

Corporate Tax Aggressiveness in the 2007–2008 Financial Crisis

Amy E. Ji

This paper examines the impact of the 2007-2008 financial crisis on corporate tax aggressiveness. I hypothesize that, during the crisis, firms adopt more aggressive tax policies to save cash internally as external capital is harder or more costly to obtain because of the tight financial markets. Consistent with the prediction, my findings show that firms exhibited higher levels of tax aggressiveness in the crisis period than in the non-crisis period. I further find that the impact of the crisis on corporate tax aggressiveness was stronger for firms with lower cash holdings (i.e., firms more susceptible to the credit supply shock). Overall, the results suggest that the credit crisis affects firms' aggressive tax behaviors via its negative impact on their funding ability.

Keywords: Tax aggressiveness, Crisis, FIN 48, Financial crisis, Taxes

Introduction

The goal of this study is to assess the impact of the 2007-2008 financial crisis on corporate tax aggressiveness. Tax aggressiveness refers to firms' attempts to decrease their tax liabilities. Although firms are able to limit their tax payments made to tax authorities, there are potential costs related to aggressive tax strategies. If firms' tax positions are disallowed by tax authorities, they will have to pay back taxes, penalties, and interests which can be larger than tax savings (Chi et al., 2014). Additionally, corporations can face potential reputation costs if they become known to be tax aggressors (Chi et al., 2014). Firms also incur the costs of implementing tax transactions (e.g., direct labor and information system) as well as agency costs such as rent extraction (Chen et al., 2010; Balakrishnan et al., 2018). As the determinants of tax aggressiveness, prior studies have identified firm-level characteristics such as firms' financial constraints, CEOs' compensation, analyst coverage, corporate governance, tax preparers, ownership structures, customer-supplier relationships, and hedge fund activism (Law and Mills, 2015; Higgins et al., 2015; Chi et al., 2014; Allen et al., 2016; Armstrong et al., 2015; Kim and Zhang, 2016; Klassen et al., 2015; Badertscher et al., 2013; Cen et al., 2017; Cheng et al., 2012). Although firm-specific determinants have been examined, it is unclear whether macroeconomic conditions affect corporate tax aggressiveness. To fill this gap, I evaluate the association between the 2007 credit crisis and tax aggressiveness in this study.

The global financial crisis of 2007-2008 was the worst economic disaster in almost a century. In general, academics concur that a bubble in housing prices caused the crisis (Yeoh, 2010). Banks wrote down loans due to mortgage delinquencies, experiencing significant declines in their stock market capitalization (Brunnermeier, 2009). The financial crisis that began in the financial sector resulting from subprime mortgage defaults had dramatic effects on the whole U.S. economy (Francis et al., 2012).

The major effect of the crisis was that it deteriorated firms' funding abilities as the crisis was characterized by the drying-up of liquidity in the banking system (Ivashina and Scharfstein, 2010). The bond markets became an expensive source of external financing as spreads on commercial papers and long-term corporate bonds rose rapidly during the crisis (McNulty et al., 2013). The increases in ambiguity over the length of the crisis as well as the governmental responses further raised the cost of external funds (Bliss et al., 2015). Prior studies that examine the effects of the crisis on real corporate decisions find that, during the 2007-2008 financial crisis, firms used a significant amount of their cash savings, cut dividend distributions to shareholders, sold more assets, and bypassed profitable investment projects (Campello et al, 2010; Bliss et al., 2012; Duchin et al., 2010).

I posit that firms exhibit higher levels of tax aggressiveness in the 2007-2008 financial crisis period than in the non-crisis period. As external financing is harder or more costly to obtain during the credit crisis, corporations may attempt to pursue alternative sources of funds and tax savings can be one source of internal financing that they can turn to. In other words, to substitute more costly external financing sources in the

Amy E. Ji
Haub School of Business
Saint Joseph's University, PA, USA
Email: aji@sju.edu

period of financial constraints, firms may use their tax policies as an additional source of financing. Thus, during the crisis, they are likely to implement more aggressive tax policies to generate tax savings. Additionally, I hypothesize that the impact of the crisis on corporate tax aggressiveness is stronger for firms with lower cash holdings. Corporate cash holdings are an important internal financial resource that can mitigate the effect of the credit supply shock. Firms with lower cash balances are likely to have higher incentives to use an additional source of internal financing because of the tight financial markets in the crisis period. Thus, relative to cash-rich firms, firms with lower cash balances are likely to have higher incentives to generate tax savings and adopt more aggressive tax policies in responding to the crisis.

To empirically assess the hypotheses, I construct a sample of 12,418 firm-year observations over the period of 2007 to 2013, using firms covered in Compustat database. To measure corporate tax aggressiveness, I use Financial Accounting Standards Board's Interpretation No. 48 (FIN 48) uncertain tax benefits (described more below). Consistent with the expectation, the findings suggest that corporate tax aggressiveness increased during the crisis period and higher levels of corporate cash holdings weakened the impact of the crisis on firms' aggressive tax activities. As supplemental analyses, I use alternative dependent variables. I also use an alternative sample. These additional analyses yield qualitatively similar results.

The current study makes several contributions to the literature in the following ways. First, the study adds to the tax aggressiveness literature by showing that macroeconomic conditions such as the financial crisis affect firms' aggressive tax activities. Because of its supply-driven nature, the 2007 crisis presents an ideal setting to analyze the role of tax aggressiveness as an alternative source of internal financing. Unlike other financial crises originated from real sectors, the 2007 crisis began in the financial sector, causing a lending contraction. Most prior studies have identified various firm-level determinants of corporate tax aggressiveness such as firms' financial constraints, CEOs' compensation, analyst coverage, corporate governance, tax preparers, ownership structures, customer-supplier relationships, and hedge fund activism. The current study complements this stream of research by identifying the macroeconomic credit shock as one determinant of corporate tax aggressiveness.

