I use cross-sectional analysis to study the relationship between CEO age and firm performance following the acquisitions. My empirical results show that firms managed by younger CEOs actually perform poorly both in the long run and short run. An examination of the target characteristics shows that younger CEOs prefer acquiring private and high-growth targets with higher risk. The results are consistent with the hypothesis that younger CEOs are more overconfident, and take greater risks in their investment decisions.

The rest of this paper is organized as follows. Section 2 surveys the existing literature on acquisitions, which inspires my research. Section 3 develops the hypotheses. Section 4 describes the data gathering and cleaning procedure.

Section 5 demonstrates the empirical methodologies. Section 6 presents and discusses the empirical results. Finally, section 7 presents the conclusions of this study.

2. Literature review

This study builds upon the following four subtopics discussed first in the literature review: (i) Merger and Acquisition Theory, (ii) CEO Age, Horizon and Agency Problems, (iii) CEO Age, Physiological and Psychosocial Problems, and (iv) CEO Age and Acquisition behavior.

2.1 Merger and Acquisition Theory

Academic attention on mergers and acquisitions has existed for several decades. Mergers and acquisitions activities serve as an important long-term investment mechanism for firms. Due to the importance of these activities, an extensive body of work has emerged in order to study, from multiple angles, the motives and additional factors which are considered by managers who engage in mergers and acquisitions. Specifically, researchers have focused primarily on whether mergers and acquisition are wealth creating or wealth destroying activities for the firm's shareholders. In general, only the mergers and acquisitions driven by a synergy motive enable shareholders' value maximization (Jensen and Ruback, 1983), while the mergers and acquisitions triggered by the agency and hubris motives reduce shareholders' benefits.

The synergy motive implies that takeovers take place only if the gains are obtained for both acquirer's and target's shareholders. In other words, the market value of firm after takeover should be larger than not only the market value of the bidder itself prior to the merging, but also the sum of the market values of both

the bidder and the target. The extra value created by takeover is what firms want to attain through this activity. Conventionally, there are three kinds of synergy triggered by different resources: financial synergy, operational synergy and collusive synergy. According to Chatterjee (1986), collusive synergy, which results from the price could contribute to the highest value creation for shareholders.

The agency motive suggests that the managers of acquirers intend to make takeovers to benefits themselves and meet self-interest, but to the detriment of shareholders' welfare and the firms' long-term development. Berle and Means (1932) claim that managers who have no wealth invested in their firms are more likely to make takeovers to benefits themselves rather than shareholders. Jensen and Meckling (1976) suggest that although corporate owners could use the law and contracts to supervise the managers' behavior, the cost of sophisticated contracts is high. Therefore, managers who hold only a small portion of stock of their firms still are faced with agency problem. Amihud and Lev (1981) find that within the context of conglomerate mergers, managers engage in such activities for the purpose of decreasing the firm's idiosyncratic risk, for the purpose of lowering their personal employment risk. Since only market risk is theorized to determine price, such mergers add no value to shareholders. Jensen (1986) argues that corporate managers prefer to use cash to make non-value maximization investments rather than giving money back to shareholders. When managers return cash to shareholders, the resources under managers' control are reduced, resulting in a reduction of power. Shleifer and Vishny (1989) observe that managers are inclined to make specific investments for which they have a specific set of knowledge. Managers who employ such a strategy make it costly and difficult for shareholders to replace them. Through this way, managers make profits at the cost of firms and shareholders' interests.

The hubris hypothesis maintains that there are no synergy gains in the

acquisitions. Acquisitions are triggered by manager mistakes; the net gain of takeovers is zero, which means that there only exists a value transfer from acquirer to target, without any economic value added. Roll (1986) finds that managers usually overestimate the value of their targets, resulting in paying too much in acquisitions. Even if the markets are operating perfectly efficiently, the managers may make mistakes. Therefore, the hubris hypothesis indicates that the non-value maximization acquisitions derive from manager mistakes and an overestimation of the target firm's value. The losses of acquirers are offset by the premium paid for the targets. The target gains and acquirer gains are negatively correlated; the more target obtains, the lower the return for the acquirer. On the whole, the total gain is zero.

2.2 CEO Age, Horizon and Agency Problems

Agency problems arise when cooperating parties have different goals and there is a division of labor (Jensen and Meckling, 1976; Ross, 1973). Managers sometimes pursue their own benefits at the cost of shareholder interests and firm value, which manifests the classic agency problem. Fama (1980) first proposes that the divergence of security ownership and control actually is an efficient form of economic organization and this form could make managers operate firms better. In a competitive labor market, managers who do not adequately perform their duties will be replaced or will be remunerated with lower wages. Concerned for their careers, managers have to overcome the difficulties and grasp the opportunities from both within and outside the firm, attempting to make their firm outperform the others with the objective of bettering their own personal careers. Therefore, career concerns may offset agency problems to some extent. Borland (1992) shows evidence that managers attempt to use good performance as a signal to increase the market's assessments. Through a model, he explains that career concerns could strongly explain managers' good behavior. Holmstrom (1999)

proposes that when managers make decisions, they are concerned about their future career, and therefore they do not satisfy themselves at the expense of shareholders' interests. Furthermore, wage is an implicit contract that links managers' performance today to their future wages. Managers aware that good qualified management will make themselves more demanded and be offered higher wages. Accordingly, when managers are young and have much more competitive power, they work very hard. As they age, they have less passion and are less hard-working. Chevalier and Ellison (1999) study the agency and horizon problem in the mutual fund industry. They observe that compared to the older managers, younger managers care more about their future career and are more eager to demonstrate their high quality management. They are therefore prone to include funds with less unsystematic risk in their portfolios, while older mangers with shorter horizon take more risk and prefer high unsystematic risk funds in their portfolios. They also highlight that the labor market is much harsher for young managers as the young managers have a higher risk of being terminated due to unfavorable recent performance, compared to older managers.

When a managers' age approaches 65, career concerns are reduced, since retirement is at least traditionally within the near future. In the absence of career concerns, mangers will manipulate firms to benefits themselves and thus create an even more serious agency problem, which is referred to as the horizon problem. Dechow and Sloan (1991) find that prior to CEO departures, there is a significant reduction in the growth of R&D expenditure. They document that CEOs reduce R&D expenditure during their final years in office to improve firms' short-term earnings for their personal benefits. However in doing so, managers ignore the firm's long-term development and shareholders' value, and control the firm to satisfy their own interests. Gibbons and Murphy (1992) find that future compensation is positively related to firms' performance, especially among firms with CEOs close to termination. They claim that the optimal compensation

contract will boost the CEOs, who are going to retire to have career concerns and mitigate CEOs' horizon problem. Thus, firms should improve compensation and strengthen the incentives for managers close to retirement. Brickley et al. (1999) find that CEOs have superior performance around their retirement age. They provide two possible reasons to explain this phenomenon. The first reason is that the CEOs may serve on their own board after their departure. Therefore, they have to operate firms well and make higher stock returns to benefit their board. The second reason is that CEOs may serve as outside directors on other boards. Accordingly, they need to show good performance to the labor market and prove their ability. Yermack (2006) observes that when CEOs leave their firms, they usually receive a separation package as a reward, and this severance pay is related to firm's current performance. Even though the severance pay will encourage CEOs to perform better in the short-term, this method perversely intensifies managers' horizon and agency problems. In order to attain higher separation packages, managers will manipulate firms and improve firms' short-term performance at the cost of long-term performance so as to increase their personal income.

2.3 CEO Age, Physiological and Psychosocial Problems

With the aging process, the physiological and psychosocial qualities of CEOs change. Some researchers focusing on managers' physiological problems find that the older managers have lower energy levels than those of their younger counterparts, which may affect managers' decisions. Child (1974) argues that successful leadership of firm depends on the qualities of character of top management. The young managers are qualified with much more energy, drive and have willingness to accept change, while the senior managers have less physical and mental passion to execute the organizational changes. Taylor (1975) considers that the older managers need more time to process information and

reach decisions. Usually the older managers expect to collect more information so as to make decisions accurately. Furthermore, the older managers are less confident about their decisions and more flexible in altering decision in adverse situations. Harman (1991) notes that along with the aging process, the chance of disease and death will increase and energy level will decrease. Therefore, the older CEOs have less energy to take the risk of making acquisitions. All else being equal, an older manager would prefer less risk, and slower growth, as their appetite for risk decreases with age. Roberts and Rosenberg (2006) argue that the energy metabolism changes with the aging process. The ability of older adults to accurately control energy intake and expenditure is weakened. Therefore the older managers have less energy and drive to deal with difficulties.

Additional research considers the managers' psychosocial problem. Roll (1986) studies the hubris theory and finds that CEOs make mistakes about estimating the target firm's value and they are overconfident about their judgments and decisions. Heaton (2002) argues that younger managers are more optimistic. They believe that the market undervalues their firm's value and projects. Thus overconfident managers often make overinvestments and value-destroying investment. Forbes (2005) highlights the psychological changes along with manager's aging process. He finds that younger managers are more overconfident than older managers, because younger managers have less experience and knowledge, and they seldom recognize and correct their cognitive biases. In contrast, older managers have likely experienced failures and bad situations over their careers, so they like to think twice and correct for their decision errors. Malmendier and Tate (2005) find that managers are overconfident and they like to use free cash to make overinvestment rather than giving it back to shareholders. Kovalchik et al. (2005) find that the older managers are less biased and overconfident than the younger managers. Older managers have more accurate beliefs about their knowledge and limitations. Mallemndier and Tate

(2008) find that managers will over-estimate their ability and think they have capacity to generate returns both in their current firms and in potential target. Accordingly, managers often make value-destroying acquisitions, especially in the case of younger managers.

Further research accounts for both managers' physiological and psychosocial problems. Carlsson and Karlsson (1970) note that behavioral flexibility and mobility decreases with age. Older CEOs are reluctant to change or to move to a new environment. Their social circles, their spending traits, and their expectations about the income after retirement are established. They care deeply about their current life and will not take any risk to disrupt it. Stevens et al. (1978) find that with tenure increasing, it costs manager more to leave the firm. Therefore, the older managers have greater psychological commitment to the organization and they become more conservative about their decisions. Hambrick and Mason (1984) show that managerial characteristics could predict the strategic choices and firm performance level. They find that older executives are more conservative and have difficulty in grasping new ideas and learning new behaviors, however, the younger executives have more stamina both physically and mentally, so they are more willing to accept changes and resulting challenges.

2.4 CEO Age and Acquisition Behavior

Using the event study methodology of Fama et al. (1969), using the cross-sectional analysis on the cumulative abnormal return, CAR(-1,+1), around the announcement date, and the three-year buy-and-hold abnormal return after the acquisitions, Gao (2010) finds that managers with long horizon tend to use overvalued stock to acquire undervalued target. This occurs since such managers want their companies to maintain their stocks' overvaluation in the long-term. Likewise, the managers with short horizon are inclined to use cash to pay for the acquisitions. This allows them to hide the actual value of their firms and complete

the acquisitions even at cost of the firms' long-term value. Since they have short horizon, they generally emphasize on firms' short-term performance. He discovers that firms managed by short horizon managers have higher stock returns in short-term while firms operated by long horizon managers have higher stock returns in long-term. Yim (2013) demonstrates that bad acquisitions will not lead to higher turnover for both young managers and old managers. He also argues that no matter what the outcome for the firm, managers will be provided higher compensation following the acquisitions. Therefore, increases in compensation stimulate managers to pursue acquisitions early in their careers. Moreover, his study highlights that along with the aging process, CEOs personal characteristics will change which affects acquisition propensity.

