This is the accepted version of the publication Mun, S. G., & Jang, S. (Shawn). (2022). Explaining the asset growth anomaly in the restaurant industry: Motivations and consequences. Tourism Economics, 28(1), 62–82. Copyright © 2020 (The Author(s)). DOI: 10.1177/1354816620954587.

Explaining the Asset Growth Anomaly in the Restaurant Industry: Motivations and Consequences

Abstract

Many business leaders have the tendency to vigorously pursue rapid firm growth, but this focus is often criticized as problematic in terms of operating performance. Accordingly, this study suggested that the asset growth anomaly is an inevitable phenomenon for growing restaurant firms: operating profitability increases as assets grow to the optimum level and then decreases after this level. However, most restaurant firms invest their capital below the optimum level, and only a small number of restaurant firms increase their assets too rapidly. Further, the amount of a CEO's bonus payments motivates their investments in asset growth, while the amount of stock options increases the probability of overinvestment practices in restaurant firms. Therefore, even though overinvestment practices are not apparent in most restaurant firms, an appropriate proportion of equity-based incentives is beneficial to prevent overinvestment practices by a few restaurant firms in order to avoid negatively impacting shareholders' wealth.

Keywords: *asset growth, return on asset, asset turnover, investment-return, CEO compensation, overinvestment*

1. Introduction

Firm growth is considered an imperative benchmark for business success, but in reality it often has the opposite result. A firm grows through capital investments using either internal financing or external financing such as debts and stock issuances. However, a firm also contracts when it takes resources out of a business, such as debt retirement, share repurchasing, and dividend payouts. Holding capital resources is clearly essential for funding future growth opportunities. Yet, firms with high asset growth rates have faced abnormally lower long-term market returns, whereas firms pursuing asset contraction frequently have shown higher future market returns (Titman, Wei, & Xie, 2004; Cooper, Gulen, & Schill, 2008; Lipson, Mortal, & Schill, 2011; Gray & Johnson, 2011).

In this respect, it is not surprising that capital investments and initial public offerings can be seen as negatively related to stock returns (Stern & Bornstein, 1985; Ritter, 1991; Baker, Stein, & Wurgler, 2003; Titman et al., 2004; Anderson & Garcia-Feijoo, 2006), while debt prepayments (Affleck-Graves & Miller, 2003) and dividends (Michaely, Thaler, & Womack, 1995) are considered positive signs. In the restaurant industry, out of 121 IPO (initial public offering) firms, 39 firms (32.2%) were delisted within five years and 56 firms (66.7%) were delisted within ten years after going public (Mun & Jang, 2019). On the other hand, the announcement of a dividend increase is considered a favorable signal and tends to fuel significant positive market reactions in both the hotel and restaurant industries (Borde, Byrd, & Atkinson, 1999; Sheel, & Zhong, 2005). Furthermore, even though stock prices often rise after a dividend announcement until the ex-dividend date, the ex-dividend stock price drop still tends to be less than the full amount of dividend payments, which eventually increases the value of shareholders (Bali & Hite, 1998; Eades, Hess, & Kim, 1984; Durand & May, 1960; Michaely, 1991; Ngoc & Cuong, 2016). Besides, either dividend payouts have a positive relationship with a restaurant firm's future profitability or highly profitable restaurant firms are more likely to pay dividends than their counterparts (e.g., Ajanthan, 2013; Kim & Gu, 2009; Oak, Hua, & Dalbor, 2012).

Cooper et al. (2008) supported this negative asset growth effect, referred to as the asset growth anomaly, and provided empirical evidence of a strong negative correlation between a firm's asset growth and subsequent abnormal stock returns. If that is the case, then why do firms eagerly pursue asset growth even though it ultimately hurts the value of shareholders? Some studies have viewed the asset growth anomaly as the result of a firm's overinvestment behaviors (Titman et al., 2004; Richardson, 2006). Titman et al. (2004) proposed that while firms tend to overinvest when they increase investments, investors are inclined to underreact. This leads to a negative investment-return relationship. Similarly, other scholars have explained the anomaly using the q-theory of investment (Liu, Whited, & Zhang, 2009; Li & Zhang, 2010), which suggests that firms tend to invest more when the stock market's expected returns are lower than what they could be (Liu et al., 2009; Li & Zhang, 2010). Overinvestment refers to a firm's investment in negative net present value (NPV) projects after exhausting all positive NPV projects (Jesen, 1986; Richardson, 2006; Stulz, 1990). Therefore, both explanations indicate that the tendency for managers to engage in excessive investments causes an undesirable investment-return relationship. This means that the asset growth anomaly would grow stronger as firms continue investing in projects that generate fewer future cash flows (D'Mello & Miranda, 2010; López-de-Foronda et al., 2019). If this is true, then it would be highly rational to expect that fast asset growth would not be beneficial and instead could deteriorate a firm's operating performance and profitability. Accordingly, this only leads to more questions: Why do some firms overinvest? And is there an optimum level of asset growth?

In the restaurant industry, firm growth (or number of stores) is considered one of the most important indicators of business success, and restaurant firms tend to grow primarily through investment in fixed assets, including land and buildings. Thus, fast market expansion, even through mergers and acquisitions, has been a prevalent business strategy for restaurant firms in the U.S. in recent decades (Aaronallaen & Associates, 2018; Chatfield, Dalbor, & Ramdeen, 2011; Dogru, Ozdemir, Kizildag, & Erdogan, 2019; Epstein, 2009; Kim, 2006). Recently, Dogru, Kizildag, Ozdemir, and Erdogan (2020) suggested that firm growth through acquisitions can increase overinvestment problems and eventually decrease firm performance, but only when restaurant firms have high free cash flows. However, if restaurant firms have low free cash flows, then firm growth through acquisitions tends to reduce underinvestment problems and enhance firm performance (Dogru et al., 2020).

In this context, the cross linkage between the asset growth anomaly and a manager's tendency to overinvest would be complemented by observing the relationship between asset growth and the firm's operational performance. In other words, negative or presumably non-linear relationships between asset growth and operational performance (e.g., profitability and efficiency) would indicate the presence of overinvestment practices. More specifically, if a restaurant firm underinvests, then asset growth would have a positive impact on firm performance. On the other hand, if a restaurant firm overinvests, then the effect of asset growth should become negative. Indeed, managers may acquire fixed assets beyond the optimal level of efficiency for their own benefit, including greater financial compensation and more managerial power (e.g., Constantinou, Karali, & Papanastasopoulos, 2017; Moeller, Schlingemann, & Stulz, 2005). Further, the relationship between firm size and a manager's compensation may be indirect because managers are more likely to receive greater financial compensation as a firm's sales grow (e.g., Devers, Cannella Jr, Reilly, & Yoder, 2007; Finkelstein, Cannella, Hambrick, & Cannella, 2009; Tosi, Werner, Katz, & Gomez-Mejia, 1998).

