

Asset Securitization Reporting Readability and BHC Credit Risk

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Abstract

This study examines the effect of asset securitization (SEC) reporting readability on credit risk by employing American bank holding company (BHC) data from year 2000 to 2016. Empirical results of this study show that a BHC's asset securitization reporting readability is negatively related to the BHC's credit risk when controlling for other BHC characteristics variables and considering endogeneity issues. This study also finds that the SEC reporting readability effect is mainly through the incomplete information channel. In addition, the implementations of SFAS No.166 (2009), SFAS No.167 (2009) and Dodd-Frank Act (2010) strengthen the SEC reporting readability effect. Moreover, the scale of on-balance sheet securitized assets (e.g. contractual total retained interests, ARI) weakens the SEC reporting readability effect, especially for total retained interests from consumer loan securitizations (CONSRI). Furthermore, the study also demonstrates that the positive tone of SEC reporting negatively relates to BHC credit risk while the negative tone of SEC reporting has the opposite effect.

Keywords: Asset securitization (SEC); Text reporting readability; Text reporting tones; Credit risk; SFAS No.166 (2009); SFAS No.167 (2009); Dodd-Frank Act (2010)

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1. Introduction

Recent literature has documented that incomplete accounting information plays a critical role in determining credit risk. As a pioneer, Duffie and Lando (2001) show that incomplete accounting information may lead outside investors to misunderstand a firm's true asset value distributions and therefore the firm's credit risk. Most of previous studies address this issue and describe a firm's incomplete accounting information by employing AIMR disclosure ranking (Yu, 2005), analyst earnings forecast dispersion (Lu et al., 2010), real earnings management activities (Chen et al., 2015), and segment disclosure quality (Chen and Liao, 2015). However, few studies address this issue for a BHC's credit risk and discuss from the perspective of the incomplete accounting information about off-balance sheet transactions. Asset securitization is one of main off-balance sheet transactions in a BHC's business and may contribute to the BHC's incomplete accounting information. This is mainly because securitization transactions have very complicated structures and outside investors difficultly assess the true extents of securitization recourse and risk transfer, which may lead to an increase on managers' strategic reporting incentives (Grossman and Stiglitz, 1980; Bloomfield, 2002) and incomplete accounting information level (Cheng et al., 2011)¹. In addition, for valuing retained interests from securitizations, a BHC's managers have to make assumptions about default rates, prepayment rates, and discount rates, which provides managers with the discretion to determine the "gain on sale" of the securitized assets and thereby also contributes to the BHC's incomplete accounting information. Moreover, Lambert et al. (2007) demonstrates that accounting information with more variation (less precision) increases the assessed variance of a firm's asset value. With the application of Lambert et al. (2007) model, the incomplete accounting information about asset securitization increases outside investors' assessed variance of a BHC's real asset value distribution. The above reveal that the incomplete information

¹ Cheng et al. (2011) demonstrate that BHCs engaging in securitization transactions have higher information uncertainty than non-securitizing ones.

about asset securitization seems to make outside investors have ambiguous knowledge of a BHC's true earnings, cash flows and asset value distribution. Therefore, according to structural credit models of Merton (1974) and Duffie and Lando (2001),² incomplete accounting information about asset securitization is reasonably conjectured to be positively associated with BHC credit risk. Furthermore, since most of quantitative information about asset securitization (e.g. off-balance sheet securitized assets, on-balance sheet retained interests from securitized assets, and asset securitization assumptions) is required to disclose in financial report according to the regulations of SFAS No.140 (2000), SFAS No.166 (2009), and SFAS No. 167 (2009)³, managers are likely to employ textual presentations as a tool of strategic reporting for asset securitization, consistent with Schrand and Walther (2000). Therefore, this study employs managers' strategically textual reporting behaviors (measured by readability and tone variables) to describe a BHC's incomplete accounting information about asset securitization and further investigates the effect of managers' strategically textual reporting about asset securitization on credit risk. However, few existing studies in credit risk literature connect a BHC's incomplete accounting information about asset securitization with one source of the BHC's idiosyncratic risks. The purpose of this study is therefore to fill part of the important gap by investigating the idiosyncratic risk effects resulting from asset securitization reporting readability and tones on BHC credit risk (measured by BHC credit rating).

Many previous studies have shown that asset securitization becomes an important operating and financing strategy for BHCs. As an operating strategy, Loutschina (2011) demonstrate that asset securitization makes a BHC hold more diversified loan portfolios,

² In the structural credit model frameworks of Merton (1974) and Duffie and Lando (2001), the four main determinants of firm credit risk are leverage ratio, asset return, asset volatility, and incomplete information.

³ SFAS No.140 (2000) requires BHCs to disclose the following asset securitization related information, including (1) the fair value of each type of retained interest at the end of each reporting period; (2) the sensitivity of these valuations to changes in main parameters; and (3) the cash amount received and gains on sale recognized from securitizing assets with different asset type. SFAS No. 166 (2009) specifies retained interest to be measured at fair value rather than at an allocated portion of the previous carrying amount of securitized assets. In addition, SFAS No. 166 (2009) and SFAS 167 (2009) also especially expanded the required disclosures about continuing involvements with securitized assets.

consistent with Greenbaum and Thakor (1987), Pavel and Phillis (1987), and Hess and Smith (1988). Greenbaum and Thakor (1987) also show that asset securitization allows a BHC to shift activities of comparative disadvantage while concentrating on those of comparative advantage. In addition, Baradwaj et al. (2015) find that asset securitization alter the lending strategy for small business by both small and large banks. Bord and Santos (2015) demonstrate that asset securitization leads to poor-quality corporate loans while Benmelech et al. (2012), Shivdasani and Wang (2011), and Wang and Xia (2010) fail to find the same evidence. Also, Casu et al. (2013) show that securitizing banks are likely to be more profitable institutions, with higher credit risk exposure. Moreover, as a financial strategy for asset securitization, Loutskina (2011) finds that asset securitization is negatively related to their holdings of liquid securities because it provides banks additional source of funding. Chen et al. (2008) find that a BHC's equity risk is positively related to its off-balance sheet securitized loans, especially for the loans with higher and less externally verifiable credit risk. Barth et al. (2012) find that a BHCs' on-balance sheet retained interests from securitized assets positively relate to its credit risk. Moreover, a BHC's bond investors view off-balance sheet securitized loans as secured borrowings, which are also positively related to the BHC's bond yield spread. Based on the above discussions, asset securitization provides BHCs' managers new operating strategies and financing opportunities and therefore affects a BHC's operating and financial activities. Since asset securitization valuations have numerous assumptions and risk transfer information in securitization structure is not completely disclosed, poor asset securitization reporting quality (e.g. poor readability/ tones) increases the *assessed* variances of a BHC's secured borrowings, financing flexibility, operating strategy and asset value distributions (Lambert et al., 2007). To capture the implied asset securitization information, this study employs managers' strategically textual reporting about asset securitization as main proxies (measured by the readability). As a result, poor asset securitization reporting readability affects outside investors' knowledge of a BHC's operating activities, financial policies, and asset value distributions. That is, poor asset

securitization reporting readability positively relate to a BHC's incomplete information level.

Some previous studies have documented that financial report readability is an information quality measure of describing managers' strategic disclosures, such as You and Zhang (2009), Lee (2012), and Rennekamp (2012). Higher financial report readability allows investors to more easily assess a firm's public information shown in financial report. In addition, Lehavy et al. (2011) show that annual report readability negatively relates to a firm's information uncertainty, measured by analyst dispersion and overall earnings forecast uncertainty. Cheng et al. (2011) also demonstrate that asset securitization is positively related to information uncertainty. Following Lehavy et al. (2011) and Cheng et al. (2011), this study conjectures that less readable asset securitization reporting makes a BHC's accounting information less precise (more volatile)⁴, which increases the BHC's incomplete accounting information level.

Based on the above discussions, poor asset securitization reporting readability positively relate to a BHC's incomplete accounting information. This study therefore hypothesizes that poor asset securitization reporting readability positively relate to credit risk from the incomplete information perspective based on structural credit models (Merton, 1974; Duffie and Lando, 2001). In addition, the readability of the specific topic in a BHC's financial report is also rarely discussed in literature.⁵ Few studies directly investigate the effects of asset securitization reporting readability on BHC credit risk. Therefore, this work contributes to the asset securitization, readability and credit risk literature by employing the strategically textual reporting about asset securitization, one of main off-balance sheet transactions, to explore its economic consequences on debt holders.

After the implementation of SFAS No. 166 (2009), retained interests from securitized assets are specified to be measured at fair value rather than at an allocated portion of the previous carrying amount of securitized assets. In addition, SFAS No. 166 (2009) and SFAS

⁴ Asset securitization reporting with less readability make a BHC's accounting information vaguer (e.g. information hoarding, Ertugrul et al., 2016) and thereby raise the BHC's incomplete accounting information level.

⁵ Most of these related studies discuss the readability of the whole annual reports (e.g. Ertugrul et al., 2016).

167 (2009) also especially expanded the required disclosures about continuing involvements with securitized assets. For valuing retained interests from asset securitizations, a BHC's managers have the discretion to manage earnings by manipulating the assumptions about default rates, prepayment rates, and discount rates, which may enhance the managers' incentives of strategic reporting about asset securitization, increase the incomplete information about asset securitization assumptions for outside investors, lead investors to assess a BHC's asset value distribution with less precise information about asset securitization (Lambert et al., 2007) and thereby raise BHC credit risk (Merton, 1974; Duffie and Lando, 2001). Therefore, this study also investigates whether the asset securitization regulatory changes of SFAS No. 166 (2009) and SFAS 167 (2009) enhance the effect of asset securitization reporting readability on BHC credit risk.

Furthermore, this study also explores whether a BHC's securitized assets characteristics change the effect of asset securitization reporting readability on the BHC's credit risk. Among the securitization related literature, two types of risk characteristics of securitized assets are mainly focused, including the credit risk and the verifiability of securitized assets, and the amount of contractual interests retained by a BHC when conducting asset securitization transactions (namely retained interests). For the first risk characteristic of securitized assets, Chen et al. (2008) contend that the credit risk of 1-4 family residential mortgage loans (MBS) is low and highly verifiable, that of consumer loans (non-residential mortgage loans, CONSBS) is high but highly verifiable, and that of commercial loans and leases (COMMBS) is high and less verifiable. For the second characteristic of securitized assets, the higher the proportion of retained interest, the riskier the securitization. Previous studies have documented that the degree of economic consequences of asset securitization on equity risk/ credit risk varies with the types of the securitized loans (e.g. COMMBS, CONSBS, and MBS) and total retained

interests (ARI), which have different risk characteristics.⁶ According to the above discussions, different types of securitized loans have different risk characteristics, which may lead a BHC's managers to have dissimilar incentives of engaging strategically textual reporting behaviors about asset securitization in 10-K and thereby may change the effect of asset securitization readability on BHC credit risk.

This study examines whether asset securitization reporting readability affects a BHC's credit risk by employing American BHC credit rating from year 2000 to 2016. The study also considers the well-known control variables that affect BHC credit risk, such as profitability, financial leverage, equity volatility, firm size, and other BHC characteristics. We employ SEC_FK and SEC_SMOG variables as the readability proxies of asset securitization reporting in Item 1a, Item 7, Item 7a, and Item 8 of annual report (10-K) (namely SEC_FRR; FRR=FK, SMOG). The higher values of SEC_FK and SEC_SMOG, the lower the readability of asset securitization reporting. Meanwhile, this study also discusses the asset securitization reporting in the specified section of annual report, such as Item 7 and Item 7 liquidity section. The readability variables of asset securitization reporting in Item 7 and Item 7 liquidity section are denoted as I7_SEC_FRR, and I7_SEC_LIQ_FRR, respectively. In addition, we also consider tone analysis variables, SEC_POS and SEC_NEG, defined as the proportion of positive words and negative words in asset securitization reporting, respectively. Empirical results of this study show that a BHC's asset securitization reporting readability variables (SEC_FRR) are positively related to the BHC's credit risk when controlling for other BHC characteristics variables. This study also finds that the asset securitization reporting readability effect is mainly through the incomplete information channel. Meanwhile, the variables of I7_SEC_FRR and

⁶ Chen et al. (2008) show that different types of securitized loans are all positively related to the bank's equity risk, especially for securitized commercial loans. In addition, the banks retain more risk when the types of securitized loans have "higher" and/or "less verifiable" credit risk. According to Chen et al. (2008), the extent of credit risk on securitized loans is as follows: the COMMBS's risk is highest, CONSBS's risk is middle, and MBS's risk is lowest. Barth et al. (2012) find that a firm's credit risk is positively related to the firm's retained interests from securitized assets during the period of 2001-2006.