3. Hypothesis

As discussed above, much of the literature has suggested that both the managers' agency and horizon problems contribute adversely to firm performance (Hart and Mellor, 1970; Jensen and Meckling, 1976; Fama, 1980; Rhodes, 1983; Richard and Shelor, 2002; Christian and Niels, 2005). On the contrary, other researchers put forward that managers' characteristics influence firm performance (Taylor, 1975; Child, 1974; Harman, 1991; Heaton, 2002; Roberts and Rosenberg, 2006; Roll, 1986; Forbes, 2005). This study hypothesizes that both of these aspects will affect firm performance. Since younger CEOs have more career concerns, they are faced with agency and horizon problems to a lesser degree when compared to the older CEOs. However, younger CEOs like to take risk and tend to be more overconfident about their investments, which results negatively on firm performance. Therefore the aspect which dominates will decide whether the younger CEOs could perform better than older CEOs. We state Hypothesis 1A

as follows:

Hypothesis 1A: *If the agency and horizon problems are dominant, firms operated by younger CEOs will perform better than the firms operated by older CEOs in both short-term and long-term post takeovers.*

As noted earlier, Fama (1980) and Borland (1992) show that the younger CEOs care about their careers, because their performance is related to their compensation and future demand in the labor market. Compared to the older CEOs, the younger CEOs have a longer horizon. Therefore, due to career concerns and assessment from labor market, they have a stronger motivation to manage the firm well. In a study of mutual fund manager characteristics, Chevalier and Ellison (1999) observe that younger CEOs have greater career concerns than older CEOs; thus they try to use strong performance in exchange for a longer tenure at the firm. While for the older CEOs, they have a shorter horizon. As they approach retirement, they usually are faced with more serious agency and horizon problem. An extensive body of literature has found that older CEOs like to manipulate their firms prior to retirement (Dechow and Sloan, 1991; Gibbons and Murphy, 1992; Barker and Mueller, 2002). Older CEOs intend to manipulate the short-term firm performance to benefit them at the cost of firm long-term performance. Therefore, this study predicts that due to career concerns, younger CEOs make acquisitions driven by firm value maximization, while the older CEOs have shorter horizon and make acquisitions driven by the resulting agency and horizon problems. Accordingly, following the acquisitions, firms managed by young CEOs perform better than the firms operated by old CEOs in both short-term and long-term.

Hypothesis 1B: *If the physiological and psychosocial problems are dominant, the firms operated by younger CEOs will perform worse than the firms operated by older CEOs in both short-term and long-term post takeovers.*

The physiological and psychosocial characteristics of the CEO change within the context of a normal human aging process, which may influence top management in its decisions and ultimately firm performance. Compared to younger managers, older managers have less energy and drive. What's more, they are often very conservative. Some research provides evidence that to some extent, the firm performance depends on the quality and character of top management. With the level of energy decreasing, the older managers have less physical passion to make risky investments, to change to a new environment or to accept new things (Child, 1974; Harman, 1991; Roberts and Rosenberg, 2006). Not only do managers age, but also their psychological characteristics are altered. When managers are young, they often overestimate their ability. They think they have capability to handle different investments and without worry of failure. However, they are often overconfident, as they do not have ability to recognize and correct their cognitive biases. Therefore they often make bad decisions and value-destroying investments (Carlsson and Karlsson, 1970; Hambrick and Mason, 1984; Roll, 1986; Heaton, 2002; Forbes, 2005; Malmendier and Tate, 2005 and 2008). Because younger managers have more energy and are more likely to be overconfident about their ability, they usually take risks and make overinvestments. Therefore, I predict that due to the differences in both physiological and psychosocial qualities, the younger CEOs intend to make value-destroying acquisitions, resulting in firm's bad performance in both short-term and long-term.

4. Data

The sample period of this study is from January 1, 1993 to December 31, 2006. During this period, the final sample consists of 1062 acquisitions from the Thomson Financial SDC Platinum Merger and Acquisition Database, which meet the following's criteria:

1. Public acquirers and U.S. targets.
2. The acquisitions are completed.
3. The acquirers' primary stock exchanges: Amex, NYSE and NASDAQ.
4. The acquirer controls less than 50% of the targets' shares prior to the announcement and owns 100% of the target's shares after the transactions.
5. The deal value of transactions disclosed in SDC is more than $1 million.
6. Not involving an acquirer from either the financial sector (SIC code 6000-6999) or the utility sector (SIC code 4900-4999).
7. The financial statement information and stock price data of acquirers are available in Compustat and CRSP databases separately.

There are four categories of variables in this study: CEO characteristics, acquirer characteristics, deal characteristics and governance characteristics. I gather the data about CEO characteristics from the Execucomp database. The data include AGE, TENURE, OWNERSHIP and EBC (equity based compensation). The AGE is the CEO chronological age. TENURE refers to the number of years that a person has been CEO in a specific firm. According to Denis et al. (1997), I define OWNERSHIP as the CEO's percentage holding of firm's total common shares, which exclude any unexercised stock options. Based on the Bryan et al. (2000), EBC is measured as ratio of sum of value of awards from annual stock option and restricted stock grants to total compensation. From the Compustat and CRSP databases, I collect the data on acquirer characteristics. The acquirer characteristics variables include FIRM SIZE, MVE, LEVERAGE, FCF, CAPEXP

and PASTRETURN. FIRM SIZE is book value of total assets (item6). MVE is the product of the number of shares outstanding multiplied by the stock price at the 30th trading day prior to announcement date. LEVERAGE is the ratio of the sum of the long-term debt (item9) and debt in current liabilities (item34), to the value of total assets (item6) minus total common equity (item60) and plus the product of common shares outstanding (item25) and fiscal end price (item199). FCF is defined as operation income before depreciation (item13) minus interest expenses (item15), minus income taxes (items16), minus capital expenditure (item128). CAPEXP is capital expenditure (item128). I calculate the acquirer's PASTRETURN in the same way as Masulis et al. (2007). I use CRSP value-weighted return to calculate the buy-and-hold abnormal returns (BHARs) during the period (-210, -11), which measures the bidders' past returns. From the Thomson Financial SDC Platinum Merger and Acquisition database, I find the deal characteristics data, which includes DEAL VALUE, RDV, PUBLIC, STOCK, MA, and DIVERSIFYING. DEAL VALUE is directly extracted from SDC database, while the RDV is measured as deal value over bidder market value of equity defined above. PUBLIC is a dummy variable, equaling to 1 for public targets, and 0 otherwise. STOCK is a dummy variable, equaling to 1 for deals at least partially stock-financed, and 0 otherwise. Similarly, the DIVERSIFYING dummy variable equals to 1 if bidder and target do not share a Fama-French industry, and 0 otherwise. MA variable measures activities of mergers and acquisitions in 12 different industries. MA variable is calculated as the ratio of the value of all corporate control transactions (more than 1 million) reported by SDC in each prior year and each Fama French industry divided by the total book value of assets of all Compustat firms in the same year and same Fama French industry. From the Risk Metrics database, I use the GIM index to describe governance characteristics. The Risk Metrics published six volumes over the years: 1990, 1995, 1998, 2000, 2002, and 2006. I find 762 acquisitions with GIM index data

from these years. From the Compustat and CRSP databases, I collect the target data of 480 acquisitions. TOBINQ is defined as the ratio of the value of total assets (item6) minus total common equity (item60) and plus the product of common shares outstanding (item25) and fiscal end price (item199) to book value of assets (item6). R&D/SALES refers to the ratio of the research and development expense (item46) over the sales (item117). SALESGTH is the ratio of sales (item117) measured at fiscal yearend of the announcement year to the sales (item117) measured at the fiscal yearend of the year prior to the announcement year.

5. Methodology

5.1 Measurement of Short-term Firm Performance of Acquirers

This study uses Cumulative Abnormal Returns (CARs) to measure the bidder's short-term stock performance. The event windows are (0, +1) and (-1, +1), where day 0 is the announcement day. The estimation window is 270 days, starting at the 510th until the 240th day prior to the announcement day. The daily stock returns are obtained from CRSP database. Based on the methodology of Brown and Warner's (1980), I use a standard event study methodology and use the market model as the benchmark:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it} \quad (1)$$

Where, R_{it} is the daily return for stock i on day t, R_{mt} is the daily value-weighted market return on day t, α_i and β_i are parameters, and ε_{it} is the error term. Accordingly, the abnormal return for firm i on day t is measured as:

$$AR_{it} = R_{it} - \alpha_i - \beta_i R_{mt} \quad (2)$$

We cumulate the abnormal return over the event window to obtain the cumulative abnormal return:

$$CAR_{t_1,t_2} = \sum_{t_1}^{t_2} AR_{it} \quad (3)$$

Where t_1 is 1th day before the event day and t_2 is the 1th after the event day.

5.2 Measurement of Long-term Firm Performance of Acquirers

There are two common methods to measure the firm's long-term stock performance, the buy and hold abnormal returns and calendar-time portfolio approach. Fama (1998) strongly advocates using calendar-time portfolio approach to measure the firm's long-term abnormal returns. He points out that the BHAR assumes independence of multiyear event-firm abnormal returns and uses problematic model, while the calendar-time portfolio approach accounts for the dependence of event-firm abnormal returns and presents a better approximation for the normal distribution. In order to more exactly measure the firm's long-term stock performance, both methods are employed in this study.

5.2.1 Buy and hold abnormal returns (BHAR)

I use BHARs to measure acquirers' firm performance over 36 months and 60 months following the acquisitions. Barber and Lyon (1997) introduce the use of BHAR to measure the abnormal stock returns. For the sample firms, the abnormal return is calculated as:

$$AR_{it} = R_{it} - E(R_{it}) \quad (4)$$

Where R_{it} is the return for firm i on month t, $E(R_{it})$ is the month t expected return of firm i. This study considers a value-weighted market index (R_{mt}) as the expected return of each stock.

Unlike the measure of CARs, the BHAR for each firm is calculated as the return on a buy-and-hold investment in a sample firm less the return on a buy-and-hold investment in a benchmark portfolio over the τ months. This is calculated as follows:

$$BHAR_{i\tau} = \prod_{t=1}^{\tau}[1 + R_{it}] - \prod_{t=1}^{\tau}[1 + E(R_{mt})] \quad (5)$$

5.2.2 Calendar time portfolio approach

Calendar time abnormal returns are calculated over the 36 months and 60 months after the acquisitions. The estimation window is from 17th month prior to the announcement day to the 8th month prior to the announcement day. The Fama and French (1993) three-factor model is used to calculate calendar-time abnormal returns:

$$AR_{it} = R_{it} - R_{ft} - \beta_{i1}(R_{mt} - R_{ft}) - \beta_{i2}HML_t - \beta_{i3}SMB_t \quad (6)$$

Where, AR_{it} is the monthly abnormal return of the calendar-time portfolio. β_{i1}, β_{i2}, β_{i3} parameters are estimated by regressing stock i monthly excess returns on the monthly market portfolio excess returns, book to market factor returns, and size factor returns. HML_t and SMB_t are the book-to-market factor returns and size factor returns as developed by Fama and French (1993). HML_t is the high-minus-low book-to-market portfolio return in month t; SMB_t is the small-minus-big size portfolio return in month t.

5.3 Measurement of Operation Performance

Following Healy et al. (1992), I consider return on asset (ROA) to measure firm's profitability. The ROA of each firm is defined as:

$$ROA = \frac{operation\ income\ before\ depreciation\ (item13)}{total\ assets\ (item\ 6)} \quad (7)$$

In order to exclude industry effects, I also calculate industry-adjusted ROA of each firm, which is calculated as firm ROA minus the median ROA of Compustat firms in the same industry.

5.4 Cross-sectional Analysis of Market Performance

I use Ordinary Least Square (OLS) regression models to study the relationship between CEO age and firm performance. I use CAR(0,+1) and

CAR(-1,+1) as dependent variables to measure the short-term firm stock performance around the announcement day. I also consider the three-year and five-year firm's industry-adjusted ROAs as dependent variables. ROA provides a measure about firms' long-term operating performance. In the models, the dependent variable PERFORMANCE is substituted for CAR(0,+1), CAR(-1,+1), 3yROA, and 5yROA. To analyze the influences of CEO age on firm's performance, I use three dummy variables to divide CEO age into four groups. Following Yim (2013), Dummy1 equals to 1 if CEO is between 50 and 59 years old and equals to 0 otherwise. It's commonly accepted that ordinarily, CEOs will retire at age 65 (Dechow and Sloan, 1991; Gibbons and Murphy, 1992; Murphy and Zimmerman, 1993; Brickley et al., 1999). Therefore, age 65 is an important milestone in CEO's career. Dummy2 equals to 1 if CEO is between age 60 and age 64, and equals to 0 otherwise. Dummy3 equals to 1 if the CEO equals to or more than 65 years old, and equals to 0 otherwise. Only taking CEO age into account will be problematic, because a young CEO with longer tenure may not be perform worse than the old CEO with shorter tenure. Longer tenure will make CEO have more experience and better ability to operate the firm. Accordingly, I use the variable AGETENURE to combine the effects of CEO age and tenure. I define AGETENURE as the natural logarithm of the product of CEO age and tenure. In order to better capture the relationship between CEO age and firm performance, I control for variables on acquirer characteristics, deal characteristics and governance characteristics.

