Assessment of Mortgage-Backed Securities and Trading for Bank of America

A Major Qualifying Report

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Abstract

Bank of America is currently facing major changes to their mortgage trading floor. Financial Industry Regulatory Authority (FINRA) has proposed their reporting system, Trade Reporting and Compliance Engine (TRACE), to be implemented in May of 2011 which requires firms to report information on all trades of Mortgage-Backed Securities. Because of these new requirements, Bank of America has needed to assess their current state at the desks and determine what alterations will need to be made before TRACE goes live. The goal of this project was to study the TRACE documents provided by FINRA, evaluate the workflow of the desks, provide detailed summaries and maps created from those studies, and supply recommendations for change which will further them in their goal of meeting the regulation requirements.

Acknowledgements

We would like to thank Jason Tondreau for all of his support and guidance during our time at Bank of America. We would also like to thank Professor Wang and Professor Gerstenfeld, who offered great comments and suggestions during our PQP work in A-term and made themselves available for direction while we were at Bank of America in B-term. And last, we want to especially thank Bank of America for all of the resources they made available to us in order to make this a successful project.

Authorship

The research and recommendations that were developed as well as the written work on the report were created with equal contributions by both team members, Emily Herries and Jacob DeLew.

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Executive Summary

Problem Statement

Bank of America faces meeting new regulations from the Financial Industry Regulatory Authority (FINRA) on their Mortgage-backed securities trading floor. FINRA is implementing the Trade Reporting and Compliance Engine (TRACE), which requires firms to report all asset-backed security trades in T+1 (by 5pm same day) timing. Late trade reports and corrections to trades which have already been reported will incur a fee. Bank of America meets the challenge of assessing their technical, procedural, and cultural ability to fulfill these requirements and make changes where necessary.

Although TRACE is already in effect at the credit desks, reporting mortgage-backed securities (MBS) is a great deal more complicated. With the wide variety of products that are traded on the MBS floor, the complexity of reporting all the required products correctly and on time amplifies. It also brings the matter of determining which of the many products traded at Bank of America fall within FINRA's definition of asset-backed securities. Furthermore, the mortgage-backed securities trading floor does not currently have a uniform system for booking trades. Each desk has a different process, making it even more difficult to ensure that each desk will be capable of reporting to TRACE when the time comes.

Background

In preparation for our work at Bank of America, our main research focus was on Mortgage-Backed Securities in general. Although we had an idea of what they were, we lacked knowledge about the specifics of them. We felt that the best way to become deeply involved in project work from day one of our arrival was to have a good understanding of exactly what it was that was being traded on the floor and the overall impact that Mortgage-Backed Securities have at Bank of America.

We broke our background research up into five major sections. In the first, we defined Mortgage-Backed Securities (MBS). In the second, we took a closer look at three Government Sponsored Agencies (GSEs), Ginnie Mae, Fannie Mae, and Freddie Mac, and their impact on MBS. In the third section, we reviewed several different types of MBS. Specifically, we looked at basic Pass-Through MBS, Collateralized MBS, and Stripped MBS. In the fourth, we discussed how to valuate MBS. More specifically, we researched the effects of prepayment risk, analytical tools that are used to valuate MBS, and, in particular, tools which are used on the Bank of America trading floor. In the last section, we went into the role of MBS in the marketplace. Here we gave a brief overview of the recent history and how they are currently traded in the market. The most important part of the last section is our brief research into TRACE, which ultimately ended up being our main project focus.

Methods

The overall goal of this project was to research and develop methods to help Bank of America fulfill TRACE requirements before the launch in May. In order to achieve this goal, our main objectives were to study documentation about TRACE released by FINRA, assess the current trade booking systems on the Mortgage-Backed Securities trading floor, determine which desks would eventually be affected by TRACE, identify problem areas which could hinder trade reporting, and ultimately offer recommendations for change.