I7_SEC_LIQ_FRR provide the similar results. Moreover, the study presents that the positive tone of asset securitization reporting (SEC_POS) negatively relates to BHC credit risk while the negative tone of asset securitization reporting (SEC_NEG) has the opposite effect. Similarly, this work also finds that the positive tone of asset securitization reporting shown in Item7 and that of Item 7 liquidity section both negatively relate to BHC credit risk. However, the negative tone of asset securitization reporting in Item 7 liquidity section has an insignificant impact.

Furthermore, this study also finds that the implementations of SFAS No.166 (2009), SFAS No.167 (2009) and Dodd-Frank Act (2010) strengthen the asset securitization reporting readability effect while the scale of on-balance sheet securitized assets (e.g. contractual total retained interests, ARI) weakens the asset securitization reporting readability effect, especially for total retained interests from consumer loan securitizations (CONSRI). Finally, our results remain hold with considering endogeneity issues. This work provides some new insights for the existing credit risk and asset securitization literature by discussing the economic consequences of a BHC's strategically textual reporting about asset securitization on debt holders.

The remainder of this paper is organized as follows. Section 2 introduces the measures of a BHC's asset securitization reporting readability and tone analysis. Section 3 presents the theories and hypotheses. Section 4 summarizes other major variables used in the empirical examinations. Section 5 presents and analyzes empirical results. Finally, section 6 provides concluding remarks.

2. Main Measures

This section introduces the mainly used variables of asset securitization reporting readability (SEC_FRR) and tones (SEC_TONE) in this study and describes how to calculate these variables. This study follows Li (2008) and Chen and Tseng (2016) to employ these two readability variables, FK and SMOG, to describe the complexity of asset securitization

reporting. For the FK and SMOG variables, the FK variable stands for the Flesch–Kincaid grade level (Flesch, 1948) and the SMOG variable (McLaughlin, 1969) is viewed as a more accurate and more easily calculated substitute for the FOG index. The details of these two readability variables are discussed in the following.

The SMOG variable presents the required years of education to understand a piece of writing, implying that the higher SMOG variable indicates lower text readability. The detailed definition of the SMOG index is shown as Eq. (1).

$$SMOG = 1.043 \sqrt{\text{number of polysyllables} \times \frac{30}{\text{number of sentences}}} + 3.1291 \quad (1)$$

The Flesch–Kincaid reading grade level (FK) means the generally needed number of years of education to comprehend this text. As a result, the higher FK variable indicates lower text readability. The detailed definition of the FK variable is shown as Eq. (2).

$$FK = 0.39 \left(\frac{\text{Total words}}{\text{Total sentences}} \right) + 11.8 \left(\frac{\text{Total syllables}}{\text{Total words}} \right) - 15.59 \quad (2)$$

Based on the above discussions, the higher values of SMOG, and FK variables both stand for poorer readability level. Regarding the strategically textual reporting about asset securitization in a BHC’s annual report, this study mainly focus on the asset securitization related descriptions in Item 1a (Risk Factors), Item 7 (Management’s Discussion and Analysis of Financial Condition and Results of Operations), Item 7a (Quantitative and Qualitative Disclosures about Market Risk), and Item 8 (Notes to Consolidated Financial Statements). For example, the key titles of asset securitization related descriptions or paragraphs in Item 7 and Item 8 include “Summary of Significant Accounting Principles” (SSAP), “Variable Interest Entities”(VIE)⁷, “Securitized and Other Variable Interest Entities”(SEC_VIE), “Fair Value Measurements” (FV), “Representations and Warranties Obligations and Corporate

⁷ The title of “Variable Interest Entities” may be also presented by “Special Purpose Entities” or “Special Purpose Vehicles”. It would be an individual note in Item 8 or a subtitle in the note of “Summary of Significant Accounting Principles.

Guarantees”(GU) and “Off-Balance Sheet Arrangements and Contractual Obligations”(OBS). The current work estimates the SEC_FRR (FRR=SMOG, FK) by using the total textual information related to asset securitization in the sections of Item 1a, 7, 7a, and 8 of a firm’s complete annual report. That is, SEC_FK and SEC_SMOG variables (namely SEC_FRR; FRR=FK, SMOG) are the readability proxies of asset securitization reporting used in this study. The higher values of SEC_FK and SEC_SMOG, the lower the readability of asset securitization reporting.

Meanwhile, this study also discusses the asset securitization reporting in the specified section of annual report, such as Item 7 and Item 7 liquidity section. The readability variables of asset securitization reporting in Item 7 and Item 7 liquidity section are denoted as I7_SEC_FRR and I7_SEC_LIQ_FRR, respectively.

In addition, following Ertugrul et al. (2016), we also consider tone analysis variables, SEC_POS and SEC_NEG, defined as the proportion of positive words and negative words of asset securitization reporting in the sections of Item 1a, 7, 7a, and 8, respectively.⁸ This study identifies the words with positive and negative tones by employing the dictionary developed by Loughran and Mcdonald (2011). Similarly, I7_SEC_POS and I7_SEC_LIQ_POS (I7_SEC_NEG and I7_SEC_LIQ_NEG) are defined as the proportion of positive words (negative words) in asset securitization reporting for Item 7 and that for Item 7 liquidity section, respectively.

Moreover, Loughran and Mcdonald (2014) develop a new measure of annual report readability by employing the 10-K document file size (CSTF_SIZE), defined as the natural logarithm of the complete text file size (in megabytes). Loughran and Mcdonald (2014) also find that the CSTF_SIZE performs better than traditional annual report readability measure (e.g. FOG index). However, since the CSTF_SIZE variable describes the 10-K document file

⁸ The study defines the positive (negative) tone of a BHC’s asset securitization reporting in annual report as the percentage of the number of positive (negative) words to that of total words identified by the dictionary of Loughran and Mcdonald (2011) for the BHC’s asset securitization reporting.

size, it is not applicable for measuring asset securitization reporting readability. This study therefore estimates asset securitization reporting readability by employing SEC_SMOG and SEC_FK. The CSTF_SIZE variable is viewed as a control variable in examining the effect of asset securitization reporting readability on BHC credit risk.

3. Theories and Hypotheses

Among the sections of a BHC's annual report, asset securitization reporting more precisely captures the disclosure characteristics of managers' strategic reporting on the BHC's asset securitization (one of off-balance sheet reporting), covering the information about risk transfer in securitization structure and assumptions of valuing retained interests. In addition, since most accounting information disclosure regulated by SFAS is demonstrated in asset securitization reporting, managers have more incentives to engage in strategically textual reporting (Grossman and Stiglitz, 1980; Schrand and Walther, 2000) for off-balance sheet securitized assets and on-balance sheet retained interests, which may bias outside investors' knowledge of asset securitization reporting.

In addition, many studies have documented that asset securitization provides a BHC's managers new investment and financing opportunities (e.g. Greenbaum and Thakor, 1987; Pavel and Phillis, 1987; Hess and Smith, 1988; Loutskina, 2011), which leads to affect the BHC's operating and financing activities. Since retained interests valuations have numerous assumptions and the risk transfer information of securitization structure is not completely disclosed, poor asset securitization reporting readability increases the *assessed* variances of a BHC's off-balance sheet securitized assets (e.g. recourse), on-balance sheet retained interests, secured borrowings, financing flexibility, operating strategy and asset value distributions (Lambert et al., 2007)⁹. That is, poor asset securitization reporting readability affects outside

⁹ Lambert et al. (2007) indicate that accounting information with more variation (less precision) increases the assessed variance of a firm's asset value.

investors' knowledge of a BHC's operating strategies, financial activities, and asset value distributions. Therefore, the above reveal that poor asset securitization reporting readability increases a BHC's incomplete information level. In addition, Lehavy et al. (2011) show that poor annual report readability positively relates to a firm's information uncertainty, measured by analyst dispersion and overall earnings forecast uncertainty. Cheng et al. (2011) also demonstrate that asset securitization is positively related to information uncertainty. Following Lehavy et al. (2011) and Cheng et al. (2011), poorer asset securitization reporting readability is conjectured to make a BHC's accounting information less precise (more volatile), which also increases the BHC's incomplete accounting information level. According to the above discussion, this study therefore hypothesizes that poor asset securitization reporting readability positively relates to credit risk from the incomplete information perspective based on structural credit models (Merton, 1974; Duffie and Lando, 2001), shown as the following hypothesis 1 and hypothesis 1a.

Hypothesis 1. *Poor asset securitization reporting readability is positively related to BHC credit risk. That is, SEC_FRR is positively related to BHC credit risk.*

Hypothesis 1a: *A BHC's poor asset securitization reporting readability positively associates with the BHC's credit risk via the incomplete information channel.*

Since SFAS No.166 (2009) requires BHCs to specify retained interests to be measured at fair value rather than at an allocated portion of the previous carrying amount of securitized assets¹⁰, the impacts of the information about asset securitization and retained interests (e.g. assumptions/ risk transfer in securitization structure) become more important for outside investors during the post-SFAS No.166 (2009) period. To avoid a significant decrease on a BHC's value from the damage of the fair value changes of retained interests after the

¹⁰ SFAS No. 166 (2009) and SFAS No.167 (2009) require BHCs to expand the disclosures about continuing involvements with securitized assets.

implementation of SFAS No.166 (2009), managers are likely to use their discretions on choosing the appropriate assumptions, which therefore increases managers' incentives of strategic reporting about asset securitization. As a result, the implementation of SFAS No.166 (2009) enlarges outside investors' incomplete knowledge of asset securitization assumptions, which lead to an increase on the assessed variance of a BHC's asset value for outside investors (Lambert et al., 2007) and thereby increase BHC credit risk (Merton, 1974; Duffie and Lando, 2001). Therefore, this study hypothesizes that the effect of asset securitization reporting readability on credit risk become larger at the implementation of SFAS No.166 (2009).

Hypothesis 2: *The effect of asset securitization reporting readability on credit risk become larger at the implementation of SFAS No.166 (2009).*

Some BHCs' securitized assets characteristics may distort the effect of asset securitization reporting readability on BHC credit risk. Chen et al. (2008) show that the credit risk of 1-4 family residential mortgage loans (MBS) is low and highly verifiable, that of consumer loans (non-residential mortgage loans, CONSBS) is high but highly verifiable, and that of commercial loans and leases (COMMBS) is high and less verifiable. In addition, the higher the proportion of retained interest, the riskier the securitization. Therefore, this study explores whether the scale of on-balance sheet securitized assets (e.g. contractual total retained interests, ARI) changes the SEC reporting readability effect, especially for total retained interests from mortgage loan securitizations (MRI), those from consumer loan securitizations (CONSRI), and those from commercial loan securitizations (COMMRI).

Previous studies have documented that different types of securitized loans have different risk characteristics. It may lead a BHC's managers to have dissimilar incentives of engaging strategically textual reporting behaviors about asset securitization in 10-K and thereby may change the effect of asset securitization readability on BHC credit risk. Therefore, this study hypothesizes that the effect of asset securitization reporting readability on credit risk may be

changed with different types of on-balance sheet securitized assets.

