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Determinants of the complementary level of financial and tax aggressiveness: a cross-country study

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Abstract: This study aims to examine the factors affecting the complementary level of financial and tax aggressiveness. This research considers the diversity of cost and benefit faced by firms when presenting financial and tax reporting aggressively at the same time. Our proxies for cost (the level of detection risk) are country-level variables, namely book-tax conformity and law enforcement. Meanwhile, our proxy for benefit is the financial constraint of a firm. In this study, we develop a new measure of financial constraint which is more comprehensive. Using a sample of listed firms in East Asia and Europe from 2014 to 2016, we find that firms with a higher level of detection risk (such as higher book-tax conformity or stronger law enforcement) tend to engage in a lower complementary level of financial and tax aggressiveness, in accordance with the developed hypothesis. We also find that firms tend to engage in a higher complementary level of financial and tax aggressiveness if they will derive significant benefit from aggressive financial and tax reporting activities. These results suggest that firm and country characteristics influence managers' decisions to present financial statements and tax reporting aggressively at the same time or not.

Keywords: complementary level of aggressiveness; financial aggressiveness; tax aggressiveness; book-tax conformity; law enforcement; financial constraint.

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1 Introduction

This study aims to analyse the determinants of the complementary level of financial and tax aggressiveness. As insider parties of a firm, managers and majority shareholders can take advantage of flexibility in the choice of accounting methods permitted by financial accounting standards and tax regulations to pursue opportunistic actions aimed at maximising utility (Jensen and Meckling, 1976; Fama and Jensen, 1983) through, for example, financial reporting aggressiveness and/or tax reporting aggressiveness (Procházka and Molin, 2016). Following Frank et al. (2009), we define financial reporting aggressiveness as upward earnings management that may or may not be within the confines of financial accounting standards. Meanwhile, tax reporting aggressiveness is defined as the downward management of taxable income through tax planning that may or may not be considered fraudulent tax evasion. Generally, firms will face trade-offs when making financial and tax reporting decisions (Shackelford and Shevlin, 2001).

Kellog and Kellog (1991) state that the main reason for firms engaging in financial reporting aggressiveness is to increase firm value, as this is expected to encourage investors to invest their capital. On the other hand, the main reasons for firms engaging in aggressive tax reporting are to raise the utility of insider parties through earnings after tax distribution, such as bonuses or dividends (Kim et al., 2011), to increase cash flow efficiency (Mills, 1998) and to alleviate financial constraint (Edwards et al., 2016). Moreover, managers have the opportunity to concurrently draw up financial statements and tax reporting aggressively to maximise utility.

Prior studies that have examined the determinants of the complementary level of financial and tax aggressiveness within firms are still limited and focus on separately examining the determinants of either financial reporting aggressiveness or tax reporting aggressiveness. This study therefore aims to fill the gaps in previous studies by testing the factors that influence the diversity of the complementary level of financial and tax aggressiveness. We define the complementary level of financial and tax aggressiveness as the probability of a firm presenting its financial statements and tax reporting aggressively

at the same time. In contrast to Rachmawati et al. (2018), this study not only considers country-level characteristics influencing such complementarity but looks at firm-level characteristics as well.

In this study, the diversity of the cost (such as the level of detection risk) and benefit faced by firms when presenting financial and tax reporting aggressively at the same time are considered. Based on contracting theory, managers should consider the cost and benefit which will be faced by firms as the consequences of their decisions in drawing up financial statements and tax returns. Firms will bear a greater cost when conducting financial and tax reporting aggressively at the same time. In this study, our proxies for cost (the level of detection risk) are country-level variables, namely book-tax conformity and law enforcement.

However, firms will also acquire greater benefits when conducting financial and tax reporting aggressively at the same time. The examples of benefits that will be gained by firms are greater opportunity to obtain additional external capital (Kellog and Kellog, 1991) and greater cash flow efficiency (Mills, 1998). Our proxy for benefit is the financial constraint of firms, because firms displaying financial constraint will experience a greater benefit when conducting concurrent aggressive financial and tax reporting. In this study, we develop a new measure of financial constraint which is more comprehensive than those used in previous studies. Previous studies measured a company's financial constraint by combining a number of measures of financial constraint by scoring each measure (Almeida et al., 2004; Rauh, 2006; Fee et al., 2009; Linck et al., 2013; Kurt, 2017). Each measure had the same weight, even though the contribution of each measure in measuring a company's financial constraint vary. In other studies, financial constraint was measured by dummy variables (Demonier et al., 2015; Dyreng and Markle, 2016). Different from previous studies, this study develops a more comprehensive measure of financial constraint by combining several measures of financial constraint that are often used in previous studies, namely the net debt ratio, interest coverage ratio, and dividend payout ratio. These measures is combined using confirmatory factor analysis, so that the weighting of each measure is more appropriate, according to its contribution in measuring the company's financial constraint. This research is the first study that measures financial constraint using confirmatory factor analysis.

Using a sample of listed firms from East Asia and Europe from 2014 to 2016, we hypothesise and find that firms from countries with higher book-tax conformity tend to face trade-offs between [redacted] aggressiveness because these aspects can be compared easily to each other in such environments (Desai, 2005; Blaylock et al., 2015; Tang, 2014). Furthermore, we hypothesise and find that firms from countries with stronger law enforcement tend [redacted] between [redacted] aggressiveness because the level of detection risk faced by them is higher (Atwood et al., 2012; Hoopes et al., 2011; Hanlon et al., 2014). Lastly, we hypothesise and find that firms facing financial constraint tend to engage in concurrent aggressive financial and tax reporting.

[redacted]-country [redacted] complementary level of financial and tax aggressiveness. The results suggest that firm-level and country-level characteristics influence managers' decisions about whether or not to present financial statements and tax reporting aggressively and concurrently. This study fills a research gap by explaining why previous studies have produced

inconclusive results for the relationship between financial and tax aggressiveness. Our study should be of interest to regulators, both tax policymakers and the capital market authorities, by revealing that in practice firms do not necessarily face trade-offs when making financial and tax reporting decisions. At the same time, firms may act aggressively in their financial statements and tax returns. Indeed, our results provide input for regulators to use in determining future policy, especially related to efforts to minimise the complementary level of financial and tax aggressiveness. Our results should also be of interest to managers of firms in assisting them to produce financial statements and corporate tax returns with better quality. Although financial and tax aggressiveness carried out concurrently can provide benefit for firms under financial constraint, such firms also need to consider the level of detection risk they will face as a result. In addition, the greater potential for imposition of sanctions by regulators over financial and tax aggressiveness also needs to be considered (Desai, 2005; Chen et al., 2010; Atwood et al., 2012; Hoopes et al., 2011; Hanlon et al., 2014).

