Taking a Big Bath upon a Sovereign Downgrade

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Abstract

Firms whose credit ratings are equal to or above the sovereign rating of their country of domicile (bound firms) are more likely to be downgraded than other firms. This sovereign ceiling rule creates exogenous variations on the credit ratings of bound firms. We find that bound firms reduce discretionary accruals after sovereign downgrades, and are likely to experience a reversal of earnings subsequent to the accrual reduction. Bound firms are also more likely to manage earnings up upon a subsequent sovereign upgrade. Further, the reduction in discretionary accruals is more significant in countries with higher disclosure requirements or stronger shareholder protection, consistent with the notion that firms facing restraints of opportunistic disclosure behaviors are more likely to take advantage of peculiar negative shocks to conduct abnormal write-offs. Finally, we find that bound firms increase the impairments of intangible assets after sovereign downgrades. Overall, this study provides evidence that managers may strategically employ big bath accounting in response to negative economic shocks.

Keywords: Big bath accounting, Earnings management, Sovereign downgrade, Ceiling rule, Credit rating

1 Introduction

The literature of opportunistic accounting practices has predominantly focused on income-increasing accounting choices (Burgstahler and Dichev, 1997; Degeorge, Patel and Zeckhauser, 1999; Beatty, Ke, and Petroni, 2002; Bergstresser and Philippon, 2006). Nevertheless, anecdotal evidence tends to suggest that, during bad times such as economic downturns, "strategic" managers may accelerate the recognition of expenses and write off every possible asset as to increase earnings in the future (e.g., Accounting Onion, 2007; Fortune, 2012; Bloomberg, 2016).[1] By doing so, managers can attribute current lower earnings to a negative shock and thereby harvest the gains from future earnings. Thus far, limited academic studies are able to identify such "big bath accounting" upon economic downturns (Healy and Wahlen 1999; Dechow, Ge, and Schrand, 2010).[2]

Multiple empirical obstacles are impeding the growth in this stream of research. One notable challenge is that negative macroeconomic shocks affect various aspects of firms in the economy. In this regard, it is difficult to identify whether a write-off is due to a firm's deteriorating fundamentals or an external shock for which the manager could blame lower earnings when conducting a big bath. In other words, we can hardly pinpoint the effect of a particular negative shock on managers' accounting choices from the unobserved or unmodeled latent factors. In this paper, we endeavor to overcome this empirical challenge and fill in the important void by examining firms' accounting choices during the credit rating downgrades due to sovereign downgrades.

In particular, following a sovereign rating downgrade, a firm with a rating equal to or higher than the sovereign rating would be downgraded because firms' credit ratings are bound by the sovereign rating of its country of domicile. This rule, implemented by rating agencies, is called the sovereign ceiling rule of credit ratings (Almeida, Cunha, Ferreira, and Restrepo, 2017; Adelino and Ferreira, 2016; Basu, Naughton, and Wang, 2018).[3] Taking advantage of this rule, we examine the accounting choices of bound firms that are subject to a higher likelihood of being downgraded after a sovereign downgrade.

There are several merits of using this setting to examine the "big bath accounting". First, bound firms' credit ratings are forced to be downgraded due to an arbitrary rule

[1] See, "Big bath accounting is alive and well at Merrill Lynch, Citigroup and GM", Accounting Onion November 8, 2007. "Will JP Morgan take a 'big bath' on the London Whale", Fortune June 20, 2012. "Samsung needs a bath", Bloomberg October 6, 2016.

[2] Most accounting studies center on the discussion of "big bath accounting" upon CEO turnovers (e.g., Strong and Meyer, 1987; Elliott and Shaw, 1988; Pourciau, 1993; Murphy and Zimmerman, 1993).

[3] Basu, Naughton, and Wang (2018) examine how credit rating changes affect firms' voluntary disclosure decisions.

imposed by rating agencies upon a sovereign downgrade, not because these firms' fundamentals are particularly worse than other firms prior to the sovereign downgrade. In this respect, the negative shock on bound firms' credit ratings is exogenous. Second, the ceiling rule is a mechanical and external shock (rather than an internal factor), to which the manager can attribute the poor earnings and leave themselves unblamed. Third, since the bound firms are not fundamentally problematic, managers can wrap up with a personal assurance that the company is well poised to capture opportunities when the market conditions turn more favorable; also, they can seize personal benefits from the performance improvement or earnings reversal. Therefore, a sovereign downgrade and the ceiling rule provide managers with a necessary condition to take an earnings bath.

We conduct our tests by using a worldwide sample of 19,697 firm-year observations covering 2,606 firms from 61 countries over the 1999-2013 period. Using a difference-in-differences approach (Almeida, et al., 2017), we show that the accounting choices of bound firms primarily reflect the incentive of "taking a big bath" rather than an attempt to portray these firms as less troubled following a sovereign downgrade. That is, firms, which are likely to be downgraded due to the sovereign ceiling rule, report lower abnormal accruals following the downgrade events. The change is both statistically significant and economically relevant. For example, the estimated coefficient suggests that the return on assets for these firms has been manipulated downwards by 1.6% to 1.7% based on two abnormal accrual measures. This finding is consistent with the notion that managers manipulate earnings down in order to attribute poor performance to economic downturns and associated mechanical downgrades in credit ratings.

Furthermore, we employ a regression discontinuity design. In particular, due to the noise and inertia in credit ratings, firms with neighboring credit ratings are similar to each other regarding creditworthiness and investment opportunities (Cherneko and Sunderam, 2012). Therefore, firms just at or above the ceiling rule cutoff (the sovereign rating) are similar to those just below the cutoff in various dimensions. As such, the assignment of the ceiling rule among firms in the narrow band around the cutoff can be viewed as locally randomized (Thistlethwaite and Campbell, 1960; Lee and Lemieux, 2010). Therefore, the regression discontinuity design can help us isolate the effect of ceiling rule on earnings management. The estimated results show that bound firms manipulate earnings down by around 1.3% to 1.7%.

We conduct several robustness checks. One may be concerned that treated and control firms are quite different, which leads to a divergent pre-shock trend and undermines the validity of the difference-in-differences test. To address this concern, we

match treated and control firms based on a propensity-score match, and find highly consistent results using the matched sample (the discretionary accruals decline by 1.7% to 1.9% of total assets). Further, we examine the dynamic responses of discretionary accruals during the window around the sovereign downgrade. We find that the ceiling rule has no effect on discretionary accruals in years before the sovereign downgrade, leads to a reduction in discretionary accruals after the sovereign downgrade, and also establishes some reversal in the third year after the sovereign downgrade. This evidence is consistent with a parallel trend between treated and control groups and a causal effect of the ceiling rule on discretionary accruals.

We then perform a falsification test to strengthen the causal interpretation of our results. Our results could be caused by a higher sensitivity of treated firms to macro shocks such as credit crunches rather than the ceiling rule. We turn to the 2007-2009 global financial crisis to address this concern. During the global financial crisis, some firms are also subject to a macro shock but do not experience a sovereign downgrade and the ceiling rule. If we do not find a similar decline in discretionary accruals for these firms, we are able to attribute our main finding to the shock of ceiling rule caused by the sovereign downgrade. Indeed, we find no result using the global financial crisis as a new setting.

To substantiate our inference, we further examine the heterogeneous response of firms across different countries to sovereign downgrades. We find that the decline in earnings caused by the ceiling rule is more pronounced in countries with a higher disclosure requirement, a better investment profile, a higher anti-self-dealing index, or a higher anti-director index. This evidence is consistent with the notion that big bath accounting in normal times can be easily detected and seriously punished in countries with better regulations (Glaum, Landsman, and Wyrwa, 2018), and can be undertaken only in particular events such as sovereign downgrades.

Given that the discretionary accrual is an aggregated measure of accounting manipulation, we investigate the detailed accounting items that are directly related to big bath accounting. Our results show significant increases in impairments of goodwill and other intangibles following sovereign downgrade events. This strengthens our argument that treatment firms opportunistically employ income-decreasing accounting following a sovereign downgrade.

Finally, we investigate whether the earnings bath would help to pump up the performance in subsequent years. Our dynamic regression results discussed above suggest that treated firms indeed experience some earnings reversal relative to control

firms three years after the sovereign downgrade. To further check whether treated firms gain larger flexibility to pump up their earnings, we examine whether bound firms can manage earnings up when their country experiences a subsequent rating reversal, i.e., a sovereign rating upgrade after a downgrade. Using a difference-in-differences test, we find that firms whose country's rating was downgraded will increase discretionary accruals during a subsequent sovereign rating upgrade.

Our study joins a large body of literature on managerial opportunistic reporting (Healy and Wahlen 1999; Dechow, Ge, and Schrand, 2010; Beyer, Cohen, Lys, and Walther, 2010). The literature recognizes that "big bath accounting" is an important earnings management tool that helps managers seize private benefits (e.g., Strong and Meyer, 1987; Elliott and Shaw, 1988; Pourciau, 1993; Murphy and Zimmerman, 1993). However, prior studies primarily focus on the setting of CEO turnovers. For example, studies by Elliott and Shaw (1988), Strong and Meyer (1987), and Moore (1973) document strong associations between large discretionary write-offs and executive turnover. The literature fails to provide conclusive evidence supporting an anecdotal but prevailing view that managers tend to employ "big bath accounting" in economic downturns. For example, Riedl (2004) finds that write-offs are weakly associated with economic factors after 1995, although write-offs have a significant association with big bath accounting. In contrast, Glaum, Landsman, and Wyrwa (2018) show that goodwill impairment incidence is negatively associated with economic performance, but they regard the recognition of impairment as an indicator of good corporate governance. One key empirical challenge in this literature lies in separating managers' incentive to take write-offs that reflect declines in asset value from that to manipulate earnings (Francis, Hanna, and Vincent, 1996). Our paper makes use of "the ceiling rule" to overcome the empirical obstacle and adds to this literature by showing that managers employ big bath accounting to pass the buck to a mechanical credit rating change due to sovereign downgrades.[4]

Our paper is also related to the literature on international accounting research. Prior studies have examined how institutions such as adoptions of International Financial Reporting Standards (IFRS), legal and tax systems, capital market development, or foreign institutional investors affect firms' accounting practices in an international context (e.g., La Porta, Lopez-De-Silanes, Shleifer, and Vishny 1998; Ali and Hwang, 2000;

[4] Indeed, as compared to CEO turnovers, sovereign downgrades are less frequent. However, sovereign downgrades would affect many firms simultaneously, especially big corporations, resulting in an economically important multiplier effect. There is a large body of literature examining the asset pricing implication of asset write-offs (Elliott and Shaw 1988; Zucca and Campbell, 1992; Bartov, Lindahl, and Ricks, 1998; Comprix, 2000; Li, Shroff, Venkataraman, and Zhang, 2011).

