ERASMUS UNIVERSITEIT ROTTERDAM
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Conditional Conservatism and Tax Avoidance

MSc in Accounting, Auditing & Control

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Contents

Abstract

This thesis examines the relationship between conditional conservatism and tax avoidance; the sample includes listed U.S. companies during the period of 2009-2016. This thesis computes tax avoidance based on cash effective tax rates (CETR) and employs the C-score method developed by Khan and Watts (2009) and the skewness method from Givloly and Hayn (2000) to measure conditional conservatism. The main findings of this thesis imply that firms can use conditional conservatism as a vehicle to reduce actual tax burdens. The findings provide an indication that the tax reducing effects of conditional conservatism would be less pronounced when firms have tax losses carried forward. In general, this thesis provides insight by investigating the relationship between conditional conservatism and tax avoidance from an ex post perspective and by examining how some company features such as having tax losses carried forward affect this relation. This thesis is complementary to the existing taxation explanation theory of accounting conservatism.

1. Introduction

1.1 Research question

The purpose of this thesis is to examine whether conditional conservatism can be used for tax avoidance, i.e., to reduce actual tax burdens. The research question is:

RQ: Can conditional conservatism be used for tax avoidance to reduce tax burdens?

Providing an answer to this research question is of utmost importance, because conservatism has been a topic of discussion for some time. Whether accounting standards should emphasize conservatism or emphasize neutrality has long been a highly debated topic of concern. Meanwhile, standard setters' attitudes towards conservatism have been changing or evolving from time to time (Watts, 2003; Ball & Shivakumar, 2005), indicating the importance of providing a comprehensive and systematic evaluation of the two concepts. However, it may be impractical to focus on all aspects of conservatism and neutrality in a single thesis. Therefore, this thesis focuses on a relatively less discussed and unresolved aspect of conservatism, i.e., the relationship between conditional conservatism (one type of conservatism) and tax burdens.

1.2 Background introduction

Accounting conservatism, the practice of timely recognizing expenses and liabilities while gradually recognizing revenues and assets, is a commonly discussed topic in academic research, and is also a common accounting practice in the real business world, dating back some 500 years (Basu, 1997).

One can understand the concept of conservatism as a differential verification of good news and bad news; and it takes a higher degree of verification to record good news than to record bad news (Basu, 1997). Although the concept of accounting conservatism is understandable and while researchers have formed a consensus on the existence of accounting conservatism, whether to accept and adopt conservatism still remains a heated debate (Watts, 2003). There are two forms of conservatism: conditional conservatism and unconditional conservatism; the primary difference between the two is that conditional conservatism is news dependent, while unconditional conservatism is relatively predetermined and is not news dependent (Watts, 2003).

In his highly comprehensive review, Watts (2003) summarized four explanations of accounting conservatism: contracting; regulation; litigation; and taxation. Researchers have reached a consensus that accounting conservatism tends to improve contracting efficiency, by providing lenders timely information regarding borrowers' bad performance, thereby assisting lenders to make more informed decisions. Moreover, researchers have determined that standard setters and regulators tend to favor accounting conservatism, because they are more likely to be held accountable when companies overstate and over-claim assets and earnings, rather than when companies understate and under-claim assets and earnings (Watts, 2003; Qiang, 2007). By asking firms to report conservatively, standard setters and regulators are shifting the responsibility to the firms. Moreover, researchers discovered that accounting conservatism is helpful in reducing litigation risks (Kellogg, 1984; Qiang, 2007). Firms and auditors are potentially facing costly litigation claims due to finance scandals; however, auditors can shrewdly pass on the responsibility and liability to their clients, for example, by not compromising their clients' aggressive interpretation of accounting standards or questionable accounting practices. Thus, firms tend to report conservatively in their financial statements and would, thus, be less likely to be held responsible once they are being sued. Firms are, therefore, willing to adopt a more conservative approach.

The last explanation of conservatism is taxation. Watts (2003) proposed that accounting conservatism can defer income to reduce tax burdens; moreover, conservatism provides a natural excuse because conservative accounting requires a higher level of verification of recognizing good news than for bad news. Interestingly, much of the previous research regarding tax explanations of conservatism tended to focus more on how tax burdens affect the level of accounting conservatism, rather than the tax-reducing effects of accounting conservatism. Researchers have identified that tax is a crucial and important determinant of accounting conservatism, and high tax pressure is positively associated with more unconditional conservatism (Basu, 2005; Ball & Shivakumar, 2005; Kim & Jung, 2007; Qiang, 2007). However, researchers are divided on the issue of whether tax burdens are associated with conditional conservatism and whether conditional conservatism can actually reduce tax burdens. Many researchers find that conditional conservatism and tax burdens are not related and hold that conditional conservatism is unlikely to reduce tax burdens, because losses due to conditional conservatism are barely allowed to be considered as a deductible in taxable income (Basu, 2005; Ball & Shivakumar, 2005; Kim & Jung, 2007; Qiang, 2007). Conversely, Lara et al. (2009b) posited that conditional conservatism can also reduce current tax burdens by

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asymmetric recognition of bad news and good news. Furthermore, Lara et al. (2009b) actually found that high marginal tax rates are associated with more conditional conservatism. To summarize, scholars are divided on whether conditional conservatism can be used to reduce tax burdens, but they generally focus on an ex ante analysis and conclude with conflicting evidence; therefore, this thesis aims to provide more insight for the discussion from an ex post perspective: whether conditional conservatism results in actual tax costs reductions. This thesis may also extend the research of Lara et al. (2009b), because if their findings that high marginal tax rates lead to more conditional conservatism is valid, then it is quite reasonable to assume that, consequently, more conditional conservatism should result in real tax reductions in relevant years.

As regarding tax avoidance, previous research has identified diverse determinants of its occurrence. For example, firms can register in a variety of tax havens, or structure their transactions to reduce taxes (Hanlon & Heitzman, 2010). However, it is not yet clear whether and how conditional conservatism and tax avoidance are related.

1.3 Research method and main findings

A careful review of the literature with regard to tax avoidance and accounting conservatism provides input for the choice of the theory used, after which the model is developed based on prior research. This thesis computes tax avoidance based on cash effective tax rates (CETR) and employs the C-score from Khan and Watts (2009) and the skewness method introduced by Givoly and Hayn (2000) to measure conditional conservatism. The sample comprises listed U.S. companies throughout the period of 2009-2016. As for data sources, the basic financial accounting information is collected from Compustat, while the stock returns and auditor information are derived from the CRSP dataset. The corporate related governance information is gathered from the ISS dataset.

The findings of this thesis suggest that firms can utilize conditional conservatism as a vehicle to reduce actual tax payments. The results provide some indication that the tax reducing effects of conditional conservatism would be less pronounced when firms have tax losses carried forward. There is some marginally significant evidence that suggest that the tax reducing effects of conditional conservatism are less pronounced when firms hire one of the Big Four accounting firms as an external auditor. With regards to litigation risks, the thesis can not find

statistically significant evidence that supports an attenuating role of litigation risks in the relationship of tax avoidance and conditional conservatism.

1.4 Contributions and implications

This thesis differs from previous research as pertaining to the tax explanation of conditional conservatism in three aspects. Firstly, while previous research is divided on whether conditional conservatism can reduce taxes, researchers focused on ex ante analyses of whether high tax pressure leads to more conditional conservatism and they found conflicting results. Conversely, this thesis provides the unconcluded discussion with an ex post perspective and presents direct evidence as to whether conditional conservatism results in actual reductions in tax payments. Secondly, unlike previous relevant research that primarily relies on the Basu (1997) model for measuring conditional conservatism, this thesis adopts the C-score proposed by Khan and Watts (2009) and the skewness method by Givoly and Hayn (2000) to measure conditional conservatism. These two measures provide the firm-year evaluation of conditional conservatism and allow for more enhanced measurement accuracy. Thirdly, apart from evaluating the correlation between conditional conservatism and tax, this thesis goes a step further and examines how some firm features such as having tax losses carried forward affect the tax reducing effects of conditional conservatism, providing more insights regarding conditional conservatism's tax reducing effects.

The results of this thesis may be relevant for standard setters who require more information about the potential effects of conservatism. Knowing that conditional conservatism may be related to a company's tax avoidance activities, standard setters can better evaluate and improve their existing policies to discourage firms that take advantage of conditional conservatism to engage in tax avoidance. The results of this thesis may also provide additional information to tax authorities that are developing advanced and precise methodologies to detect and deter corporate tax avoidance behaviors. As for academia, this thesis may add value by providing direct empirical evidence that may be pertinent to the on-going and unconcluded discussion of the conditional conservatism-tax relationship.

1.5 Thesis outline

The remainder of the thesis is organized as follows. The next chapter reviews relevant studies involving previous research conducted on conservatism and tax avoidance. Chapter 3 illustrates the motivation and develops pertinent hypotheses, while Chapter 4 discusses the research

method. Chapter 5 provides an overview of the protocols regarding the data selection and preparation, and Chapter 6 discusses the main empirical results. Chapter 7 provides an additional analysis designed to enhance the robustness of the research, while Chapter 8 concludes the thesis, by highlighting limitations and suggestions for future research opportunities.

2. Literature review

The main concepts that are related to the research question of this thesis are introduced and discussed in this chapter to provide a systematic overview of different definitions, measurements, models, and empirical evidence regarding tax avoidance, accounting conservatism and the association between tax avoidance and accounting conservatism. The objective of this literature review is to focus on and identify the gaps and findings that appear contradictory in previous research and to review the research methodologies that have been used. It, therefore, provides the fundamentals to answer the research question and clarifies the appropriateness of the research design.

This research involves two specific directions of the academic literature, i.e., conservatism and tax avoidance. The first section of this chapter begins by introducing literature relevant to conservatism, including definitions, explanations, and measurements of conservatism. The second section concerns literature related to tax avoidance and measurement of tax avoidance.

2.1 Conservatism
2.1.1 Definition of conservatism

Conservatism is an important qualitative accounting attribute, not only in accounting standards, but also in practice, and it has existed for over 500 years (Basu, 1997). Despite its theoretical and practical importance, there is no authoritative definition of conservatism (Givoly & Hayn, 2000). However, a widely used definition in literature references is the "*Accountant's tendency to require a higher degree of verification to recognize good news as gains than to recognize bad news as losses*" (Basu, 1997, p.4). Watts (2003) proffered that one important consequence of conservatism is the consistent under-statement of net asset values. Given that the research purpose is aimed at detecting the potential tax reducing effects of conditional conservatism, this thesis adopts the definition summarized by Givoly and Hayn (2000, p.292), as "*A selection criterion between accounting principles that lead to the minimization of cumulative reported earnings by slower revenue recognition, faster expense recognition, lower asset valuation, and higher liability valuation.*"

Researchers remain divided as to whether accounting conservatism is a desirable feature. The supporters of conservatism believe that accounting conservatism can improve contracting efficiency (Goh & Li, 2011; Louis et al., 2012; Donovan et al., 2015). This is because it allows

for the timelier reporting of information that is useful for the decision-making process of the contracting parties, thereby alleviating information asymmetry. For example, under a debt contract, the lending parties have asymmetrically fewer payoffs than borrowing parties, because lending entities cannot share the profit of borrowers' good performance, but have to bear the impending risks and potential losses of a borrowers' poor performance (e.g., defaulting in a debt contract). Therefore, by requesting borrowing parties to report conservative numbers for contracting, lending parties can acquire timelier indicators of bad performance, and can take appropriate and timely counter-measures to minimize losses. Another example of contracting is the share-based compensation plan in which managers enjoy the incremental benefits of a good performance and have general incentives to inflate earnings for personal benefits. By requiring more conservative numbers, shareholders can restrain the earnings inflation tendency of managers. However, opponents of conservatism believe that conservatism may sacrifice neutrality, which would provide biased numbers for valuation and reducing the earnings quality and analyst's forecasting accuracy (Penman & Zhang, 2002; Chen et al., 2013). Ruch and Taylor (2015) proposed that the controversy of conservatism lies in the understanding of the different information roles of accounting. For example, while one side believes that accounting should provide neutral information for valuation purposes, the other side holds that accounting should allow contracting parties better evaluations when it comes to the effectiveness and efficiency of contracts. Therefore, the desirable attribute from one perspective may not necessarily be the case from another perspective.