The remainder of this paper is organised as follows: Section 2 reviews the literature available, Section 3 develops the hypotheses, Section 4 outlines the research methodology, and Section 5 presents our sample selection, descriptive statistics, test results and sensitivity analysis. Finally, Section 6 presents our conclusions.

2 Literature review

2.1 *Theoretical aspects of the relationship between financial and tax reporting aggressiveness*

Theoretically, managers will face trade-offs when making financial and tax reporting decisions (Shackelford and Shevlin, 2001). If managers decide to increase the firm's financial reporting income through earnings management activities, then corporate income tax payable that is reported increases. Conversely, if managers decide to decrease the firm's taxable income through tax management actions, then income reported becomes smaller. Houcine and Halaoua (2017) explain that tax motives may lead managers to delay their profits to periods of lower tax rate or to choose decreasing earnings management. Some studies show that the relationship between financial and tax reporting aggressiveness is a negative one (Erickson et al., 2004; Lennox et al., 2013). This occurs because it is very difficult to report high financial income in conjunction with low taxable income. Knowledgeable investors, capital market authorities and tax authorities will tend to become suspicious of those firms that present their financial and tax reporting aggressively at the same time (Dyck and Zingales, 2004; Erickson et al., 2004; Desai, 2005). Based on Bulow et al. (1985), managers in this case chose a substitution strategy for financial and tax reporting (i.e., the selected reporting strategies can reduce the benefits accruing to firms when they commit to other reporting strategies).

2.2 *Practical aspects of the relationship between financial and tax reporting aggressiveness*

Practically, flexibility in the choice of accounting methods also potentially causes conflict between financial and tax reporting purposes (Frank et al., 2009). For financial reporting

purposes, firms tend to report a higher book income to their shareholders and creditors, while for tax reporting purposes, firms tend to report a lower taxable income to their tax authorities. However, managers are able to draw up financial statements and tax returns aggressively at the same time to maximise their own utility. Houcine and Halaoua (2017) explain that tax incentives may also lead managers to choose increasing earnings management. Increasing tax rates in future periods may encourage managers to recognise future income in the current period and to delay the expenses for the following years. Some studies show evidence that the relationship between financial and tax reporting aggressiveness is positive (Frank et al., 2009; Lyon, 2014; Heltzer et al., 2015). Based on Bulow et al. (1985), in such conditions, managers have chosen a complementary strategy for financial and tax reporting (i.e., the selected reporting strategies do not reduce the benefit for the firms in terms of other reporting strategies, but instead complement each other).

3 Hypothesis development

Badertscher et al. (2009) fill this research gap by testing whether firms that restate earnings due to accounting irregularities tend to choose to trade-off or not with tax reporting. Badertscher et al. (2009) find that the tax benefits and detection risks faced by firms affect their decisions to trade-off or not against tax reporting. Firms that have tax benefits (proxied by firms with net operating loss carry forwards) tend to engage in more conforming earnings management. Firms that face detection risks (proxied by firms that have high-quality external auditors or greater analyst following) tend to engage in more conforming earnings management. This occurs because these firms are being more effectively monitored than firms that have low-quality external auditors or no analyst following. Lyon (2014) also explains inconclusive results by reviewing and comparing the results of Frank et al. (2009) and Lennox et al. (2013). Lyon (2014) finds that financial and tax reporting aggressiveness has an uncertain relationship (which can be positive or negative). Furthermore, Lyon (2014) finds that there are differing characteristics between firms with positive and negative relationships between financial and tax reporting aggressiveness. Thus, Lyon (2014) concludes that firm characteristics can be used as an early indicator in identifying the reporting strategy of firms.

This study fills the gap in previous studies by examining the factors affecting the complementary level of financial and tax aggressiveness. The complementary level of financial and tax aggressiveness is defined as the probability of a firm presenting its financial statements and tax reporting aggressively at the same time. If the managers have chosen a complementary strategy (in terms of drawing up the financial statements and tax returns aggressively at the same time), these firms will be classified as having a high complementary level of financial and tax aggressiveness. Meanwhile, if managers have chosen a substitution strategy (in terms of facing trade-offs when making financial and tax reporting decisions), these firms will be classified as those having a low complementary level of financial and tax aggressiveness. A higher complementary level of financial and tax aggressiveness represent higher risks caused by fraudulent reporting as well as uncertain reporting positions (fraud risk).

We consider the variety of cost and benefit which will be faced by firms in determining the factors that affect the complementary level of financial and tax aggressiveness. Based on contracting theory, managers should consider the cost and benefit which will be faced by firms as the consequences of their decisions in drawing up financial statements and tax returns. Firms will bear a greater cost when conducting financial and tax reporting aggressively and concurrently. In this study, our proxies for cost (the level of detection risk) are book-tax conformity and law enforcement. Firms will also get a greater benefit when conducting financial and tax reporting aggressively at the same time. Examples of benefits that will be accrued by such firms are gaining a greater opportunity to obtain additional external capital (Kellog and Kellog, 1991) and cash flow efficiencies (Mills, 1998). Our proxy for benefit is financial constraint, because firms facing financial constraint will experience greater benefit when conducting financial and tax reporting aggressively at the same time.

3.1 Book-tax conformity

Every country has a different level of book-tax conformity (Atwood et al., 2010; Atwood et al., 2012). Higher required book-tax conformity can improve the earnings quality of firms and the tax compliance of taxpayers (Desai, 2005; Whitaker, 2006). Blaylock et al. (2015) state that higher book-tax conformity can minimise the incentive of managers to carry out upward earnings management because such actions could lead to higher taxable income. In addition, higher book-tax conformity can also minimise the incentive of managers to conduct downwards tax management because such actions can lead to lower book income reported to stakeholders.