Ball, Kothari, and Robin, 2000; Guenther and Young, 2000; Ball, Robin, and Wu, 2000, 2003; Ball and Shivakumar, 2005; Barth, Landsman, and Lang, 2008, Fang, Maffett, and Zhang, 2015). The general conclusion is that firms located in counties with worse institutions are more likely to have opaque financial reporting. We add to this stream of literature by showing that firms with better institutions could employ an alternative form of opportunistic accounting: they take a big bath under the circumstance of a sovereign bond downgrade.

The paper proceeds as follows. Section 2 discusses the sovereign ceiling rule of credit ratings, reviews related literature, and delineates research questions to be tested. Section 3 describes the data and sample selection and introduces the research design. Section 4 presents the main results and Section 5 shows additional tests. Section 6 concludes the paper.

2 Ceiling rule in crediting ratings and hypotheses development

2.1 Ceiling rule in credit ratings

The "*ceiling rule*" of credit ratings refers to the practice that rating agencies follow a relatively strict policy of not granting a private company a credit rating higher than the sovereign rating. Until 1997, such a ceiling rule was strictly implemented. In April of 1997, S&P relaxed its sovereign ceiling rule in three economies including Argentina, Panama, and Uruguay (Almeida et al., 2017). Although rating agencies have moved slightly away from strict enforcement of the sovereign ceiling rule since 1997, corporate ratings that violate the ceiling are still rare (refer to the detailed discussion in Almeida et al., 2017).

Several significant findings on rating agencies' practices are worth emphasizing (Almeida et al., 2017). First, bound firms (i.e., firms that have ratings equal to or above the sovereign rating) are more likely to obtain a rating downgrade, within and after the month of a sovereign downgrade, than unbound firms. Second, the rating downgrades of bound firms are due to neither of the following reasons: a) in a macroeconomic shock, the change in default probabilities can be non-linear – the increase in the credit risk of higher rated firms is much larger than that of lower-rated firms, and b) S&P will reevaluate only firms that have a credit rating above the sovereign by performing stress tests, which likely leads to the discontinuous change in bound firms' credit ratings. Therefore, Almeida et al. (2017) argue that "S&P continues to apply the sovereign ceiling rule in the event of a sovereign downgrade," which is a predetermined rule exogenously applied to all bound firms, regardless of their fundamentals.

To demonstrate that the ceiling rule is similarly applied to our sample, we examine the relationship between sovereign and corporate credit ratings. First, we show that firms with a higher credit rating than the sovereign rating are rare. In our sample, 88.1% of firms had a rating lower than the sovereign, 8.3% had the same rating, and 3.6% had a rating higher than the sovereign. These numbers are highly similar to those in Almeida et al. (2017), which are 88.2%, 8.4%, and 3.4%, respectively. Second, we show that a sovereign downgrade indeed leads to a higher probability of rating downgrade for bound firms. Figure 1 reports the frequency of corporate downgrade in the month before, the month of, and the month after a sovereign downgrade by groups. Downgrades are grouped according to the pre-downgrade distance between the corporate rating and its corresponding sovereign rating. The middle panel shows that in the month of the sovereign downgrade, over 50% of downgrades occurs within the group of firms that have exactly the same rating with the sovereign debt (distance = 0), much higher than the groups of unbound firms (distance < 0). As shown in the lower panel, one month after the sovereign downgrade, the downgrades of bound firms (distance ≥ 0) account for more than half of all downgrades. The upper panel shows, however, one month before the sovereign downgrade, corporate downgrades are evenly distributed across distance groups. These results are also very similar to Almeida et al.'s (2017).

2.2 Big bath accounting

Accounting literature has long argued that financial reporting can serve as a strategic tool for managers to achieve different interests (Healy and Wahlen 1999; Dechow, Ge, and Schrand, 2010; Beyer, Cohen, Lys, and Walther, 2010). For example, a large body of studies show that managers seek to manipulate the earnings as to meet analyst forecasts (e.g., Burgstahler and Dichev, 1997; Graham, Harvey, and Rajgopal, 2005), to avoid violating debt covenants (e.g., Watts and Zimmerman, 1986), or to pump up the equity price (e.g., Christie and Zimmerman, 1994).[5]

The majority of the literature focuses on income-increasing accounting methods. Only a handful of studies examines the income-decreasing accounting methods (i.e., big bath accounting) (e.g., Dechow, Ge, and Schrand, 2010). The prior literature on big bath

[5] Burgstahler and Dichev (1997) argue that meeting or beating an analyst forecast is an indicator of earnings management. Watts and Zimmerman (1986) show that managers seek to manipulate the earnings up as to prevent from violating the debt covenants. Christie and Zimmerman (1994) show that target firms appear to manipulate the earnings up prior to the announcement of M&A. Teoh, Welch, and Wong (1998) find that companies adjust the discretionary accruals up before the seasoned equity offering.

accounting predominantly examines the accounting choices around CEO turnovers. For example, Strong and Meyer (1987) find that discretionary write-offs are often associated with management changes. Consistently, Elliott and Shaw (1988) show that the new manager seeks to blame prior management for problems by increasing the discretionary write-offs. Pourciau (1993) find that incoming CEOs manage accruals to reduce earnings in the year of CEO turnover and increase them later. In contrast, Murphy and Zimmerman (1993) suggest that the turnover-related changes in accounting accruals are due mostly to poor performance instead of managerial discretion.

However, anecdotal evidence implies that big bath accounting often takes place when the company faces a negative shock. For example, in 2016, Samsung, one largest mobile manufacturer in the world, reported having battery problems in the Galaxy Note 7 release. This unexpected problem adversely affected the company's image and forced it to recall all Galaxy Note 7 smartphones. Although the scale of the recall is unprecedented for Samsung, Samsung reported a cost around three billion dollars which is much higher than the expected amount. Thus, Samsung was accused of implementing big bath accounting to lower its net income in 2016 and then will increase it in 2017 via washing away bad debts (Bloomberg, 2016). Surprisingly, few empirical works seek to examine the big bath accounting of firms in a negative shock. The significant gap between the real world and academic literature motivates us to examine the big bath accounting in the scenario of a corporate rating downgrade due to a sovereign downgrade.

2.3 Accruals management upon rating downgrades

It seems not obvious that companies subject to the ceiling rule due to sovereign downgrades would implement an income-decreasing accounting. In contrast, prior studies have shown that companies may seek to pump up the credit rating via manipulating earnings up (Liu, Subramanyam, Zhang, and Shi, 2018). For example, Alissa, Bonsall IV, Koharki, and Penn Jr (2013) find that firms use income-increasing earnings management when they are below their expected ratings. This finding is particularly relevant in our context.

According to the ceiling rule, when the sovereign rating has been downgraded, firms with a rating equal to or above the sovereign rating are more likely to be downgraded and thus adversely affected, compared to firms rated below the sovereign rating (Almeida et al., 2017). Importantly, the rating downgrades of these companies are mechanically driven by the ceiling rule rather than the deterioration in firm fundamentals. In this respect, the credit ratings of these firms are likely to be lower than what they expect. This

would give the (unexpectedly) downgraded firms an incentive to use income-increasing earnings management (Alissa et al., 2013). In a more general context, a prior study has shown that, instead of using big bath accounting, firms would rather use other accounting tools such as income-smoothing accounting to inflate their credit ratings (Jung, Soderstrom, and Yang, 2013).

In addition, it has been argued that an exogenous downgrade in a firm's credit rating would increase the degree of the firm's financial constraints (Tang, 2009; Almeida et al., 2017). An increase in discretionary accruals can potentially serve as a strategic tool to ease the firm's financial constraints, because strong earnings can credibly signal positive prospects, enabling constrained firms to raise capital and make investments (Linck, Netter, and Shu, 2013). From this perspective, we may expect an increase in discretionary accruals when the firms are downgraded.

However, implementing big bath accounting is still possible in the context of sovereign downgrades because firms restricted by the ceiling rule can hardly pump up their credit ratings by using discretionary accruals. More specifically, once a firm is downgraded by the ceiling rule, its credit rating is likely to border the sovereign rating. The firm would find it difficult to increase its credit rating by implementing income-increasing accounting because it can hardly go above its home country's sovereign rating. Thus, apart from the scenario discussed in Alissa et al. (2013), income-increasing accounting may not be an effective strategic tool in the presence of the ceiling rule.

In contrast, big bath accounting can be preferable. The ceiling rule triggered by a sovereign downgrade is a mechanical and exogenous shock to bound firms, thus the managers can credibly attribute the poor earnings to the ceiling rule instead of their bad performance. In addition, big bath accounting in the current year can lead to a mechanical improvement of future earnings or flexibility for managing earnings up in the future. This scenario not only allows managers to wrap up with a personal assurance that the company is poised to seize opportunities when market turns favorable, but also enables them to capture personal benefits from the performance improvement. Based on the arguments above, we have the following two opposing predictions:

H0 (the income increasing hypothesis): *After sovereign rating downgrades, firms bound by the ceiling rule will manipulate up their discretionary accruals to a greater extent than other firms.*

H1 (big bath hypothesis): *After sovereign rating downgrades, firms bound by the ceiling rule will manipulate down their discretionary accruals to a greater extent than other firms.*

3 Sample selection and empirical design

3.1 Sample and variables

Our sample consists of publicly listed firms worldwide between 1999 and 2013. We obtain these firms' accounting and stock price information from the Factset database. We follow Almeida et al. (2017) and exclude financial firms (SIC codes 6000-6999) from the sample. For each firm in this sample we construct several earning quality measures, including Dechow, Sloan, and Sweeney's (1995) modification of Jones' (1991) discretionary accruals (*Accr_MJones*), Kothari, Leone, and Wasley's (2005) discretionary accruals (*Accr_MKLW*), and Dechow and Dichev's (2002) discretionary accruals (*Accr_DD*).[6] For all measures, we obtain residuals from regressions at the country-year-industry level. The industry classification is based on the first-digit SIC code. We require each observation to have at least one non-missing earnings quality measure. The initial sample includes 385,113 firm-year observations of 50,346 firms from 132 countries.

We then obtain corporate and sovereign credit ratings (foreign currency long-term issuer rating) from Compustat Capital IQ Entity Ratings, supplemented by Bloomberg. We match firms in Factset to Capital IQ using ISIN.[7] For firms that cannot be precisely matched by ISINs, we manually match them by company names. After restricting firms to those with a credit rating, our sample includes 22,650 firm-year observations of 3,029 firms from 61 countries.