We began our work by studying several documents provided to Bank of America by FINRA. Some of the documents highlighted the rule change, while others focused on technical specifications required for trade reporting. We summarized these documents, pulling out key facts that would be valuable to Bank of America. Through these documents, we were able to gain all the necessary knowledge about TRACE to begin assessing the current state on the floor.

A majority of our time at Bank of America was spent gathering information about the currently flow of trade booking. We spoke with all of the Trading Support staff on the floor and

continuously brought rough drafts of our flowcharts back to them for approval. During this time, many gaps in information were found, which we continued working to fill. Also, we were able to identify in our research which desks would be affected by TRACE and which did not trade products that were require to report.

After assessing the current state, we were able to identify multiple points in the process that could eventually hinder trade reporting. We also found several weak spots in the flows that, although they might not affect trade reporting, could still be better. In the end, we came up with what we feel are solid recommendations for improvement.

Results and Discussion

At the completion of our project, we were able to provide our liaison with summaries of all the vital TRACE documents, flowcharts of all the desks on the Mortgage-Backed Securities floor, written documentation of potential hindrances that should be assessed further before TRACE goes live, recommendations for changes that should be made prior to May 16th, 2011, and our ideas for an optimal future state.

The TRACE documentation was fairly straightforward. After creating the summaries we presented our findings to our manager, Jason Tondreau. Our research was successful because we managed to compile documents that had been released by FINRA and never found by Bank of America or spread throughout the organization. From there, we were able to answer questions for people within Bank of America and had good knowledge of how TRACE will work.

We also feel that our flowcharts will be extremely helpful for the organization. Because of the multiple ways that trades are booked, it is not only important to map out the flow for TRACE, but in case they ever need to be referenced in the future. Although we did not have enough time to complete flowcharts for every desk, we did complete those that would be affected by TRACE. Because of these flowcharts, we were able to pinpoint potential problem areas which could affect TRACE.

Finally, our project resulted in taking those potential problem areas and recommending solutions to remedy them. Ultimately, we were also able to identify an optimal future state once TRACE goes live.

We documented our work so that Bank of America, especially our liaison, Jason Tondreau, could reference some of the work that still needs to be done before TRACE goes live. He will continue where we left off in meeting the TRACE requirements.

Conclusions and Recommendations

We broke up our recommendations for Bank of America into two major sections: the first is a set of recommendations for changes to be made before the TRACE launch and the second is a set of recommendations for an optimal future state.

Our recommendations for changes to be made before the TRACE launch include adding the required fields to all the trade capture tickets, checking Bloomberg's ability to handle trade reporting, minimizing cancellations and corrections, improving the cash product trade entry tool, improving the sales trade reporting tool, implementing a notification system for their compliance supervision tool, eliminating frequent trade mismatches, and making other alterations at specific desks. Within our optimal future state recommendations, we suggested that they start booking directly into Bloomberg, automating the dummy CUSIP replacement process, standardizing real-time risk reports, and, most importantly, preparing for the possibility of real-time dissemination.

Although we have provided Bank of America with the framework to start the process of meeting TRACE requirements, there is still a lot of work to be done before the trading floor will be ready for reporting. The technical work required to alter trade capture software will be immense and time consuming. The trade booking process at the desks will also need to change to meet requirements for timely and effective reporting. They have a long road ahead before they will be well prepared for TRACE.

Chapter 1: Introduction

Mortgage-backed securities (MBS) have been a staple of the financial world since they first arose in the early 1970s. They offer a new opportunity for those looking to invest their money, and also provide loans to people who need to borrow funds for a home purchase that they would not normally be able to afford. Mortgage-backed securities, to put it simply, provide people new options. Thanks to mortgage-backed securities, the rate of homeownership in the United States has dramatically increased, mortgage loans have become more readily available, a new standard for mortgage applications and acceptances has been implemented, and mortgage interest rates have been standardized. There are various financial institutions who act as originators for mortgage-backed securities, dividing them into pools for the investors. These organizations act as the middle man, taking a small percentage of the cash flows paid by the borrowers before paying them out to investors.

