US Bank Loan Portfolio Analytics Using Federal Reserve Regulatory Balance Sheet Filings: Methods, Trends, and Research Directions

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***Abstract*—This document is a model and instructions for LaTeX. This and the IEEEtran.cls file define the components of your paper [title, text, heads, etc.]. *CRITICAL: Do Not Use Symbols, Special Characters, Footnotes, or Math in Paper Title or Abstract.**

***Index Terms*—component, formatting, style, styling, insert.**

I. Introduction

As part of its macroprudential and microprudential supervision process mandated post the 2008 Global Financial Crisis, the Federal Reserve requires the Bank Holding Companies(BHCs), Savings and Loan Holding Companies(SLHCs) and Intermediate Holding Companies(IHCs) to file various reports. These reports may be on a daily, monthly , quarterly , annual or on in an as required basis.

All BHCs, SLHCs and IHCs(called Banks hereon) are required to file the FR Y-9C report on a quarterly basis by banks having assets more than $ 50 Billion or more.This information is used by the Federal Reserve(Fed) to monitor the health of the banks in between inspections.[2]

In this paper , we will discuss on the opportunities for analytics given by the vast data provided in the FRY-9C.

A. Role of BHCs in US Credit Market

BHCs by virtue of their size provide the much required stability to the banking system. BHCs provide approximately 63% of the total credit in the US as of 2018 which provide the much needed liquidity to the Credit markets. Also since BHCs are subject to enhanced oversight and so any minor glitches in the performance can attract the attention of regulatory agencies like the Fed.

BHCs also offer the much required diversification since the traditional interest income sources do not offer the required economies of scale for sustainability of banks the size of the BHCs and so BHCs are constantly on the lookout for opportunities to provide risk capital. This activity makes BHCs inherently innovative enabling BHCs to diversify their lending. BHCs lend to diversified obligors like private creditors and also engage in market making and underwriting activities.

All the above make the BHCs systemically important despite their critics saying that the large banks(which were the forefathers of the BHCs) were the cause of the 2008 meltdown.

B. Reason for considering the FR Y-9C data for Bank analysis

The FR Y-9C provides a rich set of data which is available in public in the Federal Financial Institutions Examination Council(FFIEC) website. While the data is provided on an aggregate basis the data has been provided in such a way as to lend itself to further analysis. Further the FR Y-9C is a report which has been specifically designed for Banks and while banks form 63 % of the total credit only, they form the bulk of the data required for the analysis for the purpose of this paper. Below, I present some of the reasons choosing FR Y-9C over reports like SEC 10-Q Report or NCUA Call reports.

C. The FRY-9C Vs the SEC 10-Q

The SEC 10-Q is a quarterly financial report which should be filed by publicly traded companies in the United States.[3] The SEC 10-Q need not be filed by privately held companies. While all banks are publicly traded in the US due to the capital requirements post the 2008 Global Financial Crisis, the SEC-10Q has got limitations in the analysis of banks.The SEC 10-Q report is a freeform report in that it does not have a specific structure. Because it does not have a specific structure unlike most of the Fed Reports which have a specific structure with instructions for each data item or MDRM reported.[4]

The SEC 10-Q is also a report which is more generically tailored for generic company financials, which may include banks as well as non banks. Given that this paper is about bank loans, the SEC 10-Q dataset would be too comprehensive for the purposes of this paper and using the SEC 10-Q data will inject considerable extra effort in the process.

D. The FRY-9C vs the NCUA Call Reports

The National Credit Union Administration(NCUA) requires all Credit Unions to file comprehensive reports at the level of each loan after is available for public consumption its website.

These data dumps provide a wealth of information concerning the invdividual loans lent by each credit union.[5] However since we are interested in the performance of bank loans on an aggregation, we will ignore this dataset for the purposes of this paper. The figure below shows a comparison of the approximate filers for FR Y-9C, SEC 10-Q and the NCUA Call reports. Data taken from [6], [8],[7]

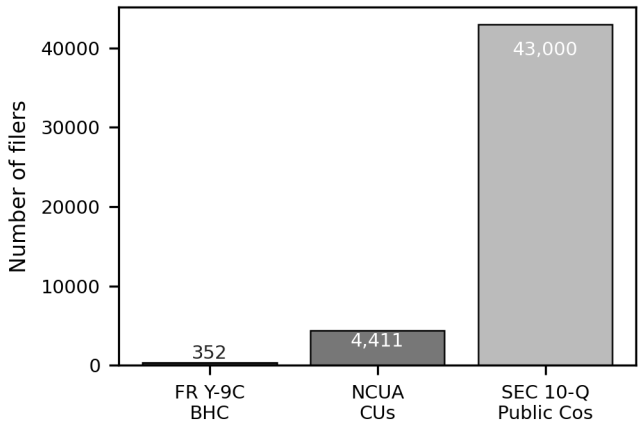

Fig. 1. Filer count FR Y-9C, SEC 10-Q, NCUA Call Reports

II. History of the FR Y-9C

Before I delve into the history of FRY-9C, the concept of a BHC must be explained.