We construct several variables to control for other factors that affect earnings management, including firm size (*Size*), book-to-market ratio (*BTM*), financial leverage (*Leverage*), stock returns (*Return*), stock return volatility (*RetStD*), analyst coverage (*Analyst*), and institutional ownership (*InstOwn*). To ensure that our results are not driven by the real effect of sovereign downgrades documented by Almeida et al. (2017), we further control for capital expenditure (*Capex*), debt issuance (*Debtissue*), and equity issuance (*Equityissue*). *Size* is defined as the natural logarithm of firm's total assets. *BTM* is the ratio of total assets to market valuation. *Leverage* is the ratio of the sum of long-

[6] While Dechow and Dichev's (2002) use an unsigned measure – the standard deviation of the residuals from the accrual model – to proxy for earnings management, signed discretionary working capital accruals is more suitable for our research setting because we seek to disentangle the big bath accounting from income-increasing accounting. Thus, we measure earnings management by directly taking the residual term of Dechow and Dichev's (2002) model.

[7] Capital IQ provides a linking table that links ISIN to Capital IQ's companies.

term debt and short-term borrowings to total assets. *Return* and *RetStD* are the annual stock return and the standard deviation of monthly stock returns over a year.

Analyst is estimated as the natural logarithm of the total number of analysts following the firm for each year. We retrieved the information of analysts from I/B/E/S database. *InstOwn* is defined as the total institutional ownership in percentage of the firm's market capitalization. *Capex* is the ratio of capital expenditure to net property, plant, and equipment. Debtissue is the new debt issued divided by lagged total assets. Equityissue is stock sales minus stock repurchases, then divided by lagged total assets. Since our baseline regressions utilize a first-differences specification, we take the first differences of all accrual measures and control variables. After requiring nonmissing values of first-differenced variables, our sample consists of 19,697 firm-year observations of 2,606 firms from 61 countries.

Table 1 presents the summary statistics of the variables used in the study. The three discretionary accruals measures, *Accr_MJones*, *Accr_MKLW*, and *Accr_DD*, have a mean (median) value of 0.01 (0.01), -0.004 (-0.003), and -0.002 (-0.003), respectively. In addition, the natural logarithm of sample firms' book assets has an average (median) value of 15.42 (15.32); the average (median) book-to-market ratio is 1.044 (0.986), and the average (median) leverage is 33.3% (31.2%). Capital expenditure accounts for around 20.3% (16.5%) of an average (median) firm's fixed assets. Our sample firms have an average (median) annual return of 15.3% (9.5%) and the average (median) standard deviation of stock returns is 36.9% (30.6%).

In our final sample, there are 115 incidences of bound firms receiving a sovereign downgrade. Among these 115 cases, 68% (78 cases) experienced a corporate credit rating downgrade within one year after the sovereign downgrade year. This suggests that the sovereign ceiling rule is a binding rule in our sample.

3.2 Empirical design

We use a difference-in-differences (DID) analysis to exploit the staggered nature of sovereign downgrades across countries. The treatment group contains firms that had a rating equal to or above the sovereign rating of the firm's domicile country in the year prior to the sovereign downgrade (bound firms). The control group contains firms that had a rating lower than the sovereign rating one year prior to the sovereign downgrade (unbound firms). A DID identifies the effect of sovereign downgrades by comparing the change in earnings management of bound firms with that of unbound firms around the downgrade. Since the ceiling rule is predetermined and not correlated with bound firms'

fundamental problems, it represents an exogenous shock. Therefore, the DID helps us establish a causal effect of credit rating changes on earnings management. Specifically, we estimate the following DID model:

$$\Delta ACCR_{i,t} = \beta_0 + \beta_1 \Delta Downgrade_{i,t} + \beta_2 \Delta X_{i,t-1} + \tau_t + \varepsilon_{i,t}, \quad (1)$$

where i and t index firms and years; Δ is the first-difference operator; $ACCR_{i,t}$ represents discretionary accruals based on different models, including *Accr_MJones*, *Accr_MKLW*, and *Accr_DD*; $Downgrade_{i,t}$ equals one for the period after a sovereign downgrade and increases by one for each additional occurrence of sovereign downgrade for treatment firms (firms with a credit rating equal to or higher than the sovereign debt one year prior to the sovereign downgrade); $X_{i,t-1}$ represents the set of lagged covariates that can influence earnings management, including *Size*, *BTM*, *Leverage*, *Return*, *RetStD*, *Analyst*, *InstOwn*, *Capex*, *Debtissue* and *Equityissue*; τ_t represents fiscal year fixed effects; and $\varepsilon_{i,t}$ is the usual error term. We also include industry fixed effects in some specifications to absorb time-invariant unobserved industry heterogeneity.[8] Standard errors are clustered at the country level. β_1 measures the differential effect of sovereign downgrade on treatment and control firms' earnings management and is the coefficient of our interest.

We take the first differences for all variables except for fiscal year fixed effects. The first-differences specification removes time-invariant unobserved firm heterogeneity, and thus is equivalent to controlling for firm fixed effects in a corresponding levels regression. An advantage of using first-differences in our context is that first-differences can easily accommodate repeated treatments – some bound firms experience a sequence of sovereign downgrades (either consecutively or staggered across years) and thus are affected by the ceiling rule repetitively. Therefore, we use first-differences as our baseline specification throughout this paper. As a robustness check, we also conduct a DID analysis that employs levels regressions. The results from both types of specifications are consistent.

However, bound firms and non-bound firms potentially differ in various ways. In addition, the number of non-bound firms is predominantly larger than that of bound firms. To ensure that the control group in our analysis is similar to the treatment group so that control group's earnings management constitutes a good counterfactual outcome of the treatment group, we adopt two empirical strategies. First, we restrict our sample firms to those that are just below, at, and just above the sovereign rating. Due to the noise and inertia in credit ratings, firms with neighboring credit ratings are similar to each other regarding creditworthiness and investment opportunities (Cherneko and Sunderam,

[8] Some firms change industries during our sample period. Therefore, industry fixed effects are not fully subsumed by firm fixed effects (first-differences).

2012). Therefore, unbound firms that are just below the sovereign rating are highly similar to bound firms that are at or just above the sovereign rating, and thus represents a good counterfactual for bound firms. Using this narrow-band sample, we reestimate equation (1). Essentially, we are estimating a parametric RD design (Chava and Roberts, 2008; Lee and Lemieux, 2010).[9] To guarantee the robustness of our RD design, we adopt multiple bandwidths that specify differing distances between firms' credit rating and the sovereign rating.

Second, we perform a propensity-score match between bound and unbound firms before reestimating equation (1). More specifically, in the year prior to each sovereign downgrade, we estimate a logit regression in which the dependent variable is a dummy indicating whether a firm's credit rating is at or above the sovereign rating and the covariates include firm size, book-to-market ratio, leverage, capital expenditure, analyst coverage, institutional ownership, annual stock returns, standard deviation of stock returns, debt issuance, and equity financing. Based on the estimation result we compute the propensity score for each bound and unbound firm. Then, we match each bound firm with an unbound firm that is the bound firm's nearest neighbor with replacement. We restrict our matching within the same country and same industry. Finally, we estimate the DID regression using this propensity-score matched sample.

4 Empirical results

4.1 Difference-in-differences

Applying the DID approach, we examine *Accr_MJones*, *Accr_MKLW*, and *Accr_DD* of bound and unbound firms around sovereign downgrades. Panel A of Table 2 presents the result. Columns (1) through (3) strictly follow the specification of model (1). The coefficient of $\triangle$*Downgrade* for $\triangle$*Accr_MJones*, $\triangle$*Accr_MKLW*, and $\triangle$*Accr_DD* is -0.013, -0.016, and -0.017, respectively. All three coefficients are statistically significant. The magnitudes suggest that bound firms' discretionary accruals decline by 1.3% to 1.7% of total assets relative to unbound firms after a sovereign downgrade, which are economically significant. Columns (4) through (6) further control for industry fixed effects. The results consistently show that in the post downgrade period, bound firms significantly reduce their discretionary accruals (-0.012, t = -2.46 for *Accr_MJones*; -0.016, t = -3.11 for

[9] We do not conduct a typical nonparametric RD design and plot the discontinuity figure because the rating notches are so few (especially for those above the sovereign rating) that the calculation of the optimal bandwidth fails to return a value.

Accr_MKLW; and -0.017, t = -2.32 for *Accr_DD*). The economics magnitudes are almost the same as those in the first three columns.

To ensure that our findings are robust to alternative model specifications, we also use levels regressions to perform the DID analysis. We estimate equation (1) without taking the first differences and report the results in Panel B of Table 2. In columns (1) to (3), the dependent variables are *Accr_MJones*, *Accr_MKLW*, and *Accr_DD*, respectively, and all control for firm and year fixed effects. The results suggest that for bound firms, all the three measues of discretionary accruals experience a significant decline after sovereign downgrades. The decline in *Accr_MJones*, *Accr_MKLW*, and *Accr_DD* is 1.5% (t = -3.87), 1.1% (t = -3.20), and 1.1% (t = -4.41), respectively. In columns (4) through (6), we control for firm fixed effects and industry*year fixed effects, and the results are highly consistent with those in the first three columns.

Overall, using both first-differences and levels regressions, our DID analysis suggests that relative to unbound firms, bound firms reduce discretionary accruals significantly after sovereign downgrades. This result is not consistent with managers trying to portray their firms as less troubled after a negative shock but is consistent with a big-bath accounting incentive. Because our results of using *Accr_MJones* are highly consistent with those of using *Accr_MKLW* and *Accr_DD*, we would report only the results using *Accr_MKLW* and *Accr_DD* for the rest of the paper.

4.2 Regression discontinuity design

One may still concern that firms with a credit rating equal or above the sovereign rating are fundamentally different from those below the sovereign rating and, thus, our result simply captures the distinct reactions, to macroeconomic events, of the two groups of firms. To address this concern, we adopt four empirical strategies: 1) an RD design; 2) propensity-score matching; 3) dynamic effect regressions; and 4) a falsification test utilizing the setting of the financial crisis.

We conduct an RD design by restricting our sample to firms whose credit rating is close to the sovereign rating. The RD design takes advantage of a predetermined rule arbitrarily created at a certain cutoff and compares outcomes of firms barely passing the cutoff and those barely missing it (Thistlethwaite and Campbell, 1960; Lee and Lemieux, 2010). In the current setting, whether a firm would be subject to the ceiling rule is exclusively determined by the *distance* of its credit rating to the sovereign rating. We compute the *distance* between each firm's rating and its sovereign rating and use four bandwidths denoted by *distance*: [-2, +1], [-1, +1], [-2, 0], and [-1, 0], where zero means at

the sovereign rating and a negative (positive) sign means below (above) the sovereign rating prior to a sovereign downgrade.

