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Earnings Smoothing and Investment Sensitivity to Stock Prices

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Abstract: Existing research suggests that market misvaluations affect corporate investment, often leading to suboptimal investment. I examine whether earnings smoothing reduces the impact of market misvaluations on corporate investment and in turn enhances investment efficiency. I find that earnings smoothing has a strong negative effect on the sensitivity of corporate investment to stock prices. Further analyses indicate that this negative effect is driven by both innate and discretionary components of earnings smoothing and is more pronounced for firms operating in more volatile business environments. I complement these findings by demonstrating that firms with smoother earnings have lower over- (under-)investment and higher future operating performance. Collectively, the evidence suggests that earnings smoothing improves corporate investment efficiency by reducing the impact of market misvaluations on investment.

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Earnings Smoothing and Investment Sensitivity to Stock Prices

1. Introduction

Corporate investment and stock prices are positively correlated. More investment occurs when market valuations are high than when they are low. The traditional interpretation of this positive relation is that firms respond to information about investment opportunities that is embedded in stock prices (Tobin 1969). However, firms investing in booming markets have lower operating performance than firms investing in depressed markets (Bowuman, Fuller, and Nein 2009). This evidence is consistent with the mispricing hypothesis that stock prices contain irrationality and nonfundamental movements in stock prices drive firms away from optimal investment (e.g., Shiller 1981; Barro 1990; Rhodes-Kropf and Viswanathan 2004).

Figure 1 illustrates these relationships among Tobin's Q, investment, and future operating performance. It also reveals that investment sensitivity to Tobin's Q (measured as the market value of assets divided by the book value of assets) has increased and investment profitability has decreased significantly over time, which may indicate a trend of overreaction of corporate investment to stock prices. In this paper, I investigate whether earnings smoothing reduces investment sensitivity to stock prices and as a consequence improves investment efficiency.

A review of the literature suggests that there are two opposing views on earnings smoothing. One view is that earnings smoothing garbles firm underlying operations and creates opacity (e.g., Leuz, Nanda, and Wysocki 2003; Bhattacharya, Daouk, and Welker 2003). The other view is that earnings smoothing reveals managers' private information and drives stock prices closer to firm fundamentals (e.g., Kirschenheiter and Melumad

2002; Arya, Glover, and Sunder 2003). Because most of the theoretical research and empirical evidence from the U.S. setting support the latter view, I derive my hypotheses based on the assumption that earnings smoothing provides information.

My empirical analyses are based on the premise that firms react to market mispricing in their investment decisions.[1] Given similar market mispricing caused by macro-economic shocks or investor sentiment shifts, firms have weaker incentives to respond to mispricing when the duration of mispricing is shorter. Because earnings smoothing removes the transient component of earnings and accelerates the correction of mispricing (e.g., Sankar and Subramanyam 2001; Arya, Glover, and Sunder 2003), I predict that earnings smoothing reduces the sensitivity of corporate investment to stock prices. That is, earnings smoothing reduces firms' propensities to make more (less) investment when market valuations are high (low).[2]

To examine the effect of earnings smoothing on the relation between corporate investment and stock prices, I design my tests based on Baker, Stein, and Wurgler (2003). I define earnings smoothing as the ratio of cash flow volatility to earnings volatility. My baseline test consists of regressing investment on Tobin's Q, future stock returns, the interaction terms between earnings smoothing and these two proxies for stock misvaluations, and certain control variables.[3] The mispricing hypothesis predicts that

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[1] Mispricing affects corporate investment through the equity financing and catering channels. Mispricing affects the pattern of equity financing and in turn corporate investment (Baker, Stein, and Wurgler 2003). Mispricing also leads firms to cater to investor sentiment via corporate investment in order to sustain short-run stock prices (Polk and Sapienza 2009).

[2] I use the term "investment sensitivity to stock prices" to be consistent with the prior literature (e.g., Baker, Stein and Wurgler 2003; Chen, Goldstein, and Wei 2007). However, my theory emphasizes that earnings smoothing reduces the impact of market *misvaluations* on corporate investment.

[3] Using future stock returns as a proxy for mispricing follows the idea that underpriced (overpriced) stocks tend to earn higher (lower) returns when mispricing is corrected in the future. Using future stock returns is intended to mitigate the concern that variation in Q contains not only mispricing but also information about

firms invest more (less) when stocks are overpriced (underpriced). High Tobin's Qs indicate a greater likelihood of current overpricing while high future stock returns indicate a greater likelihood of current underpricing. Therefore, I expect the coefficients on Q to be positive on average and less positive for firms with smoother earnings. Similarly, the coefficients on future stock returns should be negative on average and less negative for firms with smoother earnings. I confirm this prediction. In particular, firms that rank in the top tercile of earnings smoothing have investment (proxied by asset growth) that is only roughly a third as sensitive to stock prices as firms in the bottom tercile of earnings smoothing.

I perform several additional tests to complement the main finding that earnings smoothing reduces investment-price sensitivity. First, I decompose earnings smoothing into its innate and discretionary components and find that both components of earnings smoothing contribute to the reduction of investment-price sensitivity. Second, exploring cross-sectional variation in the effect of earnings smoothing, I show that the negative impact of earnings smoothing on investment-price sensitivity is greater when firms operate in more volatile and uncertain business environments (proxied by cash flow volatility, stock return volatility, and bid-ask spread). Third, I examine the effect of earnings smoothing on equity financing sensitivity to stock prices because equity financing is a channel through which stock prices affect investment (e.g., Bosworth 1975; Morck, Shleifer, and Vishny 1990). The result shows that earnings smoothing also reduces equity financing sensitivity to stock prices.

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investment opportunities. I discuss competing interpretations of investment-Q sensitivity in detail in Section 6.

To determine whether earnings smoothing reduces the impact of market misvaluations on investment, leading to more efficient investment, I examine the relation between earnings smoothing and investment efficiency. I focus on a firm's deviation from expected investment predicted by its sales growth and its future operating performance. The results show that one decile increase in earnings smoothing is associated with a reduction of over-investment (under-investment) measured by asset growth by 0.45% (0.35%). One decile increase in earnings smoothing increases return on assets, operating cash flows, and sales growth by 0.41%, 0.29%, and 0.12%, respectively.[4]

My paper contributes to several streams of literature. I add to the earnings smoothing literature by showing that earnings smoothing has a positive impact on firms' resource allocations. The evidence in my study is consistent with the view that earnings smoothing provides information rather than garbles it. Further, it provides an economic explanation as to why firms that smooth earnings receive higher valuations (Ghosh, Gu, and Jain 2005; Allayannis and Simko 2009), and why managers who smooth earnings receive higher compensations (Das, Hong, and Kim 2009).

I complement the recent literature that studies the relation between accounting quality and investment efficiency (e.g., Biddle and Hilary 2006; Biddle, Hilary and Verdi 2009; McNichols and Stubben 2008; Francis and Martin 2010). Biddle, Hilary and Verdi (2009) document that firms with superior financial reporting quality have lower over-(under)-investment. I show that the effect of accounting information on investment-price sensitivity may be a causal link that explains the results in their study. In addition,

[4] The mean (median) values of investment, return on assets, operating cash flows, and sales growth in my sample are 13.83% (6.87%), 2.39% (4.03%), 8.08% (8.6%), and 11.24% (8.05%), respectively.

McNichols and Stubben (2008) document that firms overinvest when managers inflate earnings and conclude that earnings management leads to inefficient investment. I provide evidence that earnings management in the form of earnings smoothing actually enhances investment efficiency.

My paper extends the literature that examines the relations between market (mis)valuations and corporate financing and investing activities (e.g., Baker and Wurgler 2002; Baker, Stein, and Wurgler 2003; Chang, Dasgupta, Hilary 2006, 2009). These studies do not address the welfare implications of market misvaluations. Using earnings smoothing as a common link, I find that nonfundamental movements in stock prices lead to suboptimal investment and accounting information can mitigate this negative impact of market misvaluations on the real economy.

My paper proceeds as follows. Section 2 reviews related literature and develops testable hypotheses. Section 3 describes the sample selection and research design. Section 4 presents main empirical results. I analyze the relation between earnings smoothing and investment efficiency in Section 5. Section 6 conducts sensitivity analyses and Section 7 concludes.

2. Related Literature and Hypotheses Development

2.1 Corporate investment and stock prices

Numerous studies have documented a positive relation between corporate investment and stock prices. In the framework of market efficiency and symmetric information, this positive relation simply reflects firms' rational responses to the information about investment opportunities embedded in stock prices. However, there is much evidence that stock markets are not completely efficient and information does not flow freely among managers and investors. In the presence of investor irrationality and/or information asymmetry, nonfundamental movements in stock prices impact corporate investment, often leading to suboptimal investment.

Stock misvaluations affect corporate investment through equity financing. Mispricing affects the cost of raising equity capital and therefore the pattern of equity financing (Baker and Wurgler 2002). The cash flows associated with equity issuances and repurchases in turn impact corporate investment (e.g., Morck, Shleifer, and Vishny 1990; Blanchard, Rhee, and Summers 1993; Stein 1996). For example, Baker, Stein, and Wurgler (2003) document that equity-dependent firms display a higher investment sensitivity to stock prices. They conclude that stock market mispricing affects these firms' equity financing and in turn their investment. Mispricing also has a direct impact on corporate investment. When the market misprices firms according to their level of investment, mispricing leads firms to use investment to cater to investor demand in order to sustain short-run stock overvaluations (Shleifer and Vishny 2003; Polk and Sapienza 2009).[5] Polk and Sapienza (2009) test this "catering" channel and document a positive relation between abnormal investment and discretionary accruals (their proxy for mispricing), even after controlling for equity financing.

Theoretical and empirical evidence suggests that firms' responses to market misvaluations lead to over- or under-investment. For example, over-investment arises when managers subsidize failing projects with the excess cash received from selling overpriced securities (Chang, Dasgupta, and Hilary 2006). Under-investment arises when long-horizon managers forgo profitable investment to avoid transferring wealth

[5] For example, in the booming market, investors may view investment as a signal of growth and overprice firms that undertake more investment.

from existing investors to new ones by issuing underpriced securities (Stein 1996). Misvaluations also lead firms to undertake investment of poor quality. Rhodes-Kropf and Viswanathan (2004) link merger waves and market misvaluations, proposing that market misvaluations lead firms to overlook the synergies between acquirers and targets and miscalibrate the quality of mergers and acquisitions. Bowuman, Fuller, and Nain (2009) obtain empirical support for this theoretical prediction by showing that acquisitions undertaken in booming markets have lower long-run stock and operating performance than those undertaken in depressed markets. Hoberg and Phillips (2010) document that in competitive industries firms experience sharp declines in cash flows and stock returns after high industry-level market valuations, financing, and investment.

The discussion above illustrates how misvaluations affect corporate investment and lead to suboptimal investment. In the next section, I discuss how earnings smoothing can reduce the impact of stock misvaluations on investment and therefore improves investment efficiency.

2.2 Earnings smoothing and corporate investment

There is disagreement on the informativeness of earnings smoothing. On the one hand, some regulators and researchers argue that earnings smoothing conceals underlying business operations and creates opacity (e.g., Levitt 1998; Leuz, Nanda, and Wysocki 2003; Jayaraman 2008). For example, using a cross-country design, Leuz, Nanda, and Wysocki (2003) document that managers in countries with weak investor protection smooth earnings to mask firms' true performance in an attempt to shield their private control benefits. On the other hand, some researchers suggest that earnings smoothing provides information by revealing the permanent component of earnings and managers' private information (e.g., Barnea, Ronen and Sadan 1975; Ronen and Sadan 1981; Sankar and Subramanyam 2001; Tucker and Zarowin 2006). Because most of the theoretical research and empirical evidence from the U.S. setting support the information role of earnings smoothing, I derive my predictions based on the assumption that earnings smoothing provides information.[6]

I posit that earnings smoothing reduces the impact of market mispricing on investment through a reduction of the duration of mispricing. Given similar market mispricing, firms have less incentives and opportunities to respond to mispricing when the duration of mispricing is shorter. Consistent with this idea, Chang, Dasgupta, and Hilary (2006) document that firms with greater information asymmetry (proxied by less analyst coverage) issue equity less often. When these firms do issue equity, they often issue in large amounts, especially after large price run-ups. Earnings smoothing reduces information asymmetry and facilitates the convergence of equity prices on firm fundamentals (Arya, Glover, and Sunder 2003). Therefore, earnings smoothing reduces the impact of mispricing on equity financing and in turn corporate investment.

