Evidence that Managers Intervene in Financial Reporting to Avoid Working Capital Deficits

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Abstract

Prospect theory predicts that managers will take actions to avoid financial reporting outcomes that deviate unfavorably from benchmark reference points. We examine this prediction by analyzing the incidence of working capital deficits, measured as current ratios less than 1.0 (that is, we take current liabilities as the reference point for current assets). Consistent with the view that managers take actions to avoid reporting working capital deficits, we find that distributions of quarterly reported current ratios exhibit a severe discontinuity at 1.0, that the discontinuity increases with exogenous increases in the cost of credit in the economy and that determinants of a firm's likelihood to achieve a given current ratio are diagnostic only for avoiding a working capital deficit, not for pseudo working capital targets. We also find evidence that firms that avoid working capital deficits report lower (higher) proportions of inventory (accounts receivable and cash), consistent with managers increasing sales volume so as to capitalize product margins on the balance sheet, thereby increasing current asset levels.

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I. Introduction

We examine the applicability of a key component of prospect theory (Kahneman and Tversky, 1979) to financial reporting outcomes. Specifically, we analyze the notion that individuals will act as if they view deviations from a reference point asymmetrically: a positive deviation is less value increasing than a similar-magnitude negative deviation is value decreasing.[1] Our setting is the quarterly reporting of working capital, which affords a natural reference point; the prediction is that managers will avoid reporting a working capital deficit.

While a large experimental literature shows individuals behave as predicted by this portion of prospect theory (Kahneman, 2003) by taking actions to avoid outcomes below a reference point, the applicability of the prediction outside a laboratory setting is unclear. First, prospect theory does not specify how to identify a reference point (the specification is context specific and possibly subject to debate). Second, decision maker expertise and experience have been shown to dampen the effects of loss aversion (Genesove and Mayer 2001; Shapira and Venezia 2001) in real world settings.

However, archival research in financial reporting provides evidence that addresses both of these difficulties, in the context of earnings outcomes. Hayn (1995), Burgstahler and Dichev (1997) and DeGeorge et al. (1997) have identified discontinuities in reported earnings distributions around well motivated reference points. The discontinuities have been interpreted as consistent with loss aversion from prospect theory (Koonce and Mercer 2005). That is, managers intervened to avoid reporting earnings just below

[1] Prospect theory refers to this notion as *loss aversion*, implying that an outcome below the reference point is a loss, even if that outcome is positive in an absolute sense. The prospect theory notion of loss aversion is consistent with managerial aversion to reporting accounting losses, if the reference point for revenues + gains is expenses + losses (revenues + gains = expenses + losses). For consistency with previous research that applies this feature of prospect theory, we will use the term loss aversion.

critical reference points so as to avoid the asymmetric negative view of the firm by a loss averse stakeholder.

Subsequent research, for example, Durtschi and Easton (2005; 2009) and Beaver et al. (2007) has focused on several research design features of published papers that document earnings discontinuities, including the effects of sample selection, choice of earnings deflator, different earnings components, and analyst optimism and pessimism. While these investigations point to research design choices, not managerial interventions, as the drivers of distribution discontinuities, Burgstahler and Chuk (2011) provides analysis and evidence to dispute this conclusion. Research directly investigating managerial intervention via accrual manipulation has not found strong evidence of unusual reporting activity in the vicinity of key earnings reference points (Dechow et al. 2003; Ayers et al. 2006). Taken together, these results suggest that previous research is not dispositive as to whether loss aversion from prospect theory meaningfully influences financial reporting.

We extend this research to a balance sheet context and examine whether managers avoid reporting working capital deficits. We choose this setting because it offers two features that support a strong research design. The first is an unambiguous reference point; the definition of working capital establishes the reference point for total current assets as total current liabilities, implying that the reporting objective predicted by loss aversion is avoiding a working capital deficit. The second feature is ratio measurement; measuring a working capital deficit as a current ratio below 1.0 obviates the need for extensive sample selection screens, choosing a deflator, and analyzing components that might artificially drive a discontinuity around 1.0. Thus, compared with investigations of

earnings, the investigation of working capital allows for an analysis of the implications of prospect theory in a setting that is less confounded by research design decisions. Moreover, current ratios are important in their own right for assessing liquidity and creditworthiness (Beaver 1966), and managers appear to be concerned with reported current ratios (Lev 1969; Gramlich, McAnally, and Thomas 2001).

Applying prospect theory to reporting current ratios, we argue that a working capital deficit induces loss averse stakeholders to make asymmetrically negative assessments of liquidity and credit quality (a working capital deficit is viewed more negatively than a similar-sized working capital surplus is viewed positively). If this provides incentives to management to manage the balance sheet to avoid reporting a working capital deficit, we would expect a discontinuity in the distribution of current ratios, specifically, an unexpectedly small (large) frequency of reported current ratios just below (above) 1.0. Our results are consistent with this expectation. Using a large ample of quarterly current ratios reported between 1968 and 2008, we find a statistically significant discontinuity in the current ratio distribution precisely at 1.0.

As discussed by, for example, Burgstahler and Chuk (2011), the extent of management interventions to avoid missing a benchmark reference point should vary with the costs and benefits of the intervention. To probe this possibility, we investigate whether the magnitude of the current ratio discontinuity varies in times of tight and loose credit, based on the view that tighter credit should exacerbate stakeholder loss aversion in the use of current ratios to assess liquidity and credit quality. Using time series differences in the effective federal funds rate as a proxy for exogenous shocks to credit tightness, we find that the distribution of current ratios for observations in the highest

quartile of effective federal funds rates exhibits a statistically larger discontinuity than does the distribution of firms in the lowest quartile.

To supplement these distributional findings, we estimate firm level logistic regressions for observations falling in the current ratio bins immediately surrounding the 1.0 current ratio level. We estimate five logistic regressions that model the probability a firm falls in the higher of two adjacent current ratio bins: 0.95 vs. 0.96, 0.97 vs. 0.98, 0.99 vs. 1.00, 1.01 vs. 1.02 and 1.03 vs. 1.04. The comparisons of firms in all but the 0.99 vs. 1.00 current ratio bins are "pseudo" comparisons that do not contain a theoretically justified reference point. We expect significant explanatory power for the model that compares the 0.99 vs 1.00 bins but not for the pseudo models.

Results of this test corroborate the distributional evidence; the higher the effective federal funds rate, the higher the likelihood a firm will fall into the 1.0 current ratio bin. This result holds when we control for the information environment, the existence of explicit debt and lease contracts, and firm profitability, each of which is a statistically significant predictor in its own right. In the pseudo estimations, none of these variables is statistically significant. This implies that management uses the posited current ratio reference point of 1.0, as opposed to exhibiting a general tendency toward reporting higher current ratios relative to lower current ratios.

We also provide evidence on actions taken to avoid working capital deficits. We find that firms reporting a small working capital surplus have lower (higher) proportions of inventory (net accounts receivable and cash) than firms reporting a small working capital deficit. This is consistent with managers increasing sales volume so as to capitalize profit margins on the balance sheet and in turn increase current assets. This

result is also potentially consistent with manipulation of the allowance for doubtful accounts, although we cannot provide definitive evidence because this account is not directly available in the data. We also find some evidence that the proportion of short term debt in current liabilities is lower for firms reporting working capital surpluses, but results do not definitively support the view that managers reclassify short term debt to long term to decrease current liabilities (Gramlich et al. 2001; Gramlich et al. 2006).

Finally, we extend our analysis internationally, since prospect theory should not be jurisdiction-specific. We find evidence of a discontinuity in current ratios at 1.0 in non-US data, concentrated in common law countries, consistent with the view that financial reporting in common law countries is more informative for decision makers relative to code law countries.

Our study adds to the literature on the descriptive validity of prospect theory in financial reporting. Our focus on working capital deficits, measured with current ratios, enables analysis of prospect theory predictions while avoiding some of the research design issues that have hampered research studying earnings based targets. We also provide evidence of balance sheet management and the management of current ratios in general (Lev 1969; Gramlich et al. 2001). Our results complement prior research showing that managers intervene in balance sheet reporting to avoid violating explicit debt covenants (Dichev and Skinner 2002) and governmental solvency targets (Gaver and Paterson, 2004). Finally, our results suggesting that balance sheet management varies with the tightness of credit extend previous findings on the association between macro conditions and financial reporting outcomes. Unlike existing research that primarily focuses on investor responses to earnings during periods of changing interest rates

(Collins and Kothari 1989) and business cycles (Johnson 1999), our results shed light on how variation in the macro economy with respect to tightness of credit influences managerial financial reporting choices.

The paper proceeds as follows. In Section II we develop our hypotheses. In Section III we discuss our sample selection and conduct our main empirical analysis. In Section IV we extend our results to the international setting and conclude in Section V.

II. Theory and Hypothesis Development

Prospect Theory and Loss Aversion

Prospect theory (Kahneman and Tversky 1979) posits that when decision makers evaluate outcomes, the perceived value of an outcome is reference-point- dependent. As illustrated in Figure I, outcomes above (below) the reference point are termed "gains" ("losses"). The individual's subjective value function is asymmetric, in that it is concave (convex) in "gains" ("losses"), and kinked at the reference point so that the convexity in losses is steeper than the concavity in gains. Prospect theory uses the term loss aversion to describe the notion that the decrease in value from losses is greater than the increase in value from gains.

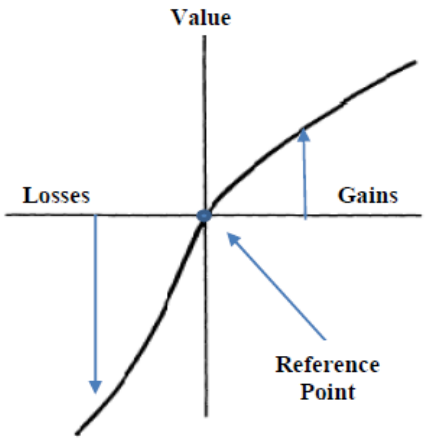

Figure I: Loss Averse Value Function
(Tversky and Kahneman 1991)

Experimental research has shown that decision makers behave as if they have loss averse value functions (Kahneman 2003). However, generalizing this behavior to non-laboratory settings has proven difficult. The first difficulty arises because in real world settings, incentives and characteristics of decision makers might override loss averse tendencies. For example, while Genesove and Mayer (2001) show sellers appear to exhibit loss aversion in the housing market, the effect is smaller for real estate investors relative to owner occupants. Shapira and Venezia (2001) find loss aversion to be less descriptive for professional stock market investors than non-professionals, and List (2004, 2003) uses evidence from the sports memorabilia market to demonstrate that market experience seems to eliminate loss averse behaviors.

The second difficulty stems from identifying and measuring decision makers' reference points. Laboratory experiments allow researchers to define reference points and make them salient subjects via experimental design, but outside the laboratory reference points may be ambiguous. Prospect theory does not specify how decision makers determine reference points (Thaler 2000).[2] Holmes et al. (2011) review the support for loss aversion in archival management research, noting that strong inferences are difficult to draw regarding the descriptive validity of loss aversion because the choice of reference points is many times *ad hoc*. Boettcher (2004) voices similar concerns with respect to archival political science research on loss aversion.

Loss Aversion and Financial Reporting

Our aim is to shed light on factors that shape financial reporting behaviors, taking as given that managers will consider how stakeholders will judge the firm using financial

[2] Recent experimental work by Abeler et al. (2011) and Baucells et al. (2011) provides some evidence regarding the reference points individual decision makers use.

reporting information. If the marginal stakeholder is loss averse, managers will rationally seek to avoid reporting outcomes that fall below important stakeholder reference points. However, stakeholders evaluating public firms may have sufficient experience or expertise to overcome loss aversion, in which case we would not expect to observe reporting outcomes linked to reference points.

The financial reporting context simplifies the task of identifying and measuring reference points because financial reporting equations provide natural reference points. Consider the following definition of net income:

Net Income = (Revenues + Gains) – (Expenses + Losses) (1)

The reference point for revenues + gains is expenses + losses. Favorable (unfavorable) deviations from the reference point result when revenues + gains are greater (less) than expenses + losses, implying that loss averse managers have incentives to avoid reporting net income just below zero.

Survey evidence from CFOs also assists in reference point identification. Specifically, CFOs say they believe it is important to avoid reporting earnings below zero, below prior period earnings, and below analyst expectations (Graham et al. 2005). Koonce and Mercer (2005) explicitly refer to zero earnings, prior period earnings and analyst earnings estimates as candidate reference points when considering the implications of loss aversion in archival financial reporting research.