Firms from countries with higher book-tax conformity tend to display a decreased tendency of managers to act in order to maximise their utility through [redacted] aggressiveness and/or tax reporting aggressiveness. The flexibility of choice of accounting methods allowed in countries with higher book-tax conformity is limited as there is close alignment between financial accounting standards and tax regulation (Desai, 2005; Tang, 2014; Blaylock et al., 2015; Rachmawati and Martani, 2017). This can lead to an increased level of comparability between financial and tax reporting (Desai, 2005). Where financial and tax reporting are comparable, knowledgeable investors, capital market authorities and the tax authorities tend to become suspicious of firms that draw up financial statements and tax returns aggressively at the same time. As a result, financial and tax aggressiveness would be more easily detected by regulators (both tax authorities and capital market authorities) and there would be greater potential for the imposition of sanctions (Erickson et al., 2004; Desai, 2005).

Based on contracting theory, the higher the book-tax conformity, the greater the cost (in term of detection risk) that will be faced by firms when presenting financial statements and tax returns aggressively at the same time (Rachmawati et al., 2018). Because of this higher level of detection risk, we suggest that firms from countries with higher book-tax conformity are more likely to choose a substitution strategy rather than a complementary strategy when conducting financial and tax reporting. In accordance with this argument, we state our hypothesis as follows:

H_1 Firms from countries with higher book-tax conformity tend to engage in a lower complementary level of financial and tax aggressiveness.

3.2 Law enforcement

Law enforcement within a country provides for the protection of minority shareholders' rights from expropriation risk and opportunistic actions carried out by firms' insider parties (LaPorta et al., 1997, 1998, 2006). Strong law enforcement (including strong tax law enforcement) can reduce the incentives of insider parties to engage in expropriation and opportunistic actions such as manipulating book income (Hung, 2001; Leuz et al., 2003; DeFond et al., 2007; Hanlon et al., 2014) and manipulating taxable income (Hoopes et al., 2011; Atwood et al., 2012). Firms in countries with stronger law enforcement will face a greater level of monitoring carried out by regulators and a greater litigation risk (Atwood et al., 2012; Hoopes et al., 2011; Hanlon et al., 2014). Thus, the stronger a country's law enforcement, the higher the detection risk and the potential penalties faced by firms (Atwood et al., 2012).

According to findings from prior studies, we argue that the stronger a country's law enforcement, the higher the detection risks faced by firms when carrying out concurrent aggressive financial and tax reporting. This results from the level of monitoring carried out by the regulators, the risk of litigation and the potential penalties faced by firms all being high. Firms in countries with stronger law enforcement will be more careful in drawing up their financial statements and tax returns because they are required to present financial information of good quality (Rachmawati et al., 2018). Based on contracting theory, the stronger the law enforcement of the country, the greater the cost (in term of detection risk) faced by firms when presenting financial statements and tax returns aggressively at the same time (Rachmawati et al., 2018). Because of higher levels of detection risk, we suggest that firms from countries with stronger law enforcement are more likely to choose a substitution strategy than a complementary strategy when conducting financial and tax reporting. In accordance with this argument, we state our hypothesis in the alternative as follows:

H_2 Firms from countries with stronger law enforcement tend to engage in a lower complementary level of financial and tax aggressiveness

3.3 Financial constraint

Firms suffering financial constraint generally have limited internal funding (Koh and Lee, 2015), and thus need additional capital from external parties, either through bank loans or issuance of stocks or bonds (Fee et al., 2009; Shyam-Sunder and Myers, 1999; Frank and Goyal, 2003; Claessens et al., 2006; Schrand and Zechman, 2012; Koh and Lee, 2015; Edwards et al., 2016). Based on previous studies, firms with financial constraint have a greater motivation to pursue opportunistic action aimed at maximising their utility by presenting financial statements aggressively to the capital owners. If such firms present less profitable financial statements they will find it difficult to obtain additional capital from external parties. Moreover, such firms cannot issue shares or bonds at adequate price (Koh and Lee, 2015). Therefore, firms with financial constraint are compelled to pursue financial reporting aggressiveness to increase the value of the firm and to encourage investors to invest their capital (Kellog and Kellog, 1991; Dechow et al., 1995; Koh and Lee, 2015). Firms with financial constraint also have a tendency to pursue tax

efficiency through aggressive tax reporting. Badertscher et al. (2009) state that firms with relatively high free cash flow tend not to conduct tax aggressiveness because they have the ability to pay tax, while firms with financial constraint generally have limited free cash flow (Koh and Lee, 2015).

Firms with financial constraint will acquire benefits when drawing up financial statements and tax returns aggressively and concurrently. On the one hand, the opportunity for firms to acquire additional capital from external parties increases when firms conduct aggressive financial reporting (Kellog and Kellog, 1991; Dechow et al., 1995; Koh and Lee, 2015). While on the other, by reporting tax aggressively firms can achieve tax savings (Badertscher et al., 2009; Chen et al., 2010; Lyon, 2014) and thus make cash flows more efficient (Mills, 1998) and ease the financial constraint experienced (Edwards et al., 2016). Based on these arguments, we suggest that firms with financial constraint are more likely to choose the complementary strategy than the substitution strategy when conducting financial and tax reporting. In accordance with the argument, we state our hypothesis in the alternative as follows:

H_3 Firms with financial constraint tend to engage in a higher complementary level of financial and tax aggressiveness.

4 Research methodology

4.1 Measure of financial constraint

Previous studies have measured financial constraint based on firm performance (Rauh, 2006; Badertscher et al., 2009; Linck et al., 2013), financial cost borne by firms (Almeida et al., 2004; Claessens et al., 2006; Rauh, 2006; Fee et al., 2009; Linck et al., 2013; Koh and Lee, 2015; Dyreng and Markle, 2016; Edwards et al., 2016) and earnings distribution (Almeida et al., 2004; Claessens et al., 2006; Rauh, 2006; Fee et al., 2009; Linck et al., 2013; Demonier et al., 2015; Dyreng and Markle, 2016; Kurt, 2017). This study develops a new measure of financial constraint which considers all three of these factors.

The argument for the first factor is that firms with poor financial performance are more likely to face financial constraint than firms with good financial performance. In this study, financial performance associated with financial constraint is proxied by net debt ratio (Linck et al., 2013). We argue that firms with high net debt ratio tend to face financial constraint because their internal funding is limited. The net debt ratio is measured as the sum of long-term debt and short-term debt minus excess cash, scaled by total assets for year *t*.

