Litigation risk, accounting quality, and investment efficiency

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A B S T R A C T
This paper examines the moderating effect of litigation risk on the relationship between accounting quality and investment efficiency. We use directors' and officers’ (D&O) liability insurance as a proxy for litigation risk, accruals quality for accounting quality, and investment cash flow sensitivity for investment efficiency (Biddle & Hilary, 2006; Hovakimian & Hovakimian, 2009). Using Canadian data from 1998 to 2008, we show that firms with higher D&O insurance coverage exhibit lower quality accruals. Moreover, the previously documented negative association between accruals quality and investment cash flow sensitivity is stronger (weaker) when abnormal D&O coverage is low (high), suggesting that the role of accounting quality in facilitating investment efficiency is conditional upon observable litigation risk.

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1. Introduction

This paper examines the effect of a determinant of litigation risk on the relationship between accounting quality and investment efficiency. Litigation risk mitigates agency problems and promotes greater accounting quality; and greater accounting quality, in turn, enhances capital allocation efficiency (Biddle & Hilary, 2006). Accordingly, factors that might reduce litigation risk can undermine the deterrent effect of litigation risk, inducing opportunistic behaviors by managers, reducing accounting quality and investment efficiency. We argue that directors' and officers’ (D&O) liability insurance reduces litigation risk, and we examine the association of D&O insurance, accounting quality, and investment efficiency.

We exploit a unique institutional setting in Canada, where firms are required to disclose D&O insurance information. We use disclosed D&O coverage limits to measure litigation risk and posit that managers and directors with high abnormal coverage limits face low litigation risk. Under these observable conditions we hypothesize that the relationship between accounting quality and investment efficiency is altered.

Consistent with extant evidence, we confirm a negative association between abnormal D&O coverage limits and accruals quality. Moreover, we find that the documented negative association between accounting quality and investment cash flow sensitivity is weaker when abnormal D&O insurance coverage limit is high. Overall, our findings suggest that litigation risk is an important governance mechanism that ensures the quality of accounting information and improves capital allocation efficiency by reinforcing the role of accruals in investment financing decisions. Our findings are robust to alternative measures of accounting quality and investment efficiency.

Our research contributes to the literature in the following ways. First, we extend prior research on accruals quality and investment efficiency by documenting that observable risk exposure moderates the association between accounting quality and investment efficiency. Our results highlight the importance of litigation risk in ensuring the quality of accounting information and promoting investment efficiency. Second, we provide evidence on the effects of litigation risk on accruals quality. Prior studies use accounting restatements or earnings conservatism as a proxy for accounting information quality or exploit cross-country differences in legal institutions (Burgstahler, Hail, & Leuz, 2006; Chung & Wynn, 2008; Kim, 2005; Leuz, Nanda, & Wysocki, 2003; Lin, Officer, Wang, & Zou, 2013). Our firm-level evidence further underscores the importance of litigation risk even in an environment with a high level of investor protection, such as in Canada.

The remainder of the paper is organized as follows. In Section 2, we provide the literature review and the hypothesis development. Section 3 presents the sample selection and describes the research design. Section 4 discusses empirical findings, and Section 5 provides the results of robustness checks. Finally, Section 6 offers concluding remarks.

2. Related literature and hypothesis development

2.1. D&O legal liability insurance

To protect managers from personal legal liabilities arising from business decisions, many companies bear any costs of litigation against directors and officers through D&O insurance and indemnification
provisions. In general, D&O insurance coverage usually (i) reimburses the firm for its indemnification payment for directors and officers, (ii) covers individual directors and officers for their wrongful acts to the extent that they have not been indemnified by the firm, or (iii) covers the firm to the extent that any legal action names it as defendant along with the directors and officers. Typical losses covered by D&O policies include compensatory damages, settlement amounts, and legal fees incurred in defense of claims arising as a result of the official acts of directors and officers. D&O policies have the effect of shifting litigation risks from individual directors and officers to a third-party insurer to the extent of the dollar amount of coverage limits purchased, thus effectively reducing legal liability of a firm and its managers and directors.