Earnings smoothing also reduces the impact of mispricing on investment by reducing the likelihood of the firm being targeted by speculative investors. Firms with shorter horizon shareholders have greater incentive to cater to investor sentiment via investment to boost short-run stock prices (Polk and Sapienza 2009). Short horizon speculative investors prefer targeting firms with more volatile stock valuations (Baker and Wurgler 2006). Earnings smoothing reduces return volatility (Markarian and Gill-de-Albornoz 2010) and therefore the likelihood of the firm being targeted by speculative

[6] Leuz, Nanda, and Wysocki (2003) acknowledge in their paper that " the evidence for the U.S. suggests that, on average, managers use their discretion in a way that increases the informativeness of earnings", which "may be the result of effective outside investor protection".

investors. As a result, earnings smoothing helps to insulate managers from making investment to cater to investor sentiment. Figure 2 illustrates the relations among earnings smoothing, stock prices and corporate investment.

I articulate my main arguments above based on the assumption that variations in Tobin's Q and future stock returns are proxies for market misvaluations caused by macro-economic shocks or investment sentiment shifts, which is consistent with Baker, Stein, and Wurgler (2003). However, it is possible that the degree of mispricing captured by Tobin's Q and future stock returns varies across firms. If earnings smoothing reduces market mispricing and in turn the divergence between stock prices (Q and future stock returns) and firm fundamentals, firms with smoother earnings will also have weaker incentives to respond to stock prices. Because both explanations for the negative effect of earnings smoothing on investment-sensitivity are consistent with the mispricing hypothesis, I do not make distinctions between these two explanations.

Based on the discussion above, I hypothesize that earnings smoothing reduces the impact of stock prices on corporate investment. Specifically, my first hypothesis is:

H1: *Earnings smoothing is negatively associated with investment sensitivity to stock prices.*

Having established the baseline relation between earnings smoothing and investment sensitivity to stock prices, I now investigate innate earnings smoothing through neutral application of accounting standards and discretionary smoothing through intentional managerial intervention. The purpose of this investigation is two-fold. Prior research provides mixed evidence on the informativeness of innate versus discretionary earnings smoothing (e.g., Tucker and Zarowin 2006; Jayaraman 2008).[7] Therefore, it is important to document the effect of discretionary earnings smoothing because we are interested in what actions firms can take to affect earnings quality and in turn improve investment efficiency. In addition, as detailed in Section 6, the evidence on the effect of innate smoothing on investment-price sensitivity helps to address the concern that managerial attributes rather than earnings smoothing per se explain my results. Based on the argument that both innate and discretionary components of earnings smoothing remove the transient component of earnings and drive prices closer to firm fundamentals, I predict that both components reduce investment sensitivity to stock prices. My second set of hypotheses is:

H2a: *Innate earnings smoothing is negatively associated with investment sensitivity to stock prices.*

H2b: *Discretionary earnings smoothing is negatively associated with investment sensitivity to stock prices.*

The impact of earnings smoothing on investment-price sensitivity is likely to vary with firms' business environments. When firms operate in volatile and uncertain business environments, it takes longer for valuation uncertainty to be resolved, which magnifies the impact of misvaluations on investment. Further, prior research suggests that earnings smoothing is more informative when firms experience extreme performance (Kirschenheiter and Melumad 2002; Jayaraman 2008). Given that firms operating in more volatile business environments are more likely to experience extreme performance, earnings smoothing should be particularly informative for these firms. Therefore, I expect that the marginal effect of earnings smoothing in reducing the impact of stock

[7] For example, Tucker and Zarowin (2006) find that discretionary earnings smoothing provides information. In contrast, Jayaraman (2008) and LaFond, Lang, and Skaife (2007) conclude that while innate earnings smoothing provides information, discretionary earnings smoothing garbles information.

prices on investment is greater for firms operating in more volatile business environments. My third hypothesis is:

> **H3:** *The negative effect of earnings smoothing on investment sensitivity to stock prices is greater for firms that operate in more volatile business environments.*

Finally, I examine the relation between earnings smoothing and equity financing sensitivity to stock prices. Because equity financing is a channel through which stock valuations affect investment (e.g., Morck, Shleifer, and Vishny 1990; Stein 1996), the test of the impact of earnings smoothing on equity financing is a complement to the hypotheses that I develop for investment. Chang, Dasgupta, and Hilary (2006) show that firms with greater information asymmetry are more likely to time the market in equity financing. Therefore, I predict that earnings smoothing reduces equity financing sensitivity to stock prices through a reduction of information asymmetry. My fourth hypothesis is:

> **H4:** *Earnings smoothing is negatively associated with equity financing sensitivity to stock prices.*

3. Sample Selection and Research Design

3.1 Data selection

My main sample consists of firms listed on the Compustat Annual Fundamental Files during 1993-2006. I start my sample in 1993 because I need cash flow statement data to reliably estimate earnings smoothing over the five years t-1 to t-5 and cash flow statements are not widely available until 1988.[8] I stop at 2006 because I require future three-year stock return and operating performance data for my tests. I obtain stock return

[8] Collins and Hribar (2002) suggest that accruals estimated from the balance sheet as opposed to the cash flow statement contain measurement error and may lead to biased inferences.

data from CRSP. Following common practice in prior research, I exclude the financial and real estate industries (SIC codes in the 6000 to 6999 range) and the regulated utilities industry (SIC code 4200) because the investment and financing polices of firms in these industries are likely to be significantly different from firms in other industries. I exclude firm-year observations with less than $10 million book value of equity to ensure that my results are not driven by extremely small companies. I winsorize all continuous variables at the 1% and 99% levels by year to mitigate the influence of extreme outliers. My final main sample consists of 32,234 firm-year observations.

3.2 Measure of earnings smoothing

I use the ratio of cash flow volatility to earnings volatility as my primary measure of earnings smoothing (*SMTH*).[9] This measure captures the extent to which accrual accounting has smoothed out the underlying volatility of the firm's operations, which is consistent with prior research on earnings smoothing (e.g., Leuz, Nanda, and Wysocki 2003; Francis, LaFond, Ohlson, and Schipper 2004; Bowen, Rajgopal, and Venkatachalam 2008; McInnis 2010). Cash flow (earnings) volatility is the standard deviation of cash flows from operations (earnings before extraordinary items) scaled by the average total assets estimated at the annual level over the five years t-5 to t-1 with a minimum of four year data. Detailed definitions of all the variables used in this study are provided in the Appendix. Large values of *SMTH* indicate greater earnings smoothing. I report the raw values of *SMTH* in descriptive statistics. I use the decile ranking of *SMTH* by year in the regression analyses to address the concern of non-normality and simplify the economic interpretation of regression coefficients.

[9] I discuss the results of using alternative measures of earnings smoothing in Section 6.

3.3 Empirical models for hypotheses testing

3.3.1 Test of hypothesis 1 (Basic effect of earnings smoothing)

I test the effect of earnings smoothing on investment sensitivity to stock prices in two ways. First, following Baker, Stein and Wurgler (2003), I estimate the following equations separately for the three subsamples formed by terciles of earnings smoothing:

$$INVEST_{i,t} = \alpha + \beta_1 Q_{i,t-1} + \beta_2 CF_{i,t} + \beta_3 LogAsset_{i,t-1} + \sum YearDum + \sum IndDum + \varepsilon_{i,t} \quad (1)$$

$$INVEST_{i,t} = \alpha + \beta_1 RET_{i,t+3} + \beta_2 CF_{i,t} + \beta_3 LogAsset_{i,t-1} + \sum YearDum + \sum IndDum + \varepsilon_{i,t} \quad (2)$$

where *INVEST* is firm i's investment, measured as the percentage change in book value of assets from year t-1 to t. I use change in assets (asset growth) because Cooper, Gulen, and Schill (2008) argue that it is a more comprehensive measure of firm-level real investment and disinvestment than other investment measures used in prior research.[10] *Q* is measured as the market value of assets (the market value of equity plus the book value of liabilities) divided by the book value of assets at the beginning of year t. *RET* is measured as the cumulative raw returns over the three years t+1, t+2, and t+3. The choice of three years is based on the evidence that mispricing associated with external financing is likely to unravel over this horizon (Loughran and Ritter 1999; Baker and Wurgler 2000). I use raw returns because mispricing contains both market-wide and firm-specific components. High *Q* indicates a greater likelihood of current overpricing while high *RET* indicate a greater likelihood of current underpricing.

Other variables are included as controls. Cash flow (*CF*) is included to control for the effect of internal financing on investment (Fazzari, Hubbard, and Petersen 1988).

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[10] Using asset growth to measure investment is consistent with Baker, Stein, and Wurgler (2003) and Chen, Goldstein and Wei (2007). I discuss the robustness of the results to an alternative measure of investment from Biddle, Hilary, and Verdi (2009) in Section 6.

I measure *CF* as the sum of net income before extraordinary items, depreciation and amortization expense, and R&D expense scaled by lagged assets.[11] *LogAsset* is included to control for firm size and to mitigate the concern of spurious correlation as *INVEST* is scaled by lagged assets. I include year and two-digit SIC industry dummy variables to control for year and industry effects on firm investment.

Consistent with the market mispricing argument that firms invest more (less) when their stocks are overpriced (underpriced), I expect *INVEST* to be positively associated with *Q* and negatively associated with *RET*. According to H1, which predicts that earnings smoothing reduces investment sensitivity to stock prices, I expect the positive coefficients on *Q* to decrease across *SMTH* terciles and the negative coefficients on *RET* to increase across SMTH terciles.

Second, I expand the above basic framework by including both *Q* and *RET* and the interaction terms between *SMTH* and these two proxies for stock prices in the same regression below. This is a more rigorous test because *RET* will only attract a significant coefficient when it contains incremental information over *Q*.

$$INVEST_{i,t} = \alpha + \beta_1 Q_{i,t-1} + \beta_2 SMTH_{i,t-1} {*} Q_{i,t-1} + \beta_3 RET_{i,t+3} + \beta_4 SMTH_{i,t-1} {*} RET_{i,t+3} + \beta_5 CF_{i,t} + \beta_6 LogAsset_{i,t-1} + \beta_7 SMTH_{i,t-1} + \sum YearDum + \sum IndDum + \varepsilon_{i,t} \quad (3)$$

The interactions between *SMTH* and *Q* and *RET* capture the effect of earnings smoothing on investment sensitivity to stock prices. *SMTH* is included separately to control for its direct effect on investment. I expect a significant negative coefficient on *SMTH*Q* ($\beta_2 < 0$) and a significant positive coefficient on *SMTH*RET* ($\beta_4 > 0$).

3.3.2 Test of hypothesis 2 (Effect of innate and discretionary earnings smoothing)

[11] I use this *CF* measure to be consistent with Chen, Goldstein, and Wei (2007). The inferences remain unchanged when I use cash flows from operations to proxy for internal financing.

I first decompose earnings smoothing into its innate and discretionary components by regressing total earnings smoothing on innate determinants of earnings quality as described in Dechow and Dichev (2002). I estimate the following equation by year and two-digit SIC industry:

$$SMTH_{i,t-1} = \alpha + \beta_1 LogAsset_{i,t-1} + \beta_2 STDCFO_{i,t-1} + \beta_3 STDSALES_{i,t-1} + \beta_4 OperatingCyles_{i,t-1} + \beta_5 Loss_{i,t-1} + \varepsilon_{i,t-1} \quad (4)$$

where *STDCFO* (*STDSALES*) is the standard deviation of cash flows (sales) measured over the five years t-5 to t-1, *OperatingCyles* is the log of the firm's operating cycles, and Loss is the number of years the firm reported negative earnings over the five years t-5 to t-1. I use the predicted values from the equation above to proxy for innate earnings smoothing (*ISMTH*) and the residuals to proxy for discretionary earnings smoothing (*DSMTH*).[12]

I estimate the effect of innate and discretionary earnings smoothing on investment sensitivity to stock prices using the following regression:

$$INVEST_{i,t} = \alpha + \beta_1 Q_{i,t-1} + \beta_2 ISMTH_{i,t-1}{*}Q_{i,t-1} + \beta_3 DSMTH_{i,t-1}{*}Q_{i,t-1} + \beta_4 RET_{i,t+3} + \beta_5 ISMTH_{i,t-1}{*}RET_{i,t+3} + \beta_6 DSMTH_{i,t-1}{*}RET_{i,t+3} + \beta_7 CF_{i,t} + \beta_8 LogAsset_{i,t-1} + \beta_9 ISMTH_{i,t-1} + \beta_{10} DSMTH_{i,t-1} + \sum YearDum + \sum IndDum + \varepsilon_{i,t} \quad (5)$$

Consistent with H2, which predicts that both innate and discretionary earnings smoothing reduce investment sensitivity to stock prices, I expect significant negative coefficients on *ISMTH*Q* (β_2<0) and *DSMTH*Q* (β_3<0) and significant positive coefficients on *ISMTH*RET* (β_5 >0) and *DSMTH*RET* (β_6 >0).