Note that first, these bandwidths are narrow enough given a total of 22 notches of credit ratings classified by the S&P, which ensures that treated and control firms are highly similar to each other in terms of characteristics that determine credit rating; second, we employ varying bandwidths around the sovereign rating to ensure that our results are not sensitive to the sample selection; last but not the least, two of these bandwidths completely remove the "superior" firms – firm rated strictly above the sovereign rating, which further mitigates the concern that treated firms performed much better than control firms before the sovereign downgrade and subsequently experience an earnings reversal after the sovereign downgrade.

Then, for each bandwidth specification, we conduct a parametric RD design by estimating equation (1) with industry fixed effects. Table 3 presents the estimation results. Using four bandwidths around the sovereign rating, we find that sovereign downgrades cause bound firms to reduce their *Accr_MKLW* by 1.3% to 1.4% of total assets, and reduce their *Accr_DD* by 1.6% to 1.7% of total assets. All estimates are significant at conventional levels. These magnitudes are highly consistent with those using the full sample (Panel A of Table 2), suggesting that our main findings sustain in the two groups of firms that are close to the sovereign rating, and are not sensitive to sample selections.

Moreover, the RD design strengthens a causal inference: since the outcome variable, discretionary accruals, and other variables that determine discretionary accruals, should be continuous functions of credit ratings and evolve smoothly around the sovereign rating, any discrete change in discretionary accruals should be attributed to the presence of the ceiling rule that creates a discrete change in bound firms' expected credit ratings.

4.3 Propensity-score matching and other robustness checks

To further mitigate the concern that bound and unbound firms are fundamentally different, we perform a propensity-score match between the two groups based on various characteristics. Then, we reestimate the baseline model (equation (1)) with industry fixed effects and report the results in columns (1) and (2) of Table 4. The coefficient estimates suggest that after a sovereign downgrade, bound firms reduce *Accr_MKLW* by 1.9% of total assets relative to unbound firms (t = -2.87), and reduce *Accr_DD* by 1.7% of total assets relative to unbound firms (t = -2.43).

We also conduct other robustness checks. First, we exclude countries that have fewer than ten observations. This step removes 13 countries from our sample and leaves 48

countries. Columns (3) and (4) of Table 4 present the first-differences DID estimates after this restriction. The results show a consistent decline of the two discretionary accruals measures for bound firms relative to unbound firms after sovereign downgrades. In particular, the relative decline in *Accr_MKLW* is 1.6% (t = -3.16), and the relative decline in *Accr_DD* is 1.7% (t = -2.20). The economic magnitudes are the same as those in the baseline regressions.

Second, we exclude countries that have no treated firms, either because these countries never experienced a sovereign downgrade, or because they had a sovereign downgrade but no firms were abound by the sovereign rating. This stringent restriction leaves us only 19 countries in the sample. Using this sample, we conduct the first-differences DID analysis and report the results in Columns (5) and (6) of Table 4. The coefficient on $\triangle$*Downgrade* is -0.016 for *Accr_MKLW* and -0.018 for *Accr_DD*, both being statistically different from zero (t = -2.70 for *Accr_MKLW* and t = -2.29 for *Accr_DD*). The economic magnitudes of the coefficients are of a similar level with those of the baseline DID estimates.

4.4 Dynamic treatment effects

The data must satisfy a parallel trend assumption for the DID analysis to identify a causal effect. That is, prior to a sovereign downgrade, bound firms and unbound firms should have a parallel trend regarding their discretionary accruals so that the unbound firms constitute a good counterfactual of the bound firms. To check this assumption and substantiate our causal inferences, we perform regressions that examine the dynamic responses of discretionary accruals to sovereign downgrades. In particular, we create multiple dummies that indicate the number of years a bound firm is from the sovereign downgrade year, *Year* (n), where a negative n indicates the nth year prior to the sovereign downgrade, 0 indicates the year of sovereign downgrade, and a positive n indicates the nth year after the sovereign downgrade. Incorporating these dummies into our DID model (with levels regressions), we are able to identify the dynamic effects of the ceiling rule on bound firms' discretionary accruals.

Table 5 presents the results. Columns (1) and (2) use *Accr_MKLW* as the dependent variable and the columns (3) and (4) use *Accr_DD* as the dependent variable. For each measure, we first control for firm and year fiscal effects (columns (1) and (3)) and then control for firm and industry*year fixed effects (columns (2) and (4)). All control variables are the same as in the baseline model and are omitted in the table to save space.

As the results show, when *Accr_MKLW* is the dependent variable, the coefficients on *Year* (*n*) when *n* is negative and zero are all statistically insignificant, and the magnitudes are very small, suggesting a parallel trend between bound and unbound firms before the sovereign downgrade. The coefficients become negative and statistically significant in the first year after the sovereign downgrade, and the economic magnitudes are large (-2.2% and -1.9%). The coefficients remain negative in the second year after the sovereign downgrade, but not statistically significant. Notably, the coefficients become positive in the third year after the downgrade event, suggesting that the discretionary accruals are likely to reverse after taking a big bath.

The case for *Accr_DD* is highly similar: the coefficients are small and not statistically different from zero in the years prior to the sovereign downgrade, start to become negative and statistically significant the first year after the sovereign downgrade (-2.0% and -1.9%), remain negative (and statistically significant, different from *Accr_MKLW*) the second year after the downgrade event, and experience some reversal in the third year after the event.

We also plot the regression estimates with a 95% confidence interval in Figure 2, which clearly show the evolvement of responses of discretionary accruals to sovereign downgrades. For both accruals measures, the coefficients are close to zero for all years before the sovereign downgrade year, which suggests a parallel trend between bound and unbound firms. A decline happens immediately after the sovereign downgrade year. The timing of accrual responses of bound firms relative to unbound firms supports a causal interpretation of our main finding.

Dechow, Sloan, and Sweeney (1995, 1996) show that when income-increasing accounting is used, discretionary accruals gradually increase as the alleged year of manipulation approaches and then exhibit a sharp decline after that. As such, when income-decreasing accounting is employed, one should expect a sharp decrease in discretionary accruals reflecting a "big bath". The subsequent increases in discretionary accruals would be consistent with the reversal of prior understatements in earnings. The results in Table 5 and Figure 2 are in line with this argument, showing large and negative discretionary accruals of bound firms following the sovereign downgrade year and positive discretionary accruals in the subsequent years (i.e., a reversal).

4.5 Falsification test

We also perform a falsification test to further mitigate the concern that our results are caused by a higher sensitivity of bound firms (than unbound firms) to macro shocks such as credit crunches, rather than the ceiling rule. We argue that during the 2007-2009

global financial crisis, some countries did not experience a sovereign downgrade and, therefore, their bound firms were subject to a macro shock but not affected by the sovereign ceiling rule. If we do not find a similar decline in bound firms' discretionary accruals using the financial crisis setting, we can not conclude that the decline in bound firms' discretionary accruals after sovereign downgrades is due to a higher sensitivity of bound firms to macro shocks.

Therefore, we pick countries that did not experience a sovereign downgrade during the global financial crisis and similarly classify treated firms as those having the same or a higher credit rating than the sovereign rating in each country. We then conduct a DID analysis using levels regressions because the financial crisis is a one-off shock that affects all countries at the same time. The model specification is as follows:

$$Accr_{i,j,t} = \beta_0 + \beta_1 Bound08_i * Post_t + \beta_2 X_{i,t-1} + \mu_i + \tau_{j,t} + \varepsilon_{i,t}, \quad (2)$$

where i and t index firms and years; *Bound08* equals one for firms that had the same or a higher credit rating than the sovereign rating at the beginning of 2008 and the sovereign rating was not downgraded in 2008, and zero otherwise; *Post* equals one for the period after 2008 and zero otherwise; $Accr_{i,t}$ includes *Accr_MKLW* and *Accr_DD*; $X_{i,t-1}$ are similarly defined as in equation (1); μ_i is firm fixed effects and $\tau_{j,t}$ is industry*year fixed effects; and $\varepsilon_{i,t}$ is the usual error term. We are interested in β_1, which captures the differential effect of the financial crisis on treated and control firms.

Table 6 reports the results. Columns (1) and (2) use a sample period from 2003 to 2013 and columns (3) and (4) use a sample period from 2005 to 2011. In all four columns, the coefficients on *Bound08*Post* are positive and statistically insignificant. Specifically, between 2003 and 2013, the coefficient is 0.008 (t = 1.57) for *Accr_MKLW* and 0.004 (t = 1.01) for *Accr_DD*; between 2005 and 2011, the coefficient is 0.004 (t = 0.68) for *Accr_MKLW* and 0.004 (t = 0.18) for *Accr_DD*. These results suggest that the reaction of bound firms to the macro shock is indifferent from that of unbound firms. Therefore, our baseline results are unlikely caused by a nonlinear reaction of bound firms to a macro shock.

5 Additional tests

5.1 Heterogeneous effect of sovereign downgrades

To substantiate our argument that the reduction in discretionary accruals is mainly due to the incentive of firm managers to implement big bath accounting, we examine the heterogeneous response of firms to sovereign downgrades. In countries with better institutions, such as higher financial statement transparency or better shareholder

protection, big bath accounting can be detected more easily and punished more severely (e.g., Dechow, Ge, and Schrand, 2010). Therefore, managers with pervert incentives in these countries have to rely on peculiar events, such as sovereign downgrades, to implement such opportunistic accounting.

Because a sovereign downgrade is both rare and salient, investors can hardly give a completely fair judgment of the write-offs and are likely to partially attribute them to the negative macro shock, leaving managers less guilty. For countries with worse institutions, however, managers can frequently conduct opportunistic accounting without being noticed, and do not rely on such settings as sovereign downgrades. Therefore, we conjecture that our main result is more pronounced for firms in countries with better institutions.

Following the literature, we use several measures of country-level institutions: disclosure requirements (*DiscReq*), investment profile (*InvProfile*), anti-self-dealing index (*AntiSD*), and anti-director rights index (*AntiDir*). Disclosure requirements quantify the affirmative disclosure requirements on the prospectus, insiders' compensation, ownership by large shareholders, inside ownership, contracts outside the normal course of business, and related-party transactions (La Porta, López-de-Silanes, and Shleifer, 2006). Investment profile reflects the risk of expropriation, contract viability, payment delays, and the ability to repatriate profits (International Country Risk Guide).

Anti-self-dealing index measures the strength of minority shareholder protections against self-dealing by the controlling shareholder, including the disclosure, approval, and litigation that govern a specific self-dealing transaction (Djankov, La Porta, López-de-Silanes, and Shleifer, 2008). Anti-director rights index measures how strongly the legal system favors minority shareholders against managers or dominant shareholders in the corporate decision-making process, including the voting process (Djankov et al., 2008). For all four measures, the higher the value, the better the country's institution. For country-years that have missing information, we replace the missing value by the prior year's value.