2.1.2 Two types of conservatism

Conservatism can be further classified into two specific types: conditional conservatism and unconditional conservatism. The main difference between the two is that conditional conservatism is news-dependent, while unconditional conservatism is predetermined and, therefore, not news-dependent (Watts, 2003).

Conditional conservatism is primarily characterized by differential verification and recognition between good news and bad news (Basu, 1997). For example, long-lived assets are written down upon receiving unfavorable news; however, it is not written up later, upon receipt of favorable news. Another example is, if a company were expected to win a litigation claim, it would not recognize gains as revenue until all the criteria of the revenue recognition are met. However, if the firm were expected to lose the litigation claim, the company would estimate and disclose it in its notes, in advance. Therefore, the impact of a potential loss in the case

would be reflected on its financial statement. Because of its news-dependent features, conditional conservatism is more flexible and can, thus, reflect more on the discretionary tendency of management.

Conversely, unconditional conservatism is a set of predetermined accounting procedures, which are not news-dependent, leading to the persistent under-statement of the net asset value (Watts, 2003). For example, LIFO is used for inventory accounting, which is not news-sensitive but is a more predetermined method of measuring the costs of the inventory. Another example is the expensing of research and development (R&D) expenses or advertising expenses, rather than capitalizing the expenses; thus, the expensing will ultimately lead to an understatement of the net asset value.

Research suggests that an inverse correlation exists, between conditional conservatism and unconditional conservatism (Beaver and Ryan, 2005), as the application of unconditional conservatism may preempt the overall impact of conditional conservatism. For example, the net value of fixed assets under accelerated depreciation would be less than the net value of the same fixed assets under a straight-line depreciation; therefore, when unfavorable economic news arises, there is less room for impairment under an accelerated depreciation than under a straight-line depreciation, making it appear as being less conservative. Thus, Qiang (2007) and Kim and Jung (2007) posited that, when evaluating different explanations of conditional conservatism, the effects of unconditional conservatism should be controlled. Qiang (2007) also suggested that, situations leading to conditional conservatism may differ from those of unconditional conservatism; more would be discussed in the next part of this literature review, as pertaining to explanations of conservatism.

2.1.3 Explanations of conservatism

Watts (2003) summarized four different explanations of conservatism, i.e., contracting, regulation, litigation and taxation. In this part, the four explanations will be discussed in more depth.

2.1.3.1 Contracting explanation

Debt contracting

As mentioned above in the definition part, one explanation of conservatism is that it can improve the debt contracting efficiency, by alleviating information asymmetry and reducing

asymmetric payoffs among various contracting parties. Donovan et al. (2015) found that conservatism can guarantee creditor value in cases of defaults. They also discovered that, in debt contracting situations, creditors of firms that report conservatively before defaulting have higher loan recovery rates. Moreover, conservatively reporting firms are more likely to breach debt covenants preceding default, thereby entering into and emerging from bankruptcy more quickly upon unfavorable economic shocks. Zhang (2008) further determined that lending parties would also extend borrowing parties' lower interest rates if the borrowing parties report conservatively. On the other hand, Martin and Roychowdhury (2015) ascertained that, when lenders have insurance on their outstanding loans (e.g., when lenders are engaging in credit default swaps), they would require less conservative reporting on borrowing firms, and would reduce the level of monitoring.

Corporate governance contracting

Apart from debt contracting situations, conservatism can also help resolve agency problems. Chi et al. (2009) determined that, conservatism can serve as a mechanism for corporate governance; they determined that firms with CEOs who simultaneously serve as chairmen of the board (so that the board is less independent) have a greater demand for conservatism, so as to compensate for their weaknesses in corporate governance. Goh and Li (2011) suggested that firms that disclose material weaknesses report less conservatively than firms without such weaknesses; moreover, firms that fix their internal control weaknesses later would report more conservatively than firms that do not fix their internal control weaknesses, thus indicating that strong internal controls can facilitate conservative reporting. Ramalingegowda and Yu (2012) ascertained that firms that have higher institutional ownership are generally more conservative in their reporting, and this relation is even more significant when firms are having more growth options and information asymmetry. From the investors' perspective, according to Louis et al. (2012), investors do not believe that companies with large cash holdings are effective. However, investors tend to believe large cash holding companies that report conservatively are more effective than large cash holding companies that do not report conservatively. Overall, research evidence suggests that institutions or investors view conservatism as an appropriate mechanism for corporate governance.

Manager share-based compensation contracting

Previous research also shed light on how conservatism can alleviate numerous agency problems. LaFond and Watts (2008) indicated that insiders have more information about the

company than outside equity investors, leading to information asymmetry. Thus, conservatism can reduce the managers' earnings manipulation, and minimize excess compensation and deadweight losses caused by information asymmetry and increase the firm's equity value. Moreover, Chen et al. (2007) proffered that, while managers' earnings manipulation reduces accounting numbers' valuation value and stewardship value, conservative reporting improves the firm's value and contracting efficiency by providing downward biased numbers.

Qiang (2007), Ball and Shivakumar (2005), and Basu (2005) proposed that it is conditional conservatism that enhances the contracting efficiency, while unconditional conservatism is, at best, neutral in contracting efficiency, since unconditional conservatism does not utilize any new information.

2.1.3.2 Regulation explanation

Watts (2003) proposed that standard setters and regulators have incentives for conservatism, because in the political process over-reported assets and income are more evident and discernable than under-reported assets and income. Hence, by requiring conservative reporting, standard setters and regulators are less likely to be held accountable. However, Watts (2003) also indicated that, in recent years, FASB seems to have strayed from conservatism and now favors more neutrality, due to various lobbying activities from investment bankers. Ball and Shivakumar (2005) ascertained that, historically, two types of conservatism tend to confuse regulators, and that is why regulations are inclined to be rather ambivalent regarding conservatism. Qiang (2007) suggested that accounting standard setters and regulators tend to prefer unconditional conservatism, so as to avoid large negative shocks and to maintain smooth earnings. Since firms capture regulators' intentions, they impose unconditional conservatism to prevent unwelcomed regulatory intervention. Qiang (2007) also proposed that firms may refrain from employing conditional conservatism, because this type of conservatism may result in significant negative influences in earnings and, thus, may attract the attention of regulators.

2.1.3.3 Litigation explanation

Under litigation explanation, auditors and firms are more likely to be held responsible for overstatements than for understatements (Qiang, 2007). Thus, auditors can pass on this liability to firms by not compromising aggressive accounting practices and by not issuing a clean bill, or by terminating the contract. In reaction, firms can adopt conservatism in accounting, and report bad news as early as possible to alleviate their responsibility, once being sued (Kellogg,

1984). Empirically, Huijgen and Lubberink (2005) discovered that U.K. firms that cross-listed in both the U.K. and U.S. reported more conservatively than U.K. firms not cross-listed, because cross-listed firms face more litigation risks; therefore, they have stronger incentives for pursuing a higher level of conservatism. Qiang (2007) found that litigation risks can induce both types of conservatism, because, although firms prefer to adopt unconditional conservatism, some potential plaintiffs particularly require conditional conservatism in contracting; therefore, conditional conservatism is involved as well.

2.1.3.4 Taxation explanation

Two links between taxable and book income

Tax codes and accounting standards usually serve different purposes: tax codes are designed for tax authorities to collect taxes, and are primarily on a cash basis, while accounting standards are designed for firms to reflect economic events in a true and fair manner, and are more on an accruals basis. However, tax codes and accounting standards still share two links. According to Kelley (2005), the first link is that firms that are aiming to minimize taxable income usually have to compromise book income, due to book-tax conformity. The second link is, firms are generally very careful regarding large book-tax differences, because large book-tax differences may trigger an IRS audit. Previous research indicates that the probability of getting an IRS audit is positively associated with a firm's book-tax differences; firms with large book-tax differences are more likely to face an IRS audit and IRS adjustments, which are likely to be quite costly (Hoopes et al., 2012). Therefore, some firms narrow the differences between book income and taxable income in order to deflect the attention of the IRS (Mills and Sansing, 2000).

Conservatism and taxation

Watts (2003) proposed that firms can reduce the current value of taxes by deferring their income, and conservatism provides a natural excuse since conservative accounting requires a higher verification of recognizing good news than for bad news. Kelley (2005) investigated whether taxes affect conservatism, and found that firms reporting large positive book-tax differences tend to be more conservative; however, after-tax burdens are reduced, these same firms become less conservative. Conversely, Heltzer (2009) could not identify a positive association between large positive book-tax differences and financial reporting conservatism; however, Heltzer actually discovered that large negative book-tax differences indicate a higher level of unconditional conservatism. Although Heltzer (2009) and Kelley (2005) are divided

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on the subject of how book tax and conservatism are associated, both of them agree that tax costs do affect the level of firms' reporting conservatism. Kim and Jung (2007) investigated how tax burdens (they utilized marginal tax rate as a proxy) influence accounting conservatism in Korean companies, and they determined that unconditional conservatism, rather than conditional conservatism was positively associated with a firm's tax burden. This association was also more pronounced when the book-tax conformity of the firm was stronger. Moreover, they determined that firms with low non-tax costs were more likely to have tax-motivated conservatism; therefore, they stressed the importance of controlling non-tax costs. Qiang (2007) used the estimated association between book and tax income as a proxy for tax costs, and empirically determined that tax burdens tend to induce unconditional conservatism. Ball and Shivakumar (2005), Basu (2005) and Qiang (2007) also posited that, while tax burdens are associated with unconditional conservatism, tax burdens are not likely to be associated with conditional conservatism, simply because losses due to conditional conservatism are not likely to be deductible for taxable income. On the other hand, Lara et al. (2009b) argued that firms can also take advantage of conditional conservatism to reduce tax burdens, because the asymmetric recognition feature of conditional conservatism allows firms the flexibility to shift income from periods of high marginal tax periods to low marginal tax periods. Lara et al. (2009b) actually found that firms of high marginal tax are associated with more conditional conservatism in their financial reporting.

As discussed above, scholars have reached a consensus that tax is associated with unconditional conservatism, and the higher the tax pressure, the more unconditional the firms in their conservatism regarding financial reporting. However, scholars are still divided on whether conditional conservatism is related to tax burdens and whether conditional conservatism can reduce tax burdens. Moreover, while researchers focus on an ex ante analysis, they often discover conflicting evidence (Kim & Jung, 2007; Qiang, 2007; Lara et al., 2009b). Therefore, this thesis approaches this discussion from another perspective, i.e., whether more conditional conservatism in financial reporting results in reductions of actual tax payments. The results of this thesis may supplement the findings of Lara et al. (2009b) because of their finding that high marginal tax rates induce more conditional conservatism. Therefore, it should be reasonable to expect that more conditionally conservative reporting results in less tax payments in relevant years.

2.1.4 Measurement of conservatism

Ball and Shivakumar (2005) and Qiang (2007) proffered that it is important to consider which type and which measurement of conservatism should be used for different research topics. Table 1 is a summary of commonly-used measures of conservatism in previous research. It is evident that researchers commonly use differential timeliness (DT), the C-score, MTB (Market to Book ratio), the accrual-based method, and skewness as a measurement protocol for conservatism. These measures are discussed in more detail below.

