ACCOUNTING CONSERVATISM, ENVIRONMENTAL UNCERTAINTY AND THE CAPITAL STRUCTURE

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Abstract

The purpose of this paper is to examine the effect of reporting conservatism on firm's capital structure decisions and the role of environmental uncertainty as a moderating variable. While the role of conservatism has been investigated in certain debt-contracting setting, evidence is sparse about the effect of conservatism on the degree of financial leverage. We examine this issue using a sample of Australian firms from 1992 to 2005. We find that accounting conservatism positively affect a firm's leverage structure. Further, we find that the relation between accounting conservatism and firm leverage is moderated by environmental uncertainty context; however this finding is not robust to all three proxies that we used to measure conservatism.

Keywords: Conservatism, Financial Leverage, Environmental Uncertainty, Australia

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1. Introduction

This study examines the effect of reporting conservatism on a firm's capital structure decisions and how that association is moderated by environmental uncertainty. In their seminal paper, Miller and Modigliani (1958) show that in a perfect capital market, firms should be indifferent to the choice between debt and equity. However, subsequent theoretical developments have provided alternative explanations for firm-level capital structure decisions. The proponents of trade-off theory argue that managers make capital structure decisions based on the trade-off between the benefits of debt (e.g., the tax deductibility of interest and a reduction in agency costs related to free cash flow) and the cost of debt (e.g., bankruptcy costs and shareholder/bondholder conflict of interests) (Miller and Modigliani, 1963; DeAngelo and Masulis, 1980). Pecking order theory demonstrates that capital market frictions (e.g., transaction costs, information asymmetry) make it costly for firms to raise funds externally, and, as a result, firms finance operations by relying first on internal funds, then on debt and finally on equity (Myers, 1984; Myers and Majluf, 1984).

A large volume of empirical literature investigates the relative superiority of one theory over another with respect to the determinants of capital structure choices. For example, a positive association between firm profitability and a high debt ratio is consistent with trade-off theory, whereby profitable firms can reduce their tax obligations because they have relatively lower bankruptcy costs (Warner, 1977). Pecking order theory, in contrast, suggests that profitable firms should rely more on internal sources of financing and less on debt financing. The empirical evidence is consistent with this proposition (Baskin, 1989; Hovakimian, Opler, Titman, 2001; Shyam-Sunder and Myers, 1999).

Accounting researchers have attempted to link capital structure decisions with accounting conservatism. Conservative accounting practices require a higher degree of verification for recognising gains than for recognising losses, which means that conservatism reflects the differential ability of accounting earnings to recognise economic losses relative to economic gains (Basu, 1997). This definition of conservatism is commonly referred to as news-dependent or conditional conservatism,[1] and has

[1] In contrast to news-dependent conservatism, news-independent or unconditional conservatism in accounting occurs through the application of accounting policies that consistently accelerate expenses or defer revenues, resulting in a lower profit figure than would otherwise be reported (Ruddock, Taylor, and Taylor, 2006). Our focus on 'news-dependent' conservatism is justified by the fact that the timely recognition of losses encouraged by this conservatism measure is an important determinant of earnings quality, where earnings are used for contracting purposes. To

been shown to affect different aspects of debt contracting. Watts (2003) argues that debt contracting has a strong impact on the demand for conservatism. Lenders participate less in firms' economic gains than shareholders, but are adversely affected by losses. Relative to shareholders, lenders prefer financial statement information that more efficiently incorporates economic losses to ensure that management does not favour shareholders over lenders. Empirical evidence lends support to this theory by showing that conservatism helps lenders through the timely signalling of default risk, as found in accelerated covenant violations (Zhang, 2008), and lenders reduce interest rates when borrowers are relatively more conservative (Ahmed, Billings, Morton, and Harris, 2002).

Although the role of conservatism has been investigated in certain debt-contracting settings, evidence is sparse about its effect on the degree of financial leverage or capital structure. We examine this issue using data from Australia where the 'tax imputation system'[2] adopted in 1987 reduced the tax incentive of using debt in Australia, thus allowing alternative theories to be tested (Qiu and La, 2010). Evidence on the determinants of capital structure in Australia is mixed. For instance, Allen (1991, 1993) and Cassar and Holmes (2003) find that more profitable firms choose to use less debt financing, which contradicts the pecking order theory, whereas Twite (2001) finds the opposite. Twite (2001) and Cassar and Holmes (2003) both report that growth firms use more debt, a finding that also contradicts the pecking order theory. Cassar and Holmes (2003) also report a negative relation between asset tangibility and debt financing, providing evidence to refute the bankruptcy cost theory.

We extend the research on the determinants of capital structure in Australia by incorporating 'accounting conservatism' as an additional explanatory variable. We then examine whether this association is moderated by environmental uncertainty defined as "the unpredictability of the actions of customers, suppliers, competitors and regulatory groups" (Govindarajan 1984). High environmental uncertainty increases the risk of accurately assessing future earnings and accentuates information asymmetry. Demand for accounting conservatism to reduce information asymmetry and benefit debt trading becomes more pronounced in this environment.

This study contributes to the literature in three ways. First, to the best of our knowledge this study is the first in Australia to examine the role of accounting conservatism in capital structure decisions. The Australian environment is unique because the 'tax imputation system' adopted in 1987 reduced the tax incentive of using debt, thus allowing alternative capital structure theories to be tested. Second, whereas previous studies test the beneficial effect of conservatism, such as whether accounting conservatism benefits firms by reducing the cost of debt, this study extends the extant literature by examining the role of accounting conservatism in capital structure decisions. Third, we include environmental uncertainty as a contextual variable to explain capital structure decisions. We believe that studying the association between reporting conservatism and capital structure decisions in particular contexts will provide more significant insights.

The remainder of the paper proceeds as follows. The next section provides a brief review of the literature and develops testable hypotheses. Section 3 explains the research design issues. Section 4 introduces the sample selection criteria and some descriptive statistics. Section 5 explains the main tests result. Section 6 concludes.

2. Literature review and hypotheses development

Since the introduction of the MM (1958) capital structure irrelevance theory, researchers have searched for explanations for capital structure and have generated important insights into the relevance of capital structure decisions in the presence of market friction. This stream of research incorporates the effects of taxes, bankruptcy costs, information asymmetry, agency issues and other types of friction on corporate leverage decisions. The trade-off theory and pecking order theory that resulted from this work have generated a number of testable propositions on the determinants of capital structure (Harris and Raviv, 1991).