Model1: (8)

$$PERFORMANCE = \beta_0 + +\beta_1 * DUMMY1 + \beta_2 * DUMMY2 + \beta_3 * DUMMY3 + \beta_4 * MVE + \beta_5 * LEVERAGE + \beta_6 * FCF + \beta_7 * CAPEXP + \beta_8 * PASTRETURN + \varepsilon$$

Model2: (9)

$$PERFORMANCE = \beta_0 + +\beta_1 * DUMMY1 + \beta_2 * DUMMY2 + \beta_3 * DUMMY3 + \beta_4 * MVE + \beta_5 * LEVERAGE + \beta_6 * FCF + \beta_7 * CAPEXP + \beta_8 * PASTRETURN + \beta_9 * RDV + \beta_{10} * PUB + \beta_{11} * STOCK + \beta_{12} * MA + \beta_{13} * DIVERSIFYING + \varepsilon$$

Model3: (10)

$$PERFORMANCE = \beta_0 + +\beta_1 * DUMMY1 + \beta_2 * DUMMY2 + \beta_3 * DUMMY3 + \beta_4 * MVE + \beta_5 * LEVERAGE + \beta_6 * FCF + \beta_7 * CAPEXP + \beta_8 * PASTRETURN + \beta_9 * RDV + \beta_{10} * PUB + \beta_{11} * STOCK + \beta_{12} * MA + \beta_{13} * DIVERSIFYING + \beta_{14} * EBC + \beta_{15} * OWNERSHIP + \varepsilon$$

Model4: (11)

$$PERFORMANCE = \beta_0 + +\beta_1 * DUMMY1 + \beta_2 * DUMMY2 + \beta_3 * DUMMY3 + \beta_4 * MVE + \beta_5 * LEVERAGE + \beta_6 * FCF + \beta_7 * CAPEXP + \beta_8 * PASTRETURN + \beta_9 * RDV + \beta_{10} * PUB + \beta_{11} * STOCK + \beta_{12} * MA + \beta_{13} * DIVERSIFYING + \beta_{14} * EBC + \beta_{15} * OWNERSHIP + \beta_{16} * GIM + \varepsilon$$

Model5: (12)

$$PERFORMANCE = \beta_0 + +\beta_1 * AGETENURE + \beta_2 * MVE + \beta_3 * LEVERAGE + \beta_4 * FCF + \beta_5 * CAPEXP + \beta_6 * PASTRETURN + \varepsilon$$

Model6: (13)

$$PERFORMANCE = \beta_0 + +\beta_1 * AGETENURE + \beta_2 * MVE + \beta_3 * LEVERAGE + \beta_4 * FCF + \beta_5 * CAPEXP + \beta_6 * PASTRETURN + \beta_7 * RDV + \beta_8 * PUB + \beta_9 * STOCK + \beta_{10} * MA + \beta_{11} * DIVERSIFYING + \varepsilon$$

Model7: (14)

$$PERFORMANCE = \beta_0 + +\beta_1 * AGETENURE + \beta_2 * MVE + \beta_3 * LEVERAGE + \beta_4 * FCF + \beta_5 * CAPEXP + \beta_6 * PASTRETURN + \beta_7 * RDV + \beta_8 * PUB + \beta_9 * STOCK + \beta_{10} * MA + \beta_{11} * DIVERSIFYING + \beta_{12} * EBC + \beta_{13} * OWNERSHIP + \varepsilon$$

Model8: (15)

$$PERFORMANCE = \beta_0 + +\beta_1 * AGETENURE + \beta_2 * MVE + \beta_3 * LEVERAGE + \beta_4 * FCF + \beta_5 * CAPEXP + \beta_6 * PASTRETURN + \beta_7 * RDV + \beta_8 * PUB + \beta_9 * STOCK + \beta_{10} * MA + \beta_{11} * DIVERSIFYING + \beta_{12} * EBC + \beta_{13} * OWNERSHIP + \beta_{14} * GIM + \varepsilon$$

6. Empirical Results and Discussion

6.1 Short-term performance

I first want to analyze the relationship between CEO age and short-term firm performance. In the Table 2, Panels B, C, and D indicate that the CARs over windows (-1,0), (0,+1), (-1,+1) and (-2,+2) of group CEO age more than 50, group CEO age between 50 and 59, and group CEO age between 60 and 64 are negative, while the Panel E shows that the CARs over the same windows of group CEO age more than 64 are positive. Especially the CAR (0,+1) of this group is 0.46% significantly positive at 5% level. The result indicates that except for CEOs aged more than 64, CEOs acquisitions perform poorly in the short-term. This is particularly the case for the CEOs younger than 50 years old, where the CAR over window (0,+1) is -0.95%, which is the lowest cumulative abnormal return among the four different age groups. The results suggest that the acquisitions made by younger CEOs do not bring acquiring firms profits in the short-term.

(Insert Table 2 here)

The results in the Table 3 are consistent with those of the Table 2. Firms with CEOs age less than 50 have lowest CARs over the four event windows, which means these firms perform worse than firms from the other three groups. Especially, the CAR over window (0,+1) of group of CEOs age less than 50 is significantly different from the CARs over the same window of groups of CEOs aged between 60 and 64, and more than 64 at 10% and 5% significant levels respectively. These results indicate that the short-term stock performance of firms operated by the younger CEOs are worse than those of firms managed by the older CEOs.

(Insert Table 3 here)

The Figure 1 presents the cumulative abnormal returns of firms from different age groups, from 30 days prior to the announcement day to the 60 days after the

announcement day. The CARs of firms with CEOs aged 60 to 64 are higher than the CARs of the other firms on average. Particularly 2 days before and after the announcement day, the CAR of group of CEO age 60 to 64 is the highest. On the contrary, the CARs of firms operated by younger CEOs aged less than 50 are lower than the CARs of other firms. Except for the CARs of group age more than 64, the CARs of the other three age groups are decreasing after the announcement day. Among the other three groups, the CARs of younger CEO group is declining more rapidly after the announcement day. Figure 1 indicates that the short-term stock performance of firms operated by younger CEO aged less than 50 perform worst, which is not consistent with our hypothesis 1A. This result however lends support to hypothesis 1B.

(Insert Figure 1 here)

The regression results of CEO age and CAR(0,+1) are presented in the Table 4, Panel A. The coefficients of DUMMY3 are positive and significant in Models 1 to 4. Particularly in Model 4, the coefficient of DUMMY3 is significant at level 1%. The coefficient of DUMMY2 is positive and significant only in the Model 2. The coefficients of AGETENURE are positive and significant in the Models 5, 7, and 8. These results together indicate that the older the CEOs and the longer the tenure, the better short-term stock performance the firms will have subsequent to acquisitions. Additionally, this relationship between CEO age and firm short-term performance is especially evidently among the group aged over 64. Table 4, Panel B shows results about the relationship between CEO age and short-term performance, when the dependent variable is CAR(-1,+1). The coefficients of DUMMY1, DUMMY2, and DUMMY3 are all positive and significant in Models 1 to 4. Similarly, the coefficients of AGETENUREA are positive and significant at the 5% level in Models 5 to 8. These results strongly suggest that older CEOs with longer tenure manage firms better. This phenomenon is observed with statistical significance in all three age groups.

(Insert Table 4 here)

The results of the event study in the short term and regression results on the CARs highlight the relationship between CEO age and firms' short-term performance. The younger CEOs aged less than 50 years old operate firms comparatively poorly in the short-term. These firms experience negative abnormal stock returns around the announcement and underperform than other groups, which is contrary to the hypothesis 1A, which predicted, due to career concerns, younger CEO would better operate firms in the short-term, in order to obtain a positive assessment from the labor market. This result, may relate to the characteristics of younger CEOs'.

6.2 Long-term performance

For the firms' long-term performance, I firstly use the BHARs to measure the firm's long-term stock performance after the mergers and acquisitions. In Table 5, Panels B, C, D and E show results of the BHARs from four different age groups. The value of BHAR over the window (0,+60) for the group of CEOs aged less than 50 is -17.69%, which is the lowest. This suggests that the firms operated by younger CEOs less than 50 perform worse in the 5 years after the acquisitions, when compared to other CEOs. When focusing on BHARs over window (0,+36), the group CEOs older than 64 has the lowest BHAR and the group CEO younger than 50 has the second lowest BHAR. Even in the 3 years after acquisitions, the performance of firms managed by younger CEOs is weaker.

(Insert Table 5 here)

Table 6 compares the mean differences in BHARs among the four different age groups. The mean BHARs over windows (0,+36) and (0,+60) of group age less than 50 are -16.97% and -17.69% respectively, which are lower than the mean BHARs over the same windows of group age between 50 and 59,

and group age between 60 and 64, and significant at levels 5% and 10%, respectively. Firms from group (1) to group (4) have similar weak long-term stock performance. From the results, CEOs younger than 50 and CEOs older than 64 years operate firms worse than other CEOs in the long-term.

(Insert Table 6 here)

Figure 2 presents the average changes of BHARs in the 60 months after the announcement day. Firms operated by CEOs aged less than 50 have decreasing BHARs in the 5 years following the acquisitions. Particularly from 30 months, the BHARs of younger CEOs is lower than the BHARs of CEO groups aged between 50 and 59, and between 60 and 64. The BHARs of the CEO groups of age between 50 and 59, 60 and 64, and older than 64 first decline from announcement day to the approximately 30 months after the acquisitions, and then begin to increase from 30 months after the acquisitions. As of 54 months after the acquisitions, the BHAR of younger CEOs underperform when compared to the BHARs of the other three age groups. The BHAR results provide weak evidence that the firms operated by younger CEOs perform badly following the takeovers in the long-term.

(Insert Figure 2 here)

According to Fama (1998) and Michell and Stafford (2000), the Calendar-time portfolio approach considers event-firm abnormal returns and provides a better approximation for the normal distribution, when compared to the BHAR method. I also use Calendar-time portfolio approach to better measure the long-term stock performance. Table 7 presents the results of Calendar-time portfolio approach. In Panel A, the coefficients of alpha are not significant. This indicates that the calendar-time abnormal returns over window (0,+36) of four age groups are not observed with statistical significance. Although the results do not provide the evidence that firm's long-term performance in the 3 years after the acquisitions is related to the CEO age, the results indicate the firms in the sample

do not underperform the benchmark index of firms. Likewise, in the Panel B, the calendar-time abnormal returns over window (0,+60) of four age groups are also not significant across all regressions. Therefore, the Calender-time portfolio approach does not offer evidence that the firm's long-term performance is related to the CEO age.

(Insert Table 7 here)

In order to better judge long-term firm performance, I consider not only the firm's stock performance, but also I focus on the firm's operating performance following the acquisitions. In table 8, considering the ROA1 and ROA2, which is measured by data for first year and second year after the acquisitions, the values of ROA1 and ROA2 of group aged less than 50 are significantly lower than the values of ROA1 and ROA2 in the other three groups. The values of ROA3, ROA4 and ROA5 of group aged less than 50 are lower than those of groups aged between 50 and 59, and 60 and 64. The 3yROA and 5yROA are measure by ROA data using three year and five year averages following the acquisitions. The values of 3yROAs and 5yROAs for groups aged between 50 and 59, 60 and 64, and more than 64 are higher than those for group aged less than 50. The mean differences in ROAs between the four age groups strongly imply that the operating performance of firms operated by younger CEOs who are less than 50 years old is inferior in the long-term after the acquisitions.

(Insert Table 8 here)

Table 9 presents the regressions results for the relationship between CEO age and operating firm performance. When 3yROA is the dependent variable, the results are shown in Panel A. DUMMY1, DUMMY2, and DUMMY3 variables are positive and significant in Models 1 through 4. The AGETENURE variable is also positive and significant at the 1% level in models 5 and 8, and at 5% level in models 6 and 7. These two results together indicate that the firms with older CEOs have better long-term operating performance following acquisitions

activities. In Panel B, the dependent variable is 5yROA. DUMMY1 and DUMMY3 are positive and significant in models 1 to 3. DUMMY1, DUMMY2, and DUMMY3 are all positive and significant only in Model 4. AGETENURE is positive and significant in models 5 to 8. Although the results of 5yROA are not as strong as the results of 3yROA, they are still suggestive that older CEOs with longer tenure could enhance firm operating performance in the long-term.