Hypothesis 3: The effect of asset securitization reporting readability on credit risk may be changed with different types of on-balance sheet securitized assets

4. Data and Methodology

4.1. Data sources and sample selection

Since this study aims to investigate the effect of a BHC's asset securitization reporting readability on credit risk (measured by credit rating), the study follows Ellul and Yerramilli (2013) to select BHCs with ever top 100 ranked by asset values during 2000 to 2016 as the preliminary sample observations from Bank Regulatory database.¹¹ Then we exclude the sample observations without Standard & Poor's credit rating and further removes the credit rating observations with invalid and missing data to ensure sample observations with asset securitization reporting readability and other necessary financial and market data. Finally, the sample includes 818 annual BHC observations during the sample period from the year 2000 to 2016. Table 1 shows the distribution of the sample observations, which shows that approximately 94.25% of BHC observations are investment grade.

[Insert Table 1 here]

Regarding the data source of asset securitization reporting readability, this work acquires the textual descriptions of asset securitization reporting in 10-K documents from the Securities and Exchange Commission (SEC) online Edgar system. The study follows Li (2008) and Chen and Tseng (2016) to select the qualified texts of annual report for the calculation of asset securitization reporting readability. The screening procedures for the 10-K texts are as follows: First, firms without a matching central index key (CIK) and firm-year annual reports that do

¹¹ The total asset size of Top 100 BHCs is over 70% of total asset size of financial industry.

not have electronic 10-K filings on Edgar are deleted. Second, the heading items, tables, figures, and all the paragraphs that have less than one line for each 10-K file are removed. Finally, we focus on the textual descriptions of asset securitization reporting in Item1a, Item7, Item7a, and Item 8 of 10-K (i.e. SSAP and DIHA sections) and calculate the asset securitization reporting readability based on the remaining texts in related textual descriptions about asset securitization reporting. However, Chen and Tseng (2016) show that many firms' original 10-K files are incomplete and the missing items (e.g. Item7, Item 8) could be found at another website link.¹² To overcome the limitation, this study hand-collects the textual descriptions of asset securitization reporting in Item7 and Item 8.

4.2. BHC credit rating and other control variables

For the dependent variable, this study employs credit rating (RAT) as the proxy of BHC credit risk. We also consider credit rating determinant variables as control ones to explore whether a BHC's asset securitization reporting readability additionally explain the BHC's credit rating variations. The RAT variable is defined as the numerical scores of issuer rating, obtained from COMPUSTAT database, where AAA is 1, AA+ is 2, AA is 3, etc. Therefore, it should be noted that a higher value of RAT variable represents a higher credit risk.

This study follows prior literature to employ a BHC's characteristics as control variables for the BHC's credit rating. The BHC characteristics include equity volatility (VOL), financial leverage (LEV), profitability (PM), firm size (SIZE), market-to-book value ratio (MB), risk based capital (CAP1), audit quality (BIG4, UNQUAL), and the natural logarithm of the complete 10-K document file size (CSTF_SIZE). The VOL and LEV variables are the annualized standard deviation of daily equity returns over the previous 150 days and the ratio of total debts to total assets (sum of total debt book value and equity market value), respectively. In addition, PM stands for profit margin, defined as the ratio of net income to total revenue.

¹² The complete textual contents of Item 8 may be found at another website link. The names of document format files are ANNUAL REPORT or EX-13.

According to structural credit models (Merton, 1974), VOL and LEV variables are both positively related to firm credit risk while the profitability variable (e.g. PM) has an opposite effect. Moreover, this study also follows Zhang (2006) to employ firm asset size (SIZE) as the proxy of information uncertainty. The SIZE variable is the natural logarithm of the market value of a BHC's assets at the end of a fiscal year.¹³ Furthermore, MB is the market-to-book ratio, defined as the market value of equity divided by the book value of equity. CAP1 is risk based capital, defined as the ratio of a BHC's total tier-1 capital to its risk-based assets. Meanwhile, BIG4 equals to one if a firm is audited by Big 4 accounting firms and else are zero. UNQUAL equals to one if an auditor show the unqualified opinion and else are zero. This study also controls the variable of 10-K document file size (CSTF_SIZE, Ertugrul et al., 2016; Loughran & Mcdonald, 2014) to demonstrate the importance of the asset securitization reporting readability effect on credit risk. The CSTF_SIZE variable is defined as the natural logarithm of the 10-K complete text file size (in megabytes), which is negatively related to annual report readability. The needed data for these above variables are available from COMPUSTAT, Bank Regulatory and SEC Edgar databases.

The summary statistics of the above variables of the firm sample observations with BHCs' asset securitization reporting readability and tone variables are shown in Table 2. Table 2 shows that the average credit rating score (RAT) is 7.6638 (between A- and BBB+ in Standard and Poor's rating system). On average, SEC_FK is 15.9870, SEC_SMOG is 16.8648, SEC_POS is 6.10%, and SEC_NEG is 34.81%. The results reveal that the readers are required to have sixteen education years to understand the asset securitization reporting in a BHC's annual report and about 30.43% (6.09%) of textual presentations is negative (positive).

Table 2 also reveals that the average of a BHC's leverage ratio (LEV) is 53.70%, the average of a BHC's equity volatility (VOL) is 36.22%, the average of a BHC's profitability

¹³ A firm's asset market value is defined as the sum of book value of debt and market value of equity. The market value of equity is the product of year-end stock price and the outstanding shares.

(PM) is 13.45%, and the average of capital adequacy ratio (CAP1) is 12.07%.

[Insert Table 2 here]

5. Empirical Analysis

5.1. Examinations on the effect of asset securitization reporting readability on credit risk

This section introduces the methodologies to examine our hypotheses, analyze empirical results, and provide implications. For the hypotheses, this study uses order probit regression model to explore the effect of asset securitization reporting readability on BHC credit risk when controlling for other well-known variables stated in the literature. In addition, this research also considers the year-fixed effect and heteroscedasticity issues (firm-level clustered standard errors, Petersen, 2009) in evaluating the effectiveness of regression coefficients estimates. We develop the following model specification to examine the hypothesis 1, shown in Eq. (3), (4), and (5):

$$\begin{aligned}
 RAT_{it} = & \alpha + \beta_1 SEC_FRR_{it} + \beta_2 SIZE_{it} + \beta_3 MB_{it} + \beta_4 LEV_{it} + \beta_5 VOL_{it} + \beta_6 PM_{it} \\
 & + \beta_7 BIG4_{it} + \beta_8 UNQUAL_{it} + \beta_9 CAP_{it} + \beta_{10} CSTF_SIZE_{it} + \varepsilon_{it}
 \end{aligned}
 \tag{3}$$

$$\begin{aligned}
 RAT_{it} = & \alpha + \beta_1 I7_SEC_FRR_{it} + \beta_2 SIZE_{it} + \beta_3 MB_{it} + \beta_4 LEV_{it} + \beta_5 VOL_{it} + \beta_6 PM_{it} \\
 & + \beta_7 BIG4_{it} + \beta_8 UNQUAL_{it} + \beta_9 CAP_{it} + \beta_{10} CSTF_SIZE_{it} + \varepsilon_{it}
 \end{aligned}
 \tag{4}$$

$$\begin{aligned}
 RAT_{it} = & \alpha + \beta_1 I7_SEC_LIQ_FRR_{it} + \beta_2 SIZE_{it} + \beta_3 MB_{it} + \beta_4 LEV_{it} + \beta_5 VOL_{it} + \beta_6 PM_{it} \\
 & + \beta_7 BIG4_{it} + \beta_8 UNQUAL_{it} + \beta_9 CAP_{it} + \beta_{10} CSTF_SIZE_{it} + \varepsilon_{it}
 \end{aligned}
 \tag{5}$$

Where:

$SEC_FRR = SEC_FK, SEC_SMOG$; $I7_SEC_FRR = I7_SEC_FK, I7_SEC_SMOG$;

$I7_SEC_LIQ_FRR = I7_SEC_LIQ_FK, I7_SEC_LIQ_SMOG$

Table 3 provides the results of Eq. (3), (4) and (5) for the entire sample period. This table

exhibits the results of six different order probit regression models with credit rating (RAT) as the dependent variable against various asset securitization reporting readability variables (SEC_FRR, I7_SEC_FRR, I7_SEC_LIQ_FRR) and other well-known control variables. Empirical results of column (1) and (4) in Table 3 show that SEC_FK and SEC_SMOG significantly and positively related to BHC credit rating when controlling for other well-known variables, respectively. Because higher values of SEC_FK and SEC_SMOG variables represent poorer readability, and because a higher value of RAT variable represents a higher BHC credit risk, the positive coefficients of SEC_FK and SEC_SMOG indicate that BHCs with worse asset securitization reporting readability have higher credit risk. The results suggest that poor asset securitization reporting readability increases outside investors' *assessed* variance of a BHC's real earnings, cash flows, and asset value distributions (e.g. Lambert et al., 2007), which lead to an increase on firm credit risk (Merton, 1974; Duffie and Lando, 2001). The results also confirm Hypothesis 1 that poor asset securitization reporting readability is positively associated with BHC credit risk.

In addition, empirical results of column (2) and (5) (column (3) and (6)) in Table 3 show that I7_SEC_FK and I7_SEC_SMOG (I7_SEC_LIQ_FK and I7_SEC_LIQ_SMOG) significantly and positively related to BHC credit risk when controlling for other well-known variables, respectively. The results indicate that debt holders or rating agencies mainly care about the managers' strategically textual reporting of asset securitization in Item 7 and Item 7 liquidity section.

[Insert Table 3 here]

Moreover, this study discusses whether the tones of asset securitization reporting affect BHC credit risk. We replace SEC_FRR, I7_SEC_FRR, and I7_SEC_LIQ_FRR variables in Eq. (3) to Eq. (5) by tones variables of SEC_TONE, I7_SEC_TONE, and I7_SEC_LIQ_TONE (TONE=POS, NEG), respectively. Table 4 provides the results of six different order probit

regression models with credit rating (RAT) as the dependent variable against various asset securitization reporting tone variables and other well-known control variables. Empirical results of column (1) to (3) in Table 4 show that SEC_POS, I7_SEC_POS, and I7_SEC_LIQ_POS all significantly and negatively relate to BHC credit risk, suggesting that the positive tone of asset securitization reporting not only brings debt holders (or rating agencies) optimistic information about the quality of the off-balance sheet securitized loans and the on-balance sheet securitized loans but also induces a decrease on outside investors' *assessed* variance of a BHC's real earnings, cash flows and asset value distributions since the positive tone conveys a certain message.

Meanwhile, since the negative tone of asset securitization reporting not only brings debt holders passive information about the quality of the asset securitization but also induces a decrease on outside investors' *assessed* variance of a BHC's asset value distributions, the negative tone of asset securitization reporting has uncertain effect on BHC credit risk. Empirical results of column (4) to (6) in Table 4 show that SEC_NEG, I7_SEC_NEG both significantly and positively relate to BHC credit risk while I7_SEC_LIQ_NEG has an insignificant effect, suggesting that the passive information effect of asset securitization reporting may dominate or equal to the variance reduction effect.

Based on the above empirical findings, we preliminarily conclude that the positive tone of asset securitization reporting decreases the concerns of asset securitization quality for debt holders (or rating agencies) while the negative tone has the opposite effect.

[Insert Table 4 here]

Table 5 provides the results of twelve different order probit regression models with credit rating (RAT) as the dependent variable against various asset securitization reporting readability and tone analysis variables and other well-known control variables. Empirical results of column (1) to (12) in Table 5 show that SEC_FRR and SEC_NEG both significantly affect credit risk

while SEC_POS has an insignificant effect. Meanwhile, I7_SEC_FRR, I7_SEC_NEG, and I7_SEC_POS have the similar results. However, I7_SEC_LIQ_FRR and I7_SEC_LIQ_POS both significantly affect credit risk while I7_SEC_LIQ_NEG becomes to have an insignificant effect. The above results suggest that debt holders (or rating agencies) care about the readability and negative tones of asset securitization reporting in Item 1a, 7, 7a, and 8 while focus on the positive tone of asset securitization reporting in Item 7 liquidity section. The results also suggest that asset securitization reporting readability and tone analyses variables both play the important roles in determining BHCs' credit risks.