Based on the second factor, firms with high financial costs face financial constraint than firms with low financial costs. This study proxies the financial cost borne by firms with interest coverage ratio (Claessens et al., 2006). Firms with low interest coverage ratios are more likely to face constraint high interest coverage ratios. Following Claessens et al. (2006), interest coverage ratio is measured by earnings before interest and taxes divided by interest expenses. If in a given year firms have no interest expenses, then these firms are excluded from the sample. Because the relationship between the interest coverage ratio and financial constraint is negative, the interpretation of the results is facilitated by the value of the interest coverage ratio being multiplied by –1.

The argument for the last factor is that firms that cannot afford to distribute their earnings to shareholders are more likely to face financial constraint than firms that are able to distribute earnings. This study proxies earnings distribution with the dividend payout ratio (Almeida et al., 2004; Claessens et al., 2006; Rauh, 2006; Fee et al., 2009; Linck et al., 2013; Demonier et al., 2015; Dyreng and Markle, 2016; Kurt, 2017). Previous studies indicate that firms with financial constraint are more significantly correlated with lower dividend payout ratios than firms without financial constraint (Fazzari et al., 1988; Almeida et al., 2004; Fee et al., 2009). Claessens et al. (2006) state that dividend-paying firms are less financially constrained than firms that do not pay dividends. Firms pay a low dividend because the need for investment funding exceeds internal funding, and so these firms have little or even no income that can be distributed to shareholders (Fazzari et al., 1988). The dividend payout ratio is measured by dividend per share divided by earnings per share. Because the relationship between the dividend payout ratio and financial constraint is negative, the value of the dividend payout ratio is multiplied by −1 to facilitate interpretation of the results.

This study combines these three measures of financial constraint using confirmatory factor analysis to generate a new financial constraint variable (FINCON). Confirmatory factor analysis is a model that analyses a construct that can be measured from several observed variables, where the number and composition of these observed variables are predetermined by the theory (Anderson and Gerbing, 1988; Arieftiara, 2017). Through the confirmatory factor analysis model, this study can evaluate construct validity appropriately. Thus, the new measure of financial constraint is more comprehensive and able to simplify the interpretation of the results. A larger value of FINCON indicates a greater financial constraint faced by firms.

4.2 *Research model*

This research uses a binary logistic model, because the dependent variable in this model is a dummy variable (COMP). Specifically, we estimate the following model:

$$\Pr(COMP_{it}=1)=\frac{e^{\alpha_0+\alpha_1 BTC_{it}+\alpha_2 ENFOR_{it}+\alpha_3 FINCON_{it}+\alpha_4 CONTROL_{it}+\varepsilon_{it}}}{1+e^{\alpha_0+\alpha_1 BTC_{it}+\alpha_2 ENFOR_{it}+\alpha_3 FINCON_{it}+\alpha_4 CONTROL_{it}+\varepsilon_{it}}} \quad (1)$$

where $COMP_{it}$ is a dummy variable, equal to 1 if the complementary level of financial and tax aggressiveness for firm i in year t is high and 0 if otherwise. BTC_{it} is book-tax conformity in the country of firm i in year t. $ENFOR_{it}$ is law enforcement in the country of firm i in year t. $FINCON$ is financial constraint of firm i in year t. GDP_{it} is the natural log of per capita gross domestic product in the country of firm i in year t. STR_{it} is the statutory tax rate in the country of firm i in year t. $DTSYS_{it}$ is a dummy variable, equal to 1 for firms in countries with a territorial approach and 0 if otherwise. $SIZE_{it}$ is the natural log of total assets of firm i in year t. $GROW_{it}$ is sales growth of firm i in year t. LEV_{it} is calculated as total short-term debt and long-term debt divided by total assets of firm i in year t. $DLOSS_{it}$ is a dummy variable, equal to 1 for firm i with negative pre-tax book income in year t and 0 if otherwise. ROA_{it} is calculated by pre-tax book income divided by total assets of firm i in year t. $NUMAN_{it}$ is number of analysts following firm i in year t. PPE_{it} is total property, plant and equipment divided by total assets of firm i in year t. IA_{it} is total intangible assets divided by total assets of firm i in year t. $DYEAR_{it}$ is the year dummy variable.

We use the complementary level of financial and tax aggressiveness (COMP) measure developed by Rachmawati et al. (2018). COMP is measured via several stages. First, financial reporting aggressiveness (DFIN) and tax reporting aggressiveness (DTAX) are calculated using discretionary permanent differences following the method of Frank et al. (2009). Second, DFIN and DTAX are classified into quintiles by country-year. Based on the quintile combination for DFIN and DTAX, we classify a firm into one of four groups. For the first group, if the quintile combination for DFIN and DTAX consists of firms that perform financial and tax aggressiveness at the same time (i.e., the magnitudes of DFIN and DTAX are both positive), then the firms in this group are classified as having a high complementary level of financial and tax aggressiveness. For the second group, if the DFIN and DTAX quintile combination consists of firms that perform either financial or tax aggressiveness only (i.e., the magnitude of either DFIN or DTAX is positive), then the firms in this group are classified as having a low complementary level of financial and tax aggressiveness. In the third group, if the DFIN and DTAX quintile combination comprises firms that perform financial and/or tax aggressiveness (i.e., the magnitude(s) of DTAX and/or DFIN are/is positive), then the firms in this group are removed from the sample because the relationship between DFIN and DTAX is ambiguous. For the fourth group, if the quintile combination for DFIN and DTAX consists of firms that do not engage in financial and tax aggressiveness (i.e., the magnitudes of DFIN and DTAX are both negative), then the firms in this group are removed from the sample. COMP is a dummy variable that is equal to 1 if the complementary level of financial and tax aggressiveness for firm i in year t is high and 0 if otherwise.