Taking equation (1) as the determinant of a reference point, a test for the influence of stakeholder loss aversion can be based on the distribution of reported earnings relative to zero. If stakeholders' asymmetric value function provides asymmetric reporting incentives, managers should take actions to avoid reporting net

losses.[3] This implies an unexpectedly low (high) number of earnings observations just below (above) zero. Hayn (1995), Burgstahler and Dichev (1997) and DeGeorge et al. (1999) document that earnings distributions exhibit the kinds of discontinuities around reference points predicted by loss aversion.[4]

Durtschi and Easton (2005, 2009) challenge the interpretation of earnings distribution discontinuities as evidence of managerial intervention. They show sample selection issues pertaining to the scalar used to deflate reported earnings, as well as the properties of the deflator itself, underpin the observed distribution discontinuities around zero earnings and prior period earnings. For the analyst based reference point, they show that forecast error magnitudes are correlated with analyst optimism and pessimism in a manner that would generate a distribution discontinuity. However, Burgstahler and Chuk (2011) discuss and evaluate the research designs, findings and inferences in Durtschi and Easton (2005, 2009) and conclude (p. 2) that "[e]arnings management remains the only plausible explanation for pervasive evidence of discontinuities in earnings distributions."

Collectively, these studies imply that evidence on the intervention itself would be helpful (and might even be required) to support the inference that managerial intervention is responsible for the observed discontinuities. To date, research has provided little systematic evidence on this point. Dechow et al. (2003) find no evidence of increased

[3] Asymmetric managerial payoff functions could also generate earnings discontinuities. For example, a compensation contract that specifies a bonus for positive earnings, or earnings greater than a prior period's earnings or earnings greater than analyst expectations, would create contractual reference points. We are not aware of any study documenting the systematic use of these reference points explicitly in compensation contracts. Survey evidence in Graham et al. (2005) concludes that managers are interested in reporting earnings that exceed these reference points to influence stock prices, and less so for explicit contracting reasons. However, Matsunaga and Park (2001) provide evidence consistent with boards paying lower bonuses when earnings fall short of analyst expectation or prior earnings (but not when earnings levels fall below zero).

[4] In addition to the zero net income reference point, researchers have documented discontinuities using prior period earnings and analyst forecasts as reference points.

discretionary accrual activity to avoid reporting earnings below zero, as one might expect if managers are influencing reported earnings levels via accrual manipulation. Ayers et al. (2006) examine abnormal accrual activity around three earnings reference points. They find evidence of accrual intervention with respect to analyst-based reference points that is sensitive to how analyst expectations are defined and no unique evidence that managers intervene to avoid reporting earnings below zero or prior earnings.

This previous research is consistent with two interpretations. The first is that corporate stakeholders do not exhibit loss aversion, so the lack of systematic evidence of managerial intervention is not surprising.[5] A second possible interpretation is that stakeholders exhibit loss aversion, but the research designs used to detect the effects of stakeholder loss aversion on reported earnings are not powerful enough to overcome confounding effects when examining distribution discontinuities or to measure managerial accrual intervention with sufficient precision.[6]

Testing the Implications of Loss Aversion Using Working Capital

We focus on the balance sheet and study reported working capital to assess whether stakeholder loss aversion influences financial reporting. Working capital is defined as follows:

Working Capital = Total Current Assets – Total Current Liabilities (2)

Working capital has a well-defined reference point. Equation (2) defines the reference point for total current assets as total current liabilities, implying under stakeholder loss

[5] Fennema and Koonce (2011) make a similar point, that the Durtschi and Easton (2005, 2009) papers ultimately question the descriptive validity of psychology based theories with respect to financial reporting.
[6] Earlier work by Beaver et al. (2003) and Beatty et al. (2002) investigate managerial intervention in the property-casualty and banking industries, respectively. By using these particular industries, these studies capitalize on a setting where managerial intervention can be measured without the use of common abnormal accrual models used in the large sample studies of Dechow et al. (2003) and Ayers et al. (2006).

aversion that a manager would seek to avoid reporting working capital levels below zero (i.e., avoid a working capital deficit). Our analysis of working capital confronts none of the confounding effects noted by Durtschi and Easton (2005, 2009) and Beaver et al. (2007). Since total current assets and total current liabilities are standard line items in financial reports, there are very few sample selection screens necessary to create a measure of working capital. To standardize working capital metrics across firms of different sizes, we measure working capital using current ratios (total current assets divided by total current liabilities). Current ratios require no deflation, so there is no sample attrition from identifying a deflator and no confounding properties of the deflator itself. Avoiding a working capital deficit in equation (2) is equivalent to avoiding a current ratio below 1.0.[7]

1.0 as the Current Ratio Value of Interest (the Reference Point)

Using the distribution of current ratios to test for stakeholder loss aversion effects requires that stakeholders use the current ratio to make a judgment about the firm. Current ratios are important for assessing the ability of a firm to repay its obligations. As Beaver (1966) notes, ratio analysis "began with the development of a single ratio, the current ratio, for a single purpose – the evaluation of credit-worthiness." Both trade creditors and lenders rely on the current ratio. The Credit Research Foundation, an industry advocate for trade creditors, provides the following guidance to its constituents:

> Although analysis of the customer's profitability and capital position are important, the most important factor to the trade creditor is the customer's liquidity position. We can begin to analyze the liquidity and quality of the current assets by calculating the current ratio. It is an indicator of the customer's ability to meet its short-term obligations with

[7] Beaver et al. (2007) note that earnings level distributions are confounded by components of net income, including special items and taxes. We have identified no obvious components of total current assets or liabilities that would generate a current ratio distribution discontinuity around 1.0.

> current assets. … We should be very concerned if the customer has a low current ratio (Credit Risk Foundation, 2004).

With respect to debt contracts, lenders have been shown to contract explicitly on current ratios (Dichev and Skinner 2002; Sufi 2009).

Research suggests that lenders, creditors and financial analysts view current ratios of 1.0 as the minimum acceptable level, with current ratios less than 1.0 viewed as liquidity deficiencies and cause for concern (Altman and McGough 1974; Barren 1992, Kristy 1994). As part of making judgments regarding a firm's ability to continue as a going concern over the subsequent 12 months, SAS No. 59 requires auditors to consider negative trends, including working capital deficiencies. Research has documented explicit mention of working capital deficits to support the issuance of a going concern opinion (Lee et al. 2005; Johnson 2010).[8]

Stakeholders may also monitor reported current ratios to evaluate working capital management. For example, if the industry average current ratio represents that industry's target, management may take actions to move the reported current ratio toward the industry average (Lev 1969; Gramlich et al. 2001). An industry average reference point, however, is not well suited for investigating loss aversion, because deviations in either direction from the reference point reflect negatively on management (exceeding the industry average current ratio would not be interpreted as a gain under loss aversion, but rather as excessive working capital).

For current ratio values close to 1.0, we assume that liquidity perceptions are more favorable for firms with higher current ratios, which makes the 1.0 reference point

[8] Going concern opinions are costly, making suppliers, customers and other potential creditors reluctant to do business with the firm (Mutchler 1984; Menon and Swartz 1987). As Francis (2004) notes, the issuance of a going concern might actually push a company into bankruptcy as lenders and suppliers withdraw credit or change their terms.

amenable to testing the implications of stakeholder loss aversion. Loss averse stakeholders are hypothesized to conclude liquidity is asymmetrically insufficient when current assets fall below the reference point, current liabilities, even if a current ratio of 0.99 is not economically meaningfully different from a current ratio of 1.01. Loss aversion predicts that the decrease in perceived repayment ability given a working capital deficit of a specific magnitude (e.g., current ratio of 0.99) will substantially outweigh the increase in perceived repayment ability associated with a working capital surplus of the same magnitude (current ratio of 1.01), relative to a benchmark of 1.00. This leads to the following hypothesis:

H1: Current ratios are managed to avoid working capital deficits.

An assumption underpinning H1 is that loss averse stakeholders use working capital information from the financial statements to assess liquidity and credit quality. However, the way stakeholders use the current ratio may vary with economic conditions. For example, tighter credit makes it more difficult to obtain financing and likely increases the scrutiny of a firm's liquidity position.[9] On the other hand, during times of easy credit strong scrutiny of a firm's reported working capital, or any other metric that informs about liquidity, is less necessary. The effects of stakeholder loss aversion, therefore, should be more pronounced when it is more likely that a stakeholder is using current ratio information from the financial statements to make a judgment. This implies the following hypothesis:

H2: The extent of current ratio management to avoid working capital deficits is increasing in the cost of credit in the economy.

[9] This intuition is similar to Bradley and Roberts (2004), who show that financial covenants in private lending agreements are more extensive during economic downturns.

Utilizing variation in the cost of credit as a conditioning factor is particularly appealing because it occurs at the macroeconomic level and is exogenous to the firm (Ball 2008).

III. Sample Selection and Empirical Analysis

Sample

The sample selection begins with the 1,014,143 unique firm-quarter observations available on the quarterly Compustat North America database from 1968 through fiscal year 2008 with nonzero total assets (*atq*). We remove 169,206 observations with missing or zero current assets (*actq*) and current liabilities (*lctq*). Consistent with prior work (Beaver et al. 2007; Burgstahler and Dichev 1997) we remove 110,092 observations from financial institutions (SIC codes 6000-6500) and utilities (SIC codes 4400-5000). Current ratios are not well defined for financial institutions and utilities face regulation that may limit the extent to which managers can attempt to achieve current ratio targets. Finally, we remove 17,098 observations in the Fama and French (1997) industry group "Restaurants, Hotels and Motels" since the median firm in this industry operates with current ratios below one.[10] The final sample contains 717,747 firm-quarter observations.

Table 1 Panel A presents current ratio descriptive statistics by Fama and French (1997) industry classifications. The entertainment and transportation (medical equipment and pharmaceutical products) industries exhibit the smallest (largest) median current ratios. Table 1 Panel B provides descriptive evidence on the pooled sample current ratio and its components. The median (mean) current ratio is 1.967 (4.173), suggesting that the median firm carries roughly twice the amount of current assets as current liabilities. In terms of composition, total current assets are comprised roughly of 30% cash, 35% net accounts receivable, 28% inventory, and 7% other current assets. Total current liabilities

[10] These firms operate in SIC codes 5800-5829, 5890-5899, 7000, 7010-7019, 7040-7049, and 7213.

are comprised roughly of 42% accounts payable, 34% other current liabilities, 19% current portion of long term debt, and 3% taxes payable. Interestingly, the mode of the sample distribution current ratio (untabled) is exactly 1.0, consistent with 1.0 representing an important value for management.

Distributional Test of H1

Following prior research, we test for deviations from distributional smoothness under the null hypothesis that the number of firm-quarter observations in any current ratio interval is equal to the average of the number of observations in the two immediately adjacent intervals (Burgstahler and Dichev, 1997; Dichev and Skinner, 2002; Brown and Caylor 2004; Beaver et al. 2007). We construct intervals with width equal to 0.01.[11] The test statistic for interval *i* is $n_i - E(n_i) / \sqrt{\text{var}(n_i - E(n_i))}$, where n_i is the actual number of observations in interval *i*, $E(n_i)$ is the expected number of observations in interval *i*, calculated as $(n_{i+1} + n_{i-1})/2$, and $\sqrt{\text{var}(n - E(n))}$ is the estimated standard deviation of the difference.[12] Under the null hypothesis, these standardized differences are distributed $N \sim (0,1)$. Under the alternative hypothesis, managerial interventions will shift more observations from the bin immediately preceding 1.0 to the bin immediately following 1.0. This should result in standardized differences that are unusually negative (positive) for the bin immediately before (after) 1.0. Because

[11] As discussed in Dichev and Skinner (2002), there is no theory that specifies the correct bin width; the researcher needs to choose bin widths that are fine enough to observe changes in the shape of the distribution and wide enough to filter out noise. Research suggests such balance is achieved by selecting bin widths equal to $2(IQR)n^{-1/3}$, where *IQR* is the interquartile range of the variable of interest and *n* is the number of observations (Silverman 1986; Degeorge, Patel and Zeckhauser, 1999). In our sample, this value is 0.007. We round up to 0.01 because this is the closest round number that defines bins in such a way that bins will end (begin) immediately before (after) the current ratio value of 1.0.

[12] The variance of the difference between the observed and expected number of observations in interval *i* is constructed following Beaver et al. (2007) as $Np_i (1 - p_i) + (1/4)N(p_{i-1} + p_{i+1})(2 - p_{i-1} - p_{i+1})$

the intervals before and after the 1.0 current ratio are not independent, for statistical tests we draw inferences by focusing on whether the bin immediately preceding the cutoff is significantly negative (Burgstahler and Dichev 1997; Brown and Caylor 2005).

