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Accounting Conservatism and Firm Investment Efficiency

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Accounting Conservatism and Firm Investment Efficiency

Abstract

Conservatism, through the timelier recognition of losses in the income statement, is expected to increase firm investment efficiency through three main channels: (1) by decreasing the adverse effect of information asymmetries between outside equity holders and managers, facilitating the monitoring of managerial investment decisions; (2) by increasing managerial incentives to abandon poorly performing projects earlier and to undertake fewer negative net present-value investments; and (3) by facilitating the access to external financing at lower cost. Using a large US sample for the period 1990-2007 we find a negative association between conservatism and measures of over- and under- investment, and a positive association between conservatism and future profitability. This is consistent with firms reporting more conservative numbers investing more efficiently and in more profitable projects. Our results add to a growing stream of literature suggesting that eliminating conservatism from accounting regulatory frameworks may lead to undesirable economic consequences.

Keywords: *Conservatism, earnings asymmetric timeliness, investment efficiency, overinvestment, underinvestment*

Data Availability: *Data is available from the sources identified in the paper.*

JEL Classification: *G10, G31, M41.*

1. Introduction

In the joint FASB and IASB conceptual framework project, conservatism is not considered a desirable qualitative characteristic of accounting information (FASB, 2008). This decision has fueled the stream of research on the economic effects of conservative accounting and raised interest on the possible costs of eliminating conservatism. Recent studies highlight the informational benefits of conservatism, which is expected to reduce information asymmetry problems (LaFond and Watts, 2008), leading to lower earnings management (Chen et al., 2007) and lower cost of capital (Suijs, 2008). Firm commitment to conservative reporting leads to full disclosure (Guay and Verrecchia, 2007), facilitating managerial monitoring, as no information is withheld. In turn, closer monitoring is expected to improve capital allocation decisions (Bushman and Smith 2001, Bushman et al., 2007; Ahmed and Duellman, 2007a). However, critical voices claim that full disclosure leads to inefficiencies in corporate governance. Hermalin and Weisbach (2008) show that, under full disclosure, managers have incentives to deviate from optimal decision making (i.e. inefficient risk-taking in investments), due to career concerns.

In this paper, we try to shed light on the debate of the effects of increased monitoring on firms' investment policies by studying the association between accounting conservatism and firm investment efficiency. Following Basu (1997), conservatism is defined as the more stringent verifiability requirements for the recognition of gains relative to losses into accounting earnings.[1] This asymmetry results in earnings that reflect bad news (difficult-to-verify economic losses) faster than good news (difficult-to-verify economic gains). Conservatism can then be interpreted

[1] As developed in Beaver and Ryan (2005) there are two types of conservatism: conditional or news related and unconditional or news unrelated. Khan and Watts (2009) refer to the first one as conservatism flow. They argue that this conservatism flow builds up a cumulative understatement of net assets: conservatism *stock*. In this paper, we focus on the consequences of increased *conditional* or *flow* conservatism..

as a commitment by management to reflect low (bad) realizations of economic events in the financial statements in a timelier manner (Guay and Verrecchia, 2007).

We hypothesize that conservatism has a significant informational role that results in improvements to firm investment efficiency. In particular, we expect conservatism influences firm investment efficiency in three main ways. First, recent research demonstrates that conservatism appears as a reaction to information asymmetries (LaFond and Watts, 2008; Khan and Watts, 2009). Conservatism reduces the adverse effects of existing asymmetries between managers and outside investors by restricting managerial accounting manipulation and permitting other sources of information to flourish (LaFond and Watts, 2008). Therefore, increased conservatism ameliorates information asymmetry problems and contributes to facilitate the *ex post* monitoring process over managerial investment decisions. This is consistent with the evidence in Ahmed and Duellman (2007b) and Garcia Lara et al. (2009) that conditional conservatism is associated to the existence of stronger corporate governance mechanisms that decrease the power of the CEO and improve monitoring.

Second, by requiring early recognition of poor realizations, accounting conservatism plays a significant role in resolving managerial agency conflicts. As argued by Ball and Shivakumar (2005), because losses have to be recognised in a timely manner, managers are aware that they will not be able to defer the earnings consequences of their investment decisions to the next generation of managers; i.e., managers have to bear the consequences of their decisions during their tenure. This is predicted to limit managerial investments in *ex ante* negative net present value (NPV) projects, reducing the likelihood of managers engaging in empire building strategies, 'pet' projects or 'trophy' acquisitions. Similarly, conservatism is predicted to trigger the early abandonment of *ex post* poorly performing projects and deter

strategies of continuing (over) investment in under performing projects. Under conservative reporting, because loss recognition cannot be deferred, managers opt to abandon negative NPV projects earlier. Therefore, timely loss recognition is expected to increase managerial incentives to react quickly to negative realizations, limiting losses on projects that do not perform.

Finally, firm conservatism is predicted to facilitate attracting external funding at lower cost. Conservative accounting mitigates bondholder-shareholder conflicts over dividends and lowers cost of debt financing (Ahmed et al., 2002; Zhang, 2008), which permits access to less risky debt and therefore, reduces debt overhang negative effects on investment efficiency (Myers, 1977; 1984). Conservatism is also expected to decrease cost of equity capital (Guay and Verrecchia, 2007; Suijs, 2008). These decreases in cost of debt and cost of equity capital are expected to facilitate financing investment opportunities that otherwise might not be pursued because of lack of funding or because the costs associated to accessing the funding outweigh the benefits of undertaking the projects.

All these effects should lead to a positive association between conservatism and investment efficiency. Recent empirical work by Bushman et al. (2007) and Ahmed and Duellman (2007a) provide some initial evidence on the association between conservatism and investment efficiency. Bushman et al. (2007) show that investment efficiency varies internationally with aggregate conservatism at the country-level, while Ahmed and Duellman (2007a) study the relation between conservatism and future outcomes of firms' investment policies. In a related line of research, work by Jackson (2008) and Jackson et al. (2009) shows that firm depreciation method is associated to managerial capital investment decisions. In particular, they provide evidence that firms that use accelerated depreciation (which could be interpreted as a form of balance-sheet conservatism) make significantly larger capital

investments than firms that use straight-line depreciation. This evidence is consistent with conservative accounting treatments affecting investment decisions, but silent on whether this increased investment is efficient. In this paper, we more directly address the issue of whether more conservative firms invest more efficiently by analyzing if conservative accounting constrains managerial tendencies to under- and over-invest.

We study the association between conditional conservatism and investment efficiency using a large US sample of 41,851 firm-year observations for the period 1990-2007. We follow the methodology in Biddle et al. (2009) and analyse the association between investment efficiency and a proxy of firm-level conservative reporting CONS, which is based on the work of Khan and Watts (2009). In our tests, we also incorporate the measure of accrual quality in Biddle et al. (2009) to ensure that we isolate the economic consequences of conservatism. In particular, we study if more conservative firms show lower capital over- and under-investment. The analysis yields three key findings. First, we find that conservatism enhances investment efficiency by contributing to reduce both over- and under-investment. Specifically, firms with higher conservatism invest less (more) in years when there are signs of over- (under-) investment in the whole economy, the industry of reference and at the firm-specific level. The results are robust to the inclusion of multiple control variables and to the use of alternative measures of investment. Second, we find that conservatism decreases investment among firms with free cash flow problems, and increases investment amongst those that face financing constraints, as measured by high leverage. Overall, these results are consistent with conservatism reducing under-investment by facilitating access to external funding. We also show that more conditionally conservative firms are less likely both to over- and under- invest relative to their optimal levels of investment. Our evidence thus discards the possibility that, in line with the

arguments in Hermalin and Weisbach (2008), in firms committed to more transparent financial reporting and increased conservatism, managers have greater career concerns (in terms of job stability and reputation costs) and deviate from optimal investment to secure their jobs. In our final set of tests, we analyze the association between conservatism and future investment performance. To the extent that conservative firms invest more efficiently, we should observe superior future investment performance for these firms. Using measures of future firm stock returns and gross profit margins, we find evidence of superior investment performance in firms that are more conservative.

Our results add to the recent stream of empirical literature on the effects of higher quality reporting over investment efficiency (Biddle and Hilary, 2006; McNichols and Stubben, 2008; Biddle et al. 2009), and particularly, on how conservative accounting choices affect firms' investment decisions (Bushman et al. 2007, Ahmed and Duellman 2007a), by limiting under-investment and facilitating firm access to external financing. We show that conservatism is associated to investment efficiency as a distinctive qualitative characteristic of accounting, different and beyond Biddle's et al (2009) accruals quality measure. Our findings suggest that firm commitment to conservatism can lead to a direct benefit to investors in the form of more efficient investments.

The rest of the paper is organized as follows. Section 2 discusses the expected association between investment efficiency and conservatism. Section 3 contains the research design and the description of the sample. Section 4 discusses the main results and robustness checks, and finally, section 5 concludes.

2. Conservatism in accounting and investment efficiency

An efficient investment policy can be defined as one in which all positive NPV investment projects are identified, funded and implemented, while all negative NPV projects are rejected (Julio 2007). Agency theory predicts that whilst managers may be well informed about the existence of profitable investment opportunities, they might not always pursue them because of (1) moral hazard problems that derive in managerial expropriation of firm cash flows, myopic biases and inefficient selection of investment opportunities (Jensen and Meckling, 1976; Jensen, 1986; Stein, 1989); and (2) lack of available funding derived from high cost of external financing. This high cost of equity capital can be due to the firm capital structure, which might drive a wedge between the overall return to investment and the return accrued to shareholders; but it can also be partly attributable to information asymmetries and complications in the estimation of the firm's future cash flows.

Accounting information plays an important role in monitoring senior managers (Bushman and Smith, 2001), contributing to ameliorate moral hazard problems and to decrease the problems created by information asymmetries, and, as shown by Lambert et al. (2007) it facilitates the estimation of firms' future cash flows. As suggested by Bushman and Smith (2001) and Lambert et al. (2007), these effects are expected to increase firm value by improving firm's investment decisions. Empirical research by Biddle and Hilary (2006), McNichols and Stubben (2008), Biddle et al. (2009) and Hope and Thomas (2008) confirms that the quality of accounting information and disclosure affects investment efficiency. In particular, Biddle and Hillary (2006) document a positive association at the country- and firm-levels between investment-cash flow sensitivity and information opacity. In a similar vein, Schleicher et al. (2008) show that IFRS adoption in Europe contributes to lower investment cash-flow sensitivity,

Biddle et al. (2009) find that increased accruals quality is associated to lower over- and under-investment and McNichols and Stubben (2008) show that firms that manipulate their reported earnings make suboptimal investment decisions during the misreporting period. Finally, Hope and Thomas (2008) demonstrate that not disclosing geographic segment information has a negative effect on the efficiency of foreign investment.