3.3.3 Test of hypothesis 3 (Cross-sectional variation in the effect of earnings smoothing)

I use Equation (6) to test whether the effect of earnings smoothing on investment

[12] *DSMTH* and *ISMTH* are ranked into deciles by year before they enter Equation (5).

sensitivity to stock prices is more pronounced when firms operate in more volatile business environments.

$$INVEST_{i,t} = \alpha + \beta_1 Q_{i,t-1} + \beta_2 HIGH_{i,t-1}{*}Q_{i,t-1} + \beta_3 SMTH_{i,t-1}{*}Q_{i,t-1} + \beta_4 SMTH_{i,t-1}{*}HIGH_{i,t-1}{*}Q_{i,t-1} + \beta_5 RET_{i,t+3} + \beta_6 HIGH_{i,t-1}{*}RET_{i,t+3} + \beta_7 SMTH{*}RET_{i,t+3} + \beta_8 SMTH_{i,t-1}{*}HIGH_{i,t-1}{*}RET_{i,t+3} + \beta_9 CF_{i,t} + \beta_{10} LogAsset_{i,t-1} + \beta_{11} SMTH_{i,t-1} + \beta_{12} HIGH_{i,t-1} + \beta_{13} SMTH_{i,t-1}{*}HIGH_{i,t-1} + \sum YearDum + \sum IndDum + \varepsilon_{i,t} \quad (6)$$

where *HIGH* is an indicator variable coded as one if the corresponding proxy for the uncertainty of business environments falls above the median in year t-1, and zero otherwise. Consistent with Francis and Martin (2010), I alternatively use cash flow volatility (*STDCFO*), stock return volatility (*STDRET*), and bid-ask spread (*SPREAD*) to proxy for the uncertainty of a firm's operating environment. *STDCFO* is defined in equation (4). *STDRET* is the standard deviation of daily stock returns in year t-1. *SPREAD* is the average daily bid-ask spread in year t-1, measured as the difference between ask and bid prices divided by the average of bid and ask prices.

The coefficients on *SMTH*HIGH*Q* and *SMTH*HIGH*RET* indicate the incremental effect of earnings smoothing in mitigating investment-price sensitivity when firms' business environments are more volatile. I expect a significant negative coefficient on *SMTH*HIGH*Q* ($\beta_4 < 0$) and a significant positive coefficient on *SMTH*HIGH*RET* ($\beta_8 > 0$).

3.3.4 Test of hypothesis 4 (Earnings smoothing and equity financing sensitivity to stock prices)

I examine whether earnings smoothing affects equity financing sensitivity to stock prices by replacing the dependent variable in equation (3) with proxies for financing.

$$ISU_{i,t} = \alpha_0 + \beta_1 Q_{i,t-1} + \beta_2 SMTH_{i,t-1}{*}Q_{i,t-1} + \beta_3 RET_{i,t+3} + \beta_4 SMTH_{i,t-1}{*}RET_{i,t+3} + \beta_5 CF_{i,t} + \beta_6 LogAsset_{i,t-1} + \beta_7 SMTH_{i,t-1} + \sum YearDum + \sum IndDum + \varepsilon_{i,t} \quad (7)$$

where *ISU* is capital raised from external financing by firm i in year t. Although my primary focus is equity financing, I present both equity financing (*EISU*) and debt financing (*DISU*). Comparison of differential equity and debt financing sensitivity to stock prices helps to lend support to the argument that firms respond to *stock market* misvaluations. I provide detailed discussions regarding this matter in Sections 4.2.4 and 6. Following Bradshaw, Richardson, and Sloan (2006), I measure external financing using cash flow statement data. *EISU* is the net cash proceeds from the issuance and/or purchase of common and preferred stock less cash dividends paid. *DISU* is the net cash proceeds from the issuance and/or repayment of debt. I scale *EISU* and *DISU* by lagged assets to measure the amount of capital raised relative to the existing asset base.

Consistent with H4 that earnings smoothing reduces equity financing sensitivity to stock prices, I expect a significant negative coefficient on *SMTH*Q* ($\beta_2 < 0$) and a significant positive coefficient on *SMTH*RET* ($\beta_4 > 0$).

4. Empirical results

4.1 Descriptive statistics

Panel A of Table 1 reports descriptive statistics for the sample used for testing hypotheses H1 - H4. *INVEST* has a mean of 13.83% and a median of 6.87%, suggesting that firms invest and grow on average. Mean values for *EISU* and *DISU* are 0.87% and 2.06% respectively, indicating an overall tendency towards raising additional external capital. However, the medians of external financing proxies are all close to zero. *SMTH* has a mean of 1.9 and a median of 1.26, revealing that on average a firm's cash flow volatility exceeds its earnings volatility, consistent with the role of accruals to smooth out transitory components of earnings (Dechow 1994). The mean (median) value of *Q* is

1.86 (1.4) and the mean (median) of *RET* is 0.44 (0.41). These descriptive statistics are consistent with those reported in prior research (Francis, LaFond, Ohlson, and Schipper 2004; Baker, Stein, and Wurgler 2003; Bradshaw, Richardson, and Sloan 2006).

Panel B of Table 1 reports the Pearson and Spearman correlation matrix among these variables. *INVEST* and proxies for external financing (*EISU* and *DISU*) are positively correlated, suggesting that firms raise external capital to finance investment projects. As expected, *INVEST* is positively correlated with *Q* and negatively correlated with *RET*. In addition, *INVEST* is positively correlated with *CF* and negatively correlated with LogAsset. *SMTH* is positively correlated with *STDCFO*, consistent with the innate smoothing role of accruals documented in Dechow and Dichev (2002). Finally, *SMTH* is negatively correlated with *STDRET* and *SPREAD*.

4.2 Regression results

4.2.1 Results for H1

Figure 3 presents the investment sensitivity to stock prices across earnings smoothing terciles from low to high. Panel A reports the coefficient estimates of investment sensitivity to *Q* from Equation (1) and Panel B reports the coefficient estimates of investment sensitivity to *RET* from Equation (2). Specifically, moving from low to high *SMTH*, the coefficient estimates on *Q* decrease from 6.463 to 2.236 (with a coefficient of 5.215 for the medium group) while the coefficient estimates on *RET* increase from -5.231 to -2.295 (with a coefficient of -4.238 for the medium group). This pattern of results suggests that earnings smoothing reduces investment sensitivity to stock prices.

Table 2 reports the results for H1 when both *SMTH* and *RET* are included in the same regression. Column 1 estimates the baseline regression without the interaction terms between *SMTH* and *Q* (*RET*). It shows that *INVEST* is positively (negatively) related to *Q* (*RET*) with the coefficient of 4.892 (-3.430), significant at less than 1% level. Table 1 Panel A indicates that the standard deviation of *Q* (*RET*) is 1.41 (0.81). Thus one standard deviation in *Q* changes *INVEST* by 6.89% (1.41*4.892 = 6.90) while one standard deviation in *RET* changes *INVEST* by 2.78% (0.81*3.430 = 2.78).

Column 2 reports the results of Equation (3). The coefficient on *SMTH*Q* is significantly negative (β_2 = -0.429, t = 4.67) and the coefficient on *SMTH*RET* is significantly positive (β_4 = 0.292, t = 3.44). Given that unconditional investment sensitivity to *Q* from Column 1 is 4.892, the coefficient on *SMTH*Q* shows that one decile increase in *SMTH* results in about an 8.8% (0.429/4.892) decrease of positive investment sensitivity to *Q*. Similarly, one decile increase in *SMTH* is associated with about an 8.5% (0.292/3.430) decrease of negative investment sensitivity to *RET*.

Turning to control variables, both Columns 1 and 2 show a positive significant coefficient on *CF*, confirming the evidence in the prior literature that investment is positively related to internal financing (Fazzari, Hubbard, and Petersen 1988). The coefficients on *LogAsset* are significantly negative, suggesting that large firms have less growth potential and invest less. The overall evidence in Figure 2 and Table 2 is consistent with H1, providing evidence that earnings smoothing reduces investment sensitivity to stock prices.

4.2.2 Results for H2

Table 3 reports the regression results for H2. Column 1 presents the baseline regression results. It indicates a positive coefficient on Q (4.904) and a negative coefficient on *RET* (-3.435). It also shows that *ISMTH* is not significantly related to *INVEST* while *DSMTH* is significantly positively related to *INVEST*. Column 2 reports the results of Equation (5). The coefficients on *DSMTH*Q* ($\beta_2 = -0.684$, t = -6.49) and *ISMTH*Q* ($\beta_3 = -0.124$, t = -1.35) are both negative although the latter is not statistically significant. The coefficients on *ISMTH*RET* ($\beta_5 = 0.166$, t = 1.92) and *DSMTH*RET* ($\beta_6 = 0.278$, t = 3.23) are both significantly positive.[13] These results are generally consistent with H2, which predicts that both innate and discretionary components of earnings smoothing reduces investment sensitivity to stock prices.[14]

4.2.3 Results for H3

Table 4 reports the regression results of Equation (6). Columns 1, 2, and 3 report the results when the proxy for uncertainty of business environments is *STDCFO*, *STDRET*, and *SPREAD*, respectively. The coefficients on *HIGH*Q* (*HIGH*RET*) are significantly positive (negative) across all three columns, indicating that firms are more likely to respond to stock prices when they operate in more uncertain business environments. None of the coefficients on *SMTH*Q* and *SMTH*RET* are significant, indicating that earnings smoothing does not significantly reduce investment sensitivity to stock prices when the uncertainty of business environments is low. The coefficients on

[13] Given that my primary interest is whether each component of earnings smoothing drives the results and I do not have a prior to predict which component prevails, I do not compare the magnitudes of the effects associated with innate and discretionary smoothing.

[14] When the coefficients on the interactions between earnings smoothing and *RET* are statistically significant, I conclude that the results are generally consistent with my hypotheses even though the coefficients on the interactions between earnings smoothing and *Q* are not statistically significant. I use the same criterion to interpret the results for H3. This is because unlike Tobin's Q, *RET* is not subject to the concern that it contains information about investment opportunities.

*SMTH*HIGH*Q (SMTH*HIGH*RET)* are negative (positive) in all three columns and significant in Columns 1 and 3. These results are generally consistent with H3, which predicts that the negative effect of earnings smoothing on investment-price sensitivity is stronger when firms' business environments are more volatile.

4.2.4 Results for H4

Table 5 reports the results for H4. Columns 1 and 3 estimate the baseline regressions with *EISU* and *DISU* as the independent variable, respectively. Columns 1 and 3 show that the magnitudes of the coefficients on *Q* and *RET* are greater for *EISU* than for *DISU* (2.085 versus 0.685; -0.907 versus -0.637), although the distributions of *DISU* and *EISU* (as shown in Panel A of Table 1) indicate that on average firms issue more debt than equity. This combined evidence suggests that equity financing is more sensitive to stock prices than debt financing, consistent with the view that stock market misvaluations affect equity issuance and repurchases.

Columns 2 and 4 report the results of Equation (7) with *EISU* and *DISU* as the independent variable, respectively. Column 2 shows a negative coefficient on *SMTH*Q* (β_2 = -0.251, t = -4.54) and a positive coefficient on *SMTH*RET* (β_4 = 0.087, t = 2.54), providing evidence consistent with H4 that earnings smoothing reduces equity financing sensitivity to stock prices. More specifically, one decile increase in SMTH reduces the average equity financing sensitivity to *Q* (2.085 from Column 1) by 12% (0.251/2.085) and reduces the average equity financing sensitivity to *RET* (-0.907 from Column 1) by 9.6% (0.087/0.907). Column 4 shows a negative coefficient on *SMTH*Q* (β_2 = -0.049, t = -2.11) and a positive but insignificant coefficient on *SMTH*RET* is (β_4 = 0.019, t = 0.65). In particular, one decile increase in *SMTH* reduces the average debt financing sensitivity to *Q* (0.685 from Column 3) by 7.2% (0.049/0.685) and reduces the average debt financing sensitivity to *RET* (-0.637 from Column 3) by 3.0% (0.019/0.637). These results suggest that earnings smoothing has a stronger negative effect on equity than on debt financing sensitivity to stock prices.

5. Investment Efficiency

To validate the prediction that earnings smoothing reduces the impact of market misvaluations on corporate investment, which in turn leads to more efficient investment, in this section I examine the relation between earnings smoothing and investment efficiency. I focus on a firm's likelihood to deviate from expected investment predicted by its sales growth and its average operating performance in the subsequent three years. These two tests complement each other for the following reasons. Examining a firm's deviation from expected investment provides a direct test of the prediction that mangers over-invest (under-invest) when market valuations are high (low). However, this test critically depends on the assumption that sales growth is a good proxy for investment opportunities. Examining future operating performance mitigates the model specification concern. However, any observed relation between earnings smoothing and operating performance may be caused by unknown factors that are related to earnings smoothing but unrelated to firm investment decisions.