Figure 1a depicts the current ratio distribution. For parsimony, current ratio values between 0.01 and 7.0 are displayed. Visual inspection reveals a positively skewed distribution with a discontinuity at the bin immediately preceding the current ratio of 1.0, denoted with the light gray arrow. The significance of the discontinuity is supported statistically. The standardized difference for the interval immediately to the left of 1.0 is -4.22 (5.52 to the right), which exceeds the value of -2.33 required of a standard normal test statistic for a 1% significance level in a one tailed test.

Because the current ratios in our sample result from numerators and denominators that are not themselves normally distributed variables, as evidenced by the descriptive statistics in Table 1 Panel B, we do not specify *a priori* the distribution of current ratios, except that it should be smooth. To address the distributional question, we create a simulated pseudo current ratio distribution using the same 717,747 firm-quarter observations in Figure 1a. After sorting all observations in ascending order by current assets, we form 7,177 groups based on the current asset ranking (approximately 100 observations per group). Within each group, we randomly assign the related current liability observations (a pseudo current liability). We choose pseudo current liabilities within current asset groups so as to assign a current liability value that would be economically reasonable given the level of current assets.

We then sort by current liabilities in the same fashion and form 7,177 groups based on the current liability ranking. Within each group, we randomly assign the related

current asset observations (a pseudo current asset value). Having a pseudo current asset and pseudo current liability value for each observation, we then form a pseudo current ratio equal to the pseudo current asset divided by the pseudo current liability. We remove any pseudo current ratio where the pseudo current asset (liability) is exactly equal to the firm's originally reported current asset (liability) value to ensure that characteristics of the original distribution are completely purged. With a distribution of pseudo current ratios, we are able to assess how many observations fall within each current ratio bin of size 0.01. We repeat the generation of the pseudo current ratio distribution 100 times and average the number of observations in each bin. Finally, we round the average number of observations in each bin to the nearest whole number, and plot this simulated pseudo current ratio distribution in Figure 1b.

Relative to Figure 1a, the simulated pseudo distribution in Figure 1b is smoother, with no obvious discontinuity. The test statistic for the bin immediately preceding 1.0 is -0.516 (0.600 to the right of 1.0), not significant at conventional levels. In only one of the 100 individual pseudo current ratio distributions is the test statistic immediately preceding the 1.0 current ratio level significantly negative at the 1% level (the expected result under the null hypothesis). These results suggest that the discontinuity observed in Figure 1a is not a mechanical artifact.

Test of H2 – Attenuating Effects of Credit Tightness in the Economy

To examine H2 empirically, we begin by grouping the entire current ratio sample depicted in Figure 1a into quartiles based upon the effective federal funds rate; data are obtained from the Federal Reserve website.[13] Each observation is assigned the average

[13] http://www.federalreserve.gov/releases/h15/data/Monthly/H15_FF_O.txt

daily effective federal funds rate corresponding to the calendar month that matches the month of the fiscal quarter end. We plot these current ratio distributions by quartile of the effective federal funds rate in Figures 2a-2d.

Visual inspection of these four distributions reveals that the overall current ratio distribution shifts to the right as credit becomes tighter (proxied by increasing effective federal funds rates). Untabulated results show the median (mean) current ratio for the observations presented in the histograms increases from 1.727 (2.080) in the lowest effective federal funds quartile (Figure 2a) to 1.933 (2.196) in the highest effective federal funds quartile (Figure 2d). This is consistent with firms retaining more liquidity when the cost of credit is higher. Also, and related to our hypotheses, the current ratio discontinuity is visually striking as the effective federal funds rate increases. The test statistic for the current ratio bin immediately preceding (to the right of) 1.0 is -0.801 (1.223), -1.623 (2.569), -1.469 (1.884), and -4.796 (5.471) in Figure 2a, 2b, 2c, and 2d, respectively. Only in the highest quartile of the effective federal funds rate is the discontinuity statistically significant at conventional levels.

To test whether the observed difference in the discontinuity is larger in the highest quartile (Figure 2d) compared with the lowest quartile (Figure 2a), we follow the research design in Altamuro et al. (2005) and estimate the following OLS regression:

$$CR\_DIFF_b = \alpha_0 + \alpha_1 HFF_b + \alpha_2 TBIN_b + \alpha_3 (HFF*TBIN)_b + \varepsilon_b \quad (3)$$

where:

CR_DIFF_b is the difference between the expected number of observations and the actual number of observations in current ratio bin *b* from the distribution in which the bin resides, with bin width equal to 0.01. The expected number of observations in each bin *b* is estimated using the average number of observations in the bins immediately adjacent to bin *b*.

HFF_b	is an indicator variable that equals one if the observation is from the distribution in Figure 2d (i.e. the highest effective federal funds rate quartile), and zero if the observation is from the distribution in Figure 2a (i.e. the lowest effective federal funds rate quartile).
$TBIN_b$	is an indicator that equals 1 if the observations falls in the bin including the target current ratio of 1.0, -1 for the histogram bin immediately to the left of the target current ratio of 1.0, and zero otherwise.
*HFF*TBIN*	equals the product of *HFF* and *TBIN*.

In equation (3) the dependent variable, *CR_DIFF*, measures the unexpected number of observations in each bin of both of the current ratio distributions. The coefficient of *TBIN* captures the extent to which firms are more likely to have working capital surpluses and less likely to have working capital deficits when the effective federal funds rate is low. The coefficient on *HFF*TBIN* captures incremental discontinuity when the effective federal funds rate is high. We expect $\alpha_3 > 0$ under H2.

Estimation of equation (3) is presented in Table 2. The coefficient on *TBIN* is positive and statistically significant (α_1=34.750, p<0.01), suggesting that the discontinuity is statistically larger in the region of the target 1.0 current ratio than at other locations in the distribution when the effective federal funds rate is low. More importantly, the incremental coefficient on *HFF*TBIN* is positive and statistically significant (α_3=127.250, p<0.01), consistent with the discontinuity becoming more pronounced as the effective federal funds rate, our proxy for tight credit, increases.

Test of H2 – Firm-Quarter Observation Level Regressions

While the comparison of distributions across quartiles sorted on the effective federal funds rate has research design advantages (McNichols 2000), an alternative approach is to return to the observations comprising the current ratio distribution in Figure 1a and isolate the observations that reside on either side of the working capital

surplus/deficit threshold. This specification allows for an investigation of whether the level of the effective federal funds rate affects the probability a firm meets or exceeds a current ratio of 1.0, controlling for other firm specific factors.

We estimate the following logistic regression for only the firm-quarter observations in the current ratio bins 0.99 and 1.00, that is, firm-quarter observations residing in the current ratio intervals [0.99, 1.00) and [1.00, 1.01), respectively:

$$\Pr(MB_{i,t}) = \delta_0 + \delta_1 FF_{i,t} + \delta_2 LnASSETS_{i,t} + \delta_3 LOSS_{i,t} + \delta_4 DEBT_{i,t} + \delta_5 LEASE_{i,t} + \delta_6 MB_{i,t-1} + \mu_{i,t} \quad (4)$$

where:

$MB_{i,t}$	is an indicator that equals one if the ratio of current assets (*actq*) to current liabilities (*lctq*) reported by firm *i* in quarter *t* is in the interval [1.00, 1.01) and zero otherwise.
FF	equals the average daily effective federal funds rate as reported by the Federal Reserve for the calendar month associated with the final month of fiscal quarter *t* of firm *i*.
LnASSETS	equals the natural logarithm of total assets (*atq*) reported by firm *i* in quarter *t*.
LOSS	is an indicator that equals 1 if firm *i* reported income before extraordinary items (*ibcomq*) less than zero in quarter *t*, and zero otherwise.
DEBT	is an indicator that equals 1 if firm *i* reported either short term debt (*dlcq*) or long term debt (*dlttq*) at quarter *t*, and zero otherwise.
LEASE	is an indicator that equals 1 if firm *i* reported total minimum rental payments (*mrct*) in fiscal year *y* containing quarter *t*, and zero otherwise.[14]

The dependent variable, *MB*, indicates whether the firm avoided reporting a working capital deficit. If this outcome is more likely when the effective federal funds rate is higher, we expect $\delta_1 > 0$. We include firm size (*LnASSETS*) to proxy for other, unspecified, reasons current ratio information may not be used for judging the firm. For example, larger firms have richer information environments (Atiase 1985) that provide better and more direct information about liquidity and creditworthiness, inducing reduced

[14] Minimum lease payment information pertaining to leases the firm has entered into is not disclosed in Compustat on a quarterly basis. As such, we assume that any lease commitments outstanding at fiscal year end were also outstanding during each quarter of the fiscal year.

reliance on the current ratio. Second, if auditors are less likely to issue a going concern opinion for larger firms (McKeown et al. 1991; Behn et al. 2001), financial statement information that might otherwise underpin a going concern opinion, such as a working capital deficit, is more likely to be ignored. These factors imply $\delta_2<0$.

We include an indicator for negative net income (*LOSS*) to control for the economic condition of the firm and to rule out the possibility that the current ratio discontinuity is somehow uncovering the profit/loss discontinuity (Hayn 1995; Burgstahler and Dichev 1997; DeGeorge et al. 1999; Beaver et al. 2007). If poor economic condition results in both a reported loss and a lower current ratio, we expect $\delta_3<0$. If, on the other hand, management knows the firm will report a loss, they may have more incentive to avoid reporting a working capital deficit, since two negative signals may exacerbate the negative views of those evaluating the firm's creditworthiness. This would imply $\delta_3>0$. Given the competing explanations, we do not have a prediction about this coefficient.

We include two indicator variables, *DEBT* and *LEASE*, to proxy for the presence of explicit lending or leasing agreements that may contain current ratio covenants. To the extent that firms are concerned with avoiding working capital deficits due to explicit contracting covenants, we expect $\delta_4>0$ and $\delta_5>0$. On the other hand, stakeholders who have implicit contracts with the firm may rely more heavily on current ratios from financial reports because they have less access to alternative information that an explicit contract could specify. In such a case, we would expect $\delta_4<0$ and $\delta_5<0$. Which effect dominates overall is difficult to specify *ex ante*, so we do not make signed predictions with respect to *DEBT* and *LEASE*.

Finally, we include the one quarter lagged value of the dependent variable. Firms who avoided a working capital deficit in the prior quarter likely have incentives to continue to do so, whereas firms who did not avoid in the prior quarter likely face lower incentives to avoid in the current quarter. Moreover, including working capital deficit avoidance in the prior quarter helps control for firm specific factors that may have not changed over the previous quarter, such as the operating environment. Both factors imply $\delta_6>0$.

In Panel A of Table 3, we provide descriptive statistics on these variables for the current ratio bins of interest (i.e., bins 0.99 and 1.00) along with the four immediately preceding and following bins, included to provide benchmarks for interpreting the activity in bins 0.99 and 1.00. With respect to the effective federal funds rate, there is no discernible pattern across the current ratio bins, except that bins after bin 1.00 generally exhibit higher rates than before bins 1.00. Interestingly, the 0.99 bin reports the lowest average effective federal funds rate (5.229%) while the 1.00 bin reports the highest (5.611%). This is consistent with firms who find themselves just below bin 1.00 and facing a tight credit environment taking actions to move from bin 0.99 to bin 1.00.

A similar pattern emerges when we examine firm size. While the overall pattern is not inconsistent with the total assets of firms increasing as the current ratio bin increases, the second highest average asset value reported appears in bin 0.99 ($106.911 million) and the lowest in bin 1.00 ($74.515 million). This is consistent with smaller firms moving out of the 0.99 bin and into the 1.00 bin to avoid reporting a working capital deficit. The percentage of firms reporting losses tends to increase as the current ratio decreases, and there are slightly more firms reporting losses in the 1.00 bin (43.6%)

than in the 0.99 bin (44.3%). This finding suggests that the discontinuity in the current ratio distribution is not simply a manifestation of the discontinuity at zero in the earnings distribution. With respect to our proxies for explicit contracts, the proportions of observations reporting debt or minimum lease payments reach their lowest levels in the 1.00 bin. This is potentially consistent with firms who rely more on implicit rather than explicit contracts having more incentives to avoid working capital deficits.

