The Implications of Book-Tax Differences: A Meta-Analysis

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Abstract

Over the last decade, a large body of tax accounting literature on the association between book-tax conformity (BTC)/book-tax differences (BTD) and firms' opportunistic reporting behavior has emerged. Yet, existing empirical evidence on the questions whether increased book-tax conformity actually reduces Earnings Management (EM) and/or Tax Sheltering (TS) and whether book-tax differences are really indicative of such opportunistic reporting behavior is not yet clear. We therefore conduct a meta-analysis aimed at identifying the sources of heterogeneity in primary studies and at providing a consensus estimate with respect to the sign and the statistical significance level for the examined association. Our qualitative literature review reveals that major sources of heterogeneity in the study design include differences in the proxies for EM and TS and in the measures used to determine BTD and BTC. Our meta-regression results show that BTD are indeed indicative of opportunistic reporting behavior, and even more so of EM. These results are, however, weaker for studies that determine BTD only roughly as the difference between book and estimated taxable income instead of using more specific BTD proxies. Moreover, examining actual BTD computed from tax returns instead of only approximating these from financial statements strongly increases the effects. Hence, efforts taken to accurately determine BTD seem to be worth wile when it comes to the explanatory power for opportunistic reporting. Furthermore, our results suggest a negative association between book-tax conformity and EM/TS, which we interpret as an indicator for higher conformity indeed being effective in reducing aggressive reporting.

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1. Introduction

The observed increase in differences between book and taxable income (Book-Tax Differences, BTD) as well as various reporting scandals in the US have triggered an intense discussion on the appropriate degree of Book-Tax Conformity (BTC), i.e. the degree to which book and tax accounting should be aligned. In particular, it is largely unclear to what extent book-tax differences relate to deterministic deviations between financial and tax accounting or rather to "aggressiveness" in either or both book and tax reporting. At the same time, it also is uncertain whether increased book-tax conformity would actually reduce Earnings Management (EM) and/or Tax Sheltering (TS) and whether book-tax differences are really indicative of such opportunistic reporting behavior.

Over the last decade, a large body of tax accounting literature on these issues has emerged. The empirical evidence is, however, not yet clear. While recent evidence provided by Watrin et al. (2014) and Blaylock et al. (2015), for instance, finds that book-tax conformity is associated with significantly more earnings management, Tang (2015) concludes that high book-tax conformity deters overall earnings management and tax avoidance. Furthermore, existing studies partly report opposing results with respect to the influence of BTD on earnings management and/or tax sheltering. While some studies determine a significant positive association between BTD and opportunistic reporting (e.g. Wilson (2009)), other papers report no significant (e.g. Lisowsky et al. (2013)) or even a significant negative relation (e.g. Lennox et al. (2013)). Hence, the question arises whether particular study characteristics could explain these differences in outcomes. In that regard, major sources of heterogeneity in the study design include differences in the proxies for EM and TS and in the measures used to determine BTD and BTC. Measures for EM and TS, for example, include accruals, indicator variables for detected or alleged fraud, or tax contingencies. With respect to BTD, most studies rely on proxies such as the total difference between book and estimated taxable income while others use more specific measures targeted at capturing EM/TS more precisely. Moreover, a major challenge for most investigations constitutes the fact that actual tax return data is not available. As a consequence, in the majority of studies BTD are approximated from publicly available financial statement information, whereas only a few studies are based on observed BTD upon tax return data availability.

The contribution of our meta-analysis therefore is - beyond a qualitative literature review - to quantify the impact of these sources of heterogeneity in study design with respect to the sign and statistical significance of the association between BTD/BTC and EM/TS. To this end, we

employ meta regression analysis (MRA) as an innovative tool in the empirical accounting literature (Pomeroy and Thornton (2008)). This approach is aimed at clarifying the interpretation of opposing outcomes and at providing guidelines for future studies on this topic.

In particular, our findings show that BTD are indeed indicative of both EM and TS, and even more so of EM. These results are, however, weaker for studies that only determine BTD roughly as the difference between book and estimated taxable income instead of using more specific BTD proxies. Moreover, examining actual BTD computed from tax returns instead of only approximating these from financial statements strongly increases the effects. Hence, efforts taken to accurately determine BTD seem to be worth wile when it comes to the explanatory power for opportunistic reporting. Furthermore, our results suggest a negative association between book-tax conformity and EM/TS which we interpret as an indicator for higher conformity being indeed effective in reducing aggressive reporting.

The paper continues as follows: Chapter 2 contains a comprehensive literature review with regard to the association between BTD and EM/TS and demonstrates the existing heterogeneity in previous studies with regard to the measurement of BTD/BTC and EM/TS. Chapter 3 describes the procedures and methodology used for our quantitative meta-analysis. The results of our study are presented and discussed in Chapter 4. Chapter 5 concludes.

2. Qualitative Literature Analysis: Association between BTD/BTC and Proxies for Tax Sheltering and/or Earnings Management

There has been a long-standing debate among tax experts and legislators regarding the appropriate degree of book-tax conformity, i.e. the extent to which book and tax accounting should be aligned. [1] In that regard, proponents of increased book-tax conformity (Desai (2003) and Desai (2005); Whitaker (2005); Shaviro (2009); Yin (2001)) posit that it would constrain managers' scope and incentives for aggressively reporting on both financial and taxable income as a result of the book-tax trade-off,[2] thereby enhancing earnings quality, tax compliance and transparency. Opponents (Hanlon et al. (2005); Hanlon and Shevlin (2005); Hanlon et al. (2008); McClelland and Mills (2007)) of increased book-tax conformity, however, emphasize the divergent objectives of both reporting lines and expect that book-tax conformity would result in a decrease of accounting information available to the public and,

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[1] For an extensive discussion on the pros and cons of book-tax conformity, *see* for instance Hanlon and Maydew (2009); McClelland and Mills (2007).

[2] Generally speaking, managers would have to trade-off high book income vs. low taxable income.

hence, in a decrease of earnings quality (Hanlon et al. (2005); Ali and Hwang (2000); Guenther and Young (2000), Hanlon et al. (2008)).

Generally speaking, divergent reporting in financial and tax accounts gives rise to book-tax differences. The extent of BTD, in turn, presumably depends on the level of BTC in a given country. Specifically, the lower the conformity level, the higher is the expected scope for BTD.

According to Desai and Dharmapala (2009), the measured book-tax gap can – apart from deterministic differences between tax and financial accounting – be attributed to either downward managing of taxable income (tax sheltering/avoidance) or over-reporting of financial income (earnings management).[3] There is a great variety of empirical papers which examine precisely this relation and test for a potential association between BTD/BTC and proxies for TS and/or EM.[4] Most of these individual studies estimate models whose specifications roughly resemble the following equation:

$$Y = X\emptyset + \gamma BTD + \vartheta$$

(1)

where *Y* is a measure of EM or TS, *X* a vector of control variables including a constant, *BTD* a measure of BTD or BTC, and ϑ an error term.

Table 1 first of all provides an overview of the identified studies on this topic and summarizes the papers with respect to their authors, title, year and journal of publication, sample period, country and size as well as, most importantly, the utilized EM/TS and BTD/BTC measures.

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[3] For more information on that *see* Desai and Dharmapala (2009), p. 540.
[4] There are, however, only very few studies which examine the effects of BTD on the interplay of earnings management and tax sheltering. For examples *see* Tang (2015); Frank et al. (2009).

Table 1: Overview of studies with BTD as a proxy for Tax Sheltering and/or Earnings management

Authors	Title	Year	Publication	Period	Country	Sample Size	Topic	Dependent variable	BTD or BTC?	BTD/BTC measure(s)
Wilson	An Examination of Corporate Tax Shelter Participants	2009	TAR	1975-2002	U.S.	118	TS	TS indicator	BTD	Total BTD BTD w/o tax shelt. Permanent BTD Temporary BTD
Desai, Dharmapala	Corporate tax avoidance and firm value	2009	REST	1993-2001	U.S.	4,985	TS	TS indicator	BTD	Total BTD
Gallemore, Maydew, Thorncock	The Reputational Costs of Tax Avoidance	2014	CAR	1995-2001	U.S.	84	TS	TS indicator	BTD	Total BTD
Lisowsky	Seeking Shelter: Empirically Modeling Tax Shelters using Financial Statement Information	2010	TAR	2000-2004	U.S.	9,223	TS	TS indicator	BTD	Total BTD DTAX
Lisowksy, Robinson, Schmidt	Do Publicly Disclosed Tax Reserves Tell Us About Privately Disclosed Tax Shelter Activity?	2013	JAR	2006-2009	U.S.	3,262	TS	TS indicator	BTD	Total BTD Permanent BTD DTAX
Mills	Book-Tax Differences and Internal Revenue Service Adjustments	1998	JAR	1982-1992	U.S.	525	TS	Audit adjustments	BTD	Total BTD Temporary BTD
Chen, Gavious, Josef	The Relationship Between the Management of Book Income and Taxable Income Under a Moderate Level of Book-Tax Conformity	2013	JAAF	1994-2007	Isreal	313	TS (and EM)	Audit adjustments	BTD	Total BTD
Cho, Wong, Wong	Book-Tax Differences and Inland Revenue Audit Adjustments in New Zealand	2006	JBFA	1991-2000	New Zealand	81	TS	Audit adjustments	BTD	Total BTD Temporary BTD
Mills, Sansing	Strategic Tax and Finanical Reporting Decisions: Theory and Evidence	2000	CAR	1982-1992	U.S.	481	TS	Audit adjustments	BTD	Total BTD
Tang	An empirical analysis of book-tax reporting difference and tax noncompliance behavior in China	2005	Thesis	1998-2003	China	1,251	TS	Audit adjustments	BTD	Total BTD
Chan, Lin, Mo	Will a departure from tax-based accounting encourage tax noncompliance? Archival evidence from a transition economy	2010	JAE	1996-2003	China	1,286	TS	Audit adjustments	BTD	Total BTD
Frischmann, Shevlin, Wilson	Economic Consequences of Increasing the Conformity in Accounting for Uncertain Tax Benefits	2008	JAE	2007	U.S.	354	TS	Tax contingencies	BTD	Total BTD
Cazier, Rego, Tian, Wilson	Early Evidence on the Determinants of Unrecognized Tax Benefits	2009	WP	2007	U.S.	566	TS	Tax contingencies	BTD	Total BTD Permanent BTD DTAX