A. The BHC Concept

The concept of a bank holding company(BHC) came into existence during the mid-1920s with the Fed proposing it in 1927 . The Glass Steagall Act of 1933 provided for the separation of the banking and non banking activities adding more teeth to the principle of BHC. Changes to the construct were made in 1970 when the BHC act was amended. The Dodd Frank Act following the Global Financial Crisis of 2008 created more restictions on BHC while bringing in more banks under the cover of a BHC owing to the ease of supervision under the structure of a BHC.[13]

B. The FR Y-9C History

According to the Fed in its website, the report started as FRY-9 in 1978. In 1985 report was changed to act as a parallel report to the call reports which are filed in various capacities by banks. For example Deposit taking banks may based on whether they have foreign offices or not need to file the reports of FFIEC-031 or FFIEC-041 which are called the call reports.

In 1986, the FR Y-9 was split into FR Y-9C (consolidated statement) and FR Y-9LP(Parent company only financial statements) . The threshold for filing the report was changed from $ 150 million to $ 3 billion between 2006 and 2018 in various stages.

The FR Y-9C is required to be filed by BHCs on a quarterly basis in accordance with regulation Y. In 2011, the Dodd Frank Act abolished the Office of Thrift Supervision and SLHCs , except for exempt SLHCs were required to file the FR Y-9C. There was a 2 year phase in period for SLHCs starting Q1 2012 for starting to file FR Y-9C. As per Regulation YY , IHCs of Foreign Banks were also required to file FR Y-9C from 2016.[2]. The data is summarized as table below

TABLE I
Timeline of FR Y-9C Reporting Requirements[2]

Year	Event
1978	Introduction of FR Y-9 report.
1985	Modified to act as parallel to bank Call Reports (FFIEC 031/041).
1986	Split into FR Y-9C (Consolidated) and FR Y-9LP (Parent only).
2006–2018	Filing threshold raised from $150M to $3B.
2011	Dodd-Frank: OTS abolished; SLHCs (except exempt) required to file.
2012–2014	Two-year phase-in for SLHCs starting Q1 2012.
2016	Reg. YY: IHCs of foreign banks required to file.

III. FR Y-9C for Bank Loan Analysis

The FR Y-9C report is apt for data analysis for the following reasons. The FR Y-9C has got a very well defined MDRM structure where there are rules provided in very minute detail for each MDRM in the report. This makes the report consistent and the reliability of data provided by each bank in each of the MDRM is high. In order to maintain consistency of the data, the Fed publishes a set of Edit Checks as well with the FR Y-9C instructions. A section of these Edit Checks must be satisified in order for banks to even submit the report.These checks and consistent clean data reduce a lot of time spent by researchers in processing the data for their analysis.

Also the FR Y-9C report data is available for public consumption in the FFIEC website and so considerable time is reduced in obtaining the required permissions for accessing confidential data. This makes data availability faster.

All the above combined with the rich dataset of around 2000 data points or MDRMs provided in FR Y-9C makes it an ideal candidate for Bank data analysis and in specific BHC Loan data analysis.

IV. Purpose of this paper

This paper attempts to provide a review of the data available in the FR Y-9C report. If the facts provided previously in this paper are taken into consideration and a search is done for scholastic material referencing the FR Y-9C alone, the amount of papers obtained are limited. Given the huge opportunity which lies untapped, this paper attempts to increase the consumption of data from the FR Y-9C for the purposes of research into the behavior of banks and for the economic analyses possible using this very rich dataset provided for free.

Possible areas where FR Y-9C data can be leveraged include usage of FR Y-9C MDRMs as independent variables in the regression equations . Xiangchao et al. [9] use the FR Y-9C data in their investigation to check whether Securitization and CDS have an effect on US Bank Lending . For testing

their hypothesis they use the FR Y-9C, they use data from HC-C(Loans and Lease Financing Receivables), HC-R(Risk Weighted Assets) and HC-S(Securitization) to check if CDS and Securitization affect loans growth.

Abdul-Khalik and P.C. Chen use the derivatives data from FRY-9C to examine the impact of derivative trades before and after FAS133 and the use of derivatives by banks to hedge risk in their paper . [10]

V. Brief description of the schedules of FRY-9C

The FR Y-9C has got 24 schedules with a number of data points called MDRMs within each schedule. The description of each of the schedules are listed below in the table.

TABLE II
FR Y-9C Schedules[2]

Schedule	Description
HI	Consolidated Income Statement
HI-A	Changes in Equity Capital
HI-B	Charge-Offs and Recoveries on Loans and Leases and Changes in Allowances for Credit Losses
HI-C	Disaggregated Data on the Allowance for Credit Losses
ISnotes-P	Notes to the Income Statement — Predecessor Financial Items
ISnotes	Notes to the Income Statement — Other
HC	Consolidated Balance Sheet
HC-B	Securities
HC-C	Loans and Lease Financing Receivables
HC-D	Trading Assets and Liabilities
HC-E	Deposit Liabilities
HC-F	Other Assets
HC-G	Other Liabilities
HC-H	Interest Sensitivity
HC-I	Insurance-Related Underwriting Activities (Including Reinsurance)
HC-K	Quarterly Averages
HC-L	Derivatives and Off-Balance Sheet Items
HC-M	Memoranda
HC-N	Past Due and Nonaccrual Loans, Leases, and Other Assets
HC-P	Closed-End 1-4 Family Residential Mortgage Banking Activities
HC-Q	Financial Assets and Liabilities Measured at Fair Value
HC-R	Regulatory Capital
HC-S	Servicing, Securitization, and Asset Sale Activities
HC-V	Variable Interest Entities

