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Do peers matter for tax saving?

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This study aims to investigate if peers' tax-saving success influences a firm's tax aggressiveness. Relying on the inter-dependence amongst firms, the proposition that a firm would change its tax payment decisions is when it observes that its peer group achieves tax-saving success. A peer group was defined as the five firms most similar in size to the focal firm in the same industry. The authors examine whether peers' tax level motivates the focal firm to adjust its tax strategy by controlling the effect of industrial leaders, whose profit margins are ranked top three in the industry. It was found that firms tend to mimic the average tax performance of their peers by changing their own tax burden. Additionally, this peer effect in the tax setting is more pronounced for firms with higher tax burden, lower profitability and less cash hold, revealing the asymmetric responses of firms to their peers' performances under the above-mentioned conditions. The results also survive numerous robustness tests, including alternative measures of tax avoidance, different industry classifications and instrumental tests. The researchers provide empirical evidence of peer effects in tax payment decisions. The findings also suggest a novel way to detect tax-avoiding activities, which are likely to happen in a clustered manner.

Key words: Tax-saving decision; tax aggressiveness; peer effects.

INTRODUCTION

A number of tax studies state that the engagement of aggressive tax positions is primarily driven by firm-level attributes (Armstrong et al., 2015, 2012; Badertscher et al., 2013), profitability (Tijjani and Peter, 2020), executive incentives (Desai and Dharmapala, 2006; Gaertner, 2014; Mahenthiran and Kasipillai, 2012) and the cultural environment (Boone et al., 2013; Hasan et al., 2017). Since firms compete or interact with their peers, corporate tax decisions would respond to the tax-saving success achieved by their peers. However, the association between peer effects and tax avoidance is largely unexplored, with only a few exceptions (Bird et al., 2018; Kubick et al., 2014; Brown, 2011; Brown and Drake, 2013). This study extends the line of research by investigating whether the average tax-saving behavior of peers has a significant economic effect on firms' tax avoidance. More specifically, the authors assume and investigate whether the firm would shift its tax level toward its peers and whether such an effect would be more pronounced when the firms have higher tax spending, lower profitability and less cash hold.

Accounting for one-third of pretax income, taxation is

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one of the primary issues handled by firms. The preceding literature documents that firms potentially maintain a related low tax level during a long period (Dyreng et al., 2010) and lower their tax burden and risk simultaneously by employing internal control (Gallemore and Labro, 2015) or information technology (Hamilton and Stekelberg, 2016). More recently, Kim et al. (2019) show that firms have their own optimal tax level and adjust their tax planning to gradually approach the optimal level, and this effect is more pronounced when firms have higher tax spending, more foreign business operations, and higher income mobility. To survive in such a competitive and dynamic business world, firms should better control their tax spending and adjust their tax strategy in a timely manner.

Based on previous studies on peer effects, the first preposition was that firms have an incentive and ability to learn from their industry peers and calibrate their tax strategy using their peers as the benchmark. Regularly interacting with others, firms have incentives to respond to the tax-saving success of peer firms to "maintain" their position.[1] For instance, Brown (2011) and Brown and Drake (2013) suggest that firms mimic the tax avoidance of other firms with whom they share board interlocks. Similarly, Kubick et al. (2014) show that product market leaders not only engage in a more aggressive tax position but also provide a benchmark of tax avoidance for their industrial peers. In addition, when firms attempt to change tax planning and implement a new tax plan, they can observe or learn about the tax positions of their industry peers from disclosure rules around taxes. This is because the reported accrual expense and the associated "real" tax payment would be disclosed by firms according to the requirements of the unique Financial Accounting Standards Board (FASB).

Alternatively, firms may not have the incentive and ability to mimic the tax strategy of their peers. First, firms may forgo potential tax-saving adjustment because they believe that the tax planning of industry peers is not "one size fits all" or that it cannot be continued for a long period. For example, extant literature has long realized that the level of tax avoidance can be affected by firm attributes (Armstrong et al., 2015; Badertscher et al., 2013), executive preference (Dyreng et al., 2010; Gaertner, 2014), corporate social responsibility (Mgbame et al., 2017) or cultural environment (Boone et al., 2013; Hasan et al., 2017). Each firm has its own unique optimal tax level (Kim et al., 2019) and has its own preference to engage in aggressive or conservative tax positions. Second, firms may ignore the "industry benchmark" if they feel that the benefit of tax savings does not outweigh the cost of tax planning adjustment. For example, prior literature suggests that capital providers, both shareholders and debt holders, charge different premium levels to compensate for the risk stemming from an aggressive tax position (Cook et al., 2017; Goh et al., 2016; Hasan et al., 2014). Therefore, whether the peer effect has an influential impact on tax avoidance is still an open research question.

To further investigate the peer effect on tax avoidance, the authors examine the conditions under which the peer effect would be more pronounced. First, they assume that firms paying more tax expenses have a higher incentive to mimic the tax strategy of their peers because Kim et al. (2019) suggest the asymmetric adjustment speed of tax avoidance.

Second, firms are more likely to learn from their peers rather than the whole industry when their profitability and (or) cash holdings are limited. Kubick et al. (2014) demonstrate that market leaders can engage in a more aggressive tax position through bargaining power and that its tax-saving strategy would be "copied and pasted" by its nonleader industry peers. However, the tax-saving strategy engaged by market leaders may involve better internal control, a high-quality information system or more professional tax consultants, which are not easily accessible by nonleader industry peers. The mimicry of industry leaders would be constrained by their own economic resources or calibration ability. In addition, the cost of unsuccessful tax-avoiding activities is more likely to attenuate the ability to maintain a competitive position. Firms will be more conservative about the tax adjustment if their calibration ability is below the average or median level. In line with this idea, it was posited that firms with higher tax burden, lower profitability and less cash holding are more likely to mimic the peers surrounded rather than the industry leaders or the overall peers.

Using the methodology of Dyreng et al. (2010), Bird et al. (2018) document how a firm's tax saving outcome affects the subsequent action of its peers. To distinguish this paper from Bird et al. (2018), the authors follow Manski (1993) and define the peer effect as the average performance of a group impacting the behaviors of an individual. For each firm-year observation, peer group was defined as firms of similar size in the given industry-year and calculate the average tax level of each peer group. In both univariate and multivariate tests, the authors investigate whether a firm's tax level can be affected by its peers' average tax level while controlling the average tax level from the whole industry and market leaders. Using the effective tax rate (both book and cash effective tax rate) to measure tax outcomes, it was found that firms' tax behaviors are associated with their peers' tax saving outcomes in the prior year, indicating that firms attempt to mimic their industry peers or market leader incrementally.