(Insert Table 9 here)

From the BHARs and Calendar-time portfolio approach, I find that the relationship between CEO age and long-term stock performance is not overwhelmingly strong or robust. However, when using ROA to measure the firm's long-term operating performance, the results suggest that compared to the older CEOs, younger CEOs less than 50 years old are detrimental to firm operating performance in the long-term, consistent with hypothesis 1B.

The above analysis finds that the younger CEOs actually perform worse both in the short and long-term following acquisitions, consistent with hypothesis 1B. Further research is needed to analyze whether the overconfidence and risk taking lead to younger CEOs' inferior performance.

6.3 target analysis

Among the 1062 acquisitions, there are 480 acquisitions with public targets and data available in the Compustat database. I use this subsample to do the following studies on target. First I analyze whether the younger CEOs would like to take risk to make acquisition on high-growth targets. There exists a well-developed literature on the characteristics of high-growth firms (Shepherd, 1986; Lang et. al, 1996; Denis, 1994; Kallapur and Trombley, 1999; Cui and Mak, 2002; Aivzian et. al, 2005). These studies usually use Tobin's q, R&D, and sales growth to divide the firms. The high-growth firms typically have high Tobin's q, R&D, and sales growth. Because these firms intend to take risk to grow fast, their cash

flows and stock prices are characteristically more volatile. I compare the TOBINQ, R&D/SALES, SALESGTH of the subsample and the number of private targets acquired by the bidders among the four different age groups of full sample.

In the Table 10, group aged less than 50 has the highest TOBINQ of 3.4712. This group also has the highest R&D/SALES of 0.4403; however this is not significantly different from the R&D/SALES of groups aged between 50 and 59, and 60 and 64. The R&D/SALES of group aged less than 50 is only higher than the R&D/SALES of group aged more than 64 at 10% level of significance. For the SALESGTH, group aged less than 50 has the highest value. Additionally, the SALESGTH of group aged less than 50 is significantly higher than the SALESGTHs of the other three groups. When looking at the number of private targets acquired by bidders, the number of private targets acquired by CEOs of group aged less than 50 is significantly different from the number of group aged between 50 and 59, and 60 and 64. The results in the Table 10 indicate that the younger CEOs less than 50 years old may intend to acquire high-growth and private targets, which are of very high risk. Since younger CEOs have more energy and are more prone to take risks than older CEOs, they are inclined to expand firms and overinvest.

(Insert Table 10 here)

Furthermore, I use the subsample of 480 acquisitions to do the regression analysis on the relationship between short-term stock performance and target characteristics. I examine whether the high-growth companies are of higher risk. As many firms do not have R&D data in the Compustat database, I only use TOBINQ and SALESGTH separately as independent variables in the regressions and also use deal characteristic variables as control variables: RDV, STOCK, MA, and DIVERSIFYING. In Table 11, when the dependent variable is CAR(0,+1), regression (1) indicates that TOBINQ has a negative relation with the CAR(0,+1) at the 1% significance level. When the dependent variable is CAR(-1,+1), the

regression (1) also shows that the TOBINQ is negatively related to the CAR(0,+1) at the significance level of 5%. When SALESGTH is the independent variable, both regressions fail to show a statistically significant relation with either CAR(0,+1) or CAR(-1,+1). The results of TOBINQ strongly indicate that higher levels of Tobin's q lead to lower short-term abnormal returns around the announcement day. The results of SALESGTH show weakly a negative relationship between sales growth and short-term stock performance.

(Insert Table 11 here)

The difference of means and regression analyses on the targets provide evidence that younger CEOs take on more risk. They acquire many high-growth and private targets, which leads to inferior firm performance both in the short and long-term. Although I have indicated that younger CEOs are inclined to take risk and expand their firms, it is not yet clear whether younger CEOs make value-destroying acquisitions driven by overconfidence and hubris. I therefore analyze overconfidence's influence on firm performance.

Following the study of Berkovitch and Narayanan (1993), I analyze the relationship between target gain, acquirer gain and total gain to determine what motivations exist behind the acquisitions made by different CEOs of different age groups. If the acquisitions are driven by the synergy, the correlation between target gain and total gain and the correlation between target gain and acquirer gain should be both positive. If the motive is agency, these two correlations should both be negative. If the motive is hubris, the correlation between target gain and total gain should be zero, while the correlation between target gain and acquirer gain should be negative.

In Table 12, TARGET denotes the target gain and is used as the dependent variable of the regression. ACQUIRER denotes the acquirer gain and TOTAL denotes the total gain. These two variables are used as the independent variables. The Panel A presents the correlations between TARGET and TOTAL of four

different age groups. The coefficients of TOTAL are all significantly positive to the TARGET at the 1% significant level. More than this, the coefficient of CEOs group less than 50 is less than the coefficients of CEOs groups of age 50 to 59, and 60 to 64. This indicates that CEOs from all four age groups make acquisitions resulting from the synergy motive and older CEOs less than 65 create more synergy than younger CEOs. Panel B presents the results for the correlations of TARGET and ACQUIRER for the four different age groups. The coefficient of ACQUIRER for the group aged between 60 and 64 is significantly negative at the 1% level, which suggests that the CEOs close to the retirement make acquisition driven by the agency problem (Gibbons and Murphy, 1992; Brickley et al, 1999). The coefficients for ACQUIRER in the other three groups are not significant, which may indicate that acquisitions are driven by the hubris motive. The correlation between target gain and total gain indicate that CEOs younger than 50 years old make synergy gained acquisitions. However the correlation the between target gain and acquirer gain partially suggest that CEOs younger than 50 make acquisitions driven by overestimation. In Panel C, the mean target gain and acquirer gain of CEO group aged less than 50 are -103.732 and -1407.46 million dollars. The mean target gain of other three groups are positive and the mean acquirer gain of other three groups are much higher. This suggests that the CEOs younger than 50 years old make value-destroying acquisitions. If such acquisitions are not driven by an agency motive, they are more likely to be made by younger CEOs' overconfidence.

(Insert Table 12 here)

The analysis on the target gain and total gain provides evidence that the younger CEOs have less of an agency problem than the older CEOs, especially compared to CEOs close to the retirement. The analysis on the target gain and acquirer gain suggests that firms operated by younger CEOs underperform after acquisitions more likely resulting from younger CEOs' overconfidence. The

analysis on the target is consistent with the hypothesis that younger CEOs have more energy to take risk and focus on high-growth targets to expand their firms. Also within this explanation, younger CEOs are overconfident than their older counterparts, resulting in value-destroying acquisitions.

7. Conclusions

There is an extensive body of literature which examines the relationship between CEO age and firm performance. However, few works have analyzed the effect of CEO age on firm performance following acquisitions. Gao (2010) studies the relationship between CEO age and acquisitions behavior from the angle of managerial horizon. He finds that acquirers operated by short horizon CEOs have better short-term performance, while the acquirers managed by long horizon CEOs have better long-term performance. Yim (2013) indicates that younger CEOs are more likely to make acquisitions than older CEOs, since younger CEOs have longer tenure to benefit from the increased compensation after the acquisitions. Although they take managerial problem and age-related CEO characteristics into account, they do not analyze the role of career concerns or the physiological and psychosocial problem in acquisition decisions.

According to Fama (1980), Borland (1992), and Chevalier and Ellison (1999), younger CEOs have more career concerns, compared to older CEOs. Younger CEOs strive to perform well and get better assessment from the labor market, which could increase their compensation and make them more demanded by the market. Child (1974), Harman (1991) and Roberts and Rosenberg (2006) highlight that along the aging process, the CEO's physiological and psychosocial qualities change. In the physiological aspect, the younger CEOs have more energy, drive and willingness to accept challenges and changes. While in the

psychosocial aspect, the younger CEOs are overconfident about their ability and tend to make overinvestments. Usually, the younger CEOs have less experience and knowledge than the older CEOs. Therefore younger CEOs could not recognize or correct their bad decisions and mistakes.

Using a sample of 1062 acquisitions, I investigate the correlation between CEO age and short-term and long-term firm performance following acquisitions. The empirical results suggest that in the short-term, firms operated by younger CEOs perform worse around the announcement day compared to firms managed by older CEOs. In the long-term, the BHARs indicate that younger CEOs are less effective in their operation of firms following acquisitions. The Calendar-time portfolio approach does not find any strong relationship between CEO age and long-term stock performance. ROA results highlight the correlation between CEO age and firms' long-term operating performance after the acquisitions. From the ROA results, I find that the younger CEOs are inferior to the older CEOs both for the three and five year average ROAs post-acquisitions.

The short-term and long-term results are consistent with Hypothesis 1B: firms operated by older CEOs have better both short-term and long-term performance after acquisitions. In order to determine whether the younger group make poor acquisitions due to their physiological and psychosocial characteristics, I conduct a further analysis based on the subsample of 480 acquisitions. The empirical results of target subsample show that the younger CEOs opt to acquire private and high-growth companies to expand their firms. Furthermore, the empirical results partially suggest that older CEOs, especially close to retirement, are faced with an agency problem. Although younger CEOs are not faced with such an agency problem, they make value-destroying acquisitions driven by hubris. These two reasons together explain the poor firm performance after acquisitions, which is consistent with Hypothesis 1B.

Overall, the empirical results in this study indicate that although the

younger CEOs have career concerns, their overconfidence and risk taking dominate their career concerns, which leads to firms operated by younger CEOs to underperform firms managed by older CEOs both in the short-term and long-term post acquisitions.

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Appendices

Figure1 Short-term stock performance (CARs) of firms

The following graph is drawn by the cumulative abnormal returns of four different age groups over the daily event window (-30, +60).

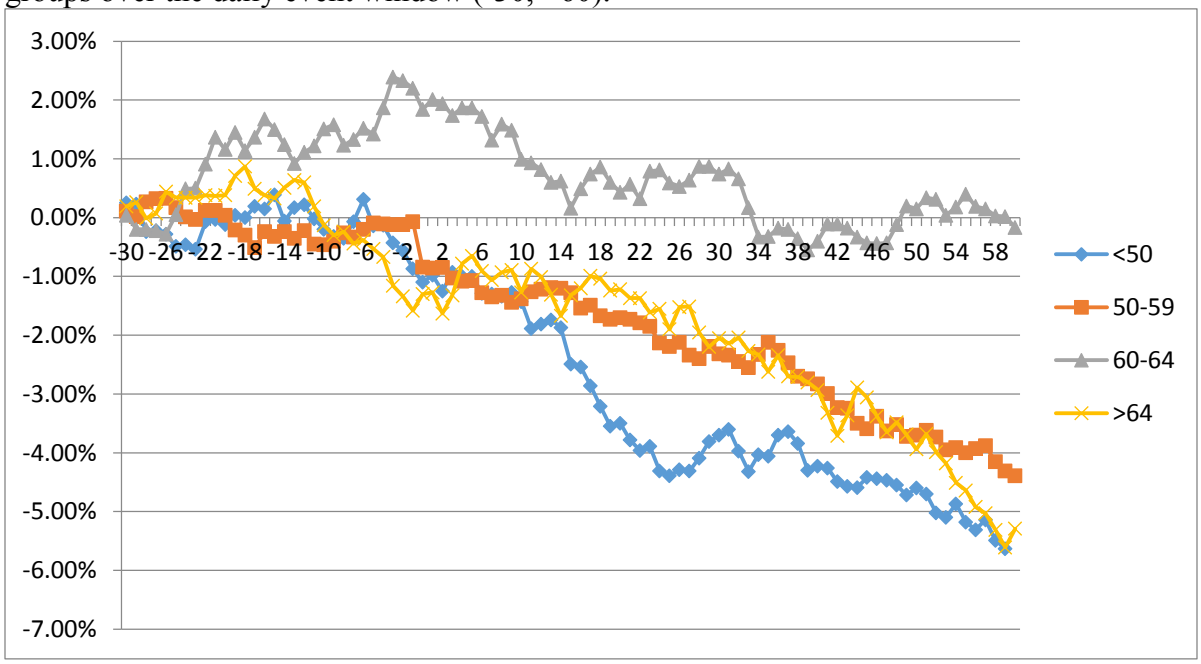

Figure2 Long-term stock performance (BHARs) of firms

The following graph is drawn by the buy-and-hold abnormal returns of four different age groups over the monthly event window (0, +60).