Bank of America is one of these organizations. In June of 2010, Bank of America was number one on the list of "Banks and Thrifts with the Largest Mortgage-Backed Securities Portfolios" with their total assets adding up to more than two billion dollars ("Banks and Thrifts", 2010). Bank of America takes a percentage of the money earned by the investors for securities that they hold. Playing a mortgage-backed securities "servicer" role makes MBS a huge part of Bank of America's day to day operations. They also play a role as a broker because they constantly buy and sell MBS and collect commission fees as well as potential capital gains or losses. Since mortgage-backed securities are ultimately so valuable to the institution, it's important that the bank ensures that the mortgage trading desks are consistently running smoothly.

With the recent financial crisis, new regulations, and their merger with Merrill Lynch, many systems and operations within the bank have yet to be fully optimized. The process mapping and information flow at the mortgage trading desks of Bank of America has been neglected due to a lack of communication between different facets of the organization and the frequent turnover of employees. This is problematic because FINRA has announced new regulations for reporting all MBS trades and Bank of America now faces the challenge of

altering their complex processes to meet these requirements. They are in need of new ideas to help them make their non-normalized processes capable of reporting trades to TRACE. The credit desks within Bank of America already have TRACE in place. Studying the credit desk systems could be beneficial because their system could be leveraged and reapplied to the mortgage trading desks.

Despite Bank of America's best efforts to focus some of their energy on making changes to meet these future regulations, a lack of man power coupled with the demanding environment has caused it to be put on the backburner. In order to remedy the situation, research into methods for meeting the requirements will need to be done. Before they can do so, they will need to have a deep understanding of their current processes with a particular focus in the different software and technology in use that will need to be modified. An in-depth, site specific study will need to be produced and opportunities for swift, clear-cut change will need to be documented.

The goal of this project is to assess the mortgage trading desks, with an objective of understanding the workflow through the business. Our team will work to gain an understanding of mortgage-backed securities in our background research, assess the current workflow state, and ultimately provide Bank of America with recommendations for consolidation and improvement which will help them report trades to TRACE.

Chapter 2: Background

2.1 Definition of Mortgage-Backed Securities

Mortgage-backed securities (MBS) "[represent] a pool of mortgages that have been 'securitized'" or packaged into bonds which outsiders have an option of purchasing as an investment (Morris *et al.*, 2010). In other words, it is a type of fixed income investment. When an individual borrows money, they have the option of "prepaying" the loan, making the interest earned by the investor that much less ("MBS Basics", 2006). "These prepayments bulk up the cash flow" for the investor, "but ultimately they shrink the bonds yield and lifetime" (Morris *et al.*, 2010). This prepayment risk makes estimating how much an MBS will ultimately pay out tough. The combination of the volatility of the market, opportunities to refinance, and prepayments can make investing in mortgage-backed securities risky. Ultimately, MBS does offer a multitude of different opportunities to both borrowers and investors, making them appealing to both parties.

There are three key players in mortgage-backed securities - the borrower, the investor, or bondholder, and the servicer, or middle man. A borrower initiates the process when they would like to make a major investment that they do not have the funds for, most commonly the purchase of a piece of property. The borrower approaches the servicer to borrow these funds. The servicer generally already has several pools of loans prepared, which could "comprise of a group of 30 year mortgages at 6% interest, totaling $1 million or more" (Morris *et al.*, 2010). The servicer prepares these pools using money provided by the investors.

From there, the borrowers make their required monthly payments to the servicer, including interest, and have the option of prepaying, or paying a sum of money in advance, if they would like. The servicer takes a certain percentage of those monthly payments, determined by the "pass-through rate". The "interest rate" is the amount of interest that the borrower pays on the loan and the "pass-through rate" is the amount of interest that is actually passed off to the lender or investor. Therefore, the fee that the servicer receives is the

difference between the interest rate and the pass-through rate ("MBS Basics", 2006). Figure 1 is an illustration of the cash flow in MBS.