Next, we examine how our baseline result varies with country-level institutions. More specifically, for each country-level measure, we construct an interaction term by multiplying $\triangle Downgrade$ with the country-level measure and then include the interaction term in the right-hand side of equation (1) (controlling for industry fixed effects). The coefficient on the interaction term indicates the incremental effect of the country-level institution on the ceiling rule.

Table 7 reports the estimated coefficients, columns (1) through (4) for *Accr_MKLW* and columns (5) through (8) for *Accr_DD*. For each accrual measure, we report the coefficient on △*Downgrade*DiscReq*, △*Downgrade*InvProfile*, △*Downgrade*AntiSD*, and △*Downgrade*AntiDir*. We omit the coefficients on other control variables for brevity. The estimation results show that the coefficients on all four interaction terms are negative and statistically significant for *Accr_MKLW*. Similarly, for *Accr_DD*, all four interaction terms have negative coefficients, all being statistically different from zero except the coefficient on △*Downgrade*AntiSD* (-0.018, t = -1.38).

Taken together, these findings suggest that better country-level institutions lead to a larger reduction of discretionary accruals in response to sovereign downgrades, consistent with our conjecture.

5.2 Taking a big bath via impairment activities

Total abnormal discretionary accruals based on different models only reflect aggregated information on accounting manipulation. Prior studies find that asset write-offs have a significant association with "big bath" accounting (e.g., Riedl 2004). Along this line, we directly examine the provisioning and impairment activities following sovereign downgrades to explore the channel through which managers take a big bath. Specifically, we conduct the DID analysis in equation (1) by replacing the dependent variable with various provisioning and impairment measures, including bad debt provisions, risk provisions, operation provisions, property, plant and equipment provisions, impairments of goodwill, and impairments of other intangibles, all scaled by total book assets. We additionally control for industry fixed effects.

The results are reported in Table 8. In the first four columns, the dependent variables are the four provisioning measures. The results show that none of the coefficients on △*Downgrade* is statistically significant, suggesting that bound firms' managers do not increase provisioning activities after experiencing sovereign downgrades. Columns (5) and (6) use goodwill impairments and impairments of other intangible assets as the dependent variable, respectively. The coefficient on △*Downgrade* is significantly positive for goodwill impairments (0.006, t =1.96), the magnitude suggesting that bound firms' goodwill impairments increase by 0.6% of total assets following a sovereign downgrade relative to unbound firms. The coefficient is 0.002 (t = 2.55) for impairments of other intangibles, indicating an increase of 0.2% of total assets after a sovereign downgrade.

For the robustness of our results, we implement levels regressions in columns (7) and (8) using the two impairment measures as dependent variables. We find an even larger increase of goodwill impairments, the magnitude suggesting that bound firms increase goodwill impairments by 1.2% of total assets following a sovereign downgrade. The coefficient estimate for impairments of other intangibles is the same as in the first-differences specification (0.002, t = 1.84), suggesting a 0.2% of total assets increase after a downgrade event.

Overall, by examining specific write-off items, we shed light on possible channels through which managers decrease earnings after sovereign downgrades. Our results imply that impairments of intangible assets (including goodwill and other intangibles) are likely to be the main channel.

5.3 Earnings management in subsequent upgrades of sovereign ratings

Implementing big bath accounting upon the sovereign downgrade gives managers the chance of a future earnings reversal or flexibility to manage earnings up once an opportunity emerges. We already show that both accrual measures start to reverse in the third year after the sovereign downgrade. In this section, we test if managers would try to manage earnings up when their firm experiences a rating upgrade after being affected by a prior sovereign downgrade.

As discussed in the hypothesis development section, the existence of the ceiling rule discourages managers from implementing an income-increasing accounting upon the sovereign downgrade. However, such a ceiling rule would not have an impact if the sovereign ratings are upgraded back. When rating agencies update the sovereign rating, bound firms in the prior sovereign downgrade need not be upgraded mechanically. The assigned ratings of these firms could be lower than what they deserve or expect. Under this circumstance, these firms will find it beneficial to adopt an income-increasing accounting because they may be able to increase their ratings given that they are no longer constrained by the sovereign ratings (Alissa et al., 2013). To test this conjecture, we examine the accounting choice (i.e., discretionary accruals) of bound firms when the sovereign rating is upgraded within the five years of the prior sovereign downgrade.

Similar to the baseline model, we employ a first-differences DID, where we replace $\triangle Downgrade$ by $\triangle Upgrade$. *Upgrade* is a variable that starts from zero and increases by one for each additional occurrence of sovereign upgrade after a sovereign downgrade (if the sovereign upgrade occurs within five years of the sovereign downgrade). The results are presented in Table 9. In columns (1) and (2), the coefficient estimate of $\triangle Upgrade$ for

$\triangle Accr\_MKLW$ is 0.023 but not statistically significant (t = 1.62); and the coefficient of $\triangle Upgrade$ for $\triangle Accr\_DD$ is 0.025 and statistically significant (t = 2.51). Adding industry fixed effects in columns (3) and (4) leads to similar coefficient estimates and statistical significance (0.023, t = 1.63 for $\triangle Accr\_MKLW$; 0.025, t = 2.47 for $\triangle Accr\_DD$).

These results suggest that firms that were bound in a prior sovereign downgrade manage earnings up upon a subsequent sovereign upgrade. This evidence supports the argument of Alissa et al. (2013) that firms would conduct income-increasing earnings management when they are below their expected ratings. It also reinforces our prior argument that bound firms employ big bath accounting instead of income-increasing accounting upon sovereign downgrade. This is partially driven by the fact that they can hardly enjoy the benefit of implementing income-increasing accounting when they are bound by the ceiling rule.

6 Conclusion

Firms bound by sovereign ratings are associated with a higher probability of being downgraded upon sovereign debt downgrades. Taking advantage of this exogenous rule on credit ratings, we examine the accounting choices of bound firms upon sovereign downgrades.

We find that bound firms are associated with negative discretionary accruals after sovereign debt downgrades. This result primarily reflects the incentive of bound firms to strategically take a "big bath," rather than an attempts to portray the firms as less trouble following a shock on firms' ratings. The result is robust to different model specifications and sample selections and is not due to a higher sensitivity of bound firms to macro shocks. The big bath accounting is more pronounced in countries with better institutions, consistent with the notion that firms are more likely to take advantage of some peculiar negative shock to conduct abnormal write-offs if such opportunistic behaviors are difficult under stricter regulations. Further, we document a channel through which managers write off firms' assets upon sovereign downgrades – increasing impairments of intangible assets. Finally, we find that bound firms manage earnings up upon a sovereign rating upgrade after experiencing a sovereign rating downgrade.

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Table 1. Summary statistics

	N	Std.Dev.	Mean	Median	P25	P75
Downgrade	19,697	0.321	0.060	0.000	0.000	0.000
Accr_MJones	19,697	0.062	0.010	0.010	-0.022	0.042
Accr_MKLW	19,697	0.066	-0.004	-0.003	-0.036	0.030
Accr_DD	19,697	0.053	-0.002	-0.003	-0.028	0.020
Size	19,697	1.467	15.415	15.317	14.353	16.455
BTM	19,697	0.492	1.044	0.986	0.695	1.303
Leverge	19,697	0.179	0.333	0.312	0.213	0.428
Capex	19,697	0.154	0.203	0.165	0.104	0.251
Return	19,697	0.515	0.153	0.095	-0.143	0.351
RetStD	19,697	0.233	0.369	0.306	0.213	0.451
Analyst	19,697	0.969	2.748	2.944	2.303	3.434
InstOwn	19,697	0.389	0.354	0.064	0.000	0.751
Debtissue	19,697	0.123	0.025	-0.000	-0.027	0.041
Equityissue	19,697	0.055	0.000	0.000	-0.006	0.003

This table presents the summary statistics of the variables used in this study for nonfinancial firms from 61 countries between 1999 and 2013. All variables except for dummy variables are winsorized by 1% at both tails.

Table 2. Baseline results: Ceiling rule and earnings management

Panel A: First-difference regressions

	(1)	(2)	(3)	(4)	(5)	(6)
	⊿Accr_MJones	*⊿Accr_MKLW*	*⊿Accr_DD*	*⊿Accr_MJones*	*⊿Accr_MKLW*	*⊿Accr_DD*
⊿Downgrade	-0.013**	-0.016***	-0.017**	-0.012**	-0.016***	-0.017**
	[-2.64]	[-3.15]	[-2.27]	[-2.46]	[-3.11]	[-2.32]
⊿Size	-0.024**	-0.013**	-0.029***	-0.024**	-0.013**	-0.029***
	[-2.09]	[-2.31]	[-9.51]	[-2.07]	[-2.21]	[-8.95]
⊿BTM	0.005	0.006	0.002	0.005	0.005	0.002
	[1.27]	[1.32]	[0.78]	[1.26]	[1.30]	[0.73]
⊿Leverge	-0.113***	-0.109***	-0.110***	-0.113***	-0.110***	-0.110***
	[-12.43]	[-14.97]	[-11.35]	[-12.42]	[-14.99]	[-11.17]
⊿Capex	0.014***	0.007	0.002	0.014***	0.007	0.002
	[2.76]	[1.52]	[0.28]	[2.76]	[1.55]	[0.29]
⊿Return	0.001	0.001	0.003**	0.001	0.001	0.003**
	[0.95]	[1.46]	[2.48]	[0.95]	[1.45]	[2.47]
⊿RetStD	0.022**	0.021**	0.015	0.023**	0.021**	0.015
	[2.31]	[2.12]	[1.39]	[2.33]	[2.12]	[1.38]
⊿Analyst	0.001	0.002	-0.001	0.001	0.002	-0.001
	[0.31]	[1.12]	[-0.30]	[0.29]	[1.10]	[-0.38]
⊿InstOwn	0.002	-0.000	-0.000	0.001	-0.001	-0.001
	[0.26]	[-0.06]	[-0.15]	[0.18]	[-0.10]	[-0.19]
⊿DebtIssue	-0.002	0.002	-0.003	-0.002	0.002	-0.003
	[-0.45]	[0.55]	[-1.31]	[-0.43]	[0.55]	[-1.17]
⊿EquityIssue	-0.024**	-0.017**	-0.023**	-0.024**	-0.017*	-0.022**
	[-2.48]	[-2.00]	[-2.01]	[-2.43]	[-1.99]	[-2.01]
Industry FE	No	No	No	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Adj.R-sq	0.020	0.015	0.027	0.020	0.015	0.028
N.of Obs.	19,697	19,697	19,697	19,697	19,697	19,697