Second, it contributes to the literature that investigates the causes and consequences of the 2007 global financial crisis by exploring the impact of the crisis on real corporate activities. A few studies examine the impact of the crisis on financial policies of non-financial firms. For example, prior studies find that, during the 2007-2008 financial crisis, firms decreased investment spending, bypassed profitable investment projects, and reduced payouts to shareholders (Campello et al., 2010; Duchin et al., 2010; Bliss et al., 2012). The

current study extends this line of research by showing that corporate tax aggressiveness increased during the crisis period.

Literature Review

Tax Aggressiveness

Corporations have incentives to engage in aggressive tax strategies to decrease tax payments made to tax authorities. Reducing their taxes benefits their shareholders who are the residual claimants (Mills et al., 1998). However, such activities also imply potential costs. The tax authorities may challenge the firms' tax positions. If they are disallowed, the firms will have to pay back taxes, penalties, and interests which can be larger than tax savings (Chi et al., 2014). Corporations can face potential reputation costs if they become known to be tax aggressors (Chi et al., 2014). Firms also incur the costs of implementing tax transactions (e.g., direct labor and information system) as well as agency costs such as rent extraction (Chen et al., 2008; Balakrishnan et al., 2017).

The determinants of tax aggressiveness have been examined by prior empirical studies. Prior studies have identified various determinants of corporate tax aggressiveness such as firms' financial constraints, CEOs' compensation, analyst coverage, corporate governance, tax preparers, ownership structures, customer-supplier relationships, hedge fund activism, and Internal Revenue Service (IRS) monitoring (Law and Mills, 2015; Higgins et al., 2015; Chi et al., 2014; Allen et al., 2016; Armstrong et al., 2015; Kim and Zhang, 2014; Klassen et al., 2015; Badertscher et al., 2013; Cen et al., 2017; Cheng et al., 2012; Hoopes et al., 2012).

Law and Mills (2015) analyze an association between firm-level financial constraints and tax aggressiveness. They posit that firms with higher financial constraints are likely to establish more aggressive tax policies for the purpose of obtaining supplemental internal funds. Consistent with their prediction, their findings show that financially constrained firms pursue more aggressive tax policies evidenced by higher FIN 48 unrecognized tax benefits.

Higgins et al. (2015) examine a relation between firms' business strategies and their tax aggressiveness. They posit that firms with innovation-seeking strategies pursue more aggressive tax policies because they have more tax planning opportunities as a result of their continuous changes and aggressive quests for new products. Additionally, such firms are less concerned about their potential negative reputation caused by pursuing aggressive tax activities because their products are not likely to be easily replaced by substitutes. Their results confirm their prediction by showing that innovation-seeking firms have larger unrecognized tax benefits (UTBs).

Chi et al. (2014) examine an association between CEOs' debt compensation and firms' aggressive tax policies. They posit that CEOs' inside debt holdings

motivate CEOs to be more risk averse and, as a result, CEOs with higher levels of inside debt are likely to pursue less aggressive tax policies for their firms. Consistent with their prediction, the results document a negative relation between CEO inside debt holdings and uncertain tax benefits which are used to measure tax aggressiveness.

Armstrong et al. (2015) examine an association between firms' corporate governance and corporate tax avoidance measured by UTBs. They find that CEOs' risk-taking equity incentives are associated with tax avoidance in a positive direction. Their rationale is that managers anticipate greater personal benefits from higher levels of tax avoidance because more aggressive tax avoidance raises stock price volatility.

Kim and Zhang (2014) examine whether corporate political connections are associated with tax aggressiveness. They posit a positive association between political connections and tax aggressiveness because politically connected firms have lower expected cost of tax enforcement in addition to information advantage about tax enforcement changes. In line with their prediction, their empirical results show that politically connected firms report higher UTBs.

Klassen et al. (2015) explore whether the types of tax preparers (i.e., auditors, external tax preparers, and internal tax specialists) are associated with corporate tax aggressiveness by using confidential data from the Internal Revenue Service to identify tax preparer type. They find evidence that, relative to firms using external tax preparers or internal tax specialists, firms hiring their auditors as their tax preparers engage in less aggressive tax activities evidenced by lower UTBs. Their rationale is that the potential costs of tax aggressiveness borne by auditors are higher than those borne by other two parties.

Badertscher et al. (2013) predict and find that firms with greater concentrations of ownership and control adopt less aggressive tax policies because such firms are more risk averse and tax avoidance is a risky activity with potential costs. Cheng et al. (2012) investigate the effect of hedge fund activism on corporate tax avoidance. They find that hedge fund activists increase tax avoidance in target firms by providing informed monitoring. They further find that the increase in tax avoidance activities is related to an increase in the target firms' value.

Cen et al. (2017) predict that companies in close customer-supplier relationships are better capable of recognizing and executing tax avoidance plans through supply chains. In line with their prediction, their findings suggest that both principal customers and their dependent suppliers exhibit higher tax aggressiveness than other firms. Hoopes et al. (2012) find that firms exhibit less aggressive tax activities when Internal Revenue Service (IRS) monitoring is stricter. Allen et al. (2016) explore the effect of analyst coverage on firms' aggressive tax planning strategies. They document that analyst coverage has a negative causal impact on tax aggressiveness by boosting the visibility of aggressive

tax planning activities and demanding transparent information.