2.2. Litigation risk and accounting quality

Litigation risk as an institutional factor mitigates agency costs (Burgstahler et al., 2006; Leuz et al., 2003). To the extent that litigation risk provides an effective constraint on management and reduces opportunistic behavior, a reduction in the expected litigation risk of managers could exacerbate agency problems and undermine the deterrent effect of litigation. Consistent with the notion, prior empirical evidence in the accounting and finance literature suggest that firms with high D&O insurance coverage limits tend to exhibit a high degree of managerial opportunism pertaining to legal liability (e.g., Boyer & Delvaux-Derome, 2002; Chalmers, Dann, & Harford, 2002; Chung & Wynn, 2008).

In particular, recent studies demonstrate that high D&O coverage limits affect managers’ reporting choices for earnings. Kim (2005) and Lin et al. (2013) find a significantly positive association between D&O coverage limits and the likelihood that firms restate earnings, while Chung and Wynn (2008) report a negative association between insurance coverage and earnings conservatism. Using accruals quality as a proxy for accounting quality, we expect firms with high D&O coverage limits to be associated with lower accruals quality.

2.3. Litigation risk, accounting quality, and investment efficiency

An accounting and disclosure system that promotes transparency is required for an efficient functioning of a financial system (Rajan & Zingales, 2003). Botosan and Plumlee (2005), among others, provide empirical evidence that there exists a negative association between information asymmetry between managers and outside capital providers creates frictions in the investment process through tighter financing constraints, forcing firms to rely more on internally generated cash flows than external funds to finance their investments (e.g., Hovakimian & Hovakimian, 2009). Using accruals quality as a proxy for accounting information quality and investment cash flow sensitivity for investment efficiency, Biddle and Hilary (2006) provide international evidence that higher accruals quality reduces firms’ investment sensitivity to their internally generated cash flows, increasing investment efficiency.

We, however, argue that D&O insurance would undermine the role of accounting quality in improving investment efficiency, since D&O insurance reduces the litigation risks of managers. To the extent that the quality of accounting is less influential in investment decisions for firms with low observed litigation risk, we should observe a weaker effect on capital investment decisions when accounting quality is compromised by excessive D&O insurance coverage limits. This leads to our hypothesis stated in an alternate form as follows:

Hₐ. The effect of accruals quality on investment efficiency is weaker for firms with high D&O coverage limits than for firms with low D&O coverage limits.

3. Sample selection and research design

3.1. Sample selection

Table 1 presents the criteria for sample selection. We examine Canadian firms listed on the TSX because their insurance data is publicly available. D&O insurance data are hand-collected from proxy circulars that are available on www.sedar.com. Our initial sample includes 6288 firm-years of 582 firms from 1998 to 2008 that were listed at least once on the TSE 300 index (currently the S&P/TSX Composite Index).

To examine whether a firm changed its cross-listing status during a fiscal year, we check the date range of firms listed on the CRSP (Center for Research in Security Prices). The firm-years in the date range on CRSP are classified as cross-listed, while firm-years not in the date range on CRSP are classified as local. This check enables us to exclude the firms that changed their cross-listing status during a year, resulting in the exclusion of 2228 firm-years of 190 firms. After this exclusion, our sample includes both cross-listing-only and local-listing-only firms. We then remove 1023 firm-years of 89 firms that were merged, acquired, or went bankrupt during our sample period, and then 1324 firm-years of 69 firms that did not have information on D&O insurance coverage limits. Next, we exclude 174 firm-years of 25 firms with unavailable governance data. Further, we eliminate firms that do not carry D&O insurance and firm-years that do not have the necessary financial data to measure accruals quality, resulting in 909 firm-years of 183 firms. Finally, we remove 45 firm-years with unavailable financial data to measure investment efficiency.