Panel B: Levels regressions

	(1)	(2)	(3)	(4)	(5)	(6)
	Accr_MJones	*Accr_MKLW*	*Accr_DD*	*Accr_MJones*	*Accr_MKLW*	*Accr_DD*
Downgrade	-0.015***	-0.011***	-0.011***	-0.011***	-0.009**	-0.010***
	[-3.87]	[-3.20]	[-4.41]	[-2.66]	[-2.50]	[-4.16]
Size	-0.010***	-0.003	-0.009***	-0.011***	-0.002	-0.009***
	[-4.20]	[-1.33]	[-5.40]	[-4.65]	[-0.79]	[-5.39]
BTM	-0.002	0.001	-0.005***	-0.002	-0.000	-0.006***
	[-1.01]	[0.34]	[-2.84]	[-0.70]	[-0.02]	[-3.18]
Leverge	-0.050***	-0.044***	-0.046***	-0.045***	-0.045***	-0.047***
	[-6.17]	[-6.21]	[-7.20]	[-5.57]	[-6.23]	[-7.21]
Capex	0.005	0.002	0.006	0.009	0.003	0.008
	[0.73]	[0.27]	[1.07]	[1.21]	[0.48]	[1.40]
Return	0.004***	0.003**	0.004***	0.005***	0.003**	0.005***
	[2.84]	[2.21]	[3.82]	[3.17]	[2.45]	[4.41]
RetStD	-0.002	-0.004	-0.001	-0.007	-0.002	-0.004
	[-0.12]	[-0.33]	[-0.14]	[-0.54]	[-0.22]	[-0.37]
Analyst	-0.000	-0.002	-0.002	-0.000	-0.002	-0.002
	[-0.03]	[-1.12]	[-1.25]	[-0.25]	[-1.32]	[-1.46]
InstOwn	0.011**	0.001	0.000	0.009*	0.001	0.000
	[2.07]	[0.12]	[0.10]	[1.67]	[0.21]	[0.11]
Debtissue	0.008	0.012***	0.003	0.006	0.012***	0.003
	[1.63]	[2.90]	[0.64]	[1.32]	[2.93]	[0.77]
Equityissue	-0.001	0.010	0.010	-0.000	0.010	0.011
	[-0.12]	[1.06]	[1.11]	[-0.04]	[1.01]	[1.21]
Industry*Year FE	No	No	No	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	No	No	No
Adj.R-sq	0.516	0.322	0.203	0.538	0.339	0.221
N.of Obs.	20,408	20,408	20,408	20,408	20,408	20,408

Difference-in-differences regressions of earning quality around sovereign downgrades. Treatment firms are those that had the same or a better credit rating than the sovereign debt at the beginning of the sovereign downgrade year. Panel A presents the results of first-difference regressions. Panel B presents the results of level regressions. Definitions of all variables are reported in the Appendix. We report t-statistics in brackets based on standard errors clustered at the country level. *, **, *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 3. Regression discontinuity design

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	⊿Accr_MKLW				*⊿Accr_DD*			
Distance ∈	[-2, +1]	[-1, +1]	[-2, 0]	[-1, 0]	[-2, +1]	[-1, +1]	[-2, 0]	[-1, 0]
⊿Downgrade	-0.013***	-0.013***	-0.014***	-0.013***	-0.016**	-0.016**	-0.017**	-0.017***
	[-3.28]	[-3.08]	[-3.33]	[-3.18]	[-2.60]	[-2.70]	[-2.65]	[-2.81]
⊿Size	0.017	0.023*	0.016	0.022*	-0.020	-0.015	-0.019	-0.014
	[1.26]	[1.87]	[1.24]	[1.82]	[-1.42]	[-1.02]	[-1.34]	[-0.91]
⊿BTM	0.011	0.018	0.012	0.020*	-0.004	-0.001	-0.002	0.001
	[0.99]	[1.58]	[1.10]	[1.71]	[-0.51]	[-0.09]	[-0.28]	[0.11]
⊿Leverge	-0.134***	-0.147***	-0.126***	-0.138***	-0.075**	-0.086**	-0.072**	-0.082*
	[-3.26]	[-3.14]	[-3.12]	[-2.94]	[-2.16]	[-2.09]	[-2.04]	[-1.98]
⊿Capex	0.014	0.036	0.018	0.043*	0.000	0.002	0.002	0.005
	[0.69]	[1.59]	[0.89]	[1.93]	[0.01]	[0.14]	[0.10]	[0.33]
⊿Return	-0.002	0.001	-0.001	0.002	-0.005	-0.003	-0.004	-0.002
	[-0.35]	[0.33]	[-0.20]	[0.52]	[-1.53]	[-0.99]	[-1.21]	[-0.68]
⊿RetStD	0.034	0.031	0.025	0.021	0.090*	0.078*	0.081*	0.068
	[0.68]	[0.73]	[0.48]	[0.47]	[1.95]	[1.71]	[1.72]	[1.48]
⊿Analyst	-0.005	0.000	-0.008	-0.002	0.006	0.007	0.005	0.005
	[-1.14]	[0.08]	[-1.59]	[-0.43]	[0.99]	[0.96]	[0.75]	[0.73]
⊿InstOwn	-0.116	0.085	-0.053	0.267	-0.111	0.294	-0.053	0.483
	[-0.40]	[0.17]	[-0.16]	[0.46]	[-0.57]	[0.90]	[-0.24]	[1.37]
⊿DebtIssue	-0.018	-0.012	-0.022	-0.016	-0.023	-0.020	-0.020	-0.016
	[-0.72]	[-0.46]	[-0.85]	[-0.61]	[-1.15]	[-1.08]	[-1.04]	[-0.89]
⊿EquityIssue	-0.030	-0.017	-0.024	-0.011	-0.041	-0.029	-0.036	-0.024
	[-0.69]	[-0.30]	[-0.54]	[-0.19]	[-0.89]	[-0.57]	[-0.78]	[-0.47]
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj.R-sq	0.025	0.034	0.024	0.034	0.028	0.028	0.024	0.025
N.of Obs.	2,807	2,294	2,733	2,220	2,807	2,294	2,733	2,220

Regressions using sample firms rated just above (or at) or just below the sovereign rating. The sample period is between 1999 and 2013. We take first differences of all variables. Distance equals the firm rating minus the sovereign rating in the prior year. Definitions of all variables are reported in the Appendix. We report t-statistics in brackets based on standard errors clustered at the country level. *, **, *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 4. Robustness checks

	(1)	(2)	(3)	(4)	(5)	(6)
	⊿Accr_MKLW	*⊿Accr_DD*	*⊿Accr_MKLW*	*⊿Accr_DD*	*⊿Accr_MKLW*	*⊿Accr_DD*
	Propensity-score match		Excluding countries with fewer than 10 obs.		Excluding countries without a treated firm	
⊿Downgrade	-0.019***	-0.017**	-0.016***	-0.017**	-0.016**	-0.018**
	[-2.87]	[-2.43]	[-3.16]	[-2.20]	[-2.70]	[-2.29]
⊿Size	0.008	0.012	-0.013**	-0.029***	-0.018***	-0.032***
	[0.69]	[0.81]	[-2.17]	[-9.00]	[-5.43]	[-12.85]
⊿BTM	-0.047*	-0.028	0.005	0.002	0.001	0.000
	[-1.97]	[-0.81]	[1.26]	[0.71]	[0.47]	[0.33]
⊿Leverge	-0.068	0.016	-0.110***	-0.111***	-0.111***	-0.111***
	[-1.00]	[0.19]	[-14.99]	[-11.63]	[-15.97]	[-10.88]
⊿Capex	0.102	0.108	0.008	0.001	0.008	0.010***
	[1.66]	[1.40]	[1.58]	[0.20]	[1.47]	[3.44]
⊿Return	-0.002	-0.007	0.001	0.003**	0.001	0.004***
	[-0.36]	[-1.61]	[1.41]	[2.44]	[1.45]	[3.09]
⊿RetStD	0.109	0.119	0.021**	0.015	0.012	0.010
	[1.40]	[1.46]	[2.12]	[1.39]	[1.59]	[1.11]
⊿Analyst	-0.020	-0.012	0.002	-0.001	0.001	-0.003
	[-1.26]	[-0.77]	[1.05]	[-0.35]	[0.16]	[-1.25]
⊿InstOwn	0.046*	0.085***	-0.001	-0.001	-0.006	0.001
	[1.82]	[3.41]	[-0.11]	[-0.21]	[-1.06]	[0.37]
⊿DebtIssue	-0.054*	-0.033	0.002	-0.003	0.003	-0.004
	[-1.88]	[-0.68]	[0.46]	[-1.21]	[1.21]	[-1.09]
⊿EquityIssue	-0.014	-0.071	-0.017**	-0.022*	-0.023***	-0.030***
	[-0.23]	[-0.94]	[-2.03]	[-2.01]	[-5.96]	[-4.90]
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Adj.R-sq	0.073	0.069	0.015	0.028	0.020	0.033

N.of Obs.	829	829	19,642	19,642	14,435	14,435

Robustness checks for the relationship between ceiling rule and earnings management. Columns (1) and (2) exclude countries that never experienced a sovereign downgrade in our sample period. Columns (3) and (4) exclude countries that have fewer than 10 observations. Columns (5) and (6) use the propensity-score matched sample. Definitions of all variables are reported in the Appendix. We report t-statistics in brackets based on standard errors clustered at the country level. *, **, *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 5. Dynamics of discretionary accruals around sovereign downgrades

	(1)	(2)	(3)	(4)
	Accr_MKLW		*Accr_DD*	
Year (-3)	-0.002	-0.003	0.005	0.004
	[-0.29]	[-0.41]	[0.64]	[0.48]
Year (-2)	0.002	0.002	-0.002	-0.000
	[0.29]	[0.26]	[-0.30]	[-0.08]
Year (-1)	0.001	0.000	-0.001	0.001
	[0.09]	[0.04]	[-0.20]	[0.09]
Year (0)	-0.005	-0.004	-0.008	-0.006
	[-0.66]	[-0.54]	[-1.13]	[-0.98]
Year (+1)	-0.022***	-0.019**	-0.020***	-0.019***
	[-2.84]	[-2.41]	[-3.21]	[-2.88]
Year (+2)	-0.006	-0.004	-0.012**	-0.009**
	[-0.93]	[-0.69]	[-2.50]	[-2.01]
Year (+3)	0.003	0.005	0.003	0.007
	[0.36]	[0.54]	[0.27]	[0.61]
Other controls	Yes	Yes	Yes	Yes
Industry*Year FE	No	Yes	No	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	No	Yes	No
Adj.R-sq	0.345	0.356	0.204	0.222
N.of Obs.	20,137	20,137	20,137	20,137