In this study, we add to this literature by focusing on the association between investment efficiency and accounting conservatism. Prior research shows that timely recognition of economic losses (i) appears as a reaction to the existence of information asymmetries (LaFond and Watts, 2008; Khan and Watts, 2009), (ii) facilitates the monitoring of CEO decisions (Beekes et al., 2004; Ahmed and Duellman, 2007b; Garcia Lara et al., 2009), and (iii) decreases the cost of debt and equity capital (Ahmed et al., 2002; Guay and Verrecchia, 2007; Suijs, 2008). These effects are predicted to jointly improve investment efficiency.

2.1. The link between conservatism and investment efficiency

Prior literature on the association between conditional conservatism and investment efficiency is scarce, and has looked at the issue in a relatively indirect way. In particular, Bushman et al. (2007) provide evidence consistent with a negative relation between country-level measures of investment cash flow sensitivity and country-level measures of conditional conservatism. From a different methodological perspective, Ahmed and Duellman (2007a) find evidence that more conditionally conservative firms present higher future profitability measures like gross profit margins and cash flows, and less special item charges. They interpret this evidence as indicative of more conditionally conservative firms investing more efficiently.

Conditional conservatism, through the timelier recognition of economic losses in the income statement, is predicted to increase firm investment efficiency through three main channels: (1) by decreasing the negative effects of information asymmetries and facilitating the monitoring of managerial investment decisions; (2) by increasing managerial incentives to abandon poorly performing projects earlier and to undertake fewer negative net present-value investments; and (3) by facilitating access to external financing at lower cost. In this section, we explain each of these channels in detail.

2.1.1. Conservatism, information asymmetry and increased monitoring

In the presence of information asymmetries, managers may make suboptimal investment choices, for example, in an attempt to manipulate market's inferences about firm prospects (Bizjak et al. 1993). Recent work by LaFond and Watts (2008) demonstrates that conditional conservatism appears as a reaction to the existence of information asymmetries. Conditional conservatism serves to reduce the negative effects of existing asymmetries among the different parties to the firm by resolving agency conflicts and allowing other sources of information to flourish. Conditional conservatism also reduces the opportunities for successful earnings management, imposing greater costs on managers that wish to manipulate accounting earnings (Guay and Verrecchia 2006). As shown in McNichols and Stubben (2008), earnings management serves to mask underlying trends in revenue and earnings growth that are important in forming expectations of investment benefits. Thus, we expect that increased conditional conservatism ameliorates information asymmetry problems. This, in turn, facilitates the *ex post* monitoring of managerial investment decisions.

Conservatism deters artificial inflation of earnings available for distribution to shareholders at the expense of lenders, and limits the ability to overstate earnings and be over-compensated under accounting-based compensation plans. Khan and Watts (2009) argue that these restrictions reduce agency costs, because they discourage managerial efforts to transfer wealth to themselves instead of increasing the total firm wealth.

This monitoring role of conditional conservatism helps boards of directors and other governance mechanisms to detect and deter managerial sub-optimal behaviour. Conditional conservatism provides early warning signals to these governance bodies, which permits imposing limits to managerial control rights in a timely manner (Ahmed and Duellman 2007b, García Lara et al. 2009). Awareness of these constraints deters management from attempting to expropriate firm cash flows from shareholders and other parties to the firm by engaging in value reducing strategies such as empire building or investment in 'pet' projects and 'trophy' acquisitions. Consistent with this idea, Richardson (2006) demonstrates that the monitoring exerted by certain governance mechanisms can reduce firm over-investment of free cash flows.

Conservatism also facilitates the selection of *ex ante* positive NPV projects and reduces the probability that bad projects will be pursued, even in the absence of moral hazard problems. Analyzing investment decisions in a real options framework, Smith (2007) analytically illustrates that an accounting system biased towards conservatism avoids classifying bad investment projects as good, thus limiting investment in *ex ante* bad projects.

2.1.2. Conservatism and constraints to shift investment losses across periods

Related to our prior argument on the association between conservatism and decreased information asymmetries and increased monitoring, Ball and Shivakumar (2005) argue that

timely incorporation of bad realizations into accounting income implies that managers will not be able to defer the recognition of losses to the next generation of managers. Myopic investment behavior is a particularly pervasive problem whenever the manager is likely to leave the firm prior to the ultimate release of information to the market. Conservatism, by requiring early recognition of economic losses, is predicted to create incentives for managers to act quickly in the presence of poorly performing projects, discouraging further investments on bad projects and limiting myopic biases. In line with this prediction, recent research by Pinnuck and Lillis (2007) shows that loss reporting serves to resolve agency problems and acts as a trigger to divest unproductive investments. Pinnuck and Lillis argue that reporting accounting losses triggers the exercise of the abandonment option and divest factors, divisions and projects that represent negative NPV investments. Thus, loss reporting has a clear agency role. Firm commitment to timely loss recognition is predicted to trigger early divestment of *ex post* unproductive investments, before they accumulate into losses on abandonment or sale.

2.1.3. Conservatism and access to external financing

In their seminal work, Modigliani and Miller (1958) argue that financing and investment decisions are completely separate in perfect capital markets. However, an ample theoretical literature has subsequently shown that various frictions drive linkages between financing and investment decisions (see, e.g., Myers 1977, Childs et al., 2005). Whilst accounting policies do not affect the level of internal cash flows, we expect that one way in which conditional conservatism affects investment decisions is by facilitating firm access to external funds and, particularly, to debt financing.

In the accounting and finance literature, there is an ongoing debate on whether and how accounting information can affect firm cost of capital. Using different analytical models, Easley and O'Hara (2004) and Lambert et al. (2007, 2008) demonstrate that high quality accounting information and disclosure can reduce firm cost of capital. Guay and Verrecchia (2007) and Suijs (2008) contribute to this debate by analytically demonstrating that increased conditional conservatism results in lower cost of capital. Specifically, Guay and Verrecchia (2007) argue that a commitment to timely loss recognition results in full disclosure of information, reducing the discount markets apply to firm value in the presence of uncertainty. Suijs (2008) demonstrates that conditional conservatism lowers cost of capital by reducing price volatility.[2]

Conservatism is also expected to lower the cost of debt financing. Ahmed et al (2002) hypothesize and find evidence consistent with conservatism attenuating shareholder-bondholder conflicts over dividends. In the presence of more conservative accounting, bondholders are likely to accept a lower rate of return in light of the reduced risk of dividend overpayment to shareholders. By choosing conservative accounting methods, managers can negotiate more favorable debt terms and covenants, and likely they can also renegotiate the terms of debt to resolve conflicts between security holders and bondholders in order to allow for more efficient investment choices.[3] In a recent study, Zhang (2008) shows empirically that conditional conservatism benefits lenders through timely signaling of default risks and benefits borrowers in obtaining lower interest rates.

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[2] Empirical findings on the association between cost of capital and other earnings attributes, such as a accruals quality and income smoothing are somewhat mixed (see, e.g., Francis et al., 2004, 2005; Core et al., 2008; McInnis 2008).

[3] According to Julio (2007), renegotiation usually results in reductions in principal or interest, extensions of debt maturity, changes in covenants, or debt-for-equity exchanges.

Therefore, we expect that conservative accounting will permit access to funding at a lower cost of capital (debt and equity). We expect that this lowering in financing costs will contribute to improve investment efficiency by facilitating access to capital funds to finance positive NPV projects that the firm would not have pursued had financing costs been higher. Especially for cash-constraint and highly leveraged firms we expect conditional conservatism to contribute to reduce under-investment.

To sum up, we hypothesize that conservative accounting increases investment efficiency both by lowering managerial selection of *ex ante* negative NPV projects and by triggering early abandonment of *ex post* poorly performing ones (thereby reducing over-investment). Additionally, conservatism is expected to increase investment efficiency by facilitating firm access to external financing and lowering the cost of raising funds for new investments, which facilitates investment in positive NPV projects (thereby reducing under-investment).

3. Research design

In this section, we first present the models used to test the association between conservatism and firm investment efficiency. In particular, we use three different specifications based on the work of Biddle et al. (2009). Then, we present and validate the proxy used to measure conservatism at the firm-year level. Finally, we describe the sample used to test our predictions.

3.1. Association between conservatism and investment efficiency

As argued in Biddle et al. (2009), measures of investment-cash flow sensitivities can reflect either financing constraints or an excess of cash. Our tests are thus based on the measurement proposed by Biddle et al. (2009), which permits analyzing the effects of accounting choices in

reducing over- and under-investment, as well as the net effect. We adapt their model to capture the effects of conditional conservatism on investment efficiency as follows:

$$Investment_{t+1} = \alpha_i + \beta_i + \delta_1 CONS_t + \delta_2 CONS_t*OverInv_{t+1} + \delta_3 FRQ_t + \delta_4 FRQ_t*OverInv_{t+1} + \delta_5 OverInv_{t+1} + \gamma Controls_t + \mu_{t+1} \quad (1)$$

where Investment is a measure of future investment in both capital and non-capital goods, CONS is a firm-year-specific measure of conservatism, increasing in conservatism, OverInv is a ranked variable capturing settings where over- or under-investment is more likely, FRQ is one of the two different measures used in Biddle et al. (2009) to capture accruals quality, and Controls is a vector of control variables that affect the level of investment and conservatism. These control variables will be defined in more detail in the following sections. We estimate equation (1) in a panel-data fashion with a fixed effect model that includes firm and year indicator variables to control for year- and firm-specific shocks to investment.

Similar to Biddle et al. (2009), our investment proxy, Investment, is a measure of total investment defined as capital expenditures plus research and development plus acquisition expenditures less cash receipts from sales of property plant and equipment, multiplied by 100 and scaled by average total assets. In our robustness tests we also measure investment as capital expenditures scaled by lagged property plant and equipment. OverInv takes values between 0 and 1, where 0 (or values close to 0) indicates under-investment and 1 (or values close to 1) indicates over-investment. In the above regression (model 1) the coefficients of interest are δ_1 and δ_2. Our main hypothesis is that conditional conservatism improves investment efficiency; that is, conservatism reduces both under- and over-investment. Therefore, when under-investment is present (i.e., OverInv = 0) we expect coefficient δ_1 to be positive. A positive δ_1 indicates that conditional conservatism increases capital investment in settings where under-

investment is most likely. On the contrary, when over-investment is present (i.e., OverInv = 1) we expect coefficient δ_2 to be negative and greater in absolute value than δ_1 (i.e., $\delta_1 + \delta_2 < 0$), indicating that conservatism decreases investment in settings where over-investment is most likely.

