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The Effects of Securities Class Action Litigation on Corporate Liquidity and Investment Policy

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Abstract

The risk of securities class action litigation alters corporate savings and investment policy. Firms with greater exposure to securities litigation hold significantly more cash in anticipation of future settlements and other related costs. The result is due to firms accumulating cash in anticipation of lawsuits and not a consequence of plaintiffs targeting firms with high cash levels. The market value of cash is lower for firms exposed to litigation risk. Corporate investment decisions are also affected by litigation risk, as firms reduce capital expenditures in response. Our results are robust to endogeneity concerns and possible spurious temporal effects.

I. Introduction

The rights of shareholders, from the basic right to vote to replace directors to the right to sue for damages in a court of law, are widely recognized as being important for the efficient allocation of capital through an economy. However, the incentives created by granting strong legal rights to investors may change firm behavior in unintended ways. In this paper, we investigate how the securities litigation environment in the United States affects corporate liquidity policy and investment decisions. We find that firms significantly alter their cash holdings and investment policy to manage litigation risk.

Under the Securities Act of 1933 and the Securities Exchange Act of 1934, all publicly listed firms in the United States are exposed to the risk of security class action lawsuits. Despite the passing of the Private Securities Litigation Reform Act of 1995, which was intended to make it more difficult to initiate shareholder lawsuits by requiring plaintiffs to provide proof that executives intentionally defrauded investors, the incidence of securities lawsuit filings has increased (Choi, Nelson, and Pritchard (2009)) and corporate lawsuit costs have remained high

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(Karpoff, Lee, and Martin (2008)). As Zingales (2007) indicates, the total dollar value of lawsuit settlements totaled $9.7 billion in 2005. Given the potential size of lawsuit settlements, litigation risk has important implications for expected cash flows.

Exposure to securities litigation risk affects firms in various ways, both directly and indirectly. Firms at higher risk of litigation underprice their initial public offerings (IPOs) relatively more as a form of insurance (Lowry and Shu (2002)) and are more likely to undertake aggressive growth through acquisitions (Gormley and Matsa (2011)). Litigation risk affects firms' disclosure behavior (Skinner (1994)). Auditors shy away from corporate clients at risk of litigation and charge higher fees (Shu (2000)).

One corporate policy that may be particularly sensitive to litigation risk is the decision to accumulate cash flow in the form of liquid assets. Bolton, Chen, and Wang (2011) present a dynamic model of investment, financing, and risk management in which the firm uses both a state-noncontingent vehicle (cash) and state-contingent contracts to manage exposure to systematic and idiosyncratic risk. In their model, financial hedging and liquidity management are complementary tools in risk management. When dynamic hedging has high transaction costs, the firm relies more on increasing cash and scaling back investment for hedging risk. Similarly, Froot and Stein (1998) model a firm's risk management choices in a world in which some risks cannot be perfectly hedged in the capital market. In this framework, firms face a trade-off between managing risk by entering hedging transactions and managing risk through capital structure choices. If it is difficult or costly to hedge a particular type of risk, firms will instead adopt a more conservative capital structure by accumulating a cash buffer.

We hypothesize that litigation risk is an important determinant of a firm's decision to hold cash. Due to the costs associated with raising external financing and the possibility of future cash-flow shocks, firms have an incentive to save more cash to avoid raising external capital to finance new investments and other corporate activities (Lins, Servaes, and Tufano (2010)). Thus, we expect that, all else being equal, firms with higher exposure to litigation risk will hold more cash on their balance sheets in anticipation of future settlement costs and other indirect costs associated with litigation. We also examine whether the accumulation of cash due to litigation risk exposure has an impact on firms' real investment decisions.

Consistent with Bolton et al. (2011), in addition to accumulating cash, firms enter into state-contingent insurance contracts to protect themselves from the direct costs of litigation risk. Almost all public firms in the United States buy A-side or B-side insurance to indemnify officers or directors.[1] Many firms also buy optional entity securities coverage (C-side insurance). Such coverage provides protection for the corporation for its own liability. However, litigation insurance does not provide full coverage in many cases. According to the annual

[1] A-side coverage provides coverage directly to the directors and officers for loss resulting from claims made against them for their wrongful acts. A-side coverage applies in cases in which the corporation does not indemnify its directors and officers. B-side coverage reimburses a corporation for its loss if the firm indemnifies its directors and officers for claims against them.

Towers Perrin Directors and Officers Liability Surveys, public firms have an average litigation insurance limit of about $15 million over our sample period (1996–2006). The average settlement amount in our sample is more than 3 times larger ($56 million) than the average litigation insurance limit.[2] However, the distribution of settlement amounts is highly skewed due to several large payouts in our sample. The median settlement amount is $6.5 million. Even though according to Towers Perrin about 85% of public firms in the United States bought some C-side insurance in 2006, only about 50% of firms had C-side coverage at the beginning of our sample period. Additionally, insurance cannot offer protection from the indirect costs of litigation. Based on settlements costs, the percentage of U.S. firms buying C-side insurance, and the average annual litigation insurance limit, the aggregate net-of-insurance settlement cash outflows for U.S. publicly traded firms in our sample are approximately 2.2 billion dollars per year during our sample period. Based on annual insurance data in the Towers Perrin surveys and our firm-level settlement data, we estimate that 52% of the firms in our sample among those that agreed to settle had to pay some out-of-pocket settlement costs.

There are several empirical challenges associated with estimating a relation between litigation risk and corporate policy. The first is that of an omitted variable bias. It is possible that an unobservable factor may be causing both the initiation of a class action lawsuit and changes in firm financial policy. A second issue is that of a possible simultaneity bias or reverse causality. Firms may hold higher cash balances because of their exposure to litigation risk, but firms with higher cash balances may be more likely targets of litigation. As such, we investigate the impact of litigation risk on corporate cash holdings in both the cross section and over time using a variety of approaches. To address the potential for omitted variables bias, we assess the effect of changes in litigation risk on changes in cash holdings by analyzing the spillover effects of litigation on industry peer firms not involved in a litigation. This identification strategy is motivated by the findings of Gande and Lewis (2009) that firm share prices drop significantly when a peer firm is brought into a class action lawsuit. To deal with potential simultaneity bias, we employ a simultaneous equations framework, similar to the analysis of Lowry and Shu (2002) and Field, Lowry, and Shu (2005). Regardless of the approach we use to estimate litigation risk, our results consistently show a significant positive relation between litigation risk and cash holdings. After accounting for endogeneity, our results show that firms preemptively accumulate cash before possible lawsuits rather than plaintiffs targeting firms with high prelitigation levels of cash.

In addition to class action securities lawsuits, firms are exposed to other legal risks, such as copyright infringement, product liability, and antitrust lawsuits. As with other papers examining litigation risk, we choose to focus on securities class action lawsuits. This choice is motivated by several reasons. First, class action securities fraud litigations are brought under the Securities Act of 1933 and the Securities Exchange Act of 1934. As such, all publicly traded firms are susceptible to this particular type of lawsuit. Second, detailed information related to the class

[2]The actual total litigation cost for the average firm is larger when accounting for legal fees.

action lawsuits is publicly available for a longer period than that for other types of lawsuits and provides us with a large observable sample of litigation events. Finally, class action securities litigation is of interest, because the average settlement or penalty amounts tend to be quite large and therefore represent a significant source of loss from the firm's perspective. In our sample of lawsuits, the average settlement amount is $56.4 million, which corresponds to more than the level of cash holdings of the sued firms that settle. Moreover, the statistical distribution of settlement amounts is characterized by considerable positive skewness. A few settlements surpass the $1 billion mark, and the largest settlement in our sample amounts to $3.2 billion. In addition to the direct costs of litigation represented by settlement costs and attorneys fees, sued firms face several indirect costs (Engelmann and Cornell (1988)). Even though indirect costs are difficult to measure, they are significant in most cases. When a firm becomes a defendant in a lawsuit, the cost of implicit and explicit contracts rises. Major lawsuits can also damage the defendant's reputation and can negatively affect its relationship with suppliers and customers (Engelmann and Cornell (1988)). One potential concern with our sample of events is that securities litigation may be more sensitive to changes in firm performance compared to other types of litigation. While we do control for changes in performance in our analysis, we also investigate other litigations that are not related to securities law from the Audit Analytics litigation database. The results from the sample of nonsecurities litigation events are similar to our main results, suggesting that the effects of litigation risk are not limited to class action securities litigation.

We start our empirical investigation by examining whether changes in litigation risk lead to changes in cash holdings for firms directly involved in securities litigation. We do so by examining the impact of actual class action lawsuits filed on U.S. firms between 1996 and 2006. We find that, controlling for changing firm characteristics, cash holdings of these firms increase by an average of 15.5% relative to prelitigation levels. The results are robust to different specifications and the inclusion of firm- and year-fixed effects.