Accounting conservatism has been linked with debt contracting benefits and has provided some interesting empirical results. The contracting explanation for conservatism begins with the premise that a firm is a nexus of contracts among rational agents (Jensen and Meckling, 1976). Accounting numbers are used to write, monitor and enforce these contracts. Such accounting-based contracting motivates managers to bias earnings upwards (e.g., to maximise their bonuses). Accounting conservatism is demanded to counteract this tendency, which requires early recognition of bad news and hence biases earnings downward. Ball, Robin and Sadka (2008) directly test the 'contracting' and 'value relevance'

provide a broader perspective on the effect of conservatism on firm's capital structure decisions, we use two other conservatism measures that are not tied to 'news-independent' measure.

[2]Following the adoption of the tax imputation system in 1987, Australian shareholders now receive full credits for tax paid at the corporate level when they receive dividends. The elimination of double taxation is in contrast to the US regulatory setting, where shareholders pay tax at the corporate level and individual level when they receive dividends (Qiu and La, 2010).

explanations to better understand the primary driver of the demand for accounting conservatism. The 'contracting hypothesis' suggests that accounting conservatism exists to facilitate efficient contracting, whereas the 'value relevance hypothesis' offers a symmetric relation between earnings and stock returns. Ball et al. (2008) use the size of the debt and equity markets as a crude proxy to differentiate the two hypotheses and report a significant positive relation between timely loss recognition measures and debt market size. The relationship between timely loss recognition measures and the equity market, however, is either negative or statistically insignificant.

There are several theoretical arguments and some empirical evidence to support the benefits of conservatism for lenders of capital. Conservatism enhances creditor value by facilitating debt covenants to prevent managers and shareholders from expropriating value. The inherent conflict of interest between shareholders and bondholders may result in managers taking opportunistic action (such as making liquidating dividends to shareholders), which exposes creditors to significant losses in the event of company liquidation (Watts, 2003; Ahmed et al., 2002). Ahmed et al. (2002) propose that conservatism mitigates bondholder-shareholder agency costs, as manifested in excessive dividend distributions, by reducing the amount of reported earnings available for distribution. This lowers opportunistic unwarranted payments to shareholders by managers.[3] Accounting conservatism also aids the timely transfer of decision rights from a firm's management to its creditors when the firm experiences adverse economic conditions (Nikolave, 2010). Empirically, Zhang (2008) finds support for this argument by revealing that more conservative firms are more likely to violate debt covenants then their less conservative counterparts, and transfer decision-making rights to creditors earlier. The specific findings are that (a) conservatism benefits lenders through the acceleration of covenant violations, which transfers decision-making rights from shareholders to debt holders, thereby reducing the default risk, and (b) as a result of the decrease in default risk, the debt holders of conservative firms are more willing to accept lower interest rates, thereby reducing the borrower's cost of debt, as proxied by interest rates.

Accounting conservatism also increases bondholder value, because accounting-based debt covenants limit self-serving managerial decisions such as investing in negative net present value projects or taking on additional debt. Because conditional conservatism requires the recognition of losses earlier than gains, debt covenants provide early warning signals to creditors of probable covenant violations. Moerman (2008) suggests that conservatism decreases information asymmetry by (i) enhancing the borrower's corporate governance and (ii) providing more and higher quality information to debt market participants. Accordingly, Moerman (2008) predicts and finds that a timely loss recognition strategy improves the quality of a borrower's financial reporting and decreases the bid-ask spread at which the borrower's loans are traded.

In contrast to the theoretical and empirical evidence on the beneficial role of accounting conservatism in debt contracting, there is a paucity of evidence on the association between conservatism and financial leverage. Feras and Putnam (2011) recently filled this void by documenting a positive association between accounting conservatism and the degree of financial leverage for US companies. Because the demand for leverage is a function of the cost of debt and conservatism lowers the cost of debt (Zhang, 2008), this documented positive association makes sense.[4] We first test whether this positive association also holds in Australia. There is some evidence of conditional conservative accounting practice among Australian firms (Ruddock et al., 2006; Balkrishna, Ruddock, and Taylor, 2007). Whether such conditional conservatism is associated with capital structure decisions, however, remains unexplored. We develop the following hypothesis (in alternative form):

> H_1: There is a positive association between accounting conservatism and financial leverage.

Environmental uncertainty, capital structure and conditional conservatism

We consider environmental uncertainty as a contextual factor that may moderate the association between accounting conservatism and a firm's leverage decisions. Environmental uncertainty is defined as "the unpredictability of the actions of customers, suppliers, competitors and regulatory groups" (Govindarajan, 1984). Firms operating under high environmental uncertainty suffer from acute information asymmetry problems. For example, Akerlof (1970) describes the combined impact of

[3] Ahmed et al. (2002) use the market value-based conservatism proxy following Beaver and Ryan (2000) the accruals-based conservatism proxy [(net income before extraordinary items + depreciation-operating cash flows*-1)/total assets].

[4] Feras and Putnam (2011), however, caution that such a finding needs to be evaluated in light of the association between conservatism and the cost of equity capital. If conservatism decreases the cost of equity capital to the same or a higher degree than it does the cost of debt capital, then the relationship between conservatism and financial leverage is insignificant (e.g., there is no relationship) or even negative (e.g., conservatism decreases financial leverage in the firm's capital structure). The extant empirical evidence, however, fails to find any effect of conservatism on the cost of equity capital (Francis, LaFond, Olsson, and Schipper, 2004).

uncertainty and information asymmetry on the used car market. Based on a laboratory experiment, Umanath, Ray and Campbell (1996) provide evidence that, under conditions of asymmetric information, principals prefer contracts wherein the incentive portion of the total compensation increases with an increase in the agent's perceived environmental uncertainty. Research on trading on asset prices finds that the price is determined by both information asymmetry among investors about the future cash flow of assets and investor uncertainty about the preferences and endowments of other investors in the market (Saar, 2002).