[Insert Table 5 here]

5.2. Path analyses for the effect of asset securitization reporting readability on BHC credit risk: Incomplete information perspective

According to the hypothesis section, this study conjectures that asset securitization reporting readability (SEC_FRR, I7_SEC_FRR, I7_SEC_LIQ_FRR; FRR=FK, SMOG) affects BHC credit risk through the incomplete information channel. The incomplete information channel is one of main components of structural credit models (Merton, 1974; Duffie and Lando, 2001). To explicitly investigate which channel connects a BHC's SEC_FRR (I7_SEC_FRR, I7_SEC_LIQ_FRR) and its credit risk, this study addresses this issue by employing path analysis model, shown as Eq. (6) to (7).

$$Channel_{it} = \alpha + \beta_1 SEC_FRR_C_{it} + \varepsilon_{it} \quad (6)$$

$$RAT_{it} = \alpha + \beta_1 SEC_FRR_C_{it} + \beta_2 SIZE_{it} + \beta_3 MB_{it} + \beta_4 LEV_{it} + \beta_5 VOL_{it} + \beta_6 PM_{it} + \beta_7 BIG4_{it} + \beta_8 UNQUAL_{it} + \beta_9 CAP_{it} + \beta_{10} CSTF_SIZE_{it} + \varepsilon_{it} \quad (7)$$

Where:

$SEC_FRR_C = SEC_FRR, I7_SEC_FRR, I7_SEC_LIQ_FRR$

FRR=FK, SMOG

Channel= DISP. *DISP* is the dispersion in analysts' forecasts, which is calculated as the standard deviation of the analysts' fiscal year 1 earnings per share forecasts scaled by the absolute value of mean.

Empirical results of columns (1) to (2) in Table 6 show that SEC_FK significantly and positively relates to a BHC's incomplete information level (DISP), which significantly and positively relates to the BHC's credit risk. In addition, the result of column (2) also show that SEC_FK significantly and positively relates to the BHC's credit risk. The results reveal that the effect of SEC_FK on credit risk include the direct impact (0.2027) and the indirect impact through the incomplete information channel ($0.0927 \times 0.1518 = 0.0141$). Similarly, empirical results of columns (3) and (4) in Table 6 show that I7_SEC_FK significantly and positively relates to the BHC's DISP, which significantly and positively relates to the BHC's credit risk. In addition, I7_SEC_FK significantly and positively relates to the BHC's credit risk. The results reveal that the effect of I7_SEC_FK on credit risk include the direct impact (0.1849) and the indirect impact through the incomplete information channel ($0.1458 \times 0.1467 = 0.0214$). Similarly, empirical results of columns (5) and (6) in Table 6 also show that the effect of I7_SEC_LIQ_FK on credit risk include the direct impact (0.1463) and the indirect impact through the incomplete information channel ($0.0841 \times 0.1564 = 0.0132$). Overall, based on the above discussions, the effect of a BHC's asset securitization reporting on the BHC's credit risk is through the incomplete information channel (e.g. Cheng et al., 2011; Lambert et al., 2007). Therefore, the Hypothesis 1a is empirically supported.

[Insert Table 6 here]

5.3. Endogeneity discussions of the relation between asset securitization reporting readability and BHC credit risk

To provide more convincing evidences for the effects of SEC_FRR, I7_SEC_FRR, and

I7_SEC_LIQ_FRR on BHC credit risk, this study addresses the endogeneity issue as a robustness check. To eliminate the endogeneity concern that the correlation between *SEC_FRR* (*I7_SEC_FRR*, *I7_SEC_LIQ_FRR*) and the error term of credit rating could be due to the omitted variable problem or measurement errors, the current study utilizes a two-stage regression model to address the issue. In the first stage, we regress *SEC_FRR* (*I7_SEC_FRR*, *I7_SEC_LIQ_FRR*) proxies against the explanatory variables (including the instrument variables, denoted as *IV_SEC_FRR* (*IV_I7_SEC_FRR*, *IV_I7_SEC_LIQ_FRR*)) and estimated the predicted values of *SEC_FRR* (*I7_SEC_FRR*, *I7_SEC_LIQ_FRR*) proxies (denoted as *P_SEC_FRR* (*P_I7_SEC_FRR*, *P_I7_SEC_LIQ_FRR*)). The other explanatory variables include firm size (*SIZE*), market to book value ratio (*MB*), equity volatility (*VOL*), and financial leverage (*LEV*). In addition, the study uses the past one-year asset securitization readability variables of industrial peers in the same state as the instrument variables (e.g. Jiraporn et al., 2014).¹⁴ This is mainly because the geographic location is fixed and more likely to be exogenous. Hence, the instrument variables are more likely to satisfy the criteria of good instrument variables, namely, the relevance condition and the exclusion condition. Then, in the second stage, we regress credit rating against the predicted values of the first stage and other control variables.

Table 7 presents the results of the two-stage regressions. Empirical results of Table 7 show that the coefficients of the predicted *SEC_FRR*, the predicted *I7_SEC_FRR*, and the predicted *I7_SEC_LIQ_FRR* variables have the predicted signs and are significant in the regressions with credit risk (*RAT*) as dependent variable for the whole sample period. The results of our two-stage regression estimation provide further support for the results of Table 3 that asset securitization reporting readability variables are positively related to credit risk. Based on the

¹⁴ Jiraporn et al. (2014) indicated that geographic location is fixed and has been used as an instrumental variable in many prior studies since it is more likely to be exogenous.

above results, this study therefore concludes that our previous results are robust after controlling for potential endogeneity problems.

[Insert Table 7 here]

5.4. The effects of SEC_FRR variables on credit risk: Regulatory change perspective (SFAS No. 166(2009), SFAS No.167 (2009), and Dodd-Frank Act (2010))

SFAS No. 166 (2009) specifies retained interest to be measured at fair value rather than at an allocated portion of the previous carrying amount of securitized assets. In addition, SFAS No. 166 (2009) and SFAS 167 (2009) also especially expanded the required disclosures about continuing involvements with securitized assets. Moreover, Dodd-Frank Act (2010), enacted in July 2010, aims to create new financial regulatory processes that enforce transparency and accountability to prevent another significant financial crisis. Since SFAS No.166 (2009), SFAS No.167 (2009), and Dodd-Frank Act (2010) require firm to provide more complete securitized assets information, BHC managers have more incentives to engaging in managers' strategically textual reporting about securitized assets by less readable or more ambiguous textual presentations, which motivates this study to investigate whether the regulatory changes distort the effect of asset securitization reporting readability on credit risk.

This study employs the *No166* variable as the main variable of asset securitization regulatory changes. The *No166* variable is a dummy variable, which equals to one if the observation is at the implementation of SFAS No.166 (2009) (also No.167 (2009) and Dodd-Frank Act (2010)) and zero if otherwise. This study adds the interaction terms of No166 and SEC_FRR (*I7_SEC_FRR*, *I7_SEC_LIQ_FRR*) variables into Eq. (3) to (5) as new model specifications and further discusses whether the regulatory change of SFAS No.166 (2009) affects the SEC_FRR (*I7_SEC_FRR*, *I7_SEC_LIQ_FRR*) effects on credit risk.

The result of column (1) (column (2) to (3)) in Table 8 shows that the interaction terms of

SEC_FK (I7_SEC_FK, I7_SEC_LIQ_FK) and No166 are significantly and positively (positively) related to credit risk, suggesting that the implementation of SFAS No.166 (2009) strengthens the effect of asset securitization reporting readability on credit risk. The results of column (4) to (6) also provide the similar conclusion. This is mainly because the above regulatory changes enforce BHCs' managers to disclose many quantitative information and may thereby increase the managers' incentives of engaging in strategic reporting by lexical features (Schrand and Walther, 2000). The above results also reveal that managers are likely to use readability as a tool of strategic reporting on asset securitization at the implementations of SFAS No.166 (2009), SFAS No.167 (2009), and Dodd-Frank Act (2010).

[Insert Table 8 here]

5.5. The effects of SEC_FRR variables on credit risk: The perspective of on-balance sheet securitized assets

Since Barth et al. (2012) document that bond investors care about off-balance sheet securitized assets while credit rating agencies do not take them into considerations, it motivates this study to investigate whether the types of securitized assets have different impacts on the asset securitization reporting readability effect. Following Barth et al. (2012), this study mainly focuses on the distortion effect of the on-balance sheet securitized assets (namely contractual total retained interests), including MRI, COMMRI, and CONSRI. The MRI (COMMRI, CONSRI) variable is defined as total retained interests from mortgage (consumer loan, commercial loan) securitizations divided by market value of equity. In addition, ARI is the sum of credit-enhancing interest-only strips and retained subordinated securitizations divided by market value of equity.

This study adds the interaction terms of ARI (MRI, COMMRI, CONSRI) and SEC_FRR (I7_SEC_FRR) variables into Eq. (3) to (5) as new model specifications and further discusses whether the scale of on-balance sheet securitized assets changes the effect of asset

securitization reporting readability on BHC credit risk.

The result of column (1) (column (4)) in Table 9-1 shows that the interaction term of SEC_SMOG (I7_SEC_SMOG) and ARI is significantly and negatively related to credit risk, suggesting that the scale of on-balance sheet securitized assets weakens the effect of asset securitization reporting readability on BHC credit risk. That is, debt holders (rating agencies) might neglect the effect of asset securitization reporting readability for BHCs with higher risky assets (e.g. ARI).

In addition, this study further discusses whether the types of on-balance sheet securitized assets have different impacts on the effect of asset securitization reporting readability. The results of column (2) to (4) (column (5) to (8)) in Table 9-1 shows that the interaction term of SEC_SMOG (I7_SEC_SMOG) and CONSRI is significantly and negatively related to credit risk while those of SEC_SMOG and MRI (COMMRI) have the insignificant impact. Since the credit risk of 1-4 family residential mortgage loans (MBS) is low and highly verifiable, that of consumer loans (non-residential mortgage loans, CONSBS) is high but highly verifiable, and that of commercial loans and leases (COMMBS) is high and less verifiable (Chen et al., 2008), the result shows that debt holders (rating agencies) might neglect the effect of asset securitization reporting readability for BHCs with more retained interests of high but highly verifiable risky assets (namely CONSRI). Moreover, the results of Table 9-2 using SEC_FK and I7_SEC_FK also provide the consistent conclusion.

[Insert Table 9-1. 9-2 here]

6. Concluding Remarks

This study investigates the effect of asset securitization report readability on credit risk by employing American BHC credit rating data from year 2000 to 2016. This study finds that a BHC's poor asset securitization reporting readability positively relates to the BHC's credit risk

according to structural credit model framework of Merton (1974) and Duffie and Lando (2001). In addition, the effect of asset securitization reporting readability on credit risk is mainly through the incomplete information channel. Moreover, we also find that the implementation of SFAS No.166 (2009) (also No.167 (2009) and Dodd-Frank Act (2010)) enhances the effect of asset securitization reporting readability, implying that the regulatory changes improve the completeness of asset securitization disclosure but simultaneously enhance the incentives of managers' strategically textual reporting about asset securitization. Moreover, we find that the scale of on-balance sheet securitized assets weakens the effect of asset securitization reporting readability on BHC credit risk, especially for total retained interests from consumer loans. Furthermore, the study also demonstrates that the positive tone of SEC reporting negatively relates to BHC credit risk while the negative tone of SEC reporting has the opposite effect. Finally, our results remain hold with considering endogeneity issues.