One important concern related to the link between cash holdings and litigation risk is the potential endogeneity between the choice of how much cash to hold and the decision of shareholders to file litigation. To identify the causal effects of litigation risk, we examine the spillover effects of class action litigation on peer firms. Gande and Lewis (2009) demonstrate that the share prices of firms that are not brought into a legal dispute adjust downward significantly on the announcement of a lawsuit filing of a firm in the same industry. They also show that litigation concentration in a particular industry is a strong predictor of actual litigation events. Thus, we treat litigation events on peer firms as an exogenous source of variation in litigation risk for firms in the same industry. We find that peer firms increase their cash holdings significantly when industry peers are involved in litigation. Specifically, the conditional mean cash-to-assets ratio for peer firms increases by 10.2% relative to prelitigation levels following a litigation event in their industry.

In addition to the spillover effects analysis, we also deal with the potential simultaneity problem by estimating a system of simultaneous equations that allows us to decompose the impact of litigation risk on cash holdings (the precautionary

savings motive) and the impact of cash holdings on litigation risk (the enticement effect). The approach we employ is similar to that adopted by Lowry and Shu (2002), who examine the impact of litigation risk on IPO underpricing. The results of this system of simultaneous equations dispel concerns of reverse causality. The evidence from the simultaneous equations suggests that firms accumulate cash in anticipation of a possible lawsuit. The estimates do not support the conjecture of firms with larger amounts of cash being more exposed to predatory class action lawsuits.

We then examine corporate investment policy around litigation events. We find a significant reduction in capital expenditures for firms involved in litigation, controlling for Tobin's Q and cash flow. We also find evidence of litigation spillover effects in corporate investment. Specifically, we find that firms reduce their capital expenditures when they see some of their competitors being sued. The spillover effect is economically and statistically significant, though smaller in magnitude compared to the firms that are directly involved in the lawsuit.

Having established that firms increase their cash holdings in the face of increased litigation risk, a natural question is whether this accumulation of cash has an impact on firm value. Given that a successful lawsuit from the plaintiff's perspective will lead to a net payout of cash to the litigation claimants that in many instances are not current shareholders of the firm, we expect that the value of the marginal accumulated dollar of cash will be lower for firms exposed to litigation risk. Using the methodology of Faulkender and Wang (2006), we find that the risk of litigation decreases a firm's marginal value of cash. Our finding that the value of an additional dollar of cash is significantly lower for firms exposed to litigation risk is also consistent with that of Gormley and Matsa (2011), who argue that shareholders of firms exposed to litigation risk would prefer to receive higher payouts because excess cash might potentially increase damage awards.

Overall, our results on the relation between litigation risk and cash holdings are robust to different proxies of litigation risk, endogeneity concerns, an extensive set of firm characteristics that previous studies have shown to be related to cash holdings levels (e.g., Kim, Mauer, and Sherman (1998), Opler, Pinkowitz, Stulz, and Williamson (1999), and Mikkelson and Partch (2003)), corporate governance characteristics (Harford, Mansi, and Maxwell (2008), Dittmar and Mahrt-Smith (2007)), unionization rates (Klasa, Maxwell, and Ortiz-Molina (2009)), the inclusion of other risk proxies, different empirical specifications, different measures of cash holdings, and concerns about possible spurious effects due to temporal trends. Our results also hold when we include other types of corporate lawsuits in our analysis.

Our paper makes two primary contributions. First, we contribute to the literature on the effects of securities litigation risk on firm behavior and corporate disclosure and financial decisions. Litigation risk of various types is related to IPO underpricing (Lowry and Shu (2002)), financial reporting and accounting disclosure (Skinner (1994), (1997), Field et al. (2005)), leverage (Crane (2011)), institutional monitoring (Cheng, Huang, Li, and Lobo (2010)), Management Discussion and Analysis (MD&A) disclosures (Brown and Tucker (2011)), audit fees (Seetharaman, Gul, and Lynn (2002)), and executive pay (Peng and Roell (2008)). Gormley and Matsa (2011) investigate firm responses to liability risk arising from

firms' workers' exposure to newly identified carcinogens, finding that firms respond to that type of litigation risk by engaging in diversifying acquisitions. We extend this stream of research by investigating the link between securities litigation risk, cash holdings, and corporate investment policy, providing another avenue whereby legal institutions affect corporate behavior. Second, we identify a new determinant of cash holdings and provide evidence that litigation risk has a significant effect on corporate liquidity and investment policy, supporting the view that the precautionary savings motive is particularly important. This paper identifies a clear channel whereby precautionary savings operate and contribute to cash holdings and depressed investments. Our results also offer an insight into how firms manage risk in an integrated framework by both entering into insurance contracts and adjusting the firm's financial structure to hedge litigation risk.

II. Data

A. Sample

Our initial sample consists of the entire population of Compustat firms from 1996 to 2006 with no missing data for the main variables used in the analysis. We then match our sample with the Center for Research in Security Prices (CRSP) database and exclude firms that the CRSP does not cover. After this match, our sample contains 84,078 firm-year observations. We then match this sample with ExecuComp and First Call to obtain variables required by some of our multivariate tests. After this match, our sample consists of 13,589 observations. We then identify a sample of firms subject to class action lawsuits by collecting litigation data from the Securities Class Action Clearinghouse (SCAC) Web site (http://securities.stanford.edu/) from 1996 to 2006. We collect information about lawsuit filing dates, beginning and ending of each class period, type of resolution, and settlement amounts when available. We identify 1,397 sample firms as being involved in security class action lawsuits during our sample period. Definitions for the variables used in this study are included in the Appendix.

We also collect information about corporate litigations other than security class action lawsuits from the Audit Analytics Litigation database. The data coverage begins in 2000 and reports information on lawsuits for U.S. publicly traded firms. Audit Analytics collects information from corporate disclosures; from corporate newswires; and from legal disclosures, registrations, and legal opinions filed with the U.S. Securities and Exchange Commission (SEC). Audit Analytics reports details related to the specific litigation, including the type of lawsuits, the original date of filing, and, if available, the settlement amount. Our sample of nonsecurity lawsuits obtained from Audit Analytics spans from 2000 to 2006 and consists of 4,396 firm-year observations (firms that were sued at least once in a given fiscal year). The most common types of corporate lawsuits are product liability, copyright, patent, antitrust, and trade regulation.

B. Matching Procedure

The simultaneous equation analysis we discuss in Section III is confined to the analysis of those firms that are directly involved in class action lawsuits during

the sample period along with a matching sample of nonlitigation firms matched on past profitability, market-to-book, and industry. The matching sample consists of 1,397 litigation firms and 1,397 control firms for a total of 2,794 firm observations. To match our sample of firms involved in a class action lawsuit with comparable firms not involved in a litigation, we use the Lie (2001) modification of the Barber and Lyon (1996) method in which companies are matched by industry affiliation, profitability, change in profitability, and market-to-book ratio.[3] We select matching firms that have the same industry classification as the sample firms and are similar in level of operating performance in the year preceding the start of the lawsuit (year −1), change in performance from year −2 to year −1, and market-to-book ratio in year −1. In the first step of our matching procedure, we identify firms (a) with the same 2-digit Standard Industrial Classification (SIC) code as the sample firms, (b) with a level of operating performance between 80% and 120% of the sample firm's level in year −1, (c) with a change in operating performance between 80% and 120% of the sample firm's change between year −2 and year −1, and (d) with a market-to-book ratio between 80% and 120% of the sample firm's ratio in year −1.

If more than one firm meets the matching criteria for a single sample firm, we choose the one that minimizes the following metric:

$$(1) \qquad |\mathrm{OP}_S - \mathrm{OP}_M| + |\Delta\mathrm{OP}_S - \Delta\mathrm{OP}_M| + |\mathrm{MB}_S - \mathrm{MB}_M|,$$

where OP_S and OP_M are the level operating performance in year −1 for the sample and matching firm, $\Delta\mathrm{OP}_S$ and $\Delta\mathrm{OP}_M$ are the changes in operating performance between year −2 and year −1, and MB_S and MB_M are the market-to-book ratios in year −1. If we cannot find any firm satisfying condition (b), we look for firms with a level of operating performance within ±0.01 of the level of the sample firm. We apply the same strategy for the change in operating performance or the market-to-book ratio if we do not find any firm satisfying condition (c) or condition (d).[4] If we do not find any firm that meets these criteria, we repeat the process looking at firms with the same 1-digit SIC code. If this search is unsuccessful, we match the firm independently from the SIC code. If we still do not find a valid match, we select the firm that minimizes formula (1) independently from our filters.