The 2007-2008 Financial Crisis

The global financial crisis of 2007-2008 was the worst economic disaster in almost a century. In 2008, the US stock market suffered the biggest drop during any single year since the 1930s (Cheffins, 2009). In general, academics concur that a bubble in housing prices caused the crisis (Yeoh, 2010). Banks wrote down loans due to mortgage delinquencies, experiencing significant declines in their stock market capitalization (Brunnermeier, 2009). The financial crisis that began in the financial sector resulting from subprime mortgage defaults had dramatic effects on the whole U.S. economy (Francis et al., 2012).

The major effect of the crisis was that it deteriorated firms' funding abilities as the crisis was characterized by the drying-up of liquidity in the banking system (Ivashina and Scharfstein, 2010). The failures of many financial institutions halted global credit markets (Erkens et al., 2012). The bond markets became an expensive source of external financing as spreads on commercial papers and long-term corporate bonds rose rapidly during the crisis (McNulty et al., 2013). The increases in ambiguity over the length of the crisis as well as the governmental responses further raised the cost of external funds (Bliss et al., 2015).

As financial constraints are an important determinant of corporate policies, prior studies document the impact of the financial crisis of 2007 on real corporate behaviors. For example, Campello et al. (2010) investigate whether firms were credit constrained during the global financial crisis. They examine the effects of the financial crisis on corporate policies to assess whether financial constraints during the worst credit shortage since the Great Depression affected corporate behaviors. They find that, during this credit crisis, financially constrained firms used a significant amount of their cash savings, cut dividend distributions to shareholders, and sold more assets to finance their operations. Furthermore, many firms gave up profitable investment projects because they were not able to borrow from external parties.

Bliss et al. (2012) assess whether firms changed their payout policies to improve financial flexibility in responding to the credit supply shock of the financial crisis. They find that firms decreased payouts to shareholders for the purpose of sustaining cash levels and funding investment during the financial crisis. Ivashina and Scharfstein (2010) examine bank lending in the financial crisis to assess the impact of the banking panic on the supply of credit to the corporate segment. They find that new lending across all types of loans decreased significantly during the crisis. They further find evidence that banks with less access to deposit financing and higher risk of credit-line drawdown cut their lending to a greater amount.

Duchin et al. (2010) assess the impact of the financial crisis on corporate investment. They find that corporate

investment decreased significantly following the arrival of the crisis. In line with a causal effect of a negative shock to the supply of external funding, the decline was the largest for financially constrained firms with low cash holdings or high short-term debt. Kuppuswamy and Villalonga (2016) investigate the impact of the 2007 crisis on the corporate diversification discount. They find that the intrinsic value of diversification increased during the crisis period because diversified firms had better access to credit markets. The debt coinsurance provided by conglomerates enabled diversified firms to have better access to credit markets.

Almeida et al. (2012) analyze the impact of long-term financial contracting on firms' financial policies during the 2007 crisis. They find that firms refinancing their long-term debt during the crisis decreased investment and bypassed profitable investment projects. Balakrishnan et al. (2016) analyze the effect of accounting conservatism on corporate investment spending during the 2007 crisis. During the credit supply shock, banks assess borrowing firms' financial condition more stringently when lending loans to firms and, thus, require more verifiable financial information. Thus, the study expects that accounting conservatism is likely to play an important role in strengthening firms' funding ability and mitigate the negative effect of the crisis on corporate investment. Consistent with the prediction, the findings suggest that firms with less conservative accounting faced more severe decreases in investment activities than other firms during the crisis.

Hypothesis Development

As discussed above, the major effect of the crisis was that it deteriorated firms' funding abilities as the crisis caused an adverse shock to the supply of external funding for non-financial firms. The crisis caused the collapse of famous financial institutions as well as the freeze of global credit markets (Erkens et al., 2012). The bond markets became an expensive source of external financing as spreads on commercial papers and long-term corporate bonds rose rapidly during the crisis (McNulty et al., 2013). The crisis also led to unprecedented government involvement globally. The increases in ambiguity over the length of the crisis as well as the governmental responses further raised the cost of external funds (Bliss et al., 2015). In short, external financing sources were more costly and/or difficult to obtain because of the tight financial markets during the crisis.

It is possible that financial constraints caused by the crisis in turn affect firms' tax policies because firms may attempt to increase their cash savings from tax planning to finance their operations and investment. Firms are inclined to increase their cash reserves when they cannot obtain sufficient external funds to meet their demand for capital (Faulkender and Wang 2006). To substitute more costly external financing sources in the period of financial constraints, corporations can pursue alternative sources of funds. And tax savings can be considered

alternative sources of financing (Law et al., 2015). Financially constrained firms can adopt more aggressive tax strategies to produce additional internal funds. For example, Law and Mills (2015) find that financially constrained companies at the firm-level pursue more aggressive tax policies evidenced by higher unrecognized tax benefits. Furthermore, Hanlon et al. (2017) document the positive impact of corporate tax aggressiveness measured by unrecognized tax benefits on corporate cash holdings.

I posit that the financial crisis influences firms' tax policies through its negative impact on their funding ability. Particularly, I predict that, during the crisis, firms adopt more aggressive tax policies to increase their internal funds as external capital is harder or more costly to obtain. Firms are more likely to engage in aggressive tax activities in order to save cash internally when they have financial constraint problems. When firms experience macroeconomic financial constraints caused by the crisis, they can use aggressive tax policies in an attempt to replace external financing. In short, firms can turn to aggressive tax planning as an additional source of financing. Thus, I predict that firms are likely to undertake more aggressive tax positions in the crisis period than in the non-crisis period and test the following hypothesis.