Few extant studies explore a BHC's credit risk from the perspective of managers' strategically textual reporting about off-balance sheet transactions. The employed asset securitization reporting readability variables demonstrate a BHC's managers' strategically textual reporting about asset securitization, one of main off-balance sheet transaction in the BHC's business. The contributions of this study therefore include: (1) identifying the idiosyncratic risk effects resulting from asset securitization reporting readability (one of managers' strategically textual reporting about off-balance sheet transactions) on BHC credit risk from the incomplete information perspective, one of core components of structural credit models; (2) different from the previous studies, this study aims to explore the economic consequence of the asset securitization reporting readability rather than that of the whole annual report (e.g. Ertugrul et al., 2016); (3) this work considers the impact of the asset securitization regulatory changes (SFAS No. 166 (2009), SFAS No.167 (2009), Dodd-Frank Act (2010)) for the effect of asset securitization reporting readability on BHC credit risk. Therefore, we add this line of literature by addressing the economic consequences of asset securitization

regulatory change on credit rating agencies or debt holders. Finally, this study also considers the characteristics of on-balance sheet securitized assets and further discusses whether they change the effect of asset securitization reporting readability on BHC credit risk.

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Table 1. Sample Distribution

The sample period is yearly between 2000 and 2016. There are totally 818 annual BHC observations with available data of asset securitization reporting readability. The estimation of the asset securitization reporting readability requires that firms have asset securitization. Table 1 reports the numbers of pooled observations for firms in the given years and credit ratings. The rating subsamples are sorted by Standard & Poor's credit ratings.

Rating/ Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
AA+	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
AA	0	0	0	0	0	0	1	2	1	0	0	0	0	0	0	0	0	4
AA-	5	6	5	6	6	5	4	6	7	7	7	1	0	0	0	0	0	65
A+	5	5	6	6	6	7	9	7	5	2	2	7	7	7	7	1	1	90
A	7	6	7	7	7	6	4	5	3	7	6	2	2	2	2	7	3	83
A-	7	5	8	9	6	6	7	8	12	4	4	8	7	9	9	6	6	121
BBB+	6	4	10	11	11	15	14	13	11	8	7	8	10	11	12	16	16	183
BBB	12	7	11	11	8	4	7	7	6	7	7	8	8	6	8	6	8	131
BBB-	2	2	5	6	7	6	3	1	2	8	5	5	9	9	7	8	8	93
BB+	0	0	0	1	0	0	0	0	0	3	3	1	0	0	0	2	2	12
BB	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
BB-	0	0	0	0	0	0	0	0	0	1	2	0	1	2	2	0	0	8
B+	0	0	0	0	0	0	0	0	0	0	1	4	2	2	3	2	2	16
B	0	0	0	0	0	0	0	0	0	0	3	1	1	0	0	0	0	5
B-	0	0	0	0	0	0	0	0	0	3	0	0	1	1	0	0	0	5
Total	44	35	52	57	51	49	49	50	47	50	48	45	48	49	50	48	46	818

Table 2. Summary Statistics of Major Variables

This table presents the mean, standard deviation (Std. Dev.), minimum, and maximum of major variables used in empirical analyses. RAT is the numerical score of a firm's S&P credit rating. A higher value of RAT variable represents a higher credit risk (lower credit quality). SEC_FK and SEC_SMOG represent the two readability measures, FK and SMOG, of asset securitization reporting in Item 1a, Item 7, Item 7a and Item 8 of a firm's complete annual report (10-K). I7_SEC_FK and I7_SEC_SMOG (I7_SEC_LIQ_FK and I7_SEC_LIQ_SMOG) are readability variables of asset securitization reporting in Item 7 (Item 7 liquidity section). SEC_POS and SEC_NEG (I7_SEC_POS and I7_SEC_NEG; I7_SEC_LIQ_POS and I7_SEC_LIQ_NEG) stand for the two tone analysis measures, positive tone and negative tone, of asset securitization reporting in annual report (Item7; Item 7 liquidity section). Control variables include firm size (SIZE), market-to-book value ratio (MB), financial leverage (LEV), equity volatility (VOL), profit margin (PM), tier-1 capital adequacy ratio (CAP1), audit quality (BIG4, UNQUAL), and the natural logarithm of the complete 10-K document file size (CSTF_SIZE). SIZE stands for the natural logarithm of firm asset value and CSTF_SIZE represents another readability measure, defined as the natural logarithm of the complete 10-K document file size (megabytes). MB is the market-to-book ratio, defined as the market value of equity divided by the book value of equity. LEV is financial leverage, defined as the book value of debt divided by total assets (sum of total debt book value and equity market value). PM is profit margin. VOL is the equity volatility, measures the annualized daily volatility of previous 150 day stock returns. BIG4 equals to one if a firm is audited by Big 4 accounting firms and else are zero. UNQUAL equals to one if an auditor show the unqualified opinion and else are zero. CAP1 is defined as the ratio of a firm's total tier-1 capital to its risk-based assets. The DISP variable is the dispersion in analysts' forecasts, which is calculated as the standard deviation of the analysts' fiscal year 1 earnings per share forecasts scaled by the absolute value of mean.

Variable	Obs	Mean	Std. Dev.	Min	Max
Panel A. Dependent Variable					
RAT	818	7.6638	2.2980	2.0000	16.0000
Panel B. Securitization Reporting Readability Variables					
SEC_FK	818	15.9870	1.2691	11.4590	20.0950
SEC_SMOG	818	16.8648	0.9505	13.0950	19.7480
I7_SEC_FK	818	14.9792	1.5963	9.4850	20.2510
I7_SEC_SMOG	818	16.2163	1.1833	11.2080	20.2960
I7_SEC_LIQ_FK	774	15.1600	2.1715	9.9870	26.5760
I7_SEC_LIQ_SMOG	774	16.2867	1.6428	12.6950	25.2540
Panel C. Securitization Reporting Tone Variables					
SEC_POS	818	0.0610	0.0226	0.0000	0.1695
SEC_NEG	818	0.3481	0.0659	0.0000	0.5672
I7_SEC_POS	818	0.0704	0.0355	0.0000	0.4286
I7_SEC_NEG	818	0.3316	0.1002	0.0000	1.0000
I7_SEC_LIQ_POS	774	0.1426	0.1039	0.0000	1.0000
I7_SEC_LIQ_NEG	774	0.1361	0.0904	0.0000	0.5294
Panel D. Control Variables					
SIZE	818	10.9387	1.4486	8.5145	14.7608
MB	818	1.6284	0.9899	0.0000	7.3616
LEV	818	0.5370	0.2034	0.0052	1.0000
VOL	818	0.3622	0.5831	0.0636	11.1569
PM	818	0.1345	0.1354	-0.9539	0.6299
BIG4	818	0.7115	0.4533	0.0000	1.0000
UNQUAL	818	0.6308	0.4829	0.0000	1.0000
CAP1	818	0.1207	0.0846	0.0653	1.0100
CSTF_SIZE	818	2.0137	1.5792	-1.6300	4.9199

Table 3. The Effect of Asset Securitization Reporting Readability on Credit Risk

This table shows the results of six different order probit model with the credit risk (RAT) as the dependent variable against asset securitization reporting readability variables (SEC_FRR, I7_SEC_FRR, I7_SEC_LIQ_FRR; FRR=FK, SMOG) using data of 818 annual firm observations from year 2000 to 2016. The year-fixed effect and heteroscedasticity issues are considered in these results. RAT is the numerical score of a firm's S&P credit rating. A higher value of RAT variable represents a higher credit risk (lower credit quality). SEC_FRR, I7_SEC_FRR, and I7_SEC_LIQ_FRR represent readability measures of asset securitization reporting in complete annual report (10-K), Item 7, and Item 7 liquidity section, respectively. Control variables include firm size (SIZE), market-to-book value ratio (MB), financial leverage (LEV), equity volatility (VOL), profit margin (PM), tier-1 capital adequacy ratio (CAP1), audit quality (BIG4, UNQUAL), and the natural logarithm of the complete 10-K document file size (CSTF_SIZE). This table presents the model coefficients and Pseudo R-squared. The z-statistics calculated by firm-level clustered standard errors for each coefficient appears immediately underneath. The signs of “*, **, ***” represent the significance of 10%, 5%, and 1%, respectively.

	(1) RAT	(2) RAT	(3) RAT	(4) RAT	(5) RAT	(6) RAT
SEC_FK	0.1526** (1.98)					
I7_SEC_FK		0.1070* (1.69)				
I7_SEC_LIQ_FK			0.1098*** (3.19)			
SEC_SMOG				0.2315*** (2.66)		
I7_SEC_SMOG					0.1792** (2.32)	
I7_SEC_LIQ_SMOG						0.1531*** (3.67)
SIZE	-0.6502*** (-6.38)	-0.6525*** (-6.25)	-0.6337*** (-6.62)	-0.6429*** (-6.34)	-0.6531*** (-6.26)	-0.6272*** (-6.50)
MB	-0.4624*** (-2.75)	-0.4452*** (-2.70)	-0.4943*** (-3.34)	-0.4591*** (-2.77)	-0.4419*** (-2.75)	-0.5027*** (-3.47)
LEV	-0.2560 (-0.26)	-0.2444 (-0.25)	-0.2441 (-0.23)	-0.2711 (-0.27)	-0.2854 (-0.29)	-0.2559 (-0.24)
VOL	0.2801** (2.31)	0.2692** (2.23)	0.2629** (2.25)	0.2776** (2.30)	0.2672** (2.19)	0.2626** (2.25)
PM	-1.1141** (-2.28)	-1.0109** (-2.09)	-0.8384* (-1.72)	-1.1428** (-2.36)	-1.0287** (-2.10)	-0.8100* (-1.67)
BIG4	-0.0738 (-0.24)	-0.0669 (-0.23)	0.0778 (0.28)	-0.0828 (-0.27)	-0.0773 (-0.26)	0.0950 (0.34)
UNQUAL	-0.5938** (-2.42)	-0.5598** (-2.32)	-0.5291** (-2.05)	-0.5936** (-2.43)	-0.5540** (-2.31)	-0.5311** (-2.06)
CAP1	-0.7870 (-0.89)	-0.9083 (-1.10)	-0.8785 (-1.10)	-0.7747 (-0.88)	-0.9154 (-1.10)	-0.8567 (-1.07)
CSTF_SIZE	0.0742 (0.68)	0.0711 (0.66)	0.0670 (0.59)	0.0683 (0.62)	0.0628 (0.57)	0.0801 (0.70)
Observations	818	818	774	818	818	774
Pseudo R ²	0.1658	0.1643	0.1655	0.1681	0.1672	0.1668

Table 4. The Effect of Asset Securitization Reporting Tones on Credit Risk

This table shows the results of six different order probit model with the credit risk (RAT) as the dependent variable against asset securitization reporting tone variables (SEC_TONE, I7_SEC_TONE, I7_SEC_LIQ_TONE; TONE =POS, NEG) using data of 818 annual firm observations from year 2000 to 2016. The year-fixed effect and heteroscedasticity issues are considered in these results. RAT is the numerical score of a firm's S&P credit rating. A higher value of RAT variable represents a higher credit risk (lower credit quality). SEC_TONE, I7_SEC_TONE, and I7_SEC_LIQ_TONE represent tone measures of asset securitization reporting in complete annual report (10-K), Item 7, and Item 7 liquidity section, respectively. Control variables include firm size (SIZE), market-to-book value ratio (MB), financial leverage (LEV), equity volatility (VOL), profit margin (PM), tier-1 capital adequacy ratio (CAP1), audit quality (BIG4, UNQUAL), and the natural logarithm of the complete 10-K document file size (CSTF_SIZE). This table presents the model coefficients and Pseudo R-squared. The z-statistics calculated by firm-level clustered standard errors for each coefficient appears immediately underneath. The signs of “*, **, ***” represent the significance of 10%, 5%, and 1%, respectively.