Differential timeliness method (DT)

There are a large number of researches identifying the existence of differential timeliness (Watts, 2003). Basu (1997) was the first to propose the differential timeliness method (hereafter, DT). The DT method intends to capture the timeliness differences between good news and bad news being incorporated into earnings. Under this particular method, bad news is incorporated into earnings on a timelier basis than good news, which represents conditional conservatism. The DT method has gained wide popularity in accounting research; however, it is also very controversial. Moreover, proponents of the DT method believe that it is simple and quite understandable. Conversely, opponents argue that the DT method is biased and has some errors. Givoly et al. (2007) pointed out three biases of the DT method: (1) it suffers from aggregation effects, economic events effects and disclosure policy effects;[1] (2) it cannot detect situational non-conservative reporting, for example, firms that report aggressively before an IPO; and it relies on market prices to determine good and bad news; (3) differential timeliness is probably only one potential dimension of conservatism, and even if DT manages to capture it, there may be other sources of conservatism, which this method fails to capture. Patatoukas and Thomas (2011) regressed lagged earnings on current news and argued that, theoretically, lagged earnings should not be able to differentiate between good and bad news. However, they still discovered timeliness differences between good news and bad news; therefore, they question DT's reliability and suggest avoiding the DT method in research. Despite all the discussions, Ball et al. (2013) still believe that the DT method provides an econometrically adequate estimate of conditional conservatism. Moreover, LaFond and Watts (2008) suggested

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[1] According to Givoly et al. (2007), Aggregation effects: DT method can only capture the total aggregated effects of economic events, instead of capturing effect for a certain event; Economic events effects: A few leading economic events may dominate and bias DT method; Disclosure policy effects: DT method may be biased by the timing of information disclosure.

that although the DT method cannot be error-free, increasing the interval of estimation (estimated over multiple years) can effectively reduce the errors.

C-score

Based on Basu's (1997) DT method, Khan and Watts (2009) further developed a measure called the C-score. The C-score provides a more adequate measure of conditional conservatism, because it allows firm-year estimation, and it also takes into account three important factors of conditional conservatism (i.e., size, market to book ratio and leverage), thereby gaining more predictive reliability (Chi et al., 2009). However, it is important to note that, the C-score may not be an appropriate measure in all research settings; for example, Khan and Watts (2009) cautioned that the C-score may not be effective when evaluating companies in a weak environment of legal enforcement. Louis et al. (2012) also warned that, when applying the C-score, special attention should be given to correlated omitted variables, otherwise the C-score may be biased.

Accrual-based method

Givoly and Hayn (2000) proposed the accrual-based method, arguing that conservatism can be identified by evaluating the sign and magnitude of the accumulated accruals over time. Hence, if the accounting accruals over a long period of time are consistently and prominently negative, then the company can be identified as reporting conservatively. Compared to the DT method, the accrual-based method does not rely on market prices; thus, it can avoid various errors induced by market inefficiencies (Lara et al., 2009a). Ball and Shivakumar (2005) further developed this method by linking accruals to cash flow from operations. They argued that, although in general, accruals and cash flow exhibit an inverse association in the period of having a negative cash flow from operations (negative cash flow from operations (CFO)), there could be an attenuating positive effect that can reduce this negative association. This is because current negative revisions in CFO would be positively associated with revisions in future expected cash flows[2]. It should also be noted that, the accruals method is generally believed to be a measure for unconditional conservatism (Xie, 2015).

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[2] To better illustrate, a modified example originally provided by Ball and Shivakumar (2005): An investment that has decreased cash flow in period t, would also be likely to have decreased cash flow in period t+n (future expected cash flow), and this would be recognized through accruals, thus in this situation, accruals and CFO are positively associated. However, if the investment has increased cash flow in current period, although it is also likely that in future periods the cash flow would be revised upwards, it is not recognized through accruals due to conservatism. This asymmetry in recognition through accruals reduces the generally negative accrual-cash flow association, in the situation of negative cash flow.

MTB (Market to Book Ratio)

MTB stands for market to book ratio. Previous research has adopted MTB in two different ways, i.e., raw MTB as in Ahmed et al. (2007) and MTB-based regression as in Beaver and Ryan (2005). Although this measure is rather simple and easy to interpret, Francis et al., (2015) proposed that MTB may also capture growing options and the growing potential of a firm. Thus, when utilizing the MTB method as a measurement, growing options and growth potential should be controlled as well. Xie (2015) suggested that although MTB is easily interpretable, it may not be an appropriate measure for conditional conservatism, because MTB may capture the overall effects of conservatism, instead of conditional conservatism.

Skewness method

The skewness method relies on the understanding that conservatism tends to recognize unfavorable economic events fully and early, while recognizing good news prudently and gradually; therefore, the earnings distribution would be more skewed towards a negative direction than cash flows would be (Givoly & Hayn, 2000). The skewness method is controversial because researchers are divided on which conservatism it captures most. While the skewness method was used to measure unconditional conservatism in Ahmed and Duellman (2013), it was adopted as a measurement of conditional conservatism by Zhang (2008). Xie (2015) posited that the skewness method captures conditional conservatism, because unconditional conservatism generates the understated, rather than skewed earnings. This thesis follows Xie (2015) and regards the skewness method as a measurement for conditional conservatism.

It is important to note that, there is no perfect measurement of conservatism. Although the skewness method and accrual-based method seem to overcome the weaknesses of the DT method, Zhang (2008) proposed that, the two methods both suffer from two limitations: (1) large negative accruals or negatively skewed earnings may not necessarily be caused by conservatism, and it can also be the result of earnings management (e.g., big bath) and; (2) cash flow from operations can be polluted by investment accruals. Overall, different measures of conservatism should be carefully examined when deciding which to use.

For this research, only the C-score and skewness methods are selected to measure conditional conservatism. Because these two measures allow for a firm-year measurement of conditional conservatism, the level of conditional conservatism can be derived for each individual firm for

a particular year. This feature is crucial as it allows the regression between tax burdens and the adequate measure of conditional conservatism to be calculated. Moreover, the C-score and skewness methods can be complementary, because even though both methods can capture asymmetric verification of good news and bad news, the skewness method does not rely on stock returns to determine good news or bad news; therefore, the skewness method is not hampered by market inefficiency (Givoly & Hayn, 2000; Zhang, 2008). Although the MTB method also provides a firm-year evaluation, it may involve significant estimation errors (Xie, 2015); thus, the MTB method is not utilized in this thesis.

Table 1 Summary of measures of conservatism commonly used in previous research

Name of Measurement	Descriptions	Example	Limitations
Differential Timeliness measure (DT)	DT method intends to capture differential timeliness of good news and bad news being incorporated into earnings. Rely on stock returns to determine good and bad news. DT method is widely used to measure conditional conservatism.	Basu (1997) Ball & Shivakumar (2005) Givoly & Hayn (2000) Ramalingegowda &Yu (2012)	(1) Rely on stock prices to determine good news and bad news, may suffer from market inefficiency. (2) May have estimation bias (3) There may be several sources of conditional conservatism, DT only captures one of them.
C-Score	Developed from DT method. Incorporating size, leverage and MTB into DT. Provide more accuracy and allow firm-year evaluation.	Chi et al. (2009) Goh & Li (2011) Khan & Watts (2009)	(1) Although C-Score has better estimation accuracy, it may still suffer from the limitations of DT method. (2) Sensitive to law enforcement environment
Accrual-based method	Identify a company as conservative if its accounting accruals are consistently and prominently negative. Do not rely on stock prices to determine good news and bad news. Used to measure unconditional conservatism.	Givoly & Hayn (2000) Donovan et al (2015) Louis et al (2012)	(1) May capture the effects of earnings management instead of conservatism (2) Cash Flow from Operation may be polluted by investment accruals
MTB method	Compare market value and book equity value. Easily interpretable and provide firm-year evaluation.	Ahmed et al (2007) Beaver & Ryan (2005) Francis et al (2015)	(1) Suffer from estimation errors (2) Capture overall effects of conservatism, rather than only the effects of conditional conservatism
Skewness method	Earnings are relatively more skewed toward negative direction than cash flows when the firm reports conditionally conservative. Allow for firm year evaluation of conditional conservatism.	Beatty et al.(2008) Givoly & Hayn (2000) Zhang (2008)	(1) May capture the effects of earnings management instead of conservatism (2) Cash Flow from Operation may be polluted by investment accruals

Table 1 shows measures commonly seen in previous research, with description, examples and limitations of each measure.

2.2 Tax Avoidance

2.2.1 Definition of Tax Avoidance

Hanlon and Heitzman (2010) suggested that tax avoidance seems to be intuitive; however, similar to conservatism, it does not have an authoritative definition. Hanlon and Heitzman (2010) also proffered that, tax planning strategies can be implemented in the two opposite ends of a continuum: from one end, a tax planning strategy is perfectly legal, e.g., purchasing municipal bonds; however, from the other end, it could be totally aggressive and illegal, e.g., tax evasion. As a significant part of this research, it is necessary to capture more tax avoiding practices. Therefore, by following Hanlon and Heitzman (2010, p.137), this thesis defines tax avoidance broadly as a "*reduction of explicit taxes*," regardless of aggressive or legal intent.

2.2.2 Determinants of Tax Avoidance

Researchers have identified various determinants of tax avoidance, which include both internal and external determinants.

Internal determinants

Previous research has identified that a firm's tax rates, size, growth opportunities, profitability, leverage, foreign operations, and income from subsidiaries are likely to affect its overall tax planning strategy (Wilson, 2009; Khurana & Moser, 2012). Apart from these basic determinants, Armstrong et al. (2015) ascertained that managers have incentives to gain personal benefits from tax avoidance activities; therefore, firms with good corporate governance would have less tax aggressiveness. Lanis and Richardson (2015) posited that, firms with a high corporate social responsibility (CSR) performance are less likely to engage in tax-avoidance activities; they argued that firms with a good CSR score are concerned about their reputation, since tax avoidance may bring about political and regulatory costs; hence, they are unwilling to put their reputation at risk. Interestingly, researchers discovered that executive characteristics may also influence companies' tax planning decision-making, by setting a "tone of top" (Dyreng et al., 2010). For example, Law and Mills (2017) ascertained that managers who have military experience are less likely to participate in tax avoidance activities, because they are more disciplined and conservative.

External determinants

Firms' tax avoidance is also affected by various external factors; for example, Hoopes et al. (2012) proposed that when the tax enforcement is stricter, firms are less likely to engage in

aggressive tax planning. Huang et al. (2016) determined that firms with a greater level and higher concentration of corporate customers are generally more likely to attempt tax avoidance, because these companies need to increase their cash flow and accounting earnings. With regard to ownership structure, Khurana and Moser (2012) found that firms with higher long-term institutional ownership are less likely to risk tax avoidance activities, because long-term institutional investors are more conservative and are not willing to sacrifice their overall long-term benefits for short-term tax benefits.

2.2.3 Measurement of Tax Avoidance

According to Hanlon and Heitzman (2010), there is no perfect measurement for tax avoidance; thus, it is important to consider a relevant research setting when deciding which measure to utilize. Table 2 presents a summary of the commonly seen measures of tax avoidance.[3]

This thesis adopts the cash effective tax rate (CETR) as the proxy for tax avoidance. Compared with the other measures, CETR has two very important features. Firstly, CETR captures the tax deferral strategies of firms (Hanlon & Heitzman, 2010), which is exactly how conditional conservatism facilitates tax avoidance (i.e., deferring the recognition of good news, while recognizing the bad news in a timely manner). Secondly, the numerator of CETR is income taxes actually paid; therefore, it tends to capture any concrete reductions in tax payments. By using CETR as a proxy for tax avoidance, the tax reducing effects of conditional conservatism can be systematically captured.