In the debt-contracting process, lenders demand accounting conservatism because they bear a downside risk with no upside potential. We argue that such demand is intensified for firms operating in an environment of high uncertainty. Such firms suffer from severe information asymmetry problems, which cause an increase in their agency costs, and as the agency costs increase so too does the demand for accounting conservatism. For example, LaFond and Roychowdhury (2008) find that the demand for conservatism increases (decreases) as the severity of the agency problem increases (decreases). Hui, Morse and Matsunaga (2009) find that as the level of information asymmetry decreases due to the provision of more earnings forecasts by management, a firm's financial statements become less conservative. Francis and Martin (2010) study the relationship between accounting conservatism and acquisition profitability and find that although accounting conservatism is associated with more profitable acquisitions, this relationship is stronger for firms operating in volatile environments and experiencing high degrees of information asymmetry. Based on the results from the accounting conservatism literature, we suggest that the effect of conservatism on a firm's capital structure is more pronounced when the agency costs are high. This leads to the following proposition.

> ***H_2*:** The positive association between accounting conservatism and firm leverage is stronger for firms operating under high environmental uncertainty.

3. Research design issues

To examine the moderating role of environmental uncertainty on the association between accounting conservatism and firm capital structure, we first operationalise the three constructs.

3.1 Financial leverage/capital structure

We specify financial leverage in terms of book value and market value. Book value financial leverage is measured as total debt (short-term debt + long-term debt) / total assets. Market value financial leverage is measured as total debt / market value of assets, where the market value of assets = total assets- total shareholders' equity + the market value of the firm's common equity. Market value of equity is derived by multiplying the share price at the end of the fiscal year by the number of outstanding shares.

3.2 Accounting conservatism

Three measures of accounting conservatism proxies are used in this study. Our first conservatism measure is based on Basu (1997) and is referred to as the differential timeliness measure. The underlining assumption of the differential timeliness measure is that conservatism results in timely loss recognition but untimely gain recognition. Accordingly, conservatism should result in a stronger correlation between earnings and stock returns during bad news periods (when returns are negative) than between earnings and stock returns during good news periods (when returns are positive). *Con_diff* as the ratio of the relative timeliness of a firm's incorporation of bad news relative to good news in its earnings. This ratio, referred to by Givoly, Hayn and Natarajan (2007) as the differential timeliness ratio, is captured by $(\beta_1 + \beta_2)/ \beta_1$in the following regression.

$$E_{it}/P_{it-1} = \alpha_i + \alpha_{1i}DR_{it} + \beta_1 R_{it} + \beta_2 R_{it} * DR_{it} + \varepsilon_{it}, \quad (1)$$

Where $E_{it}$is the earnings per share for firm *i* in fiscal year *t*; P_{it-1} is the price per share for firm *i* at the beginning of the fiscal year *t*; R_{it} is firm's *i* 15-month return ending three months after the end of fiscal year *t;* and DR_{it} is a dummy variable that equals 1 during periods of bad news (e.g., $R_{it} < 0$) and 0 during periods of good news (e.g., $R_{it} > 0$).

Our second measure of conservatism is the degree of accumulation of non-operating accruals. According to Givoly and Hayn (2000), the accumulation of negative non-operating accruals is a product of the recording of bad news, and is thus an indication of conservatism. We define *Con_nonopaccr* as the ratio of non-operating accruals to total assets. We first calculate total accruals as the difference between net income and operating cash flow. We then calculate operating accruals as the sum of Δaccounts receivable - Δinventories - Δprepaid expenses + Δaccounts payable + Δtaxes payable. Non-operating accruals is then the difference between total accruals and operating accruals. We deflate these values by total assets to control for heteroscedasticity. We determine the average of (non-operating accruals /total assets) using the current and the preceding four years' observations. We multiply the average asset deflated non-operating accruals by negative 1 so that higher values indicate greater conservatism.

Our third measure of conservatism is the ratio of the skewness in earnings divided by the skewness in cash flow and is denoted as C*on_nskew*. When the

recognition of bad news in earnings is timelier than that of good news, then the earnings distribution will be negatively skewed (Givoly and Hayn, 2000; Zhang, 2008). We measure skewness using the current and preceding four years' of earnings and cash flows observations. We multiply the average skewness by negative 1 so that higher values indicate greater conservatism.

Despite its popularity, differential timeliness measure is criticised in the literature. To begin with, Givoly and Hayn (2000) and Dietrich, Muller and Reidl (2007) are concerned that differential timeliness measure induces biases in the coefficient estimates and R^2 measures, thus leading researchers to mistakenly interpret reported results as evidence of conservatism.[5] Givoly and Hayn (2000) also explain that management disclosure policy on the timing of good news releases versus bad news releases affects the relationship between prices and returns, which may result in misleading conservative measures based on the reverse regression proposed by Basu (1997). Roychowdhury and Watts (2007) explain that Basu's (1997) measure of differential timeliness measure to gauge conservatism is based on single-period returns and earnings, and thus the generated estimates measure the average degree of conservatism for each single-period but do not assess the cumulative effect of conservatism from previous years.

On the other hand, although *Con_nonopaccr* and *Con_nskw* overcome the problem of relying on stock returns to proxy for periods of good/bad news, they are not without limitations. In particular, negative non-operating accruals or a negatively skewed earnings could be due to earnings manipulation rather than accounting conservatism.

3.3 Measurement of environmental uncertainty

A parsimonious proxy for the extent of environmental uncertainty is the coefficient of variation of sales, which is based on external market conditions and is thus more appropriate as a measure of environmental uncertainty (Bergh and Lawless 1998; Dess and Beard 1984; Ghosh and Olsen 2009; and Habib, Hossain, and Jiang, 2011).[6] The coefficient of variation of sales is calculated as follows.

$$CV(Z_i) = \frac{\sqrt{\frac{\sum_{k=1}^{5}(z_i - \bar{z})^2}{5}}}{\bar{z}} \quad (2)$$

where, CV is the coefficient of variation, z is the sales observations for each firm in each year and $\bar{z}$ is the mean sales value. This firm-specific measure of environmental uncertainty is calculated using historical data over a four-year period that includes the current year, and is validated as an objective measure of environmental uncertainty by Synder and Glueck (1982). We label this environmental uncertainty measure EU_{sales}.