5.1 Over- and under-investment

To measure over- and under-investment, I estimate the following piece-wise linear model of investment as a function of sales growth for two-digit SIC industry in each year and use the residuals as proxies for deviations from expected investment.[15]

$$INVEST_{i,t} = \alpha_0 + \beta_1 SG_{i,t-1} + \beta_2 NEG_{i,t-1} + \beta_3 SG*NEG_{i,t-1} + \varepsilon_{i,t} \quad (8)$$

where *SG* is the annual sales growth for firm i in year t-1. *NEG* is an indicator variable taking the value of one for sales decreases, and zero otherwise.

I then examine the relation between earnings smoothing and over- and under-investment by estimating the following equation.[16]

$$OINVEST\ (UINVEST)_{i,t} = \alpha + \beta_1 SMTH_{i,t-1} + \beta_2 LogAsset_{i,t-1} + \beta_3 Slack_{i,t-1} + \beta_4 Leverage_{i,t-1} + \beta_5 Tangibility_{i,t-1} + \beta_6 K\text{-}structure_{i,t-1} + \beta_7 Dividend_{i,t-1} + \beta_8 Age_{i,t-1} + \sum YearDum + \sum IndDum + \varepsilon_{i,t} \quad (9)$$

where *OINVEST* is the positive residuals from equation (9) and *UINVEST* is the negative residuals multiplied by minus one for ease of interpretation. To mitigate the concern of endogeneity, I measure all independent variables at the beginning of year t. Following Biddle, Hilary, and Verdi (2009), I control for a set of firm characteristics that may affect corporate investment. *LogAsset* is the log value of book assets. *Slack* is the ratio of cash balance to property, plant, and equipment. *Leverage* is the ratio of total debt to total assets. *Tangibility* is the ratio of property, plant, and equipment to total assets. *K-Structure* is the ratio of long-term debt to the sum of the long-term debt and the market value of equity. *Dividend* is an indicator variable taking the value of one if the firm pays

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[15] Using sales growth to proxy for investment opportunities is consistent with Biddle, Hilary, and Verdi (2009). I estimate a piece-wise linear regression because the relation between investment and sales growth could differ between sales contractions and sales expansions (e.g., McNichols and Stubben 2008; Chen, Hope, Li, and Wang 2010).

[16] In this model all firms in my sample are classified as either over-investing or under-investing. To relax the restriction that all firms deviate from optimal investment, I apply a multi-nominal logistic regression used in Biddle, Hilary, and Verdi (2009). I sort firms into quartiles each year based on the residuals from equation (8). Firm-year observations in the top (bottom) quartile are classified as the over-investing (under-investing) group and those in the middle quartiles as the normal investing group. Thus the multinomial logistic regression tests how earnings smoothing affects the probability of a firm falling into the suboptimal investing groups versus the normal investing group. Untabulated results indicate that using the logistic model does not affect my inferences.

a dividend, and zero otherwise. *Age* is the number of years since the firm first appeared on CRSP.[17] These variables control for firm size, internal financing capability, financial constraints, asset pledgeability, debt overhang problem, and firm maturity, respectively.

Table 6 reports the regression results for tests of over-investment (Columns 1 and 2) and under-investment (Columns 3 and 4). Columns 1 and 3 present the univariate results while Columns 2 and 4 present the multivariate results with the control variables included. The coefficient estimates on *SMTH* in Columns 1 and 2 are -0.613 (t = -6.24) and -0.450 (t = -4.64), respectively. The coefficient estimates on *SMTH* in Columns 3 and 4 are -0.439 (t = -14.79) and -0.350 (t = -12.19), respectively. These coefficients indicate the percentage change of *OINVEST* and *UINVEST* associated with one decile increase of *SMTH*. When compared with the mean and median values of *INVEST* (13.83% and 6.87%, respectively) in Table 1 Panel A, these effects appear economically significant.

5.2 Subsequent operating performance

I test the relation between earnings smoothing and firm future operating performance by estimating the following equation.

$$Performance_{i,t+3} = \alpha + \beta_1 SMTH_{i,t-1} + \beta_2 Sales_{i,t-1} + \beta_3 Q_{i,t-1} + \beta_4 LogAsset_{i,t-1} + \beta_5 Age_{i,t-1} + \beta_6 Leverage_{i,t-1} + \beta_7 Hindex_{i,t-1} + \sum YearDum + \sum IndDum + \varepsilon_{i,t+3} \quad (10)$$

where Performance is the average firm operating performance over the three years t+1, t+2, and t+3. I consider performance measures based on earnings, cash flows, and sales. Specifically, I use return on assets (*ROA*), return on equity (*ROE*), cash flows from operations (*CFO*), asset turnover (*ATO*) and sales growth (*SG*). Control variables are

[17] I do not include *Q* and *CF* as control variables because they are used to test investment sensitivity to stock prices. Untabulated results indicate that including these variables does not affect my conclusion.

mainly adopted from Chen, Goldstein, and Wei (2007). *Sales* and *LogAsset* are included to proxy for firm size because Core, Holthausen, and Larcker (1999) find that larger firms have higher future operating performance. *Age* is included to control for firm maturity. *Hindex* is the Herfindahl index based on sales and is included to control for the effect of product market competition on firm profitability.

I use these three sets of performance metrics to complement each other because they each have their unique strengths and weaknesses. The positive relation between *SMTH* and *ROA* could be mechanical, simply reflecting inter-temporal shifting of accruals as opposed to the economic consequences of more efficient investment. *CFO* is less likely to be subject to the same concern. However, *CFO* is not a timely performance metric and does not match well with underlying economic activities (Dechow 1994).[18] Sales-based measures are reliable in the sense that revenues are less likely to be manipulated than expenses (Ertimur, Livnat, and Martikainen 2003; Jegadeesh and Livnat 2006).

Table 7 reports the regression results for the test of operating performance. When future performance is measured as *ROA*, *ROE*, *CFO*, *ATO*, and *SG*, the coefficient on *SMTH* is 0.405, 0.945, 0.292, 0.362, and 0.116, respectively, which represent the percentage increases of corresponding operating performance associated with one decile increase of *SMTH*. Untabulated results show that the mean (median) values of these performance measures in my sample are 2.39% (4.03%) , 2% (8.8%), 8.08% (8.6%), 120.29% (104.63%) and 11.24% (8.05%), respectively. Therefore, the effect of earnings smoothing on future operating performance appears economically significant.

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[18] For example, negative *CFO* can result from investment in positive net present value projects if disproportionately large amounts of cash flows are received at the later stages of the investment. This is especially true for relatively young firms.

6. Sensitivity analyses

6.1 Alternative interpretations of investment sensitivity to Q

Variation in Q comes from three sources – mispricing, information about investment profitability, and measurement error (Baker, Stein, and Wurgler 2003). My theory emphasizes that earnings smoothing reduces the impact of mispricing on firm investment. Therefore the other two components in Q can create alternative interpretations of my results.

I address the concern that firms with smoother earnings have a lower investment sensitivity to Q because there is less information about investment opportunities in Q for these firms.[19] First, as pointed out by Baker, Stein and Wurgler (2003), using future stock returns, which reflect managers' views about over- and under-valuations, helps to mitigate this concern. In the framework of market efficiency, future stock returns should not contain the information about investment opportunities embedded in Q.[20] Second, the analyses related to H4 show that equity financing is more sensitive to stock prices than debt financing and earnings smoothing has a stronger negative effect on equity than on debt financing sensitivity to stock prices. These results are consistent with the conjecture that firms react to *stock market* misvaluations by exploiting time-varying cost of *equity*. Finally, if the negative association between earnings smoothing and investment sensitivity to stock prices reflects less information in stock prices about firm

[19] The information hypothesis states that firms react less strongly to stock prices when prices contain less information about firm fundamentals. Consistent with this conjecture, Chen, Goldstein, and Jiang (2007) document a positive relation between price informativeness (proxied by price nonsynchronicty and PIN) and investment sensitivity to stock prices.

[20] Using future stock return also helps to discriminate between the interpretations given by the mispricing hypothesis and those given by the adverse-selection models set in an efficient market (Myers and Majluf 1984).

fundamentals for firms with smoother earnings, I should observe a negative rather than a positive relation between earnings smoothing and firm future operating performance.

Measurement error may also drive the negative relation between earnings smoothing and investment sensitivity to Q if earnings smoothing is positively related to measurement error in Q. Prior research shows that measurement error in Q is greater for young, growing, and low-dividend firms (e.g., Fazzari, Hubbard, and Petersen 1988; Erickson and Whited 2000). However, in my sample, firms with smoother earnings tend to be mature, large, and dividend-paying firms.[21] Therefore, measurement error is unlikely to drive my results. Another possible threat is that the relation between investment and Q is concave. That is, investment sensitivity to Q is higher when Q is low than when Q is high. The negative correlation between SMTH and Q (shown in Table 1 Panel B) suggests that the possible concave relation between Q and investment would bias my results away from showing a negative relation between earnings smoothing and investment sensitivity to Q.

6.2 Alternative earnings smoothing and corporate investment measures

I perform a few sensitivity tests with respect to measures of earnings smoothing and corporate investment. I measure earnings smoothing as the negative correlation between changes in accruals and changes in cash flows from operations and the negative correlation between the change in discretionary accruals and the change in pre-managed income as in Tucker and Zarowin (2006). I measure investment as the sum of capital expenditure, research and development cost, and acquisition expenditure less cash receipts from sale of property, plant, and equipment as in Biddle, Hilary, and Verdi

[21] Untabulated results show that earnings smoothing is significantly positively correlated with *Age*, *LogAsset*, and *Dividend* (Pearson correlations of 0.13, 0.10, and 0.08, respectively).

(2009).[22] The results based on these alternative measures do not change my main conclusion that earnings smoothing has a negative effect on investment sensitivity to stock prices.

6.3 Control for capital constraints

I document that earnings smoothing has a negative effect on investment sensitivity to stock prices. Baker, Wurgler and Stein (2003) show that capital constraints have a positive effect on investment sensitivity to stock prices. To assess the sensitivity of my results to firms' capital constraints, I include the Kaplan-Zingales index (measured as a function of cash flow, cash dividends, cash balance, and leverage) in my regressions.[23] Consistent with Baker, Stein and Wurgler (2003), I find a positive relation between the Kaplan-Zingales index and investment sensitivity to Q. However, the negative relation between earnings smoothing and investment sensitivity to stock prices is unchanged.

6.4 Managerial attributes

Arguably, managers who smooth earnings also have greater propensities to smooth investment, resulting in a less prompt response to stock prices and less volatile investment. Therefore, the observed negative relation between earnings smoothing and investment sensitivity to stock prices may simply be driven by managers' preferences or attributes rather than by earnings smoothing per se. The evidence that innate earnings smoothing reduces investment sensitivity to stock prices helps rule out managerial preferences as the sole driver for my results.

[22] This alternative measure of investment includes only cash acquisitions as reported in the statement of cash flows. As stock acquisitions are a key element in the relation between investment and misvaluations, asset growth is a more appropriate measure of investment for the purpose of my study.
[23] The Pearson and Spearman correlations between SMTH and KZ index are -0.01 and -0.05, respectively.

7. Conclusion

The increased trend of corporate investment volatility in recent years indicates that firms are likely to overreact to stock price movements in their investment decisions, resulting in inefficient investment. In this study, I examine the effect of earnings smoothing on corporate investment sensitivity to stock prices and investment efficiency. I find that earnings smoothing reduces investment sensitivity to stock prices. In addition, I document that both innate and discretionary earnings smoothing contribute to the reduction of investment sensitivity to stock prices. Exploring cross-sectional variation in the effect of earnings smoothing, I show that the negative impact of earnings smoothing on investment sensitivity to stock prices is greater when firms operate in more volatile and uncertain business environments. Finally, I demonstrate that earnings smoothing also has a negative effect on equity financing sensitivity to stock prices.

To determine whether the negative effect of earnings smoothing on investment-price sensitivity translates into more efficient investment, I examine the relation between earnings smoothing and investment efficiency. The results reveal that earnings smoothing reduces a firm's over- (under)-investment and increases its future operating performance. Collectively, these results suggest that earnings smoothing reduces the volatility of investment introduced by non-fundamental movements in stock prices, leading to more efficient corporate investment.

My sample covers years 1993-2006, which likely characterize a period where firms display too high of an investment sensitivity to stock price movements. Future research could examine whether earnings smoothing has an adverse effect on investment efficiency in settings where managers have the tendency to excessively smooth investment in the presence of changes in firm fundamentals. Future research could also identify settings where managers use earnings smoothing to mask underlying operations so as to prevent external interferences with their value-destroying investment activities.