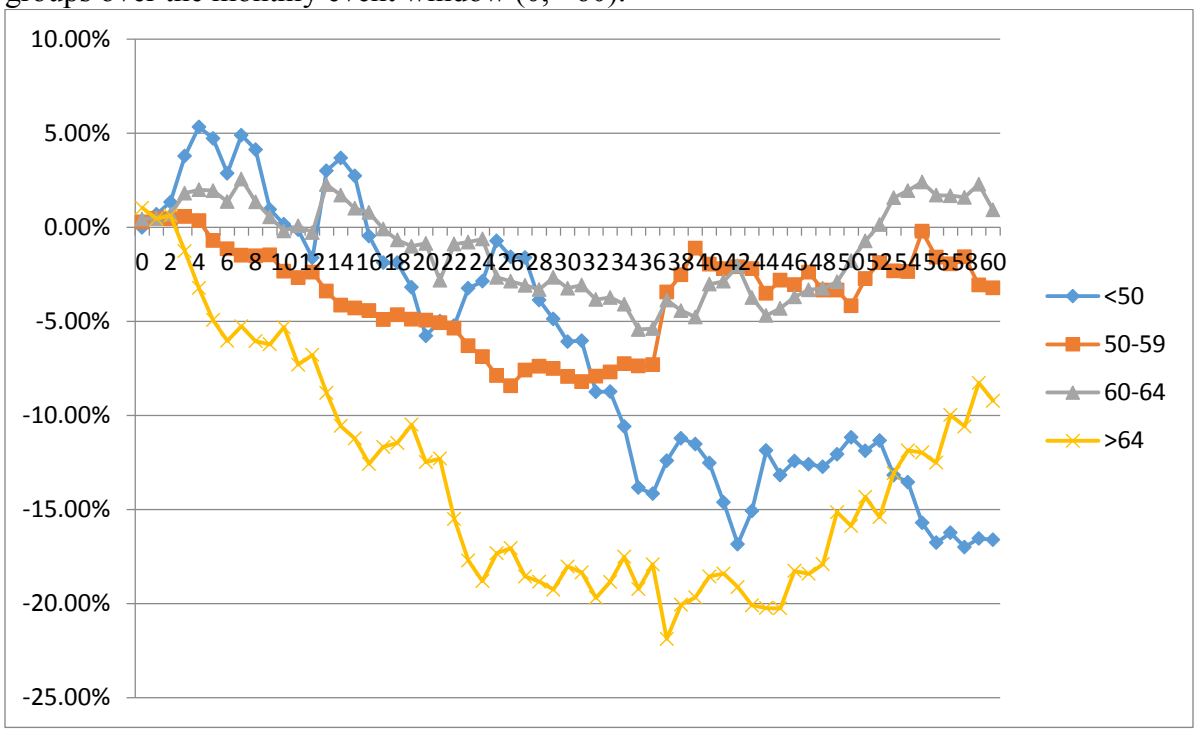

Table 1 Summary Statistics of Variables

The total sample includes 1062 completed US acquisitions from January 1, 1993 to December 31, 2006. The deal value of these acquisitions is at least $1 million. Acquirers are public firms in US that control less than 50% of targets' shares prior to the announcement and own 100% of targets' shares after the transactions. Acquirers from both financial (SIC code 6000-6999) sector and utility (SIC code 4900-4999) sector are excluded. Targets are from US. The acquirers have stock data in CRSP, financial statement data in Compustat, and CEO data in ExecuComp and RiskMetrics. Panel A reports the annual summary statistics of CEO age and tenure.

Panel A: Annual Summary of CEO Age and Tenure

	age						tenure					
year	N	Mean	Std. Dev.	Min.	Median	Max.	N	Mean	Std. Dev.	Min.	Median	Max.
1993	38	55.39	8.11	36	56.5	69	38	1.58	0.60	1	2	3
1994	51	54.86	6.32	40	55	68	51	2.04	0.94	1	2	5
1995	71	55.85	6.60	45	55	69	71	2.94	1.01	1	3	5
1996	85	55.02	7.32	39	55	74	85	3.01	1.37	1	3	5
1997	105	56.80	9.27	33	57	79	105	3.5	1.81	1	4	6
1998	116	53.99	8.20	34	55	76	116	4.03	2.23	1	4	11
1999	124	53.41	7.53	34	55	71	124	3.9	2.34	1	4	8
2000	109	54.02	7.67	40	55	72	109	3.94	2.54	1	3	9
2001	78	54.55	6.81	36	54	66	78	4.23	2.75	1	3	11
2002	66	55.41	6.53	42	54	71	66	4.74	2.63	1	4	11
2003	58	56.00	6.97	41	55	73	58	5.03	2.75	1	5	12
2004	71	55.73	8.03	42	55	73	71	5.87	3.71	1	5	13
2005	72	55.19	7.09	40	56	74	72	5.43	3.93	1	4	14
2006	18	52.00	6.19	39	52.5	61	18	7.17	4.69	1	6.5	17
Total	1062	54.91	7.59	33	55	79	1062	4.00	2.70	1	3	17

Panel B reports the summary statistics of variables about acquirers. AGE is the CEO chronological age. TENURE refers to the number of years that a person has been working as a CEO in a specific firm. OWNERSHIP is defined as the CEO's percentage holding of firm's total common shares, which exclude the unexercised stock option. EBC is the ratio of the sum of value of awards from annual stock option and restricted stock grants to total compensation. FIRM SIZE($million) is the book value of total assets. MVE($million) is the product of numbers of shares outstanding multiply by the stock price at the 30^{th} trading day prior to announcement date. LEVERAGE is total debt over the market value of total assets. FCF($million) is defined as operation income before depreciation minus interest expenses minus income taxes and minus capital expenditure. PASTRETURN is the BHARs during the period (-210, -11). CAPEXP($million) is the capital expenditure. DEAL VALUE($million) is extract from SDC. RDV is the ratio of deal value to the total book assets. PUBLIC equals to 1 for public target, and equals to 0 otherwise. STOCK equals to 1 for deals at least partially stock-financed, and equals to 0 otherwise. MA is the ratio of the value of all corporate control transactions (more than 1 million) reported by SDC for each prior year and each Fama French industry divided by the total book value of assets of all Compustat firms in the same year and same Fama French industry. DIVERSIFYING equals 1 if bidder and target do not share a Fama-French industry, and equals 0 otherwise. GIM is collected from the RiskMetrics.

Panel B: Summary of different variables about acquirers

	N	Mean	Std. Dev.	Min.	Median	Max.
CEO Characteristics Variable						
AGE	1062	54.91	7.59	33	55	79
TENURE	1062	4	2.7	1	3	17
OWNERSHIP	1062	0.04	0.16	0	0	2.21
EBC	1062	0.48	0.31	0	0.53	1
Acquirer Characteristics Variable						
FIRM SIZE	1062	8233.37	22071.9	8.58	1748.63	405200
MVE	1062	19032.9	43762.5	15.33	3159.32	507661.4
LEVERAGE	1062	0.1	0.11	0	0.07	0.61
FCF	1062	483.32	1377.81	-2476	70.88	16556
CAPEXP	1062	463.06	1115.46	0.06	75.27	15502
PASTRETURN	1062	0.21	0.68	-0.76	0.06	6.72
Deal Characteristics Variable						
DEAL VALUE	1062	1046.86	4398.21	1.2	155.07	89167.72
RDV	1062	0.32	4.84	-0.19	0.05	157.39
PUBLIC	1062	0.55	0.5	0	1	1
STOCK	1062	0.57	0.49	0	1	1
MA	1062	0.01	0.02	0.001	0	0.13
DIVERSIFYING	1062	0.24	0.43	0	0	1
Governance Characteristics Variable						
GIM	762	9.12	2.85	3	9	16

Panel C reports the summary statistics of variables about targets. TOBINQ is the Market value of assets over book value of assets. R&D/SALES is the ratio of the research and development expense over the sales. SALESGTH is the ratio of sales measured at fiscal yearend of announcement year to the sales measured at fiscal yearend of one year prior to the announcement year.

Panel C: Summary of different variables about targets

<50	N	Mean	Std. Dev.	Min.	Median	Max.
TOBINQ	81	3.47	5.33	0.55	1.85	32.62
R&D/SALES	81	0.44	2.21	0	0.05	19.63
SALESGTH	81	0.38	0.77	-0.36	0.15	5.45
50-59	N	Mean	Std. Dev.	Min.	Median	Max.
TOBINQ	273	2.35	2.01	0.33	1.71	20.17
R&D/SALES	273	0.33	1.38	0	0.04	12.61
SALESGTH	273	0.42	2.61	-0.65	0.15	42.44
60-64	N	Mean	Std. Dev.	Min.	Median	Max.
TOBINQ	95	2.09	1.3	0.76	1.62	7.3
R&D/SALES	95	0.22	0.92	0	0.02	8.19
SALESGTH	95	0.45	2.48	-0.83	0.12	23.78
>64	N	Mean	Std. Dev.	Min.	Median	Max.
TOBINQ	31	1.56	0.68	0.82	1.34	3.55
R&D/SALES	31	0.02	0.06	0	0	0.26
SALESGTH	31	0.1	0.22	-0.46	0.13	0.71
Total	N	Mean	Std. Dev.	Min.	Median	Max.
TOBINQ	480	2.44	2.76	0.33	1.67	32.62
R&D/SALES	480	0.31	1.44	0	0.03	19.63
SALESGTH	480	0.4	2.28	-0.83	0.14	42.44

Table2 Cumulative abnormal returns for acquirer firms

This table reports CARs for 8 event windows for full sample (Panel A), and subgroups classified by CEOs age. The 1042 observations are used to do the event study. There are 20 outliers excluded from the full sample. CARs are computed from Market Model estimated from day -510 to -240 relative to the announcement day. Panel B shows CARs of group age less than age 50. Panel C shows CARs of group age between age 50 and 59. Panel D shows CARs of group age between 60 and 64. Panel E shows CARs of group age more than age 64.

Panel A: Full sample

window	N	Mean CAR	Patell Z	+\-	Generalized Sign Z
(-60,-11)	1042	-0.55%	-1.197	497\545	-0.023
(-10,-2)	1042	0.01%	0.107	509\533	0.721
(-1,0)	1042	-0.41%	-4.121***	493\549	-0.271
(0,+1)	1042	-0.53%	-4.009***	500\542	0.163
(-1,+1)	1042	-0.50%	-3.417***	511\531	0.845
(-2,+2)	1042	-0.59%	-3.067***	486\556	-0.705
(+2,+10)	1042	-0.49%	-1.594	497\545	-0.023
(+11,+60)	1042	-3.08%	-5.711***	446\596	-3.186***

Panel B: <50

window	N	Mean CAR	Patell Z	+\-	Generalized Sign Z
(-60,-11)	243	-0.75%	-0.465	118\125	0.328
(-10,-2)	243	-0.87%	-1.864*	107\136	-1.085
(-1,0)	243	-0.60%	-2.058**	112\131	-0.443
(0,+1)	243	-0.95%	-3.298***	119\124	0.456
(-1,+1)	243	-1.03%	-3.15***	121\122	0.713
(-2,+2)	243	-1.26%	-2.849***	114\129	-0.186
(+2,+10)	243	-0.28%	-0.43	123\120	0.97
(+11,+60)	243	-4.73%	-3.447***	97\146	-2.37**

Panel C: (50-59)

N	Mean CAR	Patell Z	+\-	Generalized Sign Z
512	-1.15%	-1.795*	232\280	-1.174
512	0.23%	0.766	250\262	0.418
512	-0.48%	-3.898***	242\270	-0.289
512	-0.69%	-4.141***	236\276	-0.82
512	-0.53%	-2.921***	241\271	-0.378
512	-0.49%	-2.019**	238\274	-0.643
512	-0.45%	-0.747	242\270	-0.289
512	-2.76%	-3.884***	225\287	-1.793*

Panel D: (60-64)

window	N	Mean CAR	Patell Z	+\-	Generalized Sign Z
(-60,-11)	194	1.69%	1.592	106\88	1.963**
(-10,-2)	194	1.22%	2.61***	109\85	2.394**
(-1,0)	194	-0.34%	-1.751*	89\105	-0.481
(0,+1)	194	-0.04%	-0.325	94\100	0.238
(-1,+1)	194	-0.14%	-0.702	97\97	0.669
(-2,+2)	194	-0.27%	-0.905	87\107	-0.768
(+2,+10)	194	-1.10%	-1.893*	83\111	-1.343
(+11,+60)	194	-1.50%	-1.23	81\113	-1.631

Panel E: >64

N	Mean CAR	Patell Z	+\-	Generalized Sign Z
93	-1.40%	-1.343	41\52	-0.687
93	-1.46%	-2.192**	43\50	-0.272
93	0.29%	1.207	50\43	1.182
93	0.46%	2.099**	51\42	1.389
93	0.34%	1.524	52\41	1.597
93	0.01%	0.386	47\46	0.559
93	-0.02%	-0.155	49\44	0.974
93	-3.82%	-2.654***	43\50	-0.272

*, **, ***, denote statistical significant at 10%, 5%, 1% levels, respectively.