3.4 Regression specifications

We first estimate a baseline regression model to test the relationship between financial leverage and a vector of the firm characteristic variables. We include accounting conservatism as our primary variable of interest. The model is expressed as follows:

$$FLEV_{it} = \alpha_1 + \beta_1 CON_{it} + \beta_2 PROFIT_{it} + \beta_3 DIV_{it} + \beta_4 SIZE_{it} + \beta_5 DEP_{it} + \beta_6 TAN_{it} + \beta_7 AZ_{it} + \beta_8 GROWTH_{it} + \beta_9 INDLEV_{it} + \varepsilon_{it} \quad (3)$$

Where,

$FLEV_{it}$: denotes the book value leverage or market value leverage for firm i in year t as defined in section 3.1;

CON_{it} :denotes one of the three conservative measures as discussed in section 3.2;

PROFIT: firm profitability measured as operating income divided by total assets;

DIV: firm's payout ratio measured as common stock dividends divided by total assets;

SIZE: firm size measured as the natural logarithm of total assets;

DEP: depreciation expense measured as depreciation and amortisation deflated by total assets;

TAN: assets' tangibility measured as fixed assets divided by total assets;

AZ: Altman's (1968) Z-score, the ex ante probability of financial distress is measured using [3.3 EBIT + 1.0 sales + 1.4 retained earnings + 1.2 working capital/ total assets];

GROWTH: growth opportunities proxied by sales growth and is measured as [$sales_t$-$sales_{t-1}$/total $assets_t$];

INDLEV: industry leverage is the median industry leverage.

[5]Givoly et al. (2007, p. 69) identify three characteristics of the information environment that are unrelated to reporting conservatism but nevertheless affect the differential timeliness (Basu, 1997) measure. These characteristics are referred to as the 'aggregation' effect, the 'nature of the economic events' effect and the 'disclosure policy effect'.

[6]Early research on environmental uncertainty is based on managerial perceptions of external environmental volatility (Lawrence & Lorsch 1967; Duncan 1972). This research proposes a causal connection between environmental volatility and managerial perceptions of environmental uncertainty. Tosi, Aldag and Storey (1973) use market, technological and earnings volatility as three objective measures of environmental volatility but do not find a strong correlation with the Lawrence and Lorsch (1967) instrument.

The pecking order theory expects a negative association between leverage and profitability (Myers, 1984), which suggests that firms prefer to finance assets with internally generated funds to avoid the costs associated with external financing. Trade-off theory, in contrast, argues that higher profitability decreases the expected costs of distress and lowers tax expense by utilising more debt, and thus predicts a positive relationship between the two variables. Jensen (1986) suggests that increased leverage acts as a monitoring mechanism to prevent managers from taking suboptimal decisions associated with the free cash flow agency problem. Accordingly, leverage and dividends may be inversely related. However, a high dividend payout ratio may also indicate that the firm is profitable, thereby increasing its ability to borrow (Doukas and Pantzalis, 2003). Accordingly, in this case the relationship between dividends and debt is positive. Firm size is expected to have a positive association with leverage, as larger firms have lower expected bankruptcy costs (Titman and Wessels, 1988; Graham, Lemmon and Schallheim, 1998; Barclay and Smith, 1995). DeAngelo and Masulis (1980) explain that depreciation is a type of non-debt-related corporate tax shield. Consequently, the higher the depreciation expense, the lower the tax benefits of debt financing. Accordingly, we expect a negative relationship between depreciation and a firm's degree of financial leverage. Firms with more tangible assets can use them as collateral for increased borrowing, and we thus expect a positive association between tangibility and leverage. However, the amount of fixed assets that a firm owns is positively related to the operating leverage. According to Mandelker and Rhee (1984), financial leverage and operating leverage are substitutes. Thus, based on this argument, the relationship between fixed assets and financial leverage may be negative. A higher Z score reflects greater financial soundness, and we thus expect a negative association between this distress score and financial leverage. We follow previous studies (e.g., Graham, et al. 1998; Barclay and Smith, 1995; Rajan and Zingales, 1995) and argue that growth firms tend to protect their investment opportunity set by lowering the amount of debt in their capital structure. We thus expect an inverse relationship between sales growth and degree of financial leverage. The association between industry leverage and leverage is hypothesized to be positive.

To test H_2, we first partition the sample observations into high and low environmental uncertainty categories and then run regression equation (3) for the two sub-samples. Firm-year observations pertaining to more (less) than the median environmental uncertainty measure are categorised as high (low) environmental uncertainty observations respectively.

4. Sample selection and descriptive statistics

Our sample spans the period from 1992 to 2005. We start with 1992 because direct method cash flow reporting became mandatory in that year. We need cash flow data to calculate the total accruals to derive non-operating accruals. To calculate our first conservatism measure, *con-diff*, we start with a sample of 10,227 firm-year observations from 1991 to 2005 for which there is available return and capital structure data. We lose 3,819 firm-year observations because of insufficient observations to run the firm-specific differential timeliness regression. This leaves us with a sample of 6,409 firm-year observations. We require companies to have at least seven years of consecutive data including the current year to derive meaningful regression coefficients. Our final sample for this conservatism measure is 2,545 firm-year observations. For our second and third conservatism measures, we begin with an initial sample of 15,773 firm-year observations. This initial sample size is larger than the first conservatism measure because we don't require stock return data. We then exclude 1,274 observations pertaining to the financial services industry. Financial institutions are excluded because of the differing regulatory nature of their capital structure choices. We then conduct a baseline regression analysis of the determinants of capital structure excluding the conservatism variable. The purpose of running this regression is to benchmark this study with earlier Australian studies on the determinants of capital structure. None of the earlier empirical studies on capital structure in Australia used such a large sample size, and their findings are inconclusive, too. Our final sample size for the *con_nonopaccr* and *con_nskew* measures is 8,828 firm-year observations. The reduction is primarily due to the fact that we measure firm-level conservatism by using the current and preceding four years' observations.

Panels A and B of Table 1 provide some descriptive statistics on the test variables. The average of the *con_diff* and *con_nonopaccr* measures is 1.09 and 0.55, respectively, whereas that of *con_nskew* is -0.48. The *con_diff* value is comparable to that calculated by Ferris and Putnam (2011), who report an average of 1.11. The average and median of the other two conservatism measures differ markedly. We report descriptive statistics for the independent variables based on the much larger sample size for the *con_nonopaccr* and *con_nskewness* analysis. Unreported descriptive statistics based on the much smaller sample size of the *con_diff* analysis are generally similar to those derived with the larger sample. The average book and market leverage is 17% and 13% of total assets, respectively. Average profitability of the firm-year observations is -0.12. Sample firms exhibit very low dividend payout propensities and low growth opportunities. Their tangible assets represent about 38% of total assets. A negative average Z score suggests that our sample

companies are not financially sound, although the median value is positive.