However, past studies have only focused on the effects of asset growth on cross-sectional stock returns and paid little attention to operational performance. Hence, this study aimed to address this research gap in the existing literature by investigating firms' accounting information because financial statements provide prerequisite information for understanding a firm's future performance (Constantinou et al., 2017). More specifically, this study intended to identify whether a non-linear relationship exists between restaurant firms' asset growth and operating performance. In addition, this study also intended to explain why the asset growth anomaly occurs by examining whether CEO compensation, such as bonuses or stock options, motivates asset growth. This approach is meaningful and timely for the restaurant industry because in recent years total compensation for CEOs at large publicly traded restaurants has increased substantially (i.e., McDonald's, Yum Brands, Inc., Chipotle Mexican Grill Inc., and Domino's Pizza Inc.). In line with these objectives, this study provided complementary inferences on the effect of asset growth on the operating performance of restaurant firms, which can help answer the first question posed by this study: If asset growth has a negative impact on firm performance, then is there an optimal level of asset growth? In addition, this study demonstrated the different effects of CEO compensation on restaurant firms' asset growth, which can provide supplementary evidence to answer the second question posed by this study: Why do certain firms pursue asset growth even at the expense of firm performance? And how can restaurant firms avoid overinvestment? Therefore, this study ultimately aimed to directly link the phenomenon of the asset growth anomaly in restaurant firms and the two most prominent theoretical frameworks, overinvestment theory (i.e., whether there is an optimal level of asset growth for operating performance) and agency theory (i.e., whether managers' incentives cause the asset growth anomaly), by using firms' financial performance. The findings provide a strategic benchmark for restaurant firms to minimize the adverse effects of the asset growth anomaly on their financial performance.

2. Literature review

2.1. Asset growth anomaly

Previous studies have suggested that asset growth (asset contraction) negatively (positively) impacts stock returns (Anderson & Garcia-Feijoo, 2006; Lyandres, Sun, & Zhang, 2007; Wantanabe, Xu, Yao, & Yu, 2013; Yao, Yu, Zhang, & Chen, 2011). Instead of using a single, specific account for asset growth, such as capital investments, changes in fixed assets, or changes in financial resources, Cooper et al. (2008) summarized (or generalized) the overall negative effect of firms' investments and financing activities (specified examples of asset growth) on stock returns by using a simple measurement of total asset growth and referred to the phenomenon as the asset growth anomaly.

Rational or behavioral investment models are often used to explain the asset growth anomaly. For example, the rational q-investment theory (Cochrane, 1991, 1996) explains the negative relationship between capital investments and stock returns. This theory suggests that firms increase investments when the costs of capital are low (new projects with high net present value but low expected returns), but decrease investments when the costs of capital are high (new projects with low net present value but high expected returns). As such, the ability of investments to adjust to changes in the discount rate should be less sensitive for firms with higher financial constraints than for firms with lower financial constraints because financing frictions entail deadweight costs (Li & Zhang, 2010). Firms' investments are less responsive to fluctuations in discount rates as the degree of financing constraints increases. As a result, the negative investment-return relationship should be stronger for firms with greater financing constraints.

To test the hypothesis of financial frictions, Li and Zhang (2010) examined the investment-return relationship with three proxies for financial constraints, including firm size, dividend payout ratios, and credit ratings. In the model, firms with a small size, low dividend payments, and low credit ratings were classified as the financially more constrained subgroup compared with firms with a large size, high dividend payments, and high credit ratings. Under the q-investment theory, the investment-return relationship should be stronger for firms that are more financially constrained. However, the magnitude of the investment-return relationship did not significantly differ between more and less financially constrained firms. In fact, only a very weak asset growth effect was found in either sub-group. In contrast, Lam and Wei (2011) supported that investments had a strong negative effect on stock returns for firms with greater financial frictions compared with less financially constrained firms after controlling for limit-to-arbitrage, such as idiosyncratic stock returns, information uncertainty, shareholder sophistication, and potential transaction costs.

On the other hand, the mispricing explanation (Titman et al., 2004; Copper et al., 2008) suggests that a negative investment-return relationship exists due to the time lag between investors and firms. In other words, investors tend to incorporate information regarding firms' investments into stock prices too slowly. According to this behavioral explanation, managers tend to continue investing beyond the optimal level in pursuit of their own interests. However, stock markets cannot respond promptly due to information uncertainty or potential transaction costs (Lam & Wei, 2011). Titman et al. (2004) found that the negative relationship between capital investments and stock returns was stronger for firms with greater investment discretion. For example, firms with large amounts of free cash flows and small amounts of long-term debt substantially increased their capital investments, but had significantly lower stock returns compared to their counterparts. Thus, the evidence supports the argument that agency problems or overinvestment behaviors can cause a negative investment-return relationship.

D'mello and Miranda (2010) also suggested that issuing debt reduces overinvestment problems because initiating debt diminishes the amount of funds managers can control. They argued that the interest payments associated with debt restrict excessive capital investments by firms. In their models, firms' cash ratios and abnormal capital expenditures drastically declined after issuing long-term debt. Similarly, Officer (2011) argued that initiating dividends has a positive effect on stock returns because they can reduce agency costs. In this study, stock returns were higher in firms with less growth opportunities (lower Tobin's Q) when they increased dividends or initiated dividends (Lang & Litzenberger, 1989). The findings indicated that the agency costs associated with overinvestment are higher for firms with poor growth opportunities but significantly declined with dividend payouts.

2.2. Effects of asset growth on operating performance

Despite unanimous evidence of the asset growth anomaly in stock returns, the findings did not suggest what level of asset growth would be suitable or too much for a firm. However, it is reasonable to expect that firms first undertake the most profitable net present value (hereafter NPV) projects and increase firm value until they reach the optimal level. Accordingly, asset growth would increase firm value until a certain point, although the positive effect of investments on firm value decreases as assets grow. Nevertheless, identifying managers' overinvestment tendencies based on observing stock returns is not easy (i.e., the mispricing explanation). Further, the negative relationship between asset growth and stock returns is not *necessarily* evidence of managers' overinvestment tendencies. Therefore, the importance of information that can be gleaned from financial statements (i.e., operating profit, cash flow, efficiency, and expenses) should not be disregarded but instead must be used to complement stock returns and verify overinvestment practices in the restaurant industry (e.g., Constantinou et al., 2017). For example, overinvestment practices would appear stronger for firms with excess free cash flows and weaker or insignificant for firms with fewer cash flows. However, due to the weak financial position of restaurant firms (Mun & Jang, 2017), most restaurant firms are likely to invest their capital resources in only positive NPV projects. Further, only a few large or mature restaurant firms that have excessive free cash are even able to invest beyond the optimal level. Therefore, the negative effect of asset growth on operating performance (i.e., operating profits or efficiency of assets) may not be evident. Instead, the overall asset growth effect would be positive for most restaurant firms.

If this explanation is correct, then how can overinvestment practices be identified using a firm's operating performance in a restaurant business setting? Before testing the overinvestment hypothesis, this study intended to examine the overall effect of asset growth on operational performance in restaurant firms to check if the asset growth anomaly exists in the restaurant industry. Since restaurant firms generally have fairly low operating cash flows (Mun & Jang, 2017), they may be forced to invest in only positive NPV projects. That is, if restaurant firms invest their capital in fixed assets, then they may be more likely to have greater profits due to these investments. Therefore, this study expected that the overall profitability of restaurant firms increases with asset growth. Nevertheless, if firms are expected to choose projects with greater profits first, then as they invest more the expected profits would decrease. Similarly, as restaurant firms grow (or increase assets), they would become less efficient and, thus, have lower asset turnover since additional assets would generate less revenue per investment. Further, this decreasing efficiency, or asset turnover, would not significantly improve at any point, although it would slow down. In other words, overall asset turnover for restaurant firms decreased the most in the earliest stage, but the change in asset efficiency (or asset turnover rate) from the previous year would be smaller as the firms' assets grow. Therefore, this study intended to examine the overall effects of asset growth on operational performance (ROA and total asset turnover) to double-check the existence of the market-based asset growth anomaly using accounting information. Thus, this study hypothesized:

H1a: Asset growth is positively related to a firm's profitability.

