Do Earnings Management and Audit Quality Influence Over-Investment by Chinese Companies?

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Abstract

This paper examines how earnings quality affects the investment decisions of Chinese companies who employ non-Big 4 auditors. We measure earnings quality through the companies' use of discretionary accruals to manage earnings, and by the quality of the companies' auditors. We then seek to determine whether the quality of the earnings and the quality of the audit relate to overconfidence in internal decision making and lead to excess investment. We use two models for our study, adapted from the model used by McNichols and Stubben (2008). The first model measures the impact of earnings management on investment. Our second model employs a logistic regression model to measure the significant variables in companies that over-invest. We find that more important clients have significantly higher investment than less important clients, and that discretionary accruals are significant indicators of over-investment. Less important clients are more conservative in their investments, although they have more investment opportunities. We also observe that the proportion of over-investment drops for clients, regardless of their importance, whose auditors have a long tenure.

Keywords: Earnings management, Audit quality, Investment decisions, Chinese companies

1. Introduction

Previously, researchers have studied companies' use of discretionary accruals as a way to smooth income and affect earnings informativeness (Aboody and Kasznik, 2000; Bartov and Mohanran, 2004; Dechow and Dichev, 2002; Geiger and North, 2006; Jones, 1991; Tucker and Zarowin, 2006). While firms that manipulate earnings may indicate a favorable outcome for investors, such misrepresentations could affect internal decision making and lead to suboptimal or inefficient investment decisions (McNichols and Stubben, 2008). McNichols and Stubben (2008) have studied whether earnings management affects firms' investment decisions by examining fixed asset investments for a sample of firms that were investigated for accounting irregularities. The company's auditor may also influence the extent of earnings management. A higher quality audit may result in the company adopting a more conservative approach to financial reporting (McNichols and Stubben, 2008). Accordingly, other researchers have examined audit quality as a measure of earnings quality (Lenard and Yu, 2011; Boone et al., 2010; Ho et al., 2010; Li, 2010; Jenkins and Velury, 2008; Becker at al., 1998). The above authors who studied U.S. companies used Big 4 auditors to distinguish audit quality. We examine fixed asset investments for Chinese companies listed on the Chinese stock market from 1997 through 2007. We included in our sample only those companies whose variables for earnings, investment, and auditor are available in the Compustat Global Vantage database. In this database, we found that most Chinese companies hire non-Big 4 auditors. Therefore, consistent with the studies by Jenkins and Velury (2008) and Li (2010), we use importance of the client as a proxy for audit quality. We define client importance using a method similar to Li (2010), in that client importance is measured as a proportion of client sales

to total sales within the particular 2-digit SIC code. We also measure auditor tenure within the client importance group, as previous authors have linked auditor tenure and audit quality (Chen et al., 2008; Carcello and Nagy, 2004; Myers et al., 2003; Geiger and Raghunandan, 2002; Johnson et al., 2002). Our paper contributes to the literature by further investigating the link between earnings quality and firms' investment decisions. We also contribute to the investigation of Chinese companies' investment behaviors related to auditing quality.

Our paper is organized as follows. Section 2 presents the background and related literature. Section 3 presents our hypotheses, and Section 4 presents our data and methodology. This is followed by our results in Section 5, and we conclude in Section 6.