References

Allayannis, G.S., and P. J. Simko. 2009. Earnings smoothing, analyst following, and firm value. Working paper, University of Virginia.

Arya, A., J. C. Glover, and S. Sunder. 2003. Are unmanaged earnings always better for shareholders? *Accounting Horizons* 17 (Supplement): 111-116.

Baker, M, J. Stein, and J. Wurgler. 2003. When does the market matter? Stock prices and the investment of equity-dependent firms. *Quarterly Journal of Economics* 118 (3): 969-1005.

Baker, M., and J. Wurgler. 2000. The equity share in new issues and aggregate stock returns. *Journal of Finance* 55 (5): 2219-2257.

Baker, M., and J. Wurgler. 2002. Market timing and capital structure. *Journal of Finance* 57 (1): 1-32.

Baker, M. and J. Wurgler. 2006. Investor sentiment and the cross-section of stock returns. *Journal of Finance* 61 (4): 1645-1680.

Barnea, A., J. Ronen, and S. Sadan. 1975. The implementation of accounting objectives: An application to extraordinary items. *The Accounting Review* 50 (1): 58-68.

Barro, R. J. The stock market and investment.1990. *Review of Financial Studies* 3 (1): 115-132.

Bhattacharya U., H. Daouk; and M. Welker. The world price of earnings opacity. *The Accounting review* 78 (2003): 641-78.

Biddle, G., Hilary, G., 2006. Accounting quality and firm-level capital investment. *The Accounting Review* 81 (5): 963-982.

Biddle, G.C., G. Hilary, and R. Verdi. 2009. How does financial reporting quality relate to investment efficiency? *Journal of Accounting and Economics* 48 (2-3): 112-131.

Blanchard, O., C. Rhee, and L. Summers. 1993. The stock market, profit, and investment. *Quarterly Journal of Economics* 108 (1): 115-136.

Bosworth, B. The stock market and the economy. 1975. *Brookings Papers on Economic Activity* 2: 257-290.

Bouwman, C. H. S., K. Fuller, and A.S. Nain. 2009. Market valuation and acquisition quality: Empirical Evidence. *Review of Financial Studies* 22 (2): 633-679.

Bowen, R. M., S. Rajgopal, and M. Venkatachalam. 2008. Accounting discretion, corporate governance, and firm performance. *Contemporary Accounting Research* 25 (2): 310-405.

Bradshaw, M. T., S. A. Richardson, and R. G. Sloan. 2006. The relation between corporate financing activities, analysts' forecasts and stock returns. *Journal of Accounting and Economics* 42 (1-2): 52-85.

Chang, X. I. N., S. Dasgupta, and G. Hilary. 2006. Analyst coverage and financing decisions. *Journal of Finance* 61 (6): 3009-3048.

Chang, X. I.N., S. Dasgupta, and G. Hilary. 2009. The effect of auditor quality on financing decisions. *The Accounting Review* 84 (4): 1085-1117.

Chen, Q., I. Goldstein, and J. Wei. 2007. Price informativeness and investment sensitivity to stock price. *Review of Financial Studies* 20 (3): 619-650.

Chen, F, O. Hope, Q. Li, and X. Wang. 2010. Financial reporting quality and investment efficiency of private firms in emerging markets. Working paper, University of Toronto.

Collins, D.W., and P. Hribar. 2002. Errors in estimating accruals: implications for empirical research. *Journal of Accounting Research* 40 (1): 105-134.

Cooper, M. J., H. Gulen, and M.J. Schill. 2008. Asset growth and the cross-section of stock returns. *Journal of Finance* 63 (4): 1609-1651.

Core, J., R. Holthausen, and D. F. Larcker. 1999. Corporate governance, chief executive officer compensation, and firm performance. *Journal of Financial Economics* 51 (3): 371-406.

Das, S., H. Hong, and K. Kim. 2009. Cash flow volatility, income smoothing, and CEO cash compensation. Working paper, University of Chicago at Illinois.

Dechow, P. 1994. Accounting earnings and cash flows as measures of firm performance: The role of accounting accruals. *Journal of Accounting and Economics* 18 (1):3-42.

Dechow, P., and I. D. Dichev. 2002. The quality of accruals and earnings: The role of accrual estimation errors. *The Accounting Review* 77 (Supplement): 35-59.

Erickson, T., and T. M. Whited. 2000. Measurement Error and the Relationship between Investment and Q. *Journal of Political Economy* 108 (5): 1027-1057.

Ertimur, Y., J. Livnat, and M. Martikainen. 2003. Differential market reactions to revenue and expense surprises. *Review of Accounting Studies* 8 (2-3): 185-211.

Fazzari, S., R. G. Hubbard, and B. C. Petersen. 1988. Finance constraints and corporate investment. *Brookings Papers on Economic Activity* 1: 141-195.

Francis, J., R. LaFond, P. Olsson, and K. Schipper. 2004. Costs of equity and earnings attributes. *The Accounting Review* 79 (4): 967-1010.

Francis, J. R., and X. Martin. 2010. Acquisition profitability and timely loss recognition. *Journal of Accounting and Economics* 49 (1-2): 161-178.

Ghosh, A., Z. Gu, and P. C. Jain. 2005. Sustained earnings and revenue growth, earnings quality, and earnings response coefficients. *Review of Accounting Studies* 10 (1): 33-57.

Hoberg, G., and G. Phillips. 2010. Real and financial industry booms and busts. *Journal of Finance* 65 (1): 45-86.

Jayaraman, S. 2008. Earnings Volatility, Cash Flow Volatility, and Informed Trading. *Journal of Accounting Research* 46 (4): 809-851.

Jegadeesh, N. and J. Livnat. 2006. Revenue surprises and stock returns. *Journal of Accounting and Economics* 41 (1-2): 147-171.

Kirschenheiter, M., and N. Melumad. 2002. Can big bath and earnings smoothing co-exist as equilibrium financial reporting strategies? *Journal of Accounting Research* 40 (3): 761-796.

LaFond, R., M. Lang, H.A. Skaife. 2007. Earnings smoothing, governance and liquidity: International Evidence. Working paper, Massachusetts Institute of Technology.

Leuz, C., D. Nanda, and P. D. Wysocki. 2003. Earnings management and investor protection: an international comparison. *Journal of Financial Economics* 69 (3): 505-527.

Levitt, A. 1998. The numbers game. Speech delivered at NYU Center for Law and Business, New York, NY, September 28.

Loughran, T., and J. Ritter. 1995. The new issues puzzle. *Journal of Finance* 50 (1): 23-51.

Markarian, G., and B. Gill-de-Albornoz. 2010. Income smoothing and idiosyncratic volatility. Working paper, Instituto de Empresa.

McInnis, J. 2010. Earnings smoothing, average returns, and implied cost of equity capital. *The Accounting Review* 85 (1): 315-341.

McNichols, M. F., and S. R. Stubben. 2008. Does earnings management affect firms' investment decisions? *The Accounting Review* 83 (6): 1571-1603.

Morck, R., A. Shleifer, and R. Vishny. 1990. The stock market and investment: Is the market a side show? *Brookings Papers on Economic Activity* 2: 157-215.

Myers, S., and N. Majluf. 1984. Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics* 13 (2): 187-222.

Polk, C., and P. Sapienza. 2009. The stock market and corporate investment: A test of catering theory. *Review of Financial Studies* 22 (1): 187-217.

Rhodes-Kropf, M., and S. Viswanathan. 2004. Market valuation and merger waves. *Journal of Finance* 59 (6): 2685-2718.

Sankar, M., and K. R. Subramanyam. 2001. Reporting discretion and private information communication through earnings. *Journal of Accounting Research* 39 (2): 365-386.

Shiller, R. J. 1981. Do stock prices move too much to be justified by subsequent changes in dividends? *American Economic Review* 71 (3): 421-436.

Shleifer, A., and R. Vishny. 2003. Stock Market Driven Acquisitions. *Journal of Financial Economics* 70 (3): 295-311.

Stein, J. C. 1996. Rational Capital Budgeting in an Irrational World. *Journal of Business* 69 (4): 429-455.

Tobin, J. 1969. A general equilibrium approach monetary theory. *Journal of Money, Credit and Banking 1* (1): 15-29.

Tucker, J. W., and P. Zarowin. 2006. Does income smoothing improve earnings informativeness? *The Accounting Review* 81(1): 251-270.

Appendix
Variable Definitions

Investment measures:

INVEST: Change in assets (data6) scaled by lagged assets (%).

INVESTALT: The sum of capital expenditure (data128), research and development expenditure (data46), and acquisition expenditure (data129) less cash receipts from sale of property, plant, and equipment (data107) scaled by lagged total assets (data6) (%).

External financing measures:

EISU: Equity issuance, measured as the net cash proceeds from the issuance and/or purchase of common and preferred stock less cash dividends paid (data108-data115-data127) scaled by lagged assets (data6).

DISU: Debt issuance, measured as the net cash proceeds from the issuance and/or repayment of debt (data111-data114+data301) scaled by lagged assets (data6).

Earnings smoothing measures:

SMTH: The standard deviation of cash flows (data308) scaled by total assets (data6) divided by standard deviation of earnings (data18) scaled by total assets (data6) over the five years t-5 to t-1.

ISMTH: Innate component of earnings smoothing measured as the predicted value from the regression below.

DSMTH: Discretionary component of earning smoothing measured as the residuals from the following regression.

$$SMTH_{i,t} = \alpha_0 + \beta_1 LogAsset_{i,t} + \beta_2 STDCFO_{i,t} + \beta_3 STDSALES_{i,t-1} + \beta_4 OperatingCyles_{i,t} + \beta_5 Loss_{i,t} + \varepsilon_{i,t}$$

The above equation is estimated on all firms in the same industry (two-digit SIC) each year. Independent variables are defined in the "firm innate attributes" section listed below.

SMTHALT1: The negative correlation between the change in accruals (data18) and the change in cash flows from operations (data18-data123) over the five years t-5 to t-1.

SMTHALT2: The negative correlation between the change in discretionary accruals and the change in pre-discretionary earnings over the five years t-5 to t-1. Discretionary accruals are the residuals from a modified Jones model and pre-discretionary earnings are calculated as earnings before extraordinary items minus discretionary accruals.

The following equation is estimated on all firms in the same industry (two-digit SIC) each year.

$$Accruals_{i,t-1} = \alpha(1/Assets_{i,t-1}) - \beta_1 \Delta Sales_{i,t} + \beta_2 PPE_{i,t} + \beta_3 ROA_{i,t} + \varepsilon$$

Where Accruals is the difference between earnings and cash flow (data18 - data308), ΔSales is the change in sales (data12), and PPE is the gross property, plant, and equipment (data8). All variables are deflated by lagged total assets (data6).

Firm innate attributes:

LogAsset: The log of total assets (data6).

STDSALES: The standard deviation of sales (data12) deflated by total assets (data6) over the five years t-5 to t-1.

STDCFO: The standard deviation of cash flows (data308) scaled by total assets (data6) over the five years t-5 to t-1.

OperatingCycle: The log of receivables to sales (data2/data12) plus inventory to cost of goods sold (data3/data41) multiplied by 360.

Loss: The number of years over the five years t-5 to t-1 in which the firm's net income before extraordinary item (data18) is negative.

Inherent information asymmetry proxies:

STDCFO: The same as STDCFO described above.

STDRET: The standard deviation of daily stock returns.

SPREAD: The average daily bid-ask spread, measured as the difference between ask and bid prices scaled by the average of bid and ask prices.

Investment efficiency measures:

OINVEST: The positive residuals from the investment model in the following equation.

UINVEST: The absolute value of negative residuals from the investment model in the following equation:

$$INVEST_{i,t} = \alpha_0 + \beta_1 SG_{i,t-1} + \beta_2 NEG_{i,t-1} + \beta_3 SG*NEG_{i,t-1} + \varepsilon_{i,t}$$

where SG is net sales growth (data12) in year t-1, NEG is an indicator variable taking the value of 1 if SG is negative, and 0 otherwise. Equation (2) is estimated by two-digit SIC code and fiscal year.