Prior studies indicate that tax decisions can be affected asymmetrically by firm attributes or environmental factors (Lin et al., 2019; Gao et al., 2019; Kim et al., 2019; Salaudeen and Eze, 2018). To investigate the potential asymmetry, the authors construct three indicative variables (*above, LP, LC*) to measure whether the firms' tax spending, profitability and cash hold are above or below the median level and then separately examine

whether the firms with higher tax expenses, lower profitability and less cash reserves would respond differently to the peers' tax saving performance. The authors document that firms are more likely to mimic their peers' tax strategies when firms have higher tax spending, lower profitability and less cash reserves. Additionally, when firms pay higher tax spending than their peers, mimicry would be much faster than mimicry with a lower tax burden, which is consistent with the finding of Kim et al. (2019).

Overall, this study investigates whether corporate tax decisions can be affected by the tax saving outcome of peer firms and is closely related to two recent studies, Kubick et al. (2014) and Bird et al. (2018). Kubick et al. (2014) examine the relation between product market power and tax avoidance and found that firms with higher market power engage in a more aggressive tax position and that non-industry leader peers mimic the tax strategy of product market leaders.

Framing executive turnover as an external shock, Bird et al. (2018) examine whether the tax avoidance of a specific firm can affect the tax behaviors of its peers and found that peer groups would respond to the negative shock of a specific firm with executive turnover and lower tax burden.

Although this study is similar to Kubick et al. (2014) and Bird et al. (2018), it differs from these two studies in several important ways. First, the study of Kubick et al. (2014) focuses on peers with market competitive advantages and defines market leaders as firms ranked in the top three price-cost margins within a given industry year. Following Bird et al. (2018), define peers as a group of five firms with similar firm sizes within the same industry. While Bird et al. (2018) investigates how peer group members are influenced by an individual firm who recruits a new executive and reduces taxes simultaneously, their focus was on how an individual firm would take the average tax level of its peers as the benchmark to adjust its tax burden. In addition, the conclusion of Bird et al. (2018) exists only in the book effective tax rate, while the empirical results apply for both the book and cash effective tax rates. Finally, the result is incremental to the whole industry level and market leader and suggests that firms with higher tax expenses, lower profitability and fewer cash reserves have a higher propensity to mimic their peers rather than the whole industry or market leader.

Understanding how the average tax performances of a firm's peers affect its own tax behavior is important for several reasons. First, this study adds to a growing body of research examining peer effects in various corporate decisions. Prior studies document peer effects in capital structure choice (Leary and Roberts, 2014), stock split decisions (Kaustia and Rantala, 2015), risk aversion and trust (Ahern et al., 2014), financial misconduct (Parsons et al., 2018), and payout policy (Grennan, 2019). The tax issue has a nondiscretionary nature, and this setting is much different from the previous settings. The authors contribute to this line of research by providing empirical evidence of peer effects in tax decisions.

Second, a cross-sectional variation was explored in tax avoidance behavior by incorporating concepts of peer effects (Hanlon and Heitzman, 2010). Prior empirical research in the tax literature recognizes the importance of peers. For example, Brown (2011) and Brown and Drake (2013) concentrate on peers sharing board interlocks, and Kubick et al. (2014) focus on market leaders who engage in aggressive tax positions through competitive advantages. Defining peers as firms of similar size, Bird et al. (2018) suggest that firms do not make tax decisions in isolation and that the external shock of a firm can affect others' tax behaviors. In contrast, this paper indicates that a firm responds to the average tax level of peer firms and that such peer effects vary when firms have a higher tax burden, lower profitability and fewer cash reserves.

Finally, the findings have practical implications in addition to the theoretical issues. If a firm adjusts its tax behavior to respond to its peers' tax saving success, it is possible that tax avoiding activities would cluster in the peer group. Once the Inland Revenue Department detects the irregularity of the tax law, it would be better to increase the audit probability of firms of similar size within the same industry.

The rest of the paper continues as follows. The next section provides a review of the literature and develops hypotheses. Section 3 introduces the research method, and Section 4 interprets the empirical results. After that, conclusions were presented in the last sections.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

The preceding literature proposes and indicates that a firm learns from and responds to the performance of its peers in various corporate decisions. Focusing on the information environment, Seo (2021) suggests that the financial performance disclosed by peers reduces external uncertainty and induces firms to issue more reliable and accurate information. Shroff et al. (2017) also propose that when a firm's specific information is limited, its cost of equity is negatively related to the information environment of peers. Additionally, prior studies suggest that firms speed up the time taken to split their stock in response to peer actions (Kaustia and Rantala, 2015) and are more likely to pay out dividends if their peer firms have recently done so (Grennan, 2019).

Although prior studies point out the effect of peers on corporate decisions, how a firm's tax behaviors can be affected by its peers' average tax performance is underexplored. Based on the substantial literature related to peer effects, it was first posited that a firm has an incentive and ability to mimic its peers' tax strategies to "keep up" with its peers. In the United States, the

corporate tax potentially accounts for one-third of the pretax income and is regarded as a substantial proportion of the total cost. Since better control of tax spending provides more competitive advantages, firms will maintain a low tax level for a long period (Dyreng et al., 2008) and provide more incentive for executives to accomplish this objective (Dyreng et al., 2010). Likewise, firms are willing to develop internal control systems (Gallemore and Labro, 2015), high-tech information systems (Hamilton and Stekelberg, 2016) or multigeographic operations (Gupta and Mills, 2002) to lower their tax burden and risk simultaneously. In practice, CFOs or the heads of tax departments are responsible for tax planning and need to explain and justify the firm's tax level compared to its industry peers. In this regard, a firm could attempt to learn from its peers and devote resources to adopt a similar tax planning policy to keep up with others.