2. Background and Related Literature

2.1 Earnings Management and Earnings Quality

Jones (1991), Geiger and North (2006), and Tucker and Zarowin (2006) analyzed the use of discretionary accruals to manage earnings and influence earnings informativeness. Specifically, Jones (1991) found that firms that would benefit from import relief were more likely to decrease earnings through earnings management. Geiger and North (2006) found that discretionary accruals decreased significantly following the appointment of a new CFO. Tucker and Zarowin (2006) found that a change in the current stock price of higher-smoothing firms contains more information about future earnings than does the change in the stock price of lower-smoothing firms. Aboody and Kasznik (2000) and Bartov and Mohnanran (2004) found that the timing of corporate disclosures and stock option compensation were related to the use of discretionary accruals. Other studies (Dechow 1994; Dechow et al. 1998; Liu et al. 2002; Dechow and Dichev 2002) emphasized the quality of accruals. Dechow and Dichev (2002) noted that observable firm characteristics (such as length of the operating cycle, standard deviation of sales, cash flows, accruals and earnings) can be used as instruments for accrual quality. They reasoned that the timing of a firm's economic achievements often differs from timing of related cash flows, so that the benefit of accruals is to adjust for cash flow timing problems (Dechow and Dichev 2002). Thus, accrual quality is positively related to earnings persistence, or less "noisy" earnings.

2.2 Earnings Quality and Audit Quality

Becker et al. (1998) studied the relationship between audit quality and earnings management. They used the fact that a company employed a Big Six auditor as a proxy for audit quality. The results of their study indicated that clients of non-Big Six auditors reported discretionary accruals that were one-and-a-half to two percent of total assets higher than the discretionary accruals reported by clients of Big Six auditors. Reynolds and Francis (2000) also found no evidence that Big Five auditors reported more favorably for larger clients. Boone et al. (2010) used abnormal accruals as an observable proxy for audit quality, and compared Big 4 and second-tier audit firms. They found that there was little difference in audit quality between the two kinds of auditors, but that there was a more pronounced difference in perceived audit quality. Lee et al. (2006) studied IPO's of Australian firms and found that forecasts by Big 6 auditors proved more accurate than forecasts of non-Big 6 auditors. They noted that economic demand for differential audit quality reflects the same factors that underlie the demand for conservative financial reporting.

In addition to defining audit quality as the difference between Big "N" and non-Big "N" auditors, researchers have used other, varying measures of audit quality. Craswell et al. (1995) studied Australian companies and found that there was an audit fee premium, and therefore higher perceived audit quality, for Big 8 firms compared to non-Big 8 firms. However, there was also an audit fee premium for industry specialist Big 8 audit firms compared to non-specialist Big 8 auditors. Krishnan and Schauer (2000) found that audit size, but also client size, financial health, client wealth, and auditor participation in a peer review process also had an impact on audit quality.

Audit quality has also been measured by the length of time the auditor has been auditing the client. Knapp (1991) sampled audit committee members' assessments of audit quality and found that auditor size, but also audit tenure, had a significant influence on audit quality. However, the perception of quality was moderated by the types of audit firms to which audit committee members had been exposed. Ho et al. (2010) found that audit tenure is negatively related to the incidence of accrual-based upward earnings management. Other authors (Chen et al., 2008; Carcello and Nagy, 2004; Geiger and Raghunandan, 2002; Johnson et al., 2002; Myers et al., 2003) found that longer auditor tenure has a positive effect on audit quality and financial reporting. However, there is also evidence that audit quality declines as audit tenure increases. Choi and Doogar (2005) found a negative association between audit tenure and a going-concern qualification, while Myers et al. (2005) found that firms with longer tenure were more likely to make income-increasing misstatements.

Jenkins and Velury (2008) and Li (2010) studied auditor tenure to determine whether it had an influence on the reporting of more conservative earnings and would therefore measure earnings quality. Their results indicated lower

conservatism for short auditor tenure, and as such linked earnings quality to audit quality. In addition, Li (2010) measured the importance of the client in the auditor-client relationship and found that a long-term auditor-client relationship imposed a greater threat to auditor independence, and therefore earnings quality, only for smaller clients weakly monitored by auditors than for larger clients. Reynolds and Francis (2000) similarly found no evidence that economic dependence caused Big 5 auditors to report more favorably for larger clients. However, in a study of Chinese companies, Lenard and Yu (2011) found that least important clients of non-Big 4 auditors whose term is four to eight years employed more conservative accounting techniques, and therefore more earnings quality, than other groups. And Al-Thuneibat et al. (2011) studied audit firm size as a proxy for audit quality and did not find that audit firm size had any impact on the correlation between audit firm tenure and audit quality.