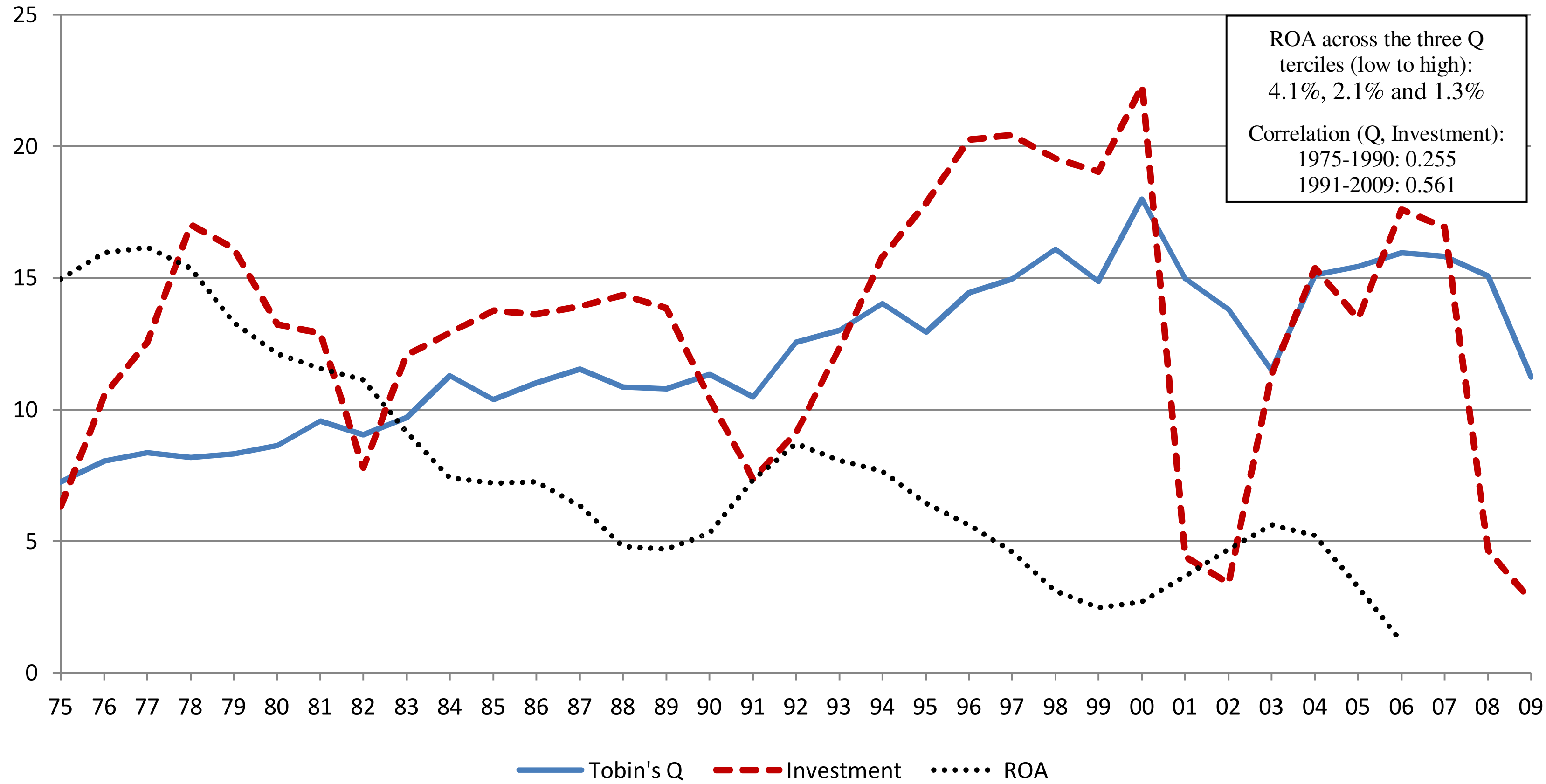
ROA: Earnings before extraordinary items (data18) scaled by lagged assets (data6) (in %).

ROE:	Earnings before extraordinary items (data18) scaled by lagged book value of equity (data60) (in %).
CFO:	Cash flow from operations (data308) scaled by lagged assets (data6) (in %).
ATO:	Asset turnover measured as sales revenue divided by total assets (data6) (in %).
SG:	Net sales growth (data12) (in %).

<u>Other variables:</u>

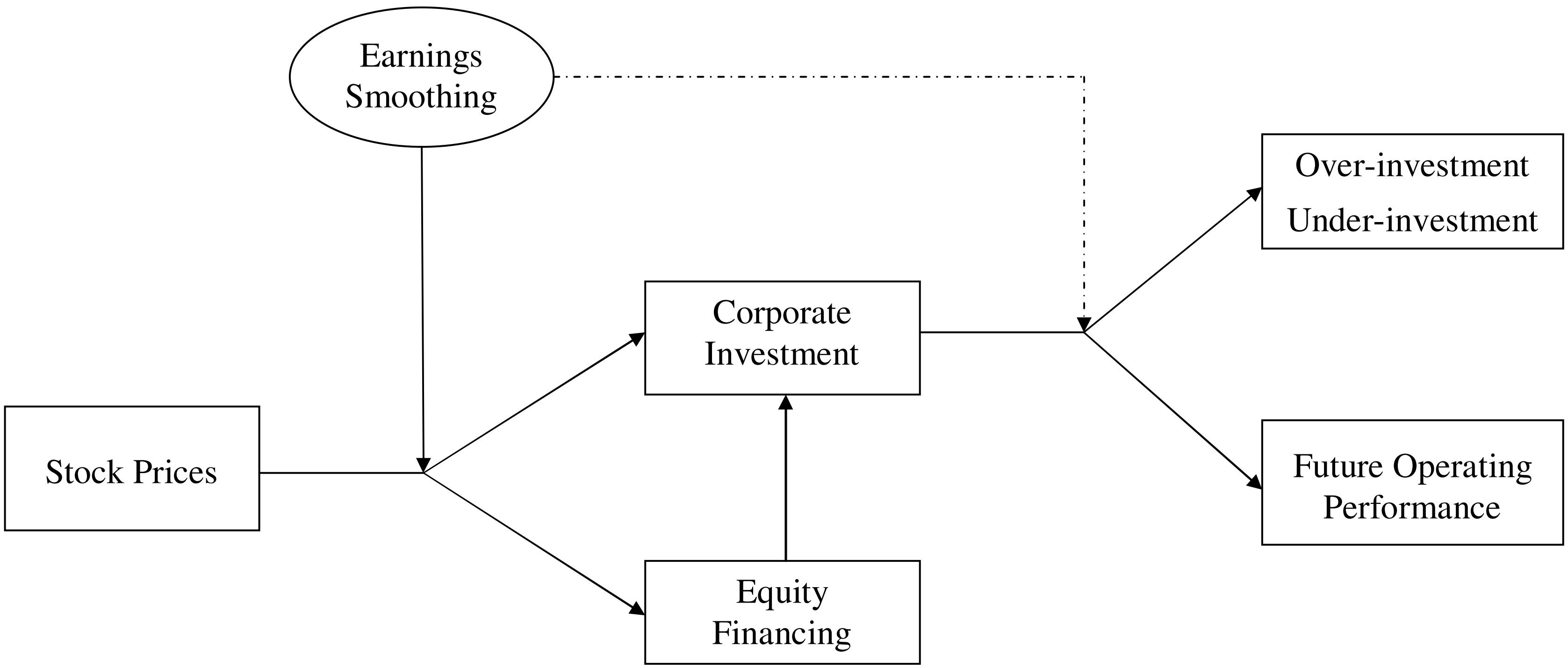
Q:	The ratio of the market value of total assets (data6 - (data 25*data 199) - data60 - data 74) to book value of total assets (data 6).
RET:	Cumulative raw returns over the three years t+1, t+2, and t+3.
CF:	The sum of net income before extraordinary item (data18), depreciation and amortization expense (data14) and R&D expense (data46), scaled by lagged assets(data6).
Slack:	The ratio of cash (data1) to PPE (data8).
Leverage:	The ratio of the sum of short-term debt (data34) and long-term debt (data9) to total assets (data6).
Tangibility:	The ratio of PPE (data8) to total assets (data6).
K-Structure:	The ratio of long-term debt (data9) to the sum of long-term debt and the market value of equity (data9+data 25*data199).
Dividend:	An indicator variable taking value of 1 if the firm pays a dividend (data21 or data127), and 0 otherwise.
Age:	The number of years since the firm first appeared on CRSP.
Sales:	Total sales revenues (data12) scaled by lagged assets (data6) (in %).
Hindex:	The Herfindahl index of sales (data12), based on firms segment reports. Industries are defined at the three-digit SIC code level.
KZ:	The Kaplan-Zingales index, measured as -1.002Cashflow - 39.368 Dividends - 1.315Cash + 3.139 Leverage, see Baker, Stein, and Wurgler (2003) for details.

Figure 1
Tobin's Q, Corporate Investment, and Future ROA by Year



This figure plots the average values of Tobin's Q (solid line), corporate investment (square dotted line) and the median values of future ROA (round dotted line) over the years 1975 through 2009. The sample is based on all firms in Compustat with a book value of equity greater than $10 million. *Tobin's Q* is measured as the ratio of the market value of total assets to the book value of total assets at the beginning of year t. Investment is the change in book value of assets(in %) in year t. *ROA* is the average return on assets (in %) over the three years t+1 to t+3. *Q (ROA)* is multiplied by 8(3) for scaling in the figure. Detailed definitions of all the variables used in this paper are provided in the Appendix.

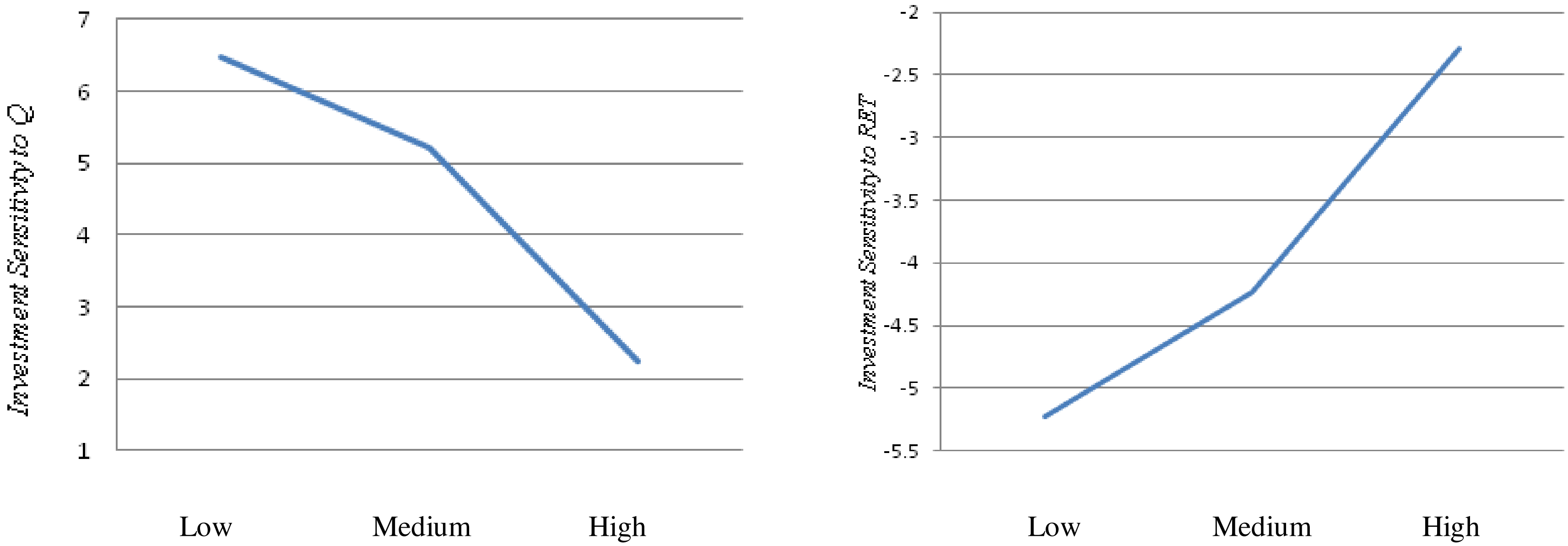
Figure 2
Relations among Earnings smoothing, Stock Prices, and Corporate Investment



This figure presents the relations among earnings smoothing, corporate investment, and stock prices. Stock prices affect corporate investment directly through the "catering" channel and indirectly through the equity financing channel. Earnings smoothing reduces the impact of stock prices on corporate investment and equity financing. This effect in turn enhances investment efficiency measured by over- (under-) investment and future operating performance.

Figure 3
Investment Sensitivity to Stock Prices across Earnings Smoothing Groups

Panel A | **Panel B**



This figure presents investment sensitivity to *Q* in Panel A and investment sensitivity to *RET* in Panel B across the three earnings smoothing groups. Investment sensitivity to *Q (RET)* is the coefficient β_1 (β_2) from the following equations estimated separately for the three earnings smoothing groups.

$$INVEST_{i,t} = \alpha + \beta_1 Q_{i,t-1} + \beta_2 CF_{i,t} + \beta_3 LogAsset_{i,t-1} + \sum YearDum + \sum IndDum + \varepsilon_{i,t}$$
$$INVEST_{i,t} = \alpha + \beta_2 RET_{i,t+3} + \beta_2 CF_{i,t} + \beta_3 LogAsset_{i,t-1} + \sum YearDum + \sum IndDum + \varepsilon_{i,t}$$

where *INVEST* is the percentage change in book assets scaled by lagged book assets in year t. *SMTH* is earnings smoothing, measured as the ratio of standard deviation of cash flows to the standard deviation of earnings over the five years t-5 to t-1. *Q* is measured as the ratio of the market value of total assets to the book value of total assets at the beginning of year t. *CF* is the cash flow in year t, measured as the sum of net income before extraordinary item, depreciation and amortization expense, and R&D expense scaled by lagged assets. *RET* is the cumulative raw returns over the three years t+1, t+2, and t+3. *LogAsset* is the log value of book assets at the beginning of year t.