3.2. Research design

3.2.1. Measurement

First, we measure expected litigation risk using abnormal D&O coverage limits (beyond the optimal level of insurance coverage limits that a firm would carry) after controlling for litigation risk and other firm characteristics. The abnormal coverage limits (ABCOV) are residuals obtained using the following Eq. (1).

\[ \text{LNCOV} = \alpha_0 + \alpha_1 \text{SIZE} + \alpha_2 \text{CROSS} + \alpha_3 \text{MRRATIO} + \alpha_4 \text{DEBT} + \alpha_5 \text{RISK} + \alpha_6 \text{ROA} + \alpha_7 \text{ACQDIVESTOR} + \alpha_8 \text{HIGHTECH} + \alpha_9 \text{REGULATE} + \alpha_{10} \text{OUTSIDE} + \alpha_{11} \text{OUTBLOCK} + \epsilon \]  

(1)

where LNCOV = the natural log of D&O insurance coverage limits; SIZE = the natural log of lagged total asset; CROSS = 1 if a firm is cross-listed in the U.S. market during a whole fiscal year, and 0 otherwise; MRRATIO = the market-to-book value ratio; DEBT = the ratio of debt to assets; RISK = standard deviation of lagged returns on assets over the past five years; ROA = return on assets; ACQDIVESTOR = 1 if the book value of total assets at the end of the fiscal year increases or decreases by more than 25% from the beginning of the fiscal year, and 0 otherwise; HIGHTECH = 1 if a firm is a member of the Pharmaceuticals (SIC codes 2833–2836), R&D Services (8731–8734), Programming (7371–7379), Computers (3570–3577), or Electronics (3600–3674) industries, and 0 otherwise; REGULATE = 1 if a firm is a member of...
listed on the TSX are hand-collected from proxy circulars.

Table 1
Sample selection criteria.

<table>
<thead>
<tr>
<th>Selection criteria</th>
<th>No. of firm-years</th>
<th>No. of firms</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. TSE 300 firms from 1998 to 2008</td>
<td>6288</td>
<td>582</td>
</tr>
<tr>
<td>2. Changed a cross-listing status during a year</td>
<td>−2228</td>
<td>−190</td>
</tr>
<tr>
<td>3. Merged, acquired, or went bankrupt</td>
<td>−1023</td>
<td>−89</td>
</tr>
<tr>
<td>4. D&amp;O insurance coverage unavailable from <a href="http://www.sedar.com">www.sedar.com</a></td>
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<td>−69</td>
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<td>5. Corporate governance data unavailable from <a href="http://www.sedar.com">www.sedar.com</a></td>
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<td>−25</td>
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<tr>
<td>6. Sample for estimation of D&amp;O purchase decision</td>
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<td>259</td>
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<tr>
<td>7. Firms that do not carry D&amp;O insurance</td>
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<td>−63</td>
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<tr>
<td>8. Sample for estimation of abnormal D&amp;O insurance coverage</td>
<td>1309</td>
<td>196</td>
</tr>
<tr>
<td>9. Sample for test of accruals quality</td>
<td>909</td>
<td>183</td>
</tr>
<tr>
<td>10. Final sample</td>
<td>864</td>
<td>183</td>
</tr>
</tbody>
</table>

This table presents the criteria for sample selection. D&O insurance data for Canadian firms listed on the TSX are hand-collected from proxy circulars.

the Telephone (SIC codes 4812–4813), TV (4833), Cable (4841), Communications (4811–4899), Gas (4922–4924), Electricity (4931), Water (4941), or Financial (6021–6023, 6035–6036, 6141, 6311, 6321, 6331) industries, and 0 otherwise; OUTSIDE = the percentage of outside directors on the board of directors; and OUTBLOCK = the percentage of ownership held by outside shareholders who own over 10% of the firm’s stock.3