2.3 Earnings Quality, Audit Quality, and Investment Decisions

Previous research has studied the relation between audit quality and external investors. Boone et al. (2008) measured the equity risk premium, or the cost of equity capital over the risk-free interest rate, in order to gauge the confidence of investors. They found that the equity risk premium decreased in the early years of the auditor's tenure but increased with additional years of tenure. Mansi et al. (2004) and Ghosh and Moon (2005) studied perceptions of investors regarding auditor quality and auditor tenure and found that investors perceive auditor tenure as improving audit quality, and that audit quality and auditor tenure are negatively related to the cost of debt financing.

In examining internal decision making, Biddle and Hilary (2006) and Biddle et al. (2009) studied accruals and found that higher quality accounting enhances investment efficiency, while measures of accounting quality are negatively related to investment for firms prone to over-investment. The findings of McNichols and Stubben (2008) indicated that earnings management can influence internal decisions in addition to targeting external parties – in either situation, earnings quality is questioned. The authors found that the manipulation of financial information, as measured by the value of fixed asset investments, results in suboptimal investment decisions. Using models based on the method of McNichols and Stubben (2008), our paper examines the relationship between audit quality and internal investment decisions for a sample of Chinese companies.

3. Hypotheses

In this study, we examine the internal decision-making of Chinese companies based on manipulation of earnings as influenced by audit quality. When considering investment decisions, company management will have expectations about the return provided by the investment, but they will also have expectations of future growth of the company based on information about revenues and earnings (McNichols and Stubben, 2008). If information about growth is misreported, due to management of earnings, then the company may over-invest or under-invest. Consistent with McNichols and Stubben (2008), we identify excess investment as investment that differs from the amount that would be predicted given the firm's investment opportunities. We estimate the expected investment as the median investment in the firm's industry in the same year. Therefore, for our first hypothesis, we consider how companies that aggressively manage earnings might contribute to over-investment.

H1: Manipulation of earnings will contribute to over-investment by Chinese companies.

Because earnings may be aggressively managed through the use of discretionary accruals in order to enhance firm performance, and firm performance reflects the company's ability to invest, we examine discretionary accruals as a factor in over-investment. In addition, factors affecting investment include considerations of the company's growth, ability to generate cash flows, and the company's investment opportunity as measured by the ratio of the market value of assets to their book value (McNichols and Stubben, 2008). Discretionary accruals have also been studied for their effect on earnings quality represented by accounting conservatism. As previous authors have found that accounting conservatism is influenced by audit quality (Jenkins and Velury, 2008; Li, 2010; Lenard and Yu, 2011), we therefore seek to determine how audit quality affects over-investment, by considering the effect of audit quality on the quality of reported earnings. Consistent with Li (2010), we use the importance of the client as a proxy for audit quality. We also consider the influence of auditor tenure on audit quality. This leads to our second hypothesis:

H2: Chinese companies with lower audit quality are more likely to have over-investment

As has been shown in previous studies, we will measure audit quality by the importance of the audit client, but also by the length of auditor tenure.

4. Data and Methodology

We obtained a sample of Chinese companies from 1997 through 2007, retrieved from the Compustat Global Vantage database. Our sample includes A-share companies listed in Shanghai or Shenzhen stock exchanges. We exclude dual-class firms because B-class shares are denominated in foreign currencies and are subject to the application of different accounting principles. Consistent with the literature, we exclude financial services industry

firms (SIC code between 6000 and 6999) because of special auditing regulations in the financial services industry. Because most Chinese companies do not hire Big 4 auditors, our sample contains only firms that have non-Big 4 auditors. Our sample consists of 3,916 firm-year observations. To control for the effect of outliers, we Winsorize all study variables from the top and bottom at the 1% level.