C. Descriptive Statistics

Table 1 presents the distribution of litigation firms by year and industry. The year with the largest number of lawsuit filings in our sample is 2001. Out of the 319 lawsuits initiated that year, 199 (68.8%) involve firms in the communications, computers, and electronics industry (SIC codes = 3570–3579, 3600–3699, 4800–4899, and 7370–7379). The large number of lawsuits for this industry in 2001 is likely due to the burst of the Internet bubble that characterized the U.S. stock market during that period.

[3] An alternative match by industry, market-to-book ratio, and size instead of profitability generates a sample that produces comparable regression results to the ones presented in this paper.

[4] For market-to-book ratio, we look for firms with a level of MB within ±0.1 of the level of the sample firm.

TABLE 1

Distribution Litigation Events across Years and Industries

The litigation sample consists of security class action lawsuits filed between 1996 and 2006 in which the defendant is a U.S. corporation with data available on Compustat. Panel A reports the distribution of the sample lawsuits across years. Panel B reports the distribution of sued firms by various industries. Securities litigation data are from the Securities Class Action Clearinghouse Web site (http://securities.stanford.edu/) from 1996 to 2006.

Panel A. Distribution of Lawsuits over Time

Year	Number of Lawsuits
1996	50
1997	81
1998	123
1999	120
2000	110
2001	319
2002	141
2003	124
2004	143
2005	116
2006	70
Total	1,397

Panel B. Distribution of Lawsuits across Industries

Industry	Number of Lawsuits
Agriculture and mining	4
Apparel	24
Communications, computers, and electronics	555
Construction	9
Finance	169
Food	15
Health	37
Manufacturing	175
Oil and gas	18
Printing and publishing	9
Recreation	15
Science	83
Services	78
Trade	121
Transportation	31
Utilities	33
Other	21
Total	1,397

Table 2 presents descriptive statistics on the resolution of the lawsuits involving our sample firms. Of the 1,128 (81%) cases that reached a resolution by the end of 2009, the majority (613) settled. Panel A of Table 2 shows that when the plaintiffs receive compensation, it is always through settlement. The descriptive statistics of settlement amounts presented in Panel B of Table 2 show that in many circumstances, the monetary awards negotiated through settlements are substantial. The mean settlement award in our sample is $56.4 million, an amount

TABLE 2

Lawsuit Resolution Statistics

Panel A of Table 2 presents the outcomes of the lawsuits contained in our security class action litigation sample as of Dec. 31, 2009. Panel B presents summary statistics related to the settlement amounts for the closed cases. For the statistics of "all nonpending cases" we assign a settlement amount equal to 0 to dismissed and withdrawn cases. Securities litigation data are from the Securities Class Action Clearinghouse Web site (http://securities.stanford.edu/) from 1996 to 2006.
[a]In all nonpending cases, we assign 0 to the settlement amount for dismissed and withdrawn cases.

Panel A. Litigation Outcome

Outcome	Number of Cases	Percent of Total
Settled	613	43.9%
Dismissed or withdrawn	515	36.9%
Still pending	269	19.3%
Total	1,397	

Panel B. Settlement Amount

			Percentile		
Settlement	Mean	Median	25th	75th	Maximum
Excluding Dismissed and Withdrawn Cases					
Settlement ($millions)	56.4	6.5	3.0	19.3	3,200.0
Settlement/Cash Holdings	114.9%	15.8%	4.1%	54.7%	11,526.5%
All Nonpending Cases[a]					
Settlement ($millions)	29.2	2.3	0.0	7.0	3,200.0
Settlement/Cash Holdings	59.6%	4.3%	0.0%	27.8%	11,526.5%

larger than the average level of cash held by the sued firm at the year of filing. Even when we include dismissed and withdrawn cases in the computation of the settlement statistics by assigning to those cases an award of $0, the mean settlement award to cash holdings is 59.6%. The largest settlement award amounts to $3.2 billion. These summary statistics demonstrate that these settlement amounts are by no means trivial. In addition to explicit settlement costs, firms face other direct costs (e.g., attorneys' fees) and several indirect costs, as described earlier. Effectively, the total amount of litigation costs is higher than the settlement costs presented in Table 2.

III. Empirical Results

A. Litigation Risk and Cash Holdings

We first examine the impact of litigation events on cash holdings in a univariate setting. We then explore the relationship between litigation and cash holdings by employing various multivariate analyses. We begin by analyzing the effect of litigation events on firms that are directly involved in securities litigation. While these results are suggestive of an effect, they are subject to possible omitted variables and simultaneity bias. To better assess the causal link between changes in litigation risk and cash holdings, we examine the effect of a litigation event for a particular firm on the cash holdings of peer firms that are not involved in litigation themselves. Since higher cash holdings may increase the probability of a litigation event in the first place, we then jointly estimate the probability of a firm being brought into litigation and the effect of litigation on the firm's cash holdings. We also investigate the value implications of increased cash holdings brought on by changes in litigation risk. We then analyze the effect of litigation risk on corporate investments.

B. Univariate Analysis

Table 3 reports summary statistics for the cash holdings of U.S. firms involved in litigations over the period 1996–2006. We report summary statistics in event time, where year 0 represents the year of the litigation filing. We calculate means and quartiles of the cash distribution for the 2 years prior and the 2 years following the litigation event. The mean cash-to-total assets ratio in the year prior to the litigation filing is 0.223. Cash holdings jump significantly in the year of the litigation, rising 17.5% relative to the prelitigation level of 0.268. The increase in cash holdings appears to be persistent, remaining higher at nearly 25% of total assets 2 years after the filing. Panel B confirms that this increase is statistically significant for both the year of the litigation and the 2-year period immediately following the lawsuit. The mean difference between the litigation year and the 2 prior years is 0.039 with a t-statistic of 3.545. The mean difference between the postlitigation period (years 1 and 2) and the prelitigation period (years -2 and -1) is also statistically significant, with postlitigation holdings averaging 0.025 higher than in prelitigation years.

To check that the mean increase is not driven by a few outliers, we also summarize changes in the distribution of cash holdings in event time. Panel A reports

TABLE 3

Univariate Statistics: Cash Holdings in Event Time

Table 3 reports the distribution of cash holdings in event time for firms involved in securities litigation. Year 0 is set as the year of the lawsuit initiation. Cash holdings are measured as the ratio of cash and short-term investments to net-of-cash total assets. The sample period is 1996 to 2006.

Panel A. Cash Holdings in Event Time

Event Year	Mean	Q1	Median	Q3	Std. Dev.
−2	0.224	0.029	0.120	0.364	0.241
−1	0.223	0.029	0.130	0.369	0.241
0	0.262	0.046	0.185	0.490	0.277
1	0.249	0.044	0.157	0.408	0.245
2	0.248	0.045	0.159	0.401	0.244

Panel B. Univariate Tests

Period	Mean Difference	Standard Error	*t*-Statistic
(0) versus (−2, −1)	0.039	0.011	3.545
(1, 2) versus (−2, −1)	0.025	0.009	2.778

the first quartile, median, and third quartile of the cash holdings distribution for firms involved in litigation. The entire distribution of cash holdings for the sample firms shifts upward. The first quartile increases from 0.029 to 0.046 in the litigation year, while the median and third quartile increase from 0.130 to 0.185 and 0.369 to 0.490, respectively.

The firms involved in litigation in our sample have slightly higher cash holdings even before the litigation event. Two years before litigation, firms in the sample have a mean cash-to-assets ratio of 0.224, compared with 0.191 for the overall Compustat sample. Firms are possibly anticipating the incidence of a lawsuit and begin accumulating additional cash. Alternatively, firms with higher cash holdings might be more likely to be targeted for litigation in the first place. In our multivariate analysis, we revisit this possibility by investigating this possible reverse causality between cash holdings and litigation risk.

C. Effects of Litigation on the Cash Holdings of Sued Firms

The univariate results suggest that firms involved in litigation increase their cash holdings. We now turn to a multivariate approach to control for changing firm characteristics and time trends that may also affect changes in cash holdings. We estimate several specifications of cash regressions in which we include a series of event dummy variables to capture the changes in cash holdings following a litigation event. The specification of the cash holdings regression is similar to that of Opler et al. (1999) and Bates, Kahle, and Stulz (2009), who identify potential determinants of cash holdings, both in the cross section and over time. The dependent variable in the regressions is defined as cash and short-term investments scaled by net-of-cash total assets. As control variables, we include firm size, leverage, cash flow, net working capital, dividend paying status, market-to-book ratio, capital expenditures, acquisition expenditures, research and development (R&D) to sales ratio, net debt and equity issuance, and cash-flow volatility. The specific definitions of these variables are included in the Appendix. We include four litigation event dummy variables, L_k, for $k = 0, 1, 2$, or 3, where year 0 is the litigation initiation year. The timing of the dummy variables is set to capture

the duration of actual litigation events. Klausner and Hegland (2010) find that the average time from class action filing to settlement is close to 2 years. We also include firm-, industry-, and year-fixed effects in various specifications.