In addition to the incentive, the peer effect potentially enhances the simulation ability. Grouping peers by different standards, extant studies document that a firm learns from and responds to its peers' tax-saving activities. For example, defining peers as firms sharing board interlocks, Brown (2011) and Brown and Drake (2013) found that firms have a higher propensity to adopt aggressive tax planning if their peers employ tax-saving activities. Kubick et al. (2014) provide empirical evidence that the aggressive tax planning employed by market leaders is "copied" and "pasted" by nonleader industry peers. Additionally, Bird et al. (2018) use tax rate changes associated with executive turnover as exogenous shocks and suggest that peer firms respond to these shocks by calibrating their book effective tax rates in the same direction. The tax-saving success achieved by peers generates valuable information for managers, and precise information can increase the likelihood of tax planning adjustment and release the concern of unsuccessful tax planning.

On the other hand, tax planning adjustment is subject to a firm's unique condition. A firm is unlikely to calibrate its tax saving activities if the cost outweighs the benefits (Kim et al., 2019). In this sense, firms may maintain or even increase their tax expenditure or payment if they believe that their prior tax position cannot be continued or that the future tax risk is beyond tolerance. In addition, tax-planning adjustment requires resource donation, such as better internal control, information systems or multi area operations. If a firm is subject to resource constraints, it is unlikely to adopt a new tax saving strategy and still adopt its prior tax planning. Taken together, the authors cannot provide a consistent assumption related to the peer effect in tax issues and propose the following null hypothesis:

H1: The current-period tax aggressiveness of an individual firm is unrelated to the prior-period tax aggressiveness of its peer firms.

Having documented the evidence of peer effects in tax avoidance, a cross-sectional test was performed to understand the underlying mechanisms. First, tax planning adjustment is apparently subject to the current tax level (Kim et al., 2019). As peers' aggressive tax position provides more incentives for individual firms to adjust their tax policy, it was expected to find stronger peer effects for firms burdening higher tax expenses. Second, as economic resources are scarce, individual firms prefer investment with higher returns and predictability. Compared to their well-performing peers, firms with lower profitability potentially have a greater incentive to learn from and respond to their peers and have a higher propensity to adjust their tax behaviors. Finally, as the potential costs of an unsuccessful tax strategy would be greater for firms characterized by less cash reserves, it would be more likely to alter their tax behavior and adopt a new tax strategy. Overall, the argument mentioned above leads to the second hypothesis:

H2: The peer effect is stronger when an individual firm is characterized by a higher tax burden, lower profitability and less cash reserves.

RESEARCH METHODOLOGY

Sample

This study sample includes all firms-year listed in the COMPUSTAT database from 1994 to 2019. The sample begins in 1994 because it required all the observations to have five years of continuously available information to calculate the long-term effective tax rate. Firms in the financial (SIC codes 6000-6999) and utilities (SIC codes 4900-4999) industries was excluded, as they face different regulatory and institutional environments. The authors remove firms with negative total tax expenses (Compustat TXT), cash taxes paid (Compustat TXPD), or negative pretax book income before special items (Compustat PI - Compustat SPI) because these firms are in a different tax-planning position compared to firms traditionally examined in this line of research (Dyreng et al., 2008). In addition, to alleviate the observations with extreme operational conditions, any firms with negative sales (Compustat SALE), negative shareholders' equity (Compustat CEQ), and less than five million total assets (Compustat AT) would also be eliminated from the sample. Finally, to further avoid the influence of outliers, the authors' winsorize all continuous variables other than the effective tax rate at the 1st and 99th percentiles.

Measure of tax avoidance

Prior studies have regarded tax avoidance as any firm behavior that reduces explicit tax spending (Hanlon and Heitzman, 2010; Dyreng et al., 2008). To capture the firm's overall tax burden on an accrual basis, the book effective tax rate (ETR) was employed, which is computed as the ratio of total tax expense (Compustat TXT) to pretax book income minus special items (Compustat PI - Compustat SPI), to measure tax avoidance.[2] In the robustness analysis, tax avoidance is also measured as the firm's cash effective tax rate (CETR), which reflects both temporary and permanent differences.

Dyreng et al. (2008) demonstrate that tax avoidance measured annually can be a noisy proxy due to fluctuations over years. Therefore, to minimize the transitional effect, two different time windows were used to calculate the long-run tax avoidance in addition to the annual ETR. The long-run book effective tax rate, ETR3 and ETR5, was computed as the sum of total tax expense (Compustat TXT) from year t-2 to year t and year t-4 to year t, divided by the sum of pretax book income less special items (Compustat PI - Compustat SPI), accumulated over the corresponding time period.

Consistent with Dyreng et al. (2008), all effective tax rate measures were constrained to fall within the [0,1] interval to ensure a valid economic interpretation related to tax avoidance. To summarize, lower effective tax rate values suggest greater tax avoidance.

Determining peers and leaders

To investigate how peers affect a firm's tax planning, the authors identify industry peers and market leaders for each firm-year observation and calculate the lagged average *ETR*s of those groups. For the industry peer group, the authors follow Bird et al. (2018) and select five firms with the most similar size within a given industry. More specifically, firms with the smallest absolute value of the difference in total assets from a firm in the same industry are defined as peers for that firm.

Following Kubick et al. (2014), the authors also regard the firms whose profit margin ranked in the top three within the same industry as market leaders. To provide enough selections within each industry-year, they use the Fama-French 17 industry (Fama and French, 1988) to define the selection scope. In the sample, the mean number of firms in each industry-year is 374, and the associated minimum and maximum numbers are 17 and 1,016, respectively. The industry classification standard was chosen to ensure a meaningful number of potential sample firms, even in relatively smaller industries.

Simulation of tax-saving behaviors

This analysis investigates the extent to which firms mimic the tax saving outcomes of their peers. To answer this research question, an ordinary least squares (OLS) regression was employed based on the study of Kubick et al. (2014) that adjusts standard errors for firm-level clustering and controls for industry ($Industry_J$) and year ($Year_t$) effects, as follows:

$$TAX_{i,t} = \alpha_0 + \alpha_1 Peer\ LTAX_{j,t} + \alpha_2 Industry\ LTAX_{j,t} + \alpha_3\ Leader\ LTAX_{i,t} + \alpha_4\ LTAX_{i,t} + \alpha_{5-15}\ FirmLevel\ Controls_{i,t} + Industry_J + Year_t + \varepsilon_{i,t} \quad (1)$$

The dependent variable (*TAX*) is one of the main proxies for tax avoidance, represents for *ETR*, *ETR3*, and *ETR5*. The variable of interest (*Peer LTAX*) is the lagged, average *ETRs* for peers with similar firm sizes mentioned above, namely, *Peer LETR, Peer LETR3,* and *Peer LETR5*, respectively. The authors explicitly include controls for the average tax level within the industry (*Industry LTAX, namely, Industry LETR, Industry LETR3* and *Industry LETR5*, respectively) and market leader (*Leader LTAX, namely, Leader LETR, Leader LETR3* and *Leader LETR5*, respectively) in the main regression models to release the possibility that primary finding stems from the corporate tax behaviors of industry or market leaders shown in Kubick et al. (2014).