H1: *Firms exhibit higher levels of tax aggressiveness in the 2007-2008 financial crisis period than in the non-crisis period.*

The impact of the crisis on firms' tax aggressiveness is likely to be stronger for firms with lower internal financial resources. Firms with lower internal financial resources are more susceptible to the credit supply shock than those with higher internal financial resources are. Firms more susceptible to the credit supply shock are likely to have higher incentives to use an additional source of internal financing because of the tight financial markets in the crisis period and aggressive tax policy can be one source of internal financing. Thus, relative to firms with higher internal financial resources, firms with lower internal financial resources are more likely to adopt aggressive tax policies to generate cash savings during the crisis.

Corporate cash holdings are an important internal financial resource that can mitigate the effect of the credit supply shock. Therefore, as a proxy for firms' susceptibility to the credit supply shock, I use corporate cash balances (Bliss et al., 2013) and examine whether the level of cash holdings affects the extent to which the crisis influences corporate tax aggressiveness. As firms with lower levels of cash reserves are likely to have more incentives to generate tax savings when faced with the credit supply shock, I test the following hypothesis.

H2: *The impact of the crisis on corporate tax aggressiveness is stronger for firms with lower cash holdings.*

Research Design

Measuring Tax Aggressiveness

To measure corporate tax aggressiveness, I use the current year increase in the FIN 48 tax reserve balance (Klassen et al., 2016). In 2006, the Financial Accounting Standards Board (FASB) issued Interpretation No. 48, Accounting for Uncertainty in Income Taxes. The goal of FIN 48 is to enhance relevance and comparability in determining income taxes by clarifying the criteria used to recognize uncertain tax benefits (FASB 2006; Cazier et al., 2009; Blouin and Robinson 2014). Prior to the adoption of FIN 48, most firms provided inadequate information about the uncertainty related to their tax positions (Cazier et al., 2009). The FIN 48 became effective beginning in 2007, requiring firms to separately disclose their liabilities for unrecognized tax benefits. The FIN 48 UTBs refer to tax benefits that might not ultimately be upheld if challenged by tax authorities. That is, the FIN 48 tax reserves represent tax savings that could potentially be additional taxes payable to the tax authorities upon audit. Hence, higher UTBs indicate more aggressive tax activities. Tax benefits that are likely to be sustained upon audit are not reported as UTBs. The FIN 48 improves tax disclosures associated with uncertain and aggressive tax positions (Erickson et al., 2015).

Rego and Wilson (2012) argue that the FIN 48 UTB is theoretically more similar to the underlying construct of tax aggressiveness than any other publicly available aggressiveness data. De Waegenaere et al. (2015) also claim that the FIN 48 UTBs measure the extent of corporate tax aggressiveness. Lisowsky et al. (2013) support these claims by empirically showing that the FIN 48 UTBs reflect aggressive tax positions, namely, tax shelters which represent extremely aggressive tax avoidance. Using confidential tax shelter data from the Office of Tax Shelter Analysis, they find that the FIN 48 tax reserves are positively related to the likelihood of tax sheltering. They also find that non-UTB tax avoidance measures such as cash effective tax rate have no significant associations with the usage of tax shelters. Lisowsky et al. (2013) conclude that the FIN 48 UTB is a suitable proxy for tax aggressiveness.

Regression Model

The first hypothesis (H1) predicts that firms exhibit higher levels of tax aggressiveness in the 2007-2008 financial crisis period than in the non-crisis period. To explore this idea, I estimate the regression below (the firm subscripts are omitted for brevity). The Tobit regression model is used because the dependent variable, which is a logarithmic transformation of the current year increase in the FIN 48 tax reserve balance, is censored at zero.

$$\text{LnUTB} = \beta_0 + \beta_1 \text{CRISIS} + \beta_2 \text{LnTA} + \beta_3 \text{MTB} + \beta_4 \text{R\&D} + \beta_5 \text{DEBT} + \beta_6 \text{ForeIncome} + \beta_7 \text{ROA} + \beta_8 \text{CarryFor} + \beta_9 \text{MERGER} + \varepsilon \quad (1)$$

The main explanatory variable of interest is CRISIS which is an indicator variable equal to 1 for the crisis period of 2007 and 2008 and 0 for the non-crisis period. H1 hypothesizes that the financial crisis increases corporate tax aggressiveness and, thus, a positive coefficient on CRISIS is expected. Furthermore, following prior studies (Chi et al, 2014; Law and Mills, 2015; Klassen et al., 2015; Higgins et al., 2015), I control for firm size (LnTA), growth opportunities (MTB and MERGER), intellectual property (R&D), the tax shield of debt (DEBT), foreign operations (ForeIncome), profitability (ROA), and tax loss carry-forward (CarryFor). Detailed definitions for all the model variables are included in Appendix A. The regression is estimated with year and industry fixed effects and the variables are winsorized at the 1% and 99% level. I cluster standard errors at the firm level.