Table 3 Mean differences in CARs between age groups

This table reports mean differences in CARs between four different age groups. CARs are computed over four event windows.

	<50	50-59	60-64	>64						
	(1)	(2)	(3)	(4)	(1)vs(2)	(2)vs(3)	(3)vs(4)	(1)vs(3)	(1)vs(4)	(2)vs(4)
window	**mean**	**mean**	**mean**	**mean**	**t-value**	**t-value**	**t-value**	**t-value**	**t-value**	**t-value**
(-1,0)	-0.60%	-0.48%	-0.34%	0.29%	-0.2949	-0.4210	-1.2757	-0.5681	-1.6403	-1.7542*
(0,+1)	-0.95%	-0.69%	-0.04%	0.46%	-0.5745	-1.5510	-0.7715	-1.6858*	-2.1142**	-2.0057**
(-1,+1)	-1.03%	-0.53%	-0.14%	0.34%	-0.9797	-0.8707	-0.6922	-1.4819	-1.8775*	-1.4247
(-2,+2)	-1.26%	-0.49%	-0.27%	0.01%	-1.2547	-0.4214	-0.3287	-1.3903	-1.3657	-0.6349

*, **, ***, denote statistical significant at 10%, 5%, 1% levels, respectively.

Table 4 OLS Regressions: analysis about relationship between CEO age and firm's short-term stock performance

Model (1) to (7) use 1042 observations, which exclude 20 outliers from the full sample 1062 acquisitions. Model (8) use 754 observations, which exclude 8 outliers from the subsample of 762 acquisitions with available GIM data. In the regressions, DUMMY1: 1 for CEO aged between 50 and 59, 0 otherwise, DUMMY2: 1 for CEO aged between 60 and 64, 0 otherwise, DUMMY3: 1 for CEO aged 65 or more than 65, 0 otherwise. The MVE takes natural logarithm of market value of equity. FCF and CAPEXP are divide by total assets. PASTRETURN, RDV, MA, OWNERSHIP and EBC are multiplied by 100. In the Panel A, the dependent variable is CAR(0,+1). In the Panel B, the dependent variable is CAR(-1,+1).

Panel A: CEO age and CAR(0,+1)

Variable	**CAR(0,+1)**							
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
Intercept	-0.7109	0.1219	0.4232	-0.8657	-2.1080	-0.8850	-0.6227	-2.0059
	(0.4538)	(0.9012)	(0.6727)	(0.5177)	(0.1111)	(0.5137)	(0.6496)	(0.2415)
DUMMY1	0.4762	0.6100	0.6154	0.7651				
	(0.2601)	(0.151)	(0.1466)	(0.1162)				
DUMMY2	0.8396	0.8889*	0.8555	0.8970				
	(0.1155)	(0.0923)	(0.1064)	(0.1406)				
DUMMY3	1.5387**	1.3663**	1.4582**	2.4191***				
	(0.021)	(0.0371)	(0.027)	(0.0013)				
AGETENURE					0.4427*	0.3562	0.3763*	0.4210*
					(0.0523)	(0.1151)	(0.096)	(0.0979)
MVE	-0.074	0.0043	-0.0062	0.0310	-0.1156	-0.0273	-0.0372	0.0025
	(0.4553)	(0.9666)	(0.9526)	(0.7963)	(0.2572)	(0.7958)	(0.7269)	(0.9838)
LEVERAGE	0.0017	0.0080	0.0046	0.0137	0.0043	0.0111	0.0072	0.0177
	(0.9224)	(0.6515)	(0.7934)	(0.5186)	(0.8061)	(0.527)	(0.6822)	(0.4)
FCF	-0.0037	-0.0046	-0.0076	0.0002	-0.0028	-0.0027	-0.0065	0.0001
	(0.8661)	(0.8295)	(0.7235)	(0.9938)	(0.8957)	(0.9002)	(0.7614)	(0.9959)
CAPEXP	0.0366	0.0494	0.0506	0.0679	0.0376	0.0505	0.0512	0.0580
	(0.3592)	(0.2115)	(0.2001)	(0.201)	(0.3462)	(0.2016)	(0.1942)	(0.275)
PASTRETURN	0.0044*	0.0047*	0.0073***	0.0053	0.0045*	0.0046*	0.0071***	0.0050
	(0.0889)	(0.0701)	(0.0087)	(0.1002)	(0.082)	(0.0764)	(0.01)	(0.1229)
RDV		-0.0080	-0.0091	-0.0078		-0.0104	-0.0119	-0.0121
		(0.8105)	(0.7833)	(0.8087)		(0.754)	(0.7196)	(0.7073)
PUBLIC		-1.5820***	-1.6438***	-1.4641***		-1.5588***	-1.622***	-1.4705***
		(<.0001)	(<.0001)	(0.0003)		(<.0001)	(<.0001)	(0.0002)
STOCK		-1.3594***	-1.3309***	-1.2897***		-1.3449***	-1.3096***	-1.1976***
		(<.0001)	(0.0001)	(0.0008)		(<.0001)	(0.0001)	(0.0021)
MA		-0.0603	-0.0626	-0.0398		-0.0665	-0.0688	-0.0527
		(0.4061)	(0.3879)	(0.644)		(0.3605)	(0.3436)	(0.5439)
DIVERSIFYING		0.4845	0.5406	0.5137		0.4943	0.5447	0.4770
		(0.2175)	(0.1689)	(0.2593)		(0.2077)	(0.1651)	(0.296)
EBC			-0.0011	-0.0021			-0.0022	-0.0035
			(0.8466)	(0.7373)			(0.6871)	(0.577)
OWNERSHIP			-0.0298**	-0.0179			-0.0297*	-0.0178
			(0.0112)	(0.1602)			(0.0111)	(0.1632)
GIM				0.0534				0.0647
				(0.4666)				(0.3765)
Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Obs.	1042	1042	1042	754	1042	1042	1042	754
F value	2.14	3.62	3.6	2.48	2.27	3.83	3.79	2.35
R-Square	0.0343	0.0725	0.0784	0.0787	0.0322	0.0699	0.0758	0.0689
Adj. R-Square	0.0183	0.0525	0.0566	0.047	0.018	0.0517	0.0558	0.0395

Panel B: CEO age and CAR(-1, +1)

Variable	CAR(-1,+1)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Intercept	-0.9612	0.0030	-0.0348	-1.6819	-2.9991**	-1.5767	-1.6477	-3.1951*
	(0.3591)	(0.9978)	(0.975)	(0.2527)	(0.0399)	(0.2926)	(0.278)	(0.0889)
DUMMY1	0.8050*	0.9342**	0.9454**	1.2234**				
	(0.0849)	(0.0469)	(0.0444)	(0.0224)				
DUMMY2	0.9976*	1.0415*	1.0796*	1.1154*				
	(0.0904)	(0.0746)	(0.0662)	(0.0954)				
DUMMY3	1.5596**	1.3778*	1.4865**	2.0719**				
	(0.0341)	(0.0574)	(0.042)	(0.0121)				
AGETENURE					0.6305**	0.5283**	0.5477**	0.5476**
					(0.0123)	(0.0346)	(0.0289)	(0.0495)
MVE	-0.1055	-0.0210	-0.0386	0.0586	-0.1631	-0.0716	-0.0888	0.0095
	(0.3351)	(0.8536)	(0.7373)	(0.6568)	(0.1473)	(0.54)	(0.4516)	(0.9437)
LEVERAGE	0.0039	0.0104	0.0105	0.0175	0.0049	0.0118	0.0118	0.0202
	(0.8447)	(0.5934)	(0.5932)	(0.4506)	(0.8009)	(0.5424)	(0.546)	(0.3806)
FCF	-0.0006	-0.0027	-0.0013	0.0013	0.0005	-0.0005	0.0004	0.0039
	(0.9801)	(0.909)	(0.9563)	(0.9633)	(0.983)	(0.983)	(0.9859)	(0.8838)
CAPEXP	0.0484	0.0646	0.0659	0.0589	0.0524	0.0686	0.0696	0.0559
	(0.2721)	(0.1399)	(0.1325)	(0.3129)	(0.2336)	(0.1163)	(0.1114)	(0.3371)
PASTRETURN	0.0084***	0.0089***	0.0102***	0.0058*	0.0085***	0.0088***	0.0101***	0.0055
	(0.0032)	(0.0018)	(0.001)	(0.0996)	(0.0028)	(0.002)	(0.001)	(0.1216)
RDV		-0.0072	-0.0068	-0.0066		-0.0091	-0.0091	-0.0090
		(0.844)	(0.8531)	(0.8513)		(0.8032)	(0.8034)	(0.799)
PUBLIC		-1.6349***	-1.6769***	-1.5268***		-1.5550***	-1.6000***	-1.4215***
		(<.0001)	(<.0001)	(0.0006)		(<.0001)	(<.0001)	(0.0011)
STOCK		-1.5648***	-1.5623***	-1.5426***		-1.5502***	-1.5424***	-1.4763***
		(<.0001)	(<.0001)	(0.0003)		(<.0001)	(<.0001)	(0.0005)
MA		-0.0426	-0.0450	0.0077		-0.0512	-0.0538	-0.0096
		(0.5963)	(0.5755)	(0.9349)		(0.5247)	(0.504)	(0.9193)
DIVERSIFYING		0.2245	0.2650	0.1477		0.2472	0.2845	0.1424
		(0.6054)	(0.543)	(0.7677)		(0.5686)	(0.5128)	(0.7758)
EBC			0.0048	0.0007			0.0040	0.0000
			(0.4337)	(0.9208)			(0.5145)	(0.995)
OWNERSHIP			-0.0119	0.0093			-0.0124	0.0093
			(0.3594)	(0.5068)			(0.3391)	(0.5051)
GIM				0.0760				0.0861
				(0.3457)				(0.2829)
Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Obs.	1042	1042	1042	754	1042	1042	1042	754
F value	2.12	3.43	3.21	2.07	2.45	3.72	3.45	2.06
R-Square	0.034	0.069	0.0705	0.0664	0.0346	0.0679	0.0693	0.061
Adj. R-Square	0.0179	0.0489	0.0486	0.0342	0.0204	0.0496	0.0492	0.0313

*, **, ***, denote statistical significant at 10%, 5%, 1% levels, respectively.

Table 5 Buy-and-hold abnormal returns for acquirer firms

This table reports BHARs for 6 event windows for full sample (Panel A), and subgroups classified by CEO age. The 1042 observations are used to do the event study. There are 20 outliers excluded from the full sample. BHARs are computed from Market Adjusted Model estimated from month -17 to -8 relative to the announcement month. Panel B shows BHARs of group age less than age 50. Panel C shows BAHRs of group age between age 50 and 59. Panel D shows BHARs of group age between 60 and 64. Panel E shows BHARs of group age more than age 64.