	(1) RAT	(2) RAT	(3) RAT	(4) RAT	(5) RAT	(6) RAT
SEC_POS	-6.1723** (-2.19)					
I7_SEC_POS		-2.4653* (-1.70)				
I7_SEC_LIQ_POS			-2.2950*** (-3.76)			
SEC_NEG				2.0356* (1.83)		
I7_SEC_NEG					1.4511** (2.02)	
I7_SEC_LIQ_NEG						0.0594 (0.06)
SIZE	-0.6054*** (-6.17)	-0.6182*** (-6.32)	-0.6182*** (-6.31)	-0.5951*** (-6.10)	-0.6137*** (-6.26)	-0.5978*** (-5.93)
MB	-0.3970** (-2.28)	-0.4013** (-2.32)	-0.3955** (-2.42)	-0.3918** (-2.24)	-0.3835** (-2.23)	-0.3916** (-2.29)
LEV	-0.0405 (-0.04)	-0.0028 (-0.00)	-0.1401 (-0.14)	0.0295 (0.03)	0.0829 (0.08)	-0.0182 (-0.02)
VOL	0.2747** (2.37)	0.2715** (2.35)	0.2637** (2.31)	0.2680** (2.34)	0.2709** (2.36)	0.2686** (2.30)
PM	-1.0305** (-2.12)	-1.0305** (-2.13)	-0.9924** (-2.24)	-0.9560** (-1.96)	-1.0023** (-2.07)	-1.0090** (-2.11)
BIG4	-0.0756 (-0.24)	-0.0538 (-0.18)	-0.1985 (-0.65)	0.0378 (0.12)	0.0259 (0.09)	-0.0378 (-0.13)
UNQUAL	-0.5942** (-2.38)	-0.5961** (-2.36)	-0.5289* (-1.95)	-0.5894** (-2.40)	-0.6040** (-2.42)	-0.5562** (-2.12)
CAP1	-0.8046 (-0.93)	-0.8117 (-0.95)	-1.1646 (-1.34)	-0.5803 (-0.68)	-0.5132 (-0.59)	-0.8922 (-1.01)
CSTF_SIZE	0.0757 (0.70)	0.0693 (0.66)	0.0491 (0.43)	0.0671 (0.60)	0.0652 (0.59)	0.0636 (0.56)
Observations	818	818	774	818	818	774
Pseudo R ²	0.1632	0.1609	0.1651	0.1624	0.1634	0.1547

Table 5. The Effects of Asset Securitization Reporting Readability and Tones on Credit Risk

This table shows the results of twelve different order probit model with the credit risk (RAT) as the dependent variable against asset securitization reporting readability and tone analysis variables (SEC_FRR, I7_SEC_FRR, I7_SEC_LIQ_FRR, SEC_TONE, I7_SEC_TONE, I7_SEC_LIQ_TONE; FRR=FK, SMOG; TONE=POS, NEG) using data of annual firm observations from year 2000 to 2016. The year-fixed effect and heteroscedasticity issues are considered in these results. RAT is the numerical score of a firm's S&P credit rating. A higher value of RAT variable represents a higher credit risk (lower credit quality). SEC_FRR, I7_SEC_FRR, and I7_SEC_LIQ_FRR (SEC_TONE, I7_SEC_TONE, and I7_SEC_LIQ_TONE) represent the readability (tone) variables of asset securitization reporting in complete annual report (10-K), Item 7, and Item 7 liquidity section, respectively. Control variables include firm size (SIZE), market-to-book value ratio (MB), financial leverage (LEV), equity volatility (VOL), profit margin (PM), tier-1 capital adequacy ratio (CAP1), audit quality (BIG4, UNQUAL), and the natural logarithm of the complete 10-K document file size (CSTF_SIZE). This table presents the model coefficients and Pseudo R-squared. The z-statistics calculated by firm-level clustered standard errors for each coefficient appears immediately underneath. The signs of ***, **, *** represent the significance of 10%, 5%, and 1%, respectively.

	(1) RAT	(2) RAT	(3) RAT	(4) RAT	(5) RAT	(6) RAT	(7) RAT	(8) RAT	(9) RAT	(10) RAT	(11) RAT	(12) RAT
SEC_FK	0.1318 (1.63)			0.1523** (2.00)								
SEC_POS	-4.5040 (-1.50)						-3.9664 (-1.32)					
I7_SEC_FK		0.0996 (1.55)			0.1211* (1.95)							
I7_SEC_POS		-1.7806 (-1.24)						-1.4819 (-1.04)				
I7_SEC_LIQ_FK			0.1027*** (2.82)			0.1149*** (3.62)						
I7_SEC_LIQ_POS			-2.1393*** (-3.54)						-2.1194*** (-3.53)			
SEC_NEG				2.0276* (1.81)						2.0072* (1.79)		
I7_SEC_NEG					1.6810** (2.47)						1.6008** (2.30)	
I7_SEC_LIQ_NEG						-0.5830 (-0.61)						-0.5585 (-0.58)
SEC_SMOG							0.2050** (2.17)			0.2304*** (2.64)		
I7_SEC_SMOG								0.1699** (2.13)			0.1889** (2.48)	
I7_SEC_LIQ_SMOG									0.1431*** (3.28)			0.1589*** (4.14)
SIZE	-0.6366*** (-6.21)	-0.6502*** (-6.23)	-0.6513*** (-6.88)	-0.6274*** (-6.16)	-0.6521*** (-6.22)	-0.6275*** (-6.47)	-0.6320*** (-6.21)	-0.6514*** (-6.25)	-0.6451*** (-6.76)	-0.6204*** (-6.14)	-0.6502*** (-6.21)	-0.6208*** (-6.35)
MB	-0.4412*** (-2.58)	-0.4313*** (-2.58)	-0.4919*** (-3.46)	-0.4365** (-2.55)	-0.4089** (-2.52)	-0.4957*** (-3.38)	-0.4410*** (-2.62)	-0.4306*** (-2.64)	-0.4998*** (-3.59)	-0.4333** (-2.57)	-0.4048** (-2.56)	-0.5037*** (-3.51)
LEV	-0.2498 (-0.26)	-0.2284 (-0.23)	-0.3455 (-0.33)	-0.2248 (-0.23)	-0.1785 (-0.18)	-0.2244 (-0.21)	-0.2652 (-0.27)	-0.2715 (-0.27)	-0.3555 (-0.34)	-0.2393 (-0.24)	-0.2076 (-0.21)	-0.2361 (-0.22)
VOL	0.2824** (2.36)	0.2706** (2.26)	0.2587** (2.27)	0.2786** (2.34)	0.2708** (2.27)	0.2628** (2.25)	0.2800** (2.34)	0.2685** (2.21)	0.2585** (2.26)	0.2760** (2.33)	0.2688** (2.23)	0.2626** (2.24)
PM	-1.1017** (-2.22)	-1.1012** (-2.08)	-0.8296* (-1.78)	-1.0385** (-2.08)	-0.9744** (-1.99)	-0.8774* (-1.74)	-1.1290** (-2.29)	-1.0279** (-2.33)	-0.8032* (-1.73)	-1.0677** (-2.16)	-0.9967** (-2.01)	-0.8473* (-1.69)
BIG4	-0.1034 (-0.32)	-0.0839 (-0.29)	-0.0780 (-0.27)	-0.0099 (-0.03)	-0.0114 (-0.04)	0.0664 (0.24)	-0.1080 (-0.34)	-0.0911 (-0.31)	-0.0606 (-0.21)	-0.0193 (-0.06)	-0.0218 (-0.07)	0.0840 (0.30)
UNQUAL	-0.5941** (-2.44)	-0.5639** (-2.34)	-0.5038* (-1.88)	-0.5895** (-2.47)	-0.5673** (-2.39)	-0.5488** (-2.11)	-0.5940** (-2.44)	-0.5575** (-2.33)	-0.5059* (-1.89)	-0.5894** (-2.47)	-0.5633** (-2.39)	-0.5502** (-2.12)
CAP1	-0.7418 (-0.84)	-0.8539 (-1.04)	-1.1375 (-1.42)	-0.4836 (-0.55)	-0.4808 (-0.57)	-0.8315 (-1.03)	-0.7358 (-0.84)	-0.8700 (-1.06)	-1.1146 (-1.37)	-0.4746 (-0.54)	-0.5074 (-0.60)	-0.8109 (-0.99)
CSTF_SIZE	0.0761 (0.70)	0.0686 (0.65)	0.0525 (0.48)	0.0685 (0.61)	0.0619 (0.56)	0.0751 (0.67)	0.0707 (0.64)	0.0612 (0.57)	0.0648 (0.59)	0.0627 (0.55)	0.0536 (0.48)	0.0883 (0.78)
Observations	818	818	774	818	818	774	818	818	774	818	818	774
Pseudo R ²	0.1678	0.1651	0.1745	0.1689	0.1696	0.1660	0.1696	0.1677	0.1756	0.1711	0.1721	0.1672

Table 6. Path Analyses for the Effects of Asset Securitization Reporting Readability Variables on Credit Risk: Incomplete Information Channels

This table shows the results of path analyses model for exploring whether the effects of asset securitization reporting readability (SEC_FRR, I7_SEC_FRR, I7_SEC_LIQ_FRR; FRR=FK, SMOG) on credit rating (RAT) through the incomplete information channel, which is one of cores of structural credit model. RAT is the numerical score of a firm's S&P credit rating. A higher value of RAT variable represents a higher credit risk (lower credit quality). SEC_FRR, I7_SEC_FRR, and I7_SEC_LIQ_FRR represent the readability variables of asset securitization reporting in complete annual report (10-K), Item 7, and Item 7 liquidity section, respectively. Control variables include firm size (SIZE), market-to-book value ratio (MB), financial leverage (LEV), equity volatility (VOL), profit margin (PM), tier-1 capital adequacy ratio (CAP1), audit quality (BIG4, UNQUAL), and the natural logarithm of the complete 10-K document file size (CSTF_SIZE). DISP is the proxy of incomplete information, defined as the dispersion in analyst earnings forecasts. The fixed effects are considered in these results. This table presents the model standardized regression coefficients (path coefficients) and R-squared. The t-statistics for each coefficient appears immediately underneath. The signs of “*, **, ***” represent the significance of 10%, 5%, and 1%, respectively.

	(1) DISP	(2) RAT	(3) DISP	(4) RAT	(5) DISP	(6) RAT	(7) DISP	(8) RAT	(9) DISP	(10) RAT	(11) DISP	(12) RAT
SEC_FK	0.0927** (2.56)	0.2027*** (7.20)										
I7_SEC_FK			0.1458** (4.19)	0.1849*** (6.63)								
I7_SEC_LIQ_FK					0.0841** (2.34)	0.1463*** (5.20)						
SEC_SMOG							0.0921** (2.54)	0.2033*** (7.39)				
I7_SEC_SMOG									0.1485*** (4.25)	0.1967*** (7.20)		
I7_SEC_LIQ_SMOG											0.0692* (1.92)	0.1532*** (5.48)
SIZE		-0.6855*** (-21.28)		-0.6910*** (-21.22)		-0.6699*** (-19.53)		-0.6706*** (-21.01)		-0.6796*** (-21.17)		-0.6626*** (-19.40)
MB		-0.3030*** (-7.65)		-0.2890*** (-7.29)		-0.3054*** (-7.23)		-0.2896*** (-7.36)		-0.2781*** (-7.08)		-0.3080*** (-7.30)
LEV		0.1016*** (2.79)		0.1060*** (2.90)		0.1280*** (3.32)		0.1056*** (2.92)		0.1064*** (2.93)		0.1265*** (3.29)
VOL		0.1248*** (4.62)		0.1203*** (4.43)		0.1227*** (4.29)		0.1230*** (4.56)		0.1188*** (4.40)		0.1224*** (4.29)
PM		-0.0727** (-2.23)		-0.0631* (-1.92)		-0.0463 (-1.33)		-0.0747** (-2.29)		-0.0658** (-2.02)		-0.0447 (-1.29)
BIG4		-0.0383 (-0.40)		-0.0273 (-0.28)		-0.0519 (0.53)		-0.0255 (-0.27)		-0.0197 (-0.21)		0.0592 (0.61)
UNQUAL		-0.2118*** (-4.22)		-0.1999*** (-3.96)		-0.1870*** (-3.48)		-0.2150*** (-4.29)		-0.1997*** (-3.97)		-0.1880*** (-3.50)
CAP1		0.0095 (0.33)		-0.0014 (-0.05)		-0.0019 (-0.06)		0.0092 (0.32)		-0.0027 (-0.09)		-0.0012 (-0.04)
CSTF_SIZE		0.0569 (0.79)		0.0555 (0.76)		0.0571 (0.74)		0.0479 (0.66)		0.0410 (0.57)		0.0681 (0.88)
DISP		0.1518*** (5.02)		0.1467*** (4.82)		0.1564*** (4.90)		0.1493*** (4.95)		0.1435*** (4.74)		0.1565*** (4.92)
Observations	724	724	724	724	680	680	724	724	724	724	680	680
Adjusted R ²	0.1796	0.5545	0.1921	0.5498	0.1686	0.5325	0.1795	0.5561	0.1927	0.5546	0.1663	0.5345