Our measure of accruals quality, AQ, is the standard deviation of discretionary accruals over the past four years times negative one. The discretionary accruals are residuals from estimation of the following Eq. (2) developed by Dechow and Dichev (2002) and modified by McNichols (2002); Petersen (2009) and Francis, LaFond, Olsson, and Schipper (2005).

\[ \Delta \text{WC} = Y_0 + Y_1 \text{CFO}_{t-1} + Y_2 \text{CFO}_{t-1} + Y_3 \text{REV}_{t-1} + Y_4 \text{PPE}_{t-1} + \varepsilon_t \]  

where \( \text{WC} \) = working capital defined as the change in accounts receivable plus the change in inventories, less change in accounts payable, less taxes payable, plus change in other assets deflated by lagged total assets; \( \text{CFO} \) = cash flow from operations, deflated by lagged total assets; \( \Delta \text{REV} \) = the change in sales revenue from the past year, deflated by lagged total assets; and \( \text{PPE} \) = the property, plant, and equipment, deflated by lagged total assets. Following prior studies, we exclude the financial and utilities industries and only include year-industry groups with ten or more observations in this estimation. We measure AQ by multiplying negative one to the standard deviation of discretionary accruals, so that a higher value of AQ corresponds to higher accruals quality.

We measure investment efficiency as cash flow sensitivity of investment (CFSI) developed by Hovakimian and Hovakimian (2009). As discussed in Biddle and Hilary (2006), the intuition behind this measure is that the efficient capital investment should not be sensitive to the firm’s available cash. For example, firms with inefficient investment may have high investment cash flow sensitivity, because these firms may invest more in years with high cash flows on hand and invest less in years with low cash flows on hand. Thus, a higher value of CFSI corresponds to less efficient investment. CFSI is defined as the difference between the cash flow-weighted time-series average investment of a firm and its unweighted time-series mean investment as in the following Eq. (3).

\[ \text{CFSI} = \sum_{t=1}^{n} \text{INV}_{t} \left( \frac{\text{CF}_{t}}{\sum_{t=1}^{n} \text{CF}_{t}} - 1/n \sum_{t=1}^{n} \text{INV}_{t} \right) \]  

where \( \text{CF} \) = cash flows of the past five years, deflated by lagged net property, plants, and equipment; \( \text{INV} \) = capital investment of the past five years, deflated by lagged net property, plants, and equipment; and \( n \) = the number of annual observations for a firm.

3.2.2. Endogeneity

In order to address the endogeneity issue for accounting choice and insurance purchase decision, we employ the two-stage estimation approach in Heckman (1979). We first run the following probit model (4) that includes a purchase choice as a dependent variable and determinants of a firm’s decision to purchase D&O insurance as independent variables. In the second stage, we run the regression models for our tests including the inverse Mills ratio obtained from the first-stage estimation of the model (4).

\[ P(\text{PURCHASE} = 1) = \delta_0 + \delta_1 \text{SIZE} + \delta_2 \text{CROSS} + \delta_3 \text{MBRATIO} + \delta_4 \text{DEBT} + \delta_5 \text{RISK} + \delta_6 \text{ROA} + \delta_7 \text{ACQDIVESTOR} + \delta_{10} \text{OUTSIDE} + \delta_{11} \text{OUTBLOCK} + \varepsilon \]  