In the multivariate analysis, they first control general firm-level attributes, namely, profitability (*ROA)*, firm size (Size), leverage (*LEV*), and the market-to-book ratio (*MB*), as firm's propensity on tax avoidance will vary with the firms' profitability, firm size, interest level and capitalization ability greatly. They also include several controls that assess a firm's opportunities for engaging in an aggressive tax position (Armstrong et al., 2015; Armstrong et al., 2012; Hanlon and Heitzman, 2010), such as research and development (*RD*), foreign income (*FI*), equity method income in earnings (*Equity*), intangible assets (*Intan*), net operating losses (*NOL* and *Dummy NOL*), and free cash flow (*FCF*) in this study's specifications. Additionally, industry and year fixed effects was included to eliminate any unobservable changes that can affect the empirical result.

To test the first hypothesis, the authors estimate the coefficient of α_1, which represents the extent to which a firm's tax burden is associated with the previous average tax level of its peer firms and can be interpreted as the extent to which a firm appears to mimic its industry peers of similar size. A positive coefficient for α_1 suggests that firms, on average, mimic the tax-saving behaviors of their peer firms.

To control the mean reversion and the use of alternative benchmarks other than peers, the authors include the average previous tax level for all firms in a given industry year. If the firms mimic their peers with similar firm sizes to a greater extent than the industry average, then α_1 should be statistically greater than α_2. However, if the industry average is the more important benchmark, then we would expect α_2 to be statistically greater than α_1 can be expected. The authors interpret the coefficient on Industry (α_2) with caution because they cannot disentangle the mimicking of the industry average from the natural process of mean reversion. Similarly, by including the firm's own lagged ETR for the firm, they control the possibility that the coefficient on Peers captures a firm's own individual responses to industry-wide economic events or mean reversion at the firm level.

If a firm "copies and pastes" the tax behavior of its peers, it can be postulated that a more aggressive tax position of peers will induce a firm response to a greater extent and at a faster speed. This is consistent with a scenario in which tax avoidance is deliberate and can be adjusted quickly when firms have multinational operation, lower growth potential, and income mobility (Kim et al., 2019). Kubick et al. (2014) also found that peer firms respond to negative shock from the focal firm rather than positive shock. If a firm perceives a higher average tax level among its peers of similar size, it might not have an incentive to adopt a new tax policy that is used by its peers. However, if a firm burdens a higher tax level than its peers, it might respond competitively and lower its tax expense and payment at a faster speed.

The tax planning of market leaders is an excellent benchmark when a firm learns from or competes with its peers (Kubick et al., 2014). However, the tax-planning adjustment of a firm will be constrained by its own economic conditions, such as political connections, operational areas, and information systems. Firms with smaller firm size, lower profitability or other resource constraints would be inclined to mimic their peers with similar size rather than the market leaders. To investigate the asymmetric peer effect mentioned above, several firm attributes was introduced to test the different responses to different situations. The asymmetric effect by modifying Equation (1) was examined to include an interaction term (*CON – Above, LP, LC*), which is a dummy variable that equals one if a firm has a higher tax level burden than its peer and has lower profitability and less cash reserves, and equals zero otherwise. The modified regression is as followed:

Table 1. Descriptive statistics and correlation matrix.

Panel A: Descriptive statistics						
Variable	**N**	**Mean**	**Std. Dev.**	**10th Pctl**	**Median**	**90th Pctl**
ETR	49,353	0.315	0.191	0.063	0.327	0.448
Peer LETR	49,353	0.297	0.105	0.167	0.295	0.427
Industry LETR	49,353	0.297	0.054	0.220	0.301	0.361
Leader LETR	49,353	0.254	0.128	0.082	0.262	0.387
LETR	49,353	0.297	0.212	0.000	0.321	0.445
ROA	49,353	0.138	0.157	0.027	0.102	0.274
Size	49,353	6.078	2.193	3.226	5.993	9.094
FI	49,353	0.014	0.034	0.000	0.000	0.053
Equity	49,353	0.001	0.005	0.000	0.000	0.002
Intan	49,353	0.172	0.239	0.000	0.066	0.506
PPE	49,353	0.354	0.326	0.047	0.254	0.811
DNOL	49,353	0.514	0.500	0.000	1.000	1.000
NOL	49,353	-0.004	0.073	-0.033	0.000	0.023
MB	49,353	3.123	3.658	0.874	2.142	5.903
LEV	49,353	0.196	0.221	0.000	0.139	0.481
FCF	49,353	0.037	0.154	-0.100	0.050	0.174
RD	49,353	0.029	0.060	0.000	0.000	0.101

Panel B: Correlation Matrix					
Variable	**ETR**	**Peer LETR**	**Industry LETR**	**Leader LETR**	**LETR**
ETR	1				
Peer LETR	0.120***	1			
Industry LETR	0.207***	0.332***	1		
Leader LETR	0.084***	0.129***	0.355***	1	
LETR	0.338***	0.110***	0.257***	0.091***	1

In Table 1, Panel A presents summary statistics for the variables used in the empirical analyses. Panel B presents Peason correlation matrix for the dependent variables and variables of interests, and the ***, **, and * represent significance at the 1, 5, and 10% levels, respectively. All variables are defined in Appendix A.
Source: Authors

$$ETR_{i,t} = \alpha_0 + \alpha_1 Peer\ LETR_{j,t} + \alpha_2 Industry\ LETR_{j,t} + \alpha_3\ LETR_{i,t} + \alpha_4\ CON_{i,t-1} + \alpha_5\ CON_{i,t-1} * Peer\ LETR_{j,t} + \alpha_6\ CON_{i,t-1} * Industry\ LETR_{j,t} + \alpha_7\ CON_{i,t-1} * LETR_{i,t} + \alpha_{8-18}\ FirmLevel\ Controls_{i,t} + \alpha_{19-29}\ CON_{i,t-1} * FirmLevel\ Controls_{i,t} + Industry_J + Year_t + \varepsilon_{i,t} \quad (2)$$