Authors	Title	Year	Journal	Period	Country	N	Type	Topic	Measure	Measures
Blouin, Tuna	Tax Contingencies: Cushioning the blow to earnings?	2007	WP	1997-2004	U.S.	6,343	TS (and EM)	Tax contingencies	BTD	Total BTD Temporary BTD
Atwood, Drake, Myers, Myers	Home Country Tax System Characteristics and Corporate Tax Avoidance: International Evidence	2012	TAR	1993-2007	22 countries	69,301	TS	Reduction in taxes paid	BTC	BTC measure Atwood
Kraft	Management Earnings Forecasts and Book-Tax Differences	2015	IJEF	1995-2010	U.S.	16,224	EM	Meeting earnings forecasts	BTD	Total BTD Discretionary BTD DD BTD
Philipps, Pincus, Rego, Wan	Decomposing Changes in Deferred Tax Assets and Liabilities to Isolate Earnings Management Activities	2004	JATA	1994-2000	U.S.	396	EM	Meeting earnings forecasts	BTD	Temporary BTD
Phillips, Pincus, Rego	Earnings Management: New Evidece Based on Deferred Tax Expense	2003	TAR	1994-2000	U.S.	4,139	EM	Meeting earnings forecasts	BTD	Temporary BTD
Badertscher, Phillipps, Pincus, Rego	Earnings Management Strategies and the Trade-Off between Tax Benefits and Detection Risk: To Conform or Not to Conform?	2009	TAR	1997-2002	U.S.	8,099	EM	Financial statement fraud	BTD	Total BTD
Lennox, Lisowsky, Pittmann	Tax Aggressiveness and Accounting Fraud	2013	JAR	1981-2001	U.S.	126,273	EM (and TS)	Financial statement fraud	BTD	Total BTD Permanent BTD DTAX
Ettredge, Sun, Lee, Anandarajan	Is Earnings Fraud Associated with High Deferred Tax and/or Book Minus Tax Levels?	2008	AJPT	1988-2002	U.S.	130	EM	Financial statement fraud	BTD	Temporary BTD Total BTD
Watrin, Pott, Ullmann	The effects of book-tax conformity and tax accounting incentives on financial accounting: evidene from public and private limited companies in Germany	2012	IJAAPE	1993-2004	Germany	1,778	EM	Discretionary accruals	BTD	Total BTD
Burgstahler, Hail, Leuz	The Importance of Reporting Incentives: Earnings Management in European Private and Public Firms	2006	TAR	1997-2003	13 European countries	269	EM	EM indicator Leuz et al.	BTC	Binary indicator
Blaylock, Gaertner, Shevlin	The association between book-tax conformity and earnings management	2015	RAST	1996-2007	34 countries	362	EM	EM indicator Leuz et al. Discretionary accruals	BTC	BTC measure Atwood

Authors	Title	Year	Journal	Period	Country	Sample size	Topic	Dependent variable	Indep.	BTD measure
Watrin, Ebert, Thomsen	Book-Tax Conformity and Earnings Management: Insights from European One- and Two-Book Systems	2014	JATA	2004-2011	27 European countries	26,708	EM	Discretionary accruals	BTC	Binary indicator BTC measure Watrin
Tang	Does Book-Tax Conformity Deter Opportunistic Book and Tax reporting? An International Analysis	2015	EAR	1994-2007	32 countries	372	EM and TS	Discretionary accruals Reduction in taxes paid	BTC	BTC measure Tang BTC measure Atwood
Frank, Lynch, Rego	Tax Reporting Aggressiveness and Its Relation to Aggressive Financial Reporting	2009	TAR	1991-2005	U.S.	156 45,235	TS and EM	TS indicator Discretionary accruals	BTD	DTAX Total BTD DD BTD

Please refer to Table 5 in the Appendix for journal abbreviations. Sample size indicates the largest number of observations in a respective paper with BTD included as explanatory variable. "EM" signifies Earnings Management; "TS" signifies Tax sheltering. The categorization of the topic is based on our own assessment of the analyzed papers. "DTAX" refers to Discretionary Permanent BTD; "DD BTD" refers to Desai and Dharmapala's (2006) Discretionary BTD measure; "BTD w/o tax shelt." refers to BTD with the effect of tax sheltering removed.

Table 1 sub-groups studies according to their dependent variables, i.e. by whether and how EM or TS is measured (see dashed and bold lines). In a second step, papers are clustered by their independent variables, i.e. by the BTD or BTC measure(s) relied upon. In this regard, several studies not only examine one single measure, but use a set of (BTD) variables (e.g. Wilson (2009); Frank et al. (2009); Cazier et al. (2009); Lennox et al. (2013); Lisowsky et al. (2013)).

Overall, the empirical evidence provided by these existing studies is rather heterogeneous. Firstly, recent evidence provided by Watrin et al. (2014) and Blaylock et al. (2015) demonstrates that book-tax conformity is associated with significantly more earnings management, whereas Tang (2015) finds that high book-tax conformity reduces overall earnings management and tax avoidance. Secondly, some studies determine a significant positive association between BTD and opportunistic reporting (Wilson (2009)), while other papers report no significant (Lisowsky et al. (2013)) or even a significant negative relation (Lennox et al. (2013)). Hence, the question arises whether particular study characteristics could explain these differences in outcomes. In that respect, heterogeneity in the study design particularly relates to differences in the measures used to determine BTD and BTC and in the proxies used to capture EM and TS. These measures are discussed comprehensively in the following.

Types of BTD

There exist several measures of BTD (see Table 2) that are employed in the empirical tax accounting literature. Some BTD measures are specifically constructed so as to capture or to account for aggressiveness in financial and/or tax reporting; other measures are defined more broadly and also entail items that are not considered to be used by firms for aggressive reporting. As Hanlon and Heitzman (2010) point out, it is, however, "often not clear why a particular measure is used for the research question at hand".

Table 2: BTD measures used in the empirical tax accounting literature

BTD Measure	Author(s)	Computation	Description
Total BTD	Manzon and Plesko (2002)	$Pretax\ book\ income - ((\frac{current\ tax\ expense}{statutory\ tax\ rate} - (NOL_t - NOL_{t-1}))$	Pretax book income – grossed up tax expense, i.e. the total difference between book and taxable income
Temporary BTD	-	$\frac{Deferred\ tax\ expense}{Statutory\ tax\ rate}$	Temporary BTD
Permanent BTD	-	$Total\ BTD - Temporary\ BTD$	Differences between book and taxable income that do not reverse over time
DTAX	Frank et al. (2009)	Error term from the following regression: $Permanent\ BTD_{it} = \alpha + \beta * Nondiscretionary\ items_{it} + \gamma * other\ statutory\ adjustments_{it} + \varepsilon_{it}$	Discretionary permanent differences Residual from regression of total permanent BTD on non-discretionary items that are known to cause permanent differences as well as on other statutory adjustments
Discretionary Total BTD	Desai and Dharmapala (2006)	Error term from the following regression: $Total\ BTD_{i,t} = \beta * Total\ Accruals_{i,t} + \mu_i + \varepsilon_{i,t}$	Part of Total BTD that can be attributed to tax avoidance and not earnings management; residual from regression of Total BTD on total accruals
BTD with the effect of tax sheltering removed	Wilson (2009)	Total BTD – effect of tax benefits: $Total\ BTD - \frac{tax\ savings}{statutory\ tax\ rate}$	BTD without the effect of tax sheltering; deduction from the Total BTD of the effect, i.e. the tax savings, of tax benefits

Source: Own representation, based on Hanlon and Heitzman (2010). "BTD" signifies Book-Tax Difference; "DTAX" refers to Discretionary Permanent BTD; "NOL" signifies Net Operating Loss Carryforward.