Table 1
Summary Statistics for Variables Used for Hypotheses Testing

Panel A: Descriptive Statistics

Variables	n	Mean	S.D.	P5	P25	P50	P75	P95
INVEST (%)	32,234	13.83	33.37	-19.58	-1.53	6.87	19.21	69.87
EISU (%)	32,234	0.87	13.45	-10.92	-2.66	-0.28	0.72	16.31
DISU (%)	32,234	2.06	11.57	-10.33	-2.30	0.00	3.28	21.61
SMTH	32,234	1.90	1.96	0.34	0.77	1.26	2.22	5.73
ISMTH	32,234	2.94	17.86	-13.71	-4.81	-0.49	4.36	34.50
DSMTH	32,234	0.87	13.45	-10.91	-2.65	-0.28	0.71	16.31
Q	32,234	1.86	1.41	0.79	1.07	1.40	2.08	4.55
RET	32,234	0.44	0.81	-0.85	-0.01	0.41	0.86	1.88
CF	32,234	0.13	0.12	-0.05	0.06	0.11	0.18	0.34
LogAsset	32,234	6.14	1.92	3.38	4.65	5.92	7.43	9.66
STDCFO	32,234	0.06	0.05	0.01	0.03	0.05	0.08	0.17
STDRET	32,048	0.03	0.02	0.01	0.02	0.03	0.04	0.07
SPREAD	32,048	0.02	0.01	0.01	0.01	0.02	0.03	0.04

Panel B: Pearson (Spearman) Correlations Above (Below) the Diagonal

		1	2	3	4	5	6	7	8	9	10	11	12	13
1	*INVEST*		0.46	0.51	0.02	0.03	-0.01	0.31	-0.10	0.38	-0.07	0.08	0.00	0.00
2	*EISU*	0.20		0.01	-0.09	-0.13	0.02	0.20	-0.03	-0.03	-0.22	0.22	0.25	0.26
3	*DISU*	0.41	-0.08		0.03	0.03	0.00	0.08	-0.06	0.05	-0.01	0.01	-0.06	-0.05
4	*SMTH*	0.09	-0.13	0.06		0.55	0.54	-0.06	-0.03	0.01	0.06	0.07	-0.22	-0.23
5	*ISMTH*	0.10	-0.17	0.06	0.55		-0.26	-0.01	-0.03	0.06	0.11	0.04	-0.24	-0.24
6	*DSMTH*	0.01	0.03	0.01	0.54	-0.26		-0.05	0.00	-0.05	-0.04	0.03	-0.02	-0.02
7	*Q*	0.33	0.01	0.11	-0.06	-0.01	-0.06		-0.07	0.39	-0.05	0.22	0.09	0.12
8	*RET*	-0.09	0.02	-0.06	-0.02	-0.02	0.00	-0.11		-0.02	-0.08	0.04	0.18	0.15
9	*CF*	0.47	-0.09	0.04	0.00	0.04	-0.04	0.50	-0.02		-0.01	0.01	-0.10	-0.09
10	*LogAsset*	-0.03	-0.31	0.03	0.07	0.12	-0.03	0.03	-0.07	-0.02		-0.39	-0.49	-0.48
11	*STDCFO*	0.03	0.31	-0.04	0.13	0.04	0.09	0.14	0.05	0.06	-0.47		0.44	0.45
12	*STDRET*	-0.07	0.45	-0.10	-0.22	-0.24	-0.02	-0.03	0.15	-0.07	-0.54	0.52		0.92
13	*SPREAD*	-0.05	0.45	-0.09	-0.22	-0.23	-0.03	0.04	0.12	-0.05	-0.51	0.51	0.93	

Panel A presents descriptive statistics for the variables used for hypothesis testing and Panel B presents correlations among these variables. *INVEST* is the percentage change in book assets scaled by lagged book assets. *EISU* is the net cash proceeds from the issuance and/or purchase of common and preferred stock less cash dividends paid. *DISU* is the net cash proceeds from the issuance and/or repayment of debt. *SMTH* is earnings smoothing, measured as the ratio of standard deviation of cash flows to the standard deviation of earnings over the five years t-5 to t-1. *ISMTH* is the innate component of earnings smoothing. *DSMTH* is the discretionary component of earnings smoothing. *SMTH*, *DSMTH*, and *ISMT*H are ranked into deciles by year in Panel B. *Q* is measured as the ratio of the market value of total assets to the book value of total assets. *CF* is cash flows, measured as the sum of net income before extraordinary items, depreciation and amortization expense, and R&D expense scaled by lagged assets. *RET* is the cumulative raw returns over the three years t+1, t+2, and t+3. *LogAsset* is the log value of total assets. *STDCFO* is the standard deviation of cash flows over the five years t-5 to t-1. *STDRET* is the standard deviation of daily stock returns. *SPREAD* is the average daily bid-ask spread, measured as the difference between ask and bid price scaled by the average of bid and ask price.

Table 2
Earnings Smoothing and Investment Sensitivity to Stock Prices

$$INVEST_{i,t} = \alpha + \beta_1 Q_{i,t-1} + \beta_2 SMTH_{i,t-1}*Q_{i,t-1} + \beta_3 RET_{i,t+3} + \beta_4 SMTH_{i,t-1}*RET_{i,t+3} + \beta_5 CF_{i,t} + \beta_6 LogAsset_{i,t-1} + \beta_7 SMTH_{i,t-1} + \sum YearDum + \sum IndDum + \varepsilon_{i,t}$$

	Expected Sign	***INVEST***	
		Column 1	Column 2
Q	(+)	4.892*	6.601*
		(14.98)	(12.19)
SMTH*Q	(-)		**-0.429***
			(-4.67)
RET	(-)	-3.430*	-4.641*
		(-12.31)	(-9.64)
SMTH*RET	(+)		**0.292***
			(3.44)
CF	(+)	88.482*	89.498*
		(31.40)	(31.91)
LogAsset	(-)	-1.686*	-1.643*
		(-13.20)	(-12.90)
SMTH	(?)	0.198*	0.843*
		(2.81)	(5.07)
Observations		32,234	32,234
R^2		21.31%	21.59%

This table reports regression results of the effect of earnings smoothing on investment sensitivity to stock prices. All variables are defined in Table 1. t-statistics are in parentheses and are calculated based on standard errors clustered by firm. Year and industry fixed effects are included. *, **, and *** denote significance at the 1%, 5%, and 10% levels, respectively (two-tailed test).

Table 3
Innate and Discretionary Earnings Smoothing and Investment Sensitivity to Stock Prices

$$INVEST_{i,t} = \alpha + \beta_1 Q_{i,t-1} + \beta_2 ISMTH_{i,t-1}*Q_{i,t-1} + \beta_3 DSMTH_{i,t-1}*Q_{i,t-1} + \beta_4 RET_{i,t+3} + \beta_5 ISMTH_{i,t-1}*RET_{i,t+3} + \beta_6 DSMTH_{i,t-1}*RET_{i,t+3} + \beta_7 CF_{i,t} + \beta_8 LogAsset_{i,t-1} + \beta_9 ISMTH_{i,t-1} + \beta_{10} DSMTH_{i,t-1} + \sum YearDum + \sum IndDum + \varepsilon_{i,t}$$

	Expected Sign	***INVEST***	
		Column 1	Column 2
Q	(+)	4.904*	8.377*
		(15.02)	(10.78)
ISMTH*Q	(-)		**-0.684***
			(-6.49)
DSMTH*Q	(-)		**-0.124**
			(-1.35)
RET	(-)	-3.435*	-5.33*
		(-12.34)	(-7.65)
ISMTH*RET	(+)		**0.166****
			(1.92)
DSMTH*RET	(+)		**0.278***
			(3.23)
CF	(+)	88.984*	91.418*
		(31.45)	(32.46)
LogAsset	(-)	-1.670*	-1.570*
		(-13.18)	(-12.47)
ISMTH	(?)	0.034	1.176*
		(0.42)	(6.32)
DSMTH	(?)	0.238*	0.334**
		(3.71)	(2.02)
Observations		32,234	32,234
R^2		21.32%	21.89%

This table reports regression results of the effect of innate and discretionary earnings smoothing on investment sensitivity to stock prices. All variables are defined in Table 1. t-statistics are in parentheses and are calculated based on standard errors clustered by firm. Year and industry fixed effects are included. *, **, and *** denote significance at the 1%, 5%, and 10% levels, respectively (two-tailed test).

Table 4

Firm Operating Environments and Relation between Earnings Smoothing and Investment Sensitivity to Stock Prices

$$INVEST_{i,t} = \alpha + \beta_1 Q_{i,t-1} + \beta_2 HIGH_{i,t-1}*Q_{i,t-1} + \beta_3 SMTH_{i,t-1}*Q_{i,t-1} + \beta_4 SMTH_{i,t-1}*HIGH*Q_{i,t-1} + \beta_5 RET_{i,t+3} + \beta_6 HIGH_{i,t-1}*RET_{i,t+3} + \beta_7 SMTH_{i,t-1}*RET_{i,t+3} + \beta_8 SMTH_{i,t-1}*HIGH_{i,t-1}*RET_{i,t+3} + \beta_9 CF_{i,t} + \beta_{10} LogAsset_{i,t-1} + \beta_{11} SMTH_{i,t-1} + \beta_{12} HIGH_{i,t-1} + \beta_{13} SMTH_{i,t-1}*HIGH_{i,t-1} + \sum YearDum + \sum IndDum + \varepsilon_{i,t}$$

	Exp. Sign	*STDCFO*	*HIGH = STDRET*	*SPREAD*
		Column 1	Column 2	Column 3
Q	(+)	2.543*	1.729**	1.401**
		(4.11)	(2.39)	(2.13)
*HIGH*Q*	(+)	6.330*	5.779*	6.223*
		(6.98)	(6.14)	(6.96)
*SMTH*Q*	(-)	-0.011	-0.102	-0.029
		(-0.11)	(-0.97)	(-0.29)
SMTH*HIGH*Q	(-)	**-0.728***	**-0.255**	**-0.412***
		(-4.50)	**(-1.56)**	**(-2.65)**
RET	(-)	-3.252*	-2.333*	-2.053**
		(-5.73)	(-3.00)	(-2.65)
*HIGH*RET*	(-)	-2.525*	-2.692*	-3.189*
		(-2.82)	(-2.83)	(-3.36)
*SMTH*RET*	(+)	0.123	0.024	-0.041
		(1.03)	(0.18)	(-0.32)
SMTH*HIGH*RET	(+)	**0.305*****	**0.259**	**0.365****
		(1.81)	**(1.52)**	**(2.13)**
CF	(+)	91.399*	93.173*	93.155*
		(33.1)	(33.45)	(33.02)
LogAsset	(-)	-1.523*	-1.397*	-1.307*
		(-11.79)	(-10.56)	(-9.79)
SMTH	(?)	0.126	0.300	0.242
		(0.67)	(1.60)	(1.37)
HIGH	(?)	-11.300*	-9.056*	-8.734*
		(-6.33)	(-5.29)	(-5.37)
*SMTH*HIGH*	(?)	1.436*	0.601**	0.797*
		(4.62)	(2.01)	(2.76)
Observations		32,155	32,048	32,048
R^2		22.30%	22.50%	22.46%

This table reports regression results of cross-sectional variation in the effect of earnings smoothing on investment sensitivity to stock prices. *HIGH* is an indicator variables coded as 1 if the corresponding proxy (i.e., *STDCFO*, *STDRET*, and *SPREAD*) for operating environment volatility/uncertainty is above the median in year t-1, and 0 otherwise. All other variables are defined in Table 1. t-statistics are in parentheses and are calculated based on standard errors clustered by firm. Year and industry fixed effects are included. *, **, and *** denote significance at the 1%, 5%, and 10% levels, respectively (two-tailed test).