While each schedule might directly or indirectly contribute to the overall loan data the most important schedules which deal with loan data are HC-C Loan and Lease Financing Receivables, HC-N Non Accrual Loans and HC-L Derivatives and Off Balance Sheet items.

A. HC-C Loans and Lease Financing receivables

This section which falls under HC gives details about the Loans and Lease receivables by the bank. Lines 1 to 10 talk about loans post which Lease details kick in. The descriptions of each of the Loan lines is given in Table VII under Appendix.The loans are organized into three sections each section based on Collateral, Borrower and Purpose.

The entire schedule is divided into two columns with one column for the data at a consolidated level and the other for data specifically reported for the domestic offices. Usually MDRMs fall into one or the other category though there are some lines having MDRMs for both categories.

With regard to the individual categories of Collateral, Borrower or Purpose, each MDRM usually falls under one category though the same MDRM falling under two or more categories is also possible.

1) Collateral: The MDRMs under this category have the collateral as one of the following

TABLE III
Collateral Types in HC-C

Collateral Type	Lines which fall under category
Real Estate	1 Col A, 1.a.1 Col B, 1.a.2 Col B,1.b,1.c.1,1.c.2.a,1.c.2.b,1.d,1.e.1,1.e.2
Unsecured Lending	6.a,6.b
Automobile	6.c

2) Borrower: This category has a slight overlap with the type of collateral. Lines under this category are

TABLE IV
Kinds of borrowers with data in HC-C

Borrower Type	Lines which fall under category
Type of occupier	1.e.1 ,1.e.2
Type of banks	2.a,2.b
Farmers	3
Based on address	4.a,4.b
Government institutions	7
Non depository institutions	9.a,9.b.1,9.b.2,9.b.3

3) Purpose: Like the other categories the category of purpose also is split into multiple categories with the type of borrower overlapping with the purpose. Below gives the specific purpose of each of the purpose based detail captured in FR Y-9C

TABLE V
Purpose Segregation in HC-C

Purpose	Lines which fall under category
Agriculture	3.
Commercial and Industrial Loans	4.a,4.b
Personal Expenditure	6
Securities and Financial Transactions	9.b.1,9.b.3

B. HC-N Past Due and Non Accrual Loans and Leases

Schedule HC-N of FR Y-9C provides details about the quality of the loan portfolio of the bank in terms of debt repayments by the counterparties for each loan. This data is provided at an aggregated loan basis. In order to have a consistent view of the performance of each segment of the loan portfolio, HC-C and HC-N have the same row taxonomy till Line 4.

However each MDRM in HC-C corresponds to three MDRMs in HC-N with the exception of the domestic offices MDRM for HC-C Line 3 which has been totally ignored for the purposes of HC-N. The reason for 3 MDRMs is because each line item in HC-C has been split based on the days past due for repayments for each of the loans. There are three buckets defined for days past due. The first bucket is days past due from 30 to 89 and the second bucket is the days past due from 90 to 180. These two buckets have the loan interest still accruing. However if any loan becomes past due beyond 180 days, that particular loan will be classified as non accrual loan which is represented in the third bucket. Please note that loans which dont have a past due status need not be reported in HC-N.

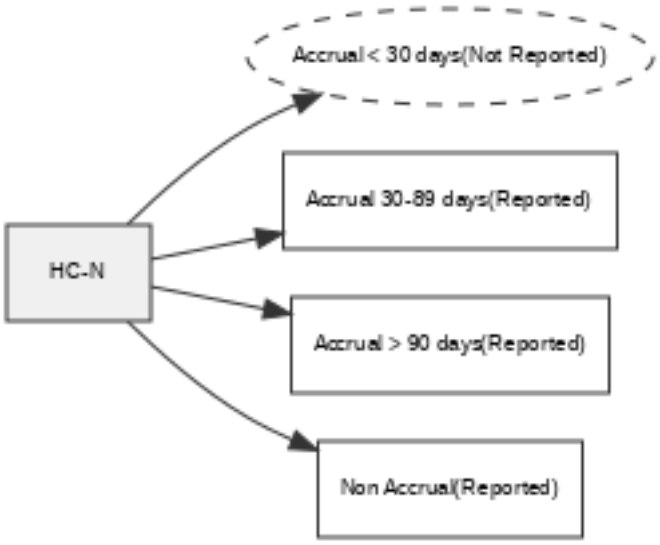

Fig. 2. HC-N Buckets

There are also certain shifts between HC-C and HC-N with regard to line numbers but there will be a relationship between an MDRM in HC-C and HC-N. The Fed does not remove lines when MDRMs are not required for reporting but makes the particular line not applicable to maintain consistency while referring line numbers in the reports. So these redundant MDRMs are removed and the corresponding line numbers are marked non-applicable. Removing the lines in such cases, the nature of the lines in HC-C and HC-N usually similar till Line 8 HC-C. Line 7 in HC-N is the catch all bucket for loans in each status which is unlike Line 9 in HC-C which details loans to non-depository financial institutions.