The second hypothesis (H2) expects that the impact of the crisis on corporate tax aggressiveness is stronger for firms with lower cash holdings. To measure the level of corporate cash holdings, I use the sum of cash and marketable securities divided by total assets (CASH), which is the most traditional measure of cash ratio (Bates et al., 2009). To test H2, I add an interaction term between CRISIS and CASH as well as CASH to the main model (1) presented above. The interaction term between CRISIS and CASH is a main independent variable of interest for H2. As H2 predicts that higher cash balances mitigate the impact of the crisis on firms' aggressive tax behaviors, the expected sign of the coefficient on the interaction term is negative. The following Tobit regression is estimated to test H2.

$$\text{LnUTB} = \beta_0 + \beta_1 \text{CRISIS} * \text{CASH} + \beta_2 \text{CRISIS} + \beta_3 \text{CASH} + \beta_4 \text{LnTA} + \beta_5 \text{MTB} + \beta_6 \text{R\&D} + \beta_7 \text{DEBT} + \beta_8 \text{ForeIncome} + \beta_9 \text{ROA} + \beta_{10} \text{CarryFor} + \beta_{11} \text{MERGER} + \varepsilon \quad (2)$$

Sample and Descriptive Statistics

The initial sample includes firm-year observations from Compustat for the sample period of 2007 through 2013. The sample period begins in 2007 because the FIN 48 became effective in 2007. Following prior studies (Goldman, 2016; Kim and Zhang, 2016), firm-year observations with missing UTB data or negative pretax income are deleted. Utilities (SIC codes 4900–4949) and financial firms (SIC codes 6000–6999) are also excluded from the sample (Hoi et al., 2013). After the sample selection process, the number of firm-year observations is 12,418. Table 1 presents descriptive statistics of the main and control variables, with mean, standard deviation, first quartile, median, and third quartile. The mean and median values of the tax aggressiveness proxy (i.e., LnUTB) are 0.82 and 0.23, respectively. Table 2 presents Pearson correlation among variables. Consistent with H1, the correlation between LnUTB and CRISIS is positive at the 1% significance level. This correlation presents preliminary evidence that corporate tax aggressiveness was higher during the 2007-2008 financial crisis than in the non-crisis period.

Table 1 Descriptive Statistics of Regression Variables

Variable	Mean	Std Dev	First quartile	Median	Third quartile
LnUTB	0.82	1.09	0.00	0.23	1.35
CRISIS	0.20	0.40	0.00	0.00	0.00
LnTA	6.87	2.03	5.62	6.88	8.18
MTB	2.54	4.75	1.12	1.92	3.21
R&D	0.03	0.07	0.00	0.00	0.04
DEBT	0.18	0.21	0.00	0.13	0.28
ForeIncome	0.02	0.03	0.00	0.00	0.03
ROA	0.10	0.09	0.04	0.08	0.14
CarryFor	0.56	0.50	0.00	1.00	1.00
MERGER	0.25	0.43	0.00	0.00	0.00

Table 2 Pearson Correlations among Variables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1)LnUTB	1									
(2)CRISIS	0.03	1								
(3)LnTA	0.64	-0.01	1							
(4)MTB	0.06	0.01	0.02	1						
(5)R&D	0.00	-0.02	-0.24	0.03	1					
(6)DEBT	0.09	0.01	0.28	-0.08	-0.17	1				
(7)ForeIncome	0.33	0.02	0.23	0.05	0.06	-0.08	1			
(8)ROA	0.05	0.04	-0.13	0.15	0.12	-0.15	0.17	1		
(9)CarryFor	0.05	-0.09	0.07	0.01	0.07	0.05	0.08	-0.13	1	
(10)MERGER	0.09	-0.20	0.15	0.02	0.00	0.05	0.05	-0.12	0.11	1

*Correlation coefficients in bold are significant at 1% level.

Results

Table 3 provides support for H1 by examining whether the level of corporate tax aggressiveness is higher in the 2007-2008 financial crisis period than in the non-crisis period. I hypothesize that, during the credit crisis, firms engage in more aggressive tax activities to increase their internal funds because of the difficulty of accessing external capital. Thus, H1 predicts a positive association between the tax aggressiveness measure, LnUTB, and the crisis period, CRISIS. Table 3 reports the results of estimating Equation (1) using Tobit. The dependent variable is a logarithmic transformation of the current year increase in the FIN 48 tax reserve balance. The main explanatory variable of interest is CRISIS which is an indicator variable equal to 1 for the crisis period of 2007 and 2008 and 0 for the non-crisis period. In line with the hypothesis, the coefficient of 0.31 on CRISIS is significant at the 1 percent level, suggesting that, during the credit crisis of 2007 and 2008, corporate tax aggressiveness was higher than in the non-crisis period. The coefficient is also economically significant as firms reported 31 percent higher current-year UTB positions during the crisis period.

Table 3 Crisis and Tax Aggressiveness

Dependent variable: natural log of (1+ increase in UTB due to current year positions)

	Coef.	p-value
CRISIS	0.313	0.000
LnTA	0.566	0.000
MTB	0.005	0.060
R&D	2.936	0.000
DEBT	-0.297	0.001
ForeIncome	4.919	0.000
ROA	1.073	0.000
CarryFor	0.024	0.450
MERGER	0.050	0.084
N		12,418
Pseudo R ²		0.254

Coefficients on control variable of LnTA, MTB, RD, DEBT, ForeIncome, ROA, and MERGER are significant and signed consistent with prior studies. The coefficient on firm size is positive, which suggests that larger firms adopt more aggressive tax policies. Larger firms tend to engage in more aggressive tax planning because they are better capable of establishing complex tax avoidance transactions and have economies of scale (Boone et al. 2013). The positive coefficients on growth opportunities (MTB and MERGER) suggest that high growth

companies have more incentives to increase tax avoidance (Boone et al. 2013). R&D has a positive coefficient. High levels of research and development expenses increase opportunities to avoid taxes because there are disparities between tax and book reporting rules (Chen and Lai, 2012). DEBT has a negative coefficient. Firms with high levels of debt are less motivated to adopt aggressive tax strategies because they receive tax benefits for interest expense deduction (Graham and Tucker 2006). ForeIncome, which is a proxy for the extent of firms' foreign operations, has a positive coefficient as multinational firms have more opportunities to transfer income and expense to countries with more advantageous tax rates (Wilson, 2009). The positive coefficient on ROA proposes that more profitable firms tend to have higher incentives for aggressive tax strategies (Chen et al., 2010).