Regressions estimating the dynamic effect of sovereign ceiling rule. Treatment firms are those that had the same or a better credit rating than the sovereign debt at the beginning of the sovereign downgrade year. Year (n) equals 1 for the nth year from the sovereign downgrade year for treatment firms and 0 otherwise. Other controls include Size, BTM, Leverge, Capex, Return, RetStD, Analyst, InstOwn, DebtIssue, and EquityIssue. Definitions of all variables are reported in the Appendix. We report t-statistics in brackets based on standard errors clustered at the country level. *, **, *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 6. Falsification test using the financial crisis

	(1)	(2)	(3)	(4)
	Accr_MKLW	*Accr_DD*	*Accr_MKLW*	*Accr_DD*
	[2003, 2013]		[2005, 2011]	
*Bound08*Post*	0.008	0.004	0.004	0.001
	[1.57]	[1.01]	[0.68]	[0.18]
Size	0.002	-0.006***	0.005	-0.003
	[0.64]	[-3.11]	[1.27]	[-0.76]
BTM	-0.002	-0.008***	-0.009**	-0.011***
	[-0.86]	[-3.20]	[-2.19]	[-3.09]
Leverge	-0.052***	-0.045***	-0.066***	-0.051***
	[-6.15]	[-5.96]	[-5.00]	[-4.45]
Capex	0.008	0.011	-0.000	0.007
	[1.05]	[1.61]	[-0.04]	[0.78]
Return	0.002	0.003**	-0.000	0.001
	[1.34]	[1.97]	[-0.24]	[0.60]
RetStD	-0.011	-0.007	0.029*	0.020
	[-0.89]	[-0.65]	[1.66]	[1.25]
Analyst	-0.003	-0.002	-0.005	-0.006**
	[-1.31]	[-1.38]	[-1.40]	[-2.11]
InstOwn	-0.006	-0.005	-0.007	-0.002
	[-0.88]	[-0.89]	[-0.63]	[-0.18]
Debtissue	0.013**	0.002	0.010	0.003
	[2.52]	[0.41]	[1.46]	[0.47]
Equityissue	0.023**	0.001	0.022	-0.002
	[1.99]	[0.10]	[1.38]	[-0.14]
Industry*Year FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	No	No
Adj.R-sq	0.379	0.250	0.403	0.266
N.of Obs.	15,683	15,683	10,086	10,086

Difference-in-differences regressions using sample firms around the 2007-2009. *Bound08* equals 1 for firms that had the same or a higher rating than the sovereign rating at the beginning of 2008 and the sovereign rating was not downgraded in 2008. *Post* equals one for the period after 2008 and zero otherwise. The first two columns use firms between 2003 and 2013 and the last two columns use firms between 2005 and 2010. We report t-statistics in brackets based on standard errors clustered at the country level. ***, **, * indicates significance at the 1%, 5% and 10% level respectively.

Table 7. Heterogeneous effect of sovereign downgrades

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	△Accr_MKLW				*△Accr_DD*			
*△Downgrade*DiscReq*	-0.051***				-0.015*			
	[-8.764]				[-1.782]			
*△ Downgrade *InvProfile*		-0.037***				-0.032**		
		[-3.725]				[-2.505]		
*△ Downgrade *AntiSD*			-0.025**				-0.018	
			[-2.555]				[-1.384]	
*△ Downgrade *AntiDir*				-0.015*				-0.027*
				[-1.725]				[-1.952]
Other controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj.R-sq	0.015	0.015	0.015	0.015	0.029	0.029	0.029	0.029
N.of Obs.	18,972	19,227	19,172	19,172	18,972	19,227	19,172	19,172

This table presents the heterogeneous effect of sovereign downgrades on discretionary accruals using the first-difference approach. The country-level dummy variales DiscReq, InvProfile, AntiSD, and AntiDir are defined based on the median value of disclosure requirement, investment profile, anti-self-dealing index, and anti-director index. Other controls include △Treat, the corresponding country-level dummy, △Size, △BTM, △Leverge, △Capex, △Return, △RetStD, △Analyst, △InstOwn, △DebtIssue, and △EquityIssue. ***, **, * indicates significance at the 1%, 5% and 10% level respectively.

Table 8. Provisions and impairments

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	⊿Provision				*⊿Impairment*		*Impairment*	
	Bad debt	Risk	Operation	PPE	Goodwill	Intangibles	Goodwill	Intangibles
(⊿)Downgrade	-0.001	0.003	0.001	-0.000	0.006*	0.002**	0.012***	0.002*
	[-0.48]	[1.16]	[0.93]	[-0.11]	[1.96]	[2.55]	[3.25]	[1.84]
(⊿)Size	0.001***	-0.004***	0.000	0.037***	0.038***	0.009***	0.017***	0.003***
	[13.69]	[-5.10]	[0.16]	[7.43]	[6.60]	[11.81]	[6.58]	[2.78]
(⊿)BTM	0.001***	0.006***	-0.001	0.014**	0.012***	0.003**	0.015***	0.002*
	[12.43]	[6.31]	[-1.34]	[2.18]	[3.80]	[2.56]	[6.49]	[1.74]
(⊿)Leverge	0.001***	0.007***	0.001	-0.105***	-0.107***	-0.028***	-0.048***	-0.007
	[7.46]	[3.55]	[0.91]	[-5.07]	[-10.00]	[-15.15]	[-7.59]	[-1.45]
(⊿)Capex	0.001***	-0.004	0.001	-0.003	0.021**	0.001	0.016	-0.002
	[7.55]	[-1.61]	[0.63]	[-0.69]	[2.64]	[0.30]	[1.31]	[-0.68]
(⊿)Analyst	0.000*	-0.002*	-0.000	0.002	-0.005***	-0.002**	0.001	0.001
	[2.01]	[-2.00]	[-0.60]	[1.56]	[-4.59]	[-2.60]	[0.27]	[0.92]
(⊿)RetStD	0.000**	0.005	0.000	-0.000	-0.033***	-0.013***	0.007***	0.000
	[2.18]	[1.56]	[0.46]	[-0.00]	[-3.16]	[-3.91]	[2.95]	[0.10]
(⊿)Return	-0.000**	0.000	-0.000	0.001	0.005***	0.001***	0.016***	0.005***
	[-2.18]	[0.69]	[-1.34]	[0.96]	[10.52]	[3.79]	[3.90]	[6.31]
(⊿)InstOwn	0.000**	-0.001	-0.000**	-0.003	0.021***	0.008***	-0.026*	-0.004
	[2.58]	[-0.36]	[-2.33]	[-0.92]	[13.47]	[10.79]	[-1.83]	[-0.81]
(⊿)DebtIssue	-0.001***	-0.000	-0.000	0.021**	0.003	0.004***	-0.000	-0.001
	[-21.77]	[-0.14]	[-0.92]	[2.26]	[1.36]	[5.43]	[-0.64]	[-1.63]
(⊿)EquityIssue	0.001***	0.006***	0.000	-0.008	-0.029***	-0.006***	-0.004	-0.001
	[6.40]	[3.12]	[0.23]	[-1.16]	[-5.16]	[-5.90]	[-0.59]	[-0.64]
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj.R-sq	0.028	0.066	0.017	0.111	0.113	0.072	0.585	0.531
N.of Obs.	9,324	14,143	5,053	3,906	4,291	4,386	6,134	6,456

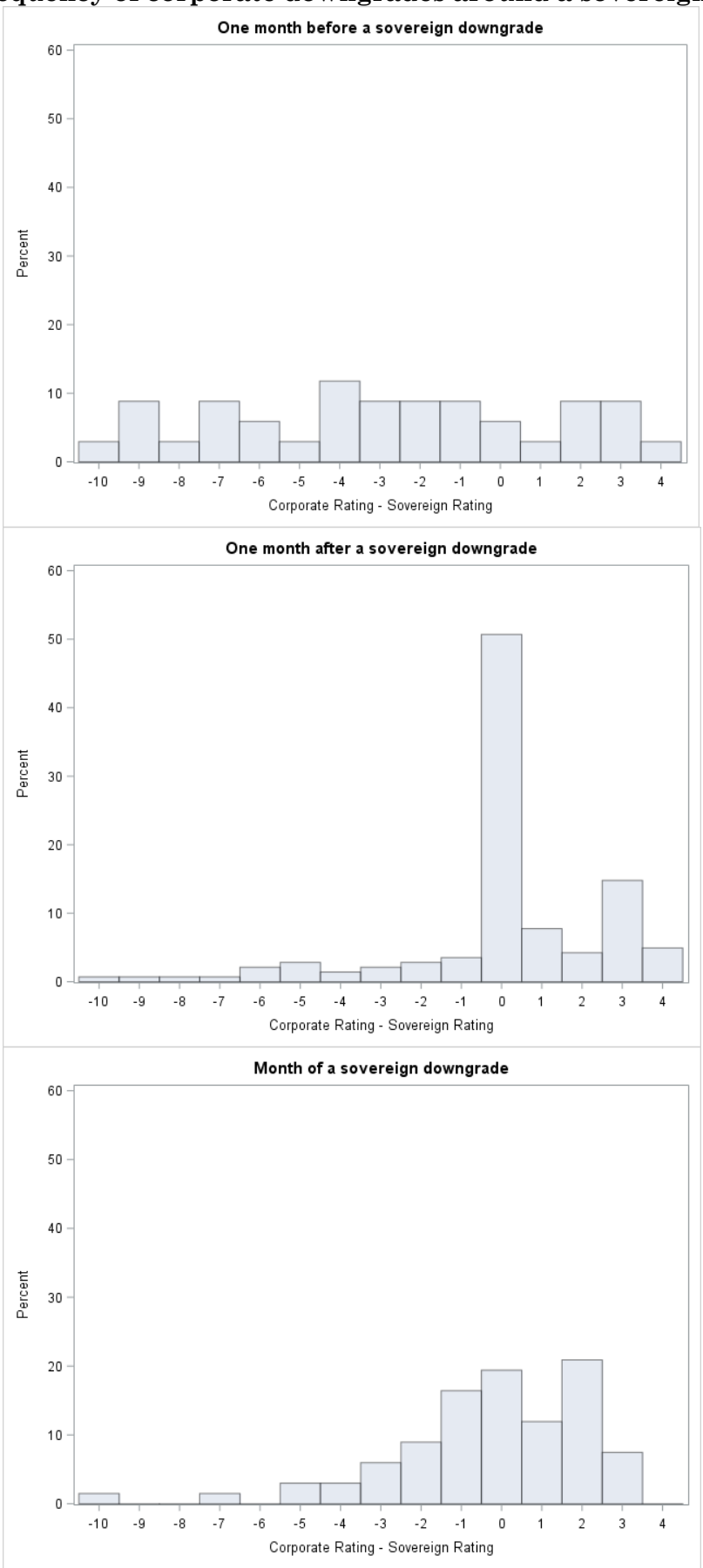
Difference-in-differences regressions of provisions and impairments around a sovereign downgrade. The dependent variables are various measures of provisions and impairments divided by book assets. Columns (1) to (6) conduct first-difference regressions and columns (7) and (8) conduct level regressions. Definitions of all variables are reported in the Appendix. We report t-statistics in brackets based on standard errors clustered at the country level. *, **, *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 9. Sovereign rating reversals and earnings management