We use the book-tax conformity measure developed by Atwood et al. (2010), in which book-tax conformity is measured using the root mean square error (RMSE) of the following equation:

$$CTE_{it} = \rho_0 + \rho_1 PTBI_{it} + \rho_2 FORPTBI_{it} + \rho_3 DIV_{it} + \epsilon_{it} \quad (2)$$

where CTE_{it} is current tax expense of firm i in the year t. $PTBI_{it}$ is pre-tax book income of firm i in the year t. $FORPTBI_{it}$ is estimated foreign pre-tax book income (foreign tax expense divided by total tax expense) of firm i in year t. DIV is total dividend of firm i in the year t. To control for firm size, all of the variables are scaled by average total assets in years $t-1$ and t. Equation (2) is estimated by country-year. The values of RMSE from equation (2) are sorted and ranked by each country and year, from highest value to lowest value. A higher (lower) RMSE indicates lower (higher) book-tax conformity. Following Atwood et al. (2010), for the analyses we rank countries each year, based on RMSE from the equation (2). In this study, we use descending ranks, so that the highest RMSE in the year is ranked 0 and the lowest RMSE in the year is ranked $n-1$ (where n is the number of included countries in that year). Thus, the countries with higher (lower) rankings in a given year have higher (lower) book-tax conformity. The rank value is then divided by $n-1$ to scale the ranking between 0 and 1. This scale indicates that the greater the rating the higher the level of book-tax conformity in a country. The resulting scaled rankings are labelled BTC.

To measure law enforcement, we use ENFOR, as developed by Rachmawati et al. (2018), who combine three measures of law enforcement obtained from the Global Competitiveness Report, namely:

1 tax enforcement index

2 protection of minority investor index

3 effectiveness of the capital market regulator index.

These measures are combined using confirmatory factor analysis to produce a new law enforcement variable (ENFOR).

This study uses GDP, STR and DTSYS to control country-level characteristics (Leuz et al., 2003; Haw et al., 2004; Atwood et al., 2012; Tang, 2014; Rachmawati et al., 2018). STR and DTSYS data were hand-collected from the PricewaterhouseCoopers Corporate Taxes: A Worldwide Summary guides and the Ernst & Young Worldwide Corporate Tax Guide for 2014 through to 2016. This study also includes DLOSS as a control variable, since loss-making firms are treated specially in terms of their taxation (Atwood et al., 2010, 2012; Tang, 2014; Blaylock et al., 2015). We use NUMAN to control its effect on the complementary level of financial and tax aggressiveness. Badertscher et al. (2009) state that a greater number of analysts following a firm should provide more effective monitoring (relative to fewer analysts following). This study also includes SIZE, GROW, LEV, ROA, PPE and IA as firm-specific control variables. Giosi et al. (2017) show that financial performance threshold values create an incentive for manager to manage earnings.

5 Empirical results

5.1 Sample selection

We use a sample of firms from seven countries in East Asia (the Philippines, Hong Kong, Indonesia, South Korea, Malaysia, Singapore and Taiwan) and eight countries in Europe (The Netherlands, Denmark, Finland, Italy, Germany, France, Spain and Sweden) from 2014 to 2016. Firms in these countries generally have a concentrated ownership structure (LaPorta et al., 1998; Claessens et al., 2000; Haw et al., 2004) which has a controlling effect on the complementary level of financial and tax aggressiveness. The research period selection reflects a number of considerations. Firstly, following the global financial crisis of 2008, countries in Europe were impacted by the sovereign debt crisis between 2009 and 2012. This crisis was caused by the fall in credit quality, especially in Greece, Ireland, Italy, Portugal, and Spain (Grande et al., 2011; Acharya and Mora, 2015). Second, the sovereign debt crisis also affected the other countries in Europe. Third, the condition of the economies in Europe improved and started to stabilise in 2013. However, because we require data for the year $t-1$, the effective research period used is 2014, 2015 and 2016.

We selected our sample from the Thomson Reuters Eikon database. This paper applies several data filters. First, firms in the financial sector are not included since this industry sector is highly regulated. Second, a firm's income tax is based on taxable income and general income tax rates. Firms in the industry sector that treated differently in taxation [for example real estate sector (in all country samples), energy sector (in Indonesia, Malaysia, and Denmark), etc.] are removed from the sample. Third, the

selected firms must have all of the components required as variables in this research. Lastly, firms in the top and bottom 1% of the total sample in each year are deleted in order to remove potential outliers. Table 1 presents the sample composition used in this study. The final sample used in this research comprised 8,113 firm-year observations. Table 1 also shows the sample composition by country. Based on Table 1, Korea, Taiwan and Hong Kong are the largest samples and the Netherlands, Denmark and Spain are the smallest.

Table 1 Sample composition

All observations, excluding the financial and real estate sectors					*21,750*
(-) Firms with no data available to estimate COMP					(10,990)
(-) Firms with no data available to estimate BTC					(220)
(-) Firms with no data available to estimate FINCON					(1,858)
(-) Firms with no data available to test the hypotheses					(569)
Total observations					*8,113*
Country	*Obs*	*%*	*Country*	*Obs*	*%*
Denmark	82	1.01%	Malaysia	500	6.16%
Finland	123	1.52%	Netherlands	79	0.97%
France	545	6.72%	Philippines	108	1.33%
Germany	473	5.83%	Singapore	380	4.68%
Hong Kong	988	12.18%	Spain	86	1.06%
Indonesia	191	2.35%	Sweden	344	4.24%
Italy	200	2.47%	Taiwan	1,749	21.56%
Korea	2,265	27.92%	*Total observations*	*8,113*	*100.00%*

5.2 Descriptive statistics

Table 2, Panel A provides the descriptive statistics for dependent and independent variables in the full sample. A total of 2,531 firm years (31.20%) have a high complementary level of financial and tax aggressiveness, while a total of 5,582 firm years (68.80%) have a low complementary level of financial and tax aggressiveness. The mean values of the BTC, ENFOR and FINCON variables are 0.59, –0.13 and –0.03, respectively. Based on the statistics, the BTC variable has the lowest standard deviation, which implies that book-tax conformity has less variability across observations than the ENFOR and FINCON variables. Table 2, Panel B shows that the mean values of ENFOR and FINCON variables of the firms with high complementary level of financial and tax aggressiveness are significantly different to the mean values of ENFOR and FINCON variables of the firms with low complementary level of financial and tax aggressiveness. Based on the table, the mean value of ENFOR (FINCON) variable of the firms with high complementary level of financial and tax aggressiveness is lower (higher) than the firms with low complementary level of financial and tax aggressiveness. However, the mean value of the BTC variable of the firms with high complementary level of financial and tax aggressiveness is not significantly different compared to the firms with low complementary level of financial and tax aggressiveness. Panel C of Table 2 provides Pearson (above the diagonal) and Spearman (below the diagonal) correlations among the [redacted]. For both the Pearson and Spearman correlations, the law enforcement variable

is negatively and significantly correlated with the complementary level of the financial and tax aggressiveness variable, while the financial constraint variable is positively and significantly correlated with the complementary level of the financial and tax aggressiveness variable, in accordance with the hypothesis. Meanwhile, book-tax conformity and the complementary level of financial and tax aggressiveness variables are positively correlated, but not significant. This occurs because book-tax conformity has less variety across observations. Table 2, Panel C also shows that there is no indication of multicollinearity across the independent variables.