Table 5
Earnings Smoothing and External Financing Sensitivity to Stock Prices

$$ISU_{i,t} = \alpha + \beta_1 Q_{i,t-1} + \beta_2 SMTH_{i,t-1}{*}Q_{i,t-1} + \beta_3 RET_{i,t+3} + \beta_4 SMTH_{i,t-1}{*}RET_{i,t+3} + \beta_5 CF_{i,t} + \beta_6 LogAsset_{i,t-1} + \beta_7 SMTH_{i,t-1} + \sum YearDum + \sum IndDum + \varepsilon_{i,t}$$

	Exp. Sign	***EISU***		***DISU***	
		Column 1	Column 2	Column 3	Column 4
Q	(+)	2.085**	3.087**	0.685*	0.880*
		(11.99)	(10.20)	(8.73)	6.58
SMTH*Q	(-)		**-0.251***		**-0.049****
			(-4.54)		**(-2.11)**
RET	(-)	-0.907**	-1.270*	-0.637*	-0.717*
		(-7.64)	(-6.30)	(-6.44)	(-4.31)
SMTH*RET	(+)		**0.087***		**0.019**
			(2.54)		**(0.61)**
CF	(-)	-13.682**	-13.091*	1.671**	1.786**
		(-8.67)	(-8.33)	(2.09)	(2.25)
LogAsset	(-)	-1.584*	-1.559*	-0.159*	-0.155*
		(-22.93)	(-22.70)	(-4.73)	(-4.58)
SMTH	(?)	-0.238*	0.178***	0.140*	0.220*
		(-7.87)	(1.88)	(5.95)	(4.47)
Observations		32,234	32,234	32,234	32,234
R^2		12.64%	13.17%	3.50%	3.52%

This table reports regression results of the effect of earnings smoothing on external financing sensitivity to stock prices. All variables are defined in Table 1. t-statistics are in parentheses and are calculated based on standard errors clustered by firm. Year and industry fixed effects are included. *, **, and *** denote significance at the 1%, 5%, and 10% levels, respectively (two-tailed test).

Table 6
Earnings Smoothing and Deviations from Expected Investment

$$OINVEST\ (UINVEST)_{i,t} = \alpha + \beta_1 SMTH_{i,t-1} + \beta_2 LogAsset_{i,t-1} + \beta_3 Slack_{i,t-1} + \beta_4 Leverage_{i,t-1} + \beta_5 Tangibility_{i,t-1} + \beta_6 K\text{-}structure_{i,t-1} + \beta_7 Dividend_{i,t-1} + \beta_8 Age_{i,t-1} + \sum YearDum + \sum IndDum + \varepsilon_{i,t}$$

	Expected Sign	***OINVEST***		***UINVEST***	
		Column 1	Column 2	Column 3	Column 4
SMTH	(-/-)	**-0.613***	**-0.450***	**-0.439***	**-0.350***
		(-6.24)	**(-4.64)**	**(-14.79)**	**(-12.19)**
LogAsset	(-/-)		-1.247*		-0.339*
			(-6.29)		(-6.14)
Slack	(+/-)		0.115**		0.100*
			(2.08)		(5.49)
Leverage	(-/+)		10.709*		-0.365
			(3.36)		(-0.37)
Tangibility	(-/-)		-5.829*		-5.688*
			(-3.11)		(-9.72)
K-Structure	(-/+)		-13.585*		3.234*
			(-5.37)		(4.26)
Dividend	(-/-)		-3.009*		-1.584*
			(-4.20)		(-7.87)
Age	(-/-)		-0.144*		-0.039*
			(-7.59)		(-7.31)
Observations		18,046	18,046	28,447	28,447
R^2		6.91%	8.90%	9.61%	12.31%

This table reports regression results of the effect of earnings smoothing on over- and under-investment. Dependent variable is over-investment (*OINVEST*) in columns 1 and 2 and under-investment (*UINVEST*) in columns 3 and 4. *OINVEST* and *UINVEST* are unexpected investment estimated from a model of investment as a function of sales growth. *SMTH* and *LogAsset* are defined in Table 1. *Slack* is the ratio of cash to PPE. *Leverage* is the ratio of the sum of short-term and long-term debt to total assets. *Tangibility* is the ratio of PPE to total assets. *K-structure* is the ratio of long-term debt to the sum of long-term debt and the market value of equity. *Dividend* is an indicator variables taking value of 1 if firm pays dividend, and 0 otherwise. *Age* is the number of years since the firm first appears on CRSP. t-statistics are in parentheses and are calculated based on standard errors clustered by firm. Year and industry fixed effects are included. *, **, and *** denote significance at the1%, 5%, and 10% levels respectively (two-tailed test).

Table 7
Earnings Smoothing and Future Operating Performance

$$Performance_{i,t+3} = \alpha + \beta_1 SMTH_{i,t-1} + \beta_2 Sales_{i,t-1} + \beta_3 Q_{i,t-1} + \beta_4 LogAsset_{i,t-1} + \beta_5 Age_{i,t-1} + \beta_6 Leverage_{i,t-1} + \beta_7 Hindex_{i,t-1} + \sum YearDum + \sum IndDum + \varepsilon_{i,t+3}$$

	Exp. Sign	*ROA*	*ROE*	*CFO*	*ATO*	*SG*
SMTH	(+)	**0.405***	**0.945***	**0.292***	**0.362***	**0.116***
		(11.85)	**(6.88)**	**(9.75)**	**(3.71)**	**(2.03)**
Sales	(+)	3.738*	7.002*	3.163*	90.375*	-4.390*
		(15.58)	(9.07)	(13.73	(101.02)	(-13.89)
Q	(?)	0.299*	0.237	0.445*	-0.940*	1.093*
		(2.79)	(0.63)	(4.89)	(-6.34)	(6.97)
LogAsset	(?)	1.469*	3.959*	1.418*	-0.700*	-0.712*
		(16.86)	(13.75)	(18.29)	(-3.68)	(-6.19)
Age	(?)	0.030*	0.128*	0.003	-0.106*	-0.095*
		(4.11)	(4.20)	(0.49)	(-5.64)	(-8.72)
Leverage	(?)	-1.802*	7.652*	-0.547	2.881	-1.630
		(-2.64)	(2.55)	(-0.87)	(1.53)	(-1.36)
Hindex	(?)	1.042	2.603	-0.409	1.417	-5.686*
		(1.17)	(0.79)	(-0.50)	(0.51)	(-4.30)
Observation		31,254	31,252	31,235	31,254	31,244
R^2		15.10%	5.58%	19.07%	83.66%	9.77%

This table reports regression results of the effect of earnings smoothing on future operating performance. *ROA* is return on asset, measured as earnings divided by lagged assets. *ROE* is return on equity, measured as earnings divided by owner's equity. *CFO* is cash flows from operations, measured as cash flows scaled by lagged assets. *ATO* is asset turnover, measured as sales divided by assets. *SG* is sales growth. All performance measures are the average performance over the three years t+1, t+2, and t+3. *Sales* is net sales. *Age* is the number of years since the firm first appeared on CRSP. *Leverage* is the debt to asset ratio. *Hindex* is the Herfindahl index of sales based on firms' segment reports where industries are defined at the three-digit SIC code level. *SMTH*, *Q*, and *LogAsset* are defined in Table 1. t-statistics are in parentheses and are calculated based on standard errors clustered by firm. Year and industry fixed effects are included. *, **, and *** denote significance at the1%, 5%, and 10% levels respectively (two-tailed test).

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Education

Ph.D.	Accounting, Georgia State University, Expected May 2011
M.Acc.	Accounting, University of Hawaii at Manoa, 2004
B.A. and B.B.A.	English and Accounting, Zhongnan University of Economics and Law, China, 2002

Research Interests

Economic Consequences of Financial Reporting, Behavioral Finance, Research Quality of Financial Analysts

Dissertation

"Earnings Smoothing and Investment Sensitivity to Stock Prices"
Committee: Lawrence Brown (Chair), Mark Chen (Finance Department), Ilia Dichev (Emory University), Lynn Hannan

Working Papers

"Forecast-Recommendation Consistency and Earnings Forecast Quality" with Lawrence Brown, (Revise and Resubmit at *The Accounting Review*)

"The Dark Side of Trading" with Ilia Dichev and Dexin Zhou

"When Do Accurate Analysts Make More Profitable Recommendations?" with Lawrence Brown

Conference Presentations and Participation

AAA Annual Meeting, San Francisco, 2010 (Presented "Forecast-Recommendation Consistency and Earnings Forecast Quality" with L. Brown)

20th Annual Conference on Financial Economics and Accounting, Newark, 2009 (Presented "Stock Recommendation-Earnings Forecast consistency" with L. Brown)

AAA FARS Midyear Meeting, New Orleans, 2009

17th Annual Conference on Financial Economics and Accounting, Atlanta, 2006

Southeast Summer Accounting Research Colloquium, Atlanta, 2006 – 2009

Awards and Honors

AAA/Deloitte/J. Michael Cook Doctoral Consortium Fellow, 2008

Catherine E. Miles Doctoral Fellowship, Georgia State University, 2007

University of Hawaii General Scholarship, 2004

Freeman Foundation Leadership Fellowship (full fellowship for pursuing graduate study at University of Hawaii), 2002-2003

Academic Service

Conference Reviewer: AAA Annual Meeting 2009, 2010
FARS Meeting 2011

Teaching

Visiting Instructor, Georgia State University, Fall 2010 – Spring 2011
Principles of Accounting II, two sections, Fall 2010
Intermediate Accounting III, two sections, scheduled Spring 2011

Instructor, Georgia State University, 2007 – 2010
Taught a total of 13 sections of Principles of Accounting II
Teaching ratings from the latest eight sections on a scale of 5:
Average of 4.2, range of 3.8 - 4.5
Average ratings for all instructors who taught the same course: 4.0

SAS Programming Tutorial Session for doctoral students, Georgia State University, Summer 2010

Professional Certification and Work Experience

Certified Public Accountant, State of Hawaii, 2006
Auditor, Hattori & Co., CPAs, Inc., Honolulu, Hawaii, 2004 - 2006

References

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Working Paper Abstracts

"Earnings Smoothing and Investment Sensitivity to Stock Prices" Job Market Paper

Abstract: Existing research suggests that market misvaluations affect corporate investment, often leading to suboptimal investment. I examine whether earnings smoothing reduces the impact of market misvaluations on corporate investment and in turn enhances investment efficiency. I find that earnings smoothing has a strong negative effect on the sensitivity of corporate investment to stock prices. Further analyses indicate that this negative effect is driven by both innate and discretionary components of earnings smoothing and is more pronounced for firms operating in more volatile business environments. I complement these findings by demonstrating that firms with smoother earnings have lower over- (under-)investment and higher future operating performance. Collectively, the evidence suggests that earnings smoothing improves corporate investment efficiency by reducing the impact of market misvaluations on investment.

"Forecast-Recommendation Consistency and Earning Forecasts Quality" with Lawrence Brown, Revise and Resubmit at *The Accounting Review*

Abstract: We investigate the implications of forecast-recommendation consistency for the informativeness of the two signals (forecasts and recommendations) and the quality of earnings forecasts. We define a forecast-recommendation pair as consistent if both the forecast and the recommendation are above or below its existing consensus. We show that consistent pairs are more informative than inconsistent pairs, and that consistent forecasts are more accurate, timelier, and bolder than inconsistent forecasts. We further demonstrate that unfavorable consistent pairs are more informative than favorable consistent pairs and unfavorable consistent forecasts are timelier and bolder but less accurate than favorable consistent forecasts.

"The Dark Side of Trading" with Ilia Dichev and Dexin Zhou

Abstract: This study investigates the effect of stock trading volume as a long-term, environmental variable on observed stock volatility. The motivation is that volumes of U.S. trading have increased more than 30-fold over the last 50 years, truly transforming the marketplace. We investigate a number of settings, including a mix of natural experiments (exchange switches, S&P 500 changes, dual-class shares), the aggregate time-series of U.S. stocks since 1926, and the cross-section of U.S. stocks during the last 20 years. Our main finding is that, controlling for other factors, there is a reliable and economically substantial positive relation between volume of trading and stock volatility. The conclusion is that stock trading produces its own volatility above and beyond that based on fundamentals.

"When Do Accurate Analysts Make More Profitable Recommendations?" with Lawrence Brown

Abstract: Loh and Mian (2006) find that analysts who issue more accurate earnings forecasts also issue superior stock recommendations. Ertimur, Sunder and Sunder (2007) confirm these findings provided that analysts are not conflicted and firms' earnings are value relevant. We introduce the notion of a pseudo stock recommendation which we define based on an analyst's one-year-ahead earnings forecast without regards to her actual recommendation. We define consistency (inconsistency) as the case where an analyst's actual and pseudo recommendations issued on the same day do (not) agree with each other. We show that consistent analysts who make accurate forecasts issue superior recommendations, but inconsistent analysts who make accurate earnings forecasts do not issue superior recommendations. Our results hold regardless of whether analysts are conflicted or earnings are value-irrelevant and are robust to buy and sell recommendations, year, and industry.