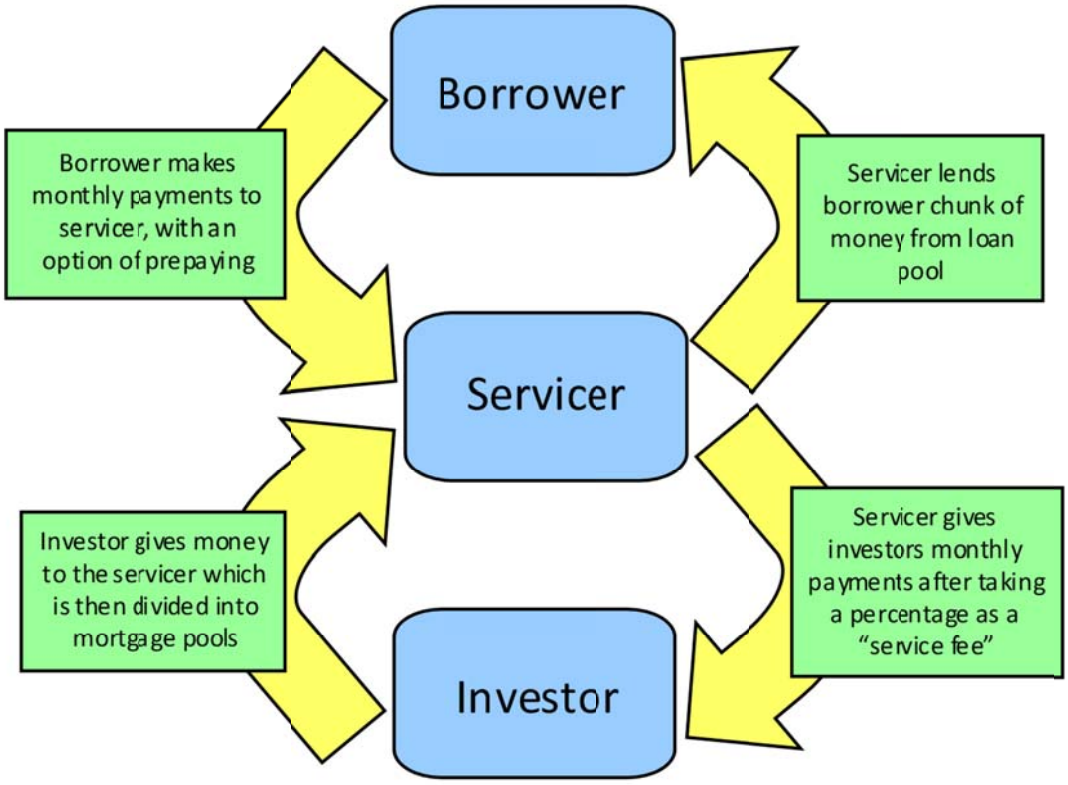

Figure 1. MBS Cash Flow

Perhaps the most complex piece to MBS is the cash flow to the investors. Cash flow is defined early on when the payments are sliced into different streams, or levels, known as tranches. Those investors who are willing to take more of a risk are in a higher tranche, where they can ultimately receive a higher return on their investment. But if a borrower were to default on their loan, those in the highest tranches would suffer most. As borrowers pay off their loans, the money is funneled up through the tranches (Morris *et al.*, 2010). Figure 2 is an illustration of tranches.