5.3 Results

Table 3 shows the results of the estimation of the factors affecting the complementary level of financial and tax aggressiveness. We estimate all regression models using binary logistic regression. Based on Table 3, the coefficient of the BTC variable is negative and significant at a 10% level. This is consistent with H_1, in that firms from the countries with higher book-tax conformity tend to engage in a lower complementary level of financial and tax aggressiveness. The results presented in Table 3 indicate that the higher the book-tax conformity of a country, the higher the level of detection risk (cost) faced by firms while preparing financial and tax reporting aggressively and concurrently. The flexibility of accounting choice allowed by financial accounting standards and tax regulations is increasingly limited because the alignment between financial accounting standards and tax regulations is high (Desai, 2005; Tang, 2014; Blaylock et al., 2015; Rachmawati and Martani, 2017). This can lead to an increased level of comparability between financial and tax reporting (Desai, 2005). Thus, knowledgeable investors, capital market authorities and the tax authorities tend to become suspicious of firms that draw up aggressive financial statements and tax returns at the same time. Based on contracting theory, the higher the book-tax conformity, the greater the cost (in terms of detection risk) that will be faced by firms when presenting financial statements and tax returns aggressively and at the same time (Rachmawati et al., 2018). In such conditions, financial and tax aggressiveness would be more easily detected by regulators (both tax authorities and capital market authorities) and there would be greater potential for the imposition of sanctions (Erickson et al., 2004; Desai, 2005).

Consistent with H_2, the coefficient of the ENFOR variable is negative and significant at the 10% level, indicating that in countries with stronger law enforcement, firms tend to engage in a lower complementary level of financial and tax aggressiveness. These results show that the stronger the law enforcement in a country, the higher the level of detection risk (cost) that will be faced by firms when presenting their financial statements and tax returns aggressively at the same time. This reflects the higher level of monitoring carried out by the regulators (both tax authorities and capital market authorities), the risk of litigation and the potential sanctions faced by firms. Firms from countries with strong law enforcement will be more careful in drawing up their financial statements and tax returns because they are required to present financial information of a better quality than firms from countries with weak law enforcement. Our results are consistent with previous studies, suggesting that stronger law enforcement can reduce the incentives for managers and majority shareholders to take opportunistic actions and expropriation risks such as manipulating earnings accounting (Hung, 2001; Leuz et al., 2003; DeFond et al., 2007; Hanlon et al., 2014) taxable income (; Atwood et al., 2012).

Table 2 Descriptive statistics and Pearson correlation

Panel A: descriptive statistics

Variable	*Obs*	*Mean*	*Median*	*Minimum*	*Maximum*	*Std. dev.*
BTC	8,113	0.59	0.64	0.00	1.00	0.32
ENFOR	8,113	−0.13	0.21	−1.81	1.56	0.97
FINCON	8,113	−0.03	0.05	−9.47	4.69	0.92
GDP	8,113	10.23	10.23	7.95	11.04	0.58
STR	8,113	0.21	0.22	0.15	0.33	0.05
SIZE	8,113	18.88	18.63	13.15	26.79	1.73
GROW	8,113	0.00	−0.01	−2.23	2.86	0.34
LEV	8,113	0.15	0.12	0.00	1.00	0.15
ROA	8,113	0.05	0.05	−0.59	0.53	0.13
NUMAN	8,113	2.37	0.00	0.00	51.00	5.44
PPE	8,113	0.41	0.33	0.00	2.91	0.37
IA	8,113	0.11	0.02	0.00	1.29	0.19

	Dummy = 1		*Dummy = 0*	
	Obs	%	*Obs*	%
COMP	2,531	31.20%	5,582	68.80%
DTSYS	2,495	30.75%	5,618	69.25%
DLOSS	2,015	24.84%	6,098	75.16%

Notes: All reported in italic are statistically significant at the 10% level or better.

$COMP_{it}$ is a dummy variable, equal to 1 if the complementary level of financial and tax aggressiveness for firm i in year t is high, and 0 if otherwise. BTC_{it} is book-tax conformity in the country of firm i in year t. $ENFOR_{it}$ is law enforcement in the country of firm i in year t. $FINCON$ is financial constraint of firm i in year t. GDP_{it} is the natural log of per capita gross domestic product in the country of firm i in year t. STR_{it} is statutory tax rate in the country of firm i in year t. $DTSYS_{it}$ is a dummy variable, equal to 1 for firms in countries with a territorial approach, and 0 if otherwise. $SIZE_{it}$ is the natural log of total assets of firm i in year t. $GROW_{it}$ is sales growth of firm i in year t. LEV_{it} is calculated as total short-term debt and long-term debt divided by total assets of firm i in year t. $DLOSS_{it}$ is a dummy variable, equal to 1 for firm i with negative pre-tax book income in year t, and 0 if otherwise. ROA_{it} is calculated by pre-tax book income divided by total assets of firm i in year t. $NUMAN_{it}$ is the number of analysts following firm i in year t. PPE_{it} is total property, plant and equipment divided by total assets of firm i in year t. IA_{it} is total intangible assets divided by total assets of firm i in year t. $DYEAR_{it}$ is the year dummy variable.