Table 4 reports the estimates from the cash holdings regressions. Standard errors are clustered at the firm level in all specifications. Specification 1 is estimated via ordinary least squares (OLS) without industry and time effects. Specification 2 adds time effects in the form of calendar year dummies. Specifications 3 and 4 include industry-fixed effects, with specification 4 including both industry and year dummies. The magnitude and signs of the coefficients of the control variables are consistent with previous research. The coefficients on the litigation event dummies are positive and statistically significant across all specifications,

TABLE 4

Class Action Litigation Events and Cash Holdings

This dependent variable in all regressions is the ratio of cash and short-term investments to net-of-cash total assets. The firm characteristics, described in detail in the Appendix, are also scaled by net-of-cash total assets. The litigation event time dummies, L_0, L_1, L_2, and L_3, are set equal to 1 in the year relative to the litigation event, with year 0 being the year the litigation was initiated. The dummy variables for the placebo regression in specification 6 are defined in a similar manner as the litigation event dummies, but the event year is generated by a simple random sample with replacement among the overall Compustat sample such that the relative frequency of random events matches the relative frequency of actual litigation initiations each year in the full sample. The *t*-statistics are calculated based on robust standard errors clustered at the firm level. The sample period is 1996–2006. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Explanatory Variables	1	2	3	4	5	6
L_0	0.060	0.063	0.046	0.045	0.039	−0.004
	(3.96)***	(3.94)***	(2.82)***	(2.83)***	(3.29)***	(0.57)
L_1	0.068	0.070	0.054	0.055	0.035	−0.008
	(4.38)***	(4.22)***	(3.15)***	(3.05)***	(2.42)**	(1.19)
L_2	0.052	0.053	0.040	0.041	0.030	0.000
	(3.39)***	(3.45)***	(2.61)**	(2.67)***	(1.98)**	(0.01)
L_3	0.030	0.031	0.021	0.022	0.012	−0.011
	(1.94)*	(2.01)**	(1.37)	(1.43)	(0.78)	(1.47)
ln(TOTAL_ASSETS)	−0.006	−0.006	−0.005	−0.005	−0.018	−0.005
	(3.10)***	(3.02)***	(2.37)**	(2.56)**	(6.07)***	(2.56)**
LEVERAGE	−0.272	−0.269	−0.234	−0.232	−0.134	−0.232
	(15.58)***	(15.58)***	(15.89)***	(15.73)***	(14.35)***	(15.95)***
CASH_FLOW	0.067	0.066	0.059	0.059	0.037	0.058
	(8.97)***	(8.39)***	(8.99)***	(8.74)***	(8.66)***	(8.60)***
NET_WORKING_CAPITAL	−0.099	−0.097	−0.083	−0.080	−0.048	−0.081
	(7.91)***	(7.93)***	(7.10)***	(6.98)***	(7.33)***	(6.90)***
DIVIDEND_PAYER	−0.049	−0.049	−0.023	−0.024	0.007	−0.025
	(4.27)***	(4.25)***	(3.13)***	(3.13)***	(2.42)**	(3.15)***
MARKET-TO-BOOK	0.008	0.008	0.007	0.007	0.004	0.006
	(8.57)***	(8.22)***	(7.65)***	(7.48)***	(6.25)***	(7.68)***
CAPITAL_EXPENDITURES	−0.480	−0.480	−0.428	−0.418	−0.319	−0.418
	(8.12)***	(8.25)***	(11.64)***	(11.56)***	(15.71)***	(11.44)***
ACQUISITIONS	−0.425	−0.432	−0.415	−0.415	−0.280	−0.419
	(10.92)***	(10.28)***	(11.10)***	(10.65)***	(19.28)***	(10.46)***
R&D_TO_SALES	0.075	0.075	0.059	0.059	0.018	0.059
	(8.85)***	(8.17)***	(10.16)***	(10.46)***	(5.93)***	(10.85)***
NET_EQUITY_ISSUANCE	0.164	0.164	0.156	0.157	0.158	0.155
	(16.94)***	(16.31)***	(15.99)***	(16.03)***	(17.36)***	(15.53)***
NET_DEBT_ISSUANCE	0.193	0.189	0.162	0.160	0.127	0.159
	(11.41)***	(10.96)***	(11.91)***	(11.87)***	(12.53)***	(11.63)***
INDUSTRY_CF_VOLATILITY	0.521	0.579	0.082	0.040	−0.025	0.049
	(4.08)***	(3.75)***	(1.05)	(0.42)	(0.58)	(0.52)
Fixed Effects		Year	Industry	Industry, Year	Firm, Year	Industry, Year
No. of obs.	50,887	50,887	50,887	50,887	50,887	50,887
R^2	0.38	0.38	0.43	0.44	0.48	0.43

suggesting that firms increase their cash holdings significantly following a litigation event. Cash holdings increase following the litigation and stay high for the 2 years following the litigation and then start to drop in the third year, consistent with the average duration of litigation events reported by Klausner and Hegland (2010). The fixed-effects estimates suggest that firms increase their cash holdings above their prelitigation levels by almost 4.5% of total assets. In economic terms, this translates into a relative increase of about 15.3% relative to prelitigation levels. To control for time-variant unobservable variation, specification 5 includes both firm- and year-fixed effects. This specification captures the within-firm variation in cash holdings around a litigation event. The coefficient of the litigation dummy is positive and statistically significant, suggesting that firms change their cash holdings in response to litigation.

Bates et al. (2009) indicate that cash holdings in the United States have a significant temporal trend. They find, in their sample, that average cash holdings increase by 129% between 1980 and 2004. While we control for various measures of time-varying firm risk and calendar year dummies, there is still some concern that our results might be coming from nonlinear temporal trends in the data. To address this concern, we reestimate the cash holdings regressions over the sample period using random "placebo" dummy variables. To do this, we randomly select firm-year observations each year to serve as a random event. We sample with replacement from the overall Compustat sample each year. The sample size is selected such that the relative frequency of random events each year matches the relative frequency of actual litigation events, as reported in Table 1. For each firm-year randomly selected, we create the set of dummy variables described above where year 0 is the year of selection. After the random selection, we end up with a series of dummy variables that looks like the litigation event variables in the previous regressions, except that the timing is randomly allocated across the panel. Thus, if a temporal trend were driving the results in the earlier specifications, we would expect a significantly positive coefficient on the random placebo variable. Specification 6 of Table 4 reports the estimates of this random placebo test. All of the estimates on the control variables are similar to those in the other specifications. The coefficients on the placebo dummy variables are insignificant, suggesting that the effects in the other regressions are systematically related to litigation events and not to temporal trends in the sample.

While consistent with the hypothesis that the risk of securities litigation leads firms to hold more cash, the results in Table 4 may be driven by an omitted variable that drives both changes in cash and a litigation event. In the next section, we address this concern by employing industry spillover effects to identify a cleaner link between litigation risk and changes in cash holdings.

D. Spillover Effects

The fundamental question we address in this paper is whether litigation risk leads firms to hold more cash. While we have demonstrated robust evidence consistent with this hypothesis, establishing a causal link is challenging. Litigation risk is inherently unobservable and difficult to measure. In order to assess the causal link between litigation risk and cash holdings, we examine the spillover

effects on other firms that are not actually involved in litigation. The existence of spillover effects around litigation events suggests that firms update their subjective probability of being brought into litigation when a peer firm has a case filed against it. Gande and Lewis (2009) find strong evidence of spillover effects in litigation. They find that lawsuits in a given industry signal an increased possibility that other firms in the same industry may be sued as well. In particular, they find that peer firms have negative stock price reactions to the announcement of litigation events for firms. In addition, Kim and Skinner (2012) find that industry membership is not a particularly good predictor of firm-level litigation events unless the specification used to predict events also contains firm-specific variables. It is reasonable then to assume that an actual lawsuit against a firm within an industry is a good proxy for changes in litigation risk for other firms in the same industry. Employing the spillover proxy addresses the concerns about potential endogeneity, as it is unlikely that the characteristics of a firm not involved in litigation are driving the lawsuits of other firms.

We first estimate spillover effects in the panel of firms in our sample. We set the industry litigation dummy variable to 1 for a given firm-year if another firm in the same 4-digit SIC industry has had a class action lawsuit filed against it in the same year. Firms that are actually involved in litigation events are dropped from the sample.[5] We then estimate the cash holdings regression including firm- and year-fixed effects. The results are reported in the first column of Table 5. The coefficient on the industry litigation dummy variable is positive and statistically significant, suggesting that exogenous changes in litigation risk exposure lead to higher cash holdings.