Table 1. Descriptive statistics and correlation analysis

Panel A: Descriptive statistics

Variables	Mean	Median	S.D.	25%	75%
BKLEV	0.18	0.11	0.22	0.00	0.28
MKTLEV	0.13	0.068	0.17	0.00	0.28
Con_diff	1.09	0.55	16.40	-1.09	1.73
Con_nonopaccr	0.022	0.0026	0.14	-0.03	0.04
Con_nskew	-0.48	-0.23	11.51	-1.18	0.81
PROFIT	-0.12	0.00	0.44	-0.14	0.08
DIV	0.017	0.00	0.03	0.00	0.03
SIZE	7.59	7.48	0.99	6.88	8.22
DEP	-0.04	-0.03	0.07	-0.06	-0.0026
TAN	0.38	0.28	0.37	0.04	0.63
AZ	-2.57	0.12	10.51	-2.07	1.43
GROWTH	0.0021	0.007	0.53	-0.03	0.14
INDLEV	0.10	0.09	0.09	0.018	0.20

Panel B: Correlation analysis

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
BOOKLEV (1)	1												
MKTLEV (2)	.806**	1											
Con_diff (3)	-	0.02	1										
Con_nonopaccr	.048**	.043**	-0.02	1									
Con_nskew (5)	-.003	-.005	-	.009	1								
PROFIT (6)	-.016	.161**	0.0064	-	-	1							
DIV (7)	.018	-	0.03	-	.012	.302**	1						
SIZE (8)	.238**	.347**	-0.001	-	.005	.505**	.379**	1					
DEP (9)	-	-	0.004	.050**	-	.223**	-.009	.011	1				
TAN (10)	.289**	.329**	-0.02	-	.004	.153**	.185**	.359**	-	1			
AZ (11)	-	.143**	0.05	-	-	.750**	.229**	.499**	.161**	.132**	1		
GROWTH (12)	-	.019	0.0072	-.002	-	.203**	.096**	.158**	.049**	.037**	.240**	1	
INDLEV (13)	.221**	.320**	0.05	-	-	.227**	.233**	.300**	-.008	.195**	.217**	.049**	1

Note: The descriptive statistics for the book and market leverage measures are based on 8,840 and 7,134 firm-year observations, respectively. The control variable statistics are based on the larger sample. *Con_diff* is based on 2,545 firm-year observations. The correlation analysis is based on a sample of 7,177 firm-year observations with non-missing observations for the variables listed in the table.

** and * denote significance level at the 1% and 5% levels, respectively (two-tailed test).

Variable definitions:

FLEV: denotes the book value leverage or market value leverage for firm i in year t as defined in section 3.1;

Con_nonopaccr: the ratio of non-operating accruals to total assets. Non-operating accruals is the difference between total accruals and operating accruals deflated by total assets. We determine the average of (non-operating accruals /total assets) using the current and the preceding four years' observations and multiply by negative 1 so that higher values indicate greater conservatism;

Con_nskew: the ratio of the skewness in earnings divided by the skewness in cash flow. We measure skewness using the current and preceding four years' of earnings and cash flows observations and multiply the average skewness by negative 1 so that higher values indicate greater conservatism;

PROFIT: firm profitability measured as operating income divided by total assets;

DIV: firm's payout ratio measured as common stock dividends divided by total assets;

SIZE: firm size measured as the natural logarithm of total assets;

DEP: depreciation expense measured as depreciation and amortisation deflated by total assets;

TAN: assets' tangibility measured as fixed assets divided by total assets;

AZ: Altman's (1968) Z-score, the ex ante probability of financial distress is measured using [3.3 EBIT + 1.0 sales + 1.4 retained earnings + 1.2 working capital/ total assets];

GROWTH: growth opportunities proxied by sales growth and is measured as [$sales_t$-$sales_{t-1}$/total $assets_t$];

INDLEV: industry leverage is the median industry leverage.

Before estimating our models, we compute pairwise correlations between the explanatory variables. As expected, the correlation between the two leverage measures is 0.81 ($p \leq 0.01$, two tailed). The correlation between both book and market-leverage and non-operating accruals-based conservatism measure is positive and statistically significant. But the correlation is insignificant for two other conservatism measures. Except for firm profitability and dividend, all the control variables are correlated with book leverage. Interestingly, the correlation between Con_nonopaccr and all the

control variables but firm growth are significant, but none of the control variables is correlated with the third conservatism measure. Of the independent variables, the highest correlation is between profitability and distress risk at 0.75. The other high (and statistically significant, ($p \leq 0.01$, two tailed) correlations are between firm size and profitability (0.51) and firm size and distress risk (0.499). Further, firm profitability and industry leverage are significantly correlated ($p \leq 0.01$ two tailed) with most of the independent variables. The highest variance inflation factor is 2.48, which is less than 10, thus indicating that collinearity is unlikely to be a major concern in this study (Neter, Wasserman and Kunter, 1983).

5. Test results

5. 1 Accounting conservatism and capital structure

Table 2 presents a multivariate analysis of the determinants of capital structure in Australia. The coefficient signs and significance are generally similar for both the book and market-based leverage measures. We first report a baseline model that does not include conservatism variable. The coefficient on profitability is positive, which supports the trade-off theory. Profitable firms are less likely to experience bankruptcy, and can thus utilise more debt to reduce their tax burden. The negative and highly significant coefficient on dividend suggests that debt acts as an alternative monitoring mechanism. The coefficient on depreciation is negative and significant (t-statistics of -7.30) for the book leverage measure, supporting the proposition of DeAngelo and Masulis (1980) that a higher level of depreciation expense lowers the tax benefit derived from debt in the capital structure. The coefficient on TAN is positive and statistically significant. More tangible assets can be used as collateral for increased borrowing, and this positive coefficient supports that view. The coefficients on AZ are negative and significant as expected (t-statistics of -9.42 and -6.24 for the book and market leverage measures, respectively). The coefficient on firm growth negative and significant (t-statistics of -2.84 and -3.29 for the book and market leverage measures, respectively), which is consistent with the proposition that high growth firms tend to lower debts on the balance sheet to protect their investment opportunity sets. Finally, as expected, the coefficient on industry leverage is positive and statistically highly significant at better than the 1% level. The adjusted R^2 of the models is 18% for the book leverage and 28% for the market leverage measure.