Table 4 provides support for H2 by testing whether the level of corporate cash reserves mitigates the association between the crisis period and tax aggressiveness. H2 hypothesizes that the impact of the crisis on corporate tax aggressiveness is stronger for firms with lower cash holdings as such firms are likely to be more susceptible to the credit supply shock. Hence, a negative coefficient on the interaction term between the crisis period (CRISIS) and cash balances (CASH) is expected. Table 4 presents the results of estimating Equation (2) using Tobit. As in Table 3, the dependent variable is a logarithmic transformation of the current year increase in the FIN 48 tax reserve balance. The variable of interest is an interaction term, CRISIS*CASH. CRISIS is an indicator variable equal to 1 for the crisis period of 2007 and 2008 and 0 for the non-crisis period. CASH is the sum of cash and marketable securities divided by total assets. Consistent with H2, the coefficient of -0.419 on CRISIS*CASH is significant at the 1 percent level, suggesting that the positive association between the crisis period and tax aggressiveness is more pronounced for firms with lower levels of cash. As cash-rich firms are less susceptible to the credit supply shock, they are less likely to engage in aggressive tax activities compared with other firms during the crisis.

In sum, testing H1 and H2 provides evidence that, during the crisis period, firms increased their aggressive tax activities and firms with lower cash reserves engaged in higher levels of tax aggressiveness than cash-rich firms did.

Table 4 Crisis, Cash, and Tax Aggressiveness
Dependent variable: natural log of (1+ increase in UTB due to current year positions)

	Coef.	p-value
CRISIS*CASH	-0.419	0.001
CRISIS	0.391	0.000
CASH	0.530	0.000
LnTA	0.572	0.000

MTB	0.004	0.108
R&D	2.577	0.000
DEBT	-0.223	0.016
ForeIncome	4.856	0.000
ROA	0.941	0.000
CarryFor	0.021	0.506
MERGER	0.060	0.036
N	12,418	
Pseudo R ²	0.255	

Supplemental Analyses

I conduct two additional analyses. First, I use three alternative dependent variables. Instead of using a logarithmic transformation of the current year increase in the FIN 48 tax reserve balance, I deflate the current year increase in the tax reserve by total assets. Furthermore, instead of using the tax reserve due to current-year positions, I use ending balance of firms' uncertain tax benefit account scaled by total assets (Armstrong et al., 2015). Supporting the main regression result, using either of these two dependent variables yields significantly positive coefficients on the variable of interest, CRISIS, at the 1 percent level (Table 5).

Table 5 Alternative Dependent Variables
Panel A Dependent variable: increase in UTB due to current year positions / total assets

	Coef.	p-value
CRISIS	0.001	0.000
LnTA	0.000	0.000
MTB	0.000	0.613
R&D	0.008	0.000
DEBT	0.000	0.292
ForeIncome	0.012	0.000
ROA	0.004	0.000
CarryFor	0.000	0.445
MERGER	0.000	0.939
N	12,418	
R ²	0.080	

Panel B Dependent variable: ending balance of UTB account / total assets

	Coef.	p-value
CRISIS	0.003	0.000
LnTA	0.001	0.000
MTB	0.000	0.302
R&D	0.040	0.000
DEBT	0.000	0.862
ForeIncome	0.082	0.000
ROA	0.006	0.059
CarryFor	0.001	0.016
MERGER	0.000	0.695
N	12,418	
R ²	0.186	

As an alternative dependent variable, I also use a more general measure of overall tax avoidance, the cash effective tax rate (CETR) which is cash taxes paid scaled by pretax income less special items. When this dependent variable is used, CRISIS is not significant (untabulated), implying that the 2007-2008 credit crisis did not affect firms' broad tax avoidance.

Klassen et al. (2016) argue that cash effective tax rate is not a direct measure of tax savings specifically from aggressive tax strategies whereas the reported UTB is. Cash effective tax rate represents the entire spectrum of corporate tax avoidance strategies which contain aggressive tax positions (Dyregang et al., 2008; Hanlon and Heitzman, 2010; Lisowsky et al., 2013). Tax avoidance refers to all strategies that influence firms' tax liabilities, ranging from tax-favored real activities to activities whose main goal is avoiding taxes. Being a subset of more general tax avoidance, tax aggressiveness refers to transactions whose goal is solely avoiding taxes. Moreover, as discussed in the research design section, CETR is not significantly associated with the usage of tax shelters while the FIN 48 UTBs are. As this current study focuses on tax savings from tax aggressiveness during the credit crisis period, the finding of insignificant association between the crisis period and the firms' broad tax avoidance, CETR, is not surprising.

In the second additional analysis, I rerun the main regression (1), using the sample that includes firm-year observations with negative pre-tax income. Excluding firm-year observations with negative pre-tax income can bias tax avoidance proxies because income and loss years are treated asymmetrically (Henry and Sansing, 2014). Hence, I include loss firm-years and get the similar results (Table 6).

Conclusion

Using a sample of 12,418 firm-year observations over the period of 2007 to 2013, the current study investigates whether the credit crisis of 2007-2008 affected corporate tax aggressiveness. I predict that, during the crisis, firms adopt more aggressive tax policies to increase their internal funds as external capital is harder or more costly to obtain. Consistent with the prediction, the findings show that firms exhibited higher levels of tax aggressiveness in the crisis period than in the non-crisis period. An additional finding reveals that the impact of the crisis on corporate tax aggressiveness was stronger for firms with lower cash holdings. Collectively, the results suggest that firms adopted more aggressive tax policies to generate additional funds internally during the crisis because of their impaired access to external capital.