In Table 3 Panel B, we report in column (3) the estimation of equation (4). Consistent with predictions and corroborating previous inferences, the coefficient on the effective federal funds rate is positive and significant (δ_1=0.038, p=0.002). This result holds incrementally to other factors, each of which is an important predictor in its own right. As expected, larger firms (δ_2=-0.030, p=0.026) appear less concerned with avoiding working capital deficits, while firms that have avoided a working capital deficit in the prior quarter (δ_6=0.346, p<0.001) are more likely to continue to do so. Firms reporting losses are less likely to avoid working capital deficits (δ_3=-0.141, p=0.059), consistent with poor operating performance translating into both losses and lower current ratios. Firms with debt and leases are both less likely to avoid working capital deficits (δ_4=-0.499, p=0.002; δ_5=-0.278, p=0.001). This evidence suggests that the results documented here are not simply additional evidence of management intervention to avoid covenants in explicit contracts (Dichev and Skinner 2002).

Analysis of Pseudo Current Ratio Reference Points

To provide additional evidence on the importance of avoiding working capital deficits, we also estimate equation (4) for the bins preceding the 0.99 bin and following the 1.00 bin. In particular, we compare firms in current ratio bins 0.95 with 0.96, 0.97

with 0.98, 1.01 with 1.02 and 1.03 with 1.04, and report the results in columns (1), (2), (4) and (5) of Table 3 Panel B, respectively. In these comparisons, we define firms reporting the higher current ratio of the pair as achieving a pseudo current ratio target. For example, when comparing firms in the 0.95 and 0.96 current ratio bins, observations located in the 0.96 (0.95) are assigned value of one (zero) when measuring the dependent variable. Of course, 0.96 is not theoretically an important reference point (it is a pseudo target). Thus, if the results we report in column (3) reflect a managerial response to loss averse stakeholders, we should see our hypothesized effects only in column (3) and not in the other columns.

As noted above, each explanatory variable is statistically significant in column (3), which examines the propensity to avoid a working capital deficit. However, none of these factors is important for achieving any of the pseudo current ratio targets, with one exception for whether the firm reported a current ratio above the pseudo reference point in the prior quarter. This effect confirms that the level of a specific firm's current ratio is somewhat stable quarter over quarter. Further, that the explanatory variables are significant only in Column 3 is not a manifestation of spurious variation in the explanatory variables. The standard errors across all comparison groups are very stable across Columns (1) – (5), with statistical significance in Column (3) being driven primarily by a larger magnitude point estimate. The global performance of each prediction model is also highest in Column 3. Relative to the other columns, the model in Column 3 generates the highest proportion of correctly classified observations and the largest area under the ROC curve.

How Do Managers Intervene to Achieve Current Ratios of 1.0?

Collectively, the regression results presented in Table 3 are consistent with managers taking (unspecified) actions to avoid working capital deficits. Managers might increase reported working capital by, for example, changing working capital accrual estimates, reclassifying short term debt to long term debt under the intent and ability to refinance provisions of SFAS 6 (Gramlich et al. 2001; Gramlich et al. 2006), and by selling more product so that the gross margin is capitalized on the balance sheet (in cash or receivables). Identifying strategic working accrual estimation changes is difficult because of the lack of granularity in Compustat data. For example, accounts receivable are reported net of the allowance for doubtful accounts, which prevents examination of allowance estimation changes. As a result, we use a more aggregate approach.

In particular, we examine how the components of total current assets and total current liabilities differ between firms in the 0.99 current ratio bin and the 1.00 current ratio bin. With respect to the composition of current assets, if managers push product sales to capitalize profit margins and/or purposefully underestimate the allowance for doubtful accounts, we expect inventory (net accounts receivable and cash) to comprise a smaller (larger) proportion of total current assets for firms in the 1.00 current ratio bin compared to the 0.99 current ratio bin.[15] With respect to current liabilities, extant research suggests firms strategically reclassify short term debt as long term under SFAS 6 (Gramlich et al. 2001; Gramlich et al. 2006). This would imply that the proportion of short term debt in current liabilities would be smaller for firms in the 1.00 current ratio

[15] Another possible real activity by managers is to, within inventory, capitalize more costs by increasing production to move inventory from raw materials to work in process and finished goods. This would imply that within the inventory account, the proportion of raw material (work in progress and finished goods) would be higher for firms in the 1.00 current ratio bin. However, detailed disclosure of inventory components in the quarterly Compustat database is not well populated until 2005, which prevents a formal assessment during our sample period.

bin compared with the 0.99 current ratio bin. Moreover, the proportion of total outstanding debt that is long term should increase if short term debt is being reclassified as long term.

In Table 4, Columns A-C we examine the proportion of inventory, net accounts receivable and cash within total current assets. Inventory comprises 22.9% of total current assets for firms in the 1.00 current ratio bin, statistically smaller than the 25.6% observed for firms in the 0.99 current ratio bin. This 2.7% difference in proportional inventory is offset by increases in proportional net accounts receivable and cash of 1.4% and 1.5%, respectively. These differential proportions of net accounts receivable and cash are statistically significant and are consistent with managers selling product to capitalize product margins and, perhaps, reducing the allowance for doubtful accounts.

We also conduct proportion comparisons for adjacent current ratio bins that precede and follow the 0.99 and 1.00 current ratio bins. If managers intervene to avoid reporting working capital deficits, we should not observe systematic differences in the proportions of current asset components in adjacent current ratio bins. We find no significant difference for any adjacent bin comparison with one exception. The proportion of inventory (net accounts receivable) is statistically lower (higher) in the 1.01 current ratio bin compared with the 1.02 current ratio bin. This result is consistent with managers attempting to avoid a working capital deficit but "overshooting" the 1.00 bin. Since selling product to capitalize margins is a real activity, it is likely difficult to know before the close of a fiscal period precisely how much profit margin capitalization will be required to avoid reporting a working capital deficit. Managers may, as a result, sell enough product that the current ratio increases past 1.00 to 1.01, in which case the

proportion of inventory (accounts receivable) will be driven downward (upward), relative to the 1.02 bin proportions.

Turning to the composition of total current liabilities in Column D of Table 4, we find that the proportion of short term debt is smaller on average for firms in the 1.00 current ratio bin compared with firms in the 0.99 bin. The difference in proportions of 2.1% is statistically significant, and we observe no significant differences when investigating short term debt proportions in adjacent current ratio bins. To assess whether these results are consistent with reclassification of short term debt to long term, in Column E we examine the proportion of total outstanding debt that is long term. If short term debt is reclassified to avoid reporting working capital deficits, the proportion of total debt that is long term should increase. We observe a larger proportion of long term debt to total debt for firms reporting a surplus versus a deficit (60.9% vs. 59.9%), but the difference is not statistically significant. We also observe no significant difference in the proportion of long term debt to total debt for any of the other current ratio bin comparisons. The evidence is insufficient to conclude that the decrease in short term debt results from managerial intervention via debt reclassification, so it remains unclear how to interpret the smaller proportion of short term debt for firms in the 1.00 bin. In untabulated analysis, we find no statistically reliable differences in any other current liability proportion (accounts payable, taxes payable and other current liabilities).

Viewing these results as whole, we find support for the view that managers appear to intervene to increase current assets by selling more product to capitalize margins on the balance sheet and, possibly, by reducing the allowance for doubtful accounts.

Debt Covenant Hypothesis in Disguise?

One alternative interpretation of our results is that the current ratio target of 1.0 happens to be a common feature in debt covenants, and our results supporting H1 just confirm Dichev and Skinner's (2002) finding that firms attempt to avoid violating explicit debt covenants. Given the negative coefficient on *DEBT* in the logistic regressions reported in Table 3, Panel B, Column (3), we view this as unlikely. Nonetheless, to investigate this alternative interpretation more directly, we first extract all unique deals in Dealscan during 1988-2008, where we find 2,734 unique contracts out of 21,191 containing current ratio covenants. On one hand, that only 12.9% of contracts contain a current ratio covenant suggests debt covenants are not likely to be a key driver in our large sample distribution tests in Figure 1a. On the other hand, among the debt contracts that do explicitly contain current ratios, the current ratio of 1.0 appears to be the most frequent. In Figure 4a, we plot the distribution of current ratio values in the 2,734 sample debt contracts. The bin containing the current ratio of 1.0 represents over 35% of the observations. The next most frequent is 1.5, just under 15% of the observations.

We hesitate to over-interpret these descriptive results. However, one possible explanation for why a current ratio of 1.0 is most common among contracts available in Dealscan is that contract designers internalize the effects of stakeholder loss aversion. That is, lenders may believe that creditors and auditors evaluate the firm asymmetrically around a current ratio reference point of 1.0. In such a case, it would be rational to put a covenant in place that allows the lender to reassess its contract terms with the company.

While we can never fully rule out the explicit contracting explanation, to help further mitigate this concern, we undertake two analyses. First, to identify the portion of the total sample that is least likely to have binding current ratio covenants, we isolate the

108,229 firm quarter observations from Figure 1a reporting no short term or long term debt. In Figure 4b, we replicate our analysis from Figure 1a and plot the frequency distribution for this subset of observations using bin sizes of 0.02. The distribution results reveal a visually salient spike exactly at the current ratio value of 1.0, with a corresponding significant test statistic of -4.560 (7.096 to the right of 1.0). This result suggests that avoiding working capital deficits is important even for firms not reporting debt of any sort, which makes the explicit contracting explanation less likely.

As a second analysis, in untabulated results, we also re-estimate our regression model (2) and include an indicator variable that equals one when a firm reports a current ratio covenant exactly equal to 1.0 in Dealscan and zero otherwise. The coefficient is positive, as the debt covenant hypothesis would predict, but not statistically significant (p = 0.217) and including the indicator does not affect the inferences drawn from results reported in Table 3 Panel B. The lack of statistical significance is likely due to low power, as there are only 3 (8) observations with an explicit 1.0 current ratio covenant in the 0.99 (1.00) current ratio bins.[16]

IV. Extension to International Setting

The predictions of loss aversion should not be unique to U.S. firms. To provide additional evidence, we expand our analysis to an international setting. If loss aversion is a pervasive phenomenon, we expect to see working capital avoidance internationally. Stated formally:

[16] For all 1,564 firm quarters in our sample where we can identify a current ratio in Dealscan explicitly equal to 1.0, the mean, median and standard deviation of the reported current ratios are 1.67, 1.37 and 1.22 respectively. The average (median) firm reports current ratios well in excess of 1.0, suggesting 1.0 as a covenant value does not conform with the tight covenant "tripwire" type value suggested by Dichev and Skinner (2002).

H3: International firm current ratios are managed to avoid working capital deficits.

An underpinning assumption for H3 is that financial statement information, on average, provides decision-useful information to users of financial statements. Ball et al. (2000) point out that the legal origins of countries influence the design of accounting rules; they argue that in code law countries financial reports are less informative to financial market participants. If so, the reports should also be less likely to be used for making judgments. This implies the following hypothesis:

H4: International firm current ratios are managed to avoid working capital deficits more so in common law countries than in code law countries.

To examine H3 and H4, we collect the 387,321 unique observations available on the quarterly Compustat Global database from inception through fiscal year 2008 reporting nonzero total assets (*atq*). Applying the same sampling criteria as in the analysis of US firms, we remove 2,179 observations containing nonzero current assets (*actq*) and current liabilities (*lctq*), 37,893 observations from regulated industries, and 7,231 observations from the "Restaurants, Hotels and Motels" Fama and French (1997) industry. These restrictions result in a sample of 340,018 quarterly observations. We then use the country of incorporation code to classify each observation by country. We remove 45 observations where the country of incorporation is missing and for comparability with prior research, we retain observations from the countries examined in Leuz et al.'s (2003) investigation of international earnings management. Our final international sample contains 252,424 observations from 28 countries.

In Table 5 we provide descriptive statistics on current ratios by country, and by whether the country is a code law country or a common law country, applying the coding

used in prior research (Leuz et al. 2003, Ball et al. 2000; LaPorta et al. 1998). The largest numbers of observations come from Japan and the United Kingdom. The median current ratio ranges from a low of 1.172 in Pakistan to a high of 2.234 in Australia. Some countries, for example, Germany and the Philippines, have very large mean current ratios due to extreme values. However, we do not delete any potential outliers as they have little effect on the regions of the current ratio distribution in which we are interested. Overall the sample is roughly equally split between code and common law, with 47.7% of the sample representing code law countries.

Figure 3a presents the current ratio distribution. The distribution exhibits a discontinuity at 1.0, with a test statistic for the interval immediately to the left of a current ratio equal to 1.0 of -2.102 (3.34 to the right), significant at better than the 2.5% level in a one tailed test. This evidence supports H3. In Figures 3b and 3c, we present distributions separately for code law countries and common law countries, respectively. Visually the distribution appears to have a more striking discontinuity in common law countries. The test statistic for code law countries is -1.34 (0.890 to the right), which marginally exceeds the 10% significance level in a one tailed test. However, the test statistic for common law countries is -1.635 (3.83 to the right), significant at just above the 5% level. These results suggest that the effects are more pronounced in common law countries.

