The Tip of the Iceberg:

Pre-Publication Revisions of Bank Financial Statements

Andre Guettler[a,b], Mahvish Naeem[a], Lars Norden[c,d], and Bernardus Van Doornik[e]

[a] *Institute of Strategic Management and Finance, Ulm University, Germany*

[b] *Halle Institute for Economic Research (IWH), Germany*

[c] *Brazilian School of Public and Business Administration, Getulio Vargas Foundation, Brazil*

[d] *EPGE Brazilian School of Economics and Finance, Getulio Vargas Foundation, Brazil*

[e] *Research Department, Central Bank of Brazil, Brazil*

This version: September 2, 2021

Abstract

We investigate whether pre-publication revisions of bank financial statements contain information about financial stability. Using 9 million observations of monthly financial reports from all banks in Brazil during 2007-2019, we show that 88% of all revisions occur before the publication of these statements. The frequency, missing of reporting deadlines, and severity of revisions are positively related with bank risk, in particular before banks experience financial distress. The evidence suggests that private information from pre-publication revisions is useful for monitoring banks and financial stability.

JEL classification: G21, G28, M41

Keywords: Banks, bank performance, financial stability, regulatory reporting quality, restatements, regulatory oversight

1. Introduction

Bank financial reporting receives special attention by academia, financial markets, and policy makers for good reasons. Banks' balance sheets consist predominantly of opaque financial assets and liabilities, financial statement information is used in prudential bank regulation, and loan loss provisions constitute a dominant accrual in bank accounting. Moreover, research suggests a link between changes in accounting standards, banking regulations and banking crisis (Beatty and Liao 2014). The experience from the Global Financial Crisis of 2007-09 suggests that financial reporting may have negatively affected bank supervision before and during the crisis (Acharya et al. 2009; Bank for International Settlements 2012; Bischof et al. 2021).

In this paper, we investigate whether pre-publication revisions of bank financial statements contain forward-looking information about bank risk and financial stability. This is an important question because bank failures and systemic financial crisis are potentially costly but at the same time difficult to predict.[1] Our setting differs from the literature on bank financial reporting to the public as we analyze banks' financial statements and revisions *before* they are published. In other words, we focus on the flow of private information from banks to their supervisor and investigate the link with bank risk. If the information about banks' revisions are significantly and systemically related to risk, then it can be ruled out that revisions are idiosyncratic and unintentional reporting mistakes. Instead, such evidence would be consistent with the view that pre-publication revisions are just the tip of the iceberg as they point at strategic bank behavior related to risk taking. These revisions could also provide early-stage private information that supervisors can use for monitoring bank risk and financial stability. Late detection of potential balance sheet manipulations can be very costly, see e.g., the bankruptcy of Greensill Capital or Wirecard.

[1] Please see Laeven and Valencia (2018) for a comprehensive overview of systemic banking crises and the associated costs.

Our study is based on a unique dataset on bank regulatory reporting that to the best of our knowledge has never been used before. The data cover 2,756 financial institutions that have to submit their financial statements to the Central Bank of Brazil every month. The main dataset contains 9,302,963 bank-month-item level observations resulting from a merge of four regulatory datasets that include preliminary, revised, and final financial statements, as well as information on bank closures. Importantly, the Central Bank of Brazil has not systematically analyzed or monitored banks' revisions of financial statements, in part because the data is big and fragmented, not centrally stored and not aggregated at the bank-time level. Each observation contains information on a financial statement item reported by a certain bank and month. These data allow us to compute the frequency, severity, and direction of the revisions by item, bank, and month. Interestingly, 88% of all revisions made by banks occur before the publication of the financial statements. After aggregating over all available accounting items at the bank-month level, the final dataset consists of 204,467 observations, spanning the period from January 2007 to March 2019.

In our empirical analysis, we find that pre-publication revisions of financial statements contain significant private information about future bank risk. The frequency of revisions is negatively related to a bank's future Z-score and equity ratio and positively related to earnings volatility measured as standard deviation of the return on assets (ROA) and the return on equity (ROE). The economic significance of these relations doubles for banks that revise their financial statements most frequently.

Moreover, we find that banks' reporting speed (the number of revision rounds) is negatively (positively) related to the occurrence of revisions. Hence, banks that submit their financial statements faster and in fewer revision rounds, exhibit a relatively lower risk over the next six months.

We then show for the subsample of revised financial statements, that not only the frequency but also the severity of revisions significantly relates to future bank risk. Larger revisions are negatively related to a bank's future Z-score and equity ratio and positively related to the standard deviation of ROA and ROE.

We also find that the direction of revisions (increases or decreases) of key items contains significant information. We examine credit loss provisions, the volume of high-rated loans, and the volume of non-performing loans. For the former two measures, we find that the directional severity is positively related to future bank risk. All in all, our paper finds evidence in line with strategic pre-publication revisions of financial bank statements.

Our paper relates to three strands of literature. The first strand of literature investigates banks' risk taking and interactions with regulators. Ellul and Yerramilli (2013) show that banks with tighter risk controls exhibit less downside risk. Fahlenbrach et al. (2012) provide evidence that banks' inherent risk culture affects their risk taking and performance over a long-term horizon. Agarwal et al. (2014) document that lenient regulatory behavior can lead to costly outcomes and significantly impede the effectiveness of banking supervision and regulation. Gallemore (2021) investigates the link between financial reporting opacity, measured by delayed expected loan loss recognition, and regulatory interventions in U.S. banks during the financial crisis. He finds that reporting opacity is negatively related to regulatory intervention.

The second strand of literature examines banks' use of internal risk models. Banks report the output of these models internally (e.g., to loan officers, risk managers, management) and externally (to bank supervisors, auditors). Concerning internal reporting, Hertzberg et al. (2010) provide evidence that loan officers' compensation scheme, career incentives and potential rotation schemes affect the quality of the internal risk ratings. Concerning external reporting, there is mixed evidence about whether banks over- or

understate their market risk, which is measured by internal Value-at-Risk (VaR) models, to regulators and/or the public. Da Veiga et al. (2012) show that banks understate VaR to save costly capital, while Pérignon et al. (2008) provides evidence that banks overstate the VaR. The Basel II capital regulations also allow banks to use the internal-ratings based (IRB) approach to measure their level of credit risk. Behn et al. (2016) find that internal risk estimates employed for regulatory purposes understate actual default rates. Similarly, Mariathasan and Merrouche (2014) find that the risk-weight density becomes lower once regulatory approval to use the IRB approach is granted. Plosser and Santos (2018) provide evidence that within loan syndicates, low-capitalized banks report lower risk borrower risk estimates than high-capitalized banks.

The third strand of literature deals with the quality of published financial statements and effects of restatements. Leuz et al. (2003) provide evidence that earnings management is more severe in countries with weaker investor protection. Feroz et al. (1991) and Desai et al. (2006) provide empirical evidence what forced accounting revisions imply for management turnover. Beatty and Liao (2014) provide a comprehensive overview of earnings management and restatements for banks. Jiang et al. (2016) find that intensified competition reduces abnormal accruals of loan loss provisions and the frequency with which banks restate financial statements. Herly (2019) shows that banks subject to restatements contribute more to systemic risk than other banks and have spillover effects on the financial system. Costello et al. (2019) show that strict regulators are more likely to enforce income-reducing reporting choices by forcing banks to restate their overly aggressive call reports. Huizinga and Laeven (2012) show that banks overstate the value of distressed assets and their regulatory capital during the financial crisis.

Our paper contributes to the literature above in the following ways. First, we investigate the regulatory reporting of banks to their supervisor, which takes place before

banks make their financial statements public. Second, banks' regulatory reporting is more frequent (monthly instead of quarterly or yearly) and more detailed than their financial reporting to the public. Both features of regulatory reporting enable supervisors to observe information earlier than the public and take actions if necessary. The information could induce the supervisor to ask for revisions of financial reports, perform onsite bank examinations, take prompt-corrective actions, or close banks. Third, our study sheds light on the channels through which banks manage their regulatory reporting strategically. We find that the severity and direction of revisions for credit loss provisions, high-rated loans and non-performing loans indicate higher future bank risk.

The rest of the paper is organized as follows. In Section 2, we outline the institutional background of regulatory financial reporting in Brazil. In Section 3, we describe the data and provide summarize statistics. In Section 4, we present our main findings on pre-publication revisions of financial statements and bank risk. In Section 5, we present findings on revisions prior to bank distress. Section 6 concludes.

2. Institutional background

The National Financial System (SFN) of Brazil is structured in three functions: regulatory, supervisory, and operational. The operational function is performed by intermediary institutions that provide financial services. The financial system is dominated by banking institutions. In addition, it is highly concentrated with the five largest banks accounting for more than 70 percent of total lending. The credit market experienced significant growth in the last two decades. Bank credit to private sector increased from 31% of GDP in 2005 to almost 64% of GDP in 2019.[2] This vast expansion of credit is attributed to

[2] Source: World Bank Data

several reforms in the 2000s, a fostering credit policy after the global financial crisis of 2008, and a declining trend of the policy interest rates (Haas Ornelas et al., 2020).

Brazil's financial system has been characterized by high interest rates and high spreads. Nonetheless, the interest rates have fallen significantly in the last five years. The Selic rate, which is the policy interest rate, dropped from 14% in 2015 to 2% in 2020. As of December 2019, the average interest rate on loans was 22.6% whereas the banks' funding cost was about 11%. The high lending rates can be explained by the high-risk environment. Brazilian banks held problem assets of 7.3% and provisions expenses of 2.9% of the credit portfolio. The provisions maintained by the banks covered more than 80% of their delinquent assets, which is an important mitigator in the case of risk materialization. Furthermore, more than 60% of loans were secured by collateral (Haas Ornelas et al., 2020). Despite the high-risk environment, Brazilian banks are highly profitable. In 2019, the banking system reported an average Return on Equity (ROE) of 16.5%.

The Central Bank of Brazil, Banco Central do Brasil (BCB), is responsible for executing the monetary, credit and exchange rate policies, and regulating and supervising the National Financial System. It has the mandate of assuring the soundness and efficiency of the financial system. A variety of financial institutions fall under the jurisdiction of the Central Bank, including banks, credit unions, and non-bank financial institutions. In the rest of the paper, for the sake of simplicity, we use the term "banks" to represent all the supervised financial entities. The banks are required to report to the regulator on several aspects, including accounting information. The banks report accounting information to the Financial System Monitoring Department (*Departamento de Monitoramento do Sistema Financeiro*; Desig) of the Central Bank. The accounting plan and governing principles thereof are stipulated in the regulatory guidelines (*Plano Contábil das Instituições do Sistema Financeiro Nacional*; COSIF). The data submitted by the banks form the COSIF database.

Desig issues the submission schedule of the financial statements at the beginning of each year. The banks are required to report their accounting information, before the respective submission deadline, via an online system of the Central Bank. When a bank submits its report, an initial screening takes place. This screening involves two types of checks: pre-processing checks and post-processing checks. The pre-processing checks are embedded in the system. They identify common errors and mistakes, such as account balance errors. If any parameter of the pre-processing checks is not satisfactory, the system automatically rejects the report. Such rejected data do not enter the COSIF database. The data that meets the pre-processing checks become part of the COSIF data. In the next step, Desig performs post-processing checks and evaluates quality of the data. In case of any anomaly, it asks the bank, via the online system, for explanation and/or rectification. The system automatically shares a copy of the message with the Banking Supervision Department (*Departamento de Supervisão Bancária*; Desup) for information and further investigation. If significant inconsistencies are observed, the Financial System Monitoring Department (Desig) informs the Conduct Supervision Department (*Departamento de Supervisão de Conduta*; Decon).

The Central Bank publishes selected financial information of the banks on its website on a fixed date, which is 90 days after the reference date for the annual accounts of December and 60 days after the reference date for all the other months.[3] COSIF dataset has several levels of detail, with level-5 being the most detailed. The data is made public only up to level-3 of detail.

The banks are allowed to submit, and re-submit the financial statements before the

[3] Banks are also required to publish their reports themselves; semi-annual and annual financial statements are auditied.

publishing of the data without any restriction.[4] They do not need approval of the Central Bank to make changes and substitute the initially submitted data with a new version. The history of all the initially submitted reports is stored in a separate database, which never becomes public. We have access to this database. If banks make changes after the financial statements are published, only then it is necessary to resubmit the statements with explanatory notes on the reason of changes. If changes are made in the statements of June or December, in addition to the explanatory notes, it is necessary to have the financial statements audited again. Each month the Central Bank updates the last six months of data, which reflect any updates made by the banks in the meantime.