Panel A: Full sample

window	N	Mean CAR	Patell Z	+\-	Generalized Sign Z
(-7,0)	1042	12.77%	8.26***	649\393	5.835***
(0,+12)	1042	-0.30%	-1.656*	518\524	-2.299**
(0,+24)	1042	-0.53%	-1.975**	529\513	-1.616
(0,+36)	1042	3.43%	0.148	571\471	0.992
(0,+48)	1042	10.12%	2.901***	649\393	5.835***
(0,+60)	1042	15.71%	5.207***	656\386	6.27***

Panel B: <50

window	N	Mean BHAR	Patell Z	+\-	Generalized Sign Z
(-7,0)	241	26.15%	5.308***	132\109	-0.634
(0,+12)	241	-0.79%	-0.178	96\145	-5.315***
(0,+24)	241	-7.60%	-0.434	83\158	-7.006***
(0,+36)	241	-16.97%	-0.086	76\165	-7.916***
(0,+48)	241	-15.69%	1.662*	75\166	-8.046***
(0,+60)	241	-17.69%	2.613***	79\162	-7.526***

Panel C: (50-59)

N	Mean BHAR	Patell Z	+\-	Generalized Sign Z
513	10.47%	5.049***	291\222	1.814*
513	-3.53%	-1.464	222\291	-4.288***
513	-6.37%	-1.211	197\316	-6.498***
513	-4.50%	1.278	206\307	-5.703***
513	-3.54%	3.077***	216\297	-4.818***
513	-1.48%	4.902***	204\309	-5.879***

Panel D: (60-64)

window	N	Mean BHAR	Patell Z	+\-	Generalized Sign Z
(-7,0)	196	13.82%	3.04***	107\89	1.016
(0,+12)	196	3.24%	-0.39	89\107	-1.556
(0,+24)	196	-0.79%	0.452	83\113	-2.413**
(0,+36)	196	-4.19%	1.302	84\112	-2.27**
(0,+48)	196	-3.52%	2.329**	90\106	-1.413
(0,+60)	196	-0.25%	3.03***	87\109	-1.842*

Panel E: >64

N	Mean BHAR	Patell Z	+\-	Generalized Sign Z
92	16.04%	2.843***	55\37	1.507
92	-6.67%	-1.255	34\58	-2.875***
92	-18.40%	-3.728***	32\60	-3.292***
92	-20.59%	-4.313***	34\58	-2.875***
92	-15.42%	-3.602***	30\62	-3.71***
92	-11.54%	-2.748***	33\59	-3.084***

*, **, ***, denote statistical significant at 10%, 5%, 1% levels, respectively.

Table 6 Mean differences in BHARs between age groups

This table reports mean differences in BHARs between four different age groups. BHARs are computed over three event windows.

	<50	50-59	60-64	>64						
	(1)	(2)	(3)	(4)	(1)vs(2)	(2)vs(3)	(3)vs(4)	(1)vs(3)	(1)vs(4)	(2)vs(4)
window	**mean**	**mean**	**mean**	**mean**	**t-value**	**t-value**	**t-value**	**t-value**	**t-value**	**t-value**
(0,+12)	-0.79%	-3.53%	3.24%	-6.67%	0.6191	-1.3806	1.6566*	-0.6739	1.0502	0.7068
(0,+36)	-16.97%	-4.49%	-4.19%	-20.59%	-1.9947**	-0.0469	1.6537	-1.7699*	0.3693	1.7426*
(0,+60)	-17.69%	-1.48%	-0.25%	-11.54%	-2.0224**	-0.1533	0.8521	-1.8562*	-0.4638	0.8173

*, **, ***, denote statistical significant at 10%, 5%, 1% levels, respectively.

Table 7 Calendar-time abnormal returns for acquirers

This table reports Calendar-time portfolio abnormal returns of four different groups. The Calendar-time portfolio abnormal returns are computed from Fama-French three factors Model. The 1062 observations are used to do this study. Panel A shows the Calendar-time portfolio abnormal returns over the event window (0,+36). Panel B shows the Calendar-time portfolio abnormal returns over the event window (0,+60).

Panel A: window (0,+36)

	full sample	<50	50-59	60-64	>64
a(p)	0.0018	0.0027	0.0015	0.0004	-0.0005
	(0.86)	(0.73)	(0.65)	(0.18)	(-0.14)
b(p)	1.2564***	1.3687***	1.2198***	1.2069***	0.9888***
	(17.02)	(11.48)	(16.79)	(10.83)	(9.54)
s(p)	0.3066***	0.3443**	0.3065***	0.3489***	0.1479
	(3.51)	(3.05)	(3.42)	(3.17)	0.97
h(p)	0.0845	-0.4951**	0.1719$	0.3724*	0.3667*
	(0.82)	(-3.04)	(1.63)	(2.33)	(2.33)
F-value	247.84***	160.09***	192.88***	147.36***	58.99***
R-squared	0.7905	0.7123	0.747	0.6994	0.4876
Adj. R-squared	0.7873	0.7078	0.7431	0.6947	0.4793

Panel B: window (0,+60)

	full sample	<50	50-59	60-64	>64
a(p)	0.0006	0.0015	0.0005	0.001	-0.0014
	(0.35)	(0.57)	(0.29)	(0.47)	(-0.56)
b(p)	1.1881***	1.351***	1.1521***	1.1259***	0.9819***
	(29.50)	(21.11)	(27.83)	(23.04)	(16.36)
s(p)	0.2969***	0.425***	0.2634***	0.2998***	0.1379
	(4.11)	(4.85)	(3.50)	(3.57)	(1.21)
h(p)	0.0981$	-0.2597**	0.1187*	0.3295***	0.2475**
	(1.58)	(-3.08)	(1.73)	(4.26)	(2.61)
F-value	443.97***	239.19***	313.40***	190.31***	110.56***
R-squared	85.77%	76.70%	81.04%	72.74%	61.23%
Adj. R-squared	85.58%	76.38%	80.78%	72.35%	60.68%

$, *, **, ***, denote statistical significant at 10%, 5%, 1%, 0.1% levels, respectively.

Table 8 Mean differences in ROAs between age groups

This table reports mean differences in ROAs between four different age groups. ROAs are adjusted by using ROA of firms minus the median ROA of all firms in the same industry and year. ROA1 denotes the industry-adjusted ROA of firms calculated by the data at 1 fiscal yearend after the announcement day. 3yROA denotes the industry-adjusted three years average ROA measured by three year averages after the announcement day.

	<50	50-59	60-64	>64						
	(1)	(2)	(3)	(4)	(1)vs(2)	(2)vs(3)	(3)vs(4)	(1)vs(3)	(1)vs(4)	(2)vs(4)
	mean	**mean**	**mean**	**mean**	**t-value**	**t-value**	**t-value**	**t-value**	**t-value**	**t-value**
ROA1	0.0522	0.109	0.1002	0.0764	-5.9772***	0.8231	1.923*	-4.1024***	-2.1365**	3.1608***
ROA2	0.0389	0.1032	0.0864	0.0614	-7.1192***	1.5164	2.0327**	-4.1579***	-2.1248**	4.1215***
ROA3	0.049	0.1055	0.0844	0.0583	-6.4222***	1.7473*	2.0154**	-3.003***	-0.9322	4.5822***
ROA4	0.057	0.1004	0.0837	0.0626	-4.8848***	1.4733	1.6931*	-2.3446**	-0.5422	3.694***
ROA5	0.0579	0.1001	0.083	0.0564	-4.5371***	1.5102	2.176**	-2.1542**	0.152	4.3531***
3yROA	0.0467	0.1059	0.0904	0.0654	-6.9535***	1.4241	2.0823**	-3.9538***	-1.8907*	4.168***
5yROA	0.051	0.1036	0.0876	0.063	-6.5142***	1.4893	2.1042**	-3.4388***	-1.3019*	4.3207***

*, **, ***, denote statistical significant at 10%, 5%, 1% levels, respectively.

Table 9 OLS Regressions: analysis about relationship between CEO age and firm's long-term operating performance.

Model (1) to (7) use 1042 observations, which exclude 20 outliers from the full sample 1062 acquisitions. Model (8) use 748 observations, which exclude 14 outliers from the subsample of 762 acquisitions with available GIM data. In the regressions, DUMMY1: 1 for CEO aged between 50 and 59, 0 otherwise, DUMMY2: 1 for CEO aged between 60 and 64, 0 otherwise, DUMMY3: 1 for CEO aged 65 or more than 65, 0 otherwise. The MVE takes natural logarithm of market value of equity. FCF and CAPEXP are divide by total assets. PASTRETURN, RDV, MA, OWNERSHIP and EBC are multiplied by 100. In the Panel A, the dependent variable is 3yROA denoting the industry-adjusted three years average ROA measured by three year averages after the announcement day. In the Panel B, the dependent variable is 5yROA denoting the industry-adjusted five years average ROA measured by five year averages after the announcement day.

Panel A: CEO age and industry-adjusted ROA3

Variable	3yROA							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Intercept	-2.1497*	-0.8207	-1.5950	-4.9099***	-5.0897***	-3.4296**	-4.0996**	-7.4763***
	(0.0783)	(0.5179)	(0.2165)	(0.0048)	(0.0026)	(0.0487)	(0.0194)	(0.0008)
DUMMY1	2.1316***	1.8700***	1.8707***	2.2668***				
	(<.0001)	(0.0005)	(0.0005)	(0.0003)				
DUMMY2	1.6639**	1.4437**	1.5602**	1.9236**				
	(0.0124)	(0.0303)	(0.0192)	(0.0138)				
DUMMY3	2.1517***	2.0818**	1.9904**	2.0469**				
	(0.01)	(0.0123)	(0.0169)	(0.0337)				
AGETENURE					0.9882***	0.8885***	0.8649***	0.8940***
					(0.0005)	(0.0019)	(0.0024)	(0.0063)
MVE	0.4980***	0.4415***	0.4469***	0.4847***	0.4217***	0.3540***	0.3636***	0.3938**
	(<.0001)	(0.0008)	(0.0007)	(0.0017)	(0.0011)	(0.0086)	(0.0072)	(0.0124)
LEVERAGE	-0.0041	-0.0076	0.0013	-0.0037	-0.0022	-0.0068	0.0024	-0.0024
	(0.8566)	(0.7403)	(0.9565)	(0.8931)	(0.924)	(0.7649)	(0.9157)	(0.9305)
FCF	0.5015***	0.4954***	0.5056***	0.4953***	0.5098***	0.5019***	0.5123***	0.5028***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
CAPEXP	0.5950***	0.6159***	0.6152***	0.6312***	0.6051***	0.6242***	0.6239***	0.6346***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
PASTRETURN	-0.0114***	-0.0090***	-0.0133***	-0.0247***	-0.0118***	-0.0092***	-0.0134***	-0.025***
	(0.0005)	(0.0067)	(0.0002)	(<.0001)	(0.0004)	(0.006)	(0.0001)	(<.0001)
RDV		-0.0139	-0.0107	-0.0150		-0.0148	-0.0115	-0.0154
		(0.7413)	(0.7982)	(0.7153)		(0.7264)	(0.7838)	(0.7094)
PUBLIC		0.5261	0.6167	0.5854		0.7279*	0.8265*	0.8980*
		(0.2401)	(0.1678)	(0.2604)		(0.0972)	(0.0596)	(0.0773)
STOCK		-1.6063***	-1.6666***	-1.5856***		-1.6017***	-1.6680***	-1.523***
		(0.0002)	(0.0001)	(0.0014)		(0.0002)	(0.0001)	(0.0022)
MA		-0.0969	-0.0967	-0.1244		-0.1120	-0.1111	-0.1534
		(0.2904)	(0.2886)	(0.2606)		(0.2228)	(0.2238)	(0.1686)
DIVERSIFYING		-0.2700	-0.3458	0.4260		-0.1948	-0.2679	0.4802
		(0.5865)	(0.4843)	(0.4678)		(0.6943)	(0.5874)	(0.4134)
EBC			0.0080	0.0120			0.0075	0.0118
			(0.253)	(0.1343)			(0.2783)	(0.1383)
OWNERSHIP			0.0546***	0.0796***			0.0540***	0.0794***
			(0.0002)	(<.0001)			(0.0003)	(<.0001)
GIM				0.2827***				0.3000***
				(0.0028)				(0.0015)
Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Obs.	1042	1042	1042	748	1042	1042	1042	748
F value	122.99	96.86	90.43	68.21	138.63	106.18	98.26	73.45
R-Square	0.6715	0.6767	0.6811	0.7028	0.6698	0.6755	0.6799	0.7003
Adj. R-Square	0.666	0.6697	0.6736	0.6925	0.665	0.6692	0.6729	0.6907