Total BTD (used in 20 studies) represent the most comprehensive measure and capture both temporary and permanent BTD. Absent tax return data, they are mostly computed from financial statement information as the difference between pre-tax book income and estimated taxable income. Following Manzon and Plesko (2002), taxable income is mostly approximated by grossing up the current tax expense with the statutory tax rate.[5] Though the Total BTD measure is appealing with regard to its straightforward computation, it has been posited that it is subject to substantial measurement error, given various problems associated with estimating taxable income from financial statements (Hanlon (2003)). These problems are for instance related to different consolidation rules for book and tax purposes, tax credits, foreign operations or loss firms.[6]

Apart from this basic BTD measure, the empirical literature has come up with some more precise BTD proxies that are designed to specifically account for aggressiveness in either or both financial and tax reporting.

Temporary BTD (used in 7 studies) emerge as a result of differences between book and taxable income with regard to the timing of accrual income and expense items. They can be measured by grossing up the deferred tax expense with the statutory tax rate (e.g. Moore (2012)). Temporary BTD are considered to entail information about potential management of non-tax accruals such as depreciation (Hanlon and Heitzman (2010), p. 132).[7]

Permanent BTD (used in 4 studies), constituting the conceptual counterpart to temporary BTD, result from differences between book and taxable income that do not reverse over time. Permanent BTD are usually computed as the difference between estimated Total BTD and Temporary BTD (e.g. Wilson (2009); Lisowsky et al. (2013)). In the literature, it has been brought forward that an "ideal" tax shelter features such Permanent BTD (Plesko (2004); Frank et al. (2009); Shevlin (2002)),[8] as they decrease taxable income and effectively reduce ETRs without affecting financial income reported to shareholders. Hence, Permanent BTD could be indicative of aggressive tax reporting. Indeed, Wilson (2009) for instance

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[5] A refined approach and more details on the computation are for example provided by Wilson (2009).

[6] For more details, also *see* Hanlon and Heitzman (2010); Desai and Dharmapala (2006). Moreover, Hanlon and Heitzman (2010) posit that Total BTD also include Permanent BTD that are not related to accounting accruals as well as items that do not really represent BTD. They therefore conclude that Total BTD may not be appropriate to examine "whether information in the tax expense is indicative of earnings management in other pre-tax accruals".

[7] Other non-tax accruals include e.g. the warranty and bad debt expense.

[8] As an example for the German institutional context, internally generated intangible assets must not be recognized in tax balance sheets, but recognition in single financial accounts is optional. Hence, in case these assets are recognized in single financial statements, income is increased without raising taxable income, *see* Watrin et al. (2014), p. 66.

demonstrates that most tax shelters generate Permanent BTD. However, Hanlon and Heitzman (2010) claim the notion of Permanent BTD being more indicative of tax aggressiveness than Temporary BTD overall to be "unsupported" by empirical evidence.

A frequently used measure is the **Discretionary permanent differences (DTAX)** measure (used in 5 studies) developed by Frank et al. (2009). Targeted at quantifying "discretionary permanent differences", it is considered as a measure of tax reporting aggressiveness. Frank et al. (2009) base their proxy on permanent BTD (rather than total BTD) also arguing that anecdotal evidence suggests aggressive tax shelter activity to be rather associated with permanent BTD. In doing so, they justify excluding tax planning related to temporary differences.[9] Furthermore, they contend that permanent BTD "reflect items that are not considered aggressive tax reporting", such as changes in the tax cushion, changes in the valuation allowance, goodwill and other intangible assets or tax credits. Therefore, DTAX is estimated by regressing total permanent BTD on these non-discretionary items that are known to cause permanent differences as well as on other statutory adjustments[10] that are likely unrelated to tax aggressiveness. Specifically, discretionary permanent differences (DTAX) are the residual from this regression. This residual is supposed to capture intentional tax aggressiveness, after determinants that are not related to tax aggressiveness have been removed. Conceptually, this discretionary measure intends to cover items that decrease the firm's ETR, i.e. items that reduce taxable income and increase accounting earnings (Hanlon and Heitzman (2010), p. 142).[11] According to Frank et al. (2009), this kind of captured tax planning could or could not be considered fraudulent tax evasion (Frank et al. (2009), p. 468).

Similarly, **Desai and Dharmapala's (2006) Discretionary Total BTD** measure (used in 2 studies) constitutes a discretionary measure of tax reporting aggressiveness. More precisely, this proxy elicits that part of Total BTD that can be attributed to tax avoidance and not earnings management; i.e. it determines an abnormal BTD after the impact of total accruals is removed. Specifically, Desai and Dharmapala proceed as follows: First, they estimate Total BTD according to the methodology of Manzon and Plesko (2002). Then, Total BTD are

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[9]   Furthermore, Frank et al. (2009) argue that temporary differences also reflect earnings management via pre-tax accruals (also *see* Phillips et al. (2003) and Hanlon (2005) on this). As their study also examines how tax aggressiveness relates to pre-tax earnings management, they posit that they avoid spurious correlation between temporary BTD and pre-tax earnings management (and thus: spurious correlation between earnings management and tax aggressiveness) by excluding those temporary BTD from DTAX. Frank et al. (2009) contend that avoiding this kind of spurious correlation outweighs the costs of excluding tax planning associated with temporary BTD.

[10] Frank et al. (2009) name state taxes as an example for such statutory adjustments.

[11] Hanlon and Heitzman (2010) argue, however, that Frank et al.'s (2009) terminology for permanent BTD is "somewhat unfortunate", contending that it captures more than permanent BTD.

regressed on total accruals intended to capture earnings management. The residual from this regression, i.e. the component of Total BTD that cannot be explained by variations in total accruals, is determined to be a measure of tax avoidance activity. [12].

Finally, Wilson (2009) adopts quite a different approach to estimate **BTD with the effect of tax sheltering removed**. His approach is based on a sample of firms that were accused of having engaged in a tax shelter by the Treasury or by the Press. In particular, Wilson (2009) deducts from the Total BTD the effect, i.e. the tax savings, of tax benefits using information from the footnotes to the financial statements. To this end, he grosses up the identified federal tax savings by the applicable statutory corporate income tax rate and deducts it from the firms' Total BTD to obtain this revised BTD estimate. Ultimately, his approach aims at comparing BTD of tax shelter firms to those of non-shelter firms.[13]

BTC measures

Book-tax conformity pertains to the degree to which book and tax accounting are aligned and thus also to the extent to which there is room for book-tax differences to occur. The effects of BTC, for instance with regard to earnings management and tax sheltering, have mostly been studied by means of cross-country studies aimed at capturing differing levels of BTC across various countries. This follows the rationale that the amount of flexibility that firms have to report BTD varies across jurisdictions (Atwood et al. (2012), p. 1834). Early studies on book-tax conformity (Alford et al. (1993); Hung (2001); Ali and Hwang (2000); Guenther and Young (2000); Leuz et al. (2003); Burgstahler et al. (2006)) simply categorize the contemplated countries as having either high or low conformity. This categorization is derived from law, representing the perceived extent to which accounting provisions of the tax law conform to financial accounting standards (Watrin et al. (2014), p. 56). Hence, this measure is rather subjective and not of an empirical nature (Tang (2015), p. 443).

In contrast to that, Atwood et al. (2010) develop a comprehensive measure of the required level of BTC in a given country (used in 3 studies). They define BTC as "the flexibility that a firm has to report taxable income (TI) that is different from pre-tax book income (PTBI)" and base their measure on the conditional variance of current tax expense (CTE) (as of

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[12] Based on Desai and Dharmapala's (2006) approach, Kraft (2015) constructs another measure of Discretionary BTD, which is intended to capture both earnings management and tax avoidance. To that end, Kraft (2015) partitions total accruals into normal accruals and discretionary accruals using the model of Dechow et al. (2003). She then regresses Total BTD on normal accruals, arguing that the residual from this regression reflects Discretionary BTD that comprise earnings management and tax avoidance. Kraft's measure has not, however, been used in other studies yet.

[13] Indeed, Wilson (2009) finds that BTDs are no longer significantly different from those of the non-shelter control firms when tax savings generated by tax shelters are taken into account.

consolidated financial statements) for a given level of pre-tax book income.[14] In particular, they rely on the root mean-squared error (RMSE) from a country-year regression of CTE on PTBI as it provides an unbiased estimate of the standard error of the regression. Consequently, countries featuring a lower RMSE are assumed to have less flexibility in tax reporting and in employing strategies that generate BTD, and thus, face higher BTC. In fact, countries are ranked according to their RMSE such that countries with higher rankings in a given year feature a higher BTC.[15]

While Atwood et al.'s measure is based on data from consolidated financial statements, Watrin et al. (2014) develop a BTC measure that is based on the relation between single financial statements and tax accounts. They substantiate their approach arguing that in most European high conformity countries taxable income determination is related to single financial statements. Watrin et al.'s measure is based on permanent BTD, computed at the single entity level and aggregated at the country level. Specifically, per country and year, they compute the mean of all absolute values of permanent BTD. Thereafter, they assign a rank to each country in each year based on the mean permanent BTD such that countries with higher rankings exhibit higher BTC.[16] Obviously, the larger the BTD, the lower is the level of book-tax conformity.