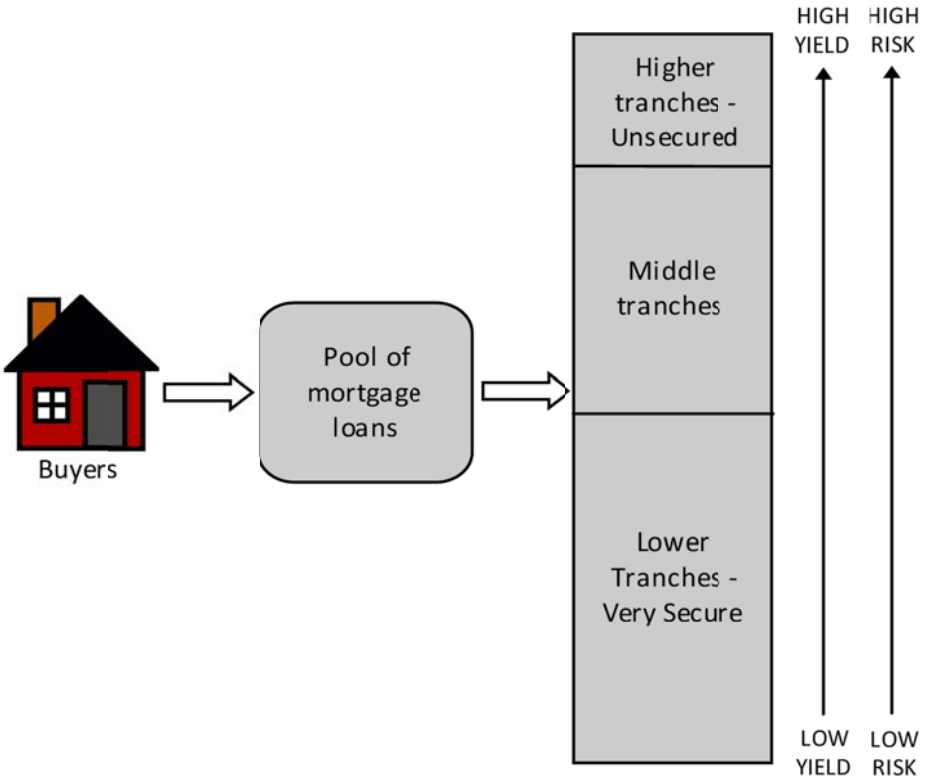

Figure 2. Division of Risk into Tranches

A majority of mortgage-backed securities are issued or guaranteed by one of three government agencies. There are three main Government Sponsored Enterprises (GSE) in existence: the Government National Mortgage Association, a U.S. government agency referred to as Ginnie Mae, the Federal National Mortgage Association, referred to as Fannie Mae, and the Federal Home Loan Mortgage Corporation, known as Freddie Mac. Although all three provide investors with credit guarantees, only Ginnie Mae is "backed by the full faith and credit of the U.S. government [and] guarantees that investors receive timely payments" (U.S. Securities and Exchange Commission, 2010). The overall goal of these agencies is to promote home ownership in the United States by expanding the secondary market for housing.

2.2 A Closer Look at the GSEs

Government Sponsored Enterprises are organizations that are publicly chartered by the government but are not intended to be fully regulated and controlled. Fannie Mae and Freddie Mac exist to expand the secondary market for home loans by purchasing home loans from banks to be securitized and redistributed to investors in the form of mortgage-backed securities ("MBS Basics", 2006). Banks either have the option to exchange mortgages for cash or for a mortgage-backed security comprised of similar mortgages. Fannie and Freddie will then guarantee payments to MBS investors based on collected interest and principle loan payments. Combined they currently guarantee about half of the mortgages in the country, $5 trillion (Muolo, 2010).

Fannie Mae and Freddie Mac are publicly traded companies that were created by the government and are subject to some regulation, but have tax advantages. They are not explicitly guaranteed by the government, however, during the financial crisis, they received funds from the government because they were unable to keep up with losses from defaults. Fannie and Freddie were extremely vulnerable when the housing bubble burst and prices began to fall because they both had a high exposure to subprime mortgages as a result of affordable housing standards set by the Department of Housing and Urban Development (Wallison, 2010). The government put them in a conservatorship, meaning they temporarily took control of them to keep them from defaulting. To ensure another similar crisis does not occur, the government is likely to change the structure of Fannie and Freddie but have yet to make an official decision for their future.