Panel B: CEO age and industry-adjusted ROA5

Variable	5yROA							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Intercept	-1.2920	-0.2808	-0.9216	-2.8867*	-3.4167**	-2.1315	-2.6678*	-4.0219**
	(0.2373)	(0.805)	(0.4251)	(0.0585)	(0.0236)	(0.1715)	(0.089)	(0.0389)
DUMMY1	1.5473***	1.3819***	1.3801***	1.7711***				
	(0.0011)	(0.0041)	(0.0039)	(0.0013)				
DUMMY2	0.9469	0.7982	0.872	1.3694**				
	(0.1128)	(0.1823)	(0.1445)	(0.0465)				
DUMMY3	1.5422**	1.4775**	1.3370*	1.5155*				
	(0.0394)	(0.0474)	(0.0728)	(0.0736)				
AGETENURE					0.7154***	0.6368**	0.6071**	0.4986*
					(0.0052)	(0.0131)	(0.0173)	(0.0829)
MVE	0.4658***	0.4523***	0.4691***	0.4463***	0.4082***	0.3874***	0.4074***	0.3946***
	(<.0001)	(0.0001)	(<.0001)	(0.001)	(0.0004)	(0.0013)	(0.0008)	(0.0045)
LEVERAGE	-0.0056	-0.0078	-0.0001	-0.0124	-0.0055	-0.0085	-0.0005	-0.011
	(0.7834)	(0.7025)	(0.9977)	(0.612)	(0.7848)	(0.6738)	(0.9812)	(0.6489)
FCF	0.4535***	0.4481***	0.4565***	0.4386***	0.4587***	0.4521***	0.4609***	0.4450***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
CAPEXP	0.5670***	0.5845***	0.5837***	0.6009***	0.5738***	0.5900***	0.5898***	0.6006***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
PASTRETURN	-0.0085***	-0.0067**	-0.0112***	-0.0166***	-0.0088***	-0.0068**	-0.0113***	-0.0171***
	(0.003)	(0.0212)	(0.0003)	(<.0001)	(0.0021)	(0.0189)	(0.0003)	(<.0001)
RDV		0.0036	0.006	0.0021		0.0035	0.0062	0.0031
		(0.9243)	(0.8738)	(0.9533)		(0.9258)	(0.8692)	(0.9315)
PUBLIC		0.1944	0.3014	0.2377		0.3471	0.4633	0.5011
		(0.6288)	(0.4523)	(0.6042)		(0.378)	(0.2387)	(0.2636)
STOCK		-1.3603***	-1.4086***	-1.1767***		-1.3588***	-1.4152***	-1.1735***
		(0.0005)	(0.0003)	(0.0068)		(0.0005)	(0.0003)	(0.0074)
MA		-0.1149	-0.1134	-0.1617*		-0.1258	-0.1237	-0.178*
		(0.1618)	(0.1645)	(0.0963)		(0.1263)	(0.1303)	(0.0696)
DIVERSIFYING		-0.5081	-0.5994	-0.0176		-0.4533	-0.5411	0.0389
		(0.2539)	(0.1762)	(0.9728)		(0.3079)	(0.2213)	(0.9403)
EBC			0.0034	0.0096			0.0034	0.0095
			(0.5913)	(0.1732)			(0.5808)	(0.178)
OWNERSHIP			0.0531***	0.0691***			0.0528***	0.0692***
			(<.0001)	(<.0001)			(<.0001)	(<.0001)
GIM				0.1901**				0.2039**
				(0.0223)				(0.014)
Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Obs.	1042	1042	1042	749	1042	1042	1042	749
F value	156	122.56	114.59	87.74	176.31	134.52	124.72	94.31
R-Square	0.7216	0.7259	0.7302	0.7523	0.7207	0.7251	0.7294	0.7497
Adj. R-Square	0.717	0.72	0.7239	0.7438	0.7166	0.7197	0.7235	0.7418

*, **, ***, denote statistical significant at 10%, 5%, 1% levels, respectively.

Table 10 Mean differences on targets

This table reports mean differences in TOBINQ, R&D/SALES, SALESGTH, and PRIVATE between four different age groups. PRIVATE is the number of private target acquired by CEOs. TOBINQ, R&D/SALES, and SALESGTH are measured by the subsample of 480 acquisitions, while PRIVATE is measured by the full sample of 1062 acquisitions.

	<50	50-59	60-64	>64						
	(1)	(2)	(3)	(4)	(1)vs(2)	(2)vs(3)	(3)vs(4)	(1)vs(3)	(1)vs(4)	(2)vs(4)
	mean	**mean**	**mean**	**mean**	**t-value**	**t-value**	**t-value**	**t-value**	**t-value**	**t-value**
TOBINQ	3.4712	2.3588	2.0999	1.5583	1.8179*	1.4134	2.9708***	2.2318**	3.1274***	4.6128***
R&D/SALES	0.4403	0.2148	0.2005	0.0218	0.8924	0.1353	1.8837*	0.9032	1.6851*	3.974***
SALESGTH	0.3879	0.2516	0.1532	0.1015	1.4982*	2.1765**	0.9707	2.5137**	3.0056***	3.0599***
PRIVATE	0.5538	0.2854	0.3112	0.5269	7.2238***	-0.6678	-3.4944***	5.3086***	0.4424	-4.3357***

*, **, ***, denote statistical significant at 10%, 5%, 1% levels, respectively.

Table 11 OLS Regressions: analysis on targets

Table 11 reports the analysis about the relationship between target characteristic and short-term stock performance. The dependent variables are CAR(0,+1) and CAR(-1,+1) respectively. Four bellowing regressions use 480 observations, which exclude 10 outliers from the subsample 480 acquisitions with available data of public target in Compustat. TOBINQ, SALESGTH, RDV and MA are multiplied by 100.

Variable	**CAR(0,+1)**		**CAR(-1,+1)**	
	(1)	(2)	(1)	(2)
Intercept	1.6883**	1.2141*	1.9811***	1.5428**
	(0.0165)	(0.0749)	(0.0089)	(0.0349)
TOBINQ	-0.0028***		-0.0026**	
	(0.0048)		(0.0135)	
SALESGTH		-0.008		-0.0082
		(0.1478)		(0.1682)
RDV	-1.2027**	-1.2809**	-1.298**	-1.3743**
	(0.0239)	(0.0169)	(0.0232)	(0.0168)
STOCK	-2.5053***	-2.5053***	-2.9167***	-2.9102***
	(<.0001)	(<.0001)	(<.0001)	(<.0001)
MA	-0.0131	-0.0077	0.0132	0.0189
	(0.9022)	(0.943)	(0.9083)	(0.8696)
DIVERSIFYING	1.2177*	1.0278	0.9434	0.7701
	(0.0766)	(0.1348)	(0.2011)	(0.2956)
Industry	Yes	Yes	Yes	Yes
Number of Obs.	470	470	470	470
F value	4.38	3.91	4.24	3.9
R-Square	0.1188	0.1074	0.1153	0.1071
Adj. R-Square	0.0917	0.0799	0.0881	0.0796

*, **, ***, denote statistical significant at 10%, 5%, 1% levels, respectively.

Table 12 Analysis about motives of acquisitions

Table 12 reports the results of analysis about the motives of acquisitions. The Panel A reports the regression analysis on the relationships between the target gain and total gain in different four age groups. The Panel B reports the regression analysis on the relationships between the target gain and acquirer gain in different four age groups. The regressions use 453 observations, which are public targets having available data in SDC. Target gain is dependent variable measuring by multiplying the target's CAR(-5,+5) by the market value of the target firm's equity as of the end of six trading days prior to the first announcement for the target, minus the value of the target shares held by the acquirer. Independent variable TOTAL denotes total gain calculated by adding the target gain and acquirer gain together. ACQUIRER denotes the acquirer gain, computing by multiplying the acquirer's CAR(-5,+5) by the market value of the acquiring firm as of the end of six trading days prior to the first announcement made by the acquiring firm. Panel C reports the summary statistics of acquisitions' gain.

Panel A: Relation between target gain and total gain

Variable	Target Gain			
	<50	50-59	60-64	>64
Intercept	650.2497	531.5337***	1143.1326	1185.4214*
	(0.2929)	(<.0001)	(0.1524)	(0.078)
TOTAL	0.4989***	0.8268***	0.8317***	0.2795***
	(<.0001)	(<.0001)	(<.0001)	(0.0062)
Number of Obs.	75	259	93	26
F value	96.36	1112.86	68.41	8.99
R-Square	0.569	0.8124	0.4291	0.2724
Adj. R-Square	0.5631	0.8117	0.4229	0.2421

Panel B: Relation between target gain and acquirer gain

Variable	**Target Gain**			
	<50	50-59	60-64	>64
Intercept	92.8533	2010.2745***	2603.1415	2000.5242***
	(0.921)	(<.0001)	(0.0012)	(0.0083)
ACQUIRER	0.1397	-0.0781	-0.8225***	-0.0099
	(0.2309)	(0.5543)	(<.0001)	(0.9388)
Number of Obs.	75	259	93	26
F value	1.46	0.35	60.19	0.01
R-Square	0.0196	0.0014	0.3981	0.0003
Adj. R-Square	0.0062	-0.0025	0.3915	-0.0414

Panel C: Summary Statistics of acquisitions' gain

	<50	50-59	60-64	>65
Mean Target gain	-103.723	2027.32	3200.818	1991.644
Mean Acquirer gain	-1407.46	-218.213	-726.643	893.0189
Mean Total gain	-1511.18	1809.108	2474.175	2884.662
The number of acquisitions with positive target gain	61/75	233/259	85/93	23/26
The number of acquisitions with positive acquirer gain	36/75	110/259	45/93	15/26
The number of acquisitions with positive total gain	53/75	209/259	71/93	23/26

*, **, ***, denote statistical significant at 10%, 5%, 1% levels, respectively.

Table 13 Variable Definitions

Variable	Definitions
Panel A: Age Dummies	
DUMMY1	Dummy variable: 1 for CEO aged between 50 and 59, 0 otherwise.
DUMMY2	Dummy variable: 1 for CEO aged between 60 and 64, 0 otherwise.
DUMMY3	Dummy variable: 1 for CEO aged 65 or more than 65, 0 otherwise.
Panel B: CEO Characteristics	
AGE	CEO chronological age.
TENURE	The number of years that a person has been working as a CEO in a specific firm.
AGETENURE	The natural logarithm of the product of CEO age and tenure.
OWNERSHIP	CEO's percentage holding of firm's total common shares, which exclude the unexercised stock option.
EBC	The sum of value of awards from annual stock option and restricted stock grants over total compensation.
Panel C: Acquirer Characteristics	
FIRM SIZE	Book value of total assets.
MVE	The product of numbers of shares outstanding multiply by the stock price at the 30th trading day prior to announcement date.
LEVERAGE	Total debt over the market value of total assets.
FCF	Operation income before depreciation, minus interest expenses, minus income taxes, and minus capital expenditure.
CAPEXP	Capital expenditure.
PASTRETURN	BHARs during the period (-210, -11).
ROA	Operation income before depreciation over total assets.
Panel D: Deal Characteristics	
RDV	Deal value over the total book assets.
PUBLIC	Dummy variable: 1 for public target, 0 otherwise.
STOCK	Dummy variable: 1 for deals at least partially stock-financed, 0 otherwise.
MA	The value of all corporate control transactions (more than 1 million) reported by SDC for each prior year and each Fama French industry, over the total book value of assets of all Compustat firms in the same year and same Fama French industry.
DIVERSIFYING	Dummy variable: 1 for bidder and target do not share a Fama-French industry, 0 otherwise.
Panel E: Governance Characteristics	
GIM	Taken from RiskMetrics, based on 24 antitakeover provisions.
Panel F: Target Characteristics	
TOBINQ	Market value of assets over book value of assets.
R&D/SALES	The research and development expense over the sales.
SALESGTH	Sales measured at fiscal yearend of announcement year over the sales measured at fiscal yearend of one year prior to the announcement year.
Panel G: Acquisitions Gains	
ACQUIRER	Acquirer's CAR(-5,+5) multiply the market value of the acquiring firm as of the end of six trading days prior to the first announcement made by the acquiring firm.
TARGET GAIN	Target's CAR(-5,+5) multiply the market value of the target firm's equity as of the end of six trading days prior to the first announcement for the target, minus the value of the target shares held by the acquirer.
TOTAL	Target gain plus acquirer gain.