Clearly, the key element in model (1) is the definition of OverInv: our proxy to detect settings in which there is under- or over-investment. Following Biddle et al. (2009), we define OverInv in three different ways. First, we measure OverInv at the aggregate economy-wide level to identify years in which there is average under- or over-investment at the economy level. We refer to this proxy as OverAggregate, and it is defined as the decile ranks of the residuals from a time-series regression of annual average future capital expenditures on annual average current sales growth. This regression is estimated in time-series fashion as follows:

$$Investment_{t+1} = \beta_0 + \beta_1 SalesGrowth_t + \mu_{t+1} \qquad t = 1975, \ldots 2007 \qquad (2)$$

where Investment is the average future investment for each sample year, and SalesGrowth is a proxy of firm investment opportunities calculated as the average change in sales from year *t*-1 to *t* for each sample year. To obtain OverAggregate at the aggregate economy-wide level, we rank the residuals of regression (2) into deciles and rescale the ranks from 0 to 1 to facilitate the interpretation of the coefficients of regression (1). Finally, we assign this annual measure to each firm based on its year. Thus, sample years with large positive (negative) residuals will be considered as years of average over-investment (under-investment) at the economy-wide level, and they will have values of OverAggregate close to 1 (0). As explained later, our sample covers the period 1990-2007. However, in the estimation of equation (2) we use observations starting in year 1975. We do so to increase the number of annual observations to 32 in order to better calibrate equation (2).

Second, we measure OverInv at the industry-year level and we refer to this proxy as OverIndustry. To do so, we estimate regression (2) at the industry-year level. Using the 48 industry groups detailed in Fama and French (1997) we obtain the annual average of Investment and SalesGrowth for each industry-year group. We impose a minimum of 20 observations per industry in any given year. Then, we follow the procedure detailed above. We estimate regression (2) and rank the residuals into deciles, and rescale the decile rankings from 0 to 1. Finally, we assign to each firm-year observation its corresponding industry-year ranking. High (low) values of OverIndustry identify settings in which over-investment (under-investment) at the industry-year level is most likely.

Third, we measure OverInv at the firm-year level and refer to this proxy as OverFirm. Specifically, for each industry and year group, we estimate regression (2) at the firm-year level and rank the firm-specific residuals residuals into deciles. Finally, we rescale the decile rankings from 0 to 1. High (low) values of OverFirm identify settings in which over-investment (under-investment) at the firm-year level is most likely.

In summary, we construct OverInv in three different ways: at the economy-wide level identifying years in which over-investment is most likely in the whole economy, at the industry level identifying industry-years in which over-investment is most likely, and at the firm level identifying firm-years in which over-investment is most likely. In robustness tests we also measure OverInv at the firm level identifying circumstances in which firms have strong incentives to over-invest, measuring this type of incentive as combination of high free cash flow and low leverage. We refer to this incentive as HighFCF.

The model described in regression (1) includes controls for effects that could confound the findings by driving either investment efficiency or conservatism. Following Biddle et al.

(2009), we control first of all for accrual quality (FRQ) and corporate governance characteristics. We also control for information asymmetry, idiosyncratic volatility, firm size, the market-to-book ratio, depreciation method, volatility of cash flow from operations (CFO), volatility of sales, volatility of capital expenditures, bankruptcy risk, tangibility, capital structure, industry capital structure, CFO to sales ratio, financial slack, and dividend payout ratio. We also incorporate controls for age of the firm, length of the operating cycle, lengh of the investment cycle, and frequency of losses, as these may influence the accruals generating process and, therefore, our measure of conservatism (CONS).

Regarding the financial reporting quality measure (FRQ in model 2 above), we use two proxies used in Biddle et al. (2009): AQ and AQW. AQ is the measure of accruals quality developed by Dechow and Dichew (2002) and modified by Francis et al. (2005). AQW is the measure of accruals quality developed by Wysocki (2008) and modified by Biddle et al. (2009). Higher values of AQ and AQW indicate higher accruals quality. In terms of the corporate governance variables, we incorporate a measure of the level of institutional holding (Inst-holdings), measured as the percentage of firm shares held by institutional investors. We also control for the number of analysts following the firm (Analysts), and the quality of external corporate governance, using InvG-Score, the measure of anti-takeover protection developed by Gompers et al. (2003), multiplied by negative one, so that InvG-Score is increasing in corporate governance quality. Because G-Score is only available for a limited number of firms, whenever G-Score is missing, InvG-Score is assigned the value of zero. G-Score-dum is an indicator variable that takes the value of one if G-Score is missing, and zero otherwise.

Regarding the control variables, we define information asymmetry (BAS) as the bid-ask-spread, measured as the annual average of daily spread scaled by the midpoint between bid and

ask. Idiosyncratic volatility (Volatility) is the standard deviation of one year of daily stock returns. Firm size (Size) is measured as the log of market value of equity.The market-to-book ratio (MTB) is the ratio of the market value of total assets to book value of total assets.[4] Depreciation method (AccDep) is an indicator variable that equals one if the firm uses accelerated depreciation, and zero otherwise. Recent work by Jackson et al. (2009) suggests firms that use accelerated depreciation have larger capital investments. Volatility of cash flow from operations (StdCFO) is the firm-specific standard deviation of the cash flow from operations scaled by average total assets, measured in the five-year period ending in the previous fiscal year (*t*-5 to *t*-1). Volatility of sales (StdSales) is the firm-specific standard deviation of annual sales deflated by average total assets, for years *t*-5 to *t*-1. Volatility of investment (StdInvestment) is the firm-specific standard deviation of annual Investment for years *t*-5 to *t*-1. Z-Score is the measure of bankruptcy risk defined in Biddle and Hilary (2006) and calculated with the following Compustat data items: Z-Score = [3.3*data170 + data12 + 0.25*data36 + 0.5*(data4–data5)]/data6. Tangibility is the ratio of property, plant and equipment to total assets. Capital structure (Leverage) is ratio of short-term plus long-term debt scaled by market value of equity. Industry capital structure (Ind Cap-struc) is the mean is the mean of capital structure for firms in the same SIC-3 digit industry, where capital structure is the ratio of long-term debt to the sum of long-term debt and market value of equity. CFO to sales (CFOsale) is the ratio of CFO to sales. Financial slack (Slack) is the ratio of cash to property, plant and equipment. Dividend payout ratio (Dividend) is a dummy variable that takes the value of 1 if the firm paid a dividend; 0 otherwise. Age is the difference between the first year when the firm appears in CRSP and the

[4] MTB, in addition to being a control variable for growth opportunities and rents which affect the level of investment, is also a control for past cumulative conservatism.

current year. Length of the operating cycle (OperCycle) is the log of receivables to sales plus inventory to COGS multiplied by 360. Length of the investment cycle (InvCycle) is a decreasing measure of the length of the investment cycle defined as depreciation expense scaled by lagged total assets. The frequency of losses (Loss) is a dummy variable that takes the value of 1 if net income before extraordinary items is negative; 0 otherwise. Finally, we include firm- and year-fixed effects to control for firm- and year- specific shocks to investment.

3.2. Conservatism and deviations from optimal investment

As an additional test of the association between conservatism and investment efficiency, we model the probability that a firm will deviate from its optimal level of investment, conditional on its level of conservatism. To do so, we first estimate a firm-specific model of investment as a function of growth opportunities using model (2). The residuals from model (2) can be interpreted as a measure of firm-specific deviation from optimal levels of investment. We use the residuals from this model to classify firms into two groups. Specifically, we sort firms annually into quintiles based on the firm-specific residuals. Firm-year observations in the top or bottom quintile are classified as over- or under-investing, whilst those in the middle three quintiles are considered to be near their optimal level of investment and are used as a benchmark group. Using these data, we estimate a multinomial logit model that predicts the likelihood that a firm will deviate from its level of optimal investment (i.e., be on one of the extreme quintiles as opposed to being in the middle quartiles) as follows:

$$Prob(ExtremeInv_{t+1}=j) = \alpha_i + \beta_i + \delta_1 CONS_t + \gamma Controls_t \quad (3)$$

where *j* takes the value of 1 if the firm is classified as under-investing (Under); 2 if it belongs to the benchmark group; and 3 if it is classified as over-investing (Over). The main coefficient of

interest in model (3) is δ_1. If conservatism deters firms from over- and under- investing, δ_1 is expected to be significantly negative, indicating that more conservative firms are less likely to invest away from their optimal levels, and thus, they will be less likely to be in the top and bottom quintiles. The set of explanatory and control variables are the same we use in estimating model (1). As before, model (3) incorporates firm- and year- fixed effects.

3.3. Performance effects of conservatism

As previously discussed, the monitoring role of conservatism helps boards of directors and other governance bodies to deter value destroying strategies such as 'empire building', investment in 'pet' projects or 'trophy' acquisitions. Therefore, it is likely that the primary effect of conservatism is to reduce over-investment. This higher investment efficiency implies future improvements in firm profitability because among the set of possible projects, firms will choose first those with higher NPV. Consequently, given that conservatism is hypothesized to improve investment efficiency, we expect to observe a positive association between present and past accounting conservatism and future investment performance. Consistent with this idea, Ahmed and Duellman (2007a) find a positive association between conservatism and firm gross profit margins and cash flows. To analyze the effect of conditional conservatism on future investment performance we employ these authors' research design and estimate the following model:

$$FutPerf = \alpha_i + \beta_i + \delta_1 \, CONS + \gamma \, Controls \; + \mu \qquad (4)$$

where FutPerf is, alternatively, the three-year average of annual stock returns for years *t+1* to *t*+3, or the three-year average of future gross profit margin (for years *t*+1 to *t*+3). We use gross profit margin, instead of other accounting-based measures of profitability, to reduce the likelihood of a possible mechanical link with conservatism. If firm accounting conservatism

improves investment efficiency, this improvement should translate into future increases in profitability. Consequently, we expect δ_1 in equation (4) to be significantly positive. We use the same control variables as before. Model (4) is run incorporating alternatively both measures of FRQ, similar to Biddle et al. (2009), to ensure that CONS does not partially reflect accruals quality (AQ and AQW).

3.4. Measure of conservatism

To estimate models (1), (3) and (4) we need a firm-specific measure of conservatism (CONS). To construct this proxy, we follow the work of Khan and Watts (2009), who estimate a measure of firm-year measure of conservatism drawing from the Basu (1997) model. Prior literature demonstrates that the Basu (1997) model is able to capture cross-sectional variation in conditional conservatism.[5] The model is as follows:

$$Earn_i = \beta_0 + \beta_1 Neg_i + \beta_2 Ret_i + \beta_3 Ret_i*Neg_i + \mu_i \quad (5)$$

where Earn is net income before extraordinary items deflated by market value of equity at the beginning of the period, Ret is the annual stock rate of return of the firm, measured compounding twelve monthly CRSP stock returns ending at fiscal year end, Neg is a dummy variable that equals 1 in the case of bad news (negative or zero stock rate of return) and 0 in the case of good news (positive stock rate of return) and *i* indexes the firm. In model (5), the β_2 coefficient is the good news timeliness measure, β_3 captures the incremental timeliness of earnings to bad news, and the total bad news timeliness is $\beta_2 + \beta_3$. Under conservative accounting, β_3 is predicted to be

[5] See Ball and Kothari (2007) for a validation of the Basu (1997) model and for a summary of prior research using the model. However, other authors cast some doubts on the validity of inferences based on the Basu asymmetric timeliness coefficient (Givoly et al., 2007; Dietrich et al., 2007).

positive and significant. Larger β_3 coefficients indicate more pronounced conditional conservatism.