3. Data

We base our study on a unique dataset on regulatory reporting that has, to the best of our knowledge, never been used before. Our data consist of changes made by the banks in financial statements submitted to the regulator. In our study, we focus on revisions and not on restatements, where the former represent the changes that are done before publication while the latter represent the substitutions that are made after the data become public. We are the first to study revisions in contrast to the existing literature that studies restatements.[5] We investigate whether and how the frequency, severity, and direction of revisions of banks' regulatory reporting contain useful information about financial stability. Our sample contains data from 2,756 banks and covers 147 months from January 2007 to March 2019.[6]

3.1. Data sources

[4] For example, for the month of January 2018, the deadline to submit the report is 18/02/2018, and the publishing date is 01/04/2018. The banks can freely revise and substitute the initially submitted reports until 01/04/2018.

[5] About 88 percent substitutions in our sample are revisions and only about 12 percent are restatements. Since our sample contains mainly revisions, we use the term revisions to represent all substitutions.

[6] The sample contains 1,812 banks and 944 non-banks. The 1,812 banks are 161 commercial banks, 67 investment banks, 1,580 credit unions, and four development banks.

Our analysis is based on four datasets obtained from the Central Bank of Brazil. Three datasets are obtained from the Financial System Monitoring Department (Desig) and one from the Department of Financial System Organization (*Departamento de Organização do Sistema Financeiro*; Deorf).

Our first dataset, is a registration database for the supervised financial institutions (*Informações sobre Entidades de Interesse do Banco Central*; Unicad). This dataset includes key information such as incorporation date, corporate control, ownership, type of institution, and segment of operation. It is continuously updated to reflect the latest characteristics of a supervised entity.

Our second dataset contains accounting data of the regulated financial institutions (COSIF).[7] Some banks are required to submit the accounting statements on a monthly basis and others on a quarterly basis. The Central Bank uses COSIF data for the purpose of monitoring, analysis, and evaluation of the financial system.

Our third dataset, revisions history data, is a confidential database that contains the history of all preliminary accounting information submitted to the Central Bank. This database basically contains all initial versions of the accounting information reported to the Central Bank as per regulatory guidelines in the COSIF manual. When a bank first submits its accounting information, it becomes part of the COSIF data. However, if a bank substitutes its initially reported accounting information with an updated version, before the publishing date, the initially submitted version is transferred to the revisions history data and only the final version becomes part of the COSIF database. The former is never made public while the latter is published according to a pre-determined schedule. The publishing date is 90 days after the reference date for the annual accounts of December and 60 days after the reference date for all the other months.

[7] COSIF data is public only up to level-3. We also have access to the internal manual and the ratios that the Central Bank uses for the purpose of monitoring and analysis of regulated entities.

Our fourth dataset is a compilation of the cases of bank closures as a consequence of license cancellations. Our sample includes 831 cases in which distressed banks cease to exist as independent entities. We denote these cases *Distress Events*. For each *Distress Event*, we have information on the date and the reason of bank license cancelation by the Central Bank. The banks exit our sample, i.e., discontinue submitting regulatory reports, on average four months before the *Distress Event*.

3.2. Data samples

We prepare two data samples for our analysis, a master dataset and an aggregated dataset. We construct our master dataset by merging the above four regulatory datasets at item-bank-time level. Our master dataset consists of 9,302,963 observations, where each row contains information on accounting item *i* reported by bank *b* at time *t*. For each accounting item *i* of bank *b* at time *t*, we have information on whether, when and to what extent the initially reported value is substituted with an updated value. This unique dataset allows us to compare the preliminary accounting information that never becomes public with the final accounting information that becomes public. Our master dataset offers several advantages for the empirical analysis. First, it allows us to identify and zoom in on the accounting items that are most frequently revised by the banks. Second, we are able to utilize each reported accounting item for computation of our measures of revisions. We aggregate our master dataset at bank-time level to construct our aggregated dataset. Our aggregated dataset consists of 204,467 bank-time level observations, where each row contains aggregated information on revisions of bank *b* at time *t*. All our multivariate results are based on our aggregated dataset.

3.3. Main variables

We measure revisions of banks' regulatory reporting using the three key metrics

$Frequency_{bt}$, $Severity_{bt}$, and $Severity\ Direction_{bt}$. $Frequency_{bt}$, our main metric, captures the ratio of total items revised to total items reported in a given month. It is defined as:

$$Frequency_{bt} = \frac{\sum_{i=1}^{I} Count_{\{Revision_{ibt} \neq 0\}}}{Total\ Items_{bt}} \quad (1)$$

where $Revision_{ibt}$ is a condition testing if the final value of an accounting item *i* of bank *b* at time *t* is different than the initial value of the accounting item *i*. *Count* is a dummy variable which equals one in case of a revised item and $Total\ Items_{bt}$ counts the total number of reported accounting items.

$Severity_{bt}$ measures the absolute intensity of the revision of an accounting item in relation to its initial value. It is computed only for the items for which $Revision_{ibt}$ is equal to one. It is defined as:

$$Severity_{bt} = \frac{1}{I}\sum_{i=1}^{I} \left| \frac{Item\ Post_{ibt} - Item\ Pre_{ibt}}{Item\ Pre_{ibt}} \right| \quad (2)$$

where $Item\ Post_{ibt}$ is the value of an accounting item *i* of bank *b* at time *t* after revision, and $Item\ Pre_{ibt}$ is the value of an item *i* of bank *b* at time *t* before revision. We use two estimates of $Severity_{bt}$ for our analysis: natural log of $Severity_{bt}$ and $\sum_{i=1}^{I} |Item\ Post_{ibt} - Item\ Pre_{ibt}|$ scaled by total assets. We denote these variables as $\ln(Severity_{bt})$ and $Severity\ to\ Assets_{bt}$, respectively.

$Severity\ Direction_{bt}$ measures the intensity and direction of the revision of an accounting item in relation to total assets of a bank. It is computed only for the items for which $Revision_{ibt}$is equal to one. It is defined as:

$$Severity\ Direction_{bt} = \frac{\sum_{i=1}^{I} Item\ Post_{ibt} - Item\ Pre_{ibt}}{Total\ Assets_{bt}} \quad (3)$$

where $Item\ Post_{ibt}$ and $Item\ Pre_{ibt}$ are as defined above, and $Total\ Assets_{bt}$ are the total assets of bank *b* at time *t*. $Severity\ Direction_{bt}$ has a positive value if $Item\ Post_{ibt} - Item\ Pre_{ibt} > 0$ and a negative value if $Item\ Post_{ibt} - Item\ Pre_{ibt} < 0$. We consider

Severity Direction$_{bt}$ for three categories of accounts: provisions (*Severity Direction: Provisions*$_{bt}$), high-rated loans (*Severity Direction: LoansAaAB*$_{bt}$), and non-performing loans (*Severity Direction: NPLs*$_{bt}$).

We employ four indicators to relate our metrics of revisions to bank risk. Our risk indicators include the bank Z-Score (*Z-Score*), the equity ratio (*Equity Ratio*) the standard deviation of return on assets (*SD ROA*), and the standard deviation of return on equity (*SD ROE*). The *Z-Score*$_{bt-5:t}$ captures the distance-to-default, i.e., the number of standard deviations a bank's (six-month rolling window) ROA has to decline to entirely deplete its equity, of bank *b* at time *t.* Since the Z-Score is highly skewed, we use the natural logarithm of the Z-Score as in Laeven and Levine (2009).[8] *Equity Ratio*$_{bt-5:t}$ measures average bank capitalization of bank *b* between *t*-5 and *t*.[9] *SD ROA*$_{bt-5:t}$ and *SD ROE*$_{bt-5:t}$ are computed over a rolling window of six months (from *t*-5 to *t*). All variables are defined in Table 1.

3.4. Summary statistics

Table 2 presents summary statistics for our variables of interest over our sample period. The average bank reports 46 accounting items per time. *Frequency* shows that the average bank revises 0.9 percent of its accounting items. This implies that the average bank revises one accounting item in two months. The banks at the 95th and 99th percentile revise five percent and 22 percent of accounting statements per time, which make about two and ten accounting items, respectively. The bank at the maximum end of the distribution revises its accounting statement completely. The average bank's intensity of revisions, measured by ln(*Severity*), is 0.12. In terms of *Severity to Assets*, the average bank's intensity of revisions is about 6 percent of its total assets. Since our measures of *Severity* are computed using only the

[8] For brevity, we use the label *Z-Score* in referring to the natural logarithm of the Z-Score.

[9] Results are qualitatively very similar if we take *Equity Ratio* from time *t*. Results are available from the authors upon request.

accounting items that are revised, the sample size is reduced.[10] The measures of *Severity Direction* reveal that the average bank revises accounts such that it increases provisions and NPLs, and decreases high-rated loans.[11] Turning to banks' risk characteristics, Table 2 shows that the average bank's *SD ROA* and *SD ROE* are 1.8 percent and 5.4 percent, respectively. The average bank's *Equity Ratio* is 39.4 percent, and the *Z-Score* equals 4.5.

Panel A of Table 3 reports the number and fraction of revisions. In our master dataset (item-bank-time level), the number of revised items is 80,278 which is 0.86 percent of total reported items of 9,302,963. In our aggregated dataset (bank-time level), there are 18,180 bank-time pairs with non-zero metrics of revisions. This makes about 8.89 percent of our aggregated data that have 204,467 observations. Panel B of Table 3 presents the timing of revisions with respect to the date on which the financial statements become public. About 88 percent of revisions in our sample take place before the financial information becomes public. This feature of our data makes our study the first of its kind.

Figure 1 zooms in on the number of revisions. Panel A shows a box plot with the distribution of revisions at bank-time level, i.e., the number of items revised when a bank *b* revises its financial statements of time *t*. The number of revised items range from a minimum of 1 to a maximum of 86. Panel B shows the distribution of revisions made by all banks in a given month. The revisions range from a minimum of 33 to a maximum of 3,399. On average, 684 accounting items are revised in a month (median is 650).

Figure 2 plots in Panel A items revised in each month in our sample period as a percentage of the total items reported in the same month. The figure shows that in the majority of the months less than 0.5 percent of items are revised. The median percentage of items revised in a given month is 0.7 percent. In the case of annual accounts, on average

[10] By construction, *Severity* is defined only for the subsample where *Frequency* is nonzero. To explain further, frequency of revisions can be zero when there is no revision but intensity cannot be measured in this case. Hence, it cannot be taken as zero.

[11] By construction, *Severity Direction* is defined only for the subsample of a specific group of accounts, hence the sample size reduces substantially.

nearly one percent of reported items are revised. The maximum revisions are four percent, in March 2016, which are triggered by the extraordinary regulatory changes.[12] Panel B of Figure 2 plots over our whole sample period the revision-making banks as a percentage of the total reporting banks. The median percentage of banks that revise is about 7 percent. In March 2016 we observe the maximum value of 77 percent of the banks revising at least one item.

Figure 3 plots in Panel A, B, and C the distribution of *Frequency*, ln(*Severity*), and *Severity to Assets*, respectively. All three distributions are positively skewed. Panel A shows that in about 70 percent of the cases, banks revise approximately 10 percent of accounting items in a month. Panel B shows that intensity of around 75 percent of revisions, in terms of ln(*Severity*), is under 0.2 (maximum is 0.7). Panel C depicts that in about 80 percent of cases, the sum of absolute revisions in a month is less than ten percent of total assets of a bank.

Our item-bank-time level data allow us to study the accounting items which are most frequently and most severely revised. Table 4 in Panel A presents the top ten frequently revised items. The top five items belong to the balance sheet and the next five items belong to the income statement. It is noteworthy that the top four items, which account for about 32.5 percent of all revisions in total, are opaque and complex accounts. For instance, the most frequently revised account of *Compensation control* contains 163 sub-accounts. The fifth most frequently revised item is the liability account of *Taxes and social security* which accounts for about 5.3 percent of all revisions. This account records taxes and social security contributions and provision thereof, and provision for deferred taxes and contributions. It is followed by four expense accounts of *Administrative expenses*, *Other operating expenses*, *Income tax*, *and Provisions and equity adjustments*. These items, respectively, account for 3.9 percent, 3.8 percent, 3.7 percent, and 3.3 percent of all revisions. The account of *Provisions and equity adjustments* records various types of provisions and losses, such as provision for

[12] The Central Bank required banks to separately report the accounts of income/expenses attributed to exchange rate variation. 80 percent of the revisions in March 2016 are in two accounts that are affected by the change.

amortization of investments, loss due to depreciation of fixed and intangible assets, and provision for financial guarantees provided by banks. The last account on the list is *Other operating income* with a share of 3.3 percent.