C. HC-L Derivatives and off balance sheet items

Schedule HC-L of FR Y-9C deals with derivatives and off balance sheet items. While derivatives need not be directly linked to a loan, derivatives can be used for hedging the risks of loans. In this angle, the most important aspects of derivatives covered in HC-L are unused commitments,Letters of Credit and guarantees. The previously mentioned instruments may be provided at a counterparty level and sometimes not exactly explicitly at a loan level. However these can be used as handy means of analytics. Given that all the three mentioned are off balance sheet items , taking these data from FR Y-9C makes the FR Y-9C a very handy for an overall analysis of Off balance sheet items.

The use of these off balance sheet items may be varied. Firms and individuals who have got facilities which are not unconditionally cancellable tend to use these facilities in a higher manner during times of stress similar to individuals using their credit cards higher during times of need.

A letter of credit is an implicit guarantee by the bank stating to pay in case the borrower does not pay. These letters of credit are common in trade finance and again are much sought after instruments spiking in use during economic downturns when trust on the counterparties is at a low.

HC-L data is also used in the CCAR(Comprehensive Capital Analysis and Review) or DFAST(Dodd Frank Annual Stress Test) modeling to model the growth of credit derivatives and other risk mitigants include the use of these instruments during periods of stress. A useful corollary on the use of these contingent instruments is that bank liquidity takes a beating and so we can use liquidity and use of the contingent instruments as a barometer to measure a downturn.

The fees generated out of these contingent instruments form a major part of the non interest income for any bank and so analysis of these commitments provides a better view of the income statements of banks as a whole.

1) Commitments: For the purpose of loan analysis , a commitment refers to a pledge made by the bank to a counterparty to fund a particular amount. Based on the loan contract terms a commitment may be conditionally or unconditionally cancellable.

In the FR Y-9C the lines under line 1 are the lines to be reported under unused commitments. These commitment data can be loosely linked to the HC-C loans to get a better picture of the loan book of the bank. The table below gives an idea of the linkages.

TABLE VI
MAPPING OF HC-L TO EQUIVALENT HC-C LINES

HC-L Line	**Equivalent HC-C Line**	**Remark**
1.a	1.c.1	
1.b.1	6.a	
1.b.2	6.b	
1.c.1.a	1.a.1	
1.c.1.b, 1.c.2	1.a.2	Commercial real estate is included in HC-L but not in equivalent HC-C Line
1.d	No equivalent in HC-C	
1.e.1	4.a, 4.b, 4.c	
1.e.2	2.a, 2.b, 9.a, 9.b.1, 9.b.2, 9.b.3	
1.e.3		Catch all bucket for all other commitments

Since the schedule HC-L of FR Y-9C deals with Off Balance sheet items alone, only the unused portion of the commitments need to be reported.

2) Letters of Credit: Banks are required to report three types of Letters of Credit which are

1. **Financial standby letters of credit** : These are letters of credit which are given to guarantee performance of financial instruments issued by the client. These are irrevocable and long term. These letters of credit are reported in line 2.a of schedule HC-L

2. **Performance standby letters of credit** : These are guarantees which are provided on a contractual basis for the bank's clients for specific contracts where the bank has to pay in case the performance of the client in certain aspects of the contract are not met. These are reported in lines 3 and 3.a

3. **Commercial letters of credit** : These are guarantees for trade finance contracts issued on behalf of client for certain trades and have a smaller scope than performance letters of credit. These are reported in line 4 of HC-L.

3) Credit Derivatives: Credit Derivatives are reported in two sets of lines in Schedule HC-L. These derivatives are usually at a counterparty level though it can be taken at a transaction level as well. Lines 7.a.1 through 7.a.4 report the Notional amounts for Credit Default Swaps(CDS), Total Return Swaps(TRS), Credit Options and other exotic derivatives. While Total Return Swaps are not exactly used in loans, there is a possibility of clients dealing with banks using Total Return Swaps to provide temporary relief and so are taken into the fold of loans.

Given the sensitivity of these Credit Derivatives, multiple aspects of the derivatives are analyzed. 7.a looks at the notional amounts, 7.b looks at the Gross fair value, 7.c looks at the notional amounts by regulatory treatment and 7.d looks at the remaining maturity. In addition the same set of credit derivatives are analyzed by the type of contracts i.e Interest Rate Contracts, Equity Contracts, Foreign Exchange Contracts and Commodity Contracts in lines 11 through 14 in HC-L.

The level of detail gone into for Credit Derivatives provides huge opportunities for analytics. These Credit derivatives may not be directly involved in Loan analytics but can be used in counterparty analytics as required.