where \( \text{PURCHASE} = 1 \) if a firm carries D&O insurance, and 0 otherwise; \( \text{SIZE} \) = the natural log of lagged assets; \( \text{CROSS} = 1 \) for a firm cross-listed in the U.S. market during a whole fiscal year, and 0 otherwise; \( \text{MBRATIO} \) = the market-to-book value ratio; \( \text{RISK} \) = the standard deviation of lagged return on assets of the past five years; \( \text{ROA} \) = the return on assets; \( \text{ACQDIVESTOR} = 1 \) if the book value of total assets at the end of the fiscal year increases or decreases by more than 25% from the beginning of the fiscal year, and 0 otherwise; \( \text{HIGHTECH} = 1 \) if a firm is a member of the Pharmaceuticals (SIC codes 2833–2836), R&D Services (8731–8734), Programming (7371–7379), Computers (3570–3577), or Electronics (3600–3674) industries, and 0 otherwise; \( \text{REGULATE} = 1 \) if a firm is a member of the Telephone (SIC codes 4812–4813), TV (4833), Cable (4841), Communications (4811–4899), Gas (4922–4924), Electricity (4931), Water (4941), or Financial (6021–6023, 6035–6036, 6141, 6311, 6321, 6331) industries, and 0 otherwise; \( \text{OUTSIDE} = 1 \) if a percentage of outside directors on the board of directors; and \( \text{OUTBLOCK} = 1 \) if the percentage of ownership held by outside shareholders who own over 10% of the firm’s stock.

3.2.3. Estimation

We first estimate the following regression model (5) to verify with our sample the documented positive association between expected litigation risk and accounting quality, using abnormal D&O coverage limits and accruals quality as their respective proxies. Since firms with high D&O coverage limits, i.e., low expected litigation risk, are likely to exhibit low accruals quality, the coefficient of abnormal coverage limits (ABCOV) is expected to be negative and significant (\( \beta_1 < 0 \)).

\[ \text{AQ} = \beta_9 + \beta_{10} \text{ABCOV} + \beta_{12} \text{SIZE} + \beta_{13} \text{SIGMACFO} + \beta_{14} \text{SIGMASALES} + \beta_{15} \text{OPCYCLE} + \beta_{16} \text{NEGGNI} + \beta_{17} \text{ASGROWTH} + \beta_{18} \text{ACQDIVESTOR} + \beta_{19} \text{OUTSIDE} + \beta_{10} \text{OUTBLOCK} + \beta_{11} \text{MILLS} + \varepsilon \]  

where \( \text{AQ} \) = the standard deviation of discretionary accruals over the past four years times negative one and discretionary accruals computed using Eq. (2); \( \text{ABCOV} \) = residuals obtained from model (1); \( \text{SIZE} \) = the natural log of lagged total assets; \( \text{SIGMACFO} \) = the standard deviation of cash flow from operation divided by total assets over the past four years; \( \text{SIGMASALES} \) = the standard deviation of sales divided by total assets over the past four years; \( \text{OPCYCLE} \) = the natural log of a firm’s
operating cycles; NEGENI = the proportion of negative income from the past four years' operations; ACGROWTH = the asset growth, adjusted by both industry and year; ACQDIVER = 1 if the book value of total assets at the end of the fiscal year increases or decreases by more than 25% from the beginning of the fiscal year, and 0 otherwise; OUTSIDE = the percentage of outside directors on the board of directors; OUTBLOCK = the percentage of ownership held by outside shareholders who own over 10% of the firm's stock; and MILLS = the inverse mills ratio obtained from estimation of the probit model (4).

To test our hypothesis, we estimate the regression model (6) below. We examine the impact of abnormal D&O coverage limits, independently and jointly with accruals quality, on investment cash flow sensitivity by partitioning the full sample into high vs. low abnormal coverage limit subsamples. We create a dichotomous variable, ABCOVHIGH, equal to one if abnormal coverage limits are higher than the median value of abnormal coverage, and 0 otherwise. We expect a positive coefficient on ABCOVHIGH (β2 > 0). According to Lin et al. (2013), firms with high D&O coverage limits are likely to face tighter financing constraints, suggesting that those firms would rely more on internally generated cash flows to finance capital investments. Since our hypothesis predicts the negative association between AQ and CFSI to be weaker for high D&O coverage firms, the coefficient on the interaction term, AQ * ABCOVHIGH, is expected to be positive (β3 > 0).