Table 2 Descriptive statistics and Pearson correlation (continued)

Panel B: Independent samples test

	Mean			Sig.
	COMP = 1	*COMP = 0*		
BTC	0.59	0.59		0.64
ENFOR	−0.17	−0.12		0.04
FINCON	0.02	−0.05		0.00

Panel C: Pearson (above) and Spearman (below) correlations

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	COMP		0.01	−0.02	0.04	−0.02	0.00	0.01	−0.03	0.01	0.00	0.02	0.04	−0.04	−0.01	−0.07
2	BTC	0.00		−0.17	−0.26	−0.23	−0.13	−0.47	−0.11	0.01	0.07	0.05	0.02	−0.12	0.10	−0.31
3	ENFOR	−0.03	−0.09		−0.10	0.32	−0.43	0.53	−0.02	0.01	−0.11	−0.10	0.03	−0.03	−0.14	0.06
4	FINCON	0.04	−0.02	−0.12		−0.01	0.07	−0.00	−0.03	−0.07	0.49	−0.39	0.38	−0.12	0.09	0.03
5	GDP	−0.02	−0.48	0.33	0.01		−0.24	0.19	−0.02	0.01	−0.10	−0.08	0.06	0.05	−0.16	0.28
6	STR	0.00	−0.17	−0.50	0.08	−0.13		0.18	0.07	−0.02	0.06	−0.02	−0.05	0.09	−0.01	0.24
7	DTSYS	0.01	−0.48	0.48	−0.03	0.35	0.10		0.03	−0.01	−0.09	−0.04	0.00	−0.02	−0.12	0.06
8	SIZE	−0.04	−0.10	−0.01	−0.06	0.03	0.04	0.05		−0.02	0.18	0.13	−0.21	0.63	0.17	0.11
9	GROW	0.00	−0.01	0.03	−0.13	0.02	−0.03	−0.02	−0.02		−0.00	0.14	−0.16	0.02	−0.09	0.02
10	LEV	0.00	0.07	−0.13	0.49	−0.06	0.10	−0.09	0.22	0.03		−0.11	0.03	0.06	0.28	0.01
11	ROA	−0.00	0.01	−0.00	−0.63	−0.03	0.01	−0.01	0.11	0.21	−0.15		−0.01	0.15	0.03	−0.09
12	DLOSS	0.04	0.03	0.04	0.47	0.02	−0.05	0.00	−0.22	−0.20	0.01	−0.65		−0.13	−0.04	0.05
13	NUMAN	−0.03	0.13	−0.07	−0.19	0.10	0.13	−0.04	0.50	0.08	0.09	0.25	−0.22		0.07	0.20
14	PPE	−0.01	0.11	−0.20	0.12	−0.19	0.05	−0.12	0.21	−0.11	0.30	0.05	−0.07	0.09		−0.26
15	LA	−0.04	−0.33	0.13	0.05	0.39	0.25	−0.01	0.12	0.04	0.03	−0.03	0.03	0.31	−0.13	

Notes: All reported in italic are statistically significant at the 10% level or better.

COMP$_{it}$ is a dummy variable, equal to 1 if the complementary level of financial and tax aggressiveness for firm *i* in year *t* is high, and 0 if otherwise.

BTC$_{it}$ is book-tax conformity in the country of firm *i* in year *t*. *ENFOR*$_{it}$ is law enforcement in the country of firm *i* in year *t*. *FINCON*$_{it}$ is financial constraint of firm *i* in year *t*. *GDP*$_{it}$ is the natural log of per capita gross domestic product in the country of firm *i* in year *t*. *STR*$_{it}$ is statutory tax rate in the country of firm *i* in year *t*. *DTSYS*$_{it}$ is a dummy variable, equal to 1 for firms in countries with a territorial approach, and 0 if otherwise. *SIZE*$_{it}$ is the natural log of total assets of firm *i* in year *t*. *GROW*$_{it}$ is sales growth of firm *i* in year *t*. *LEV*$_{it}$ is calculated as total short-term debt and long-term debt divided by total assets of firm *i* in year *t*. *DLOSS*$_{it}$ is a dummy variable, equal to 1 for firm *i* with negative pre-tax book income in year *t*, and 0 if otherwise. *ROA*$_{it}$ is calculated by pre-tax book income divided by total assets of firm *i* in year *t*. *NUMAN*$_{it}$ is the number of analysts following firm *i* in year *t*. *PPE*$_{it}$ is total property, plant and equipment divided by total assets of firm *i* in year *t*. *LA*$_{it}$ is total intangible assets divided by total assets of firm *i* in year *t*. *DYEAR*$_{it}$ is the year dummy variable.

Consistent with H_3, the coefficient of the FINCON variable is positive and significant at the 1% level, indicating that firms with financial constraint tend to engage in a higher complementary level of financial and tax aggressiveness. Firms with financial constraint generally have limited internal funding (Koh and Lee, 2015) and will accrue greater benefits when drawing up financial statements and tax returns aggressively at the same time than firms without such constraint. On the one hand, the opportunity for firms to acquire additional capital from external parties increases when they report their financial statements aggressively (Kellog and Kellog, 1991; Dechow et al., 1995; Koh and Lee, 2015); on the other hand, when reporting their tax returns aggressively, firms can benefit from tax savings (Badertscher et al., 2009; Chen et al., 2010; Lyon, 2014), making the firm's cash flows more efficient (Mills, 1998) and easing financial constraints (Edwards et al., 2016).

Table 3 Logit regression of determinants of the complementary level of financial and tax aggressiveness

Variable	*Hypo*	*Exp sign*	*Dependent variable: COMP*		
			Coef.	*Sig.*	*Effect margin*
BTC	H_1	(–)	–0.14	*0.07**	–0.03
ENFOR	H_2	(–)	–0.05	*0.09**	–0.01
FINCON	H_3	(+)	0.19	*0.00****	0.04
GDP			0.00	0.49	0.00
STR			0.42	0.29	0.09
DTSYS			0.08	0.18	0.02
SIZE			–0.01	0.31	–0.00
GROW			0.10	*0.08**	0.02
LEV			–0.13	0.26	–0.03
ROA			1.96	*0.00****	0.42
DLOSS			0.41	*0.00****	0.09
NUMAN			–0.01	*0.09**	–0.00
PPE			–0.12	*0.05***	–0.03
IA			–0.85	*0.00****	–0.18
Cons			–0.60	0.18	
DYEAR				*Yes*	
LR chi²				*130.73*	
Prob.				*0.00****	
n				*8,113*	
Pseudo R^2				*1.30%*	

Notes: *, ** and *** indicate significance at 10%, 5%, and 1%, respectively. We use one-tailed tests when a sign is predicted. All variables are as defined in Table 2.