Our first model, to determine whether manipulation of earnings contributes to over-investment, is based on the model that McNichols and Stubben (2008) use to identify excess investment. We vary our model slightly from McNicols and Stubben (2008), as we use the ratio of market-to-book value to measure investment opportunity. Book value of assets is a proxy for a firm's assets in place, and the market value of assets is a proxy for both assets in place and growth opportunities (Myers, 1977). Therefore, the market-to-book value (*MTB*) ratio describes the mix of assets in place and growth opportunities. Usually, *MTB* would be greater than one, and the higher the *MTB* ratio, the more investment opportunities. Adam and Goyal (2008) have argued that the market-to-book ratio is the most suitable variable to proxy for a firm's investment opportunities. They found that this ratio is positively correlated with all growth opportunities and bears the highest information content compared to other investment opportunity proxies. The reasoning for our use of excess investment as the dependent variable is that if a company's investment deviates from the industry expectations, such inefficiencies will reduce optimal use of the company's funds, affect financial performance, and eventually result in lower return on investment. We present the following equation:

$$IND\_INV_{it} = \alpha + \beta_1 IND\_INV_{i,t-1} + \beta_2 MTB_{i,t-1} + \beta_3 CF_{it} + \beta_4 GROWTH_{it} + \beta_5 DAC_{it} + \varepsilon \qquad (1)$$

where *IND_INV* is the company's industry-adjusted investment, calculated as the company's investment (capital expenditures) less the industry median. We include as independent variables the industry-adjusted investment from the beginning of the time period ($IND\_INV_{i,t-1}$), market-to-book ratio (*MTB*), operating cash flows (*CF*), company *GROWTH* (the natural log of total assets at the end of the year divided by total assets at the beginning of the year), and the measure of discretionary accruals (*DAC*) as calculated from the Jones (1991) model. *MTB* is calculated by using the market value of equity plus the book value of debt, divided by the book value of total assets. These independent variables represent the factors that influence a company's investment behavior (McNichols and Stubben, 2008).

Second, we examine factors affecting the likelihood of a firm's over-investment by comparing a firm's investment with its industry median. We use a logistic regression model where over-investment (*OVERINV*) is a 1 if the company's investment is greater than the industry median, 0 otherwise. We use model (2) to implement this comparison.

$$OVERINV = \alpha + \beta_1 MTB_{it} + \beta_2 CF_{it} + \beta_3 Growth_{it} + \beta_4 DAC_{it} + \varepsilon \qquad (2a)$$

$$OVERINV = \alpha + \beta_1 MTB_{it} + \beta_2 CF_{it} + \beta_3 Growth_{it} + \beta_4 DAC_{it} + \beta_5 Less + \varepsilon \qquad (2b)$$

where the variables in equation (2a) are as previously defined. Once the factors that contribute to the likelihood of over-investment are identified, we then want to determine how audit quality contributes to the proportion of companies that have over-invested or under-invested. Because client importance can be a proxy for audit quality, we compare the proportion of over-investment between less and more important clients of the audit firms. We define client importance using a method similar to Li (2010), in that client importance is measured as the client's sales as a proportion of total sales, within the particular 2-digit SIC code. We divide our sample, half into the less important client group and half into the more important client group, using this client importance criteria. Then in equation (2b), the variable *Less* equals 1 if a firm's client importance is less than the median, 0 otherwise.

In addition, the tenure of the auditor also affects audit quality due to the question of auditor independence. Thus, within our client importance groups, we can further examine audit quality by measuring the differences over the tenure of the auditor in the proportion of the client's over-investment. We use measurements of short tenure (1-3 years); medium tenure (4-8 years), and long tenure (9 years or greater).

5. Results

Table 1 presents the descriptive statistics for our sample, including pooled results and separate coverage of the less important and more important client groups. As defined, the more important group is larger in terms of total assets. The more important group also has higher investment, growth, and operating cash flow. Although discretionary accruals are slightly lower for the more important group, the result is not significant. The *MTB* ratio for the more important group is lower than the *MTB* ratio of the less important group, although still greater than one. As *MTB* is the ratio of market value to book value of the firm, we can reason that as the market value of a smaller firm would be higher than the value of its assets, these firms would have more motivation and funding to invest, and would be provided more investment opportunity.