Panel B of Table 4 reports the top ten most severely revised accounting items. The first two items are the revenue and expense accounts of *Apportionment of internal results*. The purpose of this opaque account is to record, on an optional basis, the revenues and expenses that a bank's branches apportion among themselves. The next item, *Securities and derivative instruments linked with acquisition of shares of state-owned companies*, is also opaque. It registers the amount accepted by the Brazilian government as the privatization currency, which usually relates to the bonds traded at a discount. Two other most severely revised items are the *Profit/Loss on disposal of assets*. These accounts register profit/loss arising from the transactions such as disposal of investments, foreign exchange variation on investments abroad, non-financial assets held for sale, and disposal of other assets. Movements in these accounts may be valuable for banks to present a final profit to their stakeholders. Other items on the list are asset accounts of *Investments in foreign currency*, *Tax incentive investments*, and *Guarantees honored*, income account of *Other non-operating income* and expense account of *Borrowing and onlending expenses*. The contents of Table 4 highlight two aspects. First, a number of items are opaque and complex which fall in the "miscellaneous" or "other" category. Second, none of the ten most frequently revised items are on the list of the ten most severely revised items. This finding reinforces the need for central banks to monitor both our measures of frequency and severity.

4. Are revisions an early-warning indicator of bank risk?

4.1. Main results

We examine the relation between revisions and bank risk using the following model:

$$Bank\ Risk_{bt-5:t} = \alpha_t + \alpha_b + \beta R_{bt-6} + \varepsilon \quad (4)$$

where $Bank\ Risk_{bt-5:t}$ denotes any of our four indicators of bank risk: $Z-Score_{bt-5:t}$, $Equity\ Ratio_{bt-5:t}$, $SD\ ROA_{bt-5:t}$, and $SD\ ROE_{bt-5:t}$.[13] *Bank Risk* indicators are computed over a rolling window of six months (from *t*-5 to *t*). R_{bt-6} denotes any of our three measures of revisions, $Frequency_{bt-6}$, $Severity_{bt-6}$, and $Severity\ Direction_{bt-6}$.[14] Note that we measure the characteristics of revisions strictly before the bank risk proxies to avoid simultaneity. The parameter β is the coefficient of interest. We include time fixed effects (α_t) and bank fixed effects (α_b). Bank fixed effects control for any time-invariant unobserved heterogeneity across banks that affect *Bank Risk,* while time fixed effects (year-month level) control for particular changes over time. We cluster standard errors at the bank level because a bank's risk situation is likely to be correlated over time.

We investigate whether the banks that revise regulatory financial information are riskier. More specifically, we examine whether our metrics of revisions can serve as an early-warning indicator of bank risk. If this should be the case, estimations from equation (4) would return a negative sign on the coefficient β on *Z-Score* and *Equity Ratio*, and a positive sign on *SD ROA* and *SD ROE*. Such a finding would indicate that banks that revise more frequently and severely have lower *Z-Score* and *Equity Ratio*, and higher *SD ROA*, and *SD ROE*.

We start our analysis with a multivariate regression of proxies for bank risk on *Frequency*. Panel A of Table 5 reports the results.[15] We find across all specifications that our frequency estimates are higher for riskier banks. For instance, in Column (2), the coefficient estimate for *Equity Ratio* is -7.33. This implies that a change of one standard deviation in

[13] We omit the subscripts in the description below to facilitate exposition.

[14] In the robustness Section 4.2, we also use longer lag length of 12 and 18 months.

[15] The number of observations in our specifications differ because: (i) banks' reporting frequency differ depending on the type, and generating lags further reduce the number of observations, (ii) accounting items that need to be reported also differ depending on the type of bank, (iii) inclusion of fixed effects reduce the number of observations in some cases.

Frequency (0.0491) accounts for an average *Equity Ratio* decrease of 0.91 percent of its unconditional mean.

Does risk vary conditional on revisions? Equation (4) allows the prediction of bank risk on average but not of risk level conditional on revisions. We therefore employ an OLS model with dummies to capture any nonlinearities. We split *Frequency* into four mutually exclusive categories at bank-time level: *Zero*, *Low*, *Mid*, and *High*. *Zero*, the reference category, is a dummy which takes the value of one when *Frequency* (of bank *b* at time *t*) is equal to zero. The remaining sample, i.e., non-zero *Frequency*, is further split at the 33rd and the 66th percentile. *Low* (*High*) is a dummy which is set to one when *Frequency* is equal to or below (above) the 33rd (66th) percentile of nonzero *Frequency. Mid* is a dummy which is set to one when *Frequency* is above the 33rd percentile but below the 66th percentile of nonzero *Frequency*. Our model takes the form:

$$Bank\ Risk_{bt-5:t} = \alpha_t + \alpha_b + \beta_L Low_{bt-6} + \beta_M Mid_{bt-6} + \beta_H High_{bt-6} + \varepsilon \qquad (5)$$

where the variables Low_{bt-6} to $High_{bt-6}$ denote our frequency dummies, all lagged by six months. The parameters β_L and β_H are our main coefficients of interest given that they correspond to the banks with the lowest and highest revisions, respectively. We use Wald test for testing equality of the two coefficient estimates.

Panel B of Table 5 reports the results of equation (5). The evidence indicates that banks with nonzero revision frequencies have riskier profiles. Moreover, we find that banks with *High* revision frequencies are substantially riskier than those with *Low* revision frequencies (see Wald test results in the last row). Columns (1), (2), and (4) show the same results. The volatility measure of *SD ROA* in Column (3) is an exception, where the difference between the lowest and the highest revisions groups are not significant.

We complement this analysis with evidence on the timing and complexity of revisions. Using all revisions per bank and month that are lagged by six months, we create

three proxies and report results in Table 6. The first one, *Delivery Delay,* equals the number of days between the actual delivery date and the submission deadline of the financial statement. In case of multiple revisions, we use the latest delivery date. We hypothesize that a delayed delivery of financial statements after the submission deadline indicates a red flag. We find significant results across all four risk proxies in line with this reasoning. For instance, the coefficient estimate for *Z-Score* is -0.002 and significant at the 1% level. The other two proxies are *Number of Revision Rounds*, which captures the number of times financial statements are delivered by a bank for a given month, and *Revision Time Span*, which equals the number of days between the last and the first delivery date. These two proxies also indicate more complex revisions. We find consistent evidence for all four bank risk measures, e.g., each additional round of revisions decreases the *Z-Score* by -0.023 and the *Equity Ratio* by -0.688%.

Our next analysis focusses on the intensity of revisions. We measure intensity in two different ways at the bank-time level: ln(*Severity*) and *Severity to Assets*; both are again lagged by six months. We first regress our four measures of *Bank Risk* on ln(*Severity*) using equation (4). Table 7 presents the results. The coefficient β in Panel A carries the expected sign in all specifications which shows that the intensity of revisions is higher for riskier banks. We find the same for all four measures of *Bank Risk*. We then estimate equation (4) using *Severity to Assets* as our predictor variable. Panel B of Table 7 reports the results, which are analogous to the findings in Panel A. The signs of our estimates remain unchanged in all specifications. The significance levels are affected in both directions, i.e., increased in some specifications and decreased in the other. Nonetheless, the main finding remains unchanged, i.e., the intensity of revisions is higher for riskier banks. For instance, in Column (4), the coefficient estimate for *SD ROE* is 1.509 and significant at the 1% level. This implies that one standard deviation in *Severity to Assets* (0.14) accounts for an average *SD ROE*

change of 0.21 or 3.9% of its unconditional mean.

We next study the intensity of revisions in combination with the direction of revisions. We estimate equation (4) using our metric of *Severity Direction*. We do not use all accounting items to aggregate this metric (unlike our first two metrics). Several considerations prevent us from using this approach. First, the interpretation of the direction of revisions is dependent on the specific accounting item. Second, there are accounting items for which an increase/decrease in values can be best interpreted in light of the individual financial situation of a bank.[16] Therefore, we restrict our analysis to three categories of accounts for which the interpretation is rather straightforward: provisions, high-rated loans, and NPLs. This approach enables us to analyze some of the accounts that are most relevant from the risk perspective. Note that given the substantially reduced sample size, we use bank-group rather than bank fixed effects. We consider the following bank behavior risky: revisions of accounts in a manner which results in delay in booking of provisions, delay in reducing high-rated loans (loans rated Aa, A, and B), and delay in recognition of NPLs.[17]

We present the results for *Severity Direction* in Table 8. Panels A, B, and C report results for *Severity Direction* of provisions, high-rated loans, and NPLs, respectively, all lagged by six months. Panel A shows that the revisions which result in delays in booking of provisions indicate higher risk. The higher the magnitude of revisions, the higher the risk. All point estimates for β have the expected sign and are significant, except in Column (2). The results in Panel B, albeit not always statistically significant, show that the revisions which lead to delays in downgrading of loans from high-rated categories to lower categories are an indicator of risk. The results in Panel C are weaker. Nonetheless, the results for the volatility measures in Column (3) and Column (4) indicate that the revisions which cause a delay in

[16] For example: reserve accounts.

[17] See for instance Bischof et al. (2021) who provide evidence that banks delayed disclosure and recognition of losses during the financial crisis of 2007-2009. Gallemore (2021) show that delayed expected loan loss recognition negatively affects regulatory intervention decisions.

recording delinquent loans as NPLs are a red flag.

4.2. Robustness tests

In this section, we carry out further analyses to test the robustness of our main results with regard to the choice of the lag length, the computation window of the bank risk proxies, and whether revisions attributable to the Central Bank explain our results.

4.2.1. Lag length choice

One concern could be that our results are sensitive to the choice of lag length. To explore whether the lag length affects our results, we re-estimate equations (4) and (5) using different lags of *Frequency* and the frequency dummy variables. Tables A1 of the Appendix reports the results for lag lengths of 12 and 18 months. Panel A shows that the magnitude of β across all specifications is larger than in Panel A of Table 5, except for *Equity Ratio* where the coefficient size is about the same. The results in Panel B are qualitatively similar to the results in Panel B of Table 5. Moreover, the size and the statistical significance of some estimates decrease with the increase in lag length to 18 months. Nonetheless, our conclusions remain unchanged. We find that higher frequency of revisions exhibits higher bank risk for up to 18 months. Hence, our *Frequency* results are robust with regard to the lag length choice.

We repeat the above exercise for our measures of *Severity* and *Severity Direction*. Tables A2 and A3 of the Appendix present the results. Table A2 uses the 12-month lag and 18-month lag of the two *Severity* measures instead of the 6-month lag used in Table 7. While some changes in the size and the statistical significance of the coefficients are observable in both directions, conclusions remain consistent. When we use the 18-month lag of the two *Severity* measures the results become less pronounced. In Table A3 of the Appendix, we re-

estimate equation (4) using the 12-month or 18-month lag of *Severity Direction* of provisions, high-rated loans, and NPLs. The results are qualitatively similar to the results in Table 8. *Equity Ratio* in Column (2) is an exception. The point estimates for 18 months, albeit insignificant in most specifications, display the expected sign. Our results indicate that our severity measures lose most of the predictive power as soon as we increase the lag length. This effect is partially driven by decreasing power in these smaller samples (compared to the *Frequency* measures). It can also be attributed to the decreased link between the bank risk measures and the severity proxies once we increase the lag length.

4.2.2. Computation window of bank risk proxies

In another robustness test, we consider an alternative time window for computing the proxies of *Bank Risk*. Instead of computing *SD ROA* and *SD ROE* over a 6-month rolling window (from *t*-5 to *t*), we compute both measures over a 12-month rolling window (from *t*-11 to *t*). Also, we reconstruct the *Z-Score* using this alternative measure of *SD ROA*. Similarly, we calculate *Equity Ratio* as a moving average of 12 months (from *t*-11 to *t*). Computing risk proxies in this manner implies that we need to lag the explanatory variables by at least 12 months in order to avoid an overlap with the computation window of our risk proxies. Table A4 of the Appendix reports the results. Panel A and Panel B use 12-month and 18-month lag of *Frequency*, respectively. We find that the relationship between frequency of revisions and risk proxies is consistent with our findings in Panel A of Table 5. All the estimates are statistically significant at the 1% level. Our results are thus robust to changing the time window over which the bank risk proxies are computed.