We also estimate the time-series effect of litigation on peer firms by constructing industry-level observations based on firms that have not yet been involved in a litigation event. For every 4-digit SIC industry each year, we include all firms that have not had any lawsuits filed against them prior to that year. If at any time a firm in an industry becomes involved in litigation, that firm is removed from the sample and we set an event dummy variable equal to 1 for that industry. We use this dummy variable to measure the impact of the litigation on the other, nonsued firms in the industry. The industry characteristics (cash holdings, leverage, etc.) are measured in two ways. In the first approach, we equal-weight each firm in the industry, so that a particular characteristic is the average of the firm characteristics of all firms in that particular industry in a given year. In the second approach, we value-weight the observations by summing the numerators of the firm ratios and dividing them by the sum of the denominators. For example, the industry cash holdings variable for industry k in year t would be

$$\text{CASH}_{kt} = \frac{\sum_{i=1}^{N_k} \text{CASH}_{it}}{\sum_{i=1}^{N_k} \text{ASSETS}_{it}},$$

[5]We have repeated the analysis with the sued firms included in the regression and the results are similar. The results are available from the authors.

where N_k is the number of firms in industry k. We also control for industry performance measured by industry-level stock returns, cash flow, and cash-flow volatility to address the possibility that poor industry performance is driving both the litigation events and the observed spillover effects.

TABLE 5

The Effects of Litigation on Peer Firms

Table 5 reports regression estimates from industry cash holdings regressions. Industry membership is based on 4-digit SIC codes. The firm characteristics, including cash holdings (which we describe in the Appendix), are aggregated at the industry level on both an EW and VW basis each year. Firms that are involved in actual litigation events are not included in the sample. The litigation dummy is set equal to 1 in years when a firm within the same 4-digit SIC industry has a lawsuit initiated against it in that calendar year. The last column reports the results using the VW industry panel with firms from the technology, media, and telecommunications (TMT) industries (SIC codes = 3570–3579, 3600–3699, 4800–4899, and 7370–7379) omitted from the sample. The sample period is 1996–2006. The reported *t*-statistics are based on robust standard errors, clustered at the firm level in the firm-level panel and at the 4-digit SIC industry level for the aggregated industry panels. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Explanatory Variables	Firm-Level Panel	EW Industry Panel	VW Industry Panel	TMT Firms Omitted
INDUSTRY_LITIGATION_EVENT	0.018	0.014	0.016	0.021
	(2.61)**	(3.72)***	(3.86)***	(4.17)***
ln(TOTAL_ASSETS)	−0.005	−0.005	−0.005	−0.004
	(4.19)***	(1.33)	(1.39)	(1.82)*
LEVERAGE	−0.288	−0.388	−0.381	−0.150
	(14.92)***	(9.99)***	(9.68)***	(4.84)***
CASH_FLOW	0.0770	0.135	0.147	0.204
	(8.99)***	(3.70)***	(3.63)***	(3.99)***
NET_WORKING_CAPITAL	−0.118	−0.080	−0.080	−0.110
	(6.51)***	(3.15)***	(3.18)***	(2.95)***
DIVIDEND_PAYER	−0.050	−0.071	−0.071	−0.021
	(4.78)***	(4.07)***	(4.05)***	(0.24)
MARKET-TO-BOOK	0.008	0.033	0.034	0.020
	(6.45)***	(5.86)***	(5.91)***	(5.09)***
CAPITAL_EXPENDITURES	−0.481	0.517	0.515	−0.398
	(8.48)***	(4.03)***	(4.00)***	(5.12)***
ACQUISITIONS	−0.436	−0.363	−0.382	−0.221
	(10.57)***	(2.67)***	(2.78)***	(4.05)***
R&D_TO_SALES	0.075	0.1121	0.1126	0.5353
	(8.46)***	(6.22)***	(6.27)***	(5.69)***
NET_DEBT_ISSUANCE	0.218	0.398	0.406	0.108
	(10.97)***	(3.58)***	(3.65)***	(1.69)*
NET_EQUITY_ISSUANCE	0.187	0.896	0.906	0.200
	(12.96)***	(8.07)***	(7.80)***	(3.22)***
INDUSTRY_CF_VOLATILITY	0.535	0.334	0.343	0.329
	(3.57)***	(3.44)***	(3.49)***	(3.74)***
INDUSTRY_STOCK_RETURN	0.100	0.067	0.071	0.041
	(6.15)***	(0.81)	(0.82)	(1.37)
No. of obs.	49,527	4,739	4,739	3,688
R^2	0.40	0.67	0.60	0.62

Table 5 reports the results of the industry cash regressions. Column 2 reports the results from the equal-weighted (EW) industry observations, while column 3 reports the results for the value-weighted (VW) observations. The unconditional mean cash-to-assets ratio for the industry portfolios is 0.130 for the EW observations and 0.100 for the VW observations. Table 5 demonstrates that litigation has an effect on the cash holdings of peer firms in the same industry. Across all specifications, the coefficient on the industry litigation dummy is positive and statistically significant. The results are also economically significant. The estimates imply that industry cash holdings for the firms that are not involved in the litigation increase by 10.2% relative to the unconditional average in the EW case and

15% in the VW case, suggesting that an exogenous change in the probability of a future lawsuit leads firms to increase their cash holdings.

One potential concern with the industry-level regressions is that a large proportion of litigations in our sample were against technology firms just following the crash of the Internet/technology bubble in 2001. It is possible that the technology firms that survived the crash increased their cash holdings as a consequence of bad performance and at the same time were brought into litigation. To address this concern, we estimate the industry-level regressions with the firms in the communications, computers, and electronics industries (SIC codes = 3570–3579, 3600–3699, 4800–4899, and 7370–7379) omitted from the sample. The results are reported in the last column of Table 5. The magnitude and size of the coefficient on the industry litigation event dummy are similar to those of the full sample, suggesting that the results are not driven by the dynamics of tech firms around the crash of the Internet bubble.

E. Joint Estimation of Cash Holdings and Litigation Risk

The results to this point suggest that firms tend to accumulate excess cash as a form of insurance against future possible litigations. However, as mentioned earlier, higher levels of cash holdings might also increase the probability of class action lawsuits. We capture the interaction between these two effects and control for the possible endogenous relation between litigation risk and cash holdings by adopting the approach used by Lowry and Shu (2002) and Field et al. (2005). For this analysis, we use Lowry and Shu's ex ante proxy for litigation risk by assigning the value of 1 to a litigation risk dummy for the firms that are involved in a litigation in the following year, and 0 otherwise.

We use the following system of equations:

$$\text{INSURANCE\_EFFECT}: \text{CASH\_RATIO} = \gamma_1 \text{LITIGATION} + \theta_1 X + \beta_1 X_1 + \epsilon_1, \tag{2}$$

$$\text{ENTICEMENT\_EFFECT}: \text{LITIGATION} = \gamma_2 \text{CASH\_RATIO} + \theta_2 X + \beta_2 X_2 + \epsilon_2, \tag{3}$$

where CASH_RATIO is the ratio of cash and marketable securities to the book value of total assets for firm i; LITIGATION is the litigation risk for firm i, as described above; X is a vector of control variables, exogenous firm characteristics that are common to both equations because they are potentially related both to the cash ratio and to litigation risk; X_1 is the identifying variable of the first equation, an exogenous firm characteristic that is uniquely related to the cash ratio but not to litigation risk; and X_2 is the identifying variable of the second equation, an exogenous variable that is directly related to the probability of a lawsuit but not to the cash ratio.

When identifying variable X_1, we use firm leverage. The negative significant relation between leverage and the cash ratio is well established in the finance literature (e.g., Opler et al. (1999), Bates et al. (2009)). However, studies of litigation risk determinants do not find a significant relation between leverage and litigation risk (e.g., Cao and Narayanamoorthy (2014)). When identifying variable X_2, we

use stock turnover. Stock turnover is related to plaintiffs' incentives to initiate lawsuits because settlement amounts are generally increasing in the number of shares traded at the allegedly misleading prices (Lowry and Shu (2002)). However, stock turnover is not related to the cash ratio.

Our simultaneous equation analysis uses an indicator variable equal to 1 when a firm is actually involved in a lawsuit in the following year. The litigation firms are matched with control firms using the matching procedure described in Section II. The simultaneous equation model has both a continuous and a dichotomous dependent variable. In order to estimate the model and correctly determine the standard errors, we apply the 2-stage Maddala (1983) method, as in Lowry and Shu (2002). In the first stage, we fit the two models with OLS and probit regressions, respectively, using all the exogenous variables. In the second stage, we replace the original endogenous variables (cash ratio and litigation) with their respective fitted values. In this system of equations the exogenous variables refer to the fiscal year preceding the litigation filing date. Therefore, the regressions generate ex ante estimates of cash holdings and litigation risk.