EMPIRICAL RESULTS

Descriptive statistics and correlation matrix

Panel A of Table 1 provides the descriptive statistics of the study. A total of 49,353 observations shows that the average tax avoided (*ETR*) occupied 31.5% of the pretax income. The means of lagged tax avoidance from peer groups (*Peer LETR*), industry groups (*Industry LETR*), and leader groups (*Leader LETR*) are 29.7, 29.7 and 25.4%, respectively. The explicit tax savings shown in descriptive statistics are largely consistent with prior studies. The findings show that all average taxes avoided except tax savings from leader groups (*Leader LETR*) are approximately 30%, ranging from 0.297 to 0.315. The average tax avoided from the leader group occupied 25.4% of pretax income, which is the lowest tax among the different groups. This is consistent with the empirical result of Kubick et al. (2014), indicating that industry leaders save more tax expenses through their market bargaining power. As the authors arrange the firms into peer groups, market leader groups and the whole industry group, the variations of average behaviors among those groups decrease gradually with the increase of stability of membership composition (from peer to industry leader) or the number of membership (from industry leader to the whole industry). Therefore, the standard deviations of tax avoidance range from 0.054 (*Industry LETR*) to 0.212 (*LETR*), which is consistent with the variation of corporate tax behaviors among the markets.

The Pearson correlation coefficients were presented in Panel B of Table 1. The univariate correlations between the *ETR* and *LETR*s are positively correlated with one

Table 2. Mimicking of tax avoidance.

Panel A: Industry average as control benchmark				
Variable	**Expected sign**	**(1) *TAX=ETR***	**(2) *TAX=ETR3***	**(3) *TAX=ETR5***
Peer LTAX	+	0.061***(4.80)	0.018***(2.63)	0.01(1.35)
Industry LTAX	+	0.077**(1.98)	0.089**(2.10)	0.015(0.40)
Leader LTAX	+	-0.006(-0.43)	-0.013*(-1.70)	-0.008(-0.96)
LTAX	+	0.264***(21.73)	0.473***(29.58)	0.688***(65.74)
ROA	+	-0.013(-0.62)	0.061***(3.91)	0.077***(4.18)
Size	+	0.003***(3.63)	0.006***(5.28)	0.000(-0.04)
FI	-	-0.129***(-2.86)	-0.045(-1.20)	0.035(1.08)
Equity	-	-0.528*(-1.82)	0.237(0.97)	0.089(0.46)
Intan	-	0.021***(2.93)	0.020***(2.71)	0.034***(2.93)
DNOL	-	-0.007*(-1.75)	-0.017***(-4.59)	-0.016***(-4.77)
NOL	-	0.067***(4.15)	0.025(1.33)	0.060***(3.94)
MB	-	0.000(-1.50)	-0.001(-0.95)	0.001(1.32)
LEV	-	-0.034***(-4.56)	-0.038***(-4.24)	-0.023***(-2.85)
FCF	-	-0.002(-0.19)	-0.041**(-2.22)	-0.062**(-2.29)
RD	-	-0.182***(-7.91)	-0.137**(-1.98)	-0.034(-1.02)
Industry and year fixed effects		Yes	Yes	Yes
Standard errors clustered by firms		Yes	Yes	Yes
N		49,353	49,353	49,353
R-sq		15.2%	51.6%	71.1%
Panel B: Industry average excluded market leaders as control benchmark				
Variable	**Expected sign**	**(1) *TAX=ETR***	**(2) *TAX=ETR3***	**(3) *TAX=ETR5***
Peer LTAX	+	0.061***(4.79)	0.018***(2.64)	0.01(1.33)
Non-leader Industry LTAX	+	0.074**(2.02)	0.082**(2.08)	0.02(0.48)
Leader LTAX	+	-0.002(-0.12)	-0.008(-1.10)	-0.01(-0.95)
LTAX	+	0.264***(21.72)	0.474***(29.56)	0.688***(65.41)
Firm-level Controls		Yes	Yes	Yes
Industry and year fixed effects		Yes	Yes	Yes
Standard errors clustered by firm		Yes	Yes	Yes
N		49,353	49,353	49,353
R-sq		15.2%	51.6%	71.1%

This table reports results from estimating the multivariate regression (1) TAXs are ETR, ETR3 and ETR5 in Column 1 to 3, respectively. The industry control benchmarks are lagged industry average tax, Industry LTAXs, in Panel A and lagged industry average tax excluding market leaders, Non-leader Industry LTAXs, in Panel B. For brevity, industry (φ_I) and year (τ_t) are not reported. All other variables are defined in Appendix A. Standard errors are clustered by firm. *, **, and *** denote significance at the p < 0.10, 0.05, and 0.01 levels, respectively.
Source: Authors

another. From the perspective of univariate correlations, a firm's tax behavior in the current year is highly correlated with its own performance (0.338, at the 1% significance level), industry-wide average (0.207, at the 1% significance level), product market leader (0.084, at the 1% significance level) and peers of similar size (0.120, at the 1% significance level) in the prior year. However, readers were cautioned to avoid being over reliant on these simple correlations, as they do not control for other determinants of tax avoidance. These correlations suggest the need for multivariate tests that can control for potential alternative explanatory factors, which was explained below.

Main results

To test Hypothesis 1, Table 2 presents the simulation of tax behaviors by estimating Equation (1). The dependent variable is firms' tax avoidance (*TAX*), proxied by *ETR, ETR3* and *ETR5* in Columns (1) to (3), respectively. The main variable of interest is *Peer LTAX*, which is measured

Table 3. Asymmetric peer effects.