Table 2 shows the results of the regression models. Model (1), which measures the industry-adjusted investment, shows that for our pooled sample, there is a negative association between investment in the current time period compared to the previous time period. On the other hand, growth, operating cash flows, and discretionary accruals are significant and positively related to investment. We run the regression separately for the more important and less important client groups, and find that growth and prior investment are not significant indicators of investment for the less important client companies. For the more important clients, previous investment is a positive and significant indicator of current investment, as is *MTB*. This indicates that the more important clients are more aggressive in their investment. Table 3 indicates the results for Model (2), which shows the likelihood of over-investment. We indicate two versions of Model (2). Model (2a) shows the results for the pooled sample. Model (2b) shows the results including the variable *LESS*, which is coded as a 1 if the client is a less important company, 0 otherwise. We also produce more details of the over-investment group and the under-investment group. Panel A of Table 3 is the comparison between the over-investment and a benchmark group (firms in the middle two quartiles). Panel B is the comparison between the under-investment group and the benchmark group. The positive and significant coefficient of the less important clients (*LESS*) variable in Table 3, Panel B indicates that these clients are more likely to have under-invested.

We expand upon the results of Model (2) in order to examine our hypothesis regarding audit quality. The audit quality is expressed as the differences in the proportion of over-investment not only among the less important and more important clients, but also as the differences in the proportion of over-investment by the varying levels of audit tenure within the client importance. Table 4 indicates that the proportion of companies in the less important client groups that have over-invested, at 63.2%, is significantly lower, using a proportions test, than the proportion of more important companies that have done so. Within the less important client group, those companies whose auditor has a medium tenure have the highest proportion of over-investment. That level of investment then declines when the auditor tenure lengthens. For the more important clients, there is no significant difference between the proportion of over-investment for the short tenure or medium tenure groups. Then, similar to the less important clients, the proportion of over-investment declines and is significantly different for the long tenure group.

Finally, in order to examine the causal relationship between over-investment and earnings management, we use a Granger causality test to determine whether discretionary accruals cause over-investment. We implement the Granger causality Wald test separately by pooling firms across industry segment and year, and we use two lags of each variable. Table 5 reports the results of Granger causality tests of over-investment and earnings manipulation which is measured by discretionary accruals (*DAC*). The results show that discretionary accruals cause over-investment in 87.5% of 93 industry-year groups tested while only 11.11% of test results support over-investment causing discretionary accruals. The Granger causality test results reveal that it is earnings management through the use of discretionary accruals that causes over-investment.

6. Summary and Conclusions

In this paper we examine how earnings quality, as measured through the use of discretionary accruals and by the quality of the company's auditors, affects investment decisions of Chinese companies. We find that discretionary accruals are significant indicators of over-investment. We also find that when we measure audit quality by determining the importance of the audit client, the more important clients have a significantly higher proportion of over-investment than the less important clients. Within the client groups, we find that for less important clients, over-investment peaks when the auditor has a medium tenure, while for the more important clients, proportion of over-investment is just over 70% and remains there until the auditor has a long tenure. This result supports findings by previous studies that earnings management influences internal decision making. Our findings also reflect the influence of audit quality on investment decision making, which in turn has implications on policies regarding mandatory auditor rotation, as the more conservative approach to investment does not occur until the auditor tenure lengthens. Our results are limited to conclusions drawn from our sample, which includes A-share companies that are listed on the Shanghai and Shenzhen stock exchanges but does not include Chinese companies that are listed on the Hong Kong or U.S. stock exchanges. Future research could consider other factors that may affect over-investment, as well as extending these results to companies listed on stock exchanges in other countries.