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[3] A more comprehensive review of the limitations of each measure can be found in Hanlon & Heitzman (2010)

Table 2 Summary of measures of tax avoidance

Name of Measurement	Descriptions	Examples	Limitations
Book Tax Difference:			
Normal BTD (e.g. Permanent BTD, Temporary BTD, Total BTD)	The differences between book income and taxable income	Kelley (2005) Heltzer (2009)	Not capturing tax deferral strategy of firms. For residual BTD, it is hard to classify between discretionary part and non-discretionary part
Residual BTD	The unexplained part of Book and Taxable income, intended to capture the discretionary part of tax avoidance	Desai and Dharmapala (2006); Lanis & Richardson (2015)	
Effective Tax Rate (ETR):			
GAAP ETR	GAAP tax expenses divided by GAAP earnings	Armstrong et al. (2005)	GAAP ETR not capturing tax deferral strategy. ETR not distinguishing between real tax avoidance activities and lobbying activities
Cash ETR	Taxes paid in cash divided by GAAP earnings or divided by Cash Flow from Operation	Dyreng et al. (2008) Blaylock et al. (2011) Hoopes et al. (2012)	
FIN 48 Unrecognized Tax Benefits	Using information from FIN 48 Disclosure, representing the estimated amount of tax savings due to tax planning, which is potentially payable to IRS in case of audit	Armstrong et al. (2015) Hoi et al. (2013)	The estimate of unrecognized tax benefits is influenced by management intention of earnings manipulation, therefore is not "clean"
Tax Dispute with Tax authorities	Using information from KLD database, dummy variable to see whether companies have tax disputes with tax authorities	Lanis & Richardson (2015)	Dummy variable, without further information disclosed

Table 2 presents commonly adopted measurement of tax avoidance in previous research, with descriptions, examples and limitation of each measure

3. Motivation and Hypothesis Development

Previous sections have introduced the concepts, theories, and measurements of tax avoidance and conditional conservatism. Based on the concepts and theories in the previous sections, this section is devoted to developing the hypotheses of this research.

First hypothesis

Tax is a determinant of financial reporting decision-making (Shackelford & Shevlin, 2001). Shackelford et al. (2007) posited that managers tend to use accounting discretion in tax planning so as to minimize current tax burdens, and Watts (2003) indicated that conservatism can be used to reduce the net present value of tax payments. Researchers have come to a consensus that tax burdens are associated with unconditional conservatism, more specifically, the higher the tax burdens, the higher the level of unconditional conservatism in the firm's financial reporting (Ball & Shivakumar, 2005; Kim & Jung, 2007; Qiang, 2007). However, researchers are also divided as to whether tax burdens are associated with conditional conservatism and whether conditional conservatism can reduce tax burdens. Some scholarly works cannot find any evidence that tax burdens are associated with conditional conservatism (Basu, 2005; Ball & Shivakumar, 2005; Kim & Jung, 2007; Qiang, 2007). Nevertheless, results of an empirical research by Lara et al. (2009b) suggested that both types of conservatism can effectively reduce firms' current tax burdens. Lara et al. (2009b) argued that unconditional conservatism is not effective in reducing tax burdens, because it is not flexible (e.g., under unconditional conservatism, R&D expenses incurred would be expensed rather than capitalized, without any flexibility to adjust in accordance with the firm's current marginal tax burdens). In contrast, conditional conservatism is more efficient and flexible, because under conditional conservatism, managers can shift income across periods to reduce current tax burdens by discretionarily applying diverse verification criteria to recognize good news (bad news) as economic gains (losses) in the income statement. In other words, when the company is faced with high marginal tax rates, managers can discretionarily shift income towards future periods with lower expected marginal tax burdens. One real world example is that, in reaction to the anticipated decreases induced by the Tax Reform Act of 1986, some U.S. companies shifted their income across periods in order to minimize tax burdens (Scholes et al., 1992). Research also evidences that managers may take advantage of the discretionary nature of the accruals calculation to downwardly manage earnings for tax considerations (Badertscher et al., 2006). Since unconditional conservatism is pre-determined in nature and is not adequately

efficient and flexible enough to conduct these income-shifting plans, managers are much more likely to implement conditional conservatism in order to flexibly reduce tax burdens. Two possible ways of such tax-reducing strategies include increasing the costs of goods sold and increasing bad debt expenses (Lara et al., 2009b). According to Publication 538 of the IRS, companies should claim anticipated write-offs in their inventory to determine the costs of goods sold for the period (IRS, 2016), and, according to IRS Publication 535, companies can claim a deduction for bad debt on their income tax return (IRS, 2018). Companies usually claim their anticipated write-offs in the fourth quarter, and these write-offs are likely to affect the taxable income of the same fiscal year. As the judgment of write-offs is, to a large extent, discretionary in nature, managers are, therefore, able to minimize tax payments by conditional conservatism, i.e., applying asymmetric verification for good news and bad news (Lara et al., 2009b). Based on the argument above, it is reasonable to expect that conditional conservatism can reduce tax burdens; thus, the first hypothesis of this research is:

H1: Ceteris paribus, conditional conservatism is negatively associated with tax burdens.

Based on fundamental reasoning and the first hypothesis, if Lara et al.'s (2009b) results are valid (i.e., high marginal tax rates lead to more conditional conservatism in financial reporting), then all else being equal, ex-post perspective conditional conservatism should, consequently, result in real tax reductions in the relevant years. Thus, this thesis predicts a negative regression coefficient on the proxy of conditional conservatism.

Second hypothesis
According to Publication 536 of the IRS, firm losses that meet certain criteria may be viewed as net operating losses (NOL), and a loss due to the operation of a business is the most common reason for an NOL (IRS, 2018). Firms may benefit from NOL, because they can utilize tax losses to offset the profit for their taxable income. However, having NOL may also affect the tax reducing effects of conditional conservatism. Because tax losses in the current period indicate that firms are likely to have timely recognized bad news, since conditional conservatism is about timely recognizing bad news while gradually recognizing good news, the existence of tax losses may reduce the sensitivity of tax burdens to conditional conservatism. Consequently, conditional conservatism's tax reducing effects may be less pronounced when firms report tax losses in the current period. The reasoning above, therefore, leads to the second hypothesis of this research:

H2: Ceteris paribus, conditional conservatism's tax reducing effects are less pronounced when firms have a tax loss carried forward in the current period

Based on H2, this thesis predicts a negative regression coefficient on the proxy of conditional conservatism and predicts a positive regression coefficient on the interaction term of conditional conservatism and tax losses, so that the overall tax reducing effects are attenuated.

Third hypothesis

Compared to their peers, the Big Four accounting firms are larger in scale and are generally considered to offer good quality audits. Furthermore, being wary of high litigation costs and the loss of reputation, the Big Four are unlikely to compromise their standards with regard to questionable accounting practices. Thus, firms who hire one of the Big Four as their external auditor tend to have more external monitoring of their accounting practices. Moreover, these firms' tendency to apply conditionally conservative accounting practices for tax purposes may be restrained. The above-mentioned discussion leads to the third hypothesis of this research:

H3: Ceteris paribus, conditional conservatism's tax reducing effects are less pronounced for firms that hire one of the Big Four accounting firms as their external auditor.

However, it may also be the case that the tax reducing effects of conditionally conservative reporting are actually more significant for firms that hire one of the Big Four as their external auditor, because auditors generally are risk-averse and more likely to accept conservative reporting. In other words, to reduce audit risk, auditors are far more likely to question aggressive accounting practices than to question conservative accounting practices. Therefore, although this thesis predicts a remediating role for the Big Four, the results may also proceed into an opposite direction.

Fourth hypothesis

Because of the uncertain nature of business and the external environment, firms confront different levels of risks. Firms that have high litigation risks may be less likely to use conditional conservatism to reduce tax burdens, because if the tax avoidance activities are detected, IRS adjustments are likely to be costly (Hoopes et al., 2012). Thus, firms of high litigation risks are less likely to pursue tax benefits at the expense of increased overall risks. Although Qiang (2007) posited that litigation risks induce conditional conservatism, firms are

likely to use conditional conservatism to reduce risks rather than to reduce taxes. Accordingly, the fourth hypothesis of this thesis is:

H4: Ceteris paribus, the tax reducing effects of conditional conservatism would be less pronounced for firms of high litigation risks

Based on H4, this thesis predicts a negative regression coefficient on the proxy of conditional conservatism and predicts a positive regression coefficient of the interaction term of conditional conservatism and litigation risk, so that the overall tax reducing effects are attenuated.

4. Research design

This chapter intends to set the stage for the empirical section that will be discussed later in this paper. It further introduces variables and models utilized in the empirical analysis. Specifically, the first and second sections offer a discussion regarding the measurements of the key indicators, i.e., tax avoidance and conditional conservatism, respectively. The third section focuses on control variables, where the definitions of the control variables and also the reasoning behind selecting the control variables are discussed. The final section introduces the regression model used in the empirical analysis. For a better illustration of the theoretical constructs and how they are operationalized, Libby boxes and an explanation are presented in the Appendix.

4.1 Measure of Tax avoidance

Previous research has extensively adopted the Cash Effective Tax Rate (CETR) as a measurement of tax avoidance (Rego, 2003; Chen et al., 2010; Dyreng et al., 2010; Huang et al., 2016; Chyz et al., 2017). Furthermore, Dyreng et al. (2010) indicated that CETR, primarily, has two benefits: firstly, it captures the firm's tax deferring strategy and; secondly, it denotes all the explicit reductions in tax burdens.

The first benefit is especially relevant to this research, as tax deferring constitutes one very important approach of how conditional conservatism reduces taxes (by deferring income); therefore, by using CETR, the deferring and tax-reducing effects of conditional conservatism can be more effectively captured. Among all the measures of tax avoidance, CETR is the only approach that captures these deferring effects (Hanlon & Heitzman, 2010). The second benefit is also important because the numerator of CETR is income taxes paid, which can capture any reductions in tax payments caused by conditional conservatism; thus, CETR is appropriate for the research purpose. To facilitate an interpretable outcome, CETR is truncated within [0,1] in accordance with Dyreng et al. (2008) and Chyz et al. (2017).

4.2 Measure of conditional conservatism

C-score

As mentioned in the previous section, the differential timeliness method (DT), first proposed by Basu (1997), has been the most widely adopted measurement of conditional conservatism in previous research. This model captures the differential timing of good news and bad news

being recognized when calculating the earnings, based on the principle that bad news is reflected in earnings more timely than good news. The asymmetric timeliness of news recognition is regarded as conditional conservatism. Basu (1997) presented this classic model as follows:

$$\Delta E_{it}/P_{it-1} = \alpha_0 + \alpha_1 D + \gamma_0 (\Delta E_{it-1}/P_{it-2}) + \gamma_1 D * (\Delta E_{it-1}/P_{it-2})$$

where ΔE indicates changes in earnings, P depicts the stock price, while D represents an indicator variable that is equal to 1 when the changes in earnings are negative. Therefore, under this setting, $\gamma 1$ captures the differential response of bad news and good news. The larger $\gamma 1$, the higher the level of conditional conservatism for the firm. However, as suggested by Givoly et al. (2007) and discussed in the literature review section, it is crucial to note that this measure may have an estimation bias. Based on the DT model, Khan and Watts (2009) further developed the C-score method, which is presented below:

$$X = \alpha_1 + \alpha_2 D + \alpha_3 RET + \alpha_4 D * RET \tag{1}$$
$$G \quad Score = \alpha_3 = \delta_1 + \delta_2 Size + \delta_3 MTB + \delta_4 LEV + \varepsilon \tag{2}$$
$$C \quad Score = \alpha_4 = \lambda_1 + \lambda_2 Size + \lambda_3 MTB + \lambda_4 LEV + \varepsilon \tag{3}$$

where RET is the return, calculated as the accumulated buy and sell returns accrued over 12 months, starting at the 4th month after the fiscal year-end. Moreover, D denotes a dummy variable that equals 1 if the accumulated returns are negative. The dependent variable, X, indicates earnings before extraordinary items of a certain firm for a certain year, scaled by the market value of equity at the beginning of the year. Size is the natural log of the market value of equity, while MTB depicts the market to book ratio, and leverage denotes the total debt divided by the market value of equity at the beginning of the year. These three characteristics are incorporated into the linear functions to derive the C-score. Under the C-score method, conditional conservatism is represented by $\alpha 4$. Thus, the larger $\alpha 4$, the more conditionally conservative the firm. Khan and Watts (2009) proffered that, the incorporation of firm-specific variations into the C-score method allows an estimation of conditional conservatism on a firm-year basis, by providing cross-sectional and inter-temporal variations and measuring conditional conservatism for individual firms without requiring data covering a long span. Hence, the C-score is an apt measurement of conditional conservatism, with a higher reliability and validity for empirical testing. It is also crucial to note that, the G-Score signifies the timeliness response of good news, while the C-score indicates the incremental timeliness

response of bad news. Therefore, the higher the C-score, the more conditionally conservative the company would be.