**Table 7. Endogeneity Discussions in the Relation between Asset Securitization Reporting Readability and Credit Risk
(Two-Stage Regressions)**

This table shows the results of two-stage regressions with credit risk (RAT) as the dependent variable against asset securitization reporting readability variables (SEC_FRR, I7_SEC_FRR, I7_SEC_LIQ_FRR; FRR=FK, SMOG) using data observations during the period from 2000 to 2016. SEC_FRR, I7_SEC_FRR, and I7_SEC_LIQ_FRR represent the readability variables of asset securitization reporting in complete annual report (10-K), Item 7, and Item 7 liquidity section, respectively. Control variables include firm size (SIZE), market-to-book value ratio (MB), financial leverage (LEV), equity volatility (VOL), profit margin (PM), tier-1 capital adequacy ratio (CAP1), audit quality (BIG4, UNQUAL), and the natural logarithm of the complete 10-K document file size (CSTF_SIZE). The instrumental variables are the average of prior one-year readability variables of industrial peers in the same state (IV_SEC_FRR, IV_I7_SEC_FRR, IV_I7_SEC_LIQ_FRR; FRR=FK, SMOG). P_SEC_FRR, P_I7_SEC_FRR, and P_I7_SEC_LIQ_FRR are the predicted values of the first-stage regression. The t-statistics (z-statistics) are calculated by the firm-level clustered standard errors for each coefficient and appears immediately underneath. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	(1) SEC_FK	(2) RAT	(3) I7_SEC_FK	(4) RAT	(5) I7_SEC_LIQ_FK	(6) RAT	(7) SEC_SMOG	(8) RAT	(9) I7_SEC_SMOG	(10) RAT	(11) I7_SEC_LIQ_SMOG	(12) RAT
IV_SEC_FK	0.7957*** (5.01)											
P_SEC_FK		0.2997* (1.84)										
IV_I7_SEC_FK			0.6379*** (5.72)									
P_I7_SEC_FK				0.2668* (1.91)								
IV_I7_SEC_LIQ_FK					0.9250*** (10.16)							
P_I7_SEC_LIQ_FK						0.2185*** (3.47)						
IV_SEC_SMOG							0.8252*** (4.58)					
P_SEC_SMOG								0.4067** (2.07)				
IV_I7_SEC_SMOG									0.6981*** (6.45)			
P_I7_SEC_SMOG										0.3506** (2.08)		
IV_I7_SEC_LIQ_SMOG											0.9577*** (10.55)	
P_I7_SEC_LIQ_SMOG												0.2561*** (3.19)
SIZE	0.0282 (0.34)	-0.6736*** (-6.84)	0.1358 (1.59)	-0.6970*** (-6.35)	0.0895 (0.71)	-0.6551*** (-6.41)	-0.0189 (-0.32)	-0.6530*** (-6.65)	0.0592 (0.96)	-0.6789*** (-6.41)	0.0266 (0.27)	-0.6271*** (-6.24)
MB	0.2255* (1.95)	-0.4986*** (-2.86)	0.2545 (1.51)	-0.4754*** (-2.74)	0.6100 (1.60)	-0.5747*** (-3.14)	0.1324 (1.39)	-0.4820*** (-2.82)	0.1255 (0.93)	-0.4519*** (-2.67)	0.4656 (1.47)	-0.5559*** (-3.06)
LEV	1.2327** (2.07)	-0.5013 (-0.50)	2.1115** (2.64)	-0.6162 (-0.64)	0.6174 (0.47)	-0.5540 (-0.54)	0.7631* (1.68)	-0.4755 (-0.48)	1.3372** (2.31)	-0.5631 (-0.58)	0.5085 (0.54)	-0.4988 (-0.49)
VOL	-0.0296 (-1.14)	0.2881** (2.33)	-0.0087 (-0.28)	0.2644** (2.15)	0.0687 (1.07)	0.2460** (2.03)	-0.0138 (-0.73)	0.2808** (2.32)	-0.0032 (-0.15)	0.2597** (2.10)	0.0533 (1.16)	0.2505** (2.08)
PM		-1.1243** (-2.35)		-1.0848** (-2.27)		-0.9680** (-2.10)		-1.1202** (-2.35)		-1.0844** (-2.27)		-0.9383** (-2.02)
BIG4		-0.1247 (-0.41)		-0.1211 (-0.42)		0.1750 (0.62)		-0.1111 (-0.38)		-0.1211 (-0.43)		0.1792 (0.62)
UNQUAL		-0.6185** (-2.52)		-0.6023** (-2.40)		-0.6503** (-2.40)		-0.6310** (-2.53)		-0.6107** (-2.43)		-0.6429** (-2.38)
CAP1		-0.7261 (-0.81)		-0.7868 (-0.89)		-0.7897 (-0.95)		-0.7553 (-0.86)		-0.8131 (-0.93)		-0.8233 (-0.99)
CSTF_SIZE		0.0829 (0.77)		0.0745 (0.70)		0.0812 (0.72)		0.0748 (0.69)		0.0645 (0.60)		0.0732 (0.64)
Constant	2.1152 (0.91)		2.5746 (1.60)		-1.1000 (-0.56)		2.6367 (0.90)		3.4413* (1.96)		-0.6661 (-0.35)	
Observations	818	818	818	818	774	774	818	818	818	818	774	774
Pseudo R ²	0.3852	0.1654	0.3605	0.1654	0.2920	0.1648	0.3616	0.1661	0.3730	0.1665	0.3003	0.1633
F-statistic	25.13 (p < 0.001)		32.69 (p < 0.001)		103.17 (p < 0.001)		20.99 (p < 0.001)		41.59 (p < 0.001)		111.41 (p < 0.001)	

**Table 8. The Effects of Asset Securitization Reporting Readability on Credit Risk:
Regulatory Change Perspective**

This table shows the results of six different panel regressions with a BHC's credit risk (RAT) as the dependent variable against asset securitization reporting readability variables (SEC_FRR, I7_SEC_FRR, I7_SEC_LIQ_FRR; FRR=FK, SMOG) using data observations during the period from 2000 to 2016. SEC_FRR, I7_SEC_FRR, and I7_SEC_LIQ_FRR represent the readability variables of asset securitization reporting in complete annual report (10-K), Item 7, and Item 7 liquidity section, respectively. Control variables include firm size (SIZE), market-to-book value ratio (MB), financial leverage (LEV), equity volatility (VOL), profit margin (PM), tier-1 capital adequacy ratio (CAP1), audit quality (BIG4, UNQUAL), and the natural logarithm of the complete 10-K document file size (CSTF_SIZE). No166 is a dummy variable which equals to 1 if the year of observation is at the implementation of SFAS No.166 (2009), SFAS No.167 (2009), and Dodd-Frank Act (2010). This table presents the model coefficients and Pseudo R-squared. The z-statistics calculated by firm-level clustered standard errors for each coefficient appears immediately underneath. The signs of “*”, “**”, “***” represent the significance of 10%, 5%, and 1%, respectively.

	(1) RAT	(2) RAT	(3) RAT	(4) RAT	(5) RAT	(6) RAT
SEC_FK	0.1439* (1.89)					
SEC_FK*No166	0.1320* (1.86)					
I7_SEC_FK		0.0979 (1.56)				
I7_SEC_FK*No166		0.1719*** (2.70)				
I7_SEC_LIQ_FK			0.1024*** (3.05)			
I7_SEC_LIQ_FK*No166			0.1530* (1.79)			
SEC_SMOG				0.2187** (2.50)		
SEC_SMOG*No166				0.1882* (1.92)		
I7_SEC_SMOG					0.1663** (2.16)	
I7_SEC_SMOG*No166					0.2629*** (2.77)	
I7_SEC_LIQ_SMOG						0.1442*** (3.52)
I7_SEC_LIQ_SMOG*No166						0.1788 (1.56)
SIZE	-0.6483*** (-6.38)	-0.6505*** (-6.26)	-0.6318*** (-6.57)	-0.6413*** (-6.33)	-0.6516*** (-6.27)	-0.6258*** (-6.46)
MB	-0.4623*** (-2.75)	-0.4467*** (-2.71)	-0.5004*** (-3.40)	-0.4589*** (-2.78)	-0.4435*** (-2.76)	-0.5079*** (-3.53)
LEV	-0.2756 (-0.28)	-0.2793 (-0.28)	-0.2530 (-0.24)	-0.2873 (-0.29)	-0.3199 (-0.32)	-0.2610 (-0.25)
VOL	0.2804** (2.31)	0.2709** (2.25)	0.2650** (2.26)	0.2781** (2.31)	0.2695** (2.22)	0.2644** (2.25)
PM	-1.1496** (-2.40)	-1.0652** (-2.25)	-0.8317* (-1.67)	-1.1708** (-2.47)	-1.0775** (-2.26)	-0.7910 (-1.58)
BIG4	-0.0867 (-0.28)	-0.0890 (-0.31)	0.0314 (0.11)	-0.0919 (-0.30)	-0.0936 (-0.33)	0.0589 (0.21)
UNQUAL	-0.5886** (-2.42)	-0.5336** (-2.28)	-0.4921* (-1.88)	-0.5874** (-2.43)	-0.5228** (-2.27)	-0.4959* (-1.90)
CAP1	-0.8024 (-0.92)	-0.9444 (-1.15)	-0.8824 (-1.11)	-0.7904 (-0.90)	-0.9609 (-1.17)	-0.8603 (-1.07)
CSTF_SIZE	0.0689 (0.63)	0.0660 (0.61)	0.0609 (0.54)	0.0626 (0.57)	0.0573 (0.52)	0.0761 (0.67)
No166 Controlled	YES	YES	YES	YES	YES	YES
Observations	818	818	774	818	818	774
Pseudo R ²	0.1662	0.1652	0.1667	0.1685	0.1682	0.1677

Table 9-1. The Effects of Asset Securitization Reporting Readability on Credit Risk: Perspectives of Asset Securitization Characteristics

This table shows the results of eight different panel regressions with a BHC's credit risk (RAT) as the dependent variable against asset securitization reporting readability variables (SEC_FRR, I7_SEC_FRR, I7_SEC_LIQ_FRR; FRR=FK, SMOG) using data observations during the period from 2000 to 2016. SEC_FRR, I7_SEC_FRR, and I7_SEC_LIQ_FRR represent the readability variables of asset securitization reporting in complete annual report (10-K), Item 7, and Item 7 liquidity section, respectively. Control variables include firm size (SIZE), market-to-book value ratio (MB), financial leverage (LEV), equity volatility (VOL), profit margin (PM), tier-1 capital adequacy ratio (CAP1), audit quality (BIG4, UNQUAL), and the natural logarithm of the complete 10-K document file size (CSTF_SIZE). MRI (COMMRI, CONSRI) is defined as total retained interests from mortgage (consumer loan, commercial loan) securitizations divided by market value of equity. ARI is the sum of credit-enhancing interest-only strips and retained subordinated securitizations divided by market value of equity. This table presents the model coefficients and Pseudo R-squared. The z-statistics calculated by firm-level clustered standard errors for each coefficient appears immediately underneath. The signs of ***, **, **** represent the significance of 10%, 5%, and 1%, respectively.