Variable	Expected sign	(1) *CON=Above*	(2) *CON =LP*	(3) *CON =LC*
Peer LETR	+	0.103***(5.04)	0.040***(2.76)	0.042***(2.59)
Industry LETR	+	0.100**(2.43)	0.107**(2.54)	0.038(0.87)
Leader LETR	+	0.025(1.28)	-0.006(-0.41)	0.013(0.69)
LETR	+	0.361***(18.42)	0.289***(17.40)	0.273***(17.81)
CON	+	0.137***(6.19)	0.014(0.61)	-0.013(-0.88)
*CON *Peer LETR*	+	0.044*(1.81)	0.040**(2.06)	0.037**(1.98)
*CON *Industry LETR*	+	-0.043(-0.90)	-0.037(-0.78)	0.092*(1.96)
*CON *Leader LETR*	+	-0.066***(-3.29)	0(-0.04)	-0.037**(-2.49)
*CON *LETR*	+	-0.242***(-11.98)	-0.041***(-2.68)	-0.02(-1.62)
Firm-level controls		Yes	Yes	Yes
CON *Firm-level controls		Yes	Yes	Yes
Industry and year fixed effects		Yes	Yes	Yes
Standard errors clustered by firm		Yes	Yes	Yes
N		49,353	49,353	49,353
R-sq		17.1%	15.6%	15.4%

This table reports results from estimating the multivariate regression (2). CONs are Above, LP and LC in Column 1 to 3, respectively. For brevity, industry (φ_I), year (τ_t), firm level controls and interaction term of firm level controls and CONs are not reported. All other variables are defined in Appendix A. Standard errors are clustered by firm. *, **, and *** denote significance at the p < 0.10, 0.05, and 0.01 levels, respectively.
Source: Authors

using *Peer LETR, Peer LETR3* and *Peer LETR5* in Columns (1) to (3), respectively. As shown in Table 2, Panel A, the coefficients on *Peer LETR* and *Peer LETR3* are 0.061 and 0.018, which are positively significant at the 1% level, suggesting that firms' *ETRs* are related to the average *ETR*s of their peers of similar size in the prior period (one- and three-year windows). The significant and positive coefficients imply that an individual firm would still learn from its peers of similar size when the tax behaviors of whole and market leaders are considered. These results reject the null Hypothesis 1, which suggests that firms adjust their tax positions by mimicking the tax behaviors of their peers in addition to the industry and leader groups.

In this multivariate analysis, the simulation of industry-wide tax behavior is missing when tax avoidance is measured within a five-year window (Column 3), and the mimicking of industry leaders, which is shown in Kubick et al. (2014), only exists when tax avoidance is measured within a three-year window (Column 2). Although the authors observed a few insignificant coefficients on *Industry LTAX* and *Leader LTAX*, it is inappropriate to draw the conclusion that a firm's tax behavior simulates its peers rather than its industry leaders, as shown in Kubick et al. (2014). Additionally, the coefficients on *LTAX* are 0.264, 0.473, and 0.688 at the 1% significance level in Columns (1) to (3), respectively, which indicate that a firm's tax behavior is highly correlated with its own performance and that the behavior consistency increases with the longer-period measurement of tax avoidance.

The coefficients for most of the control variables are significant and in the predicted direction. The authors rerun their main regression using industry average excluded market leaders as a control benchmark. Table 2, Panel B shows the results and are consistent with Panel A indicating that the peer effect on tax avoidance also exists when the market leaders are excluded. In other words, the mimicry of the peers' tax-saving success is not driven by the market leaders, but the peers with similar firm size. In the additional tests, the authors also rerun the main regression using other industry classifications in additional tests to supplement the conclusion.

Hypothesis 2 test whether the response to peers' average tax rate is asymmetric when the firm has a higher tax level, lower profitability and lower cash reserves. To examine this research question, three dummy variables was constructed, *Above*, *LP* and *LC,* as interaction terms. Estimating Equation (2), Table 3 presents a clear asymmetric effect. The coefficients of *Peer LETR* are 0.103, 0.040, and 0.042 in Columns (1) to (3), respectively, suggesting that when firms have lower tax expenses, higher profitability and higher cash holds are more likely to mimic the tax behaviors of their peers. The coefficients of the interaction term, *Peer LETR*Con (above, LP, and LC),* are 0.044, 0.040, and 0.037 in Columns (1) to (3), respectively. The significant positive coefficients suggest that firms with higher tax levels, lower profitability and lower cash holds have a higher propensity to mimic their peers. Therefore, Hypothesis 2 is accepted.

Compared to industry leaders, peers with similar firm

Table 4. Alternative measures of tax avoidance.

Panel A: Mimicking of tax avoidance				
		(1)	**(2)**	**(3)**
Variable	**Expected sign**	***TAX=CETR***	***TAX=CETR3***	***TAX=CETR5***
Peer LCTAX	+	0.033***(3.12)	0.014*(1.83)	0.023***(3.10)
Non-leader Industry LCTAX	+	0.077*(1.91)	0.029(0.56)	-0.001(-0.04)
Leader LCTAX	+	0.020***(2.81)	0.002(0.24)	0.005(0.79)
LCTAX	+	0.534***(42.12)	0.677***(79.38)	0.794***(112.02)
Firm-level Controls		Yes	Yes	Yes
Industry and year fixed effects		Yes	Yes	Yes
Standard errors clustered by firm		Yes	Yes	Yes
N		49,353	49,353	49,353
R-sq		37.7%	59.3%	74.5%
Panel B: Asymmetry peer effect				
		(1)	**(2)**	**(3)**
Variable	**Expected sign**	***CON=Above***	***CON =LP***	***CON =LC***
Peer LCETR	+	-0.003(-0.23)	0.017*(1.82)	0.027*(1.77)
Industry LCETR	+	0.02(0.54)	0.054(1.28)	0.075**(2.26)
Leader LCETR	+	-0.006(-0.63)	0.002(0.24)	0.012(1.30)
LCETR	+	0.515***(34.39)	0.530***(34.60)	0.521***(41.18)
CON	+	-0.187***(-5.67)	0.123***(7.87)	0.018(1.06)
*CON *Peer LETR*	+	0.060**(1.98)	0.030**(2.06)	0.015(0.92)
*CON *Industry LETR*	+	0.1(1.42)	0.008(0.20)	-0.003(-0.07)
*CON *Leader LETR*	+	0.061***(2.64)	0.032***(4.29)	0.016(1.25)
*CON *LETR*	+	0.022(0.92)	-0.002(-0.18)	0.024*(1.75)
Firm-level controls		Yes	Yes	Yes
CON *Firm-level controls		Yes	Yes	Yes
Industry and year fixed effects		Yes	Yes	Yes
Standard errors clustered by firm		Yes	Yes	Yes
N		49,353	49,353	49,353
R-sq		38.3%	38.6%	37.8%

In this table, Panel A reports results of Equation (1), where TAXs are CETR, CETR3 and CETR5 in Column 1 to 3, respectively. Panel B reports results of Equation (2), where CONs are Above, LP and LC in Column 1 to 3, respectively. For brevity, industry ((φ_l), year ((τ_t), firm level controls and interaction term of firm level controls and CONs are not reported. All other variables are defined in Appendix A. Standard errors are clustered by firm. *, **, and *** denote significance at the p < 0.10, 0.05, and 0.01 levels, respectively.
Source: Authors

sizes face similar operational environments, and their tax behaviors are more appropriate to simulate by firms.