Table 6 presents the results of the second-stage regressions in which the dependent variables are the cash ratio and the litigation indicators, respectively.[6] The table presents three different specifications. Specification 1 does not contain unionization rates and governance variables, specification 2 contains the unionization rate variable, and specification 3 contains the governance index and managerial ownership variables.

In all specifications, the litigation instrument (fitted value from the first stage) is significantly related to the cash ratio, consistent with firms accumulating cash preceding the filing of a lawsuit. The cash ratio instrument (fitted value from the first stage), however, is not significantly related to litigation risk. Thus, our estimation results do not support the conjecture that firms with larger amounts of cash are more exposed to predatory class action lawsuits. The majority of the coefficients of the other variables in specification 1 are consistent with previous literature on cash holdings and litigation risk, suggesting that the significant relation between litigation risk and cash holdings is not due to the correlation between litigation risk and other firm characteristics such as firm size or amount of dividend payouts.

In specification 2 of Table 6, we control for the potential effect of industry unionization rates on the level of cash holdings.[7] While our main results persist, the unionization rate variable in the cash second-stage regression is not significant. Our results, however, are not at odds with Klasa et al. (2009), because our sample is quite different from theirs. Our sample is not restricted to manufacturing firms and contains only firms involved in a class action lawsuit along with

[6]The results of the first-stage regressions are available from the authors.

[7]The industry unionization rate data that are publicly available at www.unionstats.com are organized by Census Industry Classification (CIC) industries. Since some general SIC 4-digit industries ending with 00 do not correspond to any specific CIC industry, about 5% of our observations have missing unionization rates when we merge our Compustat data with unionization data. In order to avoid losing these observations in our regressions, we equal missing unionization rates to 0 and create a "missing unionization" indicator variable equal to 1 when unionization rates are missing, and 0 otherwise.

TABLE 6

Cash and Litigation Risk: Simultaneous Equations

Table 6 reports the estimation results for the following simultaneous equations model:

$$\text{INSURANCE\_EFFECT : CASH\_RATIO} = \gamma_1 \text{LITIGATION} + \theta_1 X + \beta_1 X_1 + \epsilon_1,$$
$$\text{ENTICEMENT\_EFFECT : LITIGATION} = \gamma_2 \text{CASH\_RATIO} + \theta_2 X + \beta_2 X_2 + \epsilon_2,$$

where CASH_RATIO is the ratio of cash and marketable securities to the book value of total assets for firm i; LITIGATION is the probability of litigation for firm i; and X_1 is leverage, the identifying variable of the first equation, while X_2 is stock turnover, the identifying variable of the second equation. Litigation risk is a dummy variable set equal to 1 for firms that are involved in a litigation in the following year, and 0 otherwise. Year and industry dummy variables are included in all specifications. The sample period is 1996–2006. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	1		2		3	
Second-Stage Dependent Variables	CASH_RATIO	LITIGATION_RISK	CASH_RATIO	LITIGATION_RISK	CASH_RATIO	LITIGATION_RISK
LITIGATION_INSTRUMENT	0.052 (6.24)***		0.051 (6.09)***		0.048 (3.73)***	
CASH_INSTRUMENT		–1.015 (–1.28)		–1.022 (–1.14)		–1.047 (–1.02)
LEVERAGE	–0.231 (–10.73)***		–0.229 (–10.65)***		–0.231 (–3.23)***	
TURNOVER		2.465 (14.41)***		2.457 (14.31)***		3.079 (7.59)***
ln(TOTAL_ASSETS)	–0.019 (–4.94)***	0.206 (9.76)***	–0.019 (–4.79)***	0.212 (9.95)***	–0.025 (–2.10)**	0.267 (5.65)***
CASH_FLOW	–0.014 (–3.81)***	–0.072 (–2.48)**	–0.014 (–3.80)***	–0.075 (–2.53)**	–0.010 (0.56)	–0.107 (–1.81)*
NET_WORKING_CAPITAL	–0.004 (–0.76)	–0.004 (–0.10)	–0.003 (–0.53)	0.024 (0.61)	–0.014 (–0.98)	0.121 (1.71)
DIVIDEND_PAYER	–0.049 (–3.63)***	–0.341 (–3.64)***	–0.049 (–3.65)***	–0.337 (–3.58)***	–0.055 (–1.96)*	–0.458 (–2.65)***
MARKET-TO-BOOK	0.010 (7.79)***	0.001 (0.06)	0.010 (7.82)***	0.001 (0.12)	0.019 (3.89)***	0.037 (0.86)
CAPITAL_EXPENDITURES	–0.470 (–7.63)***	–0.116 (–0.21)	–0.466 (–7.60)***	–0.151 (–0.28)	–0.667 (–3.47)***	–0.045 (–0.56)
ACQUISITIONS	–0.658 (–9.41)***	0.096 (0.15)	–0.658 (–9.48)***	–0.080 (–0.12)	–0.619 (–3.52)***	–0.721 (–0.10)
R&D_TO_SALES	0.094 (14.10)***	0.192 (2.44)**	0.093 (14.16)***	0.208 (2.60)***	0.083 (1.58)	0.711 (2.28)**
NET_DEBT_ISSUANCE	0.260 (7.07)***	–0.780 (–3.20)***	0.260 (7.13)***	–0.731 (–2.95)***	0.271 (2.30)**	–1.446 (–2.60)***
NET_EQUITY_ISSUANCE	0.205 (11.24)***	–0.022 (–0.12)	0.205 (11.36)***	0.023 (0.12)	0.142 (1.18)	0.360 (0.55)
INDUSTRY_CF_VOLATILITY	0.123 (7.10)***	–0.025 (–0.15)	0.118 (6.30)***	–0.130 (–0.79)	0.026 (0.61)	–0.245 (–0.91)
SYSTEMATIC_VOLATILITY	0.163 (1.05)	0.950 (0.71)	0.161 (1.04)	0.955 (0.69)	3.124 (1.73)*	0.907 (0.64)
IDIOSYNCRATIC_VOLATILITY	–0.079 (–0.37)	10.368 (7.16)***	–0.086 (–0.40)	10.488 (7.18)***	–0.421 (–0.35)	17.157 (3.30)***
UNIONIZATION_RATE			0.000 (–0.57)	–0.010 (–2.65)***		
MISSING_UNIONIZATION_RATE			–0.024 (–1.21)	–0.154 (–1.13)		
G-INDEX					–0.002 (–0.43)	–0.026 (–1.17)
OWNERSHIP					0.000 (0.25)	0.006 (0.82)
Adj. R^2	0.510		0.510		0.494	
Pseudo R^2		0.195		0.197		0.173
N	2,413	2,413	2,413	2,413	717	717

their matches. The difference between our sample and those in Dittmar and Mahrt-Smith (2007) and Harford et al. (2008) might also explain the lack of significance of the G-index variable in specification 3.

F. Litigation and Corporate Investments

The results above demonstrate that firms increase their cash holdings in response to changes in exposure to litigation risk. An important question that arises is whether this behavior has any effect on real investment. That is, do firms forgo investment in order to save cash due to the lawsuit? To examine this possibility, we estimate the investment regression

$$I_{it} = \alpha_i + \beta_1 \text{LITIGATION}_{it} + \beta_2 Q_{i,t-1} + \beta_3 \text{CF}_{i,t-1} + \gamma_t + \epsilon_{it},$$

where I_{it} is capital expenditures scaled by beginning-of-year net property, plant, and equipment; $Q_{i,t-1}$ is beginning-of-year Tobin's Q; $\text{CF}_{i,t-1}$ is the beginning-of-year cash-flow rate; and LITIGATION_{it} is set equal to 1 if the firm is involved in a class action lawsuit in year t.