Ginnie Mae is a government backed organization that is a part of the Department of Housing and Urban Development. Ginnie is different than the other GSEs in that it doesn't actually package or sell MBS. Instead they guarantee timely payments to investors of Mortgage-Backed Securities that contain specific loans. A mortgage must be federally insured or guaranteed by the Federal Housing Administration, the Department of Veteran Affairs, the Department of Agriculture's Rural Housing Service, or the Office of Public and Indian Housing ("About Ginnie Mae", 2010). Since Ginnie Mae mortgage-backed securities are guaranteed by

the government, they are considered to be very safe investments and have performed well over the last couple years as investors have fled from risky investments.

2.3 Types of Mortgage-Backed Securities

Mortgage-backed securities can be divided up into many different categories, each offering different opportunities to investors and borrowers. In different types of MBSs, rate of return, risk, cash flow, and money allocation will all vary.

2.3.1 Basic Pass-Through Mortgage-Backed Security

Pass-through mortgage-backed securities are the most common and simplest form of MBS. As described in the sections above, it is essentially a securitization of the mortgage payments to the investors through a middle-man, or servicer. The word "pass-through" refers to the fact that the cash flows through the servicer and the servicer taking a percentage of the payment as a fee.

Pass-through MBS can be subdivided into two categories, residential mortgage-backed securities (RMBS) and commercial mortgage-backed security (CMBS). RMBS is backed by only mortgages on residential properties whereas CMBS is backed by mortgages on commercial properties ("MBS Basics", 2006).

2.3.2 Collateralized Mortgage-Backed Security

Collateralized mortgage-backed securities (CMBS), also called collateralized mortgage obligations (CMOs), are similar to pass-through mortgage-backed securities but are more complex and detailed. This is where the cash flows are more defined and mortgages are divided into tranches as described above. Collateralized mortgage obligations "represent one of the most important innovations in capital markets" (Torous, 1995). CMBS allows investors to decide how much risk they are willing to take in order to receive a higher return on their investment.

2.3.3 Stripped Mortgage-Backed Security

Stripped mortgage-backed securities (SMBS) are where mortgage payments can be divided up between paying the loan's principal and paying the loan's interest. Two subtypes of SMBS are commonly referred to as "interest only" (IO) and "principal only" (PO). "Principal only" certificates entitle the holders to receive the principal on the mortgage loans but none of the interest versus an "interest only" certificate which does the opposite. "Principal only" and "interest only" are just examples of how an SMBS could be classified, but are thought to be rather extreme. SMBS exists to provide investors with the "right to receive disproportionate allocations of principal and interest" and ultimately offers more flexibility in cash flow ("MBS Basics", 2006).

2.4 Determining the Value of Mortgage-Backed Securities

Valuation of mortgage-backed securities is complex, challenging, and many times inaccurate. The volatility of interest rates, opportunities for refinancing and prepayment, and default risk make estimating the return on investment difficult.

2.4.1 Prepayment Risk

Prepayment risk is the most difficult part of valuing a mortgage-backed security. There is no real way of knowing when and how much a borrower is going to pre-pay. A borrower may decide, while interest rates are low, to take out a new loan to pay back the old loan. This is a good way for them to minimize interest costs. However, borrowers many times have other reasons for prepaying their loans which are much more difficult to track and characterize, such as a major career change, change in marital status, or some other life altering event. Initially, when mortgage-backed securities first came into being in the 1970s, flat assumptions were made for all of them when it came to prepayment. In other words, no estimation was done based on the borrower and there were no analytical tools to approximate prepayment. Over the years, "much effort has been expended on estimating prepayment models which more

accurately recognize the effects of a changing economic environment on borrower prepayment behavior" (Torous, 1995).