4.2.3. Omitting revisions attributable to the Central Bank

One may also wonder whether the Central Bank of Brazil, as the supervisor and regulator, influences banks' revisions of financial reports. As explained in detail in Section 2, the Central Bank performs post-processing checks on the financial reports submitted by the banks. It then asks them for explanation and/or rectification if it observes any anomaly. To rule out any concern that the revisions attributable to the Central Bank drive our results, we distinguish between the revisions (possibly) initiated by the Central Bank and the ones initiated by the banks themselves. We construct an alternative data sample which excludes any revisions attributable to the Central Bank. There are 15,675 bank-time level cases where the Central Bank raised critiques regarding financial reports of banks. These critiques form a separate dataset called *Inconsistências* (Inconsistencies). We merge the inconsistencies dataset with our aggregated dataset at the bank-time level. We then drop all the matched observations. The remaining sample contains the revisions exclusively attributable to the banks. The size of this subsample is approximately 92 percent of our aggregated dataset used in Section 4.1.[18]

A few comments regarding the dataset on inconsistencies are in order. First, it does not contain information on whether or not a revision was made by a bank after the Central Bank's critique. That is, a critique appearing in the inconsistencies dataset regarding bank *b*'s financial report of time *t* does not automatically imply a revision. It could also be the case that the matter was settled through an explanation offered by the bank and hence no revision in the financial report was necessary. Second, the structure of the inconsistencies dataset does not allow matching with our master dataset at the item-bank-time level. We are able to match this dataset only at the bank-time level. Nonetheless, these limitations do not affect our robustness test. Even if the data would allow exact matching of a critique to a revision at the item-bank-time level, it would still be prudent to omit the cases at the bank-time level instead

[18] The actual number of observations that enter our regressions in Table A4 may differ for the same reasons as explained above.

of omitting only the specific accounting items at the item-bank-time level. This procedure is crucial to avoid the inclusion of revisions created in a chain reaction, i.e., a critique raised by the Central Bank regarding one accounting item triggering revisions in some other accounting items, which, prima facie, would appear to have been initiated by the banks themselves. To put it simply, we drop bank *b*'s complete financial report of time *t* if the Central Bank sent any communication to bank *b* in month *t*. Our procedure thus makes sure to include only the clear cases of revisions initiated by the banks.

Table A5 of the Appendix presents the results. The coefficient estimates across all our specifications are larger than in Panel A of Table 5. Hence, there is no evidence suggesting that our results are explained by the revisions attributable to the Central Bank. Quite the contrary, the fact that the results are stronger using the subsample of revisions attributed purely to the banks lend further support to our hypothesis that revisions point to strategic bank behavior related to risk taking.

5. Can revisions predict distress events?

To further investigate the relationship between pre-publication revisions of financial statements and bank risk, we now focus on the revisions prior to *Distress Events.* These events represent bank closures, i.e., the license of a bank is revoked or subsumed by another institution. Bank license cancelation in our sample is attributed to 14 different reasons, including bankruptcies, judicial decisions, and distressed mergers. We define distressed mergers as mergers in which the merged bank's average ROA is negative in three years prior to the merger.[19]

[19] Our results are robust to using samples based on other definitions of distressed mergers. For example, (i) mergers in which the merged bank's average ROE is negative in three years prior to the merger, (ii) mergers in which the merged bank's average ROA is lower than 25th percentile of the merged banks sample in three years prior to the merger, (iii) mergers in which the merged bank's average ROA is lower than 75th percentile of the merged banks sample in three years prior to the merger. The results are not reported to conserve space and are available from the authors upon request.

Our econometric model takes the following specification:

$$Bank\ Risk_{bt-5:t} = \alpha_t + \alpha_b + \beta_F Frequency_{bt-6} + \beta_T Time\ to\ Distress_{bt-6:\tau} + \beta_{FT} Frequency_{bt-6} x Time\ to\ Distress_{bt-6:\tau} + \varepsilon \quad (6)$$

where $Frequency_{bt-6}$ is our measure of revisions. $Time\ to\ Distress_{bt-6:\tau}$ is a dummy which takes the value of one in the period $t-6:\tau$ months (τ = 12, 24, 36) before the *Distress Event*.[20] The magnitude and sign of the estimated β_{FT} indicate whether the frequency of revisions in the months leading to the *Distress Event* exhibits higher bank risk. $Bank\ Risk_{bt-5:t}$ denotes two indicators of bank risk: $Z-Score_{bt-5:t}$ and $Equity\ Ratio_{bt-5:t}$. We exclude *SD ROA* and *SD ROE* because our analysis showed that the volatility measures are weak predictors of risk for an already poorly performing sample.[21] We include time fixed effects (α_t) and bank fixed effects (α_b).

Table 9 reports the results. We find that the frequency of revisions in the period leading to *Distress Events* is related to higher levels of bank risk. The coefficient on the interaction term is negative and statistically significant in all our specifications, except in Column (1), very close before the distress event. This result can be explained by the fact that banks stop revising financial statements close to default when manipulating is not promising anymore and/or the costs of manipulation getting detected increase. Also, the magnitude of the coefficient on the interaction term is larger than the individual estimates for *Frequency*, in particular in the case of the *Equity Ratio*.

To further investigate the relation between revisions and *Distress Events*, we analyze whether complexity of revisions is related to *Distress Events.* We estimate equation (6) using our three proxies with respect to timing and complexity of revisions from Section 4. Table 10

[20] As outlined in Section 3.1, banks exit our sample, i.e., discontinue submitting regulatory reports, on average four months before the *Distress Event*. Our *Time to Distress* variable refers to the month when banks stop regulatory reporting. Arguably, this is the point in time when regulatory authorities deny banks regular operations. The official distress declaration happens after that. If we change the *Distress Event* definition to be aligned with the official distress month, results remain qualitatively similar. See Table A6 of the Appendix.

[21] The results are available from the authors upon request.

presents the results. We document that *Delivery Delay*, *Number of Revision Rounds*, and *Revision Time Span* in the period before a *Distress Event* relate positively with higher bank risk. This finding holds up across all our specifications (except for Column (1) of Panel A). For example, Column (4) of Panel B shows that each additional round of revisions decreases the *Equity Ratio* by -0.60 percent, while each additional round of revisions in the 12 months before the *Distress Event* decreases the *Equity Ratio* by additional -4.71 percent, or roughly 9 percent of the unconditional *Equity Ratio* (see Table 2). In sum, we find evidence that the frequency and the complexity of revisions before distress events are related to higher levels of bank risk.

6. Conclusions

In this paper, up to our knowledge, we are the first to investigate whether pre-publication revisions of bank financial statements contain information about financial stability. Using a unique dataset containing monthly financial reports of all Brazilian banks submitted to the Central Bank during 2007-2019, we show that the majority of all revisions occur before the publication of these statements. The frequency, missing of reporting deadlines, and severity of revisions are positively related to bank risk. This finding is particularly strong before banks experience financial distress. We also provide a preliminary tool-kit to distinguish between random and risk-blurring revisions.

Our paper also provides evidence that banks' revision behavior – reflected, for instance, in delayed provisioning and downgrading of loans to higher credit risk categories – is positively associated with bank risk. Provisions receive particular attention from regulators and academics as they directly impact the regulatory capital calculations under the Basel framework. In addition, provisions serve as shock-absorbers against adverse events. The Global Financial Crisis of 2007-2009 revealed painfully that provisions were "too little, too

late" (BIS, 2016). To address this issue, post-crisis regulatory reforms included the introduction of International Financial Reporting Standard (IFRS) 9, which relies on forward-looking assessments of loan losses for provisioning. Delayed booking of provisions could indicate strategic bank behavior to save costly capital, which can have implications for financial stability.

Overall, our findings suggest that pre-publication revisions contain valuable information for monitoring financial institutions. Proactive regulatory actions help to promote safe and sound banking systems and the early-warning indications of our revision metrics lend them suitable for this purpose. Pre-publication revision activity should hence be regularly tracked and thoroughly analyzed by financial supervisors and regulators, especially in the case of systematically important as well as financially weaker institutions, with a view to enhance financial stability. The main advantage of scrutinizing pre-publication revision activity is the timelier information generation which in turn enables faster regulatory interventions in case of suspicious revision patterns. Timely actions from regulators and policymakers are needed to prevent systemic stress events like the Global Financial Crisis.

Appendix

Table A1: Frequency of revisions lagged by 12 and 18 months

This table examines the robustness of the main findings in Table 5. Panel A reports OLS regression results of dependent variables of *Z-Score*$_{bt\text{-}5:t}$, *Equity Ratio*$_{bt\text{-}5:t}$, *SD ROA*$_{bt\text{-}5:t}$, and *SD ROE*$_{bt\text{-}5:t}$ on *Frequency*$_{bt\text{-}p}$. Panel B reports regression results of the dependent variables on frequency dummy variables. We split *Frequency* into four mutually exclusive categories at bank-time level: *Zero*, *Low*, *Mid*, and *High*. *Zero*, the reference category, is a dummy which takes the value of one when *Frequency* (of bank *b* at time *t*) is equal to zero. The remaining sample, i.e., non-zero *Frequency*, is further split at the 33rd and the 66th percentile. *Low* (*High*) is a dummy which is set to one when *Frequency* is equal to or below (above) the 33rd (66th) percentile of nonzero *Frequency. Mid* is a dummy which is set to one when *Frequency* is above the 33rd percentile but below the 66th percentile of nonzero *Frequency*. We report p-value of a Wald test for the equality of the coefficient estimates on *Low*$_{bt}$, and *High*$_{bt}$. The explanatory variables are lagged by p = 12 months in Columns (1)-(4) and by p = 18 months in Columns (5)-(8). All variables are defined in Table 1. Standard errors appear in parentheses and are clustered at the bank level. *, **, and *** indicate significance levels at the 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Z-Score	Equity Ratio (%)	SD ROA (%)	SD ROE (%)	Z-Score	Equity Ratio (%)	SD ROA (%)	SD ROE (%)
Expected sign	(-)	(-)	(+)	(+)	(-)	(-)	(+)	(+)
Lag length	p = 12				p = 18			
	Panel A: Linear Frequency Measure							
Frequency$_{bt\text{-}p}$	-0.305***	-7.122***	0.599***	2.585***	-0.248***	-5.815***	0.396**	1.684***
	(0.050)	(1.807)	(0.193)	(0.542)	(0.057)	(1.703)	(0.180)	(0.459)
Observations	160,036	160,416	160,366	160,272	140,130	140,424	140,374	140,286
Adjusted R-squared	0.547	0.859	0.486	0.450	0.557	0.864	0.523	0.473
Bank & Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Panel B: Dummy Frequency Measures							
Low$_{bt\text{-}p}$	-0.031***	-0.877***	0.030	0.237**	-0.020*	-0.536**	0.003	0.051
	(0.010)	(0.248)	(0.024)	(0.092)	(0.011)	(0.273)	(0.025)	(0.100)
Mid$_{bt\text{-}p}$	-0.040***	-0.372	0.051	0.330***	-0.026**	-0.483	0.030	0.200*
	(0.013)	(0.357)	(0.034)	(0.105)	(0.013)	(0.363)	(0.034)	(0.105)
High$_{bt\text{-}p}$	-0.084***	-1.937***	0.119***	0.687***	-0.058***	-1.512***	0.079*	0.470***
	(0.013)	(0.442)	(0.046)	(0.145)	(0.015)	(0.437)	(0.045)	(0.135)
Observations	160,036	160,416	160,366	160,272	140,130	140,424	140,374	140,286
Adjusted R-squared	0.547	0.859	0.486	0.450	0.543	0.864	0.464	0.436
Bank & Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Wald test (Low = High)	0.0011	0.0210	0.0681	0.0041	0.0321	0.0336	0.1145	0.0066

Table A2: Severity of revisions lagged by 12 and 18 months

This table examines the robustness of the findings in Table 7. The table regresses *Z-Score*$_{bt\text{-}5:t}$, *Equity Ratio*$_{bt\text{-}5:t}$, *SD ROA*$_{bt\text{-}5:t}$, and *SD ROE*$_{bt\text{-}5:t}$ on two measures of *p*-month lagged severity: ln(*Severity*$_{bt\text{-}p}$) in Panel A and *Severity to Assets*$_{bt\text{-}p}$ in Panel B. All variables are defined in Table 1. Standard errors appear in parentheses and are clustered at the bank level. *, **, and *** denote 10%, 5%, and 1% significance, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Z-Score	Equity Ratio (%)	SD ROA (%)	SD ROE (%)	Z-Score	Equity Ratio (%)	SD ROA (%)	SD ROE (%)
Expected sign	(-)	(-)	(+)	(+)	(-)	(-)	(+)	(+)
Lag length	p = 12				p = 18			
	Panel A: ln(Severity)							
ln(Severity$_{bt\text{-}p}$)	-0.122**	-1.840	0.437***	1.056**	-0.005	-0.109	0.289**	0.517
	(0.048)	(1.208)	(0.164)	(0.491)	(0.051)	(1.188)	(0.124)	(0.431)
Observations	14,374	14,381	14,376	14,374	12,730	12,738	12,732	12,732
Adjusted R-squared	0.501	0.851	0.509	0.508	0.557	0.855	0.523	0.473
Bank & Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Panel B: Severity to Assets							
Severity to Assets$_{bt\text{-}p}$	-0.151**	-0.654	0.406*	1.275*	0.026	-0.216	0.445*	0.915
	(0.067)	(1.713)	(0.220)	(0.653)	(0.062)	(1.440)	(0.252)	(0.688)
Observations	13,934	13,940	13,935	13,933	12,366	12,371	12,367	12,367
Adjusted R-squared	0.492	0.862	0.499	0.504	0.514	0.854	0.496	0.477
Bank & Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table A3: Severity Direction lagged by 12 and 18 months