To estimate the timeliness with which accounting reflects bad news at the firm-year level, Khan and Watts (2009) specify that both firm annual conservatism (CONS) and the timeliness of good news (GNews) are a linear function of firm-specific characteristics each year:

$$\text{CONS} = \beta_3 = \lambda_1 + \lambda_2 \, Size_i + \lambda_3 \, MB_i + \lambda_4 \, Lev_i \tag{6a}$$

$$\text{GNews} = \beta_2 = \eta_1 + \eta_2 \, Size_i + \eta_3 \, MB_i + \eta_4 \, Lev_i \tag{6b}$$

The empirical estimators of λ_i and η_i, i=1-4, are constant across firms, but vary over time as they are estimated from annual cross-sectional regressions. Using this specification, we substitute β_2 and β_3 in the Basu model (equation 5), to obtain equation (7) below. The firm-year measure of conservatism or incremental bad news timeliness CONS (denoted C_Score in Khan and Watts 2009), varies across firms through cross-sectional variation in the firm-year characteristics (Size, MB and Lev), and over time through inter-temporal variation in λ_{i+t} and the firm-year characteristics. Conservatism is increasing in CONS. Following Khan and Watts (2009), the annual cross-sectional regression model used to estimate CONS is as follows:

$$\begin{aligned} Earn_i = {} & \beta_0 + \beta_1 \, Neg_i + Ret_i \, (\eta_1 + \eta_2 \, Size_i + \eta_3 \, MB_i + \eta_4 \, Lev_i) \\ & + Ret_i * Neg_i \, (\lambda_1 + \lambda_2 \, Size_i + \lambda_3 \, MB_i + \lambda_4 \, Lev_i) + \delta_1 \, Size_i + \delta_2 \, MB_i + \delta_3 \, Lev_i \\ & + \delta_4 \, Size_i * Neg_i + \delta_5 \, MB_i * Neg_i + \delta_6 \, Lev_i * Neg_i + \mu_t \end{aligned} \tag{7}$$

Model (7) results from substitution of (6a) and (6b) into model (5), following Khan and Watts (2009), we include additional interaction terms between returns and firm characteristics to control for the firm characteristics separately (the main effects).

Given that there is some controversy in the literature on the validity of firm-year estimates of conditional conservatism (Givoly et al., 2007) we validate our measure following

the approach in Khan and Watts (2009). To do so, we examine whether the empirical properties of CONS are consistent with predictions of conservatism and with associations documented in prior literature. To do so, we rank firms annually into 10 portfolios according to CONS. Then, we examine three sets of properties. First, we estimate the standard Basu (1997) regression on the pooled (cross-sectional and time-series) data within each CONS decile, and examine whether the Basu incremental timeliness coefficients (β_3) from these regressions increase monotonically across the CONS deciles.

Second, we examine whether the information asymmetry is associated to CONS. Watts (2003) and Khan and Watts (2009) argue that conservatism is a means of addressing agency problems stemming from information asymmetries between parties. We use the bid-ask spread (BAS) and the PIN metric of Easley et al. (2002) to proxy for information asymmetry. We expect CONS is positively associated to PIN and BAS. Lastly, we look at the association between CONS and firm age (Age) and the length of the investment cycle (Inv.Cyc). Khan and Watts (2009) argue that conservatism is decreasing in firm age, because younger firms tend to have more growth options relative to assets-in-place than older firms. Information asymmetry increases with growth options because future cash flows from growth options are normally unverifiable, increasing agency costs and thus leading to more conservatism. Regarding Inv.Cyc, Khan and Watts (2009) argue that conservatism is positively associated to investment cycle length, because length captures investment uncertainty. These authors hypothesize that firms with longer investment cycles have future gains that are less verifiable ex ante, are more likely to face adverse outcomes from investments (the longer the cycle the more difficult it is to forecast the magnitude and timing of future cash flows), and have higher potential shareholder losses, thus increasing the likelihood of litigation and the demand for conservative accounting.

Following Khan and Watts (2009), as an additional measure of information asymmetry and investment uncertainty, we also look at the association between conservatism and idiosyncratic volatility (Volatility) measured as the standard deviation of one year of daily stock returns.

Table 1 Panel A shows the results from these tests. The Basu asymmetric timeliness for the high and low CONS deciles (diff= 0.123) is significantly positive at conventional levels. The β_3 coefficients exhibit a clear ascending trend as we move up the conservatism portfolio ranks. The β_3 coefficient monotonically increases with CONS (from portfolio 1, $\beta_3 = 0.121$; to portfolio 10, $\beta_3 = 0.243$). Table 1 Panel A also shows that information asymmetry as measured by both PIN and BAS is significantly increasing in CONS, and the highest CONS decile has significantly higher information asymmetry than the lowest CONS decile, as predicted and consistent with the results in Khan and Watts (2009). Table 1 Panel A also shows that Size is decreasing and Lev is increasing in CONS as expected. Finally, consistent with the results in Khan and Watts (2009), we show that CONS is decreasing in Age and the InvCycle, and increasing in Volatility (a proxy of investment uncertainty). Overall, the association between CONS and various firm characteristics is consistent with CONS correctly measuring conservatism.

Table 1 Panel B presents descriptive evidence of our conditional conservatism proxy CONS. The descriptive evidence of CONS is very similar to the values reported in Khan and Watts (2009). In particular, the mean (median) value of CONS in our sample is of 0.11 (0.10), and of 0.105 (0.097) in Table 4 of Khan and Watts (2009: 138). Similar to the results that Biddle et al. (2009) report for their earnings quality measures we find that AQ is negatively correlated with $Investment_{t+1}$, and that our proxy CONS is also negatively correlated with $Investment_{t+1}$ (*corr* = -0.11, *p*-value <0.01). However, as we show below, the relation between CONS and Investment is conditional on firm propensity to over- or under-invest. The correlation between

CONS and the Biddle et al. (2009) measure of accruals quality (AQ) is significantly negative, although quite low (*corr* = -0.14, *p*-value <0.01). This indicates that CONS and AQ do not proxy for the same earnings attributes. This is as expected since AQ is a measure of the volatility in the time-series association between firm current accruals and prior, current and future cash flows, obtained from the firm-level residuals from the Dechow and Dichev (2002) model during years *t*-5 to *t*-1. Conservative accounting increases the probability that accruals and cash flows do not perfectly match into each other, and that varying lags appear in the firm-level time-series mapping of cash flows into accruals.

3.5. The sample

We use COMPUSTAT to extract accounting data and CRSP to extract stock market data. To increase the power of our tests, we employ as many observations as possible from the available data sources. Our sample period covers 18 years, *t* = 1990 to 2007. Financial firms are excluded because of the different nature of their accrual accounting process and nature of investment. To mitigate the influence of outliers, all continuous variables are winsorized annually at the 1 and 99 percentiles. The resulting sample consists of 41,851 firm-year observations with data available to run the main tests. Table 1 Panel B presents descriptive statistics of main variables. The mean (median) investment across all firm-years is 12.81% (9.31%) of prior years' property, plant and equipment. The mean (median) AQ is -0.05 (-0.04) and the equivalent statistics of AQW are 1.20 (1.13). These figures are consistent with the evidence reported in Biddle et al. (2009). Control variables are also consistent with prior research and behave as expected. For completeness, Table 1 Panel C presents Pearson correlations among the variables.

4. Results

4.1. Conservatism and investment efficiency

As a first analysis, we study the association between conditional conservatism and investment efficiency in situations where firms deviate from the optimal level of investment. Table 2 reports the results of running model (1) using the three different proxies of firm incentives to over-invest. All regressions are estimated in a panel-data fashion with a fixed-effects model that includes firm and year indicator variables. Reported t-statistics are based on robust standard errors adjusted using a cluster at the firm level.

Table 2 Panel A presents results based on the time-series aggregate measure (OverInv = OverAggregate). We find evidence that conservatism is positively associated with investment in years with low aggregate-economy investment (i.e, OverInv = 0 or close to 0). The coefficient on CONS is positive and significant (CONS = 13.40, *t*-stat = 5.25), supporting the prediction that conservatism increases investment among firms that are under-investing. The main coefficient of interest is the interaction between conditional conservatism and over-investment in years when there are signs of over-investment in the economy (i.e, OverInv = 1 or close to 1). The coefficient on CONS*OverInv is significantly negative (CONS*OverInv = -18.71, *t*-stat = -5.63), which is consistent with conditional conservatism reducing investment in years when over-investment is more likely. Interestingly, we do not find evidence that AQ significantly reduces either under- or over- investment. This is likely due to the inclusion of additional control variables in the model with respect to the specification in Biddle et al. (2009).

Table 2 Panel B provides results using the cross-sectional industry-level approach to proxy for over-investment (OverInv = OverIndustry). As expected, the coefficient on OverInv is

significantly positive (OverInv = 5.21, *t*-stat = 9.38). This confirms that firms classified as being likely to over-invest have higher $Investment_{t+1}$. The coefficient associated with conservatism, CONS, is also positive and significant (CONS = 2.58, *t*-stat = 2.85), which is consistent with conservatism increasing investment in firms operating in under-investing industries. The coefficient on the interaction between conservatism and investment, CONS*OverInv, is significantly negative (CONS*OverInv = -5.79, *t*-stat = -4.16), as before, providing additional support for the prediction that conditional conservatism limits over-investment. Therefore, the results at the industry level are consistent with those obtained at the aggregate level and provide support for the hypothesis that conservatism improves investment efficiency both by mitigating over- and under-investment. We again do not find evidence of an association between AQ and investment efficiency in the industry-level tests.

Finally, we examine the association between conservatism and investment efficiency at the firm-level. Table 2 Panel C provides results using the cross-sectional firm-level approach to proxy for over-investment (OverInv = OverFirm). Similar to the results of Panel B, the coefficient on OverInv is significantly positive (OverInv = 23.62, *t*-stat = 50.96). This confirms that OverInv is a good proxy of firm-specific incentives to over-invest. As before, the coefficient associated with conservatism, CONS, is also positive and significant (CONS = 4.73, *t*-stat = 8.63), which is consistent with conservatism increasing investment in firms facing incentives to under-invest. The coefficient on the interaction between conservatism and investment, CONS*OverInv, is significantly negative (CONS*OverInv = -11.76, *t*-stat = -9.47), as before, providing additional support for the prediction that conditional conservatism limits over-investment. In this case, we also find evidence of the expected association between AQ and investment efficiency. In particular, consistent with the evidence in Biddle et al. (2009), we find

that AQ is associated both to lower under-investment (AQ = 22.02, *t*-stat = 8.57) and lower over-investment (AQ*OverInv = -40.22, *t*-stat = -8.34). This confirms that AQ and CONS capture different earnings attributes, and highlights the fact that conservatism, as a separate earnings attribute, is positively associated to investment efficiency. The results at the aggregate, industry and firm-level are internally consistent and support the hypothesis that conservatism improves investment efficiency both by mitigating over- and under-investment.