	(1)	(2)	(3)	(4)
	⊿Accr_MKLW	*⊿Accr_DD*	*⊿Accr_MKLW*	*⊿Accr_DD*
⊿Upgrade	0.023	0.025**	0.023	0.025**
	[1.62]	[2.51]	[1.63]	[2.47]
⊿Size	-0.013**	-0.030***	-0.013**	-0.030***
	[-2.27]	[-9.24]	[-2.17]	[-8.69]
⊿BTM	0.004	0.002	0.004	0.002
	[1.64]	[1.43]	[1.61]	[1.39]
⊿Leverge	-0.105***	-0.105***	-0.105***	-0.106***
	[-14.22]	[-11.50]	[-14.28]	[-11.35]
⊿Capex	0.003	-0.001	0.003	-0.001
	[0.77]	[-0.19]	[0.77]	[-0.18]
⊿Analyst	0.003*	0.000	0.003*	0.000
	[1.85]	[0.23]	[1.82]	[0.15]
⊿RetStD	0.020*	0.013	0.020*	0.013
	[1.87]	[1.18]	[1.87]	[1.17]
⊿Return	0.001	0.003**	0.001	0.003**
	[1.00]	[2.20]	[0.99]	[2.19]
⊿InstOwn	0.000	0.000	-0.000	0.000
	[0.04]	[0.08]	[-0.01]	[0.03]
⊿DebtIssue	0.002	-0.004	0.002	-0.003
	[0.45]	[-1.34]	[0.46]	[-1.21]
⊿EquityIssue	-0.016*	-0.022**	-0.016*	-0.021**
	[-1.98]	[-2.06]	[-1.97]	[-2.06]
Industry FE	No	No	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Adj.R-sq	0.015	0.028	0.015	0.028
N.of Obs.	19,697	19,697	19,697	19,697

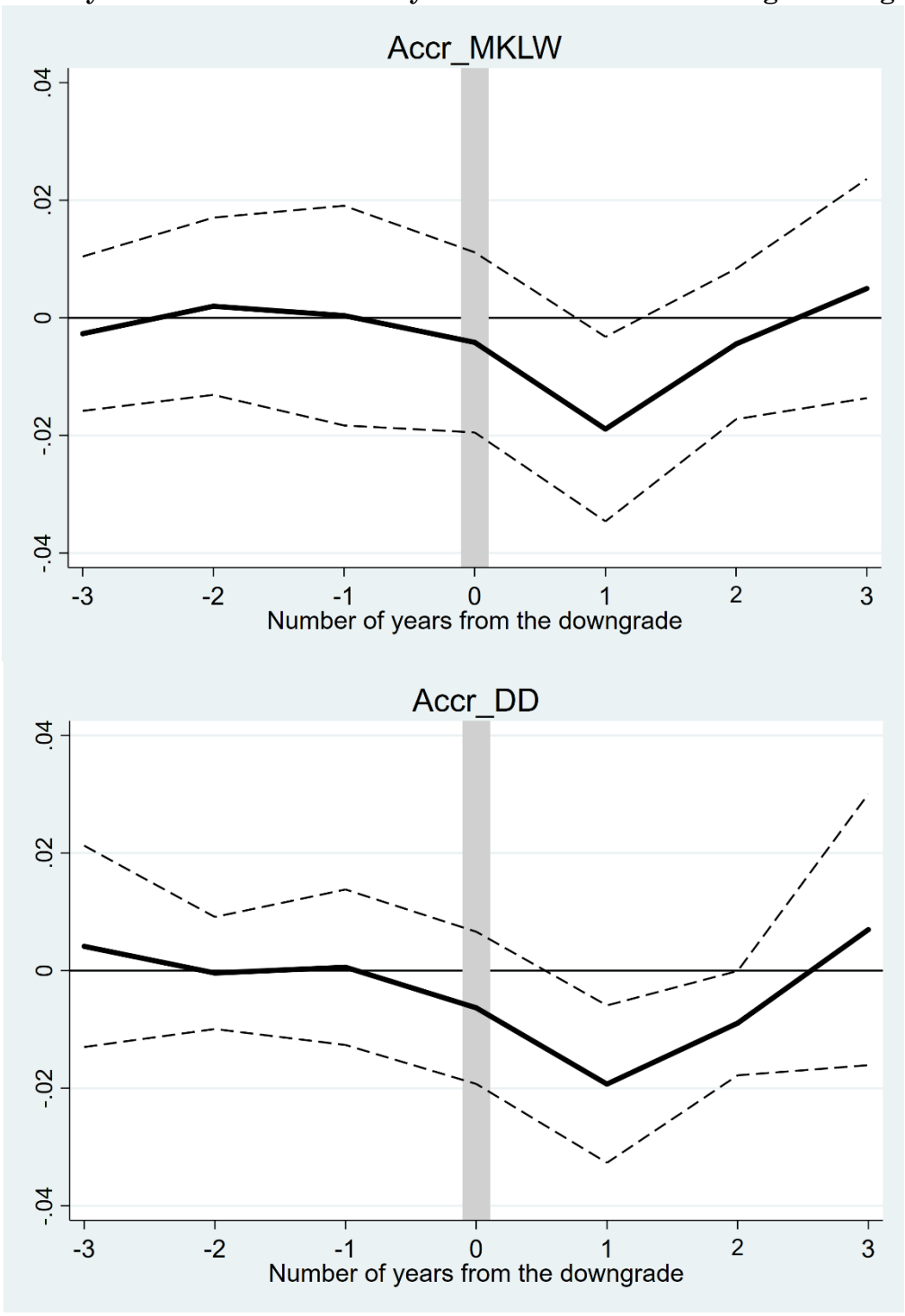
Regressions estimating the effect of sovereign rating reversals on abnormal accruals of treatment firms following a sovereign downgrade. We report t-statistics in brackets based on standard errors clustered at the country level. ***, **, * indicates significance at the 1%, 5% and 10% level respectively.

Figure 1. Frequency of corporate downgrades around a sovereign downgrade



This figure shows the frequency of corporate downgrades in the month before, the month of, and the month after a sovereign downgrade by groups according to the pre-downgrade difference between the corporate rating and its corresponding sovereign rating. The sample consists of Factset nonfinancial firms over the 1999 to 2013 period.

Figure 2. Dynamics of discretionary accruals around sovereign downgrades



This figure plots the coefficients of dummy variables indicating the number of years from the sovereign downgrade year by estimating dynamic difference-in-differences regressions. The x-axis represents the number of years from the sovereign downgrade, and the y-axis represents the level of coefficients with a 95% confidence interval.

Appendix. Variable definitions

***Dependent variables*:**

Accr_MJones	Abnormal discretionary accruals from a modified Jones model (Dechow, Sloan, and Sweeney 1995): $\frac{Accr_{i,t}}{Asset_{i,t-1}} = \beta_0 + \beta_1 \frac{\Delta Rev_{i,t} - \Delta Rec_{i,t}}{Asset_{i,t-1}} + \beta_2 \frac{PPE_{i,t}}{Asset_{i,t-1}} + \varepsilon_{i,t}$, Where *Accr* is total accruals, defined as the change of current assets (net of cash and cash equivalents) minus the change of current liabilities (net of short-term debts and income tax payables) and the change of depreciation, $\triangle Rev$ is the revenue growth, $\triangle Rec$ is the growth in accounts receivables, *PPE* is gross property, plant, and equipment, and *Asset* represents total book assets.
Accr_MKLW	Similar to *Accr_MJones*, except that ROA is included as an additional regressor in the modifiled Jones model.
Accr_DD	Abnormal discretionary accruals from Dechow and Dichev's (2002) model: $\frac{\Delta WC_{i,t}}{Asset_{i,t-1}} = \beta_0 + \beta_1 \frac{CFO_{i,t-1}}{Asset_{i,t-1}} + \beta_2 \frac{CFO_{i,t}}{Asset_{i,t-1}} + \beta_2 \frac{CFO_{i,t+1}}{Asset_{i,t-1}} + \varepsilon_{i,t}$, where $\triangle WC$ is the change in working capital, defined as the change of current assets (net of cash and cash equivalents) minus the change of current liabilities (net of short-term debts) and *CFO* represents operating cash flows.

***Control variables*:**

Downgrade	Starts from 0 and increases by 1 for each additional occurrence of sovereign downgrade for bound firms. Bound firms are those that had the same or a better credit rating than the sovereign debt prior to a sovereign downgrade.
Bound08	Equal to 1 for firms that had the same or a higher rating than the sovereign rating at the beginning of 2008 and the sovereign rating was not downgraded in 2008.
Post	Equal to 1 for the period after 2008 and zero otherwise.
Year (n)	Equal to 1 for the nth year from the sovereign downgrade year for treatment firms (firms with the same or a better credit rating than the sovereign debt at the beginning of the sovereign downgrade year) and 0 otherwise.
Upgrade	Starts from 0 and increases by 1 for each additional occurrence of sovereign upgrade after a sovereign downgrade for bound firms (if the sovereign upgrade occurs within five years of the sovereign downgrade). Bound firms are those that had the same or a better credit rating than the sovereign debt prior to the sovereign downgrade.
Size	The logarithm of total assets.
BTM	The logarithm of total assets divided by market capitalization.
Leverage	The sum of short-term debt and long-term debt divided by total assets.
Capex	Capital expenditure divided by property, plant, and equipment.
Return	Annual stock return.
RetStD	The standard deviation of monthly stock returns.
Analyst	The logarithm of the total number of analysts following a firm each year.
InstOwn	The ratio of total institutional ownership to a firm's market capitalization.

DebtIssue	The amount of newly issued debt divided by lagged total assets.
EquityIssue	Stock sales minus stock repurchases divided by lagged total assets.

***Country-level variables*:**

AntiDir	Equal to 1 if the anti-director rights index of a country (Djankov, La Porta, López-de-Silanes, and Shleifer, 2008) is higher than the sample median and 0 otherwise.
AntiSD	Equal to 1 if the anti-self-dealing index of a country (Djankov, La Porta, López-de-Silanes, and Shleifer, 2008) is higher than the sample median and 0 otherwise.
DisReq	Equal to 1 if the disclosure requirements index of a country (La Porta, López-de-Silanes, and Shleifer 2006) is higher than the sample median and 0 otherwise.
InvProfile	Equal to 1 if the investment profile index of a country (International Country Risk Guide) is higher than the sample median and 0 otherwise.