Equations (2) and (3) are not the regression model, but these two equations are included in Equation (1), to derive the final model as proposed by Khan and Watts (2009):

$$X = \alpha_1 + \alpha_2 D + RET * (\delta_1 + \delta_2 Size + \delta_3 MTB + \delta_4 LEV) + D * RET * (\lambda_1 + \lambda_2 Size + \lambda_3 MTB + \lambda_4 LEV) + \sigma_1 Size + \sigma_2 MTB + \sigma_3 LEV + \sigma_4 D * Size + \sigma_5 D * MTB + \sigma_6 D * LEV + \varepsilon$$

After deriving the C-score, it is included as an independent variable in the regression model, to test whether conditional conservatism is associated with lower tax burdens.

Skewness method

The skewness method also constitutes a widely utilized measure of conditional conservatism, and its premise is based on the understanding that when firms recognize bad news timelier than good news, earnings will be more negatively skewed than the cash flow (Givoly & Hayn, 2000; Donovan et al., 2015). Following Beatty et al. (2008), skewness method is calculated as the difference between the skewness of earnings and the skewness of operating cash flow; therefore, the larger the difference, the more conditionally conservative the company. Following Givoly and Hayn (2000), skewness is calculated as $(x - \mu)^3 / \sigma^3$, where μ and σ are the mean and standard deviation of earnings (cash flows) over period t, t-1 and t-2. All the variables are scaled by total assets.

Although the C-score is considered as a good proxy for conditional conservatism, it is still based on Basu's (1997) differential timeliness method; therefore, the C-score relies on stock returns to determine bad news and good news. The skewness method, on the other hand, is complementary to the C-score because it does not rely on stock returns to determine good and bad news therefore it does not suffer from market inefficiency (Givoly & Hayn, 2000; Zhang, 2008).

4.3 Control variables

Based on the commonly seen determinants of tax avoidance, this thesis introduces three types of control variables that are common in tax avoidance literature:

    (1) Firm-specific features as in Wilson (2009) and Khurana and Moser (2012)

    (2) The corporate governance control variable is based on Armstrong et al. (2015) and Lanis and Richardson (2015)

(3) The external monitoring control variable is based on Lanis and Richardson (2015)

The definition and measurement of variables can be found in table 3.

Table 3 Definition and measurement of variables

Name of variables	How to measure
Dependent and independent variables	
CETR	Cash taxes paid/(Pretax income-special items)
C-score	Based on Khan & Watts (2009)
Skewness	The skewness of earnings- the skewness of Cash Flow from Operation
Firm specific control variables	
Firm size	Natural Logarithm of market value of equity
Leverage	(Long term+ short term debt)/ market value of equity
R&D Expenses + Advertising Expense	(R&D + Advertising expenses) / Sales
SG&A	(SG&A expenses)/Sales
PPE Intensity	PPEGT/total assets
Capital Expenditure	CAPX/PPEGT
Intangible Asset Intensity	Intangible assets/total assets
Inventory Intensity	Inventory/total assets
Cash holding	Cash or cash equivalents/total assets
Equity income	Equity income in earnings/total assets
Foreign income	Foreign income/total assets
Sales Growth	(Sales/lagged sales)-1
Profitability	(Income before extraordinary item-Special items)/total assets
NOL	Indicator variable, denoted 1 if tax loss carry forward is positive in beginning of year, 0 otherwise
ΔNOL	Change in NOL, scaled by total asset
Litigation risk	Dummy variable that equals 1 if firm's SIC belongs to 2833-2836, 3570-3577,5200-5961,7370-7374, and equals 0 otherwise
Corporate governance control variables	
Independence of board of directors	The ratio of independent directors to total board of directors
CEO duality	Indicator variable, denoted 1 if the CEO is also the chairperson of the board, 0 otherwise
External overnance control variables	
Big 4 Auditors	Indicator variable, denoted 1 if the auditor is big 4, 0 otherwise

Table 3 presents the name of variables and how variables are defined and measured

Firm-specific control variables

Size

Size is measured as a natural logarithm of market value of equity. It is controlled because size has been predicted to function as an important determinant of tax avoidance; however, there is not yet a clear indication of this association (Rego, 2003; Huang et al., 2016). On the one hand, firms of a larger size can engage in more tax avoidance activities, because these firms can leverage their resources and the ability to save taxes, for example, by registering in low-tax countries. Large firms can even leverage their influence to affect the political process of tax

decision-making, thereby maximizing the firm's tax burdens. On the other hand, large firms may also confront higher regulatory and political costs; thus, large firms may also forgo short-term tax benefits, for overall long-term benefits. Thus, this thesis does not make a directional prediction for the coefficient on size.

Leverage

Leverage is proxied as the ratio of short term-debt and long-term debt to market value of equity at the beginning of the year (Khan & Watts, 2009). It is controlled for two reasons. First, from a conservatism perspective, leverage serves as a good proxy for bondholder and shareholder conflict, because bondholders and shareholders may have different demands for conservatism. Bondholders generally demand conditional conservatism because conditional conservatism improves contracting efficiency, thereby alleviating the information asymmetry between the firms and bondholders. However, shareholders may not necessarily prefer conditional conservatism, because conditional conservatism may result in earnings fluctuations (Ramalingegowda & Yu, 2012). Second, from a tax avoidance perspective, firms with a higher leverage can adequately take advantage of deductible interests, thus, reducing taxable income (Huang et al., 2016). Therefore, it is necessary to control leverage and this thesis predicts a negative coefficient on leverage.

Advertising, R&D, and SG&A (Selling, general and administrative) expenses

Advertising and R&D expenses are measured as the sum of the two expenses scaled by sales. It is essential to control advertising and R&D expenses as these two expenses are linked to firms' taxable income (e.g., firms can claim tax credits for their R&D expenses). Furthermore, R&D expenses also correlate to conservatism, because under non-conditional conservatism, R&D expenses tend to be expensed rather than capitalized. Therefore, when these expenses are not controlled, it may lead to errors pertaining to the correlated omitted variables (Hoi et al., 2013; Lanis & Richardson, 2015; Olsen & Stekelberg, 2015). Following Dyreng et al. (2010), the SG&A expenses are measured as SG&A scaled by sales; SG&A is controlled because it captures management's actions and it may also affect tax avoidance. Accordingly, this thesis predicts negative coefficients on the advertising, R&D and SG&A expenses.

PPE (property, plant, and equipment) intensity, Intangible assets intensity, CAPEX intensity, Inventory intensity and Cash intensity

The PPE intensity, intangible assets intensity, and capital expenditure are calculated as the respective assets divided by the total assets (Capital expenditure is scaled by PPE gross total). They are controlled since these assets are closely correlated to tax avoidance and they also include the firm's conservatism policies. Furthermore, firms can make use of the amortization and depreciation of these assets to minimize tax burdens (Lara et al., 2009a; Chen et al., 2010; Dyreng et al., 2010). Inventory intensity is measured as the inventory divided by total assets, while cash intensity is measured as cash and cash equivalents divided by the total assets. The two variables are controlled, because they capture the liquidity of a firm and are likely to affect any tax avoidance of a firm (e.g. firms that hold large cash for their operating activities may be more likely to reduce tax payment so that the cash is retained in the company) (Chen et al., 2010; Huang et al., 2016; Chyz et al., 2017). Therefore, this thesis predicts negative coefficients on PPE, intangible assets, CAPEX, inventory and cash intensity.

Profitability

Profitability is calculated as the operating income scaled by the total assets. Following Rego (2003) and Chen et al. (2010), profitability is controlled because more profitable firms tend to have stronger incentives to engage in tax avoidance. Moreover, firms with a strong profitability are less likely to be concerned about meeting earnings targets; therefore, they have less financial reporting constraints when engaging in tax avoidance activities. However, Huang et al. (2016) also argue that firms of high profitability may also confront high marginal tax rates, thus, this thesis does not provide directional prediction for the coefficient on profitability.

Equity income, Foreign income

Equity income is computed by equity income in earnings scaled by total assets, while foreign income is measured as foreign income scaled by total assets. Since there may be certain assets that are measured according to the equity method and that may apply different treatments for accounting and tax reports, equity income is also controlled (Chen et al., 2010). Foreign income is controlled, because tax rates are likely to differ in various regulatory environments; thus, there may be systematic dissimilarities between firms that have large sums of foreign income and firms with no foreign income (Olsen & Stekelberg, 2015). According to Huang et al. (2016), having equity income is likely to reduce tax burdens since equity accounting does not increase taxable income, however for foreign income the direction is not clear because although firms operating internationally may have higher marginal tax rates, internationally operating firms can also structure their transactions in low tax rates areas to reduce tax burdens.

Therefore, this thesis predicts a negative coefficient on equity income and does not make directional prediction for the coefficient on foreign income.

Sales growth

Following Huang et al. (2013) and Lanis and Richardson (2015), sales growth is controlled. Sales growth is measured as [(Sales in period t)/ (Sales in period t-1)]-1, and it is the proxy for potential growth and growth options. Previous research has ascertained that firms with additional growing options and growth potentiality invest more in assets and have more opportunities to conduct tax avoidance. Moreover, from a conservatism perspective, firms with high sales growth rates are considered to be in an environment of uncertainty (e.g., growing companies have opportunities to purchase more long-term assets, which are risky and the outcome full of uncertainty). Therefore, stakeholders have greater incentives to require conservative reporting, so as to reduce agency costs. Accordingly, this thesis predicts a negative coefficient on sales growth.

Litigation

Litigation is a dummy variable that equals 1 when the company's SIC code falls within 2833-2836, 3570-3577, 5200-5961, 7370-7374 and, if not, it equals 0. Companies from the industries mentioned above are considered to have high litigation risks, and this inherent nature affects conditional conservatism; hence, high litigation firms are controlled (Francis et al., 2015). Meanwhile, it is possible that firms of high litigation risk may be more careful in tax avoidance so as to reduce overall risks; therefore, this thesis predicts a positive coefficient on litigation.

NOL and ΔNOL

Net Operating Losses (NOL) is a dummy variable that equals 1 when companies have positive tax losses that carry forward at the beginning of the year and equals 0 otherwise. Moreover, ΔNOL is the change of NOL scaled by total assets. Following Dyreng et al. (2010) and Hoi et al. (2013), NOL and ΔNOL are controlled because firms can take advantage of NOL to reduce their tax liability. Following Huang et al. (2016), this thesis predicts a negative coefficient on NOL and a positive coefficient on ΔNOL.

Corporate Governance Control variables

In accordance with Lanis and Richardson (2015), this research has introduced two variables as proxies of corporate governance, i.e., CEO duality and board independence. CEO duality

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depicts a dummy variable that is equal to 1 if the CEO is also the chairperson of the board. Board independence, on the other hand, is measured by the proportion of the independent board of directors to the whole board. Corporate governance is controlled, because a good "tone at the top" can restrain management from pursuing short-term benefits (e.g., benefits from tax avoidance) that may place long-term benefits at risk (Lanis & Richardson, 2015). Armstrong et al. (2015) find that firms of good corporate governance are less likely to conduct tax avoidance activities, therefore this thesis predicts positive coefficients on the two corporate governance control variables.

External Governance Control variables

Similar to corporate governance, external governance functions as a restraint to self-centered management and facilitate a deterring of tax avoidance activities. Following Lanis and Richardson's (2015) study, "Big 4 auditor" has been introduced as the external governance control variable in this research. "Big 4 auditor" is a dummy variable that is equal to 1 when the firm has hired one of the Big Four audit firms as their external auditor. Accordingly, this thesis predicts a positive coefficient on the Big 4 auditor.

It is also noteworthy that since the calculation of the C-score already involves leverage and size, to avoid multicollinearity, the two variables are not included in the regression that adopts the C-score as an independent variable, rather, the two variables are only included in the regression that adopts skewness as an independent variable. Moreover, in accordance with previous research, missing values pertaining to R&D expenses, advertising expenses, SG&A expenses, equity income and foreign income are set to 0 (Dyreng et al., 2010; Hoi et al., 2013; Khan et al., 2016).