H1b: Asset growth is negatively related to the change in a firm's profitability from the previous year.

H2a: Asset growth is negatively related to a firm's total asset turnover.

H2b: Asset growth is positively related to the change in a firm's total asset turnover from the previous year.

In previous studies (e.g., Cooper et al., 2008), stock returns increased in firms with the least asset growth, but decreased in firms with the highest asset growth. Furthermore, Morgado and Pindado (2003) argued that the relationship between asset growth and stock returns was not linear but instead quadratic. They suggested that the optimal investment level is the point at which positive NPV is exhausted. In another example, Fu (2010) empirically tested firms' operating performance following seasoned equity offerings (hereafter SEOs) and showed that SEO firms had lower asset productivity than non-issuing benchmark firms. The capital investments of SEO firms were higher than those of firms without a SEO, even after controlling for growth opportunities and financial slack. Furthermore, although SEO firms were high growth firms, the study found that the proceeds from equity offerings were mainly used for capital investments rather than debt payments or working capital. The findings were consistent with the overinvestment hypothesis. Similarly, Fu (2010) found a positive correlation between investments and operating performance in firms that did not overinvest. Based on the empirical evidence, he concluded that the relationship between capital investments and operating performance was an inverse U-shape, rather than linear, and that the deterioration of operating performance for high asset growth firms was due to managers using SEO proceeds to overinvest.

While managers manipulating earnings or capital market timing is not a critical problem, the negative effect of overinvestment practices by managers is problematic in terms of firm value. Overinvestment deteriorates firm value by wasting capital resources on negative NPV projects, whereas managers manipulating earnings or capital market timing is caused by capital market inefficiencies that can be adjusted after the fact. Apparently, the operating profitability of firms that overinvest in negative NPV projects would be lower than that of firms with an optimal level of investment or firms that only invested in positive NPV projects. As such, this study expected that asset growth would have a positive effect on operational performance for low asset growth firms, but it would then turn into a negative effect at a certain point after exhausting positive NPV projects. In other words, this study expected that the asset growth anomaly could be interpreted as representing the propensity for mangers to overinvest. It was also expected that the relationship between asset growth and operational performance was not linear but instead quadratic. Therefore, this study hypothesized:

H3: Asset growth has an inverted-U shaped relationship with a firm's profitability.

H4: Asset growth has an accelerated and decreasing negative shaped relationship with a firm's asset turnover.

2.3. CEO compensation, asset growth, and overinvestment

The substantial growth of CEO compensation at large restaurant firms has been questioned in relation to firm performance. Median compensation for CEOs of publicly-traded restaurants in the U.S. increased by 21% in 2015 (Maze, 2016). More specifically, median total compensation for restaurant CEOs reached $3.9 million in 2015, mainly due to increases in stock options and incentives. Further, Mun, Paek, Woo, and Park (2019) suggested that firm size has a significantly positive relationship with compensation for the board of directors of restaurant firms. However, according to agency theory (Jensen, 1986) managers can derive personal benefits from controlling more assets rather than distributing them to shareholders (Aggarwal & Samwick, 2006). In such circumstances, managers tend to retain excess free cash flows under their control in the form of cash, non-operating assets, or capital expenditures (Cooper et al., 2008). In addition, large firm size can have a positive influence on managers' overall compensation (Gabaix & Landier, 2008). Firms also must take into account managers' private costs of growth, for instance expertise and experience in business management. As such, firms should offer greater compensation to their managers in order to motivate firm growth. Therefore, when firms offer incentives to managers in return for growth, they could face overinvestment problems. However, if firms do not offer incentives for managers, then they lose opportunities for growth.

Regardless of whether managers are pursuing firm growth or overinvesting for their own benefit, offering incentives would increase a firm's investments. However, the consequences of each situation would differ: a firm's investments would increase profitability in the first case, but decrease profitability in the second case. According to Aggarwal and Samwick (2006) and Li, Henry, and Chou (2011), a firm's investments increase operating performance due to the incentives offered to mangers. However, Morck, Scheifer, and Vishny (1988) and Kaplan (1998) found that the performance of firms with increased investments declines due to mangers engaging in overinvestment practices. Under ordinary conditions, bonuses are related to short-term performance, while stock options are associated with long-term performance. Initially, Jensen and Meckling (1976) suggested that equity-based compensation could reduce agency problems between managers and shareholders because it aligns managers' interests with those of shareholders. Dechow and Sloan (1991) and Lambert, Larcker, and Verrecchia (1991) also documented that stock-based incentives alleviated the negative effects of agency problems on investments.

However, more recent studies (e.g., Ozkan, 2007; Burns & Kedia, 2006; Benmelech, Kandel, & Veronesi, 2010) have shown a very weak relationship between equity-based compensation and firm performance. Agha (2016) explained this phenomenon by showing that when firms offered short-term incentives to managers their performance increased. However, when firms offered long-term incentives, such as stock options, managers increased investments up to a certain range of incentives, but then decreased investments beyond that point. This implies that equity-based incentives initially motivate managers to increase investments, but when managers receive incentives beyond a certain point they become less willing to take on low-profitability projects. Accordingly, investigating the relationship between CEO compensation and a restaurant firm's investment practices could meaningfully link the causes of the asset anomaly and overinvestment practices. Although restaurant firms' potential agency problems (i.e., free cash flow) are more severe than in other industries (Mun et al., 2019), this study expected that equity-based compensation would mitigate agency problems or managers engaging in overinvestment practices. In line with the existing evidence, this study hypothesized:

H5: CEO bonuses are positively related to asset growth.

H6: CEO stock options are positively related to asset growth.

H7: CEO bonuses are positively related to overinvestment.

H8: CEO stock options are negatively related to overinvestment.

3. Methodology

3.1. Samples and variables

This study used financial data from U.S. restaurant companies and CEO compensation from the COMPUSTAT database with a Standard Industry Code (SIC) of 5812 for the years 1992 to 2018. This study excluded observations with missing data for important variables, such as CEOs' bonuses and stock options. Ultimately, 2,380 observations (269 firms) were included for analysis.

This study used net profits over total assets (ROA) and sales over total assets (asset turnover) as dependent variables to measure operating performance. For the dependent variables, ROA, total asset turnover, change in ROA, or change in asset turnover were used in Model 1. In this model, the growth rate of total assets was an independent variable and the previous year's Tobin's Q (a firm's growth opportunity; (total asset – cash & short term investment – deferred tax + number of share * market price) / (total asset – cash & short term investment)), financial leverage (liabilities over asset), firm size (log of asset), financial leverage (liabilities over asset), and ROA (or asset turnover) were the control variables.

3.2. Study models and statistical analysis

To test the proposed hypotheses, this study used models including the variables explained above. Model 1 represented the overall effect of total asset growth on a firm's operating performance from the perspective of profits and generating sales after controlling for the prior year's growth opportunities, financial curb, and firm performance. By comparing models, this study aimed to clarify the overall effect of asset growth on firm performance. In Model 2, the independent and control variables were the same as in Model 1, but the squared term of asset growth was added to test whether the effect of asset growth on firm performance was quadratic.