The first two columns of Table 7 report the results where the litigation dummy is constructed based on the firms actually involved in the litigation. We see that for both specifications, capital expenditures decrease significantly during the class action filing year, consistent with the view that firms are forgoing investment to accumulate cash. The third column considers litigation spillover effects on corporate investment. Here, we define the litigation dummy based on the litigation events of peer firms in the same 4-digit SIC industry. Thus, the dummy is set to 1 for firm i if a firm in the same industry is involved in a class action lawsuit in year t. The results provide evidence of spillover effects in corporate investment. Firms that are not involved in litigation reduce capital expenditures and save cash

TABLE 7

Litigation Risk and Corporate Investment

Table 7 presents the estimation results from the investment regression

$$I_{it} = \alpha_i + \beta_1 \text{LITIGATION}_{it} + \beta_2 Q_{i,t-1} + \beta_3 \text{CF}_{i,t-1} + \gamma_t + \epsilon_{it},$$

where I_{it} is capital expenditures scaled by beginning-of-year net property, plant, and equipment; $Q_{i,t-1}$ is beginning-of-year Tobin's Q; and $\text{CF}_{i,t-1}$ is the beginning-of-year cash-flow rate. In the first two columns of the table, the variable LITIGATION_{it} is a dummy variable set equal to 1 if a litigation is filed against firm i in year t, and 0 otherwise. In the last column, the litigation dummy is set equal to 1 if there is a litigation event involving a peer firm in firm i's industry, where industry classification is based on 4-digit SIC codes. Standard errors are clustered by firm, and the resulting t-statistics are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Explanatory Variables	Own Firm Litigations		Peer Firm Litigation
LITIGATION_DUMMY	−0.157	−0.127	−0.022
	(8.19)***	(6.82)***	(2.86)***
$Q_{I,t-1}$	0.034	0.031	0.036
	(12.40)***	(11.35)***	(13.62)***
$\text{CF}_{I,t-1}$	0.223	0.201	0.232
	(15.31)***	(13.75)***	(16.49)***
Constant	0.405	0.293	0.406
	(59.81)***	(14.93)***	(58.27)***
Fixed Effects	Firm	Firm, Year	Firm, Year
No. of obs.	49,527	50,887	50,887
R^2	0.06	0.07	0.06

when peer firms are sued. The magnitude is smaller than that for the sued firms but is still economically significant. The coefficient on the litigation dummy in column 3 implies that firms reduce their investment rates, on average, by about 4.6% compared to years when no firms in an industry are in the litigation process.

One concern related to the investment results is the impact of measurement error in Tobin's Q on our estimates. Since the actual Tobin's Q is unobservable, our proxy may be measured with error. If the measurement error in our proxy for Tobin's Q is correlated with the litigation event dummy variable, then the coefficient of interest may be biased. To address this concern, we employ the reverse regression bounds approach of Erickson and Whited (2005) in order to ensure the robustness of the sign of our estimate. We find that our estimated treatment effect is robust to this concern because of a relatively low correlation with our proxy for Q.[8] The low correlation implies that any measurement error contained in our litigation event variable is likely to lead to the usual attenuation bias of the OLS coefficient, suggesting that, if anything, our estimate of the effect of litigation on investment is conservative.

G. The Effect of Litigation Risk on the Market Valuation of Cash Holdings

The evidence offered by our tests thus far presents a consistent picture. Firms that perceive being significantly exposed to litigation risk tend to accumulate cash in excess of what is predicted by the determinants established previously by the literature. An important question is how the market values these changes in cash holdings. In this section, we investigate to what extent cash that is put aside preemptively to cope with the anticipated cost of litigation contributes to firm value. A large portion of the settlement paid by the defendant firm is allocated to plaintiff shareholders that are no longer shareholders of the firm at the time of the settlement. Moreover, legal fees sustained by the defendant firm are often significant. Therefore, we expect that the changes in cash held by firms at risk of litigation contribute less to shareholder value than the cash of firms with low or no risk of litigation.

We investigate this issue by applying the method introduced by Faulkender and Wang (2006). We present the results of our analysis on the valuation of cash holdings in Table 8. We construct an ex ante measure of exposure to litigation risk as the predicted probability from a probit model similar to that of Kim and Skinner (2012).[9] With the exception of the litigation risk variable[10] and the unionization rate variables, we construct the variables as in Faulkender and Wang (2006). We measure all variables for the fiscal year preceding the litigation filing. The dependent variable is the firm's excess stock return calculated as the firm's annual stock return minus the annual stock return of the matched Fama and French (1993) 5×5 size and book-to-market portfolio. With the exception of the litigation

[8] Results available from the authors.

[9] The estimation details and estimates are reported in the Internet Appendix (available at www.jfqa.org).

[10] We have used other measures of litigation risk, including the litigation event dummy variable employed in the earlier analysis and alternative probit models described in Section IV.

variable, leverage, and the unionization variables, we scale the independent variables by the lagged market value of equity.

TABLE 8

The Effect of Litigation Risk on the Value of Cash

Table 8 presents the results of OLS regressions in which the independent variable is the excess stock return (the firm's fiscal year stock return minus the matched Fama and French (1993) 5 × 5 portfolio's return). All dependent variables, except LEVERAGE, LITIGATION, UNIONIZATION_RATE, and MISSING_UNIONIZATION_RATE, are deflated by the lagged market value of equity. CASH_HOLDINGS is cash plus marketable securities; LITIGATION is the in-sample predicted probability from the probit model reported in Table VIII; EARNINGS is earnings before extraordinary items plus interest, deferred tax credits, and investment tax credits; and NET_ASSETS is total assets minus cash holdings. DIVIDENDS are measured as common dividends paid, and NET_FINANCING is the total equity issuance minus repurchases plus debt issuance minus debt redemption. R&D_EXPENSES are set to 0 if missing, and REPURCHASES is defined as the percentage of distributions to shareholders that occur in the form of repurchases. ΔX is compact notation for the 1-year change, $X_t - X_{t-1}$. The subscript $t-1$ means the value of the variable is at the end of fiscal year $t-1$. The second and third regressions are only on the subset of firms with positive payout in the corresponding fiscal year. Standard errors are clustered at the firm level and *t*-statistics are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Explanatory Variables	1	2	3
ΔCASH_HOLDINGS	1.246 (13.46)***	1.198 (12.29)***	1.267 (6.73)***
LITIGATION	−2.074 (−18.83)***	−2.078 (−18.40)***	−1.870 (−17.26)***
LITIGATION × ΔCASH_HOLDINGS	−1.146 (−2.31)**	−1.293 (−2.42)**	−0.973 (−1.79)*
ΔEARNINGS	0.272 (4.68)***	0.271 (4.68)***	0.384 (7.42)***
ΔNET_ASSETS	0.088 (3.44)***	0.087 (3.43)***	0.086 (3.61)***
ΔR&D_EXPENSES	−0.516 (−1.06)	−0.517 (−1.07)	−0.932 (−1.96)*
ΔINTEREST_EXPENSE	−0.904 (−3.89)***	−0.902 (−3.89)***	−1.325 (−6.41)***
ΔDIVIDENDS	1.152 (1.31)	1.147 (1.30)	1.465 (1.56)
$CASH\_HOLDINGS_{t-1}$	0.155 (7.30)***	0.155 (7.22)***	0.148 (7.18)***
MARKET_LEVERAGE	−0.868 (−15.10)***	−0.876 (−15.21)***	−0.722 (−11.96)***
NET_FINANCING	−0.042 (−2.67)***	−0.042 (−2.70)***	−0.035 (−2.31)**
$CASH\_HOLDINGS_{t-1}$ × ΔCASH_HOLDINGS	−0.084 (−2.43)**	−0.085 (−2.42)**	−0.061 (−2.44)**
LEVERAGE × ΔCASH_HOLDINGS	−1.667 (−5.93)***	−1.642 (−5.67)***	−1.271 (−4.53)***
UNIONIZATION_RATE		0.001 (0.26)	
UNIONIZATION_RATE × ΔCASH_HOLDINGS		−0.002 (−0.33)	
MISSING_UNIONIZATION_RATE		−0.035 (−1.18)	
G-INDEX			−0.002 (−0.73)
G-INDEX × ΔCASH_HOLDINGS			−0.045 (−2.72)***
N	12,656	12,656	11,195
Adjusted R^2	0.17	0.17	0.15

The results of all regressions presented in Table 8 show that, consistent with Faulkender and Wang (2006) and Pinkowitz and Williamson (2007), the coefficient of the annual change in cash holdings is positive and significant. The litigation risk variable is negative and significant, suggesting that, everything else

constant, the stock market values significantly less firms exposed to litigation risk. The coefficient of the interaction between the change in cash holdings and the litigation risk variable is negative and significant, indicating that the marginal value of an additional dollar of cash is lower for firms exposed to litigation risk. These findings are consistent with the plaintiff law firms and former shareholders receiving a significant portion of the cash disbursed by the company. Our result persists also when controlling for the potential effect of the degree of industry unionization on the value of cash holdings, as in Klasa et al. (2009), and the Gompers, Ishii, and Metrick (2003) governance index, as in Dittmar and Mahrt-Smith (2007).