4.4 The Basic Regression model

The sections above have already discussed the key indicators (conditional conservatism and tax avoidance) and the control variables (including firm-specific control variables, corporate governance control variables and external governance control variables). Based on the discussion above, in order to examine the hypothesis that predicts a negative correlation between conditional conservatism and tax burdens, the following regression specification has been formulated:

$$Tax\ Avoidance = \beta_0 + \beta_1 Conditional\ Conservatism +$$
$$\beta\ Firm\ specific\ control\ variables +$$
$$\beta\ Corporate\ governance\ control\ variables + \beta\ External$$
$$governance\ control\ variables + \varepsilon_i$$

The first hypothesis of this research suggests a negative relationship between conditional conservatism and CETR; thus, β_1 is expected to be negative.

The second hypothesis predicts that the tax reducing effects of conditional conservatism would be less significant when firms have tax losses that are carried forward. To test this hypothesis, an interaction term of tax losses carried forward and conditional conservatism is added. The coefficient of conditional conservatism is expected to be negative while the newly added interaction term is expected to be positive so that the overall tax reducing effects can be attenuated.

The third hypothesis predicts that the tax reducing effects of conditional conservatism would be less significant when firms hire one of the Big Four as their external auditor. Thus, to test this hypothesis, an interaction term of the Big Four and conditional conservatism is included. Similarly, it is expected that the coefficient of the interaction term is positive so that the overall tax reducing effects can be attenuated.

The fourth hypothesis predicts that the tax reducing effects of conditional conservatism would be less significant for firms of high litigation risks. Thus, to test this hypothesis, an interaction term of the litigation risk and conditional conservatism is included. Similarly, it is expected that the coefficient of the interaction term is positive so that the overall tax reducing effects can be attenuated.

5. Sample and data

5.1 Sample selection and data preparation

Sample period and dataset

The first step regarding the sample selection is to determine an appropriate span for the sample period. The samples selected for this research cover a period from 2009-2016, taking timeliness, economic development cycles, and regulatory changes into consideration.

This research aims to capture the latest influences of conditional conservatism on tax avoidance; thus, the data should be as up-to-date as possible. Also, considering the fact that the financial crisis during 2007-2008 may have had significant impacts on the financial reporting of firms in the U.S., this research establishes a buffer and allows for a 1-year-recovery period. Therefore, the sample starts from 2009. The sample focuses on U.S. listed companies for two reasons. Firstly, the U.S. has a mature business environment and an adequate law enforcement environment. Since the calculation of the C-score is sensitive to a law enforcement environment (Khan & Watts, 2009), it is a safer and more appropriate choice to select U.S. companies. Secondly, most mature databases and datasets are focused on U.S. companies; thus, choosing a U.S. sample would substantially simplify the data collection process and also enhance accuracy.

Another fact that should be noted are changes in the regulatory environment. As indicated before, standard setters hold ambivalent attitudes towards accounting conservatism (Watts, 2003). Dating back to 1989, the predecessor of IASB issued a framework that included both neutrality and conservatism as desirable accounting attributes; however, in a joint statement with FASB in 2010, IASB held that conservatism and neutrality are incompatible, and accounting information should include neutrality rather than conservatism as a desirable qualitative attribute, such adjustments indicate that conservatism is no longer regarded as a desirable qualitative feature of financial reporting information. Instead, standard setters tend to be in favor of a "faithful representation" as a desirable qualitative attribute of financial reporting information, which emphasizes neutrality, freedom from errors and completeness (FASB, 2010, p.17). Interestingly, in 2015, IASB reintroduced conservatism in its exposure draft, after a series of long and heated debates (Wagenhofer, 2015). It is possible that the changes in the regulatory environment may have an impact on the overall outcome of the analysis. As for the dataset, the sample sources are summarized in table 4.

Table 4 Source of variables

Name of variable	Source
Tax avoidance-CETR	Compustat
C-score	Compustat, CRSP
Firm's accounting information	Compustat
Auditor information	CRSP
Board of directors' information	ISS dataset

Table 4 presents source of variables, the sample consists of U.S. companies and the sample is from 2009-2016

Sample selection process

After deciding on the time period and dataset, a series of criteria are applied for the sample selection process, and these are presented in the table 5:

Table 5 Observation

Sample procedure	Number of observations
Total number of observations from 2009-2016	10600
After reducing companies from financial sector (SIC 6000-6999) and excluding utilities companies (SIC 4000-4949)	8608
After excluding companies with missing data	7815

Table 5 includes the sample procedures and the number of observation after each selection step. Variables are winsorized at 1% and 99% to eliminate the effects of any outliers.

Following Hoi et al. (2013) and Huang et al. (2016), firms in the financial sector and utilities firms are excluded, because they have very different accounting treatments than other firms. In accordance with Chi et al. (2009), the variables are winsorized at the top 1% and 99%, to eliminate the effects of any outliers.

5.2 Sample description

Table 6 depicts the descriptive statistics and presents the number of observations, mean value, standard deviation, and the maximum and minimum value for the variables. Furthermore, the table serves as a basic overview regarding the characteristics of the independent variable, dependent variable and control variables of this research. The mean of the C-score over the sample period is -0.04, and the CETR over the sample period is 0.234. One interesting insight from the big 4 auditor statistics is that most companies in the sample tended to hire one of the Big Four accounting firms as their external auditor (approximately 92.35%), thereby demonstrating a high market share of the Big Four among the listed companies. Furthermore, the mean value of CEO duality is 0.4905, indicating that about one-half of the sample firms have a CEO serving as the chairperson of the board, which may have negative impacts on the level of independence of the board. On the other hand, on average the proportion of independent directors to the board is 0.7956, and this high proportion of independent directors may offset the negative impacts of CEO duality on corporate governance.

Table 6 Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
CETR	7815	0.23	0.20	0.00	1.00
C-score	7815	-0.04	0.44	-1.42	9.84
Sales growth	7815	0.08	0.24	-0.99	8.84
R&D and Ads	7815	0.05	0.07	0.00	0.27
SG&A	7815	0.21	0.18	0.00	4.67
Profitability	7815	0.05	0.08	-1.44	0.78
PPE	7815	0.49	0.43	0.00	8.34
Intangible	7815	0.23	0.21	0.00	0.91
Inventory	7815	0.10	0.13	0.00	0.89
Cashhold	7815	0.15	0.15	0.00	0.93
NOL	7815	0.59	0.49	0.00	1.00
DNOL	7815	0.01	0.60	-12.60	42.41
Capital expenditure	7815	0.10	0.07	0.00	1.49
Equity income	7815	0.00	0.01	-0.09	0.12
Foreign income	7815	0.02	0.04	-0.58	0.35
Litigation	7815	0.23	0.20	0.00	1.00
Independence	7815	0.80	0.10	0.00	1.00
CEOduality	7815	0.49	0.50	0.00	1.00
Big4	7815	0.92	0.27	0.00	1.00
Skewness	5010	0.02	0.65	-1.01	1.05
Size	5010	8.23	1.56	3.80	13.35
Leverage	5010	0.36	0.93	0.00	37.54

Table 6 presents the descriptive statistics for variables in the main regression model.
The source for each variable can be found in table 4 and the definition of each
variable can be found in table3.

5.3 Correlation analysis

Table 7 presents the correlation matrix for the variables utilized in the regression that employs the C-score as a measure of conditional conservatism. In general, the table depicts how the individual variables are correlated. Based on the correlation analysis, the C-score is negatively associated with CETR, which is in line with the hypothesis that conditional conservatism is negatively associated with tax burdens. In an un-tabulated result, skewness, which is the second proxy of conditional conservatism, is also negatively associated with CETR (the coefficient was -0.0473, significant at a 1% level). One interesting insight from the correlation matrix is that firms with a stronger profitability appear to pay more taxes, and these firms also tend to report less conservatively, thereby indicating that firms may sacrifice tax savings in order to meet financial reporting targets.

Table 7 Correlation matrix

	CETR	C-score	Salesgrowth	R&D+Ads	SG&A	Profitability	PPE	Intangible	Inventory	Cashhold	NOL	ΔNOL	Capital expenditure	Equity income	Foreign	Litigation	Independence	CEODuality
CETR	1																	
C-score	-0.0363***	1																
Salesgrowth	-0.0471***	-0.0534***	1															
R&D+Ads	-0.0715***	-0.0729***	0.0740***	1														
SG&A	0.0051	0.024**	0.0346***	0.6998***	1													
Profitability	0.1105***	-0.3033***	0.1805***	0.0203*	-0.0131	1												
PPE	-0.1130***	0.0747***	-0.1535***	-0.2617***	-0.2388***	-0.1479***	1											
Intangible	0.0615***	-0.1458***	0.0806***	0.1352***	0.2246***	-0.0205*	-0.4064***	1										
Inventory	0.0925***	0.1378***	-0.019*	-0.1051***	0.0005	0.0495***	-0.0542***	-0.2398***	1									
Cashhold	0.0149	0.0421***	0.0755***	0.5212***	0.4076***	0.1515***	-0.2801***	-0.2177***	-0.0758***	1								
NOL	0.1562***	-0.1423***	-0.0293***	0.0327***	0.0579***	0.1522***	-0.1457***	0.1315***	-0.0067	0.0351***	1							
ΔNOL	0.1805***	-0.0581***	0.1595***	-0.0058	-0.0146	0.2825***	-0.0365***	0.001	0.0228**	0.0279**	-0.1199***	1						
Capital expenditure	-0.0053	-0.0491***	0.1788***	0.1352***	0.1358***	0.1073***	-0.2139***	0.0247**	-0.0734***	0.1628***	0.0603***	0.0369***	1					
Equity income	-0.0155	-0.0849***	0.0107	-0.0596***	-0.0909***	0.0833***	-0.0112	-0.0027	-0.0306***	-0.0470***	-0.0242**	0.0052	-0.0332***	1				
Foreign	-0.0065	-0.2830***	0.0435***	0.1806***	0.1317***	0.4049***	-0.1228***	0.0294***	-0.0099	0.1838***	0.0979***	0.0630***	0.0122	0.0297***	1			
Litigation	0.0552***	-0.0683***	0.07466***	0.3018***	0.3421***	0.0898***	-0.0877***	0.0621***	0.0661***	0.1979***	0.0553***	0.0256**	0.1471***	-0.0498***	-0.0068	1		
Independence	-0.0421***	-0.1879***	-0.0555***	-0.0315***	-0.0647***	-0.0303***	0.0664***	0.0498***	-0.0963***	-0.0698***	-0.017	-0.0107	-0.0848***	0.0033	0.0808***	-0.0489***	1	
CEODuality	0.0286**	-0.1072***	0.0124	-0.0766***	-0.0366**	0.0291***	0.0248**	-0.0256**	-0.0004	-0.0431***	0.0237**	0.0151	-0.0221*	0.0580***	0.0131	-0.0408***	0.1195***	1
Big 4	-0.0189	-0.2172***	-0.0142	-0.0536***	-0.0922***	-0.0241**	0.0472***	0.0451***	-0.0725***	-0.1342***	0.0028	-0.0015	-0.0436***	0.0388***	0.0285***	-0.0247**	0.1771***	0.0142

The Correlation matrix shows correlations between variables of interest. ***, **, and * reflect the statistical significance of the coefficients at the 1%, 5% and 10% level, respectively. The definition of variables can be found in table 3.

6. Main regression results

H1: *Ceteris paribus, conditional conservatism is negatively associated with tax burdens.*

The first proxy of conditional conservatism is the C-score, as proposed by Khan and Watts (2009). The C-score is an independent variable while CETR is a dependent variable. Table 8 presents the regression results using the pooled OLS model, fixed-effects model, and random-effects model, respectively, and the negative association is statistically significant in all models. The results indicate that the C-score is negatively correlated to CETR, irrespective of the different models utilized. The negative association of the C-score and CETR confirms the first hypothesis of this research. This negative association between the C-score and CETR also confirms the findings of Lara et al. (2009b), who suggested that conditional conservatism is also able to reduce tax burdens by asymmetrically recognizing good and bad news.