In Model 3, the dependent variable was the growth rate of total assets and the independent variable was the growth of CEO compensation in the previous year, such as the growth of salaries, bonuses, and stock options. The control variables were the previous year's percentage of shares owned by CEOs, Tobin's Q (firm's growth opportunity), firm size (log of assets), financial leverage (liabilities over assets), and ROA (or asset turnover). In the last model (Model 4), the firms were divided into two sub-groups based on each observation's total asset growth rate and the results of Model 3: overinvestment firms that had over the optimal point of total asset growth (above 28.44%) and non-overinvestment firms that had below the optimal point of total asset growth (below 28.44). After this classification, a logistic regression model was used to test whether CEO compensation motivated and induced overinvestment practices. In this logistic model, the dependent variable was 1 for the sub-group comprised of overinvestment firms (above 28.44% of total asset growth) and 0 for the sub-group comprised of non-overinvestment firms (below 28.44% of total asset growth). In this model, the independent variables and control variables were the same as in Model 3. Below are the models used in this study:

1) $ROA_{it}(Asset\ turnover_{it}) = \alpha + \beta_1 * Asset\ growth_{it} + \beta_2 * Tobin's\ Q_{it-1} + \beta_3 * Firm\ size_{it-1} + \beta_4 * Leverage_{it-1} + \beta_5 * ROA\ (Asset\ turnover)_{it-1} + \varepsilon_{it}$

$ROA_{it+1} - ROA_{it}(Asset\ turnover_{it+1} - Asset\ turnover_{it}) = \alpha + \beta_1 * Asset\ growth_{it} + \beta_2 * Tobin's\ Q_{it-1} + \beta_3 * Firm\ size_{it-1} + \beta_4 * Leverage_{it-1} + \beta_5 * ROA\ (Asset\ turnover)_{it-1} + \varepsilon_{it}$

2) $ROA\ (Asset\ turnover)_{it} = \alpha + \beta_1 * Asset\ growth_{it} + \beta_2 * Asset\ growth_{it}{}^2 + \beta_3 * Tobin's\ Q_{it-1} + \beta_4 * Firm\ size_{it-1} + \beta_5 * Leverage_{it-1} + \beta_6 * ROA\ (Asset\ turnover)_{it-1} + \varepsilon_{it}$

3) $Asset\ growth_t = \alpha + \beta_1 * CEO's\ salary\ growth_t + \beta_2 * CEO's\ bonus\ growth_t + \beta_3 * CEO's\ option\ growth_t + \beta_4 * CEO's\ share\ owned\ \%_{t-1} + \beta_5 * Tobin's\ Q_{t-1} + \beta_6 * Firm\ size_{t-1} + \beta_7 * Leverage_{t-1} + \beta_8 * ROA(Asset\ turnover)_{t-1} + \varepsilon_t$

4) $Logit(P)_t = \alpha + \beta_1 * CEO's\ salary\ growth_t + \beta_2 * CEO's\ bonus\ growth_t + \beta_3 * CEO's\ option\ growth_t + \beta_4 * CEO's\ share\ owned\ \%_{t-1} + \beta_5 * Tobin's\ Q_{t-1} + \beta_6 * Firm\ size_{t-1} + \beta_7 * Leverage_{t-1} + \beta_8 * ROA(Asset\ turnover)_{t-1} + \varepsilon_t$

To determine the exogeneity of the unobserved errors, this study performed a Hausman test. The results rejected the null hypothesis of the Hausman test and indicated that the random-effects model was inconsistent compared with the fixed-effects model. Thus, this study used fixed-effects regression for Models 1 and 2 with robust standard error to eliminate potential issues of autocorrelation. The fixed-effects regression model also controlled for firm specific and time variant effects in the panel data.

To identify the effect of CEO compensation on asset growth, Model 3 used a fixed-effects regression model. In addition, this study developed a logistic regression model to identify the effect of CEO compensation on restaurant firms' overinvestment practices in Model 4. The overinvestment and non-overinvestment firms were classified based on the results of Model 2. These models also used robust standard errors adjusted for clustering to avoid the issue of multicollinearity.

Generalized estimating equation (GEE) models were used for Models 2, 3, and 4 to achieve a more robust conclusion, and then the results were compared with fixed-effects and logistic regression models. The GEE model is a marginal model popularly applied to longitudinal/clustered data analysis and estimators that are robust even when the models or variances are misspecified (Gardiner, Luo, & Roman, 2009; Hubbard et al., 2010). The GEE model also does not require strict distribution assumptions (Liang & Zeger, 1986).

4. Results

4.1. Descriptive statistics

Table 1 shows that returns on assets (ROA) and sales (ROS) were higher for higher asset growth restaurant firms compared to lower asset growth firms (6.05% vs. -8.78% and 4.30% vs. -4.28%). However, the asset turnover ratio for the lowest asset growth restaurant firms was higher than the asset turnover ratio for the highest asset growth firms (1.8118 vs. 1.4051). Interestingly, the profitability of restaurant firms increased with the asset growth rate, but the efficiency of assets was negatively related to asset growth rates. However, larger restaurant firms showed moderate asset growth rates, while the smaller firms indicated excessive (lowest or highest) asset growth rates. The smallest firm group ($63 million) had the lowest asset growth rates (-14.78%), and the second smallest firm group ($125 million) had the highest asset growth rates (26.73%). In addition, the firms with the highest asset growth had greater amounts of cash and short-term assets (7.18% vs. 4.45~5.33%, and 17.05% vs. 13.94~15.61%, respectively) but lower financial leverage (43.71% vs. 48.85~71.56%) than firms with lower asset growth rates. Overall, the descriptive information was consistent with previous studies that suggested firms with greater manager discretion have the potential for agency problems.

(Insert Table 1 here)

According to Figure 1, firms with the highest asset growth rates showed consistently higher profitability compared with the sub-groups with lower asset growth rates. This was true not only during the previous 5 years, but also during the following 5 years. However, the asset growth rate for the highest asset growth firms decreased after the portfolio formation year. In contrast, the asset growth rate for the lowest asset growth firms increased after the portfolio formation year. Similarly, ROA for the highest asset growth firms decreased after the portfolio formation year, but increased drastically for the lowest asset growth firms in the following 5 years (see Figure 2). Likewise, the efficiency of assets declined for the highest asset growth firms in the following 2 years, but improved for firms with the lowest asset growth rates during the same period (see Figure 3).

(Insert Figures 1, 2, and 3 here)

4.2. Analysis results for the proposed hypotheses

4.2.1. Asset growth and operational performance

As shown in Table 2, restaurant firms' operating performances had a significant positive relationship with asset growth rate. The regression coefficient between total asset growth rate and ROA was 8.7160 and statistically significant at the 1% level after controlling for the previous year's Tobin's Q, firm size, financial leverage, and profitability. The results indicated that restaurant firms' profitability increased as their assets grew, which contradicts the negative relationship between investments and stock returns provided by past studies. Thus, the result supported hypothesis 1a. The analysis also suggested that the regression coefficient between total asset growth rate and change in ROA from the previous year was -20.6462, but it was not statistically significant. Therefore, the results did not support hypothesis 1b and showed no substantial deterioration in generated net profits due to investing in additional assets.