To address this issue formally, we re-estimate equation (3), replacing whether the firm faces a high or low effective federal funds rate with whether the firm is from a common law or code law county:

$$CR\_DIFF_b = \beta_0 + \beta_1 COMMON_b + \beta_2 TBIN_b + \beta_3 (COMMON*TBIN)_b + \psi_b \qquad (5)$$

where all variables are as defined above, except that *COMMON* equals one if the company is from a common law country and zero otherwise. If the discontinuity is more pronounced in common law countries, we expect $\beta_3 > 0$. Results of estimating equation (5) presented in Table 5 confirm this prediction. In particular, the coefficient on the interaction term is positive and significant (β_3=59.500, p<.01), implying a larger discontinuity in common law countries than code law countries.

Results from our international investigation suggest that managers respond to stakeholder loss aversion, particularly in common law countries, our proxy for when stakeholders are likely to be using financial statement information to make judgments. This corroborates the conclusions of Ball et al. (2000) while extending the focus from the income statement to the balance sheet. A more refined international analysis internationally could examine whether current ratio discontinuities are more pronounced in specific individual countries, or whether institutional arrangements help explain the factors that motivate managers to care about reporting a working capital deficit.

V. Conclusions and Limitations

We examine whether managers engage in balance sheet management to avoid reporting working capital deficits, as predicted by prospect theory. Distributions of current ratios reveal discontinuities at 1.0, consistent with predictions. The magnitude of the discontinuity increases as the tightness of credit in the economy, proxied by the effective federal funds rate, increases. This suggests variation in macro economic conditions influences the importance managers ascribe to avoiding working capital deficits. Examination of the observations immediately surrounding the current ratio value of 1.0 reveals the particular importance of avoiding working capital deficits. The

determinants of a firm's likelihood to report a given current ratio value are diagnostic for avoiding a working capital deficit but not for pseudo working capital targets. Relative to firms reporting a working capital deficit, firms reporting a working capital surplus report lower (higher) proportions of inventory (accounts receivable and cash), consistent with managers increasing sales volume so as to capitalize profit margins on the balance sheet and thereby increase reported current assets. Our results extend to the international setting, where we observe balance sheet management to avoid working capital deficits, with effects more pronounced for observations from common law countries where financial reports are more informative.

Collectively, the evidence supports the conclusion that managers intervene in balance sheet reporting to achieve a reporting objective based on loss averse stakeholders. While we cannot fully rule out explicit contracting on current ratios equal to 1.0, our empirical analysis is generally inconsistent with explicit contracting explanations. Our results are consistent with the view that a seemingly "irrational" behavioral decision theory has explanatory power for financial reporting. We leave to future research an investigation of the factors that might drive out the effects of stakeholder loss aversion on corporate financial reporting decisions.

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Table 1

Descriptive Statistics

Panel A: Distribution of Current Ratios by Fama French Industry

Fama French (1997) Industry Classification	N	Mean	Median	Std Dev
Agriculture	3,338	3.456	1.761	5.854
Aircraft	4,504	2.827	2.034	6.003
Almost Nothing	2,630	3.957	2.293	12.920
Apparel	12,135	3.686	2.540	16.008
Automobiles and Trucks	12,774	2.618	1.885	11.072
Beer & Liquor	3,074	2.947	1.710	12.026
Business Services	89,017	3.290	1.813	17.210
Business Supplies	12,808	2.537	1.933	15.334
Candy & Soda	1,998	2.077	1.453	3.964
Chemicals	16,321	2.986	1.919	9.600
Coal	1,680	4.385	1.514	26.148
Computers	35,744	3.515	2.298	7.648
Construction	6,936	2.615	1.503	14.784
Construction Materials	21,584	2.724	2.152	4.008
Consumer Goods	16,096	2.951	2.192	6.355
Defense	1,429	3.072	1.869	5.170
Electrical Equipment	13,739	3.076	2.211	4.525
Electronic Equipment	46,202	3.911	2.582	12.628
Entertainment	14,789	2.987	1.098	35.903
Fabricated Products	4,161	2.478	2.015	2.947
Food Products	15,578	2.414	1.738	6.671
Healthcare	14,116	5.241	1.743	71.232
Machinery	29,705	2.815	2.144	5.080
Measuring and Control Equipment	17,717	4.230	2.797	20.273
Medical Equipment	25,056	5.154	2.942	15.271
Non-Metallic and Industrial Metal Mining	12,185	13.644	2.537	66.731
Personal Services	7,888	2.883	1.435	19.646
Petroleum and Natural Gas	51,433	3.735	1.195	28.678
Pharmaceutical Products	39,897	7.906	3.573	34.777
Precious Metals	11,749	10.730	2.516	51.720
Printing and Publishing	8,119	2.428	1.592	7.965
Real Estate	5,612	4.688	1.439	34.307
Recreation	8,027	4.130	1.986	39.653
Retail	45,195	2.309	1.740	7.904
Rubber and Plastic Products	10,275	3.061	1.965	13.670
Shipbuilding, Railroad Equipment	1,785	2.096	1.778	2.303
Shipping Containers	2,911	1.952	1.646	1.671

Steel Works Etc	14,102	2.457	2.003	3.604
Textiles	6,704	2.739	2.532	1.451
Tobacco Products	960	2.474	2.124	4.372
Trading	11,263	17.059	1.918	91.207
Transportation	9,230	1.485	1.163	5.290
Undefined	12,135	12.276	1.587	84.085
Wholesale	35,146	2.828	1.784	14.754
TOTAL	**717,747**			

Panel B: Current Ratio Components (N=717,747)

Variable	Mean	Median	Std Dev	Q1	Q3
Current Ratio	4.173	1.967	27.747	1.248	3.222
Total Current Assets ($MM)	384.379	33.390	2,263.080	6.637	146.891
Total Current Liabilities ($MM)	262.458	14.653	1,809.600	3.139	71.479
Cash to Total Current Assets	0.298	0.179	0.346	0.046	0.492
Accounts Receivable to Total Current Assets	0.349	0.346	0.305	0.170	0.488
Inventory to Total Current Assets	0.276	0.251	4.003	0.016	0.455
Other Current Assets to Total Current Assets	0.074	0.042	0.209	0.018	0.085
Accounts Payable to Total Current Liabilities	0.416	0.378	0.256	0.222	0.580
Other Current Liabilities to Total Current Liabilities	0.344	0.319	0.261	0.123	0.527
Current Portion of Long Term Debt to Total Current Liabilities	0.193	0.104	0.225	0.003	0.319
Taxes Payable to Total Current Liabilities	0.033	0.000	0.076	0.000	0.033

Figure 1a: Current Ratio Distribution (N=717,747)

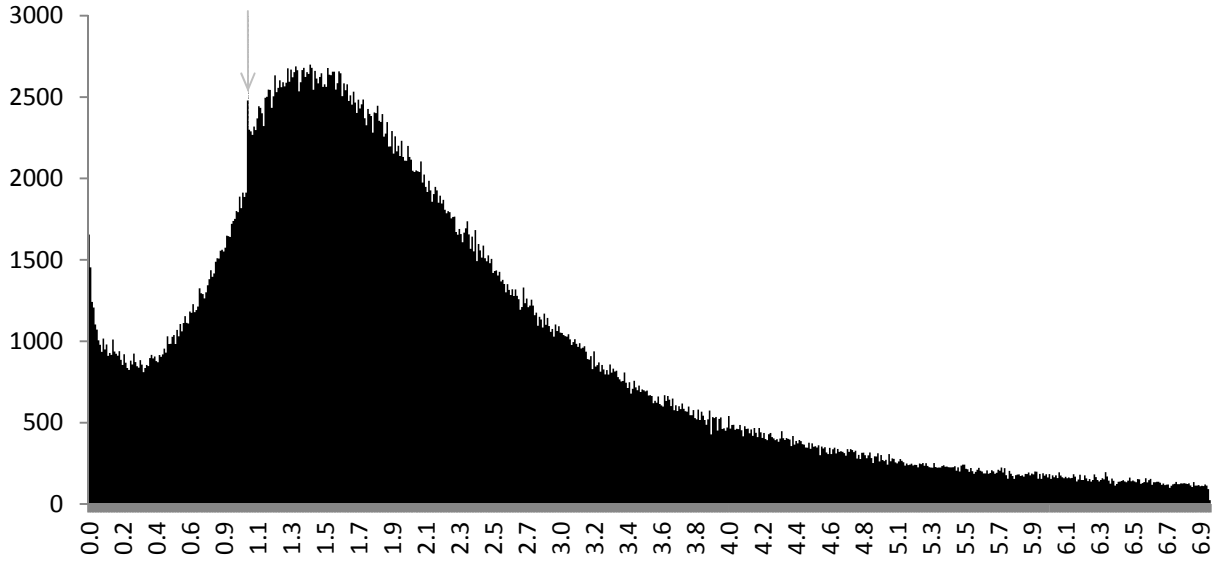


Figure 1b: Simulated Pseudo Current Ratio Distribution (derived from N=717,747)

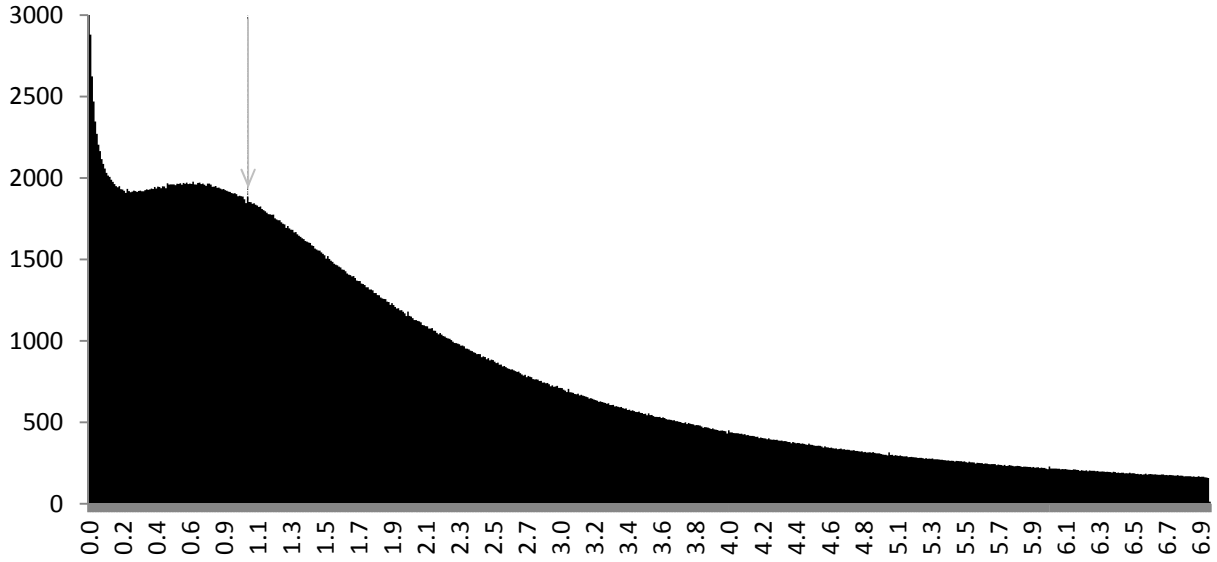


Figure 2a: Current Ratio Distribution for Lowest Quartile of Effective Federal Funds Rate (N=178,085)