In order to appreciate the economic significance of the litigation risk on the value of cash, we calculate the marginal value of a dollar of cash for the average sample firm using the mean values of the independent variables that interact with the change in cash and their coefficients in specification 1. We use the mean values of cash holdings divided by market value of equity and market leverage of 21.5% and 15.2%, respectively. The marginal value of a dollar of cash for a company with an average predicted probability of litigation (3.6%), therefore, is $\$0.93 = 1.246 - 1.146 \times 3.6\% - 0.084 \times 21.5\% - 1.667 \times 15.2\%$. This value is almost identical to the marginal value of a dollar of cash for the average firm of \$0.94 obtained by Faulkender and Wang (2006). The marginal value of a dollar of cash for a company with a predicted probability of litigation 1 standard deviation above the mean (9.6%) is \$0.86. The marginal value of a dollar of cash for a company with a predicted probability of litigation equal to 0 (1 standard deviation below the mean would be a negative number) is instead \$0.97, that is, \$0.11 higher. These results show that the contribution of litigation risk to the firms' value of cash is economically significant. Overall, the results presented in Table 8 show that the negative effect of litigation risk on the incremental value of cash holdings is both statistically and economically significant.

IV. Robustness Checks

In additional robustness tests, we demonstrate that various ex ante measures of litigation risk are positively and significantly related to cash holdings in the cross section of U.S. firms, controlling for all other factors that are known to be correlated with cash. Similar to Kim and Skinner (2012), we construct ex ante measures of litigation risk by obtaining predicted probabilities from a series of probit regressions that attempt to explain the probability that a firm is sued in a given year. The economic effects of litigation risk are significant and quite large. We find that a 1-standard-deviation increase in the ex ante measures of litigation risk yield expected increases in the conditional mean cash/assets ratio ranging from 5.9% to 6.5%, depending on the specific measure and model specification.[11]

In this section, we conduct various robustness tests related to the cash holdings results presented above. One possible concern is related to using the ratio of cash to net-of-cash total assets as our measure of cash holdings. Possible changes

[11] Estimation details and results for all of the robustness tests listed in this section are included in the Internet Appendix.

in the level of assets before a lawsuit could significantly change the value of this variable and generate spurious results. If, for instance, the goodwill impairment following an unsuccessful merger triggered a class action lawsuit, the cash ratio would be higher prelitigation due to a decline in assets (the denominator) instead of an increase in cash (the numerator). To address this concern, we replicate all of our multivariate tests, replacing the cash ratio with the natural logarithm of cash and short-term securities to verify that our results are driven by cash levels and not asset levels. The coefficient on the litigation dummy is large, positive, and statistically significant, suggesting that our results are driven by changes in cash levels and not by changes in assets.

Even though class action security lawsuits are the most common type of litigation faced by U.S. corporations, there exist many other types of lawsuits. As reported in Section II, we collect information about corporate litigations other than security class action lawsuits from the Audit Analytics Litigation database. Our sample of nonsecurity lawsuits obtained from Audit Analytics spans the time period 2000–2006. The most common types of other corporate lawsuits are product liability, copyright and patent, and antitrust and trade regulation litigations. These lawsuits are less likely to be triggered by a decline in stock price performance than are security lawsuits. Therefore, expanding the sample to all lawsuits allows us to verify that our results are not driven by a possible correlation between a general shortfall risk and a litigation risk.[12] We find a strong, positive relationship between cash holdings and measures of litigation risk based on these other types of litigation events. The findings suggest that other types of litigation, not just securities law cases, have a significant effect on corporate liquidity policy.

V. Conclusions

In this study, we link a major external source of corporate risk, securities class action litigation risk, with two of the main corporate financial decisions that executives have to make: the amount of cash to hold on the balance sheet and the level of corporate investments to sustain a firm's growth. We find that the risk of securities litigation significantly affects the amount of cash firms choose to hold. Firms at risk of being sued tend to hold significantly larger amounts of cash even after controlling for a comprehensive array of cash determinants and possible time effects. We also show that firms preemptively accumulate cash before possible lawsuits rather than plaintiffs targeting firms with high levels of cash. The impact of litigation risk on cash holdings is not limited to firms that are actually sued. We find strong evidence of spillover effects within industries, suggesting that our results are not due to an omitted variables bias. That is, when a firm is brought into a class action lawsuit under the Securities Acts, peer firms in the same industry respond by increasing their holdings as they revise their perceived exposure to litigation risk upward.

We find that litigation risk affects corporate investment decisions. Our results suggest that firms forgo capital expenditures to save cash in response to increases

[12]This is, however, a minor concern, because in our main regressions, we control for systematic and idiosyncratic risk.

in litigation risk exposure. This finding suggests that the legal protection available to firms' stakeholders can have the unintended consequence of depressing the level of corporate investments. We also provide evidence on the impact of litigation risk on the marginal value of cash. A dollar of cash is worth less for firms at risk of litigation, likely a reflection of the multiplicity of recipients of class action lawsuit settlements. Even though cash provides insurance against possible lawsuit settlement costs, because part of the cash disbursed by the defendant firm goes to the plaintiff law firms and stakeholders that do not currently own shares of the defendant companies, shareholders appear to value corporate cash less for firms that are expected to be sued in the near future.

It is well known that firms, on average, hold significant amounts of cash. Several studies, beginning with Opler et al. (1999), show that firm characteristics cannot totally explain the large amount of cash held by firms, on average. Our study identifies a new determinant of corporate cash holdings related to the precautionary motive for accumulating cash reserves. The results of this paper suggest that institutions, not just firm characteristics, interact with the costs and benefits of holding liquid assets. The empirical results also provide an insight into how firms manage risk in general. Firms appear to deal with litigation risks in an integrated manner, hedging the risk by both entering into limited insurance contracts and holding a larger cash buffer to offset the increased variability in expected cash flows, as suggested by Bolton et al. (2011) and Froot and Stein (1998).

Appendix. Data

ln(TOTAL_ASSETS): Natural logarithm of the book value of assets in 1994 dollars (source: Compustat).

LEVERAGE: (Long-term debt + short-term debt)/book value of assets (source: Compustat).

CASH_FLOW: Earnings after interest, dividends, and taxes, and before depreciation, divided by net assets (source: Compustat).

NET_WORKING_CAPITAL: Net working capital minus cash, divided by assets (source: Compustat).

DIVIDEND_PAYER: Indicator set equal to 1 in years in which a firm pays dividends (source: Compustat).

MARKET-TO-BOOK: Ratio of the market value to the book value of a firm's assets (source: Compustat).

CAPITAL_EXPENDITURES: Capital expenditures divided by assets (source: Compustat).

ACQUISITIONS: Acquisition expenditures divided by assets (source: Compustat).

R&D_TO_SALES: Research and development expenses divided by sales; set to 0 if missing (source: Compustat).

NET_DEBT_ISSUANCE: Debt issuance minus debt retirement divided by assets (source: Compustat).

NET_EQUITY_ISSUANCE: Equity sales minus equity purchases divided by assets (source: Compustat).

INDUSTRY_CF_VOLATILITY: 2-digit SIC code industry average of firms' cash flow standard deviations for the previous 20 years (source: Compustat).

LITIGATION_DUMMY: Set equal to 1 when firms are involved in class action lawsuits in the same year. The dummy maintains the same value also in the 2 years following the litigation (source: Securities Class Action Clearinghouse (SCAC)).

LITIGATION_RISK_DUMMY: Set equal to 1 when firms are involved in class action lawsuits in the following year (source: SCAC).

UNIONIZATION_RATE: Fraction of workers in a 3-digit CIC industry that are represented by unions (www.unionstats.com).
MISSING_UNIONIZATION_RATE: Set equal to 1 when unionization rate data are missing.
STOCK_TURNOVER: $[1 - \prod_{t=1}^{365}(1 - \text{volume traded}_t/\text{total shares}_t)]$, for the 1-year period preceding the lawsuit filing (source: CRSP).
INDUSTRY_STOCK_RETURN: VW average industry returns for the year preceding the litigation filing (source: CRSP).
CASH_HOLDINGS: Cash plus marketable securities (source: Compustat).
REPURCHASES: Percentage of distributions to shareholders that occur in the form of repurchases (source: Compustat).
EARNINGS: Earnings before extraordinary items plus interest (source: Compustat).
NET_ASSETS: Total assets minus cash holdings (source: Compustat).
R&D_EXPENSES: Research and development expenses; set to 0 if missing (source: Compustat).
NET_FINANCING: Total equity issuance minus repurchases plus debt issuance minus debt redemption (source: Compustat).
DIVIDENDS: Common dividends paid (source: Compustat).
MARKET_LEVERAGE: Total debt divided by total debt plus the market value of equity (source: Compustat).
IDIOSYNCRATIC_RISK: Measured as the standard deviation of residuals from a regression of excess daily returns on the market factor (source: CRSP).
SYSTEMATIC_RISK: Standard deviation of predicted values from regression of excess daily returns on the market factor (source: CRSP).

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