Robustness tests

In this subsection, the authors perform several supplemental analyses related to the main findings. In the first robustness test, the authors replace the GAAP effective tax rate with the cash effective tax rate (*CETR*) to rerun the main regression, and the conclusion holds when using an alternative measure of tax avoidance. In Table 4, the coefficients of *Peer LCTAX* (*Peer LCETR, Peer LCETR3* and *Peer LCETR5*) are 0.033, 0.014 and 0.023 at the 1, 10 and 1% significance levels in Columns (1) to (3), respectively. The empirical result suggests that a firm mimics its peers' tax behaviors in both accounting tax expenses and cash taxes paid.

This study analysis indicates that an individual firm has a higher propensity to learn from its peers with similar firm sizes. However, the sign, magnitude, and statistical significance of these analyses may be biased for the endogeneity issue. To alleviate any concerns regarding multicollinearity and reverse causality, a two-stage least squares analysis was performed. Prior studies document that geographic operations can provide more opportunities to engage in aggressive tax activities and lower its overall tax burden (Gupta and Mills, 2002). It was believed that the average level of geographic expansion among peers can constrain the average tax

Table 5. Two stage least squares test.

Variable	Expected sign	(1) *Peer LETR*	(2) *ETR*
Peer GEO	-	-0.007***(-7.44)	
Peer LETR	+		0.501*(1.90)
Industry LETR	+	0.344***(22.15)	-0.092(-0.96)
Leader LETR	+	-0.011**(-2.29)	0.000(-0.03)
LETR	+	0.006***(2.66)	0.262***(40.99)
Firm-level controls		Yes	Yes
Industry and year fixed effects		Yes	Yes
Standard errors clustered by firms		Yes	Yes
N		47,208	47,208
R-sq		16.1%	10.0%

This table reports results of two-stage regression for Equation (1), where TAXs are CETR. The instrumental variable is lagged average natural logarithm of one plus the number of geographical segments among peers. For brevity, industry ((φ_I), year ((τ_t) and firm level controls are not reported. All other variables are defined in Appendix A. Standard errors are clustered by firm. *, **, and *** denote significance at the p < 0.10, 0.05, and 0.01 levels, respectively.
Source: Authors

Table 6. Alternative industry classification.

Variable	Expected sign	(1) *TAX=ETR*	(2) *TAX=ETR3*	(3) *TAX=ETR5*
Peer LTAX	+	0.058*** (5.39)	0.024*** (3.48)	0.022*** (2.70)
Industry LTAX	+	0.025 (0.81)	0.089** (2.05)	-0.016 (-0.35)
Leader LTAX	+	0.011 (0.89)	-0.002 (-0.17)	0.000 (0.01)
LTAX	+	0.253*** (21.73)	0.469*** (29.26)	0.687*** (65.54)
Firm-level Controls		Yes	Yes	Yes
Industry and year fixed effects		Yes	Yes	Yes
Standard errors clustered by firm		Yes	Yes	Yes
N		48.354	48.354	48.354
R-sq		15.8%	51.9%	71.1%

Source: Authors

aggressiveness of peers but is unlikely to be correlated with the tax burden of an individual firm. Thus, the mean value of the natural logarithm of one plus the number of geographic segments in the peer group satisfies the essential requirements of the instrumental variable.

Column (1) of Table 5 shows that the coefficient of *Peer GEO* is -0.005 at the 1% significance level, suggesting that the instrumental variables are highly positively correlated with *Peer LETR*. In Column (2) of Table 5, the coefficient of *Peer LETR* is 0.501 with a t-statistic of 1.90, indicating that the association between the average tax burden among peers and the tax behavior of an individual firm remains robust after accounting for endogenous issues. As the Cragg-Donald Wald F statistic is greater than the critical value (Stock and Yogo, 2005), the documented association between peer effects and tax avoidance does not stem from any omitted variables.

It was also acknowledged that the robustness of this result is subject to peer group selection. In Table 6, 48 Fama-French industry groups were considered as alternative industry classifications. The industry peers and market leaders were reselected to calculate the average lagged ETRs for the reconstructed peer group and leader group. Rerunning the main regression, the coefficients of *Peer LTAX*s are 0.058, 0.024 and 0.022 at the 1% significance level among all specifications from Columns (1) to (3), suggesting that the peer effect on tax avoidance is not subject to industry choice.

The results obtained from this additional analysis are quantitatively and qualitatively similar, supporting the hypothesis that an individual firm would mimic their industry peers of similar size even though the industry classification would be different.

Conclusion

This paper investigates whether a firm's tax saving activities are highly correlated with the average tax level of its peers. Focusing on the U.S. market, it shows that

the simulation of peers' tax planning is incremental to the mimicking of average performance from whole industry peers and market leaders. Additionally, such a simulation is more pronounced when the firm has a higher tax burden, lower profitability and fewer cash reserves. It was found that firms learn from and respond to their peers' corporate tax decisions and that the magnitude of the reaction depends on firm-specific characteristics.

This paper responds to emerging literature on peer effects, which mainly focuses on dividend payments (Grennan, 2019), voluntary disclosures (Seo, 2021; Shroff et al., 2017) or stock splits (Kaustia and Rantala, 2015). The authors are not the first to examine the peer effect on tax issues. However, prior studies define peers as firms sharing board interlock (Brown, 2011; Brown and Drake, 2013) or product market leaders (Kubick et al., 2014). Although Bird et al. (2018) regard peers as firms of similar size within the same industry, they examine whether the focal firm's tax burden (GAAP ETR) can affect the average tax level among peer group members. Different from Bird et al. (2018), The authors present evidence that a firm has a higher propensity to calibrate its tax strategy once it observes the tax-saving success achieved by its peers. Using similar size instead of market leaders to capture peer groups, the authors supplement the tax issue by incorporating the peer effect into tax avoidance and provide evidence that the peer effect is incremental to the product market leader (Kubick et al., 2014) and exists in both GAAP ETR and Cash ETR. This study reveals the imitation of tax planning among peers and has significant implications for a number of corporate stakeholders. For managers, debt holders, shareholders and analysts, the prospects of the tax-planning imitation help them better evaluate the effectiveness of tax planning and financial performance. A novel way for tax authorities was also provided to detect tax-avoiding activities, which are likely to happen in a clustered manner.