One step further, this thesis conducts a comparative analysis of the different models to evaluate which model is more appropriate. Specifically, the F-test is conducted to determine whether to use the pooled OLS model or fixed-effects model. The statistic of 2.87 (significant at a 1% level) indicates that the fixed-effects model is more suitable. After this, a Hausman test is conducted to determine whether to utilize the fixed-effects model or random-effects model. The statistics of the Hausman test is 148.33 and is significant at a 1% level, thereby indicating that the fixed-effects model is more suitable than the random-effects model.

Regarding the control variables, from the results of the fixed-effect model, PPE is significantly and negatively associated with CETR. This negative association is in line with the findings of Chen et al. (2010) and Hoi et al. (2013). Furthermore, the intangible assets and capital expenditures are also negatively associated with CETR, yet the results are not significant. These results reveal that firms may take advantage of the depreciation and amortization of long-term assets to minimize tax burdens. From the expenses perspective, R&D expenses and advertising expenses are negatively correlated with CETR (significant at 10% level), which coincides with the findings of Hoi et al. (2013) and Law and Mills (2016). This denotes that firms may take advantage of R&D tax credits and advertising expenses to minimize their tax burdens. As for equity income, consistent with Chyz et al. (2017), equity income is negatively associated with CETR (significant at a 5% level). It is interesting to note that profitability is negatively correlated with CETR (significant at a 1% level). This result is consistent with the findings of Rego (2003) and Frank et al. (2009), who argued that firms with a strong profitability may be more adept at leveraging resources to minimize their tax payments. For NOL, Huang et al. (2016) proffered that the presence of NOL means that firms can use (but does not have to) the loss carried forward to reduce their tax liability. Furthermore, Huang et

al. (2016) discovered a negative relationship between NOL and CETR; however, the results of this research are not consistent with Huang et al. (2016). There may be two explanations. Firstly, the presence of NOL itself does not mean that firms are actually using it; the presence of NOL can also indicate that firms have adequately recognized the bad news in previous periods; thus, there is less bad news to be recognized in the current period. The second explanation may infer that the calculation of NOL treats all positive tax carried forward equally, regardless of the amount; therefore, NOL may suffer from estimation bias. As for ΔNOL, it is positively associated with CETR, and the result is consistent with the findings of Chen et al. (2010) and Huang et al. (2016), which denotes that firms that are actually using NOL can reduce their tax liability.

To enhance the robustness of the results, skewness is introduced as the second proxy of conditional conservatism. Table 9 presents the regression results using the pooled OLS model, fixed-effects model, and random-effects model, respectively. Similar to the C-score, skewness is negatively associated with CETR, irrespective of the different models used. Therefore, H1 is confirmed. Still, an additional evaluation of the different models is conducted, and the statistic of the F-test is 2.5 (significant at a 1% level), indicating that the fixed-effects model is more suitable than the pooled OLS model. Furthermore, the Hausman test is 117.81 (significant at a 1% level), suggesting that that fixed-effects model is more suitable as compared to the random-effects model.

Since the results of the pooled OLS model, fixed-effects model and random-effects model are similar, and the relevant tests suggested that the fixed-effects model is more appropriate, this thesis adopts only the fixed-effects model to test H2, H3 and H4. Fixed-effects model of this thesis controls for time fixed effects and also controls for unmeasured variables that are constant over time but vary between individuals. As the regression results of the control variables are similar, the table for H2, H3 and H4 only present the variables of primary interest.

Table 8 Regression results using C-score as independent variable

	Pred. Sign	Pooled-OLS	FE	RE
		Dependent variable=CETR		
C-score	-	-0.015***	-0.025**	-0.013*
		(-4.230)	(-2.316)	(-1.764)
Salesgrowth	-	-0.116***	-0.059***	-0.064***
		(-18.340)	(-5.847)	(-7.346)
RD+Ads	-	0.008***	-0.001*	-0.001*
		(-7.794)	(-1.896)	(-1.763)
SG&A	-	-0.068***	-0.02	-0.036*
		(-7.201)	(-0.561)	(-1.809)
Profitability	/	0.509***	-0.123***	-0.006
		(-24.395)	(-2.791)	(-0.175)
PPE	-	-0.036***	-0.086***	-0.052***
		(-8.597)	(-4.702)	(-5.611)
Intangible asset	-	0.059***	-0.011	0.037*
		(-6.453)	(-0.254)	(-1.842)
Inventory	-	0.145***	0.099	0.118***
		(-11.934)	(-0.951)	(-4.002)
Cashholding	-	-0.012	-0.087*	-0.006
		(-1.007)	(-1.823)	(-0.250)
NOL	-	0.130***	0.035***	0.068***
		(-23.334)	(-3.729)	(-7.892)
ΔNOL	+	2.765***	2.138***	2.057***
		(-37.492)	(-20.088)	(-19.896)
Capital expenditure	-	-0.043**	-0.068	-0.076**
		(-2.142)	(-1.626)	(-2.194)
Equityincome	-	-0.601**	-1.357**	-0.914**
		(-2.528)	(-2.572)	(-2.099)
Foreignincome	/	-0.377***	-0.154	-0.208***
		(-9.931)	(-1.563)	(-2.847)
Litigation	+	0.010***	.	0.023**
		(-2.726)	.	(-2.530)
Independence	+	-0.080***	.	-0.110***
		(-5.287)	.	(-2.931)
CEOduality	+	0.004	0.011	0.013**
		(-1.608)	(-1.509)	(-2.352)
Big 4	+	-0.005	0.046*	0.011
		(-0.896)	(-1.845)	(-0.905)
_cons		0.137***	0.226***	0.267***
		(-9.122)	(-6.044)	(-7.728)
N		7815	7815	7815
F /Wald		237.95	29.90	616.46
R-sq		0.355	0.071	0.090
F test		2.87***		
Hausman Test		-		148.33***

Table 8 presents the regression results using pooled-OLS moedl, fixed-effects model and randam-effects model. The dependent variable is Cash Effective Tax Rates (CETR) and the independent variable is C-score. Definition of variables can be found in table 3 and source of data can be found in table 4. This thesis uses ***,** and * to reflect that the coefficient estimate is different from zero at the 1%,5% and 10% levels (two-tailed), respectively. t-statistics are reported beneath the coefficients, in the parentheses.

Table 9 Regression results using Skewness as independent variable

	Pred. Sign	Dependent variable=CETR		
		Pooled-OLS	FE	RE
Skewness	-	-0.004*	-0.012**	-0.014**
		(-1.701)	(-2.002)	(-2.136)
Size	/	0.004***	0.000	-0.002
		(-2.925)	(-0.05)	(-0.784)
Leverage	-	-0.028***	-0.006	-0.010***
		(-14.849)	(-1.561)	(-3.192)
Salesgrowth	-	-0.095***	-0.059***	-0.071***
		(-10.063)	(-3.604)	(-4.891)
RD+Ads	-	-0.470***	-0.037	-0.269***
		(-17.261)	(-0.260)	(-4.955)
SG&A	-	0.060***	-0.086	0.004
		(-4.264)	(-1.166)	(-0.125)
Profitability	/	0.471***	-0.149**	0.040
		(-18.555)	(-2.530)	(-0.920)
PPE	-	-0.035***	-0.123***	-0.049***
		(-7.014)	(-4.659)	(-4.823)
Intangible asset	-	0.046***	-0.065	0.050**
		(-4.182)	(-0.999)	(-2.108)
Inventory	-	0.114***	0.056	0.110***
		(-7.832)	(-0.362)	(-3.347)
Casholding	-	0.053***	-0.114*	0.056*
		(-3.262)	(-1.652)	(-1.691)
NOL	-	0.126***	0.049***	0.092***
		(-16.728)	(-3.613)	(-7.739)
ΔNOL	+	2.716***	2.292***	2.036***
		(-25.900)	(-16.009)	(-15.285)
Capital expenditure	-	-0.051**	-0.029	-0.044
		(-2.008)	(-0.513)	(-1.008)
Equityincome	-	-0.700**	-0.123	-0.428
		(-2.324)	(-0.159)	(-0.753)
Foreign income	/	-0.409***	-0.068	-0.202**
		(-8.280)	(-0.474)	(-2.115)
Litigation	+	0.013***	.	0.034***
		(-2.876)	.	(-3.299)
Independence	+	-0.070***	.	-0.068
		(-3.792)	.	(-1.592)
CEOduality	+	-0.004	0.003	0.007
		(-1.076)	(-0.265)	(-1.117)
Big 4	+	0.008	0.081**	0.013
		(-1.214)	(-2.521)	(-0.895)
_cons		0.101***	0.237***	0.220***
		(-5.290)	(-2.604)	(-5.281)
N		5010	5010	5010
F /Wald		237.95	29.9	616.46
R-sq		0.374	0.073	0.374
F test		2.50***		
Hausman Test		-		117.81***

Table 9 presents the regression results using pooled-OLS moedl, fixed-effects model and randam-effects model. The dependent variable is Cash Effective Tax Rates (CETR) and the independent variable is Skewness. Definition of variables can be found in table 3 and source of data can be found in table 4. This thesis uses ***,** and * to reflect that the coefficient estimate is different from zero at the 1% ,5% and 10% levels (two-tailed), respectively. t-statistics are reported beneath the coefficients, in the parentheses.

H2: Ceteris paribus, conditional conservatism's tax reducing effects are less pronounced when firms have a tax loss carry forward in the current period

To test H2, an interaction term of tax loss and conditional conservatism is included. Tax loss is defined as a dummy variable that equals to 1 if firms have tax losses carried forward in the current period and equals to 0 otherwise. With regard to H2, the regression results indicate that the coefficients of the C-score and skewness are -0.025 and -0.011, respectively, and the interaction term of the C-score * tax losses, the interaction term of the skewness * tax losses are all significantly positive (with coefficients of 0.016 and 0.017, respectively). Therefore, the overall effects of conditional conservatism on tax burdens are remediated by the presence of tax losses. The remediation effects imply that the tax-reducing feature of conditional conservatism would be less pronounced when the company has tax losses carried forward in the current period. An explanation may be that tax losses in the current period indicate that firms are likely to have timely recognized bad news, since conditional conservatism is about timely recognizing bad news while gradually recognizing good news, the existence of tax losses may reduce the sensitivity of tax burdens to conditional conservatism. Therefore, the overall tax reducing effects are statistically less pronounced. Table 10 presents the regression results of H2.

Table 10 Regression results of H2

		Dependent variable=CETR		
	Pred. Sign	FE	FE	
C-score	-	-0.025**		
		(-2.313)		
Skewness	-		-0.011*	
			(-1.796)	
Taxloss	/	0.032**	0.039**	
		(-2.446)	(-1.974)	
C-score*Taxloss	+	0.016**		
		(-2.188)		
Skeness*Taxloss	+		0.017*	
			(-1.750)	
N		7815	5010	
F		26.93	15.21	
R-sq		0.071	0.075	

Table 10 presents regression results of H2. The dependent variable is CETR and the independent variables are C-score and Skewness repsectively. To test H2, an interaction term of conditional conservatism and Taxloss is included. Taxloss is a dummy variable that equals to 1 when firms have tax losses carried forward in the current period, and equals to 0 otherwise. Definition of other variables can be found in table 3 and source of data can be found in table 4. Since the results of control variables are similar, only variables of main interest are presented. This thesis uses ***,** and * to reflect that the coefficient estimate is different from zero at the 1%,5% and 10% levels (two-tailed), respectively. t-statistics are reported beneath the coefficients, in the parentheses.