4.2. Optimal level of investment

As an additional test of the association between conditional conservatism and investment efficiency, we analyse whether conservatism impacts firm likelihood of deviating from the optimal level of investment. To do so, we create a variable that takes the value of 1 if the firm-specific residual from the Investment regression (model 2) is in the top or bottom quintile of the distribution (firm-observations that are over- or under-investing relative to their optimal level of investment), and the value of 0 if the residual is in the middle three quintiles (benchmark firms, near their optimal investment levels). Using this variable, we estimate model (3), a multinomial logit pooled regression that tests the likelihood that a firm is in the extreme (under or over) investment quintiles as a function of firm conservatism. Table 3 reports results of this test. In Panel A, the coefficient on CONS is significantly negative (CONS =-0.30, *t*-stat= -1.98), suggesting that more conservative firms are less likely to under-invest. In Panel B, we also find a negative and significant CONS coefficient (CONS =-0.91, *t*-stat= -5.11). This evidence supports the notion that conservative firms are generally less likely to be in either extreme, i.e., they are less likely to deviate from optimal investment both by over- or under-investing. Regarding AQ, we only find evidence that accrual quality is associated to lower under-investment. There is no

evidence that AQ is associated to lower over-investment. This result reinforces the previous finding that CONS measures different accounting attributes than AQ.

As a sensitivity check, we repeat the analysis shown in Table 2 using as dependent variable future Capex instead of future Investment. Using this alternative measure of investment, we modify model (2) as follows:

$$Capex_{t+1} = \alpha_i + \beta_i + \delta_1 CONS_t + \delta_2 CONS_t*OverInv_{t+1} + \gamma Controls_t + \mu_{t+1} \quad (8)$$

where Capex is a more restrictive measure of investment, calculated as capital expenditure scaled by lagged property, plant and equipment. All other variables are calculated as before. Table 4 Panels A to C present the output from running this model for the full sample in a panel-data fashion with a fixed effects model that includes firm- and year- indicator variables. The results provide strong evidence in favor of the previous findings. If anything, the results are actually stronger in this alternative specification. We find evidence that conservative firms are less likely to both under- and over- invest. In particular we find that CONS is significantly positive in all Panels, and the interaction term CONS*OverInv is significantly negative across all Panels. Using this alternative measure of investment, we also find evidence consistent with AQ increasing investment efficiency, in particular, with AQ being associated to lower overinvestment (AQ*OverInv is significantly negative across all partitions), consistent with the results in Biddle et al. (2009).

It is expected that more conservative firms are capable of rising additional funding to finance their investments at a lower cost, compared to firms with more aggressive reporting policies and lower quality accounting and disclosure. Thus, we expect to see that, in the presence of high leverage, conservative firms are less likely to under-invest, as they may be capable of

obtaining additional funding at a lower cost. Conservatism is also expected to limit over-investment in firms that are cash rich, or particularly, in firms that have greater free cash flow. Thus, it is predicted that within the set of firms that face no financing constraints, more conservative firms will be less likely to over-invest. As a sensitivity test, we repeat the analyses in model (2), using an alternative proxy for incentives to over-invest: the presence of free cash-flow and capital structure problems. Since the seminal work of Jensen (1986) it is widely acknowledge that firms with high free cash flow are more prone to sub-optimal investment. To do so, we create a ranked variable (HighFCF) based on the average of two ranked decile measures of free cash flow and leverage (the latter one multiplied by one). Free cash flow is defined as the three-year average of cash flow from operations minus cash dividends paid for both common and preferred stock, scaled by average total assets. Leverage is defined as before. Similar to our previous proxies of incentives to over-invest, HighFCF takes values from 0 to 1; values closer to 1 (0) indicate settings in which the firm has incentives to over- (under) invest

Table 5 Panels A and B reports results of running model (2) using HighFCF as our proxy of OverInv. Reported results are based on pooled regressions in a panel-data fashion with a fixed effects model that includes firm- and year- indicator variables. To enhance the comparability of our results with those in Biddle et al. (2009), we report results for this model using as accruals quality first AQ (Panel A) and then, AQW (Panel B). Consistent with our predictions, the coefficient on CONS is positive and significant across both partitions. This indicates that among firms that have low free-cash flows and high leverage (Partition = 0), and thus likely to under-invest, conservatism increases investment. Regarding the interaction between conservatism and the partition variable (CONS*HighFCF), the coefficients are negative and significant across both specifications. This evidence suggests that among firms that do not face liquidity constraints

(i.e., high free cash-flow firms and with low leverage) conservative firms are less likely to over-invest. Using this alternative definition of incentives to over- (under-) invest, we do not find evidence that accruals quality (either AQ or AQW) reduces over- or under- investment.

Overall, these findings are consistent with those reported in Tables 2 and 3 and confirm the expected positive association between conservatism and investment efficiency.

4.3. Association between conservatism and future outcomes of investment policies

The findings of the previous test indicate that higher conservatism tends to reduce investment. If this is the case, conservative firms will undertake fewer projects but with higher profitability because among the set of possible projects, firms will choose first those with higher NPV and reject all negative NPV projects. As a final test, we analyze whether firms that commit to more conservative accounting policies increase future profitability thanks to improvements in investment efficiency. To the extent that conservatism results in improvements to investment efficiency (and thus, in improvements in project selection) we should observe increased future performance of the undertaken investments. To test this prediction, we regress measures of future performance on our proxy of firm conservatism and control variables. We use two proxies of future investment performance measured for the period t+1 to t+3: one proxy is accounting-based (gross profit margin) and the other is market-based (annual stock return). Because conservative accounting policies affect future earnings, we need to be careful in selecting our profitability measure. Measures such as ROA are mechanically related to conservatism in prior periods. We use gross profit margin as a measure of profitability that is less likely to be affected by prior periods conservatism.

Table 6 Panels A to D report results of estimating model (4). The sample size is reduced given that we require additional data to estimate future performance. We can observe that our proxy of commitment to conditional conservatism is positively associated to both the three year average stock return and to the three-year average gross profit margin (Panel A, CONS = 0.10, *t*-stat = 2.44; Panel B, CONS = 0.05, *t*-stat = 2.21; Panel C, CONS = 0.10, *t*-stat = 2.44; Panel C, CONS = 0.05, *t*-stat = 2.19). Thus, the results from this final test are consistent with prior evidence reported in the paper and provide corroborative evidence in support of our prediction of a positive association between conservatism and investment efficiency. Again in this test, we do not find evidence of an association between accruals quality and future performance, once we incorporate CONS to the model.

5. Summary and conclusions

Accounting conservatism, through the timelier recognition of losses in the income statement, is expected to increase firm investment efficiency through three main channels: (1) by decreasing the adverse effects of information asymmetries and facilitating the monitoring of investment decisions; (2) by increasing managerial incentives to abandon poorly performing projects earlier and undertake fewer negative net present-value investments; and (3) by facilitating access to external financing at lower cost. Using a large US sample for the period 1990-2007, we find a negative association conditional conservatism and measures of over- and under-investment. Our results suggest that conservatism improves investment efficiency in firms facing financing constraints, reducing under-investment, and also among firms with high free cash flows and low leveraged firms, reducing over-investment. We also show that more conservative firms tend to

invest less and outperform other firms in terms of future investment performance. This is consistent with firms reporting more conservative numbers investing more efficiently.

Our results add to the recent stream of empirical literature on the effects of higher quality reporting over investment efficiency (Verdi, 2006; Biddle and Hilary, 2006, McNichols and Stubben, 2008; Hope and Thomas, 2008; Biddle et al., 2009), and particularly, on whether conservatism impacts managerial investment decisions (Bushman et al., 2007, Ahmed and Duellman, 2007a). They also add to a growing stream of literature (Guay and Verrecchia, 2007; LaFond and Watts, 2008; Suijs, 2008) suggesting that eliminating conservatism from accounting regulatory frameworks is likely to lead to undesirable economic consequences.

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Table 1
Summary statistics

Panel A: Validation of the conservatism measure: C-Score

C-Score decile	C-Score	Size	MTB	Leverage	InvCycle	BAS	PIN	Volatility	Age	β_3
1	-0.037	8.750	4.961	0.250	0.053	0.029	0.134	0.023	25.960	0.121
2	0.024	7.653	3.507	0.277	0.053	0.031	0.151	0.024	23.290	0.130
3	0.055	6.887	3.108	0.285	0.054	0.034	0.168	0.027	19.645	0.141
4	0.079	6.261	2.854	0.282	0.053	0.037	0.184	0.029	17.464	0.146
5	0.100	5.733	2.536	0.312	0.053	0.039	0.197	0.031	16.978	0.157
6	0.120	5.206	2.384	0.313	0.051	0.042	0.215	0.033	15.812	0.171
7	0.140	4.727	2.183	0.350	0.051	0.045	0.228	0.036	15.018	0.180
8	0.164	4.179	2.019	0.395	0.051	0.048	0.250	0.039	14.690	0.210
9	0.193	3.587	1.920	0.493	0.051	0.054	0.265	0.044	14.685	0.214
10	0.254	3.079	1.723	1.165	0.050	0.059	0.279	0.048	14.877	0.243
Pearson correl.	0.99	-0.99	-0.91	0.70	-0.90	0.99	1.00	0.98	-0.90	0.98
Predicted sign	+	–	–	+	–	+	+	+	–	+
Diff. Hi-Lo	0.291[c]	-5.671[c]	-3.238[c]	0.915[c]	-0.004[c]	0.030[c]	0.145[c]	0.025[c]	-11.084[c]	0.123[c]

The table shows the means of selected characteristics of C-Score deciles. The sample contains 41,851 firm-year observations for the period 1990-2007. Firms are sorted annually into deciles of C-Score, and the mean of selected variables is reported for each decile. C-Score is the firm-year measure of accounting conservatism constructed by Khan and Watts (2009). Higher values of C-Score are associated with higher conservatism. Unless otherwise indicated, the following variables are measured at fiscal year end. Size is the log of market value of equity. MTB is the market-to-book value of equity ratio. Leverage equals short-term plus long-term debt scaled by market value of equity. InvCycle is a decreasing measure of the length of the investment cycle defined as depreciation expense scaled by lagged total assets. BAS and PIN are measures of asymmetric information. BAS is the bid-ask-spread defined as the annual average of daily spread scaled by the midpoint between bid and ask. PIN is the probability of an informed trade developed by Easley et al. (2002); it is only available for the period 1983-2001. Volatility is the standard deviation of one year of daily stock returns. Age is the age of the firm in a given year, measured as the number of years with return history in CRSP. β_3 is the asymmetric timeliness coefficient in a Basu (1997) regression pooling all firm-year observations in the same C-Score decile. The Pearson correlation denotes the correlation between the decile ranks of C-Score and the decile means of each firm characteristics; it is a measure of the monotonicity of the C-Score rankings in the table. Diff. Hi-Lo indicates the difference between the values of each variable for the top and bottom deciles of C-Score. The 'c' superscript indicates two-tailed statistical significance at less than 1%