Finally, another empirical proxy for mandated book-tax conformity was developed by Tang (2015). Precisely, Tang (2015) defines required BTC as the amount of variation in temporary and permanent BTD "that cannot be explained by opportunistic book and tax reporting for firms in a given country and year". To determine mandated BTD, Tang (2015) first of all aims at disentangling BTD relating to legal differences between financial and tax accounting from BTD relating to opportunistic book and tax reporting. To that end, she regresses BTD on a proxy for earnings management (discretionary accruals) and on a proxy for tax avoidance (the difference between the statutory tax rate and the effective tax rate) and their interaction term. Tang (2015) then uses the root-mean-squared errors from this regression as a measure of the degree to which book and tax income deviate due to rule differences, thus reflecting a country's level of mandatory conformity.

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[14] Given that Atwood et al. (2010) examine the association between CTE and PTBI, their measure is most likely closest related to Total BTD.

[15] Atwood et al. (2010) use descending ranks, i.e. the highest RMSE is assigned a value of zero, and the lowest RMSE is ranked n-1, with n being the number of countries included in a given year. These rankings are divided by n-1 thereafter to scale these to be between zero and one.

[16] Watrin et al. (2014) employ the same descending ranking procedure like Atwood et al. (2010), i.e. they also yield BTC ranks that range between zero and one.

BTD: Measured vs. approximated

Computing BTD obviously requires an estimate of taxable income. Taxable income is reported on tax returns and financial statements include information on the tax expense as well as on tax assets and liabilities, such as deferred taxes. Theoretically, estimates of taxable income could therefore be derived from both tax returns and financial statements. However, tax returns are usually not publicly accessible and thus only a few empirical investigations are based on such actual tax return data.[17] In the absence of tax return data, most studies rely on proxies for tax positions estimated from financial statements. For instance, as outlined above, a common approach to approximate taxable income is to gross up the current tax expense on the income statement by the statutory tax rate. However, deriving estimates of taxable income from financial statements comes along with various problems.[18] Essentially, tax disclosures in financial statements are insufficient to draw valid conclusions about taxable income and actual taxes paid in a given fiscal year (Hanlon and Heitzman (2010), p. 139), i.e. additional disclosures would be necessary to enable these computations. At the same time, however, it is also unclear whether the availability of tax return data would actually be helpful to overcome all of these measurement errors. In that regard, divergent consolidation rules for book and tax purposes constitute a major problem (Hanlon (2003); Mills and Plesko (2003)). As Hanlon and Heitzman (2010) argue, it is very difficult to match tax returns with the associated financial statement(s). Hence, it could often remain unclear how much tax is actually paid on reported accounting earnings (Hanlon and Heitzman (2010), p. 139).

Tax Sheltering Measures

To date, there has been no universally accepted definition of tax avoidance or tax aggressiveness (Hanlon and Heitzman (2010), p. 137) and thus no generally valid TS measure. According to Dyreng et al. (2008), tax avoidance is broadly defined as (legal and illegal) strategies to decrease and minimize taxes. Therefore, tax reporting aggressiveness is supposed to reflect a broad range of activities, e.g. transfer pricing arrangements, location of intangible property in low tax locations, utilization of flow-through entities in structured transactions, synthetic lease arrangements and tax shelter transactions (Frank et al. (2009)).

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[17] Examples include Lisowsky (2009); Mills (1996); Mills and Newberry (2001); Mills et al. (2002) and Plesko (2007).

[18] Hanlon (2003) and McGill and Outslay (2004) extensively discuss these issues.

For purposes of this study, we determine tax sheltering as any activity, both legal and illegal, aimed at reducing the tax liability in the framework of tax accounting.[19]

In the assessed studies, four different categories of tax sheltering measures can be identified:

(1)   Indicator variable for firms accused of engaging in a tax shelter;

(2)   (tax) audit adjustments;

(3)   tax contingencies;

(4)   reduction in taxes paid.

The first measure, which captures whether a firm is identified as being currently engaged in tax sheltering, is used by six of the papers. This TS proxy is either designed as a binary variable, indicating whether a firm is alleged to have tax shelter activity or not, or a probability measure specifying the likelihood of being a tax shelter firm. In most cases, the analyses are based on a sample constructed by Graham and Tucker (2006) who identified 43 public corporations accused of tax sheltering by searching publicly available court records and press articles between 1975 and 2000. Several papers extend their sample by identifying further tax sheltering companies via firms' disclosures, the press or Internal Revenue Service (IRS) confidential data. Wilson (2009), for example, uses the Factiva Database to determine eighteen additional corporate tax shelter participants and Gallemore et al. (2014) obtain 61 other observations for the COLI (Corporate-owned life insurance) tax shelter.[20] Lisowsky (2010) and Lisowksy et al. (2013), in contrast, exploit a new expanded data set from the Office of Tax Shelter Analysis (OTSA) established by the IRS.[21] This data captures several categories of identified illegal corporate tax shelters.[22] Finally, the identified tax shelter firms are then compared to a sample of matched control firms to identify systematic differences.

A second group of papers (six studies) uses tax audit adjustments, being a rather direct measure of a firm's tax avoidance determined by the tax authorities in the firm's final tax assessments. This TS proxy is based on the discrepancy between the final taxable income

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[19]   Hence, this does not include multinational profit shifting, i.e. the exploitation of international tax rate differentials.

[20]   The COLI shelter involved firms taking out life insurance policies on their rank-and-file employees and then receiving the death benefits if the employee died. The COLI shelter was the subject of unflattering coverage in the media, including the Wall Street Journal, which identified the companies that engaged in COLI alongside pictures of their actual deceased employees. COLI shelters are, therefore, an example of a tax avoidance strategy that many viewed as particularly aggressive and that resulted in adverse scrutiny for firms that engaged in them, *see* Gallemore et al. (2014), p. 1106.

[21]   The OTSA was established to combat the rise of tax shelters in the late 1990s.

[22]   Regulations under IRC §6011 require a firm to attach a form to its tax return for each "reportable transaction".

ascertained by the tax authorities and the taxable income previously reported by the firm in the tax return. Chan et al. (2010) additionally distinguish between book-tax conforming audit adjustments, capturing corrections of misstatements arising from violations of both financial and tax reporting regulations, and book-tax difference audit adjustments, measuring violations of tax rules only. Moreover, some papers apply scaled (by beginning total assets (*see* Cho et al. (2006); Mills and Sansing (2000)); by sales revenue (*see* Chan et al. (2010)) or logarithmic (*see* Tang (2005))) audit adjustment variables. Remarkably, all of the authors using this type of TS measure had access to (confidential) data from tax returns and tax audit results received from tax authorities in several countries (e.g. Mills (1998) for US; Chen et al. (2013) for Israel; Cho et al. (2006) for New Zealand; Tang (2015) and Chan et al. (2010) for China).

The third subgroup of studies utilizes tax contingencies as a proxy for tax aggressiveness (one published and two working papers). To be more specific, two papers (Frischmann et al. (2008) and Cazier et al. (2009)) exploit the FIN 48 contingency for unrecognized tax benefits (UTB),[23] whereas Blouin and Tuna (2007) investigate the tax cushion[24] representing loss contingencies as defined in FAS 5.[25] The rationale behind these TS measures is that they constitute uncertain tax positions, i.e. management believes that these tax positions will be most likely challenged if examined by the relevant tax authorities. Therefore, the amount of the tax contingency equals the additional tax liability which firms expect to pay in case they are audited.

The last identified measure of tax avoidance is the reduction in explicit taxes paid (two papers) which can be defined as the difference between a firm's "unmanaged tax amount", captured by e.g. the home-country statutory corporate tax rate times pre-tax earnings, and its "managed tax amount", i.e. its current taxes paid (Atwood et al. (2012)). This difference is intended to reflect how aggressively managers pursue strategies to reduce the total amount of taxes of a firm. Tang (2015), for example, uses an aggregate of two such proxies based on different definitions of the current tax expense variable at country-level.[26]

Earnings Management Measures

Aggressive financial reporting can broadly be defined as upward or downward earnings management that may or may not be within the limits of GAAP (Frank et al. (2009)). Four

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[23] For more information on the provisions and procedure of FIN 48, *see* Frischmann et al. (2008), p. 2f.
[24] For more information on the measurement of the tax cushion, *see* Blouin and Tuna (2007), p. 7.
[25] For more information on the differences between FAS 5 and FIN 48, *see* Lloyd et al. (2009).
[26] She uses the ratio of current tax expense to operating cash flows to capture both non-conforming and conforming tax avoidance, whereas she exploits the ratio of current tax expense to pretax income in order to identify only non-conforming tax avoidance.

different categories of measures, which intend to capture precisely such earnings management behavior, have been determined in the outlined papers:

(1)   Meeting earnings forecasts;

(2)   financial statement fraud;

(3)   EM indicator variable according to Leuz et al. (2003);

(4)   discretionary accruals.

There are three studies which use variables for meeting analysts' expectations as EM proxies. Kraft (2015), for example, tries to detect earnings management by quantifying the likelihood of meeting management earnings forecasts via the odds ratio, i.e. the ratio of the probability of meeting management earnings forecasts to the probability of missing these forecasts. Philipps et al. (2003, 2004) adopt an even broader approach. Specifically, the authors intend to reveal earnings management aimed at meeting three earnings targets: (1) to avoid reporting an earnings decline, (2) to avoid reporting a loss, and (3) to avoid failing to meet analysts' earnings forecasts. They employ scaled changes in annual earnings as variable of interest and compare firm-years with zero or slightly positive earnings levels to a control sample of firm-years with slightly negative earnings.