The findings are subject to some limitations, however. First, even though previous studies were carefully followed to design the empirical approach, the empirical results would still be influenced by the research design choices as well as the estimation techniques. Second, while the empirical model includes a comprehensive set of attributes, the authors acknowledge that they are unable to consider all situations in the real dynamic world. Finally, similar to most tax studies, the authors estimate a firm's degree of tax avoidance with error.

It was believed that the imitations of peers exist widely apart from tax avoidance. This study indicates an avenue of future research on firms' mimicry of perceivable behaviors of its similar sized peers.

Notes

1. In practice, a PricewaterhouseCoopers (PwC 2014) benchmarking report notes, ‘‘Heads of tax and CFOs must be prepared to explain and justify their company's effective tax rate (ETR). As such, they must understand the spread of ETR in their industry, identify the drivers for the rate, and be able to assess their position against the ETR trends of their peer group.’’

2. The book ETR reflects the tax saving activities that generate permanent differences but does not capture the impact of temporary book-tax differences.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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APPENDIX 1

Variable definitions.

Variable	Definition
TAX	*Book effective tax rate*: *ETR* equals to income tax expense (Compustat TXT) divided by pre-tax book income (Compustat PI) minus special items (Compustat SPI) in year t. *ETR3* (*ETR5*) is the sum of income tax expense (Compustat TXT) covers three (five) years period divided by the sum of pre-tax book income (Compustat PI) minus special items (Compustat SPI) over the same period. *LETR* covers the year t-1, and *LETR3* (*LETR5*) covers the year t-3 (t-5) to t-1.
CTAX	*Cash effective tax rate*: *CETR* equals to cash taxes (Compustat TXPD) divided by pre-tax book income (Compustat PI) minus special items (Compustat SPI) in year t. *CETR3* (*CETR5*) is the sum of cash taxes (Compustat TXPD) covers three (five) years period divided by the sum of pre-tax book income (Compustat PI) minus special items (Compustat SPI) over the same period. *LCETR* covers the year t-1, and *LCETR3* (*LCETR5*) covers the year t-3 (t-5) to t-1.
Peer LTAX	*Peer lagged effective tax rate*: The lagged, average TAX value of the peer firms. The observations would be excluded from the analysis if the number of observations for a given industry-year is less than 15 for Fama-French 17 industry definition. Peer firms are defined as those firms that are most similar in size within a given industry. *Peer LETR* covers the year t-1, and *Peer LETR3* (*Peer LETR5*) covers the year t-3 (t-5) to t-1.
Industry LTAX	*Industry lagged effective tax rate*: The lagged, average TAX value for a given industry-year. The observations would be excluded from the analysis if the number of observations for a given industry-year is less than 10 for Fama-French 48 industry definition. *Industry LETR* covers the year t-1, and *Industry LETR3* (*Industry LETR5*) covers the year t-3 (t-5) to t-1.
Leader LTAX	*Leader lagged effective tax rate*: The lagged, average TAX value of the market leaders. The observations would be excluded from the analysis if the number of observations for a given industry-year is less than 10 for Fama-French 48 industry definition. Market leaders are defined as those firms in the top third of the product market power within a given industry. The product market power is measured by the price-cost margin, *PCM*. *PCM* equals the operating profit (Compustat SALE – COGS - XSGA) divided by sales (Compustat SALE) of each firm. If COGS or XSGA are missing, then the authors define operating profit as operating income after depreciation (Compustat OIADP). *Leader LETR* covers the year t-1, and *Leader LETR3* (*Leader LETR5*) covers the year t-3 (t-5) to t-1.
ROA	*Return on assets*: Pre-tax income (Compustat PI) divided by lagged total assets (Compustat AT).
Size	*Firm size*: Natural log of lagged total assets (Compustat AT)
FI	*Foreign income*: Pre-tax income from foreign operations (Compustat PIFO) divided by lagged total assets (Compustat AT).
Equity	*Equity method earnings*: Equity income (Compustat ESUB) divided by lagged total assets (Compustat AT). The authors set missing observations of ESUB equal to 0.
Intan	*Intangibles*: Intangibles (Compustat INTAN) divided by lagged total assets (Compustat AT).
PPE	*Property, Plant and Equipment*: Net property, plant and equipment (Compustat PPENT) divided by lagged total assets (Compustat AT).
DNOL	*Presence of NOL*: Indicator variable equal to one if the firm has a positive tax loss carryforward (Compustat TLCF is positive) during the year, and zero otherwise.
NOL	*Change in NOL*: Change in tax loss carryforward (Compustat TLCF) during the year divided by lagged total assets
MB	*Market-to-book ratio*: Market value of equity (Compustat PRCC_F×CSHO) divided by book value of equity (Compustat CEQ).
LEV	*Leverage*: Total long-term debt (Compustat DLTT) divided by lagged total assets (Compustat AT).
FCF	*Free cash flow*: Operating cash flows minus capital expenditure (Compustat OANCF – CAPX) divided by lagged total assets (Compustat AT).
RD	*Research and development expense*: Research and development expense (Compustat XRD) divided by lagged total assets (Compustat AT).
Above	*Above*: Indicator variable equal to one if the firms' tax burden higher than its peers, and zero otherwise.
LP	*Low profit*: Indicator variable equal to one if the firms' ROA lower than the median level, and zero otherwise.
LC	*Low cash*: Indicator variable equal to one if the firms' cash holding lower than the median level, and zero otherwise.

Observations with negative shareholders' equity (Compustat CEQ), sales revenue (Compustat SALE), pretax book income (Compustat PI), total tax expense (Compustat TXT), or cash taxes paid (Compustat TXPD) are deleted. Effective tax rates (*ETR, Peer LETR, Industry LETR, Leader LETR, LETR*) are constrained to lie on the [0,1] interval. Utilities and financial firms and firms' total assets (Compustat AT) less than 5 million are excluded from the sample. All continuous variables are winsorized at the 1 and 99% levels. Missing values of PIFO, ESUB, INTAN, PPENT, DLTT OANCF, CAPX and XRD are set to zero.