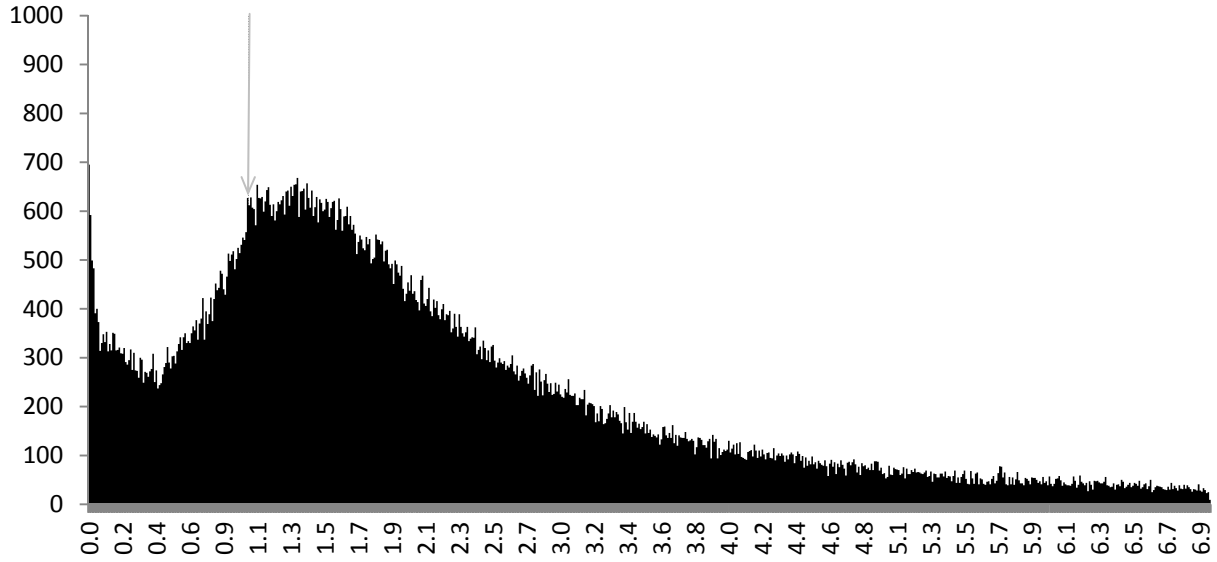


Figure 2b: Current Ratio Distribution for Second Lowest Quartile of Effective Federal Funds Rate (N=180,432)

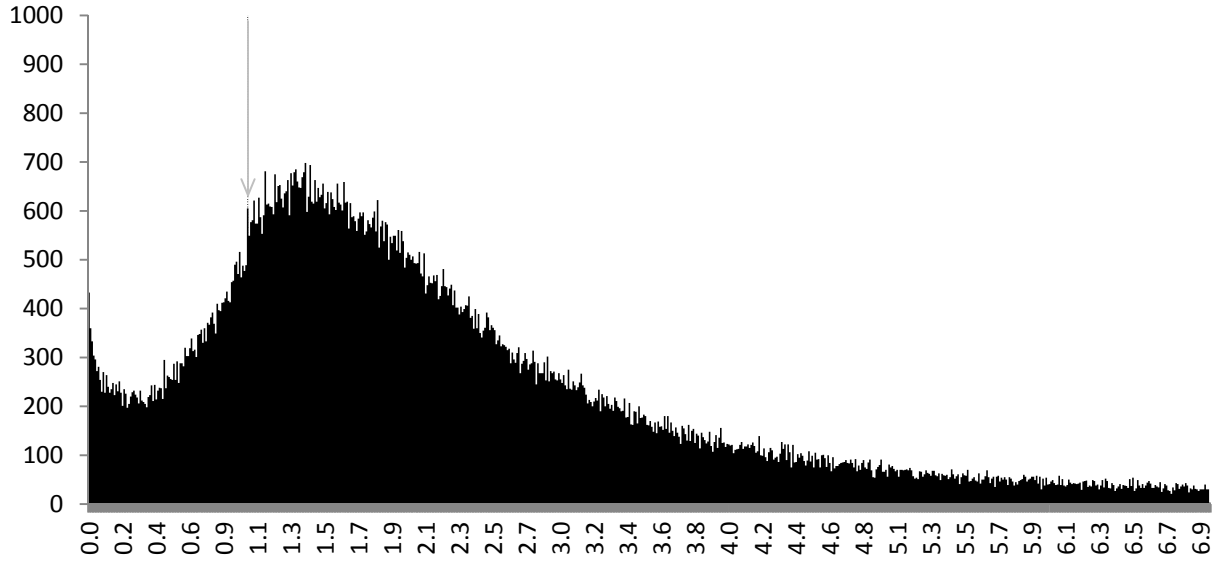


Figure 2c: Current Ratio Distribution for Second Highest Quartile of Effective Federal Funds Rate (N=178,437)

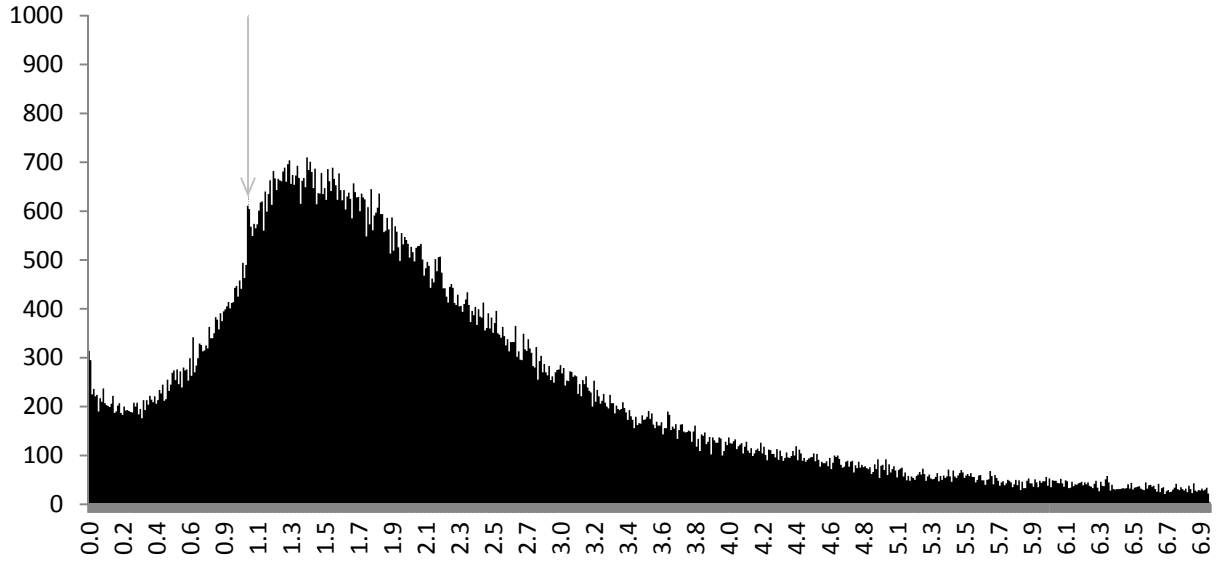


Figure 2d: Current Ratio Distribution for Highest Quartile of Effective Federal Funds Rate (N=180,793)

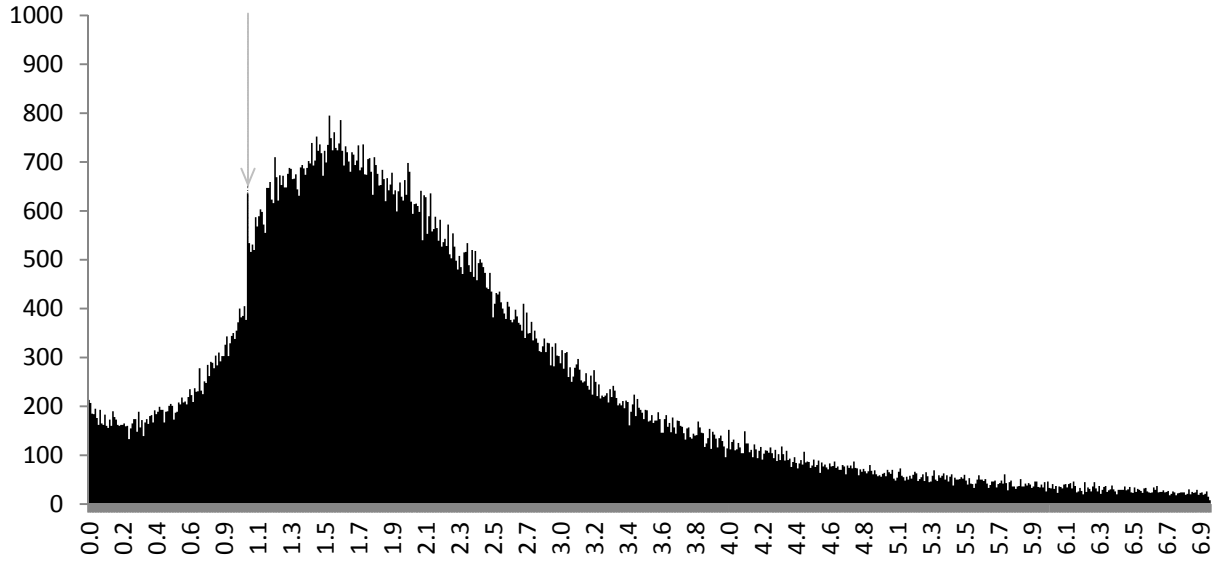


Table 2:
Regression of the Extent of the Discontinuity in the Current Ratio Distribution for Firm Quarter Observations where the Federal funds Rate is high and low

$$CR\_DIFF_b = \alpha_0 + \alpha_1 HFF_b + \alpha_2 TBIN_b + \alpha_3 (HFF*TBIN)_b + \varepsilon_b$$

Variable	Predicted Sign	
Intercept	(?)	-0.062
		(0.685)
HFF	(?)	0.063
		(0.969)
TBIN	(+)	34.750***
		(12.803)
HFF*TBIN	(+)	127.250***
		(18.106)
Adjusted R^2		0.110
# of observations[a]		1,396

Variable Definitions:
CR_DIFF is the difference between the expected number of observations and the actual number of observations in current ratio bin *b* from the distribution in which the bin resides, with bin width equal to 0.01. The expected number of observations in each bin *b* is estimated using the average number of observations in the bins immediately adjacent to bin *b*; *HFF* is an indicator variable that equals one if the observation is from the distribution in Figure 2d (i.e. the highest effective federal funds rate quartile), and zero if the observation is from the distribution in Figure 2a (i.e. the lowest effective federal funds rate quartile); *TBIN* is an indicator that equals 1 if the observations falls in the histogram bin including the target current ratio of 1.0, -1 for the histogram bin immediately to the left of the target current ratio of 1.0, and zero otherwise; *HFF*TBIN* equals the product of *HFF* and *TBIN*.
***, **, * Statistically significant at 1%, 5% and 10% levels in a two tailed test. Standard errors are presented in parentheses below the coefficient estimates.
[a]The total number of observations equals the 1,400 bins collectively presented in Figure 2a and Figure 2d, less four observations representing the first and last bins presented in each displayed distribution. For these observations, adjacent bins needed to construct the expected number of observations are unavailable, making the dependent variable *CR_DIFF* undefined.

Table 3:
Descritpive Statistics and Regression analysis of the Obsevations contained in Current Ratio Bins Surrounding the Working Capital Surplus and Deficit Threshold

Panel A: Descriptive Statistics for Firm-Quarter Observations in Current Ratio Distribution Bins Surrounding 1.0

	Current Ratio Histogram Bin									
	0.95	0.96	0.97	0.98	0.99	1.00	1.01	1.02	1.03	1.04
# Observations	1,888	1,818	1,913	1,886	1,913	2,479	2,299	2,290	2,268	2,319
CR	0.955	0.966	0.975	0.985	0.995	1.004	1.015	1.025	1.035	1.045
FF	5.266	5.272	5.234	5.247	5.229	5.611	5.478	5.376	5.455	5.465
ASSETS	84.606	87.008	88.588	92.481	106.911	74.515	102.617	106.485	109.180	104.376
LnASSETS	4.438	4.466	4.484	4.527	4.672	4.311	4.631	4.668	4.693	4.648
LOSS	0.464	0.478	0.478	0.469	0.443	0.436	0.434	0.435	0.444	0.444
DEBT	0.949	0.950	0.946	0.950	0.946	0.894	0.937	0.945	0.942	0.950
LEASE	0.729	0.741	0.726	0.742	0.743	0.664	0.721	0.730	0.735	0.730
YEAR	1996.180	1995.828	1996.179	1996.027	1996.094	1994.887	1995.361	1995.166	1995.228	1995.194

Panel B: Logistic Regression Analysis of the Determinants of Meeting or Exceeding Various Current Ratio Targets

$$\Pr(MB_{i,t}) = \delta_0 + \delta_1 FF_{i,t} + \delta_2 LnASSETS_{i,t} + \delta_3 LOSS_{i,t} + \delta_4 DEBT_{i,t} + \delta_5 LEASE_{i,t} + \delta_6 MB_{i,t-1} + \mu_{i,t}$$