A second subgroup of studies makes use of firms identified of having committed financial statement fraud (3 studies). This proxy represents an extreme case of earnings management and is basically designed as binary variable, capturing whether a firm is engaged in fraudulent overstatement of earnings, or a probability measure indicating the likelihood that a firm carries out such extreme EM practices. Thus, it is largely comparable to the first outlined TS measure (indicator variable for firms accused of engaging in a tax shelter). Badertscher et al. (2009), for example, exploit a sample of firms obtained from the GAO (General Accounting/Government Accountability Office) report[27] that restated their earnings downward due to accounting irregularities and thus can be presumed to have managed earnings upward beforehand.[28] Lennox et al. (2013) and Ettredge et al. (2008), in contrast, examine Accounting and Auditing Enforcement Releases (AAERs) which outline the results of the SEC's investigations of alleged violations of GAAP. Precisely, their samples consist of firms being sanctioned for fraud by the SEC in AAERs as well as control groups of matched non-fraud firms.

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[27]   For an example, *see* GAO (2002).
[28]   In addition, they differentiate between book-tax conforming EM (activities that also have current taxable consequences) and non-conforming EM (activities that do not affect current taxable income).

A third group of studies bases their measures on an EM indicator variable suggested by Leuz et al. (2003) (two papers). This measure constitutes an aggregate of four different proxies which are aimed at capturing a variety of earnings management practices: (1) the tendency of firms to avoid a small loss[29] (measured as the ratio of small profits to small losses); (2) the magnitude of total accruals[30] relative to the magnitude of operating cash flows; (3) the smoothness of earnings relative to cash flows[31] (measured as the ratio of the standard deviation of operating income divided by the standard deviation of cash flow from operations) and (4) the correlation of accounting accruals and operating cash flows[32] (measured as the Spearman correlation between changes in total accruals and changes in the cash flow from operations). In order to mitigate potential measurement error in individual scores, these sub-measures are aggregated into one single EM variable.

In the last subgroup of papers, financial reporting aggressiveness is measured via discretionary accruals (five studies). Using this proxy follows the rationale that higher discretionary accruals indicate higher levels of opportunistic use of leeway in financial accounting, thus capturing both upward and downward earnings management. Most of the studies refer to the methodology developed by Jones (1991) and modified by Dechow et al. (1995). In doing so, they first of all model total accruals as a function of the difference between the change in sales and the change in accounts receivable as well as Property Plant and Equipment (non-discretionary accruals).[33] Thereby, total accruals are most commonly measured as the change in current assets plus the change in short-term debt less the sum of the change in current liabilities, the changes in cash and depreciation and amortization expenses.[34] Discretionary accruals are then defined as the residual of the outlined model, i.e. the difference between total and non-discretionary accruals. Watrin et al. (2012, 2014) use, in addition to the magnitude of discretionary accruals, an indicator variable for negative values of discretionary accruals. Moreover, Tang (2015) substantiates her analysis by providing two

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[29] Burgstahler and Dichev (1997) and Degeorge et al. (1999) find evidence that U.S firms use accounting discretion to avoid reporting small losses.

[30] This measure captures overall financial reporting discretion that firms can make use of to mask their underlying economic performance. Earnings are then temporarily inflated due to accrual choices, but cash flows are unaffected.

[31] This variable captures the extent to which corporate owners and managers reduce the variability of reported earnings. By doing so, they are able to conceal changes in their firm's economic performance.

[32] The rationale behind this proxy is that firms can use accruals to hide bad or to underreport good current performance following shocks to the firm's economic performance. This induces a negative correlation between changes in accruals and shocks to operating cash flows. While a negative correlation is a "natural" result of accrual accounting, a larger magnitude indicates smoothing of reported earnings (Burgstahler et al. (2006)).

[33] All variables are scaled by total assets. For the exact formula, *see* Frank et al. (2009), p. 479f.

[34] For the formula, *see* Watrin et al. (2012), p. 285. Frank et al. (2009), by contrast, compute total accruals differently according to Hribar and Collins (2002), *see* Frank et al. (2009), p. 479f.

further variations of discretionary accruals, i.e. discretionary revenue as well as discretionary current accruals, and also constructs an aggregate measure.[35]

3. Meta-Analysis

As demonstrated by the literature survey, there is substantial heterogeneity in the measures used and the outcomes of primary studies. Beyond the qualitative analysis, we intend to go one step further and provide quantitative insights on the effects and sources of heterogeneity in study design. Furthermore, we derive a consensus estimate with respect to the sign and the statistical significance level for the association between BTD and proxies for EM and TS.

3.1. Purpose of Meta-Analysis and Meta-Studies in Accounting

Meta-analysis, in general, refers to a set of statistical techniques and quantitative review methods used to standardize and synthesize findings across empirical studies (Greenberg (1992)). According to Lipsey and Wilson (2001), a properly executed meta-analysis can make significant contributions to practice and policy by developing a general knowledge of the whole body of research in a given topic. One major goal of a meta-analysis is to identify the determinants due to which empirical findings on certain questions significantly vary or are even contradictory. An additional advantage compared to narrative literature reviews is that a meta-analysis can aggregate data from a large number of coherent studies, thereby increasing sample sizes and statistical power and identifying mean relations (with regard to sign and strength) among key variables (Pomeroy and Thornton (2008), p.308). In the case of heterogeneous findings, specific moderators might account for the variation in correlations across studies (Hunter and Schmidt (2004)).[36] In order to detect their impact, effect sizes measuring the magnitude of the relationship between the dependent variable and a specific independent variable reported in primary literature are, in principle, regressed on a set of moderator variables which quantify differences in method, design and data used (Feld et al. (2013)).

While several meta-studies have emerged in tax research, e.g. on the influence of taxation on FDI or capital structure, over the last years,[37] meta-studies in accounting are still rare.[38] In this regard, Pomeroy and Thornton (2008) identified only 33 existing meta-studies on an

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[35] For more information on these variables, *see* Tang (2015), p. 449f.

[36] Using meta-analysis techniques, the variance that is due to inherent differences between different correlations or moderator variables can be distinguished from the variance that is due to statistical artifacts (sampling or measurement error), *see* Brierly (1999).

[37] For examples, s*ee* Feld and Heckemeyer (2011); Feld et al. (2013).

[38] One main focus of the existing meta-studies in accounting lies on the interdependencies between audit committee characteristics and reporting quality.

accounting topics or being published in accounting or auditing journals (thereof only 3 in the top-tier journals) compared to for instance 105 meta-studies in Marketing and 233 in Management. That seems to be surprising at first glance as empirical studies in accounting partly produce contradictory results and meta-analysis techniques generally offer the ideal tool to detect the causes for such deviations and to derive more general conclusions. Yet, while heterogeneity in study outcomes, research designs and variables motivates meta-study analysis, it also constitutes a major methodological challenge at the same time.

Existing meta-studies in accounting basically focus on the association between two specific variables of interest Pomeroy and Thornton (2008), for example, analyze the association between audit committee independence and financial reporting quality measures.[39] The majority of meta-studies in accounting rely on meta-analysis techniques developed by Hunter and Schmidt (2000, 2004) or Lipsey and Wilson (2001).[40] These are based on the computation of mean (and overall) effect sizes[41], i.e. on the magnitude of the relationship between the dependent variable and a specific independent variable of interest, and the conduct of homogeneity analyses (e.g. chi-square tests). In the case of heterogeneity across studies, moderators are detected by sub-grouping studies based on a hypothesized moderator variable and testing the homogeneity assumption repeatedly.

In contrast to the majority of accounting meta-studies which use these classical meta-analysis techniques, most modern meta-studies go beyond that methodology and turn to meta-regressions. An important advantage of this type of analysis is that moderators are considered simultaneously (hierarchical analysis). This is especially important as moderator variables are often correlated and an isolated consideration may lead to distortions and errors of interpretation. Therefore, meta-regression analysis explicitly introduces relevant explanatory variables concurrently to investigate the extent to which these can explain heterogeneity in primary studies (Harbord and Higgins (2008)).

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[39] Further examples include Ahmet et al. (2013): association between discretionary accruals /analysts' forecast accuracy and IFRS adoption; Derfuss (2009): relationship of budgetary participation/reliance and accounting performance measures; Garcia-Meca and Sanchez-Ballesta (2010): association of board independence/ownership concentration and voluntary disclosure; Habib (2012): association between non-audit service fees and financial reporting quality or Samaha et al. (2015): impact of board and audit committee characteristics on voluntary disclosure.

[40] For more information on the procedures see Hunter and Schmidt (2000, 2004) or Lipsey and Wilson (2001).

[41] The procedures and formula calculate the population correlation coefficients (e.g. Pearson correlation coefficient) between two constructs using the sample correlations reported in prior empirical research and correct for the statistical artifacts of measurement error and sampling error. For more information on the formula see Lipsey and Wilson (2001).