\[
\begin{align*}
CFSI & = \beta_0 + \beta_1 AQ + \beta_2 ABCOVHIGH + \beta_3 AQ * ABCOVHIGH + \beta_4 SIZE + \beta_5 MBRATIO + \beta_6 ROA + \beta_7 SIGMA SALES + \beta_8 ZSCORE + \\
& + \beta_9 TANGIBILITY + \beta_{10} R&D + \beta_{11} KSTRUCTURE + \beta_{12} SLACK + \\
& + \beta_{13} DIVIDEND + \beta_{14} OUTSIDE + \beta_{15} OUTBLOCK + \beta_{16} MILLS + \epsilon
\end{align*}
\] (6)

where CFSI = cash flow sensitivity of investment computed using Eq. (4); AQ = the standard deviation of discretionary accruals over the past four years times negative one and discretionary accruals computed using Eq. (2); ABCOVHIGH = 1 if a firm's abnormal coverage limit is higher than the median value of the sample firms, and 0 otherwise; SIZE = the natural log of lagged total assets; MBRATIO = the market-to-book value ratio; ROA = returns on assets, adjusted by industry and year; SIGMA SALES = the standard deviation of sales divided by total assets over the past four years; ZSCORE = the bankruptcy prediction score calculated using Altman (1968); TANGIBILITY = the ratio of net PPE-to-total assets; R&D = 1 if a firm has an R&D amount, and 0 otherwise; KSTRUCTURE = the ratio of net fixed assets-to-sales; SLACK = cash and cash equivalents, divided by total assets; DIVIDEND = 1 if a firm pays dividends in the current period, and 0 otherwise; OUTSIDE = the percentage of outside directors on the board of directors; OUTBLOCK = the percentage of shares held by outside shareholders who own over 10% of the firm's stock; and MILLS = the inverse Mills ratio obtained from estimation of the probit model (4).

4 Empirical findings

4.1 Descriptive statistics

Table 2 presents descriptive statistics of the variables. 1309 firm-years carrying D&O insurance carry coverage limits of $77 million, on average.\(^4\) The variable of accruals quality, AQ, has the mean (median) value of 0.039 (0.031), while cash flow sensitivity of investment (CFSI) has the mean (median) value of 0.032 (0.012). We note that

\(^4\) All U.S. dollar values for D&O coverage limits are translated into Canadian dollars using exchange rate information on Compustat.

This table presents the descriptive statistics of variables. All U.S. dollar values for D&O coverage limits are translated into Canadian dollars using exchange rate information on Compustat. The variable definitions are as follows. ACQDIVER = 1 if book value of total assets at the end of the fiscal year increased or decreased by more than 25% from the beginning of the fiscal year, and 0 otherwise; CFSI = cash flow sensitivity of investment; CROSS = 1 if a firm is cross-listed in the U.S. during a year, and 0 otherwise; DEBT = the debt-to-total asset ratio; HIGHTECH = 1 if a firm is a member of Pharmaceuticals (SIC codes 2833–2836), R&D Services (8731–8734), Programming (7371–7379), Computers (3570–3577), or Electronic (3600–3674) industries, and 0 otherwise; NEGNI = the proportion of negative income from operations of the past four years; SIGMACFO = the standard deviation of lagged total assets; SIGMASALES = the standard deviation of sales divided by total assets over the past four years; ZSCORE = the bankruptcy prediction score calculated using Altman (1968); LEV = the financial leverage ratio; LNBM = the log of sales; LNMV = the log of market value of equity.

\[\text{CFSI} = \frac{\sum_{t=1}^{n} \frac{\Delta \text{REV and PPE} + \gamma \Delta \text{INV}}{\sum_{t=1}^{n} \frac{CFO}{C3}} - 1}{n}\]

\[\text{INV}_{i,t}, \text{ where} \ i \text{ and} \ t \text{ are firm and year indexes,} \ n \text{ is the number of annual observations, INV is investment, and CF is cash flow; DIVER = 1 if a firm pays dividends in the current period, and 0 otherwise; KSTRUCTURE = the ratio of net fixed assets-to-sales; R&D = 1 if a firm has an R&D amount, and 0 otherwise; SLACK = cash and cash equivalents, divided by total assets; TANGIBILITY = the ratio of net PPE-to-total assets; ZSCORE = the bankruptcy prediction score calculated using Altman (1968); LEV = the leverage ratio; LNBM = the natural log of the book-to-market ratio; LNMV = the natural log of market value of equity.} \]
4.2. Empirical findings