Another analysis was conducted in association with the asset turnover ratio. The regression coefficient between total asset growth and the asset turnover ratio was -1.3417 and statistically significant at the 1% level. The result supported hypothesis 2a. In addition, the regression coefficient between total asset growth rate and changes in the asset turnover ratio became positive and was 0.2311 and statistically significant at the 1% level under the same conditions. Therefore, the results indicated that the efficiency of restaurant firms' assets decreased with firm growth, while the magnitude of the relationship between them weakened as assets grew. Therefore, the results supported hypothesis 2b.

(Insert Table 2 here)

To confirm the non-linear relationship between asset growth and profitability, the square term of asset growth was added to the models. As expected, the relationship between asset growth and ROA was not linear but instead an inverted-U shape, which is consistent with the findings of Agha (2016). The coefficient of the square term of asset growth was -12.6590 and statistically significant at the 1% level in the FE model, while in the GEE model it was -8.9192 and statistically significant at the 5% level. Both results, therefore, supported hypothesis 3. Furthermore, the results showed that the optimal point for asset growth rates in order to achieve the highest ROA was 46.24% in the FE model and 56.86% in the GEE model (see the calculation in the section below), which indicates that the majority of restaurant firms invested less than the optimal level. In fact, only a small number of firms invested beyond the optimal level: asset growth rate was above 75% and distribution was 26.73% in the descriptive statistics (see Table 1). Nevertheless, the results confirmed that overinvestment practices exist in firms with the highest asset growth. Specifically, there was a negative relationship between asset growth and operating profitability beyond asset growth rates of 46.24% in the FE model and 56.86% in the GEE model (132 observation in the FE models (5.5%) and 85 observations in the GEE model (3.6%)).On the other hand, the coefficients of the square term of asset growth were positive (2.1891 in the FE model and 2.1731 in the GEE model) but statistically insignificant. The results represented a negative relationship between asset growth and asset turnover. Therefore, the findings did not support hypothesis 4.

(Insert Table 3 here)

- Inverted-U shaped relationship between asset growth and profitability (FE)

  $\partial\ ROA / \partial\ \textit{Total asset growth} = 11.70754 - 2 \times 12.659 \times \textit{Total asset growth} = 0$

  $\textit{Total asset growth} = 11.70754 / 25.318 = 0.4624$

- Inverted-U shaped relationship between asset growth and profitability (GEE)

  $\partial\ ROA / \partial\ \textit{Total asset growth} = 10.14203 - 2 \times 8.919202 \times \textit{Total asset growth} = 0$

  $\textit{Total asset growth} = 10.14203 / 17.838404 = 0.5686$

4.2.2. Motivations for asset growth and overinvestment

As shown in Table 4, only CEOs' bonuses had a significant positive relationship with total asset growth. The coefficient of CEOs' bonuses was 0.0362 or 0.0324 and marginally significant at the 10% level in the FE model, but it was 0.0338 or 0.0314 and statistically significant at the 5% level in the GEE model. However, CEOs' stock options did not significantly influence asset growth in any of the models. Therefore, these results supported hypothesis 5, but not hypothesis 6. The findings indicated that growth in restaurant firms tends to be motivated by CEOs' bonuses, but not their stock options. Further, Table 4 shows that growth opportunity (Tobin's Q) had a significant positive relationship with asset growth, while firm size and financial leverage had a significant negative relationship with asset growth. Thus, small restaurant firms with high-growth opportunities and low financial debts tended to invest more in assets than large restaurant firms with low-growth opportunities and large external debts.

(Insert Table 4 here)

As mentioned in the methodology section, this study used logistic regression to identify which factors motivated overinvestment by separating non-overinvestment firms (below 46.24% in the FE model or 56.86% in the GEE model of total asset growth) and overinvestment firms (above 46.24% in the FE model or 56.86% in the GEE model of total asset growth) based on the findings of the quadratic relationship between total asset growth and ROA. As shown in Table 5, the amount of a CEO's bonus did not significantly increase the probability of a firm being in the overinvestment sub-group across all models. However, the amount of a CEO's stock options had a significant positive relationship with the probability of overinvestment across all models: 0.2361 or 0.3265 and statistically significant at the 1% level in the logistic regression model and 0.2366 or 0.3303 and statistically significant at the 1% level in the logistic GEE model. The results were unexpected and did not support either hypothesis 7 or 8. In contrast to the previous evidence, the amount of stock options a CEO held significantly increased the possibility of a firm overinvesting.

In summary, the findings showed that CEOs' bonuses significantly increased the tendency of firms to pursue higher asset growth, but was not a significant motivation for overinvestment. Whereas, CEOs' stock options were not a significant motivation for firm growth, but elevated a firm's propensity to overinvest in asset growth. This phenomenon differs from other industries where CEOs' stock options generally have a negative effect on overinvestment. As mentioned in the descriptive analysis and literature review, only a few restaurant firms overinvested in assets. Further, only a few restaurant CEOs received substantially increased compensation in recent years but in these cases it was mostly in the form of stock options. Therefore, this study concluded that the unexpected findings might be caused by these unique characteristics of the restaurant industry.

(Insert Table 5 here)

5. Conclusions

Under normal business conditions, firms invest in positive NPV projects that increase firm value. However, previous studies have argued that stock returns consistently decrease as a firm increases its investments. In addition, the negative influence of investing in stock returns has been identified in most sub-components of asset growth, such as cash, capital investments, and other assets, and is even more apparent in total asset growth. Cooper et al. (2008) and Lipson et al. (2011) suggested that total asset growth was a stronger and more pervasive predictor of stock returns than any other single component of asset growth due to the synergetic benefits of it being the sum of all asset components. The q-investment theory explains this asset growth anomaly in terms of managers' rational investment behaviors, while the overinvestment hypothesis explains it in terms of the tendency for managers to pursue their own interests. Both explanations are supported by empirical evidence under different conditions, as Lam and Wei (2011) summarized.

Considering the negative relationship between asset growth and stock returns in both explanations, it is difficult to understand why firms seek growth. However, the consequences of these two explanations would differ from an operational performance perspective. For example, if the asset growth anomaly is caused by financial costs or expected stock returns (the q-investment theory: firms increase investments in assets when the financial costs or expected stock returns are low), then the profitability of high asset growth firms (e.g., firms with low expected stock returns) and low asset growth firms (e.g., firms with high expected stock returns) would not significantly differ because managers' investment decisions would be aligned with shareholders' interests. In contrast, if the asset growth anomaly is caused by mispricing or undervaluation of negative inferences (the overinvestment hypothesis: management tends to overinvest for their own benefit at the expense of shareholders but investors underreact), then the profitability and asset efficiency of high asset growth firms would significantly deteriorate, but this would not occur among low asset growth firms. In this context, this study suggests that firms' accounting information provides evidence of their underlying motivations (e.g., rational or irrational) for investment decisions.