We also find that growth of the firm (GROW variable) is positively associated and significantly at the 10% level with the complementary level of financial and tax

aggressiveness (COMP variable). According to Claessens et al. (2006), growing firms generally have greater investment opportunities, so are likely to be facing financial constraint or temporary financial distress. Lara et al. (2016) state that growing firms require additional external funding, so these firms tend to report their financial reporting aggressively in order to obtain funding at lower cost (Schrand and Zechman, 2012). Several studies show that growing firms may carry out accounting fraud to increase or maintain sales growth (Loebbecke et al., 1989; Bell et al., 1991). The other firm characteristics that are positively (negatively) associated and significant are ROA and DLOSS variables (PPE and IA variables). Consistent with Badertscher et al. (2009), we also find that the number of analysts following firms (NUMAN variable) is negatively associated and marginally significant with the complementary level of financial and tax aggressiveness. Badertscher et al. (2009) state that greater analyst following should provide more effective monitoring relative to less analyst following.

5.4 Sensitivity analysis

This study applies several sensitivity analyses, with the aim of showing that the financial constraint measure developed is better than those of previous studies. Firms with financial constraint generally require additional capital from external parties, either through debt or share issuance (Shyam-Sunder and Myers, 1999; Frank and Goyal, 2003; Claessens et al., 2006; Schrand and Zechman, 2012). In the sensitivity test used for this research, we replace the financial constraint measure (FINCON) with a debt issue variable (DDIS) and/or a stock issue variable (DSIS). The DDIS variable is a dummy variable equal to 1 if firm i will issue debt in year $t + 1$ and 0 if otherwise. The DSIS variable is a dummy variable equal to 1 if firm i will issue stock in year $t + 1$ and 0 if otherwise. According to Heitzman et al. (2010), firms that issue debt and/or stock derive a capital market benefit from giving positive signals to creditors and/or investors through voluntary disclosure. In the context of this research, firms have a capital market benefit in giving positive signals to the owners of capital through aggressive financial and tax reporting. From such actions, firms expect capital owners to assess the financial condition of the firm as healthy and/or the firm's value as increasing. Thus, such behaviours can attract capital owners' interest in buying the stocks or bonds of the firm (Kellog and Kellog, 1991; Dechow et al., 1995; Koh and Lee, 2015).

According to the results presented in Table 4, columns (1) and (3), we find that the association between the DDIS and COMP variables is positively and marginally significant. This testing shows results that are consistent with the primary results. However, in Table 4, columns (2) and (3), we fail to prove the effect of stock issue on the complementary level of financial and tax aggressiveness (insignificant). This may be because the funding of the majority of the firms in the sample comes from external debt, especially bank loans (Blundell-Wignall, 2011; Acharya and Mora, 2015; Bonizzi et al., 2015). As a result, the effect of DDIS on COMP variables is more significant than the DSIS variable. Moreover, from Table 4 we can analyse that the FINCON variable is a better financial constraint measure than the DDIS and DSIS variables. This is known from the value of pseudo R^2 from any testing done. The value of pseudo R^2 in Table 3 is larger than the value of pseudo R^2 in Table 4. This means that, ceteris paribus, the ability of the FINCON variable to explain the COMP variable is higher than the DDIS and DSIS variables.

Table 4 Sensitivity analysis of financial constraint measures

	Exp sign	(1)			(2)			(3)		
		Coef.	*Sig.*	*Effect margin*	*Coef.*	*Sig.*	*Effect margin*	*Coef.*	*Sig.*	*Effect margin*
BTC	H_1: –	–0.18	*0.03***	–0.04	–0.16	*0.05***	–0.03	–0.18	*0.03***	–0.04
ENFOR	H_2: –	–0.07	*0.05***	–0.01	–0.07	*0.05***	–0.01	–0.06	*0.06**	–0.01
DDIS	H_{3a}: +	0.06	*0.09**	0.01	-	-	-	0.06	*0.09**	0.01
DSIS	H_{3b}: +	-	-	-	0.06	0.14	0.01	0.06	0.14	0.01
Cons		–0.72	0.14	-	–0.70	0.15	-	–0.73	0.14	-
Controls				Yes			Yes			Yes
DYEAR				Yes			Yes			Yes
LR chi^2				*108.42*			*107.97*			*109.59*
Prob.				*0.00****			*0.00****			*0.00****
N				*8,113*			*8,113*			*8,113*
Pseudo R^2				*1.08%*			*1.07%*			*1.09%*

Notes: *, ** and *** indicate significance at 10%, 5%, and 1%, respectively. We use one-tailed tests when a sign is predicted. All variables are as defined in Table 2.

6 Conclusions

This study examines the determinants of the complementary level of financial and tax aggressiveness, considering both country-level and firm-level characteristics. In this case, we consider the diversity of cost and benefit that will be faced by firms when preparing financial and tax reporting aggressively and at the same time. Overall, we find that firms tend to engage in a lower complementary level of financial and tax aggressiveness when the likelihood of facing detection is high (i.e., high book-tax conformity and/or strong law enforcement). We also find that firms tend to engage in a higher complementary level of financial and tax aggressiveness when the opportunity to derive benefit from these opportunistic actions is high (greater opportunity to obtain additional external capital and to create cash flow efficiencies). These results suggest that firm and country characteristics influence managers' decisions to present financial statements and tax reporting aggressively at the same time or not. Based on contracting theory, these results also suggest that managers should consider the cost and benefit which will be faced by firms as the consequences of their decisions in drawing up financial statements and tax returns. This research may also indicate that the measure of financial constraint developed in this study is better in explaining the complementary level of financial and tax aggressiveness than the measure developed by Heitzman et al. (2010).

We do, however, suggest several caveats with regard to our results. First, this study controls the effect of concentrated ownership structures on the complementary level of financial and tax reporting aggressiveness, by limiting the scope of the countries where the majority of companies have concentrated ownership structures. We thus suggest that further research is needed to examine the influence of concentrated ownership structures on the tendency of firms to choose the complementary levels of financial and tax

reporting aggressiveness specifically. Second, this study only used 15 sample countries, consisting of seven countries from East Asia and eight countries from Europe. The more countries used as samples, the results will be more generalisable. In addition, the measure of book-tax conformity and law enforcement in this study will be more varied. We suggest that further research is needed to add other countries in East Asia and Europe as research samples, so that the cross-country analysis carried out more comprehensive and generalised. Last, this study only considers book-tax conformity, law enforcement, and financial constraint as determinants of the complementary level of financial and tax reporting aggressiveness. We thus suggest that further research is needed to explore and investigate this area.

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