D. HI-B Charge offs and Recoveries in Loans and Leases and Allowances for Credit Losses

E. HC-D Trading Assets and Liabilities

VI. Plan of the paper

1. Introduction

Motivation: Why analyze loans at the BHC level?

Role of BHCs in U.S. credit markets. Importance of supervisory datasets for researchers & policymakers.

Introduce FR Y-9C (public, quarterly, rich coverage) as the focal dataset.

Contribution of this review: summarizing what loan analytics are possible from FR Y-9C and highlighting research directions.

2. Overview of the FR Y-9C Dataset

Origin and regulatory purpose of FR Y-9C.

Coverage: which institutions file it, reporting frequency.

Loan-related schedules:

HC-C (Loans and Lease Financing Receivables)

HC-N (Past Due and Nonaccrual Loans)

HC-L (Derivatives and Off-Balance Sheet Items)

Related income statement data (HI-B interest income, provisions).

Comparison with other data sources (Call Reports, FR Y-14Q, FFIEC 002).

Strengths and limitations (public availability vs. lack of loan-level detail).

3. Analytical Themes in Loan Portfolio Research

(Each subsection reviews existing methods, stylized facts, and what FR Y-9C enables)

3.1 Loan Composition and Growth Trends across C&I, CRE, consumer, agricultural, etc.

Concentration vs. diversification.

Business cycle sensitivity of loan growth.

3.2 Credit Risk and Asset Quality

Nonperforming loans, charge-offs, and provisioning.

Loan loss reserves as a measure of expected credit loss.

Stress-period dynamics (e.g., 2008 crisis, COVID-19).

3.3 Profitability and Loan Pricing

Net interest income and yield analysis.

Loan spreads inferred indirectly from interest income vs. loan balances.

Cross-sectional variation by BHC size/class.

3.4 Capital, Liquidity, and Loan Supply

Interaction between capital adequacy and loan growth.

Liquidity positions and loan expansion/contraction.

Links to macroprudential policies.

3.5 Systemic Risk and Interconnectedness

Concentration of lending across sectors.

Role of large vs. small BHCs in systemic credit provision.

Early warning signals from FR Y-9C aggregates.

4. Methodologies for Loan Analytics

Descriptive/statistical analysis (ratios, growth rates, trend decomposition).

Econometric approaches: panel regressions, dynamic models.

Stress-testing style approaches using FR Y-9C data proxies.

Machine learning applications for risk classification.

Comparisons to loan-level data: What's possible with aggregate data vs. FR Y-14Q.

5. Policy and Supervisory Applications

How regulators use FR Y-9C to monitor loan quality.

Applications to CCAR/DFAST stress testing.

Use in financial stability monitoring (aggregate lending conditions).

Implications for macroprudential vs. microprudential supervision.

6. Limitations of FR Y-9C for Loan Analytics

Lack of borrower-level detail.

Challenges in sectoral disaggregation (some categories broad).

Time lags and quarterly frequency.

Comparisons with richer supervisory datasets (Y-14Q, confidential Fed datasets).

7. Future Research Directions

Linking FR Y-9C with other datasets (e.g., Call Reports, Y-15 systemic risk data, market data).

Improving loan risk modeling with aggregate vs. micro data.

Cross-country comparisons of supervisory reporting.

Potential role of RegTech and data standardization for future analytics.

8. Conclusion

Summarize key takeaways from the review.

Emphasize FR Y-9C's role as a public and accessible supervisory dataset.

Call for continued innovation in loan analytics using supervisory filings.

A. Abbreviations and Acronyms

Define abbreviations and acronyms the first time they are used in the text, even after they have been defined in the abstract. Abbreviations such as IEEE, SI, MKS, CGS, ac, dc, and rms do not have to be defined. Do not use abbreviations in the title or heads unless they are unavoidable.

B. Units

- Use either SI (MKS) or CGS as primary units. (SI units are encouraged.) English units may be used as secondary units (in parentheses). An exception would be the use of English units as identifiers in trade, such as "3.5-inch disk drive".
- Avoid combining SI and CGS units, such as current in amperes and magnetic field in oersteds. This often leads to confusion because equations do not balance dimensionally. If you must use mixed units, clearly state the units for each quantity that you use in an equation.
- Do not mix complete spellings and abbreviations of units: "Wb/m^2" or "webers per square meter", not "webers/m^2". Spell out units when they appear in text: ". . . a few henries", not ". . . a few H".
- Use a zero before decimal points: "0.25", not ".25". Use "cm^3", not "cc".)

C. Equations

Number equations consecutively. To make your equations more compact, you may use the solidus (/), the exp function, or appropriate exponents. Italicize Roman symbols for quantities and variables, but not Greek symbols. Use a long dash rather than a hyphen for a minus sign. Punctuate equations with commas or periods when they are part of a sentence, as in:

$$a + b = \gamma \tag{1}$$

Be sure that the symbols in your equation have been defined before or immediately following the equation. Use "(1)", not "Eq. (1)" or "equation (1)", except at the beginning of a sentence: "Equation (1) is . . ."