2.4.2 Analytical Tools

Although determining the value of mortgage-backed securities is tricky, there are several analytical tools in existence which can help make it easier.

The first tool is a "static analysis" which is similar to how estimations were done when mortgage-backed securities came about in the 1970s. It makes one flat assumption for a borrower's prepayment which leads to other assumptions about the "future behavior of interest rates". This is the major disadvantage of a static analysis. When the prepayment is assumed, cash flows for the remainder of the future are thought to follow a single path ("MBS Basics", 2006).

The second tool is known as a "dynamic analysis" which, as the name implies, offers a much more dynamic means of estimation. A dynamic analysis uses two computer models which both have a different focus. The first model takes into account the fluctuation of interest rates. In this first model, the analysis looks at multiple different scenarios for future interest rates and combines it with the second model, which looks at many different avenues for borrower prepayment. In the end, a dynamic analysis is capable of creating a "hypothetical cash flow corresponding to each scenario" which is a much more viable option than making one flat assumption ("MBS Basics", 2006). The dynamic analysis allows an investor to look at the many different scenarios and understand the multitude of possibilities before making a decision.

Although most people view the dynamic analysis as a better approach to estimating a return, it is still a flawed system. In a dynamic analysis you get many different potential results, and despite the strides that have been made since the dawn of mortgage-backed securities, there is no real way of knowing what the outcome of an investment will be.

2.4.3 Tools Used by Bank of America

Bank of America's traders use option-adjusted spread (OAS) to calculate the market value of MBS. This model can display and handle all potential options for a mortgage-backed security and analyzes the full range of potential scenarios. Option-adjusted spreading has the ability to analyze current interest rates, behavioral models, and rate reset rules and assumptions in order to estimate future cash flow. OAS "values assets and liabilities by simulating their performance across hundreds of randomly determined long-term interest rate scenarios that extend to the contractual maturity of the longest asset or liability" (Richard, 1991). Without these simulations, it would be nearly impossible to set a current market value.

2.5 Role in the Market

2.5.1 Recent History and Involvement in Financial Crisis

Over the past few years, mortgage-backed securities have come under scrutiny and are considered one of the primary causes of the financial crisis. Prior to 2007, interest rates were set low by the Federal Reserve which led to easier credit standards in the housing market (Rutledge, 2008). This led to a bubble in home prices because as prices continued to increase, individuals were looking to gain a quick profit. Subprime mortgages became popular because individuals with low credit could get a home with little or no down payment. Borrowers with subprime loans paid a higher interest rate, but many would plan on reselling the home within a short time period at a higher price. Many mortgage-backed securities were created with these subprime mortgages that would promise higher returns to investors but at a greater risk due to the increased default risk. Financial institutions and large banks significantly increased their exposure to securities backed by subprime loans but failed to completely evaluate their risk due the complexity in valuing these devices.

The crisis began when property values began to decline sharply in 2007 which led to a higher rate of foreclosures, especially from subprime borrowers who either couldn't afford their payments or didn't have the motivation to hold a mortgage that was worth more than the

home. Financial institutions began to sustain massive losses on these Mortgage-Backed Securities and were unable to unload their toxic assets due to a lack of liquidity (Rutledge, 2008). They also were holding an inadequate amount of cash to cover their losses which eventually led to the failure of Lehman Brothers and other banks near the end of 2008. The federal government stepped in with a bailout program for many financial companies, intending to prevent a collapse of the financial system by helping cover bank's losses until they were able to restructure and return to profitability under better market conditions. Since March of 2009, the financial system has recovered modestly however, the market for housing and Mortgage-Backed Securities face many issues still.