Implications

The current study has important implications for a number of diverse organizations such as tax authorities, policy makers, and audit firms as it reveals that macroeconomic conditions such as the financial crisis affect firms' aggressive tax activities. Prior studies have identified various firm-level determinants of corporate

tax aggressiveness such as firms' financial constraints, CEOs' compensation, analyst coverage, corporate governance, ownership structures, customer-supplier relationships, and hedge fund activism. By identifying the macroeconomic credit shock as one determinant of corporate tax aggressiveness, the findings in this study can be of interest to practitioners and regulators.

References

- Allen, A., Francis, B.B., Wu, Q. and Zhao, Y., (2016). Analyst coverage and corporate tax aggressiveness. *Journal of Banking & Finance*, Vol.73, pp.84-98.
- Almeida, H., Campello, M., Laranjeira, B. and Weisbenner, S., (2009). Corporate debt maturity and the real effects of the 2007 credit crisis (No. w14990). National Bureau of Economic Research.
- Almeida, H., Campello, M., Laranjeira, B.A. and Weisbenner, S.J., (2012). Corporate Debt Maturity and the Real Effects of the 2007 Credit Crisis, August 3, 2011. Available at SSRN 1405.
- Armstrong, C.S., Blouin, J.L., Jagolinzer, A.D. and Larcker, D.F., 2015. Corporate governance, incentives, and tax avoidance. *Journal of Accounting and Economics*, Vol. 60 No.1, pp.1-17.
- Badertscher, B.A., Katz, S.P. and Rego, S.O., (2013). The separation of ownership and control and corporate tax avoidance. *Journal of Accounting and Economics*, Vol. 56 No.2, pp.228-250.
- Balakrishnan, K., Blouin, J. and Guay, W., (2018). Tax Aggressiveness and Corporate Transparency. *The Accounting Review*. Chen, S., Chen, X., Cheng, Q. and Shevlin, T., (2010). Are family firms more tax aggressive than non-family firms?. *Journal of Financial Economics*, Vol. 95 No.1, pp.41-61.
- Balakrishnan, K., Watts, R. and Zuo, L., (2016). The effect of accounting conservatism on corporate investment during the global financial crisis. *Journal of Business Finance & Accounting*, Vol. 43 No.5-6, pp.513-542.
- Bates, T.W., Kahle, K.M. and Stulz, R.M., (2009). Why do US firms hold so much more cash than they used to?. *The journal of finance*, Vol.64 No.5, pp.1985-2021.
- Bliss, B.A., Cheng, Y. and Denis, D.J. (2015). Corporate payout, cash retention, and the supply of credit: Evidence from the 2008–2009 credit crisis. *Journal of Financial Economics*, Vol.115 No.3, pp.521-540.
- Blouin, J.L. and Robinson, L.A., (2014). Insights from academic participation in the FAF's initial PIR: The PIR of FIN 48. *Accounting Horizons*, Vol.28 No.3, pp.479-500.
- Boone, J.P., Khurana, I.K. and Raman, K.K., (2012). Religiosity and tax avoidance. *The Journal of the American Taxation Association*, Vol.35 No.1, pp.53-84.
- Brunnermeier, M.K., (2009). Financial crisis: mechanism, prevention and management. Macroeconomic stability and financial regulation: key issue for the G, Vol.20, pp.91-104.
- Campello, M., Graham, J.R. and Harvey, C.R., (2010). The real effects of financial constraints: Evidence from a financial crisis. *Journal of financial Economics*, Vol.97 No.3, pp.470-487.
- Cazier, R.A., Rego, S.O., Tian, X.S. and Wilson, R.J., (2009). Early evidence on the determinants of unrecognized tax benefits.
- Cen, L., Maydew, E.L., Zhang, L. and Zuo, L., (2017). Customer–supplier relationships and corporate tax avoidance. *Journal of Financial Economics*, Vol.123 No.2, pp.377-394.
- Cheffins, B.R., (2009). Did corporate governance "fail" during the 2008 stock market meltdown? The case of the S&P 500. *The Business Lawyer*, pp.1-65.
- Chen, C. and Lai, S., (2012). Financial constraint and tax aggressiveness. Working paper, *University of Auckland and Chinese University of Hong Kong*.
- Chen, S., Chen, X., Cheng, Q. and Shevlin, T., (2010). Are family firms more tax aggressive than non-family firms? *Journal of Financial Economics*, Vol.95 No.1, pp.41-61.
- Cheng, C.A., Huang, H.H., Li, Y. and Stanfield, J., (2012). The effect of hedge fund activism on corporate tax avoidance. *The Accounting Review*, Vol.87 No.5, pp.1493-1526.
- Chi, S., Huang, S. and Sanchez, J., (2014). CEO inside debt incentives and corporate tax policy. Unpublished working paper, *University of Arkansas, Arizona State University, Texas Tech University*.
- De Waegenaere, A., Sansing, R. and Wielhouwer, J.L., (2015). Financial accounting effects of tax aggressiveness: Contracting and measurement. *Contemporary Accounting Research*, Vol.32 No.1, pp.223-242.
- Duchin, R., Ozbas, O. and Sensoy, B.A., (2010). Costly external finance, corporate investment, and the subprime mortgage credit crisis. *Journal of Financial Economics*, Vol.97 No.3, pp.418-435.
- Dyregang, S.D., Hanlon, M. and Maydew, E.L., (2008). Long-run corporate tax avoidance. *the accounting review*, Vol.83 No.1, pp.61-82.
- Erickson, M.J., Goldman, N.C. and Stelkelberg, J., (2015). The cost of compliance: FIN 48 and audit fees. *The Journal of the American Taxation Association*, Vol.38 No.2, pp.67-85.
- Erkens, D.H., Hung, M. and Matos, P., (2012). Corporate governance in the 2007–2008 financial crisis: Evidence from financial institutions worldwide. *Journal of Corporate Finance*, Vol.18 No.2, pp.389-411.
- Faulkender, M. and Wang, R., (2006). Corporate financial policy and the value of cash. *The Journal of Finance*, Vol.61 No.4, pp.1957-1990.
- Financial Accounting Standards Board (FASB). (2006). Accounting for Uncertainty in Income Taxes—An Interpretation of FASB Statement No. 109. FASB Interpretation No. 48. Norwalk, CT: FASB.
- Francis, B.B., Hasan, I. and Wu, Q., (2012). Do corporate boards affect firm performance? New evidence from the financial crisis.
- Goldman, N.C., (2016). The effect of tax aggressiveness on investment efficiency.
- Graham, J.R. and Tucker, A.L., (2006). Tax shelters and corporate debt policy. *Journal of Financial Economics*, Vol.81 No.3, pp.563-594.