Table 3 reports (i) the first-stage probit estimation for the Heckman procedure, and (ii) the ordinary least square estimation to obtain abnormal coverage limits. The probit analysis in Panel A of Table 3 shows that firm size, a cross-listing status, financial distress, and outside blockholders are significant determinants of purchase decisions for our sample firms. The ordinary regression analysis presented in Panel B of Table 3 indicates that once a firm purchases D&O insurance, firm size, a cross-listing status, firm riskiness, and shares held by outside blockholders appear to be significant determinants of coverage limits. In other words, the larger and riskier the firms, the higher the coverage limits. Also, cross-listed firms tend to carry higher coverage limits, and the more monitoring the firm has, the higher the coverage limits.

Table 4 reports test results for accruals quality. Consistent with the literature and our prediction that a reduction in expected litigation risk via D&O insurance would lead to lower accruals quality, the coefficient on abnormal coverage limit (ABCOV) is significantly negative. Among control variables, firm size, cash flow volatility, and acquisition or divestures are significant determinants of accounting quality, consistent with existing evidence.

Table 5 presents the results of regression of investment cash flow sensitivity on accruals quality, abnormal coverage, the interaction of these two terms, and other control variables. The coefficient of accruals quality (AQ) is significantly negative, consistent with Biddle and Hilary (2006). When we use the median or the top 25% value of abnormal coverage to assign a value of one to ABCOVHIGH, the coefficient of ABCOVHIGH is significantly positive. The positive coefficient of ABCOVHIGH indicates that firms with very high coverage limits tend to rely more on internally generated cash flows, which is consistent with Lin et al. (2013) finding that firms with high D&O coverage limits are likely to face tighter financing constraints. Using the median value of abnormal coverage yields a statistically insignificant coefficient on the interaction term, AQ * ABCOVHIGH. However, when we use the top 25% value to highlight the firms with very high abnormal coverage, the interaction term AQ * ABCOVHIGH has a significantly positive coefficient at the 1% significance level. These results suggest that the role of accounting quality in improving investment efficiency is weaker for firms with high coverage limits. In other words, litigation risk plays a vital role for accounting quality in facilitating investment decisions.

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**Table 3**

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<th>Variables</th>
<th>Coefficient</th>
<th>z-stat</th>
<th>p-Value</th>
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<tr>
<td>INTERCEPT</td>
<td>-0.528</td>
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<td>SIZE</td>
<td>0.098</td>
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<td>CROSS</td>
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<td>MBRATIO</td>
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<td>DEBT</td>
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<td>OUTSIDE</td>
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<td>0.000</td>
<td>0.997</td>
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<td>OUTBLOCK</td>
<td>1.214</td>
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**Table 4**

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<td>0.279</td>
</tr>
<tr>
<td>ASGROWTH</td>
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<td>0.278</td>
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<tr>
<td>ACQDIVESTOR</td>
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<td>-2.270</td>
<td>0.012</td>
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<tr>
<td>OUTSIDE</td>
<td>0.013</td>
<td>1.080</td>
<td>0.140</td>
</tr>
<tr>
<td>OUTBLOCK</td>
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<td>0.389</td>
</tr>
<tr>
<td>MILLS</td>
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<td>-1.160</td>
<td>0.123</td>
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**Table 5**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Coefficient</th>
<th>t-stat</th>
<th>p-Value</th>
</tr>
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<td>SIGMACFO</td>
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<td>SIGMACSALES</td>
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<td>1.090</td>
<td>0.277</td>
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<tr>
<td>OPCODE</td>
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<tr>
<td>OUTBLOCK</td>
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<td>0.200</td>
<td>0.140</td>
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</table>