3.2. Meta-Analysis Procedure and Techniques

<u>Selection and coding of studies</u>

As a first step of our meta-analysis, we conduct a comprehensive literature research on the issue of book-tax differences/book-tax conformity in common electronic databases and editorial sources (Business Source Premier, IDEAS, EconPapers, EconBiz etc.). For this purpose, we use the following keywords: "book-tax conformity", "book-tax differences", "book-tax gap", "earnings management", "tax sheltering", "tax aggressiveness" and "tax avoidance". In addition to that, we scan relevant review papers (e.g. Hanlon and Heitzman (2010); Graham et al. (2012)), references of collected papers, conference databases as well as researcher CVs to identify further empirical studies potentially relevant to our topic. As a starting point, we also take into consideration unpublished (working) papers to avoid a possible publication bias.[42] In the review process of the potential papers, we then screen titles, abstracts and descriptions to search for studies that assess a potential association between BTD/BTC and earnings management and/or tax sheltering. This proceeding results in a final sample consisting of 27 relevant papers[43] (24 published and 3 unpublished) between 1998-2015.

In a second step, these identified papers are coded by two researchers independently. Coding of the studies in particular focuses on the different measures of BTD (e.g. Total BTD, Temporary BTD, DTAX, BTC index), whether BTD are actually observed or only approximated,[44] differences in the dependent variables, i.e. in the diverse earnings management and/or tax sheltering measures[45], institutional features (e.g. degree of book-tax conformity in a respective country; individual vs. consolidated accounts) and design characteristics (e.g. OLS vs. Logit/Probit; additional controls for accruals or tax measures). Moreover, common key statistics, such as t-values, p-values, sample sizes, standard deviations and coefficients are recorded.

<u>Methodology</u>

In methodological terms, we rely on meta-regression analysis and thus apply a fairly innovative tool in accounting research.

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[42] Nevertheless, we are aware that this could imply both strength and weaknesses. Pomeroy and Thornton (2008) state that, in principle, aggregating both published and unpublished results accounts for potential implications of statistically non-significant results, mitigating publication and replication bias. Unpublished studies, however, are likely to exhibit inconsistent research quality since they have not fully survived a peer review process.

[43] *See* Table 1.

[44] *See* chapter 2 for more information on the different BTD and BTC measures.

[45] *See* chapter 2 for more information on the different EM and TS measures.

As previously discussed, there is substantial diversity with respect to the measurement of BTD/BTC as well as with regard to the definition of the proxies for EM and TS in the reviewed papers. Therefore, we proceed along the lines of several previous meta-regression analyses and rely on t-values as dependent variable of our meta-regression rather than on actual coefficients.[46] The reason for this is that t-values properly indicate the sign as well as the significance level of correlations and that they are fully comparable across studies using different variables (Card et al. (2010)). This allows us to draw conclusions across a wide range of diverse studies. Estimated coefficients, by contrast, would not be comparable as the variables in our sample are not dimensionless, i.e. the studies employ different units and constructs (Baskaran et al. (2014)). The dependent and independent variables used in primary studies are, for example, scaled differently (e.g. by total assets or revenue) and range from dummies and ratios to continuous variables. Therefore, the coefficients differ systematically and the estimation of an average effect size[47] would not be meaningful in our setting.

Our basic meta-regression equation is presented in the following:[48]

$$\hat{t}_{s,i} = t_0 + X_{s,i}\beta + \varepsilon_{s,i}$$

(2)

$\hat{t}_{s,i}$ specifies the estimated t-value of specification i of primary study s.[49] t_0 represents the intercept and thereby the defined baseline t-value The definition of a baseline is necessary because of the kind of coding of the moderator variables. As these are defined as dummy variables which basically can be sub-grouped to identify a particular study feature, they are mostly self-excluding. If all of these dummies would then be considered simultaneously in the regression analysis, there would be perfect multi-collinearity (dummy variable trap). Therefore, we define one particular characteristic as the baseline for each subgroup. The intercept then captures all baseline features at the same time and the reported coefficients have to be interpreted in relation to this baseline (Heinemann et al. (2016), p. 10).[50] As explained, we expect that heterogeneity in the estimates of primary studies can be explained by a vector of variables which describe study-specific characteristics (X: moderating factors) as well as sampling error (ε).

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[46] For further meta-regression analysis relying on t-values, *see* Card et al. (2010); Baskaran et al. (2014); Klomp and de Haan (2010); Heinemann et al. (2016).

[47] In order to obtain this value, individual study results are combined to an overall or consensus estimate with respect to the size of effects by assuming between-study homogeneity (*see* Heinemann et al. (2016), p. 9).

[48] Standard errors are clustered at study level.

[49] Referring to equation (1), $\hat{t} = \frac{\hat{\gamma}}{sd}$.

[50] For more information on the included moderator variables and the baseline, *see* chapter 4.

4. Results

Descriptives

In the following, we present information on the specific characteristics of our MRA sample. For this purpose, Table 3 provides an overview of the variables included in the MRA with respect to the number of observations and the percentage share in relation to the total number of 62 observations, the number of studies employing the respective variable,[51] the mean t-value as well as the minimum and maximum t-values.[52]

Table 3: Summary statistics for the variables included in the MRA

Variable	Obs	% sample	# studies	Mean t-value	Min.	Max.
Dependent variable						
TS	41	66	17	1.55	-5.34	10.40
EM	21	34	12	1.21	-5.26	4.42
Independent variable of interest						
Total BTD	32	52	20	1.85	-4.43	5.80
Other BTD	21	34	13	1.87	-3.89	10.40
BTC Index	9	15	5	-1.03	-5.34	2.59
Approxim. BTD	50	81	23	0.85	-5.34	10.40
Measured BTD	12	19	6	3.88	1.57	5.80
Level of BTC[53]						
Low	43	69	19	1.49	-4.43	6.73
Medium	6	10	4	4.25	1.57	10.40
High	4	6	2	2.22	-1.96	4.45
Financial statements						
Consolidated	58	94	24	1.47	-5.34	10.40
Individual	4	6	3	0.90	-1.96	1.97
Methodology						
OLS	30	48	16	1.74	-5.34	10.40
Logit/Probit	32	52	14	1.15	-4.43	4.45
Controls (for)						
DA/TA	21	34	13	1.06	-5.25	4.42
ETR/UTB	10	16	4	-0.13	-4.43	2.47
Other BTD	7	11	3	0.79	-0.53	2.47
Total	**62**	**100**	**27**	**1.44**	**-5.34**	**10.40**

Note: "EM" signifies Earnings Management; "TS" signifies Tax sheltering. The categorization of the topic is based on our own assessment of the analyzed papers. "BTD" means Book-Tax Difference; "BTC" means Book-Tax Conformity. "OLS" refers to Ordinary Least Squares. "DA (TA)" refers to Discretionary (Total) Accruals; "ETR" signifies Effective Tax Rate; "UTB" means "Unrecognized Tax Benefit". For all measures/definitions see chapter 2.

First of all, it can be noted that on average the 27 studies in our sample report a positive association between BTD and TS/EM indicated by a t-value of 1.44 which, however, lacks

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[51] Because several studies employ more than one dependent and independent variable, the sum of studies exceeds the total number of studies.

[52] We abstain from weighting observations, e.g. by the inverse of the share of observations per study in relation to the full sample, as the number of observations extracted from primary studies is rather equally distributed (1-6 specifications per study).

[53] The remaining 15% of the observations represent cross-country studies. This variable is, however, redundant to BTC.

statistical significance at conventional levels.[54] In addition, there is a great variety in results ranging from highly significant negative (t-value of -5.34) to highly significant positive effects (t-value of 10.4).

Table 3 further reports differences regarding the dependent as well as the independent variables applied in primary studies. Due to our comparably small sample size (62 obs.), we aggregate categories such that we only differentiate between EM and TS proxies in general instead of examining all eight categories of dependent variables discussed in chapter 2 separately; otherwise, there would be too few observations per single category. The same applies to the measurement of the independent variable of interest. Therefore, we distinguish between Total BTD, Other BTD including all measures which try to capture BTD more precisely (including: Temporary BTD, Discretionary BTD, Permanent BTD, DTAX, BTD with the effect of tax sheltering removed, Discretionary Total BTD DD) and cross-country studies using a BTC index. Concerning the dependent variable, more studies in our sample examine TS (66%) than EM (34%). Although the mean t-values of both groups exhibit a positive sign, they lack statistical significance. In addition, min and max t-values demonstrate substantial heterogeneity in the results of primary studies (ranging from negative significant to positive significant findings). With regard to the independent variable of interest, more than half of our sample use Total BTD (52%), whereas only 34 % rely on other, more specific, BTD measures. The mean of both BTD groups' t-values is positive and indicates significance at the 10% level. There is, however, again great heterogeneity in results. Studies analyzing a BTC index (15%), by contrast, report an overall negative, but insignificant t-value. The negative sign is plausible as a large BTC index implies a high degree of conformity in a given country. This in turn is expected to go along with lower BTD and therefore less EM and TS (inverse correlation). A further important feature of the independent variable is whether BTD are actually measured or only approximated from financial statement information. 19% of our sample measure BTD based on real tax return data, whereas 81% only estimate the variable using financial statement information. Remarkably, the mean t-value of studies measuring BTD is considerably higher (3.88) compared to the mean t-value of studies approximating BTD (0.85) and indicates statistical significance at the 1% level. Furthermore, there is less variation in t-values, all pointing into the same direction (positive association).