H3: *Ceteris paribus, conditional conservatism's tax reducing effects are less pronounced for firms that have one of the Big Four accounting firms as their external auditor.*

As for H3, the coefficients of the C-score and skewness are -0.076 and -0.029, respectively. The coefficients of the C-score * Big Four and skewness * Big Four are positive (0.054 and 0.029, respectively) and this positive association is in line with the explanation that the Big Four accounting firms represent a higher audit quality; therefore, the firm's tendency of leveraging conditional conservatism to reduce tax payments is restrained. However, skewness * Big Four is only marginally significant and the C-score * Big Four is not significant, thus although the results support H3, the evidence is not compelling. Table 11 presents the regression results of H3.

Table 11 Regression results of H3

	Dependent variable=CETR		
	Pred. Sign	FE	FE
C-score	-	-0.076*	
		(-1.764)	
Skewness	-		-0.029*
			(-1.921)
Big 4	/	0.031	.
		(-1.138)	.
C-score*Big 4	+	0.054	
		(-1.228)	
Skeness*Big 4	+		0.029*
			(-1.883)
N		7815	5010
F		28.23	15.90
R-sq		0.071	0.074

Table 11 presents regression results of H3. The dependent variable is CETR and the independent variables are C-score and Skewness repsectively. To test H3, an interaction term of conditional conservatism and Big 4 is included. Big 4 is a dummy variable that equals 1 if the company hires Big 4 accounting firm as their external auditor, and equals 0 otherwise. Definition of other variables can be found in table 3 and source of data can be found in table 4. Since the results of control variables are similar, only variables of main interest are presented. This thesis uses ***,** and * to reflect that the coefficient estimate is different from zero at the 1%,5% and 10% levels (two-tailed), respectively. t-statistics are reported beneath the coefficients, in the parentheses.

H4: *Ceteris paribus, the tax reducing effects of conditional conservatism would be less pronounced for firms of high litigation risks*

With regard to H4, the coefficient of C-score and skewness are -0.029 and -0.015 respectively, and the coefficients of interaction terms are 0.056 and 0.016 respectively. Results show that high litigation risks may attenuate the tax reducing effects of conditional conservatism, and the finding is in line with the explanation that firms of high litigation risks have less incentive to use conditional conservatism to reduce taxes, because the potential risks and costs of tax avoidance activities are high. Although the direction of coefficients of interaction terms is within expectation, the results are not significant. Therefore, H4 is not statistically supported. Table 12 presents the regression results of H4.

Table 12 Regression results of H4

	Pred. Sign	FE	FE
Dependent variable=CETR			
C-score	-	-0.029***	
		(-2.637)	
Skewness	-		-0.015**
			(-2.059)
C-score* Litigation	+	0.056	
		(-1.517)	
Skeness*Litigation	+		0.016
			(1.547)
N		7815	5010
F		28.23	15.90
R-sq		0.071	0.074

Table 12 presents regression results of H4. The dependent variable is CETR and the independent variables are C-score and Skewness repsectively. To test H4, an interaction term of conditional conservatism and litigation is included. Litigation is a dummy variable that equals to 1 when firms are in industries of high litigation risks (with SIC code of 2833-2836, 3570-3577, 5200-5961 and 7370-7374), and equals to 0 otherwise. Definition of other variables can be found in table 3 and source of data can be found in table 4. Since the results of control variables are similar, only variables of main interest are presented. This thesis uses ***,** and * to reflect that the coefficient estimate is different from zero at the 1%,5% and 10% levels (two-tailed), respectively. t-statistics are reported beneath the coefficients, in the parentheses.

7. Additional analysis

This thesis examines the relationship between conditional conservatism and tax burdens. The results of this thesis indicate that conditional conservatism is negatively correlated with tax burdens. Given the sticky nature of conservatism and tax, to resolve the potential issue of reverse causality, this thesis introduces lagged conditional conservatism as an instrumental variable (IV) and conducts 2sls regressions. Lagged conditional conservatism is an appropriate IV, because it is closely related to current conditional conservatism (because firms tend to keep their earnings smooth, so they avoid significant changes in conditional conservatism) and it affects CETR (because of the tax deferring effects of conditional conservatism). On the other hand, CETR is not likely to affect lagged conditional conservatism, because CETR is less meaningful than the marginal tax rates for managers in terms of decision-making (Kim & Jung, 2007). Even if managers make decisions based on CETR, future CETR is unlikely to affect the conditional conservatism of the past. The results of the 2sls regression illustrate that the coefficients of both the C-score and skewness are significantly negative (-0.014 and -0.279, respectively). Moreover, the results related to over-identifying tests are not significant (with p-values of 0.407 and 0.396, respectively), suggesting that lagged conditional conservatism is an appropriate IV. Overall, after controlling the effects of reverse causality, conditional conservatism is still negatively associated with tax burdens, suggesting that conditional conservatism can reduce tax burdens. Table 13 presents the regression results of additional analysis.

Table 13 2SLS regression results

Dependent variable=CETR		
C-score	-0.014**	
	(-1.991)	
Skewness		-0.279**
		(-1.993)
F	38.20	12.69
N	6264	3771
R-sq	0.099	0.101
Over-identifying test	0.152（p=0.407）	0.129（p=0.396）

Table 13 presents the 2SLS regression results. The denpendent variable is CETR, and the independent variable is C-score and skewness respectively. Lagged C-score and lagged skewness are included as instrumental variable (IV), respectively. This thesis uses ***,** and * to reflect that the coefficient estimate is different from zero at the 1%,5% and 10% levels (two-tailed), respectively. t-statistics are reported beneath the coefficients, in the parentheses.

8. Conclusion

8.1 Findings and implications

This study analyzes the association between conditional conservatism and tax avoidance, and the main research question this thesis addresses is listed below:

RQ: Can accounting conservatism be used for tax avoidance to reduce tax burdens?

To answer this question, this thesis computes tax avoidance based on cash effective tax rates (CETR) and employs the C-score and skewness as measurements of conditional conservatism. The findings of this thesis suggest that firms can utilize conditional conservatism as a vehicle to reduce actual tax payments. The results provide some indication that the tax reducing effects of conditional conservatism would be less pronounced when firms have tax losses carried forward. There is some marginally significant evidence that suggest that the tax reducing effects of conditional conservatism are less pronounced when firms hire one of the Big Four accounting firms as an external auditor. With regards to litigation risks, the thesis can not find statistically significant evidence that supports an attenuating role of litigation risks in the relationship of tax avoidance and conditional conservatism.

The findings of this thesis may be meaningful to various stakeholders. For academia, this thesis can add value by providing direct empirical evidence to the unresolved discussion of whether conditional conservatism can reduce tax burdens. Furthermore, this thesis confirms the findings of Lara et al. (2009b), who postulated that high marginal tax rates induce conditional conservatism. Moreover, this thesis further examines how some firm's features such as having tax losses carried forward affect the tax reducing effects of conditional conservatism and, therefore, provides additional insights explaining the association between tax and conservatism. Standard setters can develop a better comprehension of the overall effects of accounting conservatism as well, which will allow them to more adequately evaluate the existing policy to discourage firms from using conditional conservatism to engage in tax avoidance. Furthermore, these results can assist tax authorities to develop better models to detect a firm's tax avoidance activities.

8.2 Limitations and suggestions for future research

One limitation of this research is the measurement of conservatism. Although the two proxies of conditional conservatism are complementary to each other, the measurements are not perfect

and may suffer from estimation errors to some extent. Therefore, future researchers can further develop proxies of conditional conservatism that can offer more reliability and accuracy. Another drawback of this research is that its generalizability is limited, because the sample consists of U.S. companies that are subject to U.S. GAAP and U.S. tax codes; thus, the results of this research may not be generalized to companies in other countries.

For future research, researchers can conduct a further examination into the tax reducing effects of conditional conservatism for countries that adopt different accounting standards/different tax laws. Besides, it is also advisable to examine and determine the cost (be it a tax or non-tax cost) of conditional conservatism being used to reduce taxes; after all, companies are making operating and tax planning decisions based not only on the benefits, but also on the overall costs.

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Appendix

To better clarify the correlation with regard to the model that is empirically tested in this thesis, Libby boxes are introduced based on Libby's (1981) predictive validity framework. The upper two boxes serve as constructs (i.e., conservatism and tax avoidance) that represent the theoretical domain, while the lower two boxes on the operational domain represent how theoretical constructs are operationalized. Between the boxes are five links. Libby et al. (2002) proposed that the study's internal validity and external validity are determined by the validity of these five links. According to Libby et al. (2002), internal validity measures how well the research design captures causes and effects, while external validity refers to the generalizability of the research. Below are detailed discussions regarding the five links' validity.

Link 1: theory and hypothesis

Libby (1981) and Libby et al. (2002) proffered that, a good hypothesis should capture the hypothesized causal relationship between concepts and should possess external validity. Based on the tax explanation of conservatism, as proposed by Watts (2003), this thesis hypothesizes a causal relation between conditional conservatism and tax avoidance, i.e., conditional conservatism can be used for tax avoidance and can reduce tax burdens. External validity, however, refers to representativeness or generalizability. Campbell (1957) suggested that, external validity relates to the population, research settings and variables that the effects of interest can be generalized. The sample of this research consists of companies in the United States since U.S. companies are subject to U.S. GAAP and U.S. tax laws; hence, the results may not be generalized as pertaining to other countries (e.g., European countries or Asian countries).

Link 2 and 3: operationalizing independent and dependent variables

Libby (1981) and Libby et al. (2002) postulated that the operationalization of concepts should be internally valid. In this thesis, the first measure of conditional conservatism is the C-score. One desirable feature of the C-score is that it provides firm-year evaluations of conditional conservatism; therefore, it can be employed to examine the association between conditional conservatism and other constructs (Khan & Watts, 2009). Moreover, the C-score has been proved as a valid measurement of conservatism (Chi et al., 2009; Khan & Watts, 2009); therefore, it is deemed a reasonable independent variable for this research. An additional measure of conservatism is the skewness method. Similar to the C-score, the skewness method also provides firm-year evaluations of conservatism, and it is complementary to the C-score,

because the skewness method also captures asymmetric verifications. Nevertheless, it does not rely on stock returns to determine economic gains or losses; thus, it is free from errors due to market inefficiency (Givoly & Hayn, 2000; Zhang, 2008). For the dependent variable, tax avoidance is operationalized as cash effective tax rates (CETR). CETR is a commonly seen as a measure of tax avoidance; the biggest advantage of CETR over other measures is that it effectively captures tax-deferring effects (Dyreng et al., 2008; Hanlon & Heitzman, 2010). This feature is crucial for the research setting, because tax deferring is how conditional conservatism helps to reduce taxes, and CETR is able to measure these effects. Besides, the numerator of CETR is income taxes paid; hence, it can capture any actual reductions in tax payments caused by conditional conservatism.

Link 4 and 5 statistics and other potentially influential variables

Link 4 represents the causal correlation that this research empirically tests, i.e., whether conditional conservatism leads to reductions in tax burdens. To better capture the causal effects, it is essential that the effects of the other factors on dependent variables are controlled (Libby, 2002). Link 5 reflects the effects of other factors on the dependent variable of this thesis, i.e., CETR. Furthermore, for this research, three different types of control variables are introduced. Following Wilson (2009) and Khurana and Moser (2012), firm-specific features (e.g., size) are controlled, so that the causal effects are not caused by firm-specific factors other than conditional conservatism. Likewise, following Armstrong et al. (2015) and Lanis and Richardson (2015), corporate governance variables and an external monitoring variable are also introduced. Besides, given the sticky nature of conservatism and tax avoidance, to resolve the issue of reverse-causality, this thesis conducts 2SLS regression and provides additional analysis.

As noted earlier, a study's internal validity and external validity are determined by the 5 links in the Libby boxes (Libby et al., 2002). Based on the discussion of the 5 links above, it can be concluded that this thesis is internally valid; however, the external validity is somewhat limited. This is because the results may not be generalized to companies located in other countries, due to the diverse accounting standards and tax codes. Below in the next page are the Libby boxes.

Construct

Conditional Conservatism

Link 1

Corporate Tax Avoidance

Link 2

Link 3

Operational

C-score

Skewness

Link 4

Cash Effective Tax Rates

Link 5

Control variables:

Firm-specific control variables

Corporate governance control variables

External governance control variables