Table 1 (Continued)

Panel B: Univariate statistics

Variable	Mean	Std. Dev.	p10	p25	Median	p75	p90
Investment $_{t+1}$ (%)	12.81	11.93	2.17	4.79	9.31	16.93	27.57
CONS	0.11	0.11	0.00	0.05	0.10	0.15	0.22
AQ	-0.05	0.04	-0.10	-0.06	-0.04	-0.02	-0.01
AQW	1.20	0.42	0.80	0.97	1.13	1.34	1.67
Inst-holdings	0.35	0.30	0.00	0.05	0.32	0.60	0.78
Analysts	4.38	6.37	0.00	0.00	2.00	6.00	13.00
InvG-Score	-3.40	4.74	-11.00	-8.00	0.00	0.00	0.00
G-Score-dum	0.63	0.48	0.00	0.00	1.00	1.00	1.00
BAS	0.04	0.02	0.02	0.02	0.04	0.05	0.07
Volatility	0.03	0.02	0.01	0.02	0.03	0.04	0.06
Size	5.59	2.03	2.98	4.05	5.47	7.02	8.37
MTB	2.72	2.61	0.84	1.26	1.92	3.17	5.31
Leverage	0.42	0.69	0.00	0.02	0.17	0.52	1.07
AcceDep	0.16	0.37	0.00	0.00	0.00	0.00	1.00
StdCFO	0.09	0.09	0.02	0.04	0.07	0.11	0.19
StdSales	0.21	0.21	0.04	0.08	0.14	0.26	0.45
StdInvestment	7.31	7.30	1.30	2.50	4.87	9.41	16.48
Z-Score	1.43	1.15	0.29	0.80	1.43	2.07	2.76
Tangibility	0.31	0.24	0.06	0.12	0.25	0.46	0.70
Ind-Cap-Struc	0.19	0.12	0.06	0.08	0.16	0.26	0.37
CFOsale	-0.01	0.64	-0.09	0.01	0.07	0.13	0.23
Dividend	0.45	0.50	0.00	0.00	0.00	1.00	1.00
Age	17.83	14.74	4.84	7.26	12.76	23.94	35.44
OperCycle	4.69	0.70	3.86	4.31	4.76	5.15	5.50
InvCycle	0.05	0.03	0.02	0.03	0.05	0.06	0.09
Loss	0.24	0.43	0.00	0.00	0.00	0.00	1.00
Slack	2.11	5.88	0.02	0.06	0.28	1.40	5.19

The sample contains 41,851 firm-year observations for the period 1990-2007. Investment is a measure of total investment calculated as capital expenditures plus research and development plus acquisition expenditures less cash receipts from sales of PPE, multiplied by 100 and scaled by average total assets. CONS is the Kahn and Watts (2009) firm-year measure of accounting conservatism. Higher values of CONS are associated to higher conservatism. Size is the log of market value of equity. AQ is the measure of accruals quality developed by Dechow and Dichew (2002) and modified by Francis et al. (2005). AQW is the measure of accruals quality developed by Wysocki (2008) and modified by Biddle et al. (2009). Higher values of AQ and AQW indicate higher accruals quality. Inst-holdings is the percentage of firm shares held by institutional investors. Analysts is the number of analysts following the firm. InvG-Score is is the measure of anti-takeover protection developed by Gompers et al. (2003), multiplied by negative one. When G-Score is missing, InvG-Score is assigned the value of zero. G-Score-dum is an indicator variable that takes the value of one if G-Score is missing, and zero otherwise. BAS is the bid-ask-spread defined as the annual average of daily spread scaled by the midpoint between bid and ask. Volatility is the standard deviation of one year of daily stock returns. Size is the log of market value of equity. MTB is the market-to-book value of equity ratio. Leverage equals short-term plus long-term debt scaled by market value of equity. AccDep is an indicator variable that equals one if the firm uses accelerated depreciation, and zero otherwise. StdCFO is the firm-specific standard deviation of the cash flow from operations scaled by average total assets, for years t-5 to t-1. StdSales is the firm-specific standard deviation of annual sales deflated by average total assets, for

years t-5 to t-1. StdInvestment is the firm-specific standard deviation of annual Investment for years t-5 to t-1. Z-Score is a measure of bankruptcy risk. Tangibility is the ratio of property, plant and equipment to total assets. Ind-Cap-Struc is the mean of capital structure for firms in the same SIC-3 digit industry, where capital structure is the ratio of long-term debt to the sum of long-term debt and market value of equity. CFOsale is the ratio of CFO to sales. Dividend is a dummy variable that takes the value of one if the firm paid dividend; zero otherwise. Age is the difference between the first year when the firm appears in CRSP and the current year. OperCycle is the log of receivables to sales plus inventory to COGS multiplied by 360. InvCycle is a decreasing measure of the length of the investment cycle defined as depreciation expense scaled by lagged total assets. Loss is a dummy variable that takes the value of one if net income before extraordinary items is negative; zero otherwise. Slack is the ratio of cash to property, plant and equipment.

Table 1 (Continued)

Panel C: Pearson Correlation Matrix

	Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)
(1)	$Investm_{t+1}$ (%)	1.00																								
(2)	CONS	-0.11	1.00																							
(3)	AQ	-0.12	-0.14	1.00																						
(4)	Inst-holdings	0.01	-0.20	0.17	1.00																					
(5)	Analysts	0.04	-0.39	0.20	0.55	1.00																				
(6)	InvG-Score	0.09	0.30	-0.26	-0.43	-0.48	1.00																			
(7)	G-Score-dum	0.09	0.32	-0.26	-0.45	-0.50	0.94	1.00																		
(8)	BAS	0.14	0.27	-0.39	-0.27	-0.24	0.35	0.34	1.00																	
(9)	Volatility	0.12	0.30	-0.39	-0.30	-0.27	0.38	0.37	0.84	1.00																
(10)	Size	0.03	-0.58	0.31	0.44	0.60	-0.54	-0.56	-0.50	-0.52	1.00															
(11)	MTB	0.26	-0.31	-0.18	0.04	0.14	-0.01	-0.01	0.09	0.07	0.24	1.00														
(12)	Leverage	-0.23	0.30	0.13	-0.10	-0.07	-0.02	-0.02	-0.01	0.02	-0.12	-0.24	1.00													
(13)	AcceDep	0.02	-0.05	0.06	-0.03	0.01	-0.01	0.00	-0.05	-0.04	0.03	-0.05	-0.01	1.00												
(14)	StdCFO	0.17	0.11	-0.62	-0.15	-0.16	0.25	0.24	0.38	0.37	-0.25	0.21	-0.12	-0.05	1.00											
(15)	StdSales	0.00	0.12	-0.36	-0.12	-0.13	0.21	0.21	0.27	0.28	-0.24	0.07	-0.05	-0.06	0.37	1.00										
(16)	StdInvestment	0.20	0.08	-0.18	-0.01	-0.04	0.13	0.12	0.19	0.18	-0.06	0.11	0.06	0.03	0.32	0.16	1.00									
(17)	Z-Score	-0.22	-0.05	0.09	0.11	0.04	-0.06	-0.06	-0.20	-0.18	-0.02	-0.12	-0.07	-0.02	-0.22	0.17	-0.25	1.00								
(18)	Tangibility	-0.01	-0.06	0.37	-0.04	0.11	-0.14	-0.14	-0.27	-0.26	0.18	-0.14	0.25	0.17	-0.31	-0.25	0.00	-0.11	1.00							
(19)	Ind-Cap-Struc	-0.26	0.04	0.32	-0.04	0.04	-0.18	-0.17	-0.27	-0.26	0.12	-0.25	0.44	0.03	-0.28	-0.14	-0.08	0.02	0.57	1.00						
(20)	CFOsale	-0.21	-0.05	0.15	0.08	0.09	-0.10	-0.11	-0.20	-0.19	0.11	-0.16	0.05	0.06	-0.24	-0.04	-0.13	0.40	0.17	0.15	1.00					
(21)	Dividend	-0.17	-0.23	0.34	0.08	0.18	-0.35	-0.32	-0.47	-0.47	0.36	-0.08	0.06	0.10	-0.33	-0.24	-0.19	0.14	0.30	0.33	0.15	1.00				
(22)	Age	-0.16	-0.16	0.25	0.16	0.24	-0.48	-0.43	-0.36	-0.36	0.32	-0.07	0.07	0.07	-0.26	-0.24	-0.21	0.07	0.19	0.24	0.10	0.41	1.00			
(23)	OperCycle	-0.01	0.00	-0.12	-0.04	-0.06	0.07	0.08	0.11	0.13	-0.10	0.02	-0.10	0.04	0.06	-0.08	-0.07	-0.11	-0.40	-0.30	-0.06	-0.09	-0.01	1.00		
(24)	InvCycle	0.24	-0.03	0.01	-0.04	0.02	0.05	0.05	0.08	0.09	0.01	0.07	-0.01	0.12	0.01	-0.03	0.17	-0.08	0.39	0.04	0.09	-0.05	-0.11	-0.20	1.00	
(25)	Loss	0.09	0.20	-0.24	-0.16	-0.15	0.16	0.16	0.37	0.37	-0.25	0.07	0.11	-0.03	0.27	0.11	0.16	-0.49	-0.14	-0.15	-0.32	-0.28	-0.17	0.05	0.05	1.00
(26)	Slack	0.14	0.02	-0.20	-0.01	-0.05	0.13	0.12	0.17	0.14	-0.07	0.13	-0.18	-0.08	0.28	0.10	0.07	-0.20	-0.36	-0.28	-0.27	-0.19	-0.15	0.02	-0.21	0.15

The sample contains 41,851 firm-year observations for the period 1990-2007. The variables are defined in Panel B of Table 1.