This table examines the robustness of the findings in Table 8. The table presents coefficient estimates from an OLS regression of *Z-Score*$_{bt-5:t}$, *Equity Ratio*$_{bt-5:t}$, *SD ROA*$_{bt-5:t}$, and *SD ROE*$_{bt-5:t}$ on our measures of *Severity Direction*$_{bt-p}$ for three categories of accounts: provisions in Panel A, high-rated loans (Aa to B rated) in Panel B, and non-performing loans (NPLs) in Panel C. The explanatory variables are lagged by p = 12 months in Columns (1)-(4) and by p = 18 months in Columns (5)-(8). All variables are defined in Table I. Standard errors appear in parentheses and are clustered at the bank level. *, **, and *** denote 10%, 5%, and 1% significance, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Z-Score	Equity Ratio (%)	SD ROA (%)	SD ROE (%)	Z-Score	Equity Ratio (%)	SD ROA (%)	SD ROE (%)
Expected sign	(-)	(-)	(+)	(+)	(-)	(-)	(+)	(+)
Lag length	p = 12				p = 18			
	Panel A: Provisions							
Severity Direction: Provisions$_{bt-p}$	-1.173*	20.962	7.826***	29.794***	-1.564	-7.146	7.058	24.172**
	(0.624)	(37.724)	(2.419)	(6.647)	(1.301)	(92.615)	(4.764)	(9.983)
Observations	1,348	1,350	1,348	1,348	1,126	1,127	1,126	1,126
Adjusted R-squared	0.100	0.148	0.090	0.090	0.095	0.144	0.080	0.036
Bank-group & Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Panel B: High-rated loans							
Severity Direction: LoansAaAB$_{bt-p}$	-0.535	-9.527	3.551***	12.457***	-0.619	-18.228	3.613**	12.420***
	(0.455)	(19.235)	(1.363)	(4.503)	(0.448)	(19.699)	(1.440)	(4.617)
Observations	1,005	1,005	1,005	1,004	852	852	852	851
Adjusted R-squared	0.067	0.204	0.029	0.033	0.138	0.173	0.069	0.030
Bank-group & Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Panel C: Non-performing loans (NPLs)							
Severity Direction: NPLs$_{bt-p}$	-0.403	20.687	1.448	8.445	-0.450	-0.436	3.635	8.085
	(0.627)	(29.555)	(2.715)	(9.223)	(0.814)	(28.181)	(2.544)	(6.618)
Observations	847	847	847	847	697	697	697	697
Adjusted R-squared	0.082	0.148	0.033	0.008	0.123	0.136	0.016	0.016
Bank-group & Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table A4: Bank risk proxies over a rolling window of 12 months

This table examines the robustness of the findings in Panel A of Table 5. We regress the bank risk proxies *Z-Score*$_{bt\text{-}11:t}$, *Equity Ratio*$_{bt\text{-}11:t}$, *SD ROA*$_{bt\text{-}11:t}$, and *SD ROE*$_{bt\text{-}11:t}$ on the frequency of revisions. The dependent variables of *SD ROA* and *SD ROE* are computed over a rolling window of 12 months, *t*-11 to *t*. *Equity Ratio* is computed as a moving average of 12 months, *t*-11 to *t*. Panel A and Panel B use 12- and 18-month lag of *Frequency*$_{bt\text{-}p}$, respectively. All variables are defined in Table 1. Standard errors appear in parentheses and are clustered at the bank level. *, **, and *** denote 10%, 5%, and 1% significance, respectively.

	(1)	(2)	(3)	(4)
	Z-Score	Equity Ratio (%)	SD ROA (%)	SD ROE (%)
Expected sign	(-)	(-)	(+)	(+)
	Panel A: 12-month lag			
$Frequency_{bt\text{-}12}$	-0.222***	-7.276***	0.647***	2.562***
	(0.031)	(1.762)	(0.177)	(0.484)
Observations	160,123	160,416	160,412	160,337
Adjusted R-squared	0.656	0.871	0.599	0.556
Bank & Time FE	Yes	Yes	Yes	Yes
	Panel B: 18-month lag			
$Frequency_{bt\text{-}18}$	-0.198***	-6.183***	0.499***	2.059***
	(0.034)	(1.643)	(0.187)	(0.465)
Observations	140,204	140,424	140,418	140,349
Adjusted R-squared	0.653	0.876	0.585	0.547
Bank & Time FE	Yes	Yes	Yes	Yes

Table A5: Frequency of revisions initiated by banks and bank risk

This table examines the robustness of the findings in Panel A of Table 5. The table reports OLS regression results of dependent variables of *Z-Score*$_{bt-5:t}$, *Equity Ratio*$_{bt-5:t}$, *SD ROA*$_{bt-5:t}$, and *SD ROE*$_{bt-5:t}$ on *Frequency*$_{bt-6}$. This sample excludes 15,675 bank-time observations for which the revisions were initiated by the Central Bank of Brazil (BCB). All variables are defined in Table 1. Standard errors appear in parentheses and are clustered at the bank level. *, **, and *** denote 10%, 5%, and 1% significance, respectively.

	(1)	(2)	(3)	(4)
	Z-Score	Equity Ratio (%)	SD ROA (%)	SD ROE (%)
Expected sign	(-)	(-)	(+)	(+)
$Frequency_{bt-6}$	-0.319***	-8.548***	0.543***	2.278***
	(0.058)	(2.099)	(0.198)	(0.517)
Observations	160,497	161,621	161,725	161,626
Adjusted R-squared	0.554	0.851	0.497	0.462
Bank & Time FE	Yes	Yes	Yes	Yes

Table A6: Frequency of revisions at different times prior to distress

This table examines the robustness of the findings in Table 9. The table reports OLS regression results of dependent variables of *Z-Score*$_{bt-5:t}$ and *Equity Ratio*$_{bt-5:t}$ on *Frequency*$_{bt-6,}$ *Time to Distress*$_{bt-6:\tau}$ (abbreviated by *TTD*$_{bt-6:\tau}$), and the interaction term between the two. *TTD*$_{bt-6:\tau}$ is a dummy which takes the value of one in the period t-6:τ months (τ = 12, 24, 36) before the *Distress Event*. *Distress Event* is the month of official license cancelation by the Central Bank of Brazil, in contrast to Table 9 where we define *Distress Event* as the last month of financial reporting before official license cancelation. Standard errors appear in parentheses and are clustered at the bank level. *, **, and *** denote 10%, 5%, and 1% significance, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	Z-Score			Equity Ratio (%)		
Time to Distress (TTD) lag, τ	12 months	24 months	36 months	12 months	24 months	36 months
Expected sign	(-)	(-)	(-)	(-)	(-)	(-)
$Frequency_{bt-6}$	-0.293***	-0.285***	-0.257***	-6.651***	-6.072***	-5.472***
	(0.051)	(0.051)	(0.050)	(1.730)	(1.659)	(1.542)
$TTD_{bt-6:\tau}$	-0.300***	-0.339***	-0.346***	-10.000***	-12.272***	-12.201***
	(0.051)	(0.040)	(0.041)	(2.100)	(1.906)	(1.967)
$Frequency_{bt-6}$ x $TTD_{bt-6:\tau}$	0.136	-0.285	-0.537*	-84.229**	-40.056**	-29.753**
	(0.727)	(0.373)	(0.285)	(37.353)	(19.462)	(13.477)
Observations	181,523	181,523	181,523	182,036	182,036	182,036
Adjusted R-squared	0.551	0.552	0.553	0.853	0.855	0.856
Bank & Time FE	Yes	Yes	Yes	Yes	Yes	Yes

References

Acharya, V., Philippon, T., Richardson, M., Roubini, N., 2009. A Bird's-Eye View: The Financial Crisis of 2007-2009: Causes and Remedies. In Restoring Financial Stability: How to Repair a Failed System, edited by V. Acharya and M. Richardson. Hoboken, N.J.: John Wiley and Sons.

Agarwal, S., Lucca, D., Seru, A., Trebbi, F., 2014. Inconsistent Regulators: Evidence from Banking. *Quarterly Journal of Economics* 129, 889-938.

Bank for International Settlements, 2016. Regulatory Treatment of Accounting Provisions. Discussion Paper.

Bank for International Settlements, 2012. 82nd Annual Report.

Beatty, A., Liao, S., 2014. Financial Accounting in the Banking Industry: A Review of the Empirical Literature. *Journal of Accounting and Economics* 58, 339-383.

Behn, M., Haselmann, R., Vig, V., 2016. The Limits of Model-based Regulation, European Central Bank Working Paper No. 1928.

Bischof, J., Laux, C., Leuz, C., 2021. Accounting for financial stability: Bank disclosure and loss recognition in the financial crisis. *Journal of Financial Economics* 141, 1188-1217.

Bushman, R., Williams, C., 2015. Delayed Expected Loss Recognition and the Risk Profile of Banks. *Journal of Accounting Research* 53, 511-553.

Costello, A. M., Granja, J., Weber, J., 2019. Do Strict Regulators Increase the Transparency of the Banking System? *Journal of Accounting Research* 57, 603-637.

Da Veiga, B., Chan, F., McAleer, M., 2012. It Pays to Violate: How Effective are the Basel Accord Penalties in Encouraging Risk Management? *Accounting and Finance* 52, 95-116.

Desai, H., Hogan, C., Wilkins, M., 2006. The Reputational Penalty for Aggressive Accounting: Earnings Restatements and Management Turnover. *The Accounting Review* 81, 83-112.

Ellul, A., Yerramilli, V., 2013. Stronger Risk Controls, Lower Risk: Evidence from U.S. Bank Holding Companies. *Journal of Finance* 67, 1757-1803.

Fahlenbrach, R., Prilmeier, R., Stulz, R., 2012. This Time is the Same: Using Bank Performance in 1998 to Explain Bank Performance during the Recent Financial Crisis. *Journal of Finance* 67, 2139-2185.

Feroz, E., Park, K., Pastena, V., 1991. The Financial and Market Effects of the SEC's Accounting and Auditing Enforcement Releases. *Journal of Accounting Research* 29, 107-142.

Gallemore, J., 2021. Bank Financial Reporting Opacity and Regulatory Intervention. Working Paper.

Haas Ornelas, J. R., da Silva, M. S., van Doornik, B. F., 2020. Informational Switching Costs, Bank Competition and the Cost of Finance. Inter-American Development Bank Working Paper No. 1104.

Herly, M., 2019. Bank Restatements and Financial System Stability. Working Paper.

Hertzberg, A., Liberti, J., Paravasini, D., 2010. Information and Incentives Inside the Firm: Evidence from Loan Officer Rotation. *Journal of Finance* 65, 795-828.

Huizinga, H., Laeven, L., 2012. Bank Valuation and Accounting Discretion During a Financial Crisis. *Journal of Financial Economics* 106: 614-634.

Jiang, L., Levine, R., Lin, C., 2016. Competition and Bank Opacity. *Review of Financial Studies* 29, 1911-1942.

Laeven, L., Valencia, F., 2018. Systemic Banking Crises Revisited. International Monetary Fund Working Paper No.206.

Laeven, L., Levine, R., 2009. Bank governance, regulation, and bank risk-taking. *Journal of Financial Economics* 93: 259–275.

Leuz, C., Nanda, D., Wysocki, P., 2003. Earnings Management and Investor Protection: An International Comparison. *Journal of Financial Economics* 69, 505-527.

Mariathasan, M., Merrouche, O., 2014. The Manipulation of Basel Risk-Weights. *Journal of Financial Intermediation* 23, 300-321.

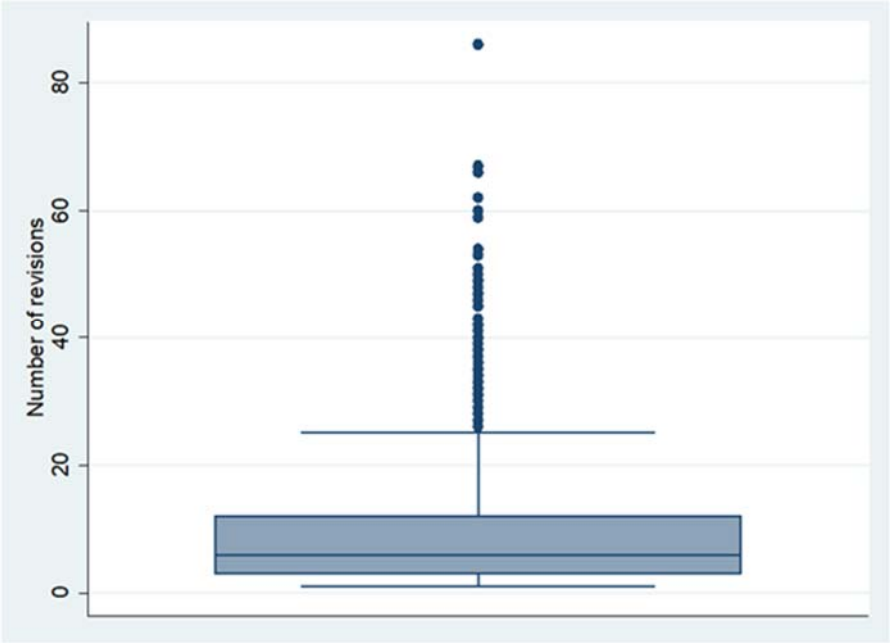
Pérignon, C., Deng, Z., Wang, Z., 2008. Do Banks Overstate their Value-at-Risk? *Journal of Banking and Finance* 32, 783-794.