Variable	Predicted Sign	(1)	(2)	(3)	(4)	(5)
Intercept	(?)	-0.285	-0.265	0.698***	-0.172	-0.139
		(0.192)	(0.190)	(0.189)	(0.166)	(0.162)
FF	(+)	-0.000	0.007	0.038***	-0.015	-0.007
		(0.012)	(0.012)	(0.012)	(0.011)	(0.010)
LnASSETS	(-)	0.006	0.002	-0.030**	0.003	-0.013
		(0.014)	(0.014)	(0.014)	(0.013)	(0.013)
LOSS	(?)	-0.021	-0.051	-0.141*	-0.061	-0.070
		(0.080)	(0.076)	(0.074)	(0.067)	(0.069)
DEBT	(?)	0.012	0.105	-0.499***	0.201	0.177
		(0.159)	(0.166)	(0.161)	(0.144)	(0.141)
LEASE	(?)	0.101	0.079	-0.278***	0.026	-0.017
		(0.079)	(0.084)	(0.083)	(0.075)	(0.072)
MB_{t-1}	(+)	0.212***	0.128*	0.346***	0.128*	0.225***
		(0.074)	(0.070)	(0.071)	(0.068)	(0.066)
Model Pr(χ^2)		0.099	0.468	0.000	0.327	0.033
Pseudo R^2		0.002	0.001	0.017	0.001	0.002
Current Ratio Bin Comparison		0.95 vs. 0.96	0.97 vs. 0.98	0.99 vs. 1.00	1.01 vs. 1.02	1.03 vs. 1.04
# of observations		3,380	3,456	3,992	4,190	4,187
# of observations $MB_t = 1$		1,642	1,720	2,251	2,091	2,112
Correctly Classified[a]		51.89%	51.53%	54.88%	51.98%	52.50%
Area Under ROC Curve (AUC)[b]		0.532	0.526	0.583	0.526	0.531

Notes: *CR* is the ratio of current assets (*actq*) to current liabilities (*lctq*) reported by firm *i* in quarter *t; $MB_{i,t}$* is an indicator that equals one if the ratio of current assets (*actq*) to current liabilities (*lctq*) reported by firm *i* in quarter *t* is in the higher of the two adjacent current ratio bins being compared and zero otherwise; *ASSETS* equals total assets (*atq*) reported by firm *i* in quarter *t*; *FF* equals the average daily effective federal funds rate as reported by the Federal Reserve for the calendar month associated with the final month of fiscal quarter *t* of firm *i*. *LnASSETS* equals the natural logarithm of *ASSETS*; *LOSS* is an indicator that equals 1 if firm *i* reported income before extraordinary items (*ibcomq*) less than zero in quarter *t*, and zero otherwise; *DEBT* is an indicator that equals 1 if firm *i* reported either short term debt (*dlcq*) or long term debt (*dlttq*) at quarter *t*, and zero otherwise. *LEASE* is an indicator that equals 1 if firm *i* reported total minimum rental payments (*mrct*) in fiscal year *y* containing quarter *t*, and zero otherwise. *YEAR* is the fiscal year.

***, **, * Statistically significant at 1%, 5% and 10% levels in a two tailed test. Robust standard errors clustered by firm are presented in parentheses below the coefficient estimates.

[a]Cutpoints used for classification are the unconditional mean of MB_t of the sample analyzed.

[b]The Receiver Operating Characteristic (ROC) curve analysis is used to quantify the accuracy of the logistic prediction equation at classifying participants as having misreported or not. The ROC curve is a graph of the sensitivity versus 1 – specificity of the prediction test. This area measures the global performance of the test. The greater the area under the ROC curve (AUC), the better the performance.

Table 4:
Examination of How Firms Avoid Small Working Capital Deficits

Current Ratio Histogram Bin	Number of Observations	Inventory to Total Current Assets	Accounts Receivable to Total Current Assets	Cash to Total Current Assets	Short Term Debt to Total Current Liabilities	Long Term Debt to Total Debt[a]
0.95	1888	0.235	0.454	0.193	0.269	0.604
0.96	1818	0.246	0.444	0.194	0.271	0.590
	difference	0.012	-0.011	0.002	0.001	-0.014
	predicted difference	(?)	(?)	(?)	(?)	(?)
	t-statistic	1.45	-1.24	0.25	0.19	-1.18
0.97	1913	0.246	0.437	0.199	0.273	0.597
0.98	1886	0.246	0.441	0.194	0.273	0.599
	difference	0.000	0.004	-0.005	0.000	0.002
	predicted difference	(?)	(?)	(?)	(?)	(?)
	t-statistic	0.02	0.53	-0.64	0.02	0.18
0.99	1913	0.256	0.439	0.190	0.272	0.599
1.00	2479	0.229	0.453	0.205	0.251	0.609
	difference	-0.027 ***	0.014 **	0.015 **	-0.021 ***	0.010
	predicted difference	(-)	(+)	(+)	(-)	(+)
	t-statistic	-3.62	1.76	1.99	-2.95	0.92
1.01	2299	0.241	0.448	0.195	0.265	0.611
1.02	2290	0.259	0.434	0.192	0.272	0.607
	difference	0.018 **	-0.014 *	-0.002	0.007	-0.004
	predicted difference	(?)	(?)	(?)	(?)	(?)
	t-statistic	2.47	-1.87	0.35	0.98	0.41
1.03	2268	0.251	0.446	0.195	0.270	0.611
1.04	2319	0.254	0.441	0.194	0.273	0.613
	difference	0.002	-0.005	-0.001	0.004	0.002
	predicted difference	(?)	(?)	(?)	(?)	(?)
	t-statistic	0.32	-0.72	-0.09	0.53	0.21

Notes: ***, **, * Statistically significant mean difference at 1%, 5% and 10% levels in a two tailed test, one tailed when predicted. [a]This ratio is only calculated when a firm has non zero total outstanding debt. The number of firms with non-zero total long term debt are 1791, 1727, 1809, 1791, 1809, 2217, 2154, 2163, 2,136, and 2203 for current ratio bins 0.95 through 1.04, respectively.

Table 5
Distribution of Current Ratios by Country

Country	N	Mean	Median	Std Dev
Austria	1,294	3.433	1.540	17.853
Belgium	1,460	2.108	1.412	2.791
Switzerland	3,789	2.778	1.872	4.004
Germany	11,985	10.468	1.814	374.131
Denmark	2,024	3.815	1.595	22.393
Spain	1,991	1.662	1.287	1.853
Finland	2,934	2.047	1.508	3.607
France	10,974	2.627	1.418	13.164
United Kingdom	36,728	4.097	1.490	26.511
Greece	2,139	1.826	1.470	7.513
Hong Kong	3,829	3.554	1.689	14.387
Indonesia	4,042	3.982	1.500	33.989
India	10,898	2.876	1.535	14.422
Ireland	1,403	3.587	1.572	8.909
Italy	4,106	2.126	1.415	6.591
Japan	47,750	2.017	1.417	13.137
Korea	41	1.393	1.331	0.332
Malaysia	19,990	3.247	1.721	10.445
Netherlands	2,809	1.918	1.436	5.390
Norway	3,682	6.640	1.717	100.819
Pakistan	2,301	2.060	1.172	29.418
Philippines	2,220	93.872	1.442	2201.140
Singapore	9,658	2.411	1.610	8.213
Sweden	7,377	3.134	1.754	17.891
Thailand	7,858	2.236	1.424	3.726
Taiwan	10,006	2.298	1.656	4.199
South Africa	5,502	2.698	1.507	12.709
Australia	33,634	10.983	2.234	164.659
TOTAL	**252,424**			
Code Law	120,623	4.964	1.519	321.965
Common Law	131,801	5.275	1.631	84.819

Figure 3a: Current Ratio Distribution for All International Observations (N=252,424)

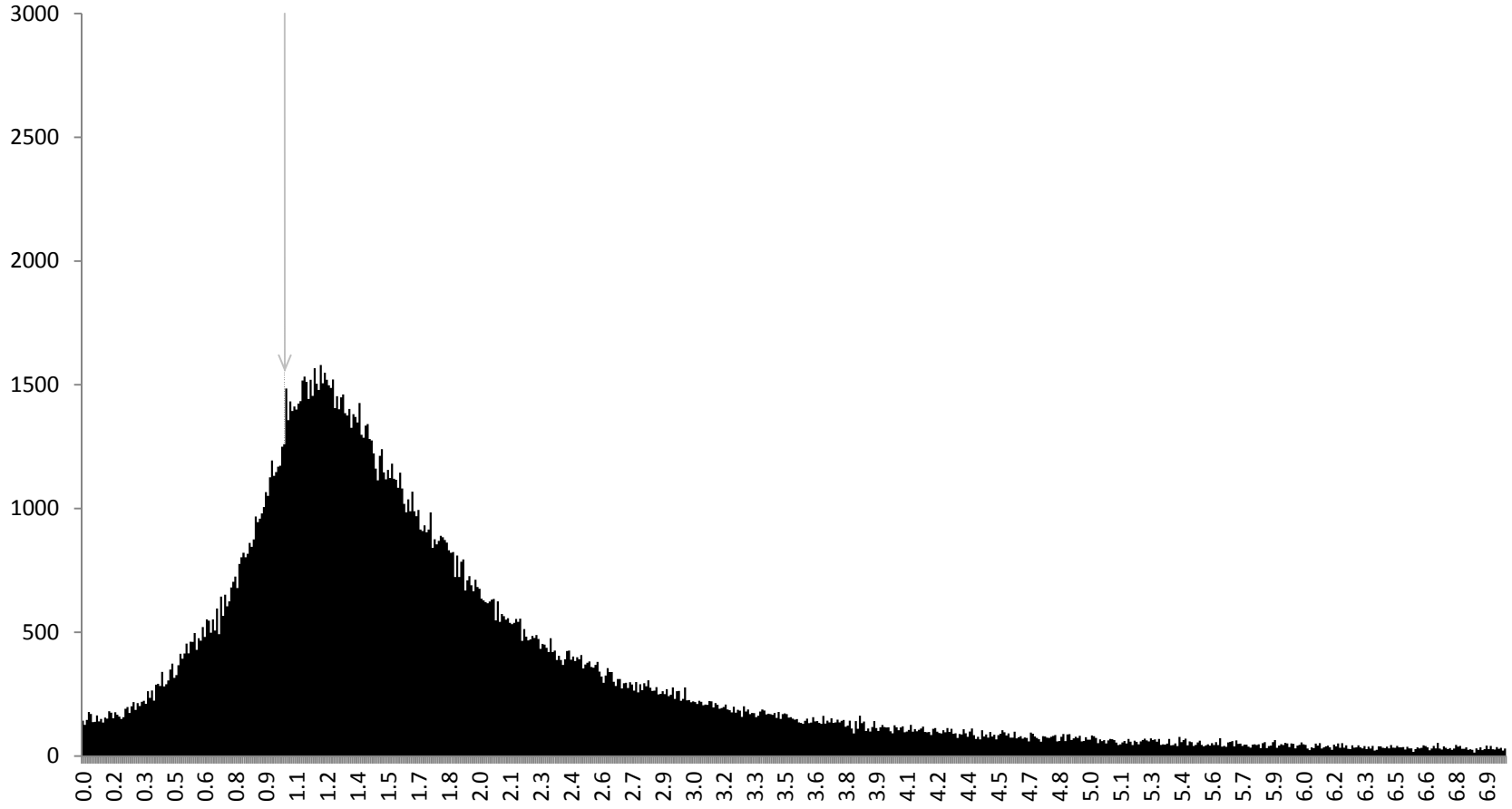


Figure 3b: Current Ratio Distribution for Code Law Country Observations (N=120,623)