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[54] We refer to a critical t-value of 1.65 at 10 % level significance, 1.96 at 5% level and 2.58 at 1% level significance.

In addition, the following graphical analysis employing boxplots (Figure 1) serves to illustrate the heterogeneity of studies with regard to their dependent and independent variable measurement and is intended to provide further insights into the distribution of t-values.

Figure 1: Boxplot for the classification of the dependent and independent variable
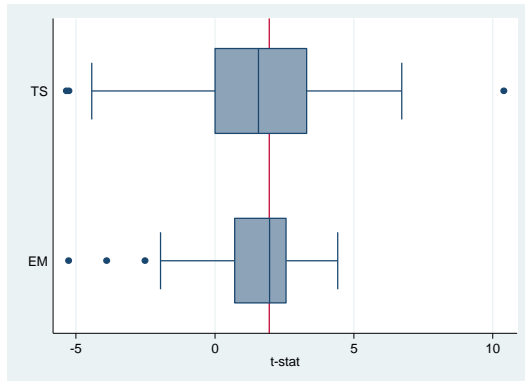
Note: This graphic illustrates/compares the overall association between measures of tax sheltering and earnings management with BTD (aggregate of all BTD/BTC measures).
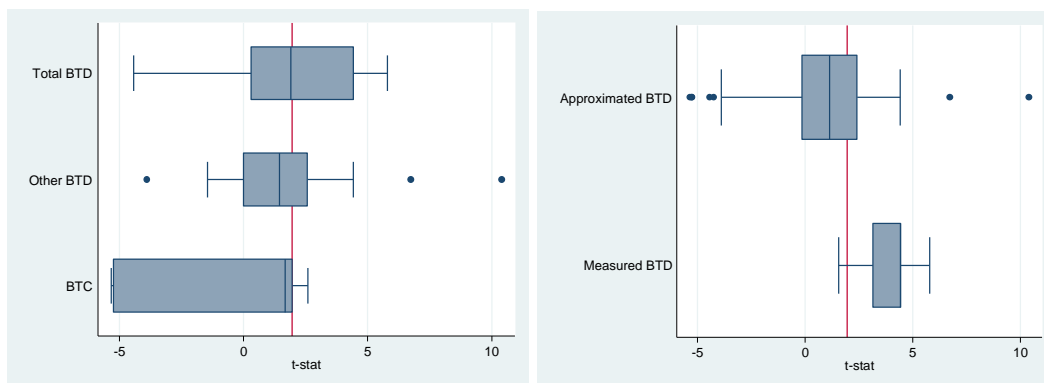
Note: These graphics illustrate the association between different kinds of BTD/BTC measures and opportunistic reporting behavior (both EM and TS).

The boxes' margins indicate the 25% and 75% quartiles whereas the vertical line in between displays the respective median t-value. The antennas span 1.5 times the interquartile range and the single dots represent outliers. The red line marks the 5%-threshold for statistical significance (t-value = 1.96^{55}) (Heinemann et al. (2016)) indicating that values to the right of this line reflect a significant positive association. Comparing the boxplots for TS or EM as dependent variable, it is obvious that 50% of the EM sample reports statistically significant positive results, whereas the median t-value for studies examining TS is slightly below the 5% threshold which implies that less than 50% of TS studies find a significant positive relation. Furthermore, papers using TS proxies as dependent variable exhibit considerably more variation in results. The lower section of Figure 1 compares boxplots for the different measures of the independent variable. While almost fifty percent of the studies using Total

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[55] This corresponds to the critical value of the t-distribution at the 5 % threshold.

BTD find a positive and significant association, there is extreme scattering in results also covering studies that report a significant negative relationship. Papers that exploit Other BTD[56] measures, by contrast, find less significant positive results, but entail, at the same time, lower dispersion (e.g. almost no significant negative results). Analyses relying on BTC indices find significant positive results in only a few cases. In line with the alleged reversed association between BTC and BTD, most of these papers report (significant) negative effects. Finally, it is remarkable that almost all studies employing measured BTD consistently report significant positive results, whereas there is great variation in findings and a large share of insignificant results of studies which only approximate BTD. Hence, studies based on actual tax return data seem to be able to capture opportunistic reporting behavior very well.

Lastly, Table 3 contains further variables included as controls in the MRA. First, the level of book-tax conformity in the respective country, distinguishing between low, high and medium BTC, is considered. The majority of studies in our sample (69%) are conducted in a low BTC country. This makes sense as most investigations examine the US setting. With regard to the type of financial statements, almost all papers use data from consolidated (94%) instead of individual accounts for their analysis. From a methodological point of view, approximately half of the studies (48%) conduct an OLS regression analysis, whereas the other half (52%) relies on Logit/Probit analyses, i.e. on a binary dependent variable. Furthermore, some studies additionally control for discretionary and/or total accruals (34%), for tax avoidance measures such as ETR and/or UTB (16%), or for the fact that more than one BTD measure is considered in their regression simultaneously (11%).

Meta-Regression Analysis Results

As outlined in chapter 3, our meta-regression analysis requires the definition of a baseline. To that end, our baseline is specified as an estimation of the association between *approximated* BTD, captured via *Other BTD* proxies, and *TS* in a country with a *low* level of BTC using data from *consolidated* financial accounts and applying an *OLS* regression analysis. The selection of the baseline is primarily based on the most common study features in our sample (see Table 3). An important exception represents the BTD proxy. While Total BTD is used most frequently, Other BTD measures are expected to capture TS and EM behavior more precisely and are therefore included in our baseline. Taken together, all the baseline features are contained in the intercept of the MRA. The other reported coefficients have to be

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[56] Specifically, these include: Temporary BTD, Discretionary BTD, Permanent BTD, DTAX, BTD with the effect of tax sheltering removed and Discretionary Total BTD DD.

interpreted relative to this baseline and present the impact of a deviation in this particular feature from the baseline (Heinemann et al. (2016)).

Table 4 summarizes our estimation results.[57] Column (1) presents the results of the main specification including the study features outlined above. While we report the basic coefficients on the left-hand side, we additionally present the results of a joint F-test in column "Joint effect baseline" in order to examine whether our baseline modified by the respective variable (specific study feature) exhibits (joint) significance. Furthermore, we extend the main specification and vary the sample composition in order to test the robustness of our results. First, we include three additional control variables in our MRA, i.e. dummies capturing whether studies control for DA/TA, for UTB/ETR and/or for Other BTD measures (column (2)). The second extension relates to the analysis of a potential publication bias. In this regard, we exclude unpublished (working) papers (column (3) and (4)) to examine whether our results remain unchanged when we only investigate published studies.

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[57]   The table is divided into subsections by headlines indicating the respective group of study features as well as their respective baseline category. The definition of the baseline study is constant throughout all specifications. It uses *TS* as dependent variable, *approximated other BTD measures* as independent variable, relies on *consolidated* financial statement data in a *low* BTC country, and uses *OLS* as methodological approach.

Table 4: Meta-Regression Analysis - Results

	(1) Main specification	Joint effect baseline	(2) With controls	Joint effect baseline	(3) Main specification, published	Joint effect baseline	(4) With controls, published	Joint effect baseline
Baseline effect	2.16 [2.18] **		2.46 [1.97] *		2.93 [2.36] **		3.3 [2.37] **	
Dependent variable, Baseline: TS								
EM	1.41 [1.22]	3.57 **	1.07 [0.83	3.53 *	1.23 [0.98]	4.16 **	0.7 [0.46]	4.00 **
BTD measure, Baseline: Other BTD								
Total BTD	-1.05 [-1.76] *	1.11	-0.82 [-1.25]	1.64	-1.04 [-1.59]	1.89 *	-0.87 [-1.19]	2.43 *
BTC Index	-3.99 [-2.01] *	-1.83 *	-4.05 [-1.86] *	-1.59 *	-4.58 [-2.17] **	-1.65 **	-4.65 [-2.03] **	-1.35 **
Measured BTD, Baseline: Approximate	2.62 [1.73] *	4.78 ***	2.15 [1.32]	4.61 ***	1.88 [1.13]	4.81 ***	1.39 [0.80]	4.69 ***
Level of BTC, Baseline: Low								
Medium	1.22 [0.59]	3.38	1.12 [0.55]	3.58	1.93 [1.19]	4.86 *	1.74 [1.09]	5.04 *
High	0.42 [0.28]	2.58	0.25 [0.16]	2.71	0.64 [0.44]	3.57 *	0.7 [0.42]	4.00 *
Financial statements, Baseline: Consolidated								
Single	-1.39 [-0.72]	0.77	-1.36 [-0.69]	1.10	-1.82 [-0.86]	1.11 *	-1.86 [-0.80]	1.44 *
Methdology, Baseline: OLS								
Binary	-1.25 [-1.53]	0.91	-1.20 [-1.34]	1.26	-1.91 [-1.85] *	1.02 *	-2.05 [-1.71]	1.25 *
Controls								
DA / TA			-0.08 [-0.08]	2.38			0.55 [0.43]	3.85 *
UTB / ETR			-1.47 [-2.36] **	0.99 **			-1.87 [-2.61] **	1.43 **
Other BTD			0.51 [0.92]	2.97 ***			0.45 [0.73]	3.75 ***
N	62		62		55		55	

Notes: Clustered *t*-statistics in brackets. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. "EM" signifies Earnings Management; "TS" signifies Tax sheltering. The categorization of the topic is based on our own assessment of the analyzed papers. "BTD" refers to Book-Tax Differences; "BTC" means Book-Tax Conformity. "OLS" refers to Ordinary Least Squares. "DA (TA)" refers to Discretionary (Total) Accruals; "ETR" signifies Effective Tax Rate; "UTB" means "Unrecognized Tax Benefit". For all measures/definitions see chapter 2.