Plosser, M., Santos, J., 2018. Banks' Incentives and Inconsistent Risk Models. *Review of Financial Studies* 31, 2080-2112.

Figure 1: Number of revisions per bank-time and per time

Panel A plots the distribution of the number of revisions on average at bank-time level. Panel B plots the distribution of the number of revisions on average at time level. The time period ranges from January 2007 to March 2019.

Panel A: Revisions at bank-time level



Panel B: Revisions at time level

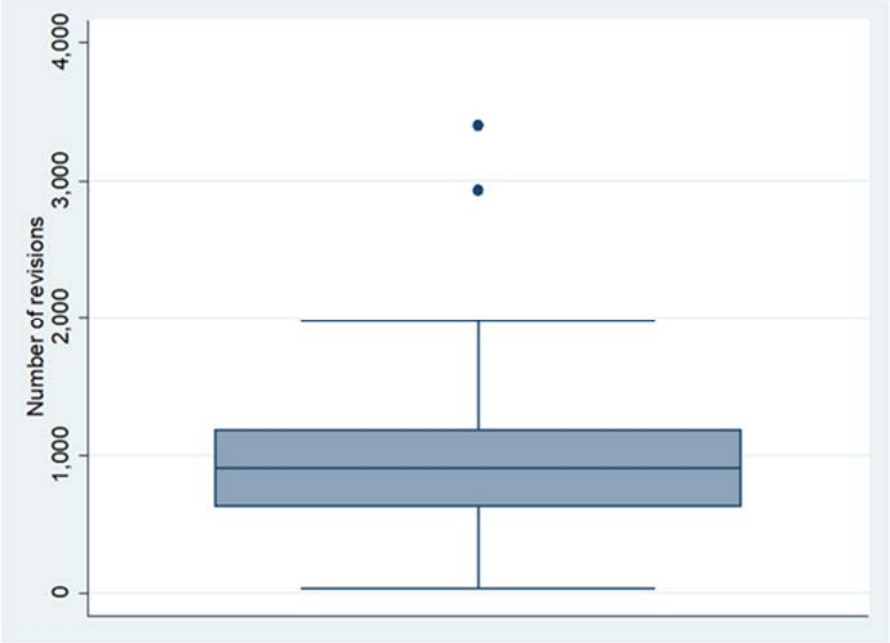
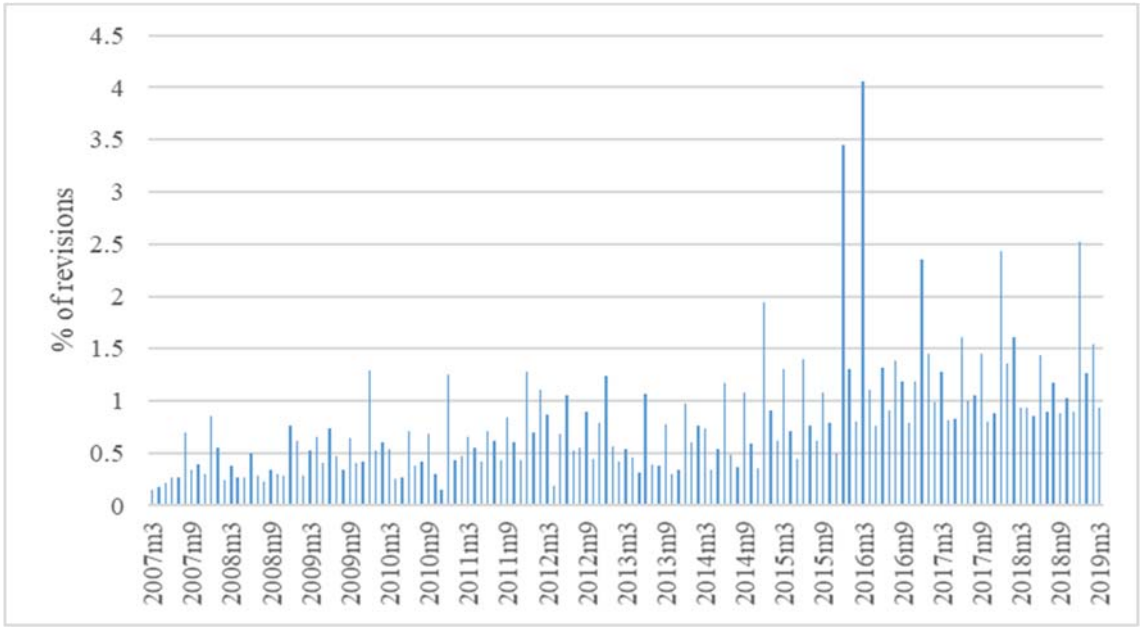


Figure 2: Percentage of revisions and banks performing revisions

Panel A plots the revisions as a percentage of the total items reported. Panel B plots the banks performing revisions as a percentage of all banks. The time period ranges from January 2007 to March 2019.

Panel A. Percentage of revisions



Panel B. Percentage of banks that perform revisions

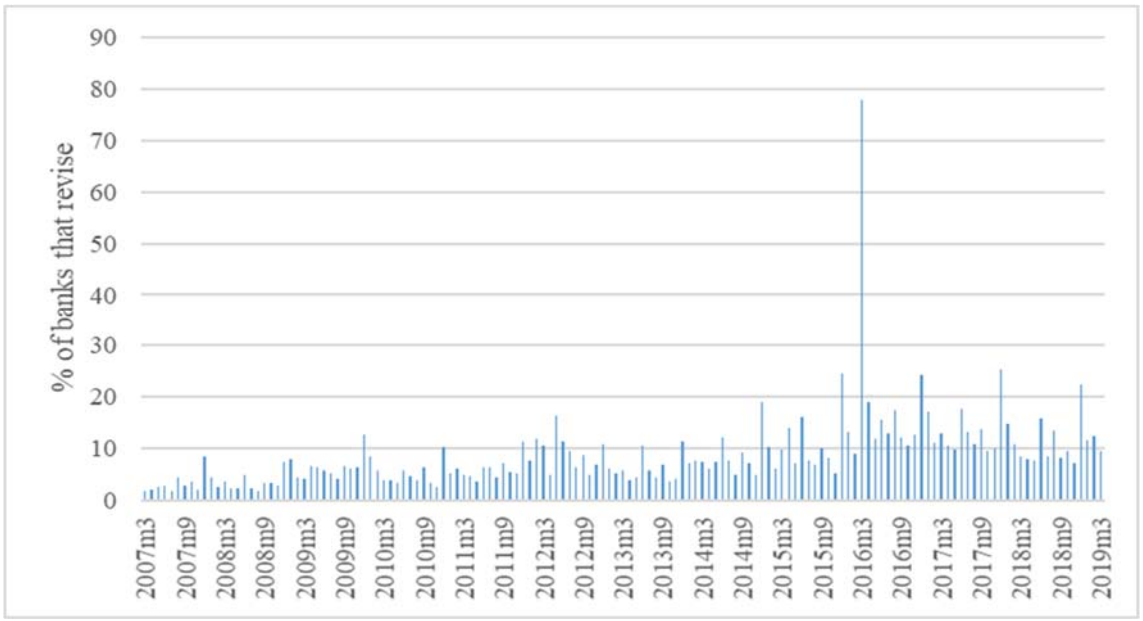
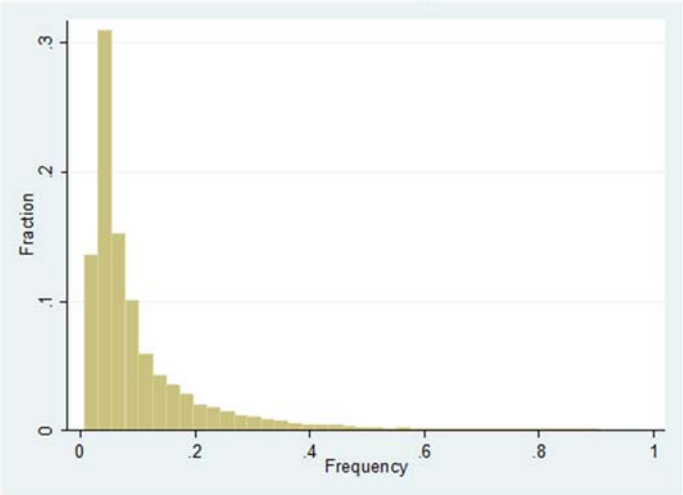


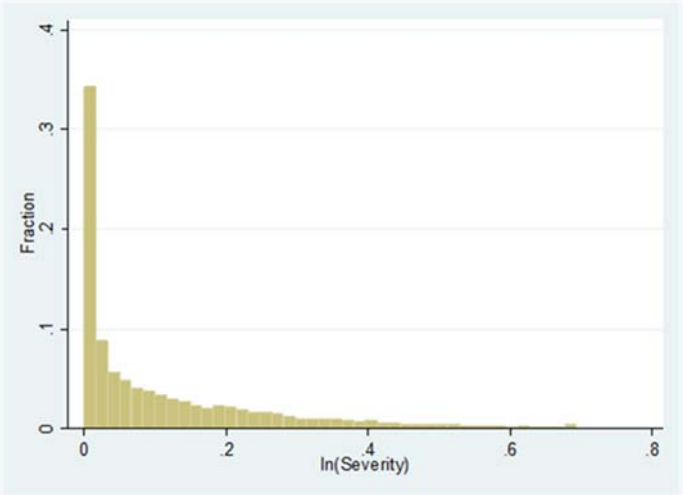
Figure 3: Distribution of measures of revisions

Panel A, B, and C plot the distribution of *Frequency*$_{bt}$, ln*(Severity*$_{bt}$), and *Severity to Assets*$_{bt}$, respectively. Panel A is based on non-zero values of *Frequency*$_{bt}$. Panel B and Panel C are based on non-missing values of ln*(Severity*$_{bt}$) and *Severity to Assets*$_{bt}$, respectively.

Panel A. *Frequency*$_{bt}$



Panel B. ln*(Severity*$_{bt}$)