This study showed that restaurant firms' operating profitability increased with asset growth, but the difference in operating profitability from the previous year did not decrease as firms' assets increased. In contrast, asset turnover for restaurant firms decreased with asset growth, but changes in asset turnover from the previous year increased as firms' assets increased. These results did not clearly indicate whether the relationship between asset growth and operating profitability was non-linear. However, a quadratic relationship between asset growth and operating efficiency was clearly present in both the FE and GEE models after adding the square term of asset growth. Operating profitability had an inverted-U shaped relationship with asset growth, although asset efficiency (or asset turnover) did not show an acceleration in its decreasing negative shaped relationship with asset growth. Therefore, this study confirmed that the asset growth anomaly is an inevitable phenomenon of firm growth in terms of operating performance. In other words, as a restaurant firm grows, the operating profitability increases decreasingly until the firm reaches an optimum level of asset growth. After this optimal point operating profitability decreases although operating efficiency continues to decrease as well. This phenomenon causes the asset growth anomaly.

In addition, the findings from the inverted-U shaped relationship between asset growth and operating profitability also provided evidence of overinvestment practices but only for a few restaurant firms, which augmented the asset anomaly (i.e., the optimum growth level was very high compared to the industry average). This begs the question, why do certain restaurant managers increase their assets irresponsibly beyond the optimal level? According to the overinvestment hypothesis, the discrepancy of interests between managers and shareholders can induce managers to invest in negative NPV projects after exhausting positive NPV projects. Managers are chiefly interested in compensation, including salary, bonuses, and stock options. This study found that the amount of bonus payments motivates managers to investment in asset growth, but does not significantly increase the probability of overinvestment practices. The amount of stock options, in contrast, was found to have an insignificant relationship with asset growth but a significant positive relationship with the probability of overinvestment practices. In this sense, although stock options did not substantially increase investments in assets, too much equity-based compensation was shown to significantly fuel managers' tendencies towards overinvestment practices.

Lastly, this study suggested that most restaurant firms did not engage in overinvestment practices. Only a small number of restaurant firms increased their assets too rapidly. Approximately 132 observations in the FE model (5.5%) and 85 observations in the GEE model (3.6%) increased their assets beyond the optimal level (above 46.24% in the FE model or 56.86% in the GEE model). This finding implies that in the restaurant industry it cannot be generalized that the asset anomaly is associated with overinvestment practices. Most restaurant firms increased investments below the optimal level or in positive NPV projects. Consequently, the overall relationship between asset growth and operating profitability was positive rather than negative (see Table 2). In this regard, although a few firms invested beyond the optimal asset growth level, rational investment theory would be more relevant than overinvestment behaviors to explain the asset growth anomaly in restaurant firms overall.

This study identified accounting information that provided clear evidence of the effects of asset growth on firm performance. Accordingly, it is recommended that accounting information be used to elucidate theories on the asset growth anomaly. This study also focused on a single industry and directly linked the asset growth anomaly to operating performance and CEOs' compensation. In addition, this study identified the varied effects of bonuses and stock options on managers' motivations for investing in assets based on the assumption that there is a discrepancy between the interests of managers and shareholders. The findings implied that restaurant firms should adjust CEO compensation schemes according to their asset growth phase to diminish conflicts between CEOs and shareholders and maximize business performance.

6. Implications and Future Research

This study intended to elucidate the phenomenon of the asset growth anomaly using overinvestment theory and agency theory to examine restaurant firms' financial performance. The findings supported the overinvestment theory and identified the optimal level of asset growth (Fu, 2010; Morgado, & Pindado, 2003; Richardson, 2006). Although asset growth was motivated by CEOs' bonuses, it did not lead the firm to overinvest capital expenditures. In contrast, the evidence also showed that substantial amounts of stock options at a few of the largest restaurant firms could have caused their CEOs to pursue overinvestment practices, which supported the agency theory. In other words, CEOs overinvested their capital resources in less efficient assets beyond the optimal level for their own benefits (Agha, 2016; D'Mello & Miranda, 2010; Officer, 2011). Nevertheless, consistent with the previous findings (Mun et al., 2019), agency problems were not a serious issue in the restaurant industry. Further, most restaurant firms did not overinvest in fixed assets even though firm growth was a strategic priority for many restaurant firms. Of the 2,380 total observations, only 132 in the FE model (5.5%) and 85 in the GEE model (3.6%) indicated overinvestment practices, which is a unique feature of the restaurant industry.

Despite its contributions, this study is not free from limitations. This study did not compare the magnitude of the negative asset growth effect among firms with different levels of free cash flows, financial constraints, or managerial information. The negative effect of asset growth on operational performance would be stronger if part of the asset anomaly was due to overinvestment practices. This study did not aim to provide evidence for why overinvestment practices explain the negative effect of asset growth on stock returns. Rather, this study sought to confirm whether asset growth had a negative effect on operating performance and, if so, why restaurant firms still pursued it to grow more rapidly. The effect of overinvestments could also be explained through comparisons among firms with different financial conditions. This could be an important topic for future research.

Another prospective topic is the relationship between firm performance and the sub-components of assets or financing resources. Cooper et al. (2008) showed that the profitability or efficiency of asset growth in firms with large amounts of cash or other assets would differ from firms with large amounts of fixed assets. In addition, the tendency of managers to overinvest would differ among firms with debt financing, equity financing, or internal financing. In this regard, the examination of sub-components of assets or financing resources would be an interesting topic for future research.

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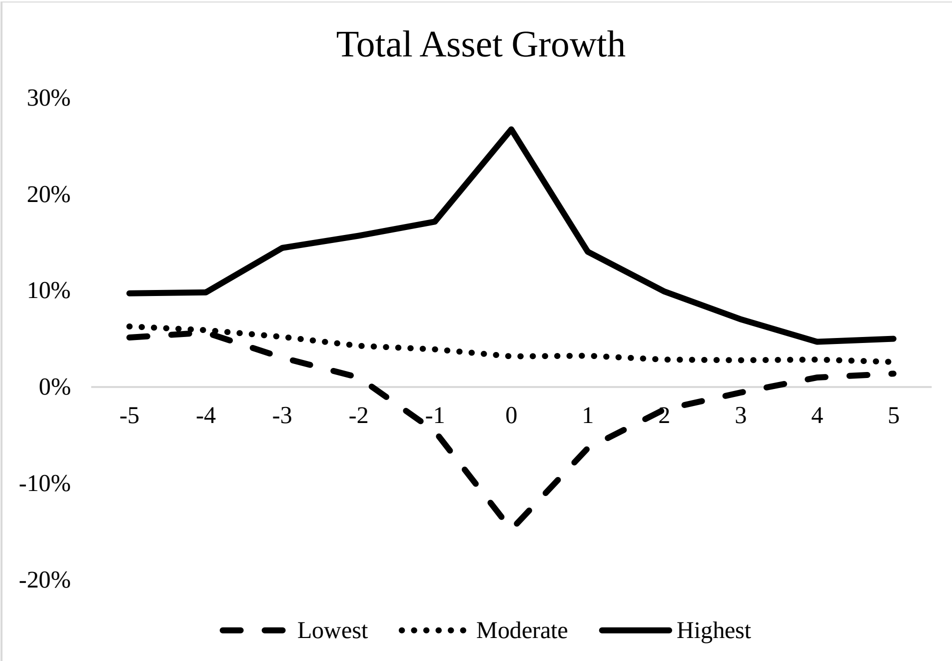