For the main specification (column (1)), the average consensus *t*-value for the baseline study is equal to 2.16. More precisely, primary studies exhibiting the design features defined above are found to report, on average, a positive and statistically significant association between BTD and TS at the 5% level. This also applies to the specification including additional control variables (column (2)). In addition, coefficients are estimated with statistical precision at the 5 % level. This holds true for all specifications in Table 4 (except for column (2): at the 10% level). The baselines in the specifications considering only published studies (columns (3) and (4)) even indicate a positive and statistically significant association at the 1% level. This hints at a potential publication bias. Results obtained from (refereed) journal articles seem to be, on average, associated with higher levels of statistical significance compared to those obtained from working papers.

Relative to the baseline, variation in the dependent variable, i.e. assessing EM instead of TS, basically leads to the same result, i.e. to a positive and statistically significant association with BTD. Nevertheless, the average consensus t-value increases (3.57 = 2.16+1.41 = baseline effect + coefficient for EM) indicating a higher level of significance (at the 1% level) compared to the baseline. This implies an even stronger association between BTD and EM proxies (in all specifications). Coefficients are again estimated with statistical precision (*see* column "Joint effect baseline"). As a first interim conclusion, it can therefore be noted that BTD seem to capture opportunistic reporting behavior and serve as a positive indicator for both TS as well as EM. However, they seem to be an even better signal for EM.

Variation in the independent variable, i.e. the BTD/BTC measure, changes results more substantially. Using Total BTD instead of Other BTD exerts an inverse influence (coefficient: -1.05) leading to an average positive t-value of 1.11 which indicates significance above the 10 % threshold. Thus, an overall significant association between BTD (measured as Total BTD) and TS can no longer be recorded. This implies that the explanatory power of BTD for EM and TS strongly depends on how precisely BTD are measured. This also holds true for the specification including additional controls (column (2)). Therefore, Total BTD being only a rough estimate of the book-tax gap seem to capture opportunistic reporting behavior worse than Other BTD measures (Temporary BTD, Discretionary BTD, Permanent BTD, DTAX, BTD with the effect of tax sheltering removed, Discretionary Total BTD according to Desai/Dharmapala) which are more explicitly aimed at approximating EM and TS behavior. This can also be interpreted as evidence for the suspected measurement error associated with Total BTD (see chapter 2). The analysis of the specifications which examine only published

studies (column (3) and (4)) provides a further hint for a potential publication bias. The overall positive t-values (1.89, 2.43) indicate significance at the 10% (column (3)) and 5% level (column (4)) and point to studies published in (refereed) journals being generally more likely to report positive and statistically significant effects. Using a BTC Index instead of Other BTD exerts an even stronger negative influence (coefficient: -3.99) which results in an overall negative t-value of 1.83, implying significance at the 10% level. This is plausible as there is an assumed reversed association between BTC and BTD. This effect seems, however, not to be stable across the other specifications as the joint overall t-values lie above the 10%-threshold of -1.65 (see columns (2) - (4)).

Varying the kind of measurement of BTD exerts the strongest influence on results. Using actually observed instead of approximated BTD implies an average t-value of 4.78 and, thus, a statistically significant positive association at the 1% level (for all specifications).[58] This provides evidence for measured BTD capturing TS and EM behavior more reliably and more precisely than only approximated BTD and is in line with the arguments brought forward by Hanlon (2003) and McGill and Outslay (2004). In particular, they point at the various problems related to the estimation of taxable income from financial accounts resulting from tax disclosures in financial statements being insufficient to draw valid conclusions about taxable income and actual taxes paid in a given fiscal year (see chapter 2).

To sum up, our MRA results point to an overall statistically significant and positive association between BTD and opportunistic reporting behavior. This implies that BTD are indeed indicative of both EM and TS, and even better so of EM. The results are, however, weaker for studies that only capture BTD roughly based on Total BTD instead of using more precise proxies (such as DTAX, Temporary BTD etc.). Moreover, examining actual BTD computed from tax returns instead of only approximating them from financial statements strongly increases the effects. Even though we cannot draw a definite conclusion with regard to BTC, our results suggest a negative association with EM and TS. This is also substantiated by the provided evidence on a positive relation between BTD and aggressive reporting, given the inverse correlation between BTD and BTC outlined above. Hence, our results support the findings of Tang (2015) pointing to a restrictive impact of book-tax conformity with regard to EM and TS.

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[58] Coefficients are estimated with statistical precision at the 1 % level (*see* column joint effect baseline).

5. Conclusion

The empirical literature on the relation between book-tax differences (BTD)/book-tax conformity (BTC) and opportunistic reporting has been growing quickly over the last decade. Specifically, these studies analyze the association between BTD and earnings management (EM) and/or tax sheltering (TS) to evaluate whether BTD can indeed serve as an indicator for opportunistic reporting behavior. Heterogeneity in measures used as well as in reported findings induces us to conduct a comprehensive and systematic literature review as well as a quantitative meta-analysis.

The systematic literature review reveals the use of various BTD measures in empirical tax accounting research. While the majority of studies use Total BTD as a rough estimate of the book-tax gap, other investigations exploit more specific proxies, such as Temporary BTD, Discretionary Permanent BTD (DTAX) or Discretionary Total BTD. Moreover, only a minority of investigations is based on actual tax return data, while most studies have to rely on BTD measures estimated from financial accounts. In addition to that, more recent studies also develop particular index-based measures for BTC by means of cross-country studies. Similarly, there are numerous variables used to capture EM and/or TS. To name just a few, these include binary variables indicating whether a firm has been identified as being engaged in tax sheltering or financial statement fraud, tax audit adjustments or discretionary accruals.

Beyond a qualitative review, the literature has reached a critical mass (27 studies) rendering meta-regression analysis feasible and appropriate to quantitatively summarize the overall evidence on the association between BTD/BTC and opportunistic reporting. This constitutes a rather innovative approach, given that there are only a few meta-studies in the accounting literature so far and considering that these utilize more basic methodological techniques such as simple homogeneity analyses.

Our meta-regression analysis (MRA) results point to a consensus estimate of a statistically significant and positive association between BTD and TS as well as between BTD and EM. The obtained results indicate a level of significance at the 5% threshold for TS and even at the 1% threshold for EM. This indicates that BTD are indeed indicative of both EM and TS, and even more so of EM. These results are, however, weaker for studies that only capture BTD roughly based on Total BTD instead of using more precise proxies. Moreover, examining actual BTD computed from tax returns instead of only approximating them from financial statements strongly increases the effects. Hence, efforts taken to accurately determine BTD

seem to be worth wile when it comes to the explanatory power for opportunistic reporting. Furthermore, our results as well as the alleged inverse correlation between BTC and BTD suggest a negative association between BTC and EM/TS. Hence, we would conclude that higher conformity is indeed effective in reducing aggressive reporting. In addition, our MRA hints at the existence of a potential publication bias in the tax accounting literature.

Finally, the fact that there exist no uniform definitions and standards for both BTD/BTC and EM/TS, giving rise to a variety of different measures used,[59] constitutes motivation and limitation of our study at the same time. This heterogeneity can also be traced back to data availability issues, e.g. tax return data or data on actual (tax or financial) fraud are mostly not accessible. Therefore, researchers have to rely on diverse proxies. As our overall sample size is comparably small, we do not obtain enough observations for each single category of BTD/BTC and EM/TS measures. Hence, we have to condense those in order to be able to conduct systematic analyses. This, however, possibly comes along with measurement imprecisions. Moreover, several moderator variables (such as the level of BTC or the type of financial statement) could not be further exploited in our MRA because of an unbalanced distribution of sample characteristics.

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[59] This is a major difference to other meta-studies in the field of taxation, e.g. on the impact of taxes on FDI, *see* Feld and Heckemeyer (2011).

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Appendix

Table 5: Journal abbreviations

Abbreviation	Journal title
AJPT	Auditing: A Journal of Practice & Theory
CAR	Contemporary Accounting Research
EAR	European Accounting Review
IJAAPE	International Journal of Accounting, Auditing and Performance Evaluation
IJEF	International Journal of Economics and Finance
JAE	Journal of Accounting and Economics
JAR	Journal of Accounting Research
JAAF	Journal of Accounting, Auditing & Finance
JBFA	Journal of Business Finance & Accounting
JATA	Journal of the American Taxation Association
RAST	Review of Accounting Studies
TAR	The Accounting Review
REST	The Review of Economics and Statistics
WP	Working Paper