Panel C. *Severity to Assets*$_{bt}$

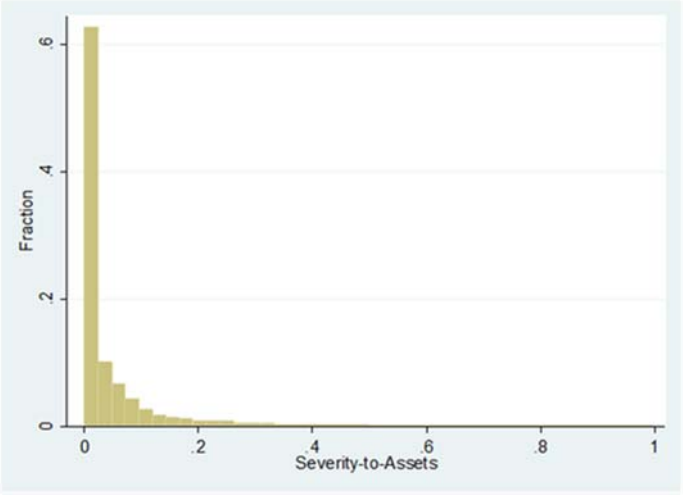


Table 1: Variable definitions

Variable	Definition
Risk indicators	
Z-Score$_{bt\text{-}5:t}$	Defined as natural logarithm of $(ROA_{bt} + Equity\ Ratio_{bt})/SD\ ROA_{bt\text{-}5:t}$, where ROA_{bt} is the rate of return on assets of bank *b* at time *t* and $Equity\ Ratio_{bt}$ is the ratio of shareholders' equity to total assets of bank *b* at time *t,* both winsorized at 1%/99% level. $SD\ ROA_{bt\text{-}5:t}$ is the standard deviation of the rate of return on assets of bank *b* at time *t*, computed over a rolling window of six months, *t*-5 to *t*, winsorized at 1%/99% level. Z-Score is rescaled to a positive number before taking the log.
Equity Ratio$_{bt\text{-}5:t}$	Ratio of shareholders' equity to total assets, computed as an average of six months, *t*-5 to *t*, winsorized at 1%/99% level.
SD ROA$_{bt\text{-}5:t}$	Standard deviation of the rate of return on assets of bank *b* at time *t*, computed over a rolling window of six months, *t*-5 to *t*, winsorized at 1%/99% level.
SD ROE$_{bt\text{-}5:t}$	Standard deviation of the rate of return on shareholders' equity of bank *b* at time *t*, computed over a rolling window of six months, *t*-5 to *t*, winsorized at 1%/99% level.
Explanatory variables	
Revision$_{ibt}$	A dummy variable which is 1 if the final value of an accounting item *i* of bank *b* at time *t* is different than the initial value of the item *i*, and 0 otherwise.
Frequency$_{bt}$	Defined as $\frac{\sum_{i=1}^{I} Count_{\{Revision_{ibt}\neq 0\}}}{Total\ Items_{bt}}$, where the numerator counts the non-zero values of $Revision_{ibt}$ of bank *b* at time *t* and $Total\ Items_{bt}$ is the total number of observations of bank *b* at time *t.*
Severity$_{bt}$	$Severity_{bt}$ is calculated for the items for which $Revision_{ibt} = 1$. It is defined as $\frac{1}{I}\sum_{i=1}^{I} \left\lvert \frac{Item\ Post_{ibt} - Item\ Pre_{ibt}}{Item\ Pre_{ibt}} \right\rvert$, where $Item\ Post_{ibt}$ is the value of an item *i* of bank *b* at time *t* after revision, and $Item\ Pre_{ibt}$ is the value of an item *i* of bank *b* at time *t* before revision. $Severity_{bt}$ is capped at 1.
ln(Severity$_{bt}$)	Defined as the natural log of 1+$Severity_{bt}$.
Severity to Assets$_{bt}$	Defined as $\frac{\sum_{i=1}^{I} \lvert Item\ Post_{ibt} - Item\ Pre_{ibt} \rvert}{Total\ Assets_{bt}}$, where $Item\ Post_{ibt}$ is the value of an item *i* of bank *b* at time *t* after revision, $Item\ Pre_{ibt}$ is the value of an item *i* of bank *b* at time *t* before revision, and $Total\ Assets_{bt}$ are the total assets of bank *b* at time *t*. The ratio is capped at 1.
Severity Direction$_{bt}$	$Severity\ Direction_{bt}$ is calculated for the items for which $Revision_{ibt} = 1$. It is defined as $\frac{\sum_{i=1}^{I} Item\ Post_{ibt} - Item\ Pre_{ibt}}{Total\ Assets_{bt}}$, where $Item\ Post_{ibt}$ is the value of an item *i* of bank *b* at time *t* after revision, $Item\ Pre_{ibt}$ is the value of an item *i* of bank *b* at time *t* before revision, and $Total\ Assets_{bt}$ are the total assets of bank *b* at time *t*. It is capped at -1 and +1.
Severity Direction: Provisions$_{bt}$	Aggregated $Severity\ Direction_{bt}$ of three items of bank *b* at time *t*: provisions for credit operations, provisions for leasing operations, and provisions for other credits.
Severity Direction: LoansAaAB$_{bt}$	Aggregated $Severity\ Direction_{bt}$ of three items of bank *b* at time *t*: loans rated Aa, A, and B.
Severity Direction: NPLs$_{bt}$	Aggregated $Severity\ Direction_{bt}$ of four items of bank *b* at time *t*: loans rated E, F, G, and H.

Direction_{ibt}	A variable which takes the value 1 when $Item\ Post_{ibt} - Item\ Pre_{ibt} > 0$ and takes the value -1 when $Item\ Post_{ibt} - Item\ Pre_{ibt} < 0$, where *Item Post*$_{ibt}$ is the value of an item *i* of bank *b* at time *t* after revision and *Item Pre*$_{ibt}$ is the value of an item *i* of bank *b* at time *t* before revision.
$\text{Direction: Provisions}_{bt}$	Defined as $\frac{\sum_{i=1}^{I} Count_{\{Direction_{ibt}=1\}}}{\sum_{i=1}^{I} Revision_{ibt}}$, where *Count* is 1 in case of a delayed increase in provisions, i.e., when $Item\ Post_{ibt} - Item\ Pre_{ibt} > 0$. It includes three provision items of bank *b* at time *t*: provisions for credit operations, provisions for leasing operations, and provisions for other credits. The ratio ranges between 0 and 1.
$\text{Direction: LoansAaAB}_{bt}$	Defined as $\frac{\sum_{i=1}^{I} Count_{\{Direction_{ibt}=-1\}}}{\sum_{i=1}^{I} Revision_{ibt}}$, where *Count* is 1 in case of a delayed decrease in high-rated loans, i.e., when $Item\ Post_{ibt} - Item\ Pre_{ibt} < 0$. It includes three items of bank *b* at time *t*: loans rated Aa, A, and B. The ratio ranges between 0 and 1.
$\text{Direction: NPLs}_{bt}$	Defined as $\frac{\sum_{i=1}^{I} Count_{\{Direction_{ibt}=1\}}}{\sum_{i=1}^{I} Revision_{ibt}}$, where *Count* is 1 in case of a delayed increase in non-performing loans (NPLs), i.e., when $Item\ Post_{ibt} - Item\ Pre_{ibt} > 0$. It includes four items of bank *b* at time *t*: loans rated E, F, G, and H. The ratio ranges between 0 and 1.
$\text{Delivery Delay}_{bt}$	The number of days between the delivery date of financial statements of bank *b* for reporting month *t* and the submission deadline for month *t*, computed as: $\text{delivery date}_{bt}$ - deadline_{t}. In case of multiple revisions, we use the latest delivery date.
$\text{Number of Revision Rounds}_{bt}$	The number of times financial statements are delivered by bank *b* for a given month *t*.
$\text{Revision Time Span}_{bt}$	The number of days between the last and first delivery date of bank *b* for reporting month *t*, computed as: $\text{last delivery date}_{bt}$ – $\text{first delivery date}_{bt}$.

Table 2: Summary statistics

This table presents summary statistics for our sample of banks. The variables are defined in Table 1. The sample period is from 200701 to 201903. All variables are calculated as of month-end.

	(1) Number of obs.	(2) Mean	(3) SD	(4) p5	(5) Median	(6) p95
Risk indicators						
$\text{Z-Score}_{bt\text{-}5:t}$	200,725	4.5308	1.0065	3.6156	4.3330	6.3652
$\text{EquityRatio}_{bt\text{-}5:t}$	204,458	0.3944	0.3827	0.0552	0.2846	0.9681
$\text{SD ROA}_{bt\text{-}5:t}$	201,646	0.0182	0.0253	0.0007	0.0080	0.0785
$\text{SD ROE}_{bt\text{-}5:t}$	201,524	0.0543	0.0735	0.0017	0.0259	0.2236
Explanatory variables						
Revision_{ibt}	9,302,963	0.0086	0.0925	0	0	0
$\text{Accounting Items Reported}_{bt}$	204,467	45.4986	18.55279	19	45	74
Frequency_{bt}	204,467	0.0096	0.0491	0.0000	0.0000	0.0541
Severity_{bt}						
$\ln(\text{Severity}_{bt})$	17,762	0.1179	0.1500	0.0000	0.0531	0.4491
$\text{Severity to Assets}_{bt}$	17,194	0.0638	0.1410	0.0000	0.0094	0.3423
$\text{Severity Direction}_{bt}$						
$\text{Severity Direction: Provisions}_{bt}$	1,722	0.0075	0.0647	-0.0104	0.0003	0.0392
$\text{Severity Direction: LoansAaAB}_{bt}$	1,331	-0.0006	0.0818	-0.0823	0.0000	0.0749
$\text{Severity Direction: NPLs}_{bt}$	1,087	0.0005	0.0598	-0.0255	0.0001	0.0335
Direction_{bt}						
$\text{Direction: Provisions}_{bt}$	1,744	0.6607	0.4643	0.0000	1.0000	1.0000
$\text{Direction: LoansAaAB}_{bt}$	1,401	0.5092	0.4306	0.0000	0.5000	1.0000
$\text{Direction: NPLs}_{bt}$	1,163	0.5411	0.4179	0.0000	0.5000	1.0000
$\text{Delivery Delay}_{bt}$	204,413	3.1616	24.0808	-11	-2	35
$\text{Number of Revision Rounds}_{bt}$	204,413	1.3695	0.7604	1	1	3
$\text{Revision Time Span}_{bt}$	204,413	4.2515	16.2595	0	0	23

Table 3: Number and timing of revisions

Panel A: Number of revisions

	$Revisions_{ibt}$ item-bank-time level		Revisions bank-time level	
	N	%	N	%
No	9,222,685	99.140	186,287	91.109
Yes	80,278	0.860	18,180	8.891
Total	9,302,963	100	204,467	100

Panel B: Timing of revisions

	$Revisions_{ibt}$	
	N	%
Before publishing date	70,754	88.14
On publishing date	220	0.27
After publishing date	9,304	11.59
Total	80,278	100

Table 4: Top ten revised items

This table shows the ten most frequently (Panel A) and severely (Panel B) revised items of financial statements.

Panel A: Most frequently revised items

Title	Statement	Position	No. of Revisions$_{ibt}$	% of total Revisions$_{ibt}$
Compensation control	Balance sheet	Assets, compensation accounts	8,794	10.9544
Compensation control	Balance sheet	Liabilities, compensation accounts	8,775	10.9308
Miscellaneous items	Balance sheet	Assets, current and long-term assets, other credits	4,347	5.4149
Miscellaneous items	Balance sheet	Liabilities, current and long-term liabilities, other liabilities	4,251	5.2953
Taxes and social security	Balance sheet	Liabilities, current and long-term liabilities, other liabilities	4,247	5.2904
Administrative expenses	Income statement	Expenditures	3,129	3.8977
Other operating expenses	Income statement	Expenditures	3,084	3.8417
Income tax	Income statement	Expenditures	2,941	3.6635
Provisions and equity adjustments	Income statement	Expenditures	2,671	3.3272
Other operating income	Income statement	Revenues	2,647	3.2973

Panel B: Most severely revised items

Title	Statement	Position	ln(Severity$_{bt}$)
Apportionment of internal results	Income statement	Revenues	4.0747
Apportionment of internal results	Income statement	Expenditures	4.0747
Securities and derivative instruments linked with acquisition of shares of state-owned companies	Balance sheet	Assets, current and long-term assets, securities and derivative instruments	3.6499
Profit on disposal of assets	Income statement	Revenues, non-operating revenues	3.5121
Investments in foreign currency	Balance sheet	Assets, current and long-term assets, short-term interbank investments with immediate liquidity	3.3865
Tax incentive investments	Balance sheet	Assets, permanent assets, investments	3.2844
Loss on disposal of assets	Income statement	Expenditures, non-operating expenditures	3.2007
Guarantees honored	Balance sheet	Assets, current and long-term assets, other credits	3.1004
Borrowing and onlending expenses	Income statement	Expenditures, operating expenditures	3.0446
Other non-operating income	Income statement	Revenues, non-operating revenues	2.9102

Table 5: Frequency of revisions and bank risk

This table estimates the relationship between frequency of revisions and bank risk. Panel A reports OLS regression results of dependent variables of *Z-Score*$_{bt-5:t}$, *Equity Ratio*$_{bt-5:t}$, *SD ROA*$_{bt-5:t}$, and *SD ROE*$_{bt-5:t}$ on *Frequency*$_{bt-6}$. Panel B reports regression results of dependent variables of *Z-Score*$_{bt-5:t}$, *Equity Ratio*$_{bt-5:t}$, *SD ROA*$_{bt-5:t}$, and *SD ROE*$_{bt-5:t}$ on frequency dummy variables. We split *Frequency* into four mutually exclusive categories at bank-time level: *Zero*, *Low*, *Mid*, and *High*. *Zero*, the reference category, is a dummy which takes the value of one when *Frequency* (of bank *b* at time *t*) is equal to zero. The remaining sample, i.e., non-zero *Frequency*, is further split at the 33rd and the 66th percentile. *Low* (*High*) is a dummy which is set to one when *Frequency* is equal to or below (above) the 33rd (66th) percentile of nonzero *Frequency. Mid* is a dummy which is set to one when *Frequency* is above the 33rd percentile but below the 66th percentile of nonzero *Frequency*. We report p-value of a Wald test for the equality of the coefficient estimates on *Low*$_{bt}$, and *High*$_{bt}$. All explanatory variables are lagged by six months. All variables are defined in Table 1. Standard errors appear in parentheses and are clustered at the bank level. *, **, and *** indicate significance levels at the 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)	(4)
	Z-Score	Equity Ratio (%)	SD ROA (%)	SD ROE (%)
Expected sign	(-)	(-)	(+)	(+)
Panel A: Linear Frequency Measure				
$Frequency_{bt-6}$	-0.292***	-7.330***	0.483***	2.231***
	(0.051)	(1.780)	(0.182)	(0.503)
Observations	181,523	182,036	181,992	181,888
Adjusted R-squared	0.550	0.853	0.495	0.457
Bank & Time FE	Yes	Yes	Yes	Yes
Panel B: Dummy Frequency Measures				
Low_{bt-6}	-0.041***	-1.036***	0.064***	0.310***
	(0.010)	(0.259)	(0.023)	(0.091)
Mid_{bt-6}	-0.050***	-0.439	0.046	0.319***
	(0.012)	(0.327)	(0.033)	(0.105)
$High_{bt-6}$	-0.075***	-2.069***	0.117**	0.579***
	(0.013)	(0.431)	(0.048)	(0.135)
Observations	181,523	182,036	181,992	181,888
Adjusted R-squared	0.550	0.853	0.495	0.457
Bank & Time FE	Yes	Yes	Yes	Yes
Wald test (Low = High)	0.0287	0.0263	0.2985	0.0755

Table 6: Revision speed, complexity and bank risk

This table examines whether speed and complexity of revisions are related to bank risk. We report OLS regression results of dependent variables of *Z-Score*$_{bt-5:t}$, *Equity Ratio*$_{bt-5:t}$, *SD ROA*$_{bt-5:t}$, and *SD ROE*$_{bt-5:t}$ on three proxies for revision speed and complexity: *Delivery Delay*$_{bt-6}$ (Panel A), *Number of Revision Rounds*$_{bt-6}$ (Panel B), and *Revision Time Span*$_{bt-6}$ (Panel C). *Delivery Delay* equals the number of days between the actual delivery date and the submission deadline of the financial statement. In case of multiple revisions, we use the latest delivery date. *Number of Revision Rounds* captures the number of times financial statements are delivered by a bank for a given month. *Revision Time Span* equals the number of days between the last and first delivery date. All explanatory variables are lagged by six months. All variables are defined in Table 1. Standard errors appear in parentheses and are clustered at the bank level. *, **, and *** denote 10%, 5%, and 1% significance, respectively.