Acknowledgments

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Table 1. Descriptive Statistics

Pooled sample				
	Mean	Sd	Min	Max
INV	0.213	0.424	-0.077	16.186
MTB	2.191	33.242	0.026	2122.392
CF	0.071	0.089	-0.170	0.363
Growth	0.069	0.307	-8.171	1.779
TA	5089.660	22348.270	0.000	732725.000
DAC	-0.003	0.095	-0.449	0.328
Less important group				
	Mean	Sd	Min	Max
INV*	0.197	0.552	0.000	16.186
MTB*	3.087	47.432	0.188	2122.392
CF***	0.055	0.087	-0.170	0.363
Growth***	-0.001	0.426	-8.171	1.371
TA***	1401.540	1163.713	0.000	15199.600
DAC	-0.005	0.107	-0.449	0.328
More important group				
	Mean	Sd	Min	Max
INV	0.226	0.275	-0.077	3.906
MTB	1.329	1.291	0.026	14.919
CF	0.084	0.088	-0.170	0.363
Growth	0.105	0.214	-0.865	1.779
TA	8781.302	31160.780	200.368	732725.000
DAC	-0.002	0.084	-0.389	0.309

INV is the company's investment (capital expenditures) deflated by total assets; MTB is the market-to-book ratio, calculated by market value of equity plus book value of debt and then divided by book value of assets, CF is operating cash flows; Growth is the natural log of total assets at the

end of the year divided by total assets at the beginning of the year; TA is the company's total assets; DAC is the discretionary accruals as calculated from the Jones (1991) model. *, **, and *** denotes respectively the 10%, 5%, and 1% significant level of t-test comparison between the less important and more important groups.

Table 2. Regression results

This table presents the regression result of equation (1):			
$IND\_INV_{it} = \alpha + \beta_1 IND\_INV_{i,t-1} + \beta_2 MTB_{i,t-1} + \beta_3 CF_{it} + \beta_4 GROWTH_{it} + \beta_5 DAC_{it} + \varepsilon$			
where *IND_INV* is the company's industry-adjusted investment, calculated as the company's investment (capital expenditures) less the industry average; MTB is the market-to-book ratio, calculated by market value of equity plus book value of debt and then divided by book value of assets, CF is operating cash flows; Growth is the natural log of total assets at the end of the year divided by total assets at the beginning of the year; TA is the company's total assets; DAC is the discretionary accruals as calculated from the Jones (1991) model.			
Dependent variable	IND_INV_t	IND_INV_t	IND_INV_t
	Pooled sample	Less important clients	More important clients
IND_INV_{t-1}	-0.128***	-0.045	0.082***
	(0.031)	(0.073)	(0.030)
MTB_{t-1}	0.001	0.001	0.040***
	(0.000)	(0.000)	(0.009)
CF_t	0.846***	0.665***	0.706***
	(0.133)	(0.247)	(0.125)
$Growth_t$	0.087**	0.083	0.092**
	(0.034)	(0.060)	(0.037)
DAC_t	0.554***	0.413**	0.251**
	(0.105)	(0.164)	(0.121)
Constant	0.044*	0.083	-0.038***
	(0.026)	(0.055)	(0.015)
Observations	1624	567	1057
Number of gvkey	707	316	391

Standard errors in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 3. Analysis of Over-/Under- Investment at Industry Level

This table presents the regression result of equation (2): $OVERINV = \alpha + \beta_1 MTB_{it} + \beta_2 CF_{it} + \beta_3 GROWTH_{it} \beta_4 DAC_{it} + Less + \varepsilon$
where OVERINV is a 1 if an observation is in the top quartile of industry-adjusted investment, 0 if in the middle two quartiles; UNDERINV is a 1 if an observation is in the bottom quartile of industry-adjusted investment, 0 if in the middle two quartiles; MTB is market to book ratio; CF is operating cash flows; Growth is the natural log of total assets at the end of the year divided by total assets at the beginning of the year; DAC is the discretionary accruals as calculated from the Jones (1991) model; Less equals 1 if a firm's client importance is less than the median, otherwise 0 where client importance is measured by the portion of a client's sales in the total sales of the two-digit SIC code industry segment. Panel A is the comparison between over-investment group and benchmark group (firms in the middle two quartiles). Panel B is the comparison between under-investment group and benchmark groups (firms in the middle two quartiles).