- Hanlon, M. and Heitzman, S., (2010). A review of tax research. *Journal of Accounting and Economics*, Vol.50 No.2-3, pp.127-178.
- Hanlon, M., Maydew, E.L. and Saavedra, D., (2017). The taxman cometh: Does tax uncertainty affect corporate cash holdings?. *Review of Accounting Studies*, Vol.22 No.3, pp.1198-1228.
- Henry, E. and Sansing, R.C., (2014). Data truncation bias and the mismeasurement of corporate tax avoidance.
- Higgins, D., Omer, T.C. and Phillips, J.D., (2015). The influence of a firm's business strategy on its tax aggressiveness. *Contemporary Accounting Research*, Vol.32 No.2, pp.674-702.
- Hoi, C.K., Wu, Q. and Zhang, H., (2013). Is corporate social responsibility (CSR) associated with tax avoidance? Evidence from irresponsible CSR activities. *The Accounting Review*, Vol.88 No.6, pp.2025-2059.
- Hoopes, J.L., Mescall, D. and Pittman, J.A., (2012). Do IRS audits deter corporate tax avoidance?. *The accounting review*, Vol.87 No.5, pp.1603-1639.
- Ivashina, V. and Scharfstein, D., (2010). Bank lending during the financial crisis of 2008. *Journal of Financial economics*, Vol.97 No.3, pp.319-338.
- Kim, C. and Zhang, L., (2016). Corporate political connections and tax aggressiveness. *Contemporary Accounting Research*, Vol.33 No.1, pp.78-114.
- Klassen, K.J., Lisowsky, P. and Mescall, D., (2015). The role of auditors, non-auditors, and internal tax departments in corporate tax aggressiveness. *The Accounting Review*, Vol.91 No.1, pp.179-205.
- Kuppuswamy, V. and Villalonga, B., (2015). Does diversification create value in the presence of external financing constraints? Evidence from the 2007–2009 financial crisis. *Management Science*, Vol.62 No.4, pp.905-923.
- Law, K.K. and Mills, L.F., (2015). Taxes and financial constraints: Evidence from linguistic cues. *Journal of Accounting Research*, Vol.53 No.4, pp.777-819.
- Lisowsky, P., Robinson, L. and Schmidt, A., (2013). Do publicly disclosed tax reserves tell us about privately disclosed tax shelter activity?. *Journal of Accounting Research*, Vol.51 No.3, pp.583-629.
- McNulty, T., Florackis, C. and Ormrod, P., (2013). Boards of directors and financial risk during the credit crisis. *Corporate Governance: An International Review*, Vol.21 No.1, pp.58-78.
- Mills, L., Erickson, M.M. and Maydew, E.L., (1998). Investments in tax planning. *The Journal of the American Taxation Association*, Vol.20 No.1, p.1.
- Rego, S.O. and Wilson, R., (2012). Equity risk incentives and corporate tax aggressiveness. *Journal of Accounting Research*, Vol.50 No.3, pp.775-810.
- Wilson, R.J., (2009). An examination of corporate tax shelter participants. *The Accounting Review*, Vol.84 No.3, pp.969-999.
- Yeoh, P., (2010). Causes of the global financial crisis: Learning from the competing insights. *International Journal of Disclosure and Governance*, Vol.7 No.1, pp.42-69.

Appendix A. Variable Definitions

LnUTB = natural log of (1+ increase in UTB due to current year positions)

CRISIS = 1 for the crisis period of 2007 and 2008 and 0 for the non-crisis period

CASH = (cash + marketable securities) / total assets

LnTA = natural logarithm of total assets

MTB = (Number of shares outstanding * fiscal year-end price) / Book value of common equity

R&D = R&D / total assets

DEBT = long term debt / total assets

ForeIncome = Pretax foreign income / total assets

ROA = pretax income / total assets

CarryFor = 1 if tax loss carry-forward is non-zero and 0 otherwise

MERGER = 1 if a firm-year observation is involved in a merger and acquisition and zero otherwise.

About the authors

Amy E. Ji is an Assistant Professor of Accounting at Saint Joseph's University. She received her Ph.D. from George Washington University. Her research interests are in corporate finance, financial accounting, and corporate governance.