	(1)	(2)	(3)	(4)
	Z-Score	Equity Ratio (%)	SD ROA (%)	SD ROE (%)
Expected sign	(-)	(-)	(+)	(+)
	Panel A: Delivery Delay			
Delivery Delay $_{bt-6}$	-0.002***	-0.070***	0.004***	0.010***
	(0.000)	(0.011)	(0.001)	(0.002)
Observations	181,512	182,023	181,979	181,875
Adjusted R-squared	0.552	0.854	0.496	0.458
Bank & Time FE	Yes	Yes	Yes	Yes
	Panel B: Number of Revision Rounds			
Number of Revision Rounds $_{bt-6}$	-0.023***	-0.688***	0.023*	0.137***
	(0.004)	(0.134)	(0.012)	(0.039)
Observations	181,512	182,023	181,979	181,875
Adjusted R-squared	0.550	0.853	0.495	0.457
Bank & Time FE	Yes	Yes	Yes	Yes
	Panel C: Revision Time Span			
Revision Time Span $_{bt-6}$	-0.001***	-0.031***	0.003***	0.010***
	(0.000)	(0.006)	(0.001)	(0.002)
Observations	181,512	182,023	181,979	181,875
Adjusted R-squared	0.550	0.853	0.495	0.457
Bank & Time FE	Yes	Yes	Yes	Yes

Table 7: Severity of revisions and bank risk

This table presents estimates for the relationship between severity of revisions and bank risk. We show OLS regression results of $Z\text{-}Score_{bt\text{-}5:t}$, $Equity\ Ratio_{bt\text{-}5:t}$, $SD\ ROA_{bt\text{-}5:t}$, and $SD\ ROE_{bt\text{-}5:t}$ on two measures of 6-month lagged severity: ln($Severity_{bt\text{-}6}$) in Panel A and $Severity\ to\ Assets_{bt\text{-}6}$ in Panel B. All variables are defined in Table 1. Standard errors appear in parentheses and are clustered at the bank level. *, **, and *** denote 10%, 5%, and 1% significance, respectively.

	(1)	(2)	(3)	(4)
	Z-Score	Equity Ratio (%)	SD ROA (%)	SD ROE (%)
Expected sign	(-)	(-)	(+)	(+)
Panel A: ln(Severity)				
ln($Severity_{bt\text{-}6}$)	-0.086*	-3.308***	0.481***	0.573
	(0.048)	(1.185)	(0.146)	(0.448)
Observations	15,854	15,858	15,856	15,853
Adjusted R-squared	0.501	0.861	0.510	0.491
Bank & Time FE	Yes	Yes	Yes	Yes
Panel B: Severity to Assets				
$Severity\ to\ Assets_{bt\text{-}6}$	-0.169***	-2.381	0.856***	1.509***
	(0.049)	(1.813)	(0.201)	(0.571)
Observations	15,346	15,347	15,347	15,344
Adjusted R-squared	0.505	0.876	0.508	0.498
Bank & Time FE	Yes	Yes	Yes	Yes

Table 8: Severity Direction of revisions and bank risk

This table examines the relationship between directional severity of revisions and bank risk. The table reports coefficient estimates from an OLS regression of *Z-Score*$_{bt\text{-}5:t}$, *Equity Ratio*$_{bt\text{-}5:t}$, *SD ROA*$_{bt\text{-}5:t}$, and *SD ROE*$_{bt\text{-}5:t}$ on our measures of *Severity Direction*$_{bt\text{-}6}$ for three categories of accounts: provisions in Panel A, high-rated loans (Aa to B rated) in Panel B, and non-performing loans (NPLs) in Panel C. All explanatory variables are lagged by six months. All variables are defined in Table I. Standard errors appear in parentheses and are clustered at the bank level. *, **, and *** denote 10%, 5%, and 1% significance, respectively.

	(1)	(2)	(3)	(4)
	Z-Score	Equity Ratio (%)	SD ROA (%)	SD ROE (%)
Expected sign	(-)	(-)	(+)	(+)
Panel A: Provisions				
Severity Direction: Provisions$_{bt\text{-}6}$	-1.755**	-1.503	7.433***	20.472***
	(0.684)	(43.529)	(2.569)	(5.728)
Observations	1,492	1,492	1,492	1,492
Adjusted R-squared	0.153	0.120	0.078	0.058
Bank-group & Time FE	Yes	Yes	Yes	Yes
Panel B: High-rated loans				
Severity Direction: LoansAaAB$_{bt\text{-}6}$	-0.594*	-2.941	1.719*	8.461*
	(0.353)	(17.093)	(0.895)	(4.927)
Observations	1,131	1,131	1,131	1,130
Adjusted R-squared	0.111	0.177	0.032	0.027
Bank-group & Time FE	Yes	Yes	Yes	Yes
Panel C: Non-performing loans (NPLs)				
Severity Direction: NPLs$_{bt\text{-}6}$	-0.567	18.176	0.597	7.449
	(0.582)	(27.697)	(2.144)	(8.776)
Observations	931	931	931	931
Adjusted R-squared	0.128	0.111	0.075	0.045
Bank-group & Time FE	Yes	Yes	Yes	Yes

Table 9: Frequency of revisions prior to distress events

This table tests whether frequency of revisions is closer related to bank risk before *Distress Events*. The table reports OLS regression results of dependent variables of $Z\text{-}Score_{bt-5:t}$ and $Equity\ Ratio_{bt-5:t}$ on $Frequency_{bt-6,}$ $Time\ to\ Distress_{bt-6:\tau}$ (abbreviated by $TTD_{bt-6:\tau}$), and the interaction term between the two. $TTD_{bt-6:\tau}$ is a dummy which takes the value of one in the period t-6:τ months (τ = 12, 24, 36) before the *Distress Event*. Standard errors appear in parentheses and are clustered at the bank level. *, **, and *** denote 10%, 5%, and 1% significance, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	Z-Score			Equity Ratio (%)		
Time to Distress (TTD) lag, τ	12 months	24 months	36 months	12 months	24 months	36 months
Expected sign	(-)	(-)	(-)	(-)	(-)	(-)
$Frequency_{bt-6}$	-0.301***	-0.272***	-0.255***	-6.809***	-6.097***	-5.423***
	(0.051)	(0.050)	(0.050)	(1.676)	(1.630)	(1.527)
$TTD_{bt-6:\tau}$	-0.342***	-0.342***	-0.348***	-12.319***	-12.722***	-12.193***
	(0.041)	(0.039)	(0.042)	(1.689)	(1.898)	(2.012)
$Frequency_{bt-6}$ x $TTD_{bt-6:\tau}$	0.198	-0.539*	-0.487**	-46.934*	-31.681*	-25.706**
	(0.518)	(0.321)	(0.235)	(26.613)	(16.200)	(11.719)
Observations	181,523	181,523	181,523	182,036	182,036	182,036
Adjusted R-squared	0.552	0.553	0.553	0.854	0.856	0.856
Bank & Time FE	Yes	Yes	Yes	Yes	Yes	Yes

Table 10: Complexity of revisions prior to distress events

This table tests whether complexity of revisions is closer related to bank risk before *Distress Events*. We show OLS regression results of dependent variables of *Z-Score*$_{bt-5:t}$ and *Equity Ratio*$_{bt-5:t}$ on *Delivery Delay*$_{bt-6}$ (Panel A), *Number of Revision Rounds*$_{bt-6}$ (Panel B), *Revision Time Span*$_{bt-6}$ (Panel C), *Time to Distress*$_{bt-6:\tau}$ (abbreviated by *TTD*$_{bt-6:\tau}$), and the interaction terms between these three explanatory variables with *TTD*. *Delivery Delay* equals the number of days between the actual delivery date and the submission deadline of the financial statement. In case of multiple revisions, we use the latest delivery date. *Number of Revision Rounds* captures the number of times financial statements are delivered by a bank for a given month. *Revision Time Span* equals the number of days between the last and first delivery date. *Time to Distress* is a dummy which takes the value of one in the period t-6:τ months (τ = 12, 24, 36) before the *Distress Event*. Standard errors appear in parentheses and are clustered at the bank level. *, **, and *** denote 10%, 5%, and 1% significance, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	Z-Score			Equity Ratio (%)		
Time to Distress (TTD) lag, τ	12 months	24 months	36 months	12 months	24 months	36 months
Expected sign	(-)	(-)	(-)	(-)	(-)	(-)
Panel A: Delivery Delay						
Delivery Delay$_{bt-6}$	-0.002***	-0.002***	-0.002***	-0.062***	-0.049***	-0.037***
	(0.000)	(0.000)	(0.000)	(0.011)	(0.010)	(0.009)
TTD$_{bt-6:\tau}$	-0.313***	-0.309***	-0.314***	-10.053***	-10.242***	-9.424***
	(0.038)	(0.038)	(0.039)	(1.542)	(1.653)	(1.671)
Delivery Delay$_{bt-6}$ x TTD$_{bt-6:\tau}$	-0.002	-0.003***	-0.002***	-0.217***	-0.210***	-0.212***
	(0.001)	(0.001)	(0.001)	(0.065)	(0.043)	(0.039)
Observations	181,512	181,512	181,512	182,023	182,023	182,023
Adjusted R-squared	0.553	0.555	0.555	0.856	0.858	0.859
Bank & Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Panel B: Number of Revision Rounds						
No. of Revision Rounds$_{bt-6}$	-0.022***	-0.019***	-0.019***	-0.598***	-0.487***	-0.473***
	(0.004)	(0.004)	(0.004)	(0.130)	(0.130)	(0.129)
TTD$_{bt-6:\tau}$	-0.243***	-0.226***	-0.273***	-6.060**	-7.394***	-8.623***
	(0.065)	(0.050)	(0.051)	(2.742)	(2.178)	(2.126)
No. of Revision Rounds$_{bt-6}$ x TTD$_{bt-6:\tau}$	-0.068*	-0.083***	-0.054***	-4.713**	-3.876***	-2.607***
	(0.038)	(0.025)	(0.020)	(1.832)	(1.160)	(0.878)
Observations	181,512	181,512	181,512	182,023	182,023	182,023
Adjusted R-squared	0.552	0.553	0.553	0.854	0.856	0.856
Bank & Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Panel C: Revision Time Span						
Revision Time Span$_{bt-6}$	-0.001***	-0.001***	-0.001***	-0.028***	-0.024***	-0.022***
	(0.000)	(0.000)	(0.000)	(0.006)	(0.005)	(0.005)
TTD$_{bt-6:\tau}$	-0.320***	-0.325***	-0.337***	-12.029***	-12.382***	-11.942***
	(0.041)	(0.039)	(0.042)	(1.715)	(1.908)	(2.032)
Revision Time Span$_{bt-6}$ x TTD$_{bt-6:\tau}$	-0.004**	-0.004***	-0.003***	-0.150*	-0.122***	-0.095***
	(0.002)	(0.001)	(0.001)	(0.079)	(0.046)	(0.035)
Observations	181,512	181,512	181,512	182,023	182,023	182,023
Adjusted R-squared	0.552	0.553	0.554	0.854	0.856	0.856
Bank & Time FE	Yes	Yes	Yes	Yes	Yes	Yes