Table 2
Conditional relation between future investment and accounting conservatism
Settings where the likelihood of overinvestment is high

$$\text{Investment}_{t+1} = \alpha_i + \beta_t + \delta_1 \text{CONS} + \delta_2 \text{CONS*OverInvest} + \gamma \text{Controls} + \varepsilon$$

Dependent variable = Investment $_{t+1}$	**Panel A** OverInvest = OverAggregate		**Panel B** OverInvest = OverIndustry		**Panel C** OverInvest = OverFirm	
	Coeff.	***t-stat***	**Coeff.**	***t-stat***	**Coeff.**	***t-stat***
CONS	13.40	5.25 ***	2.58	2.85 ***	4.73	8.63 ***
CONS*OverInvest	-18.71	-5.63 ***	-5.79	-4.16 ***	-11.76	-9.47 ***
AQ	7.20	1.32	-4.01	-0.81	22.02	8.57 ***
AQ*OverInvest	-6.55	-0.98	9.55	1.43	-40.22	-8.34 ***
Institutions	-2.16	-2.69 ***	-1.48	-2.57 ***	-2.32	-6.01 ***
Institutions*OverInvest	1.10	1.15	0.19	0.21	2.70	3.64 ***
Analysts	0.12	3.73 ***	0.01	0.54	-0.03	-1.54
Analysts*OverInvest	-0.15	-3.90 ***	-0.01	-0.14	0.05	1.42
InvG-Score	-0.22	-2.83 ***	-0.21	-2.90 ***	-0.29	-6.54 ***
InvG-Score*OverInvest	0.10	1.99 **	0.12	2.10 **	0.46	10.07 ***
G-Score-dum	2.48	4.24 ***	2.41	4.12 ***	0.97	2.83 ***
OverInvest	-	-	5.21	9.38 ***	23.62	50.96 ***
BAS	-8.26	-1.52	-7.49	-1.39	-4.52	-1.42
Volatility	-13.60	-2.08 **	-14.85	-2.27 **	0.59	0.16
Size	-0.34	-2.22 **	-0.38	-2.47 **	0.10	1.17
MTB	0.42	8.95 ***	0.41	8.80 ***	0.16	5.73 ***
Leverage	-3.04	-17.14 ***	-2.98	-16.96 ***	-0.14	-1.58
AcceDep	-0.40	-1.00	-0.43	-1.09	-0.14	-0.69
StdCFO	3.01	1.93 *	2.91	1.87 *	1.52	1.67 *
StdSales	-0.25	-0.61	-0.34	-0.85	0.53	2.14 **
StdCapex	-0.12	-9.21 ***	-0.12	-9.30 ***	-0.05	-6.09 ***
Z-Score	0.94	5.55 ***	0.95	5.57 ***	0.17	1.64 *
Tangibility	1.26	1.12	0.94	0.84	-0.79	-1.23
Ind-Cap-Struc	-7.41	-6.36 ***	-6.82	-5.90 ***	-6.74	-9.60 ***
CFOsale	-1.18	-4.74 ***	-1.18	-4.75 ***	-0.35	-1.98 **
Dividend	0.12	0.52	0.10	0.43	0.00	0.00
Age	0.04	1.10	0.04	1.13	0.01	0.63
OperCycle	-1.36	-5.14 ***	-1.39	-5.29 ***	-0.38	-2.30 **
InvCycle	10.75	2.82 ***	10.79	2.84 ***	11.69	4.87 ***
Loss	-1.08	-6.48 ***	-1.12	-6.73 ***	-0.59	-5.99 ***
Slack	0.02	0.86	0.02	0.69	0.01	0.59
Joint significance of $\delta_1 + \delta_2$	<0.001		<0.001		<0.001	
Firm and year fixed effects	Yes		Yes		Yes	
Robust std.err. (firm cluster)	Yes		Yes		Yes	
R-square (within)	0.08		0.08		0.61	
Obs	41,851		41,851		41,851	

The sample covers the period 1990-2007. Investment is a measure of total investment scaled by average total assets. CONS is the Kahn and Watts (2009) firm-year measure of accounting conservatism. Higher values of CONS are associated to higher conservatism. AQ is the measure of accruals quality developed by Dechow and Dichew (2002)

and modified by Francis et al. (2005). Higher values of AQ indicate higher accruals quality. OverAggregate is a ranked variable based on the annual unexplained aggregate investment for all firms in the economy. It takes values from 0 to 1; values closer to 0 (1) indicate settings in which under-investment (over-investment) is most likely. OverIndustry is a ranked variable based on the unexplained industry-year investment. It takes values from 0 to 1; values closer to 0 (1) indicate settings in which under-investment (over-investment) is most likely. OverFirm is a ranked variable based on the unexplained firm-year investment. It takes values from 0 to 1; values closer to 0 (1) indicate settings in which under-investment (over-investment) is most likely. The rest of control variables are defined in Panel B of Table 1. The regressions are estimated in a panel-data fashion with a fixed effects model that includes firm and year indicator variables. Reported t statistics are based on robust standard errors adjusted using a cluster at the firm level. The symbols ***, **, * denote two-sided significance at the 1%, 5%, and 10% levels, respectively.

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Table 3
Accounting conservatism and deviations from expected future investment

$$\text{Investment extremes}_{t+1} = \alpha_i + \beta_t + \delta\,\text{CONS} + \gamma\,\text{Controls} + \varepsilon$$

	Panel A		Panel B	
Multinomial logit regression	**Under-investment vs. Normal investment**		**Over-investment vs. Normal investment**	
Dependent variable = Investment extremes $_{t+1}$	**Coeff.**	***t-stat***	**Coeff.**	***t-stat***
CONS	-0.30	-1.98 **	-0.91	-5.11 ***
AQ	-2.72	-4.72 ***	-0.47	-0.84
Institutions	-0.20	-2.13 **	0.15	2.06 **
Analysts	0.00	-0.20	0.02	4.16 ***
InvG-Score	0.03	1.77 *	-0.02	-1.39
G-Score-dum	-0.18	-1.17	0.20	1.82 *
BAS	-1.74	-1.24	2.82	2.18 **
Volatility	1.38	0.84	-2.69	-1.64 *
Size	-0.12	-5.89 ***	-0.11	-7.41 ***
MTB	-0.01	-0.56	0.06	8.86 ***
Leverage	0.24	8.35 ***	-0.86	-12.01 ***
AcceDep	0.34	5.23 ***	-0.05	-0.97
StdCFO	-1.31	-4.88 ***	-0.09	-0.38
StdSales	0.34	3.85 ***	-0.17	-1.91 *
StdCapex	0.01	5.05 ***	0.02	10.71 ***
Z-Score	-0.19	-6.62 ***	-0.18	-8.03 ***
Tangibility	-0.80	-4.76 ***	0.31	2.69 ***
Ind-Cap-Struc	-4.02	-13.62 ***	-1.24	-5.65 ***
CFOsale	0.28	4.44 ***	-0.15	-5.55 ***
Dividend	0.03	0.51	-0.22	-4.73 ***
Age	0.00	0.26	-0.01	-5.53 ***
OperCycle	-0.24	-6.36 ***	-0.19	-6.77 ***
InvCycle	-4.50	-5.14 ***	9.98	16.47 ***
Loss	0.00	-0.07	-0.21	-4.44 ***
Slack	0.00	-0.04	0.01	3.95 ***
Robust std.err. (firm cluster)	Yes		Yes	
Pseudo R-square	0.09		0.09	
Obs	41,851		41,851	

The sample covers the period 1990-2007. This table presents results from multinomial logit pooled regressions. The dependent variable is based on the level of unexplained total investment. Firm-year observations in the bottom quintile of unpredicted investment are classified as under-investing, observations in the top quintile are classified as over-investing, and observations in the middle three quintiles are classified as the benchmark group (normal investment). The multinomial logit model predicts the likelihood that a firm will be in one of the extreme quintiles as opposed to the middle quintiles. CONS is the Kahn and Watts (2009) firm-year measure of accounting conservatism. Higher values of CONS are associated to higher conservatism. AQ is the measure of accruals quality developed by Dechow and Dichew (2002) and modified by Francis et al. (2005). Higher values of AQ indicate higher accruals quality. The rest of control variables are defined in Panel B of Table 1. Reported t statistics are based on robust standard errors adjusted using a cluster at the firm level. The symbols ***, **, * denote two-sided significance at the 1%, 5%, and 10% levels, respectively.

Table 4
Alternative measure of investment: capital expenditures
Conditional relation between future capital expenditures and accounting conservatism

$$Capex_{t+1} = \alpha_i + \beta_t + \delta_1 CONS + \delta_2 CONS*OverInvest + \gamma Controls + \varepsilon$$

Dependent variable = Capex $_{t+1}$	**Panel A** OverInvest = OverAggregate		**Panel B** OverInvest = OverIndustry		**Panel C** OverInvest = OverFirm	
	Coeff.	***t-stat***	**Coeff.**	***t-stat***	**Coeff.**	***t-stat***
CONS	16.97	*3.60* ***	13.77	*6.52* ***	17.78	*11.61* ***
CONS*OverInvest	-24.87	*-3.64* ***	-22.16	*-6.26* ***	-36.43	*-10.42* ***
AQ	11.84	*1.03*	27.01	*1.89* *	111.35	*14.94* ***
AQ*OverInvest	-41.43	*-2.72* ***	-56.49	*-3.08* ***	-218.81	*-17.34* ***
Institutions	-2.82	*-2.05* **	-1.34	*-1.06*	-4.27	*-4.30* ***
Institutions*OverInvest	3.11	*1.70* *	0.41	*0.20*	6.43	*3.47* ***
Analysts	-0.11	*-1.97* **	-0.19	*-4.21* ***	-0.16	*-3.50* ***
Analysts*OverInvest	-0.13	*-1.97* **	0.02	*0.25*	-0.01	*-0.09*
InvG-Score	-0.27	*-1.66* *	-0.45	*-2.90* ***	-1.01	*-8.76* ***
InvG-Score*OverInvest	0.33	*3.86* ***	0.83	*7.08* ***	1.97	*18.79* ***
G-Score-dum	5.32	*3.75* ***	4.33	*3.07* ***	2.31	*2.39* **
OverInvest	-	-	10.11	*7.24* ***	46.08	*37.70* ***
BAS	-22.67	*-1.25*	-23.90	*-1.33*	-17.96	*-1.63* *
Volatility	5.83	*0.28*	0.18	*0.01*	12.75	*0.94*
Size	1.60	*4.01* ***	1.40	*3.54* ***	1.96	*7.57* ***
MTB	1.68	*12.89* ***	1.64	*12.71* ***	0.83	*9.98* ***
Leverage	-2.90	*-8.27* ***	-2.90	*-8.54* ***	1.23	*5.76* ***
AcceDep	1.36	*1.28*	1.30	*1.22*	0.66	*1.15*
StdCFO	2.86	*0.59*	3.01	*0.63*	0.22	*0.07*
StdSales	1.24	*1.02*	1.02	*0.84*	1.29	*1.54*
StdCapex	-0.03	*-4.48* ***	-0.03	*-4.58* ***	-0.01	*-2.08* **
Z-Score	5.53	*11.53* ***	5.35	*11.16* ***	2.86	*9.15* ***
Tangibility	-73.24	*-24.03* ***	-72.24	*-23.84* ***	-20.94	*-11.60* ***
Ind-Cap-Struc	-10.33	*-3.57* ***	-8.76	*-3.04* ***	-11.44	*-6.31* ***
CFOsale	-1.04	*-1.44*	-0.96	*-1.35*	-0.06	*-0.14*
Dividend	-0.86	*-1.43*	-0.93	*-1.55*	-0.70	*-1.83* *
Age	0.12	*2.71* ***	0.12	*2.64* ***	0.03	*0.92*
OperCycle	1.47	*2.02* **	1.37	*1.89* *	0.55	*1.16*
InvCycle	13.21	*1.21*	13.35	*1.23*	48.60	*6.27* ***
Loss	-2.64	*-5.83* ***	-2.77	*-6.14* ***	-0.95	*-3.19* ***
Slack	1.64	*15.52* ***	1.63	*15.61* ***	0.82	*10.81* ***
Joint significance of $\delta_1 + \delta_2$	<0.009		<0.002		<0.001	
Firm and year fixed effects	Yes		Yes		Yes	
Robust std.err. (firm cluster)	Yes		Yes		Yes	
R-square (within)	0.19		0.20		0.55	
Obs	41,851		41,851		41,851	