D. LaTeX-Specific Advice

Please use "soft" (e.g., `\eqref{Eq}`) cross references instead of "hard" references (e.g., `(1)`). That will make it possible to combine sections, add equations, or change the order of figures or citations without having to go through the file line by line.

Please don't use the `{eqnarray}` equation environment. Use `{align}` or `{IEEEeqnarray}` instead. The `{eqnarray}` environment leaves unsightly spaces around relation symbols.

Please note that the `{subequations}` environment in LaTeX will increment the main equation counter even when there are no equation numbers displayed. If you forget that, you might write an article in which the equation numbers skip from (17) to (20), causing the copy editors to wonder if you've discovered a new method of counting.

BibTeX does not work by magic. It doesn't get the bibliographic data from thin air but from .bib files. If you use BibTeX to produce a bibliography you must send the .bib files.

LaTeX can't read your mind. If you assign the same label to a subsubsection and a table, you might find that Table I has been cross referenced as Table IV-B3.

LaTeX does not have precognitive abilities. If you put a `\label` command before the command that updates the counter it's supposed to be using, the label will pick up the last counter to be cross referenced instead. In particular, a `\label` command should not go before the caption of a figure or a table.

Do not use `\nonumber` inside the `{array}` environment. It will not stop equation numbers inside `{array}` (there won't be any anyway) and it might stop a wanted equation number in the surrounding equation.

E. Some Common Mistakes

- The word "data" is plural, not singular.
- The subscript for the permeability of vacuum μ_0, and other common scientific constants, is zero with subscript formatting, not a lowercase letter "o".
- In American English, commas, semicolons, periods, question and exclamation marks are located within quotation marks only when a complete thought or name is cited, such as a title or full quotation. When quotation marks are used, instead of a bold or italic typeface, to highlight a word or phrase, punctuation should appear outside of the quotation marks. A parenthetical phrase or statement at the end of a sentence is punctuated outside of the closing parenthesis (like this). (A parenthetical sentence is punctuated within the parentheses.)
- A graph within a graph is an "inset", not an "insert". The word alternatively is preferred to the word "alternately" (unless you really mean something that alternates).
- Do not use the word "essentially" to mean "approximately" or "effectively".
- In your paper title, if the words "that uses" can accurately replace the word "using", capitalize the "u"; if not, keep using lower-cased.

- Be aware of the different meanings of the homophones “affect” and “effect”, “complement” and “compliment”, “discreet” and “discrete”, “principal” and “principle”.
- Do not confuse “imply” and “infer”.
- The prefix “non” is not a word; it should be joined to the word it modifies, usually without a hyphen.
- There is no period after the “et” in the Latin abbreviation “et al.”.
- The abbreviation “i.e.” means “that is”, and the abbreviation “e.g.” means “for example”.

An excellent style manual for science writers is [**?**].

F. Authors and Affiliations

The class file is designed for, but not limited to, six authors. A minimum of one author is required for all conference articles. Author names should be listed starting from left to right and then moving down to the next line. This is the author sequence that will be used in future citations and by indexing services. Names should not be listed in columns nor group by affiliation. Please keep your affiliations as succinct as possible (for example, do not differentiate among departments of the same organization).

G. Identify the Headings

Headings, or heads, are organizational devices that guide the reader through your paper. There are two types: component heads and text heads.

Component heads identify the different components of your paper and are not topically subordinate to each other. Examples include Acknowledgments and References and, for these, the correct style to use is “Heading 5”. Use “figure caption” for your Figure captions, and “table head” for your table title. Run-in heads, such as “Abstract”, will require you to apply a style (in this case, italic) in addition to the style provided by the drop down menu to differentiate the head from the text.

Text heads organize the topics on a relational, hierarchical basis. For example, the paper title is the primary text head because all subsequent material relates and elaborates on this one topic. If there are two or more sub-topics, the next level head (uppercase Roman numerals) should be used and, conversely, if there are not at least two sub-topics, then no subheads should be introduced.

H. Figures and Tables

a) Positioning Figures and Tables: Place figures and tables at the top and bottom of columns. Avoid placing them in the middle of columns. Large figures and tables may span across both columns. Figure captions should be below the figures; table heads should appear above the tables. Insert figures and tables after they are cited in the text. Use the abbreviation “Fig. 3”, even at the beginning of a sentence.

Figure Labels: Use 8 point Times New Roman for Figure labels. Use words rather than symbols or abbreviations when writing Figure axis labels to avoid confusing the reader. As an example, write the quantity “Magnetization”, or “Magnetization, M”, not just “M”. If including units in the label, present them within parentheses. Do not label axes only with units. In the example, write “Magnetization (A/m)” or “Magnetization {A[m(1)]}”, not just “A/m”. Do not label axes with a ratio of quantities and units. For example, write “Temperature (K)”, not “Temperature/K”.

TABLE VII
TABLE TYPE STYLES

Table Head	Table Column Head		
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[a]Sample of a Table footnote.