This table presents the regression results to estimate abnormal coverage limits. Standard errors are adjusted for both firm and year, following Petersen (2009). The variable definitions are as follows. P(Purchase = 1) = 1 if a firm carries D&O insurance coverage limits, and 0 otherwise; LNCOV = the natural log of D&O coverage limits; SIZE = the natural log of lagged total assets; CROSS = 1 if a firm is cross-listed in the US, and 0 otherwise; MBRATIO = the ratio of market-to-book value; DEBT = the ratio of debt-to-assets; RISK = the standard deviation of lagged returns on assets over the past five years; ROA = return on assets; ACQDIVESTOR = 1 if book value of total assets at the end of the fiscal year increased or decreased by more than 25% from the beginning of the fiscal year, and 0 otherwise; HIGHTECH = 1 if a firm is a member of Pharmaceuti- cals (3E codes 2833–2836), R&D Services (8731–8734), Programming (7371–7379), Computers (3570–3577), or Electronics (3600–3674) industries, and 0 otherwise; REGULATE = 1 if a firm is a member of a telephone (3C codes 4812–4813), TV (4833), Cable (4841), Communications (4811–4899), Gas (4922–4924), Electricity (4931), Water (4941), or Financial (6021–6023, 6035–6036, 6114, 6131, 6321, 6331) industries, and 0 otherwise; OUTSIDE = the percentage of outside directors on the board of directors; and OUTBLOCK = the percentage of shares held by outside shareholders who own over 10% of the firm’s stock.

This table presents the results of OLS regression of accruals quality on abnormal D&O coverage limits and other control variables. Standard errors are adjusted for both firm and year, following Petersen (2009). The variable definitions are as follows: AQ = accruals quality measure, calculated as negative one times the standard deviation of the past four years’ residuals from the following model. ΔCFO = γ0 + γ1CFOt−1 + γ2CFOt + γ3CFOt+1 + γ4ΔREVt + γ5ΔPPEt + εt, where ΔCFO = total accruals, cash flows, which is consistent with existing evidence. These results suggest that the role of accounting quality in improving investment efficiency is weaker for firms with high coverage limits. In other words, litigation risk plays a vital role for accounting quality in facilitating investment decisions.
This table presents the results of OLS regression of investment cash flow sensitivity on abnormal D&O coverage limits, accruals quality, and other control variables. Standard errors are adjusted for both firm and year, following Petersen (2009). The variable definitions are as follows. CFSI = cash flow sensitivity of investment based on Hovakimian and Hovakimian (2009) and Biddle and Hilary (2006), and computed using the following equation: \[ CFSI = \frac{\sum_{i=1}^{n} INV_{it}}{\sum_{i=1}^{n} CF_{it}} \times 1 - \frac{n_{t}}{n_{t} - 1} \sum_{i=1}^{n} INV_{it}, \] where \( i \) and \( t \) are firm and year, \( n \) is the number of annual observations, INV is investment, and CF is cash flow; AQ = accruals quality defined as negative one times the standard deviation of the past four years’ residuals from estimation of the model (2); ABCOVHIGH = 1 for a firm’s abnormal coverage limit is higher than median or top 25% value of abnormal coverage, and 0 otherwise; SIGMASALES = the standard deviation of sales divided by total assets over the past four years; SIGMOSIZE = the bankruptcy prediction score based on Altman (1968); TANGIBILITY = the ratio of market-to-book value; ROA = returns on assets, adjusted by industry and year; SIGNMAQS = the ratio of net PPE-to-total assets; DIVIDEND = 1 if a firm pays dividends in the current period, and 0 otherwise; OUTSIDE = the percentage of outside directors on the board of directors; OUTBLOCK = the percentage of shares held by outside shareholders who own over 10% of the firm’s stock; and MILLS = the inverse Mills ratio obtained from estimation of the probit model (4).

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**References**