Table 2. Regression of firm leverage on accounting conservatism and other firm variables

$$FLEV_{it} = \alpha_1 + \beta_1 CON_{it} + \beta_2 PROFIT_{it} + \beta_3 DIV_{it} + \beta_4 SIZE_{it} + \beta_5 DEP_{it} + \beta_6 TAN_{it} + \beta_7 AZ_{it} + \beta_8 GROWTH_{it} + \beta_9 INDLEV_{it} + \varepsilon_{it} \quad (3)$$

Panel A: Book leverage

Variables	**Baseline model**		**Con_nonopaccr**		**Con_nskew**		**Con_diff**	
	Coefficient	*t-stat*	*Coefficient*	*t-stat*	*Coefficient*	*t-stat*	*Coefficient*	*t-stat*
Constant	-0.35***	-15.55	-0.43***	-13.11	-0.59***	-9.31	-0.42***	-13.60
Con_nonopaccr	-	-	0.11***	3.77	-	-	-	-
Con_nskew	-	-	-	-	0.00024	0.91	-	-
Con_diff	-	-	-	-	-	-	0.0000097	1.30
PROFIT	0.034***	2.88	0.01	0.52	0.0005	0.033	-0.0019	-0.06
DIV	-1.10***	-20.62	-1.05***	-15.52	-1.03***	-15.16	-0.85***	-6.06
SIZE	0.05***	23.26	0.06***	20.51	0.06***	20.39	0.08***	13.78
DEP	-0.36***	-7.30	-0.37***	-5.82	-0.34***	-5.50	-0.39***	-3.33
TAN	0.11***	15.55	0.10***	12.29	0.101***	12.29	0.05***	3.83
AZ	-0.005***	-9.42	-	-5.84	-0.0041***	-6.05	0.00***	-3.53
GROWTH	-0.017***	-2.84	-0.02***	-2.66	-0.0191**	-2.44	-0.02	-1.26
INDLEV	0.55***	6.18	0.58***	4.53	0.71	4.61	-0.85***	-6.06
Year & industry dummies	Yes		Yes		Yes		Yes	
Adjusted R^2	0.18		0.18		0.17		0.19	
N	14,499		8,840		8,840		2,545	

Panel B: Market leverage

Variables	**Baseline model**		**Con_nonopaccr**		**Con_nskew**		**Con_diff**	
	Coefficient	*t-stat*	*Coefficient*	*t-stat*	*Coefficient*	*t-stat*	*Coefficient*	*t-stat*
Constant	-0.29***	-15.36	-0.44***	-12.74	-0.50***	-10.86	-0.35***	-14.85
Con_nonopaccr			0.069***	4.57	-	-	-	-
Con_nskew			-	-	0.000058	0.80	-	-
Con_diff			-	-	-	-	0.0000092*	1.45
PROFIT	0.03***	6.12	0.02***	3.48	-0.0037	-0.23	0.01	0.48
DIV	-1.27***	-26.39	-1.33**	-23.95	-0.87***	-10.83	-1.35***	-14.13
SIZE	0.05***	22.90	0.05***	21.31	0.065***	19.24	0.06***	15.27
DEP	-0.021	-0.800	-0.07	-2.12	-0.33***	-4.83	-0.15**	-2.18
TAN	0.12***	21.46	0.10***	14.90	0.11***	11.17	0.06***	5.73
AZ	-0.001***	-6.24	-0.0009***	-3.38	-0.004***	-5.92	0.00***	-2.70
GROWTH	-0.01***	-3.29	-0.007*	-1.75	-0.019**	-2.29	-0.01	-0.85
INDLEV	0.56***	6.63	0.061***	5.38	0.53***	4.11	0.99***	4.24
Year & industry	Yes		Yes		Yes		Yes	
Adjusted R^2	0.28		0.26		0.19		0.27	
Observations	11,634		7,183		7,183		2,274	

Notes: The t-statistics associated with the independent variables are two-tailed, whereas those for the conservatism measures are one-tailed.
***, **and * represent statistical significance at 1%, 5% and 10% levels, respectively (two-tailed test).

Variable definitions:
FLEV: denotes the book value leverage or market value leverage for firm i in year t as defined in section 3.1;
Con_diff: is the ratio of the relative timeliness of a firm's incorporation of bad news relative to good news in its earnings, the differential timeliness ratio, is captured by $(\beta_1+ \beta_2)/ \beta_1$ from the regression $E_{it}/P_{it-1} = \alpha_i +\alpha_{1i}DR_{it} + \beta_1R_{it} +\beta_2R_{it}*DR_{it} +\varepsilon_{it}$, where $E_{it}$is the earnings per share for firm *i* in fiscal year *t*; P_{it-1} is the price per share for firm *i* at the beginning of the fiscal year *t*; R_{it} is firm's *i* 15-month return ending three months after the end of fiscal year *t;* and $DR_{it}$is a dummy variable that equals 1 during periods of bad news (e.g., $R_{it}< 0$) and 0 during periods of good news (e.g., $R_{it}>0$). We require companies to have at least seven years of consecutive data including the current year to derive meaningful regression coefficients;
Con_nonopaccr: the ratio of non-operating accruals to total assets. Non-operating accruals is the difference between total accruals and operating accruals deflated by total assets. We determine the average of (non-operating accruals /total assets) using the current and the preceding four years' observations and multiply by negative 1 so that higher values indicate greater conservatism;
Con_nskew: the ratio of the skewness in earnings divided by the skewness in cash flow. We measure skewness using the current and preceding four years' of earnings and cash flows observations and multiply the average skewness by negative 1 so that higher values indicate greater conservatism;
PROFIT: firm profitability measured as operating income divided by total assets;
DIV: firm's payout ratio measured as common stock dividends divided by total assets;
SIZE: firm size measured as the natural logarithm of total assets;
DEP: depreciation expense measured as depreciation and amortisation deflated by total assets;
TAN: assets' tangibility measured as fixed assets divided by total assets;
AZ: Altman's (1968) Z-score, the ex ante probability of financial distress is measured using [3.3 EBIT + 1.0 sales + 1.4 retained earnings + 1.2 working capital/ total assets];
GROWTH: growth opportunities proxied by sales growth and is measured as [$sales_t$-$sales_{t-1}$/total $assets_t$];
INDLEV: industry leverage is the median industry leverage.