Figure 1. Total asset growth over the years

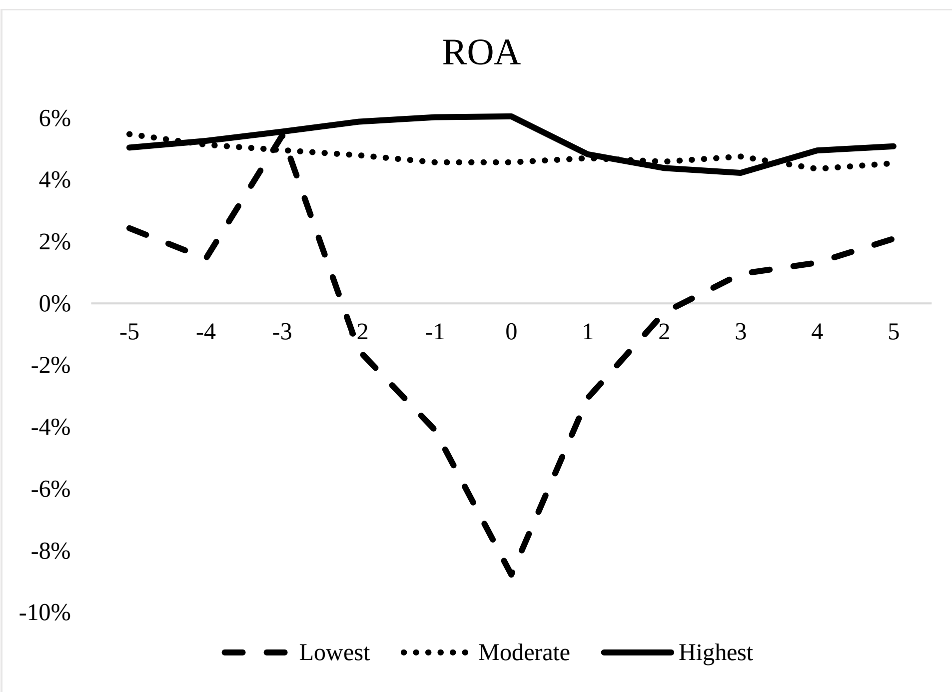

Figure 2. ROA over the years

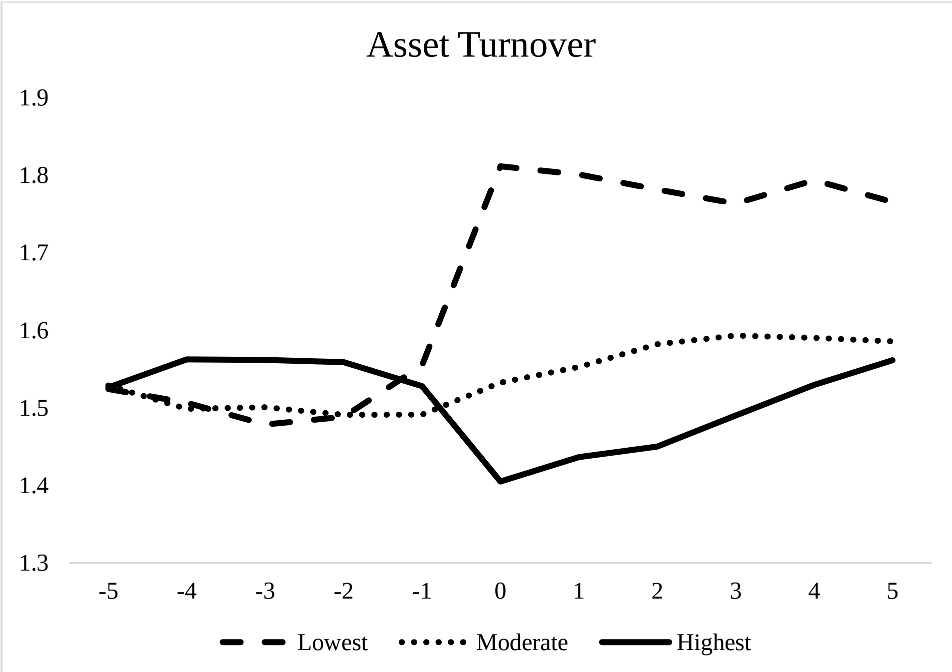

Figure 3. Total assets turnover rate over the years

Table 1. Descriptive statistics

	Total asset growth				
	All	Lowest	25% ~ 50%	50% ~ 75%	Highest
Total asset growth	0.0319	-0.1478	-0.0057	0.0774	0.2673
ROA	0.0354	-0.0878	0.0307	0.0550	0.0605
ROS	0.0229	-0.0428	0.0200	0.0372	0.0430
Asset turnover	1.5624	1.8118	1.5817	1.4933	1.4051
Total assets	150	63	223	257	125
Cash	0.0529	0.0533	0.0445	0.0506	0.0718
Short-term assets	0.1542	0.1561	0.1394	0.1480	0.1705
PPENT	0.6303	0.6253	0.6090	0.6679	0.6165
Other long-term assets	0.1648	0.1678	0.2076	0.1454	0.1479
Financial leverage	0.5398	0.7156	0.6075	0.4885	0.4371
Equity	0.4500	0.2784	0.3910	0.5051	0.5592
Observations	2,380	595	595	597	595

Note: All values are median values; Total asset growth is (total $asset_t$-total $asset_{t-1}$) over total $asset_{t-1}$; ROA is net profit over total asset; ROS is net profit over total revenue; Asset turnover is revenue over total asset; Asset turnover is revenue over total asset; Total assets are in million dollar; Cash, Short-term assets, property, plant and equipment (PPENT), and Other long-term assets are expressed as ratio of total assets; Financial leverage is total debt over total assets; Equity is the ratio of asset; Observations is number of firm year.

Table 2. Total asset growth and operating performance (ROA and asset turnover)

	ROA_t	$ROA_{t+1} - ROA_t$	Asset $turnover_t$	Asset $turnover_{t+1}$ – Asset $turnover_t$
$Constant_t$	7.8552	11.1883	1.4506***	0.1437
	(5.0228)	(13.9397)	(0.2817)	(0.1247)
Total asset $growth_t$	8.7160***	-20.6462	-1.3417***	0.2311***
	(2.1567)	(15.7290)	(0.3791)	(0.0758)
Tobins'Q_{t-1}	-3.8068***	2.2754***	-0.0106***	0.0001
	(1.1415)	(0.3953)	(0.0040)	(0.0030)
Firm $size_{t-1}$	-1.4183	-1.8676	-0.1495***	0.0351*
	(0.9912)	(1.5486)	(0.0452)	(0.0195)
Financial $leverage_{t-1}$	11.2540*	-10.6224	-0.0788	0.0648
	(6.5496)	(10.7248)	(0.0980)	(0.0569)
ROA_{t-1}	-2.3683**	1.1960	-	-
	(1.0623)	(0.9651)	-	-
Asset $turnover_{t-1}$	-	-	0.6884***	-0.2049***
	-	-	(0.0372)	(0.0394)
Observations	1,813	1,610	1,813	1,610
R^2	0.7136	0.2425	0.2435	0.0161

Note: ROA is net profit over total asset; Asset turnover is revenue over total asset; Total asset growth is (total $asset_t$-total $asset_{t-1}$) over total $asset_{t-1}$; Tobin's Q is $(\text{total asset} - \text{cash \& short term investment} - \text{deferred tax} + \text{number of share} * \text{market price})_{t-1}$ / $(\text{total asset} - \text{cash \&short term investment})_{t-1}$; Firm size is the log of total asset; Observations is number of firm year; ; Bracket is a standard error adjusted for clustering; *significant at 10%; **significant at 5%; ***significant at 1%.