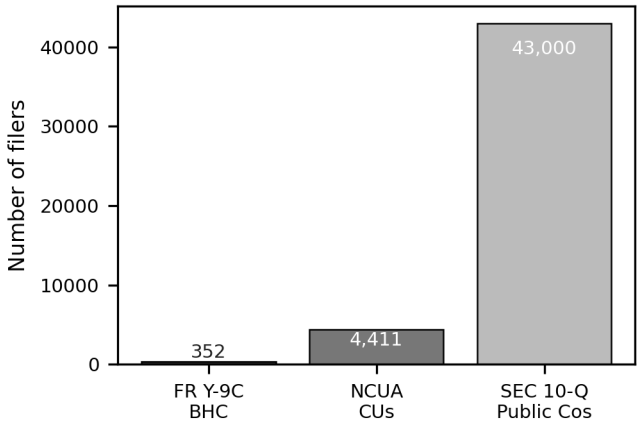

Fig. 3. Filer count FR Y-9C, SEC 10-Q, NCUA Call Reports

ACKNOWLEDGMENT

The preferred spelling of the word “acknowledgment” in America is without an “e” after the “g”. Avoid the stilted expression “one of us (R. B. G.) thanks . . .”. Instead, try “R. B. G. thanks. . .”. Put sponsor acknowledgments in the unnumbered footnote on the first page.

REFERENCES

Please number citations consecutively within brackets [**?**]. The sentence punctuation follows the bracket [**?**]. Refer simply to the reference number, as in [**?**]—do not use “Ref. [**?**]” or “reference [**?**]” except at the beginning of a sentence: “Reference [**?**] was the first . . .”

Number footnotes separately in superscripts. Place the actual footnote at the bottom of the column in which it was cited. Do not put footnotes in the abstract or reference list. Use letters for table footnotes.

Unless there are six authors or more give all authors’ names; do not use “et al.”. Papers that have not been published, even if they have been submitted for publication, should be cited as “unpublished” [**?**]. Papers that have been accepted for publication should be cited as “in press” [**?**]. Capitalize only

the first word in a paper title, except for proper nouns and element symbols.

For papers published in translation journals, please give the English citation first, followed by the original foreign-language citation [**?**].

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VII. Appendix

A. Appendix I - Line descriptions in HC-C for Loan relevant lines

B. Line descriptions for Loan relevant lines in HC-L

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TABLE VIII
HC-C LOAN CATEGORIES AND DESCRIPTIONS

Line	Description
1	Loans secured by real estate.
1.a.1	Construction, land development, and other land loans: 1-4 family residential construction loans.
1.a.2	Construction, land development, and other land loans: Other construction loans and all land development and other land loans.
1.b	Secured by farmland.
1.c.1	Secured by 1–4 family residential properties: Revolving, open-end loans secured by 1–4 family residential properties and extended under lines of credit.
1.c.2.a	Secured by 1–4 family residential properties: Closed-end loans secured by 1–4 family residential properties — Secured by first liens.
1.c.2.b	Secured by 1–4 family residential properties: Closed-end loans secured by 1–4 family residential properties — Secured by junior liens.
1.d	Secured by multifamily (5 or more) residential properties.
1.e.1	Secured by nonfarm nonresidential properties — Loans secured by owner-occupied nonfarm nonresidential properties.
1.e.2	Secured by nonfarm nonresidential properties — Loans secured by other nonfarm nonresidential properties.
2.a	Loans to depository institutions and acceptances of other banks — To U.S. banks and other U.S. depository institutions.
2.b	Loans to depository institutions and acceptances of other banks — To foreign banks.
3 Col A	Loans to finance agricultural production and other loans to farmers — Consolidated level.
3 Col B	Loans to finance agricultural production and other loans to farmers — Domestic level.
4.a	Commercial and Industrial loans — To U.S. addresses (domicile).
4.b	Commercial and Industrial loans — To non-U.S. addresses (domicile).
4.c	Commercial and Industrial loans — To U.S. addressees and non - US Addresses (domicile).
6.a	Loans to individuals for household, family, and other personal expenditures (consumer loans) (includes purchased paper) — Credit cards.
6.b	Loans to individuals for household, family, and other personal expenditures (consumer loans) (includes purchased paper) — Other revolving credit plans.
6.c	Loans to individuals for household, family, and other personal expenditures (consumer loans) (includes purchased paper) — Automobile loans.
6.d	Loans to individuals for household, family, and other personal expenditures (consumer loans) (includes purchased paper) — Other consumer loans (includes single payment, installment, and student loans).
7 Col A	Loans to foreign governments and official institutions (including foreign central banks) — Consolidated level.
7 Col B	Loans to foreign governments and official institutions (including foreign central banks) — Domestic office level.
9.a Col A	Loans to nondepository financial institutions and other loans: Loans to nondepository financial institutions — Consolidated.
9.a Col B	Loans to nondepository financial institutions and other loans: Loans to nondepository financial institutions — Domestic offices.
9.b.1 Col A	Loans to nondepository financial institutions and other loans: Other loans — Loans for purchasing and carrying securities (secured or unsecured) — Consolidated.
9.b.1 Col B	Loans to nondepository financial institutions and other loans: Other loans — Loans for purchasing and carrying securities (secured or unsecured) — Domestic offices.
9.b.2 Col A	Loans to nondepository financial institutions and other loans: All other loans (exclude consumer loans) — Consolidated.
9.b.2 Col B	Loans to nondepository financial institutions and other loans: All other loans (exclude consumer loans) — Domestic offices.
9.b.3 Col A	Loans to nondepository financial institutions and other loans: Loans for purchasing or carrying securities (secured and unsecured) and all other loans — Consolidated.
9.b.3 Col B	Loans to nondepository financial institutions and other loans: Loans for purchasing or carrying securities (secured and unsecured) and all other loans — Domestic offices.