With respect to the effect of conservatism on firm leverage, H_1hypothesizes a positive association between the two, because conservatism enhances creditor value by helping debt covenants to prevent managers and shareholders from expropriating value. We use three measures of conservatism and two leverage measures. The coefficient on our first conservatism measure, *con-diff*, is positive for both the book and market leverage measures but statistically significant only for the market leverage measure (t-statistic of 1.45, significant at better than the 10% level, one-tailed test). Our second and third conservatism measures use financial statement information rather than the association between earnings and stock return as in the *con_diff* measure. The coefficient on the second conservatism measure, *con_nonopaccr*, is positive and statistically significant at better than the 1% level (t-statistic of 3.77 and 4.57 for the book and market leverage measures, respectively). Finally, the coefficient on *con_nskew*, although positive in both leverage regressions, is statistically insignificant. We thus conclude that although accounting conservatism appears to positively affect a firm's leverage structure, this benefit is not consistent across conservatism measures. All of the control variables except firm profitability have the expected signs and are statistically significant.

5.2 Accounting conservatism, environmental uncertainty and capital structure

We now present the results for the empirical test of H_2, which holds that the beneficial role of accounting conservatism is context dependent, one such context being a firm's exposure to environmental uncertainty. Firms operating in uncertain environments suffer from greater information asymmetry problems than firms that operate in relatively stable environments. One of the desirable properties of accounting conservatism is the reduction of information asymmetry through the timelier recognition of accounting losses. We thus expect the association between leverage structure and accounting conservatism to be more positive for firms operating in an environment of high uncertainty. To test this hypothesis, we separately run equation (3) for firm-year observations pertaining to high and low uncertain environments. Our parsimonious proxy for the extent of environmental uncertainty is the coefficient of variation of sales (CV of sales), which is based on external market conditions and is developed in equation (2). Panels A and B of Table 3 presents the regression results for the book and market leverage-based measures, respectively.

Table 3. Environmental uncertainty, reporting conservatism and capital structure

$$FLEV_{it} = \alpha_1 + \beta_1 CON_{it} + \beta_2 PROFIT_{it} + \beta_3 DIV_{it} + \beta_4 SIZE_{it} + \beta_5 DEP_{it} + \beta_6 TAN_{it} + \beta_7 AZ_{it} + \beta_8 GROWTH_{it} + \beta_9 INDLEV_{it} + \varepsilon_{it} \quad (3)$$

Panel A: Book leverage

Variables	High EU						Low EU					
	(1)		(2)		(3)		(4)		(5)		(6)	
	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat
Constant	-	-9.66	-	-6.00	-0.32***	-6.16	-	-6.28	-	-14.92	-0.49***	-14.92
Con_diff	0.00**	1.65	-	-	-	-	0.00	-0.02	-	-	-	-
Con_nonopac	-	-	0.13**	2.43	-	-	-	-	0.12*	3.86	-	-
Con_nskew	-	-	-	-	0.000013	1.85	-	-	-	-	-	-1.50
PROFIT	0.00	-0.13	-0.01	-0.50	-0.02	-0.88	0.00	0.02	0.03	1.63	0.02	0.90
DIV	-	-3.41	-	-	-0.99***	-	-	-5.12	-	-11.03	-1.09***	-10.88
SIZE	0.08**	12.53	0.05**	10.18	0.05***	10.29	0.07***	7.86	0.0***	19.65	0.07***	19.70
DEP	-0.35	-1.62	-	-2.82	-0.21***	-2.59	-0.24*	-1.70	-	-2.65	-0.20**	-2.09
TAN	0.01	0.91	0.12**	8.24	0.12***	8.24	0.09***	3.67	0.08**	9.39	0.08***	9.47
AZ	0.00**	-2.51	0.00**	-3.83	0.00***	-4.11	-	-2.77	0.00**	-4.34	0.00***	-4.40
GROWTH	-0.02	-0.43	-	-2.22	-0.02**	-1.99	-0.01	-0.96	0.00	-0.10	-0.01	-0.21
INDLEV	0.78**	3.84	0.59**	2.41	0.60**	2.49	1.77***	3.13	0.62**	5.07	0.72***	5.63
Adjusted R^2	0.24		0.12		0.12		0.14		0.23		0.23	
N	1,273		4,418		4,414				4,422		4,414	

Panel B: Market leverage

Variables	High EU						Low EU					
	(1)		(2)		(3)		(4)		(5)		(6)	
	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat
Constant	-0.35	-6.71	-	-6.97	-	-6.57	-0.41***	-10.83	-	-	-	-13.63
Con_diff	0.00	1.15	-	-	-	-	0.000013	0.23	-	-	-	-
Con_nonopaccr	-	-	0.10***	3.90	-	-	-	-	0.04**	2.55	-	-
Con_nskew	-	-	-	-	0.00*	1.55	-	-	-	-	-0.00**	-2.48
PROFIT	0.00	0.10	0.02	1.63	0.01	0.85	0.01	0.56	0.03***	3.15	0.02***	3.29
DIV	-	-	-	-	-	-	-1.43***	-9.30	-	-	-	-15.54
SIZE	0.06***	8.69	0.04***	11.05	0.04***	10.80	0.06***	12.19	0.06***	18.85	0.05***	18.15
DEP	-0.04	-0.53	0.00	0.07	0.03	0.61	-0.14	-1.13	-0.06	-0.83	-0.10	-1.49
TAN	0.08***	4.70	0.09***	10.47	0.09***	9.57	0.04***	3.05	0.09***	9.91	0.09***	10.66
AZ	0.00	-1.21	0.00	-0.75	0.00	-1.48	0.00***	-2.74	0.00***	-4.05	0.00***	-3.41
GROWTH	0.00	-0.32	-0.01	-1.62	0.00	-1.15	-0.02	-0.67	0.00	-0.04	0.00	0.12
INDLEV	0.36	1.46	0.75***	3.14	0.65**	2.50	0.50***	3.89	0.58***	4.60	0.64***	5.21
Adjusted R^2	0.33		0.18		0.18		0.15		0.34		0.33	
N	1,137		3,591		3,587		1,137		3,591		3,587	

Notes: The t-statistics associated with the independent variables are two-ailed, whereas those for the conservatism measures are one-tailed.