	(1) RAT	(2) RAT	(3) RAT	(4) RAT	(5) RAT	(6) RAT	(7) RAT	(8) RAT	(9) RAT	(10) RAT	(11) RAT	(12) RAT
SEC_SMOG	0.3173*** (4.27)	0.3029*** (3.90)	0.3056*** (3.94)	0.3153*** (4.25)								
SEC_SMOG*ARI	-7.3156*** (-4.65)											
ARI	133.3167*** (5.22)				64.4594*** (3.77)				41.4912 (1.34)			
SEC_SMOG*MRI		17.6328 (0.36)										
MRI		-279.3844 (-0.34)				47.8457 (0.25)					-135.4354 (-0.40)	
SEC_SMOG*COMMRI			16.9346 (0.48)									
COMMRI			-254.9634 (-0.43)					-314.8658 (-0.92)			112.3249 (0.77)	
SEC_SMOG*CONSRI				-7.2811*** (-4.57)								
CONSRI				132.4571*** (5.12)					64.6423*** (3.54)			40.4471 (1.25)
I7_SEC_SMOG					0.2469*** (3.52)	0.2399*** (3.33)	0.2374*** (3.31)	0.2461*** (3.52)				
I7_SEC_SMOG*ARI					-3.3481*** (-3.53)							
I7_SEC_SMOG*MRI						-1.7949 (-0.16)						
I7_SEC_SMOG*COMMRI							20.6354 (0.99)					
I7_SEC_SMOG*CONSRI								-3.3726*** (-3.36)				
I7_SEC_LIQ_SMOG									0.1348*** (3.14)	0.1346*** (3.10)	0.1369*** (3.20)	0.1352*** (3.17)
I7_SEC_LIQ_SMOG*ARI									-1.9964 (-1.14)			
I7_SEC_LIQ_SMOG*MRI										8.8685 (0.45)		
I7_SEC_LIQ_SMOG*COMMRI											-5.2163 (-0.60)	
I7_SEC_LIQ_SMOG*CONSRI												-1.9464 (-1.08)
SIZE	-0.7969*** (-7.38)	-0.7638*** (-7.04)	-0.7735*** (-7.01)	-0.7921*** (-7.29)	-0.8061*** (-7.24)	-0.7749*** (-6.97)	-0.7869*** (-6.93)	-0.8017*** (-7.16)	-0.7626*** (-6.82)	-0.7325*** (-6.82)	-0.7384*** (-6.74)	-0.7584*** (-6.96)
MB	-0.5545*** (-3.30)	-0.5605*** (-3.37)	-0.5632*** (-3.36)	-0.5585*** (-3.33)	-0.5314*** (-3.32)	-0.5392*** (-3.37)	-0.5418*** (-3.35)	-0.5356*** (-3.35)	-0.5703*** (-3.77)	-0.5823*** (-3.77)	-0.5838*** (-3.80)	-0.5748*** (-3.71)
LEV	1.2317* (1.65)	1.1435 (1.50)	1.1271 (1.50)	1.2702* (1.69)	1.1754 (1.55)	1.0945 (1.41)	1.0933 (1.43)	1.2100 (1.43)	1.3011* (1.67)	1.2339 (1.57)	1.2329 (1.58)	1.3302* (1.71)
VOL	0.1839*** (3.53)	0.1863*** (3.42)	0.1880*** (3.39)	0.1823*** (3.51)	0.1700*** (3.17)	0.1739*** (3.05)	0.1756*** (3.06)	0.1687*** (3.15)	0.1715*** (3.39)	0.1768*** (3.22)	0.1771*** (3.21)	0.1704*** (3.38)
PM	-1.4813*** (-2.95)	-1.5555*** (-3.02)	-1.5742*** (-3.05)	-1.4672*** (-2.93)	-1.3761*** (-2.61)	-1.4011*** (-2.61)	-1.4179*** (-2.64)	-1.3599*** (-2.60)	-1.0487*** (-2.09)	-1.1021*** (-2.12)	-1.1118*** (-2.13)	-1.0345*** (-2.07)
BIG4	-0.0503 (-0.16)	-0.0556 (-0.17)	-0.0506 (-0.15)	-0.0538 (-0.17)	-0.0647 (-0.22)	-0.0522 (-0.17)	-0.0443 (-0.15)	-0.0661 (-0.22)	0.0828 (0.33)	0.1228 (0.44)	0.1277 (0.43)	0.0815 (0.32)
UNQUAL	-0.7552*** (-3.26)	-0.7660*** (-3.18)	-0.7986*** (-3.50)	-0.7497*** (-3.26)	-0.6719*** (-2.84)	-0.7198*** (-3.11)	-0.7371*** (-3.22)	-0.6688*** (-2.84)	-0.6255*** (-2.39)	-0.6817*** (-2.71)	-0.7016*** (-2.82)	-0.6233*** (-2.40)
CAP1	-0.0455 (-0.07)	0.0426 (0.06)	0.0429 (0.06)	-0.0234 (-0.03)	-0.0234 (-0.03)	-0.1468 (-0.22)	-0.1596 (-0.23)	-0.2065 (-0.32)	-0.1435 (-0.21)	-0.0956 (-0.14)	-0.0807 (-0.12)	-0.1250 (-0.19)
CSTF_SIZE	0.0329 (0.28)	0.0533 (0.45)	0.0462 (0.39)	0.0318 (0.27)	0.0203 (0.18)	0.0448 (0.39)	0.0395 (0.34)	0.0201 (0.18)	0.0469 (0.39)	0.0580 (0.49)	0.0536 (0.45)	0.0455 (0.38)
Observations	786	786	786	786	786	786	786	786	742	742	742	742
Pseudo R ²	0.2206	0.2141	0.2149	0.2197	0.2180	0.2128	0.2135	0.2173	0.2082	0.2042	0.2046	0.2075

Table 9-2. The Effects of Asset Securitization Reporting Readability on Credit Risk: Perspectives of Asset Securitization Characteristics

	(1) RAT	(2) RAT	(3) RAT	(4) RAT	(5) RAT	(6) RAT	(7) RAT	(8) RAT	(9) RAT	(10) RAT	(11) RAT	(12) RAT
SEC_FK	0.2291*** (3.60)	0.2207*** (3.42)	0.2224*** (3.47)	0.2282*** (3.59)								
SEC_FK*ARI	-6.0645*** (-4.04)											
ARI	107.4616*** (4.56)				48.7178*** (4.09)				33.5921 (1.62)			
SEC_FK*MRI		2.3381 (0.08)										
MRI		-21.6191 (-0.04)				69.1001 (0.50)				-35.6509 (-0.18)		
SEC_FK*COMMRI			23.4105 (0.95)									
COMMRI			-347.2395 (-0.87)				-302.5798 (-1.50)				27.1791 (0.22)	
SEC_FK*CONSRI				-6.0826*** (-3.94)								
CONSRI				107.4673*** (4.44)				48.9074*** (3.89)				33.1832 (1.56)
I7_SEC_FK					0.1628*** (2.89)	0.1597*** (2.82)	0.1579*** (2.81)	0.1625*** (2.90)				
I7_SEC_FK*ARI					-2.5399*** (-3.83)							
I7_SEC_FK*MRI						-3.2903 (-0.39)						
I7_SEC_FK*COMMRI							21.2141 (1.60)					
I7_SEC_FK*CONSRI								-2.5641*** (-3.70)				
I7_SEC_LIQ_FK									0.0929*** (2.72)	0.0934*** (2.74)	0.0940*** (2.80)	0.0933*** (2.75)
I7_SEC_LIQ_FK*ARI									-1.5739 (-1.31)			
I7_SEC_LIQ_FK*MRI										3.0671 (0.25)		
I7_SEC_LIQ_FK*COMMRI											-0.1148 (-0.02)	
I7_SEC_LIQ_FK*CONSRI												-1.5583 (-1.27)
SIZE	-0.8100*** (-7.82)	-0.7764*** (-7.45)	-0.7906*** (-7.44)	-0.8059*** (-7.73)	-0.8096*** (-7.60)	-0.7780*** (-7.32)	-0.7924*** (-7.29)	-0.8053*** (-7.52)	-0.7663*** (-7.11)	-0.7363*** (-6.89)	-0.7436*** (-6.79)	-0.7621*** (-7.03)
MB	-0.5647*** (-3.35)	-0.5732*** (-3.46)	-0.5760*** (-3.43)	-0.5687*** (-3.38)	-0.5381*** (-3.30)	-0.5478*** (-3.37)	-0.5511*** (-3.35)	-0.5424*** (-3.33)	-0.5595*** (-3.52)	-0.5717*** (-3.63)	-0.5724*** (-3.64)	-0.5643*** (-3.55)
LEV	1.2313* (1.66)	1.1362 (1.49)	1.1119 (1.49)	1.2672* (1.70)	1.1953 (1.58)	1.1075 (1.43)	1.0974 (1.44)	1.2293 (1.61)	1.3046* (1.66)	1.2441 (1.57)	1.2424 (1.59)	1.3351* (1.70)
VOL	0.1879*** (3.52)	0.1905*** (3.41)	0.1925*** (3.39)	0.1864*** (3.50)	0.1727*** (3.28)	0.1762*** (3.16)	0.1784*** (3.16)	0.1714*** (3.26)	0.1718*** (3.40)	0.1771*** (3.23)	0.1780*** (3.23)	0.1705*** (3.40)
PM	-1.4484*** (-2.85)	-1.5250*** (-2.94)	-1.5526*** (-2.97)	-1.4360*** (-2.84)	-1.3559*** (-2.58)	-1.3745*** (-2.57)	-1.3931*** (-2.61)	-1.3395*** (-2.57)	-1.0796** (-2.15)	-1.1321** (-2.18)	-1.1465** (-2.20)	-1.0643** (-2.13)
BIG4	-0.0557 (-0.17)	-0.0490 (-0.14)	-0.0416 (-0.12)	-0.0574 (-0.18)	-0.0640 (-0.22)	-0.0447 (-0.14)	-0.0336 (-0.11)	-0.0655 (-0.22)	0.0571 (0.23)	0.1050 (0.35)	0.1111 (0.38)	0.0555 (0.22)
UNQUAL	-0.7519*** (-3.25)	-0.7754*** (-3.28)	-0.7997*** (-3.52)	-0.7470*** (-3.25)	-0.6772*** (-2.83)	-0.7232*** (-3.09)	-0.7404*** (-3.17)	-0.6740*** (-2.83)	-0.6271** (-2.42)	-0.6833*** (-2.73)	-0.7023*** (-2.83)	-0.6249** (-2.42)
CAP1	-0.0425 (-0.06)	0.0509 (0.07)	0.0337 (0.05)	-0.0222 (-0.03)	-0.2161 (-0.33)	-0.1413 (-0.21)	-0.1654 (-0.24)	-0.1956 (-0.30)	-0.1572 (-0.24)	-0.1129 (-0.17)	-0.1078 (-0.16)	-0.1380 (-0.21)
CSTF_SIZE	0.0409 (0.36)	0.0615 (0.53)	0.0559 (0.48)	0.0412 (0.36)	0.0329 (0.29)	0.0552 (0.48)	0.0524 (0.45)	0.0330 (0.29)	0.0377 (0.32)	0.0471 (0.39)	0.0413 (0.34)	0.0360 (0.30)
Observations	786	786	786	786	786	786	786	786	742	742	742	742
Pseudo R ²	0.2186	0.2124	0.2134	0.2179	0.2149	0.2097	0.2106	0.2142	0.2066	0.2024	0.2029	0.2059