The sample covers the period 1990-2007. Capex is a measure of investment calculated as capital expenditure scaled by lagged property, plant and equipment. CONS is the Kahn and Watts (2009) firm-year measure of accounting conservatism. Higher values of CONS are associated to higher conservatism. AQ is the measure of accruals quality

developed by Dechow and Dichew (2002) and modified by Francis et al. (2005). Higher values of AQ indicate higher accruals quality. OverAggregate is a ranked variable based on the unexplained aggregate investment for all firms in the economy. It takes values from 0 to 1; values closer to 0 (1) indicate settings in which under-investment (over-investment) is most likely. OverIndustry is a ranked variable based on the unexplained industry-year investment. It takes values from 0 to 1; values closer to 0 (1) indicate settings in which under-investment (over-investment) is most likely. OverFirm is a ranked variable based on the unexplained firm-year investment. It takes values from 0 to 1; values closer to 0 (1) indicate settings in which under-investment (over-investment) is most likely. The rest of control variables are defined in Panel B of Table 1. The regressions are estimated in a panel-data fashion with a fixed effects model that includes firm and year indicator variables. Reported t statistics are based on robust standard errors adjusted using a cluster at the firm level. The symbols ***, **, * denote two-sided significance at the 1%, 5%, and 10% levels, respectively.

Table 5
Conditional relation between future investment and accounting conservatism
Settings when the firm has incentives to over-invest
Alternative measures of accounting quality controls

$$\text{Investment}_{t+1} = \alpha_i + \beta_t + \delta_1 \text{CONS} + \delta_2 \text{CONS*HighFCF} + \gamma \text{Controls} + \varepsilon$$

	Panel A				Panel B		
Dependent variable = Investment $_{t+1}$	**AQ: Dechow&Dichev**			**Dependent variable = Investment $_{t+1}$**	**AQW: Wysocki**		
	Coeff.	***t-stat***			**Coeff.**	***t-stat***	
CONS	2.40	2.41	**	CONS	2.50	2.52	**
CONS*HighFCF	-7.77	-3.87	***	CONS*HighFCF	-8.06	-4.02	***
AQ	-5.85	-0.99		AQW	0.22	0.75	
AQ*HighFCF	15.76	1.67	*	AQW*HighFCF	-0.33	-0.56	
Institutions	-4.08	-5.16	***	Institutions	-4.17	-5.28	***
Institutions*HighFCF	5.30	3.94	***	Institutions*HighFCF	5.46	4.06	***
Analysts	0.04	1.05		Analysts	0.03	0.99	
Analysts*HighFCF	-0.06	-1.07		Analysts*HighFCF	-0.06	-0.98	
InvG-Score	-0.23	-2.99	***	InvG-Score	-0.22	-2.91	***
InvG-Score*HighFCF	0.11	1.38		InvG-Score*HighFCF	0.10	1.20	
G-Score-dum	2.50	4.31	***	G-Score-dum	2.51	4.32	***
HighFCF	8.49	9.52	***	HighFCF	7.92	7.80	***
BAS	-5.67	-1.05		BAS	-5.95	-1.10	
Volatility	-13.92	-2.13	**	Volatility	-13.78	-2.11	**
Size	-0.78	-4.94	***	Size	-0.77	-4.92	***
MTB	0.41	8.91	***	MTB	0.41	8.89	***
Leverage	-2.44	-14.29	***	Leverage	-2.46	-14.47	***
AcceDep	-0.41	-1.04		AcceDep	-0.41	-1.04	
StdCFO	2.94	1.89	*	StdCFO	2.52	1.74	*
StdSales	-0.17	-0.41		StdSales	-0.17	-0.42	
StdInvesment	-0.10	-8.02	***	StdInvesment	-0.10	-8.01	***
Z-Score	0.41	2.42	**	Z-Score	0.40	2.35	**
Tangibility	0.65	0.57		Tangibility	0.67	0.60	
Ind-Cap-Struc	-6.29	-5.42	***	Ind-Cap-Struc	-6.32	-5.44	***
CFOsale	-1.11	-4.51	***	CFOsale	-1.11	-4.52	***
Dividend	0.15	0.66		Dividend	0.15	0.66	
Age	0.03	1.01		Age	0.03	0.98	
OperCycle	-0.93	-3.49	***	OperCycle	-0.93	-3.48	***
InvCycle	8.92	2.39	**	InvCycle	9.05	2.42	**
Loss	-1.00	-6.05	***	Loss	-0.99	-6.03	***
Slack	0.00	0.11		Slack	0.00	0.06	
Joint significance of $\delta_1 + \delta_2$	<0.001			Joint significance of $\delta_1 + \delta_2$	<0.001		
Firm and year fixed effects	Yes			Firm and year fixed effects	Yes		
Robust std.err. (firm cluster)	Yes			Robust std.err. (firm cluster)	Yes		
R-square (within)	0.09			R-square (within)	0.09		
Obs	41,851			Obs	41,851		

The sample covers the period 1990-2007. Investment is a measure of total investment scaled by average total assets. CONS is the Kahn and Watts (2009) firm-year measure of accounting conservatism. Higher values of CONS are

associated to higher conservatism. AQ is the measure of accruals quality developed by Dechow and Dichew (2002) and modified by Francis et al. (2005). Higher values of AQ indicate higher accruals quality. AQW is the measure of accruals quality developed by Wysocki (2008) and modified by Biddle et al. (2009). Higher values of AQW indicate higher accruals quality. HighFCF is a ranked variable based on the average of two ranked decile measures of free cash flow and leverage (the latter multiplied by minus one). HighFCF takes values from 0 to 1; values closer to 1 (0) indicate settings in which the firm has incentives to over-invest (under-invest). Free cash flow is defined as the three-year average of cash flow from operations minus cash dividends paid for both common and preferred stock, scaled by average total assets. The rest of control variables are defined in Panel B of Table 1. The regressions are estimated in a panel-data fashion with a fixed effects model that includes firm and year indicator variables. Reported t statistics are based on robust standard errors adjusted using a cluster at the firm level. The symbols ***, **, * denote two-sided significance at the 1%, 5%, and 10% levels, respectively.

Table 6
Association between accounting conservatism and future performance
Alternative measures of accounting quality controls

FutPerf (t+1 to t+3) = $\alpha_i + \beta_t + \delta$ CONS + γ Controls + ε

	Panel A		Panel B		Panel C		Panel D	
	AQ: Dechow & Dichev				AQ: Wysocki			
Dependent variable =	**Average future returns (t+1 to t+3)**		**Average future gross profit margin (t+1 to t+3)**		**Average future returns (t+1 to t+3)**		**Average future gross profit margin (t+1 to t+3)**	
	Coeff.	***t-stat***	**Coeff.**	***t-stat***	**Coeff.**	***t-stat***	**Coeff.**	***t-stat***
CONS	0.10	2.44 **	0.05	2.21 **	0.10	2.44 **	0.05	2.19 **
AQ	0.24	1.06	-0.27	-1.93 *	0.00	-0.09	0.00	0.98
Institutions	0.04	1.37	0.01	0.61	0.04	1.39	0.01	0.55
Analysts	0.00	0.01	0.00	1.03	0.00	0.01	0.00	1.01
InvG-Score	-0.01	-1.68 *	0.00	-0.80	-0.01	-1.70 *	0.00	-0.76
G-Score-dum	0.08	2.49 **	0.00	0.27	0.08	2.49 **	0.00	0.25
BAS	0.88	1.92 *	0.08	0.42	0.87	1.91 *	0.08	0.47
Volatility	0.87	1.46	-0.31	-1.40	0.87	1.45	-0.30	-1.39
Size	-0.14	-15.13 ***	0.01	1.33	-0.14	-15.12 ***	0.01	1.15
MTB	-0.01	-3.63 ***	0.00	0.20	-0.01	-3.72 ***	0.00	0.30
Leverage	0.01	1.10	0.00	-0.03	0.01	1.13	0.00	-0.17
AcceDep	0.01	0.42	0.01	0.73	0.01	0.43	0.01	0.72
StdCFO	0.03	0.27	-0.10	-1.16	-0.01	-0.15	-0.06	-0.75
StdSales	0.01	0.36	0.05	3.83 ***	0.01	0.30	0.05	3.84 ***
StdCapex	0.00	-0.11	0.00	-1.23	0.00	-0.11	0.00	-1.22
Z-Score	0.03	2.89 ***	0.00	-0.33	0.03	2.86 ***	0.00	-0.28
Tangibility	-0.10	-1.73 *	0.06	2.33 **	-0.10	-1.71 *	0.06	2.25 **
Ind-Cap-Struc	0.15	2.02 **	-0.01	-0.54	0.15	2.04 **	-0.01	-0.58
CFOsale	0.03	2.22 **	0.11	4.08 ***	0.03	2.22 **	0.11	4.08 ***
Dividend	0.02	1.34	0.00	-0.39	0.02	1.34	0.00	-0.41
Age	0.00	-2.12 **	0.00	-1.58	0.00	-2.09 **	0.00	-1.76 *
OperCycle	0.02	1.10	0.04	2.54 **	0.02	1.12	0.04	2.52 **
InvCycle	0.87	3.01 ***	0.03	0.27	0.86	2.98 ***	0.05	0.36
Loss	-0.01	-0.49	0.00	0.26	-0.01	-0.48	0.00	0.21
Slack	0.00	-1.02	0.00	-1.55	0.00	-1.09	0.00	-1.49
Firm-year FE	Yes		Yes		Yes		Yes	
Firm cluster	Yes		Yes		Yes		Yes	
R-sq (within)	0.15		0.05		0.15		0.05	
Obs	32,369		32,613		32,369		32,613	

The sample covers the period 1990-2007. FutPerf is a measure of future performance of current investments. FutPerf is calculated alternatively as the three-year average of annual stock returns for years t+1 to t+3, or as the three-year average of gross profit margin for years t+1 to t+3. CONS is the Kahn and Watts (2009) firm-year measure of accounting conservatism. Higher values of CONS are associated to higher conservatism. AQ is the measure of accruals quality developed by Dechow and Dichew (2002) and modified by Francis et al. (2005). Higher values of AQ indicate higher accruals quality. AQW is the measure of accruals quality developed by Wysocki (2008) and modified by Biddle et al. (2009). Higher values of AQW indicate higher accruals quality. The rest of control

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