Panel A – Overinvestment group compared to benchmark group

Var	Coefficient	Std. Error	P value		Coefficient	Std. Error	P value
	Model a				Model b		
MTB_t	0.006	0.004	0.132		0.008**	0.003	0.016
CF_t	8.845***	1.363	0.000		3.682***	0.862	0.000
$Growth_t$	1.979***	0.384	0.000		2.316***	0.390	0.000
DAC_t	7.086***	1.321	0.000				
Less					0.037	0.184	0.842
Constant	-1.887***	0.169	0.000		-1.472***	0.151	0.000

Panel B – Underinvestment group compared to benchmark group

Var	Coefficient	Std. Error	P value		Coefficient	Std. Error	P value
	Model a				Model b		
MTB_t	-0.137*	0.074	0.064		-0.229**	0.094	0.015
CF_t	-6.612***	1.334	0.000		-3.303***	1.117	0.003
$Growth_t$	-1.517***	0.366	0.000		-1.452***	0.368	0.000
DAC_t	-4.468***	1.068	0.000				
Less					0.707***	0.218	0.001
Constant	-0.535***	0.159	0.001		-0.886***	0.190	0.000

* significant at 10%; ** significant at 5%; *** significant at 1%, respectively

Table 4. Proportion comparison between over-invest and non-over-invest firms

Pooled sample				
Less important group		More important group		Z value
No. of Overinvest obs	1325	No. of Overinvest obs	1404	2.569***
No. of non-overinvest obs	771	No. of non-overinvest obs	690	
Proportion	0.632	Proportion	0.671	
Less important group				
Short tenure group		Medium tenure group		Z value
No. of Overinvest obs	167	No. of Overinvest obs	310	4.212***
No. of non-overinvest obs	106	No. of non-overinvest obs	95	
Proportion	0.612	Proportion	0.765	
Short tenure group		Long tenure group		Z value
No. of Overinvest obs	167	No. of Overinvest obs	848	0.356
No. of non-overinvest obs	106	No. of non-overinvest obs	570	
Proportion	0.612	Proportion	0.598	
Medium tenure group		Long tenure group		Z value
No. of Overinvest obs	310	No. of Overinvest obs	848	6.114***
No. of non-overinvest obs	95	No. of non-overinvest obs	570	
Proportion	0.765	Proportion	0.598	
More important group				
Short tenure group		Medium tenure group		Z value
No. of Overinvest obs	326	No. of Overinvest obs	217	0.419
No. of non-overinvest obs	137	No. of non-overinvest obs	84	
Proportion	0.704	Proportion	0.721	
Short tenure group		Long tenure group		Z value
No. of Overinvest obs	326	No. of Overinvest obs	861	2.164**
No. of non-overinvest obs	137	No. of non-overinvest obs	469	
Proportion	0.704	Proportion	0.647	
Medium tenure group		Long tenure group		Z value
No. of Overinvest obs	217	No. of Overinvest obs	861	2.365**
No. of non-overinvest obs	84	No. of non-overinvest obs	469	
Proportion	0.721	Proportion	0.647	

Table 5. Granger Causality Wald Tests

This table presents the granger causality Wald tests of over-investment (OVER_INV) and discretionary accruals (DAC), using two lags of each variable. P value (pooled) is the p-value using firms pooled across industries and years. % Sig is the percent of 93 industry/year groups where the Granger test is significant.				
Panel A – Discretionary Accruals Cause Over-Investment				
Equation	Excluded	χ^2	P value (pooled)	% Sig
OVER_INV	DAC	5.73	0.057*	87.50%
OVER_INV	All	5.73	0.057*	
Panel B – Over-Investment Causes Discretionary Accruals				
Equation	Excluded	χ^2	P value (pooled)	% Sig
DAC	OVER_INV	3.308	0.191	11.11%
DAC	All	3.308	0.191	