Variable definitions:
FLEV: denotes the book value leverage or market value leverage for firm i in year t as defined in section 3.1;
Con_diff: is the ratio of the relative timeliness of a firm's incorporation of bad news relative to good news in its earnings, the differential timeliness ratio, is captured by $(\beta_1 + \beta_2)/\beta_1$ from the regression $E_{it}/P_{it-1} = \alpha_i + \alpha_{1i}DR_{it} + \beta_1 R_{it} + \beta_2 R_{it}*DR_{it} + \varepsilon_{it}$, where $E_{it}$is the earnings per share for firm *i* in fiscal year *t*; P_{it-1} is the price per share for firm *i* at the beginning of the fiscal year *t*; R_{it} is firm's *i* 15-month return ending three months after the end of fiscal year *t;* and $DR_{it}$is a dummy variable that equals 1 during periods of bad news (e.g., $R_{it} < 0$) and 0 during periods of good news (e.g., $R_{it} > 0$). We require companies to have at least seven years of consecutive data including the current year to derive meaningful regression coefficients;
Con_nonopaccr: the ratio of non-operating accruals to total assets. Non-operating accruals is the difference between total accruals and operating accruals deflated by total assets. We determine the average of (non-operating accruals /total assets) using the current and the preceding four years' observations and multiply by negative 1 so that higher values indicate greater conservatism;
Con_nskew: the ratio of the skewness in earnings divided by the skewness in cash flow. We measure skewness using the current and preceding four years' of earnings and cash flows observations and multiply the average skewness by negative 1 so that higher values indicate greater conservatism;
EU: environmental uncertainty proxied by the coefficient of variation of sales, calculated as follows:

$$CV(Z_i) = \frac{\sqrt{\sum_{k=1}^{5} \frac{(z_i - \bar{z})^2}{5}}}{\bar{z}} \qquad (2)$$

where, CV is the coefficient of variation, z is the sales observations for each firm in each year and $\bar{Z}$ is the mean sales value. This firm-specific measure of environmental uncertainty is calculated using historical data over a four-year period that includes the current year, and is labelled as $EU_{sales.}$
PROFIT: firm profitability measured as operating income divided by total assets;
DIV: firm's payout ratio measured as common stock dividends divided by total assets;
SIZE: firm size measured as the natural logarithm of total assets;
DEP: depreciation expense measured as depreciation and amortisation deflated by total assets;
TAN: assets' tangibility measured as fixed assets divided by total assets;
AZ: Altman's (1968) Z-score, the ex ante probability of financial distress is measured using [3.3 EBIT + 1.0 sales + 1.4 retained earnings + 1.2 working capital/ total assets];
GROWTH: growth opportunities proxied by sales growth and is measured as [$sales_t$-$sales_{t-1}$/total $assets_t$];
INDLEV: industry leverage is the median industry leverage.

For the book leverage-based measure, the coefficient on *con_diff* is positive and statistically significant at better than the 5% level for the high environmental uncertainty firm-year observations (t-statistic, 1.65, one-tailed test). The corresponding coefficient for the low environmental uncertainty observations is statistically insignificant. This supports the hypothesis that a firm's leverage structure is influenced by accounting conservatism for firms with high information asymmetry as proxied by environmental uncertainty. The coefficient on our second conservatism measure, *con_nonopaccr*, however, is positive and statistically significant for both the high and low environmental uncertainty contexts (t-statistics of 2.43 and 3.86, respectively). Finally, the coefficient on our third conservatism proxy, *con_nskew*, is positive and significant at better than the 5% level for high environmental uncertainty observations, but negative and marginally significant for low environmental uncertainty observations. However, the regression results are weaker for the market-based leverage measure. The coefficients on *con_nonopaccr* and *con_skew* are positive and significant for the high environmental uncertainty observations, but the coefficient of *con_diff* is not. Similar to Panel A, the coefficient on *con_nonopaccr* is also positive and significant for low environmental uncertainty observations. We conclude that the effect of accounting conservatism on firm leverage is somewhat moderated by the level of environmental uncertainty.

In a test of the relationship between capital structure and accounting conservatism, it is critical to explore the potential impact of endogeneity on the empirical findings. In particular, while capital structure may be a function of accounting conservatism, there is also the possibility that accounting conservatism may be endogenously determined with respect to firm capital structure. Ordinary least squares provide a biased estimate of the effect of conservatism on capital structure in this case because accounting conservatism is correlated with the regression's disturbance term. To address endogeneity, we first use one-year-lagged CON measures instead of using contemporaneous CON values as an independent variable in equation (2). The ccoefficient on lagged NONOPACCR is positive and statistically significant at better than the 5% level (coefficient value 0.06, t-statistic 2.20). We also use one-year-lagged leverage measures as independent variables in a regression of NONOPACCR on lagged leverage measure and control variables. The coefficient on BKLEV is positive but not statistically significant at the conventional significance level.[7]

[7] It should be noted that standard econometric solution to endogeneity problem is to implement some type of instrumental variables estimation procedure. Instrumental

6. Concluding remarks

The purpose of this study is to examine the effect of reporting conservatism on a firm's capital structure decisions and the role of environmental uncertainty as a moderating variable. Various accounting researchers have attempted to link accounting conservatism with capital structure decisions. However, although the role of conservatism has been investigated in certain debt-contracting settings, evidence of the effect of conservatism on the degree of financial leverage is sparse. We examine this issue using a sample of Australian firms for the period 1992 to 2005 and find that accounting conservatism positively affects a firm's leverage structure. We also find that the relation between accounting conservatism and firm leverage is moderated by the degree of environmental uncertainty, but this finding is not robust to all three proxies that we use to measure conservatism.

This study has several limitations. First, the selection criteria for the sample and missing data may limit the generalisability of the results. Second, the results should be interpreted with caution because we use only one proxy to measure a firm's environmental uncertainty (an important contextual variable). Nevertheless, despite of these caveats our work contributes to the literature on the association between capital structure and financial reporting quality.

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variables should be correlated with endogenous regressors but uncorrelated with the error term in the structural equation. However, identifying precise instrumental variables is an extremely difficult task (Larcker, Richardson, and Tuna, 2007). Moreover, Rusticus and Larcker (2010) analytically show that OLS estimates provide better parameter estimates than two-stage least square approach if the chosen instrumental variables do not conform to standard definition of instrumental variables.

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