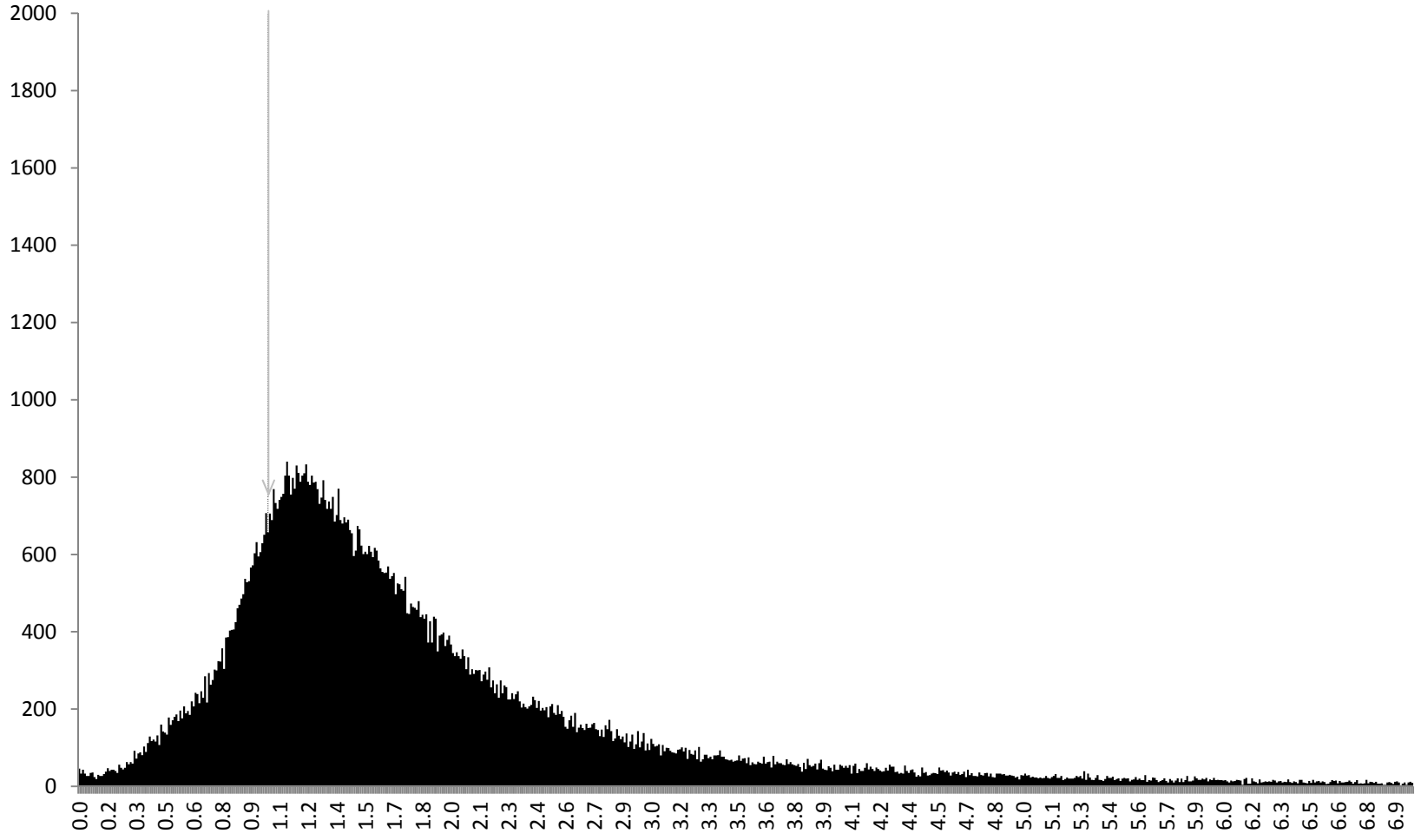


Figure 3c: Current Ratio Distribution for Common Law Country Observations (N=131,801)

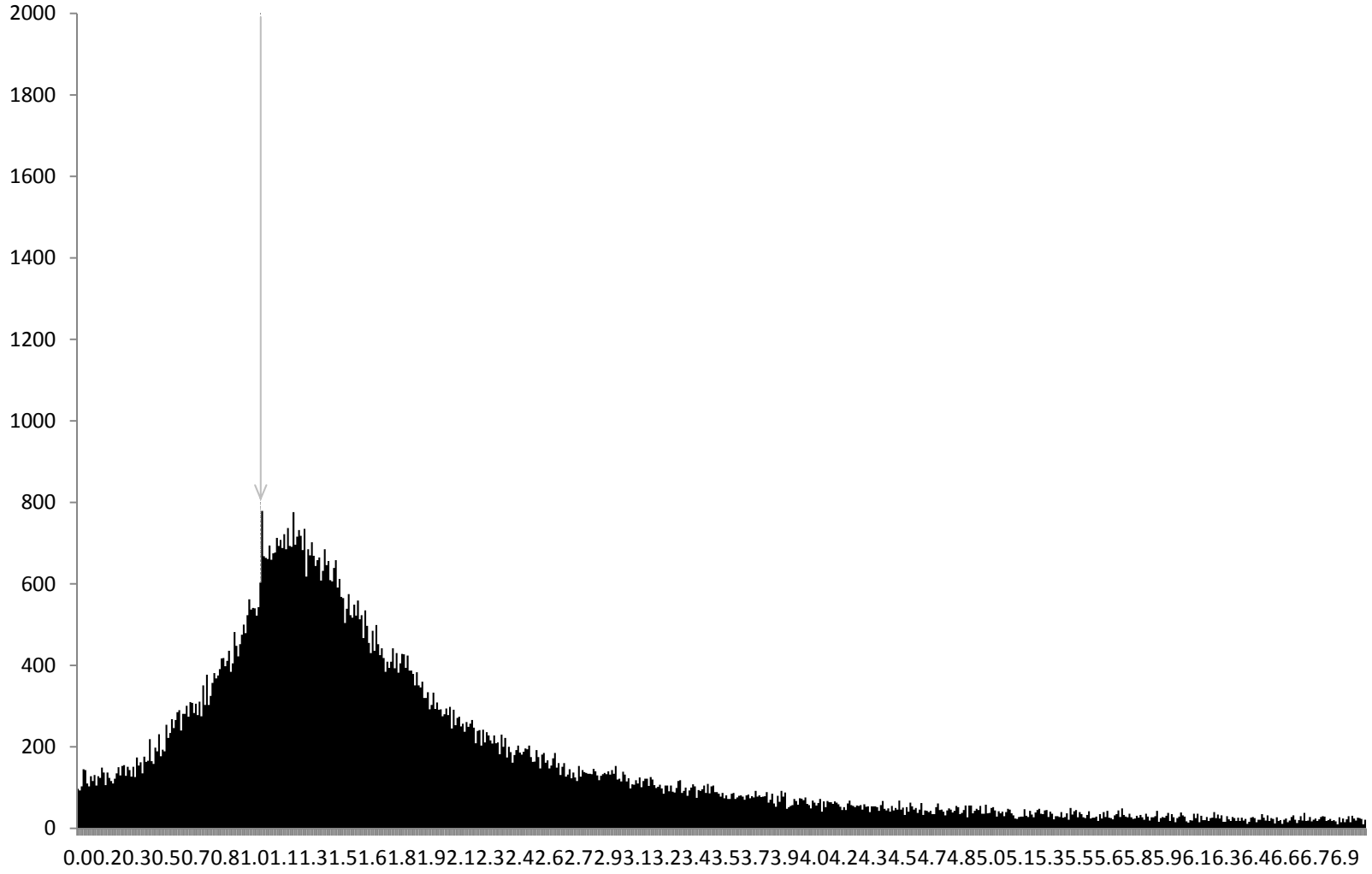


Table 5:
Regression of the Extent of the Discontinuity in the Current Ratio Distribution for Firm Quarter Observations in Common and Code Law Countries

$$CR\_DIFF_b = \beta_0 + \beta_1 COMMON_b + \beta_2 TBIN_b + \beta_3 (COMMON*TBIN)_b + \psi_b$$

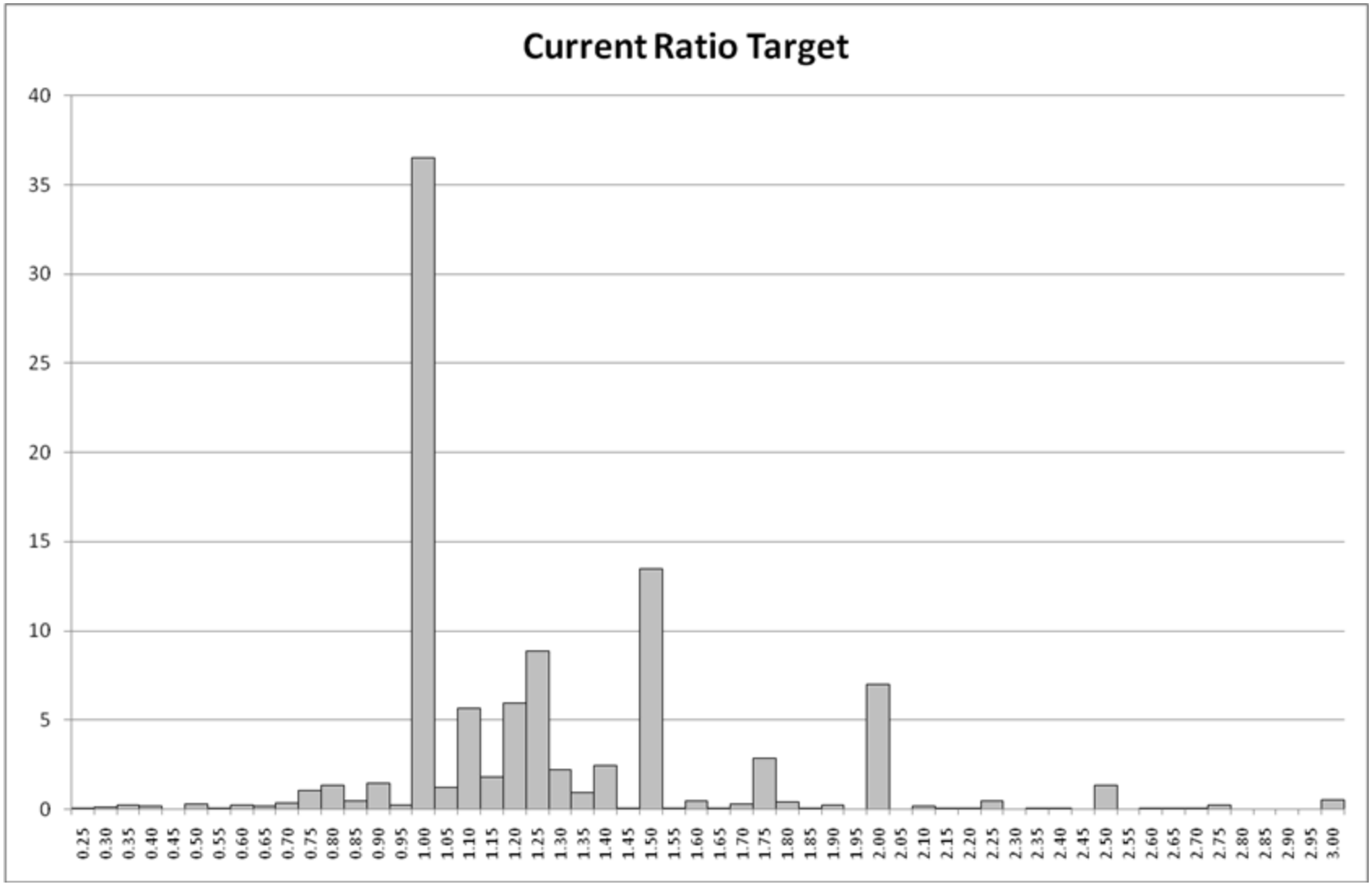
Variable	
Intercept	-0.007
	(0.668)
COMMON	-0.003
	(0.945)
TBIN	41.250***
	(12.487)
COMMON*TBIN	59.500***
	(17.659)
Adjusted R^2	0.050
# of observations[a]	1,396

Variable Definitions:
CR_DIFF is the difference between the expected number of observations and the actual number of observations in current ratio bin *b* from the distribution in which the bin resides, with bin width equal to 0.01. The expected number of observations in each bin *b* is estimated using the average number of observations in the bins immediately adjacent to bin *b*; *COMMON* is an indicator variable that equals one if the observation is from the distribution in Figure 3c (i.e. from a Common Law country), and zero if the observation is from the distribution in Figure 3b (i.e. from a Code Law country); *TBIN* is an indicator that equals 1 if the observations falls in the histogram bin including the target current ratio of 1.0, -1 for the histogram bin immediately to the left of the target current ratio of 1.0, and zero otherwise; *COMMON*TBIN* equals the product of *COMMON* and *TBIN*.

***, **, * Statistically significant at 1%, 5% and 10% levels in a two tailed test. Standard errors are presented in parentheses below the coefficient estimates.

[a]The total number of observations equals the 1,400 bins collectively presented in Figure 2a and Figure 2d, less four observations representing the first and last bins presented in each displayed distribution. For these observations, adjacent bins needed to construct the expected number of observations are unavailable, making the dependent variable *CR_DIFF* undefined.

Figure 4a: Histogram of the Percentage of Current Ratio Covenants Values in Dealscan (N=2,734)



Note: This histogram shows the percentage of current ratio covenants that attain particular values for 2,734 Dealscan debt contracts. The Y axis is the percentage of observations. The X axis represents the value of the current ratio stated in the debt contract.

Figure 4b: Current Ratio Distribution for Firms with No Reported Short Term or Long Term Debt (N=108,229)