Table 3. Total asset growth and operating performance (ROA or asset turnover)

	ROA_t		Asset $turnover_t$	
	FE	GEE	FE	GEE
$Constant_t$	8.5129*	6.4998**	1.3246***	0.1595
	(4.8789)	(3.2314)	(0.2218)	(0.1749)
Total asset $growth_t$	11.7075***	10.1420***	-1.8354**	-1.6404***
	(3.0601)	(3.1964)	(0.7765)	(0.6324)
Total asset $growth_t^2$	-12.6590***	-8.9192**	2.1891	2.1731
	(4.6966)	(4.3121)	(1.8916)	(1.7190)
Tobins' Q_{t-1}	-3.7321***	-3.3934***	-0.0213*	-0.0248
	(1.1169)	(1.2455)	(0.0127)	(0.0161)
Firm $size_{t-1}$	-1.5430	-0.5137	-0.1341***	0.0093
	(1.0107)	(0.5042)	(0.0341)	(0.0283)
Financial $leverage_{t-1}$	11.6175*	5.7125***	-0.0697	0.0444
	(6.5959)	(1.9565)	(0.1218)	(0.0310)
ROA_{t-1}	-2.1038**	-2.9694**	-	-
	(1.0656)	(1.2317)	-	-
Asset $turnover_{t-1}$	-	-	0.6823***	0.9152***
	-	-	(0.0415)	(0.1749)
Observations	1,813	1,813	1,813	1,813
R^2	0.7190	N/A	0.3063	N/A

Note: ROA is net profit over total asset; Asset turnover is revenue over total asset; Total asset growth is (total $asset_t$-total $asset_{t-1}$) over total $asset_{t-1}$; Tobin's Q is $(\text{total asset} - \text{cash \& short term investment} - \text{deferred tax} + \text{number of share} * \text{market price})_{t-1}$ / $(\text{total asset} - \text{cash \&short term investment})_{t-1}$; Firm size is the log of total asset; Observations is number of firm year; Bracket is a standard error adjusted for clustering; *significant at 10%; **significant at 5%; ***significant at 1%.

Table 4. Total asset growth and CEO's compensation

	Total asset growth$_t$			
	FE	GEE	FE	GEE
Constant	0.8745***	0.1381**	0.7797***	0.0976
	(0.2371)	(0.0596)	(0.2434)	(0.0691)
CEO's salary$_t$	-0.0300	-0.0210	-0.0322	-0.0179
	(0.0292)	(0.0238)	(0.0305)	(0.0228)
CEO's bonus$_t$	0.0362*	0.0338**	0.0324*	0.0314***
	(0.0209)	(0.0133)	(0.0187)	(0.0114)
CEO's option$_t$	0.0012	0.0014	0.0011	0.0011
	(0.0025)	(0.0027)	(0.0026)	(0.0029)
CEO's share	-0.0005	-0.0001	-0.0009**	-0.0001
owned %$_{t-1}$*100	(0.0004)	(0.0002)	(0.0004)	(0.0002)
Tobin's Q$_{t-1}$	0.0115*	0.0145***	0.0182***	0.2166***
	(0.0057)	(0.0045)	(0.0052)	(0.0049)
Firm size$_{t-1}$	-0.1157***	-0.0158**	-0.1153***	-0.0104
	(0.0339)	(0.0077)	(0.0361)	(0.0078)
Financial leverage$_{t-1}$	-0.1309***	-0.0932***	-0.1287***	-0.0944***
	(0.0370)	(0.0274)	(0.0297)	(0.0255)
ROA$_{t-1}$	0.4693*	0.4189**	-	-
	(0.2543)	(0.1771)	-	-
Asset turnover$_{t-1}$	-	-	0.0720	0.0102
	-	-	(0.0483)	(0.0171)
Observations	266	266	266	266
R^2	0.1353	N/A	0.1233	N/A

Note: ROA is net profit over total asset; Asset turnover is revenue over total asset; Total asset growth is (total asset$_t$-total asset$_{t-1}$) over total asset$_{t-1}$; CEO's salary, bonus, and stock option are the growth rates from the previous year; Tobin's Q is $(\text{total asset} - \text{cash \& short term investment} - \text{deferred tax} + \text{number of share} * \text{market price})_{t-1}$ / $(\text{total asset} - \text{cash \&short term investment})_{t-1}$; Firm size is the log of total asset; Observations is number of firm year; ; Bracket is a standard error adjusted for clustering; *significant at 10%; **significant at 5%; ***significant at 1%.

Table 5. Logistic regression: non-overinvestment firms vs. overinvestment firms

	Non-overinvestment $(0)_t$ vs. Overinvestment $(1)_t$			
	Logistic	GEE logistic	Logistic	GEE logistic
Constant	-9.9846***	-10.0117***	-20.0729**	-20.3502***
	(3.2583)	(3.4770)	(8.6915)	(7.4760)
CEO's $salary_t$	-0.2551	-0.2537	0.1898	0.2021
	(1.1899)	(1.3811)	(1.3699)	(1.4311)
CEO's $bonus_t$	-0.0557	-0.0499	-0.2535	-0.1787
	(0.2792)	(0.2667)	(0.5188)	(0.3995)
CEO's $option_t$	0.2361***	0.2366***	0.3265***	0.3303***
	(0.0602)	(0.0630)	(0.0751)	(0.0670)
CEO's share	-0.0056	-0.0058	-0.0761*	-0.0801
owned $\%_{t-1}$	(0.0079)	(0.0090)	(0.0140)	(0.0588)
Tobin's Q_{t-1}	0.0337	0.0393	-0.0288	-0.0259
	(0.3063)	(0.2721)	(0.3457)	(0.3164)
Firm $size_{t-1}$	0.5783**	0.5810*	1.4728**	1.4935**
	(0.2472)	(0.2998)	(0.7137)	(0.5912)
Financial $leverage_{t-1}$	-0.8613	-0.8785	-1.4399	-1.5048
	(1.1488)	(1.0212)	(1.2904)	(1.0731)
ROA_{t-1}	9.4591*	9.3368	-	-
	(5.5043)	(5.9336)		-
Asset $turnover_{t-1}$	-	-	3.0406**	3.1202***
		-	(1.3904)	(1.2419)
Observations	266	266	266	266
Wald $chi^2(8)$	71.25***	27.39***	54.60***	43.47***
Pseudo R^2	0.1484	N/A	0.1954	N/A

Note: Asset growth rate of non-overinvestment firms is less than 28.44%; Asset growth rate of overinvestment firms is above 28.44%; ROA is net profit over total asset; Asset turnover is revenue over total asset; Total asset growth is (total $asset_t$-total $asset_{t-1}$) over total $asset_{t-1}$; CEO's salary, bonus, and stock option, are the growth rates from the previous year; Tobin's Q is $(\text{total asset} - \text{cash \& short term investment} - \text{deferred tax} + \text{number of share} * \text{market price})_{t-1}$ / $(\text{total asset} - \text{cash \&short term investment})_{t-1}$; Firm size is the log of total asset; Observations is number of firm year; ; Bracket is a standard error adjusted for clustering; *significant at 10%; **significant at 5%; ***significant at 1%.