TABLE IX
SCHEDULE HC-L SELECTED LINE ITEMS (UNUSED COMMITMENTS, STANDBY LETTERS, CREDIT DERIVATIVES)

Line	Description
1.a	Unused commitments: Revolving, open-end loans secured by 1–4 family residential properties (e.g., home equity lines)
1.b.(1)	Unused commitments: Consumer credit card lines
1.b.(2)	Unused commitments: Other unused credit card lines
1.c.(1)	Unused commitments: Commitments to fund commercial real estate, construction, and land development loans secured by real estate (sum of items 1.c.(1)(a) and (b) must equal item 1.c.(1))
1.c.(1)(a)	Unused commitments: 1–4 family residential construction loan commitments
1.c.(1)(b)	Unused commitments: Commercial real estate, other construction loan, and land development loan commitments
1.c.(2)	Unused commitments: Commitments to fund commercial real estate, construction, and land development loans NOT secured by real estate
1.d	Unused commitments: Securities underwriting
1.e.(1)	Unused commitments: Commercial and industrial loans
1.e.(2)	Unused commitments: Loans to financial institutions
1.e.(3)	Unused commitments: All other unused commitments
2.a	Financial standby letters of credit and foreign office guarantees. Amount of financial standby letters of credit conveyed to others (for BHCs with $5 billion+ in total assets)
3	Performance standby letters of credit and foreign office guarantees
3.a	Amount of performance standby letters of credit conveyed to others (for BHCs with $5 billion+ in total assets)
4	Commercial and similar letters of credit
7	Credit derivatives
7.a.(1) Col A	Credit derivatives: Notional amounts — Credit default swaps (Sold Protection)
7.a.(1) Col B	Credit derivatives: Notional amounts — Credit default swaps (Purchased Protection)
7.a.(2) Col A	Credit derivatives: Notional amounts — Total return swaps (Sold Protection)
7.a.(2) Col B	Credit derivatives: Notional amounts — Total return swaps (Purchased Protection)
7.a.(3) Col A	Credit derivatives: Notional amounts — Credit options (Sold Protection)
7.a.(3) Col B	Credit derivatives: Notional amounts — Credit options (Purchased Protection)
7.a.(4) Col A	Credit derivatives: Notional amounts — Other credit derivatives (Sold Protection)
7.a.(4) Col B	Credit derivatives: Notional amounts — Other credit derivatives (Purchased Protection)
7.b.(1) Col A	Credit derivatives: Gross fair values — Gross positive fair value (Sold Protection)
7.b.(1) Col B	Credit derivatives: Gross fair values — Gross positive fair value (Purchased Protection)
7.b.(2) Col A	Credit derivatives: Gross fair values — Gross negative fair value (Sold Protection)
7.b.(2) Col B	Credit derivatives: Gross fair values — Gross negative fair value (Purchased Protection)
7.c.(1)(a) Col A	Credit derivatives: Notional amounts by regulatory capital treatment — Market Risk Rule: Sold protection (Sold Protection)
7.c.(1)(a) Col B	Credit derivatives: Notional amounts by regulatory capital treatment — Market Risk Rule: Sold protection (Purchased Protection)
7.c.(1)(b) Col A	Credit derivatives: Notional amounts by regulatory capital treatment — Market Risk Rule: Purchased protection (Sold Protection)
7.c.(1)(b) Col B	Credit derivatives: Notional amounts by regulatory capital treatment — Market Risk Rule: Purchased protection (Purchased Protection)
7.c.(2)(a) Col A	Credit derivatives: Notional amounts by regulatory capital treatment — All other positions: Sold protection (Sold Protection)
7.c.(2)(a) Col B	Credit derivatives: Notional amounts by regulatory capital treatment — All other positions: Sold protection (Purchased Protection)
7.c.(2)(b) Col A	Credit derivatives: Notional amounts by regulatory capital treatment — All other positions: Purchased protection recognized for capital purposes (Sold Protection)
7.c.(2)(b) Col B	Credit derivatives: Notional amounts by regulatory capital treatment — All other positions: Purchased protection recognized for capital purposes (Purchased Protection)
7.c.(2)(c) Col A	Credit derivatives: Notional amounts by regulatory capital treatment — All other positions: Purchased protection not recognized for capital purposes (Sold Protection)
7.c.(2)(c) Col B	Credit derivatives: Notional amounts by regulatory capital treatment — All other positions: Purchased protection not recognized for capital purposes (Purchased Protection)