2.5.2 Trading Mortgage-Backed Securities

Mortgage-backed securities are currently traded in the over-the-counter (OTC) market due to their level of complexity and variety of pricing methods. This mainly includes large institutional investors like hedge funds, large commercial banks, and investment banks. Since there is no set pricing standard for MBS, investors must make several predictions about key market factors such as future interest rates and prepayment speeds. They will then use these figures to develop proprietary pricing models that will assist them in deciding whether or not to buy a specific product (personal communication, September 22, 2010). To go along with their pricing model, the investor must also have a system to calculate the risk associated with each security so their overall portfolio can remain within their desired risk level. It has become clear during the past few years that many investors did not have an accurate method for measuring risk in the event of a drastic decrease in home prices. As a result, investors are now re-evaluating these risk models so they will be more accurate in the future and prevent a repeat of the financial crisis. It is also in the government's interest to reduce the risk of another crisis and as a result they are in the process of enforcing a massive regulation bill in the financial industry. Part of these regulations will require members of the Financial Industry Regulatory Authority (FINRA) to begin reporting the prices they receive for their trades of Mortgage-Backed Securities ("TRACE-FAQ", 2010). This will significantly change the market for trading MBS

because it could eventually lead to dissemination of information of all trades to members of FINRA.

2.5.3 FINRA Trade Reporting and Compliance Engine

FINRA is an independent regulator of about 4,700 brokerage financial institutions. Their main role is protecting investors ("About FINRA", 2010). This is accomplished, in part, by providing transparency to investors through the Trade Reporting and Compliance Engine (TRACE). Companies that are members of FINRA are required to report data to TRACE for fixed income trades placed in the over-the-counter market. Since TRACE offers transparency to investors, they are able to see what prices their competitors are receiving for these securities. Starting on May 16th, 2011 firms will be required to report data for trades involving Mortgage-Backed Securities and other Asset-Backed Securities. Members executing Asset-Backed Securities transactions will have until the end of the business day, or 5pm when the TRACE system closes. If a trade is placed after the system closes, they will have until the end of the next business day to report the trade ("TRACE FAQ, 2010").

There are several major requirements for financial institutions when reporting Asset-Backed Securities to TRACE. They will need to provide a security identification number such as a Committee on Uniform Security Identification Procedures (CUSIP) number or a FINRA symbol, assigned by FINRA upon request, for every transaction. The size (or volume) of the transaction will also need to be supplied. The size is considered to be the principle value of the collateral of the mortgages backing the security, or the original face value at issuance and the remaining principal thereafter. However, if par value is not used to measure the size of a transaction, the original face value of the security and the factor used at the time of the transaction are provided. The price must also be reported or, if the price is not available, the contract amount and accrued interest should be given instead. Other inclusions are the settlement date, dollar amount of commission, and indicators for different transaction types (Securities and Exchange Commission).

The secondary market for Mortgage-Backed Securities has already been changing since the beginning of the financial crisis, but these new regulations will continue to change the market for these securities and force traders to adapt their techniques to the new environment.

Chapter 3: Project Work

Upon our arrival at Bank of America, we spent time getting acclimated to our working conditions. The first few days were spent adjusting to the new environment and gaining an understanding of the day to day operations in the bank. We also began to collaborate with our sponsor to determine what our main project would be. He explained to us that they were in great need of help in meeting the FINRA requirements, which were originally set to launch on February 14th, 2011. The date has since changed to May 16th, 2011. The new TRACE requirements will require Bank of America to report MBS trades by the end of the business day on which the trade was closed. If the trade is made after 5pm, it must be reported by the end of the next business day. In addition, there were many other field requirements which we came to find were not already being recorded in the bank's current trade booking system. This, along with several other barriers, would make the change difficult for the bank. Our goal was to study the current trade booking process, compare that process to the reporting guidelines, and ultimately make recommendations for a smoother transition into trade reporting.

3.1 Research into TRACE

Upon our arrival we were provided with several TRACE documents which described not only the general requirements for TRACE reporting, but also the detailed technical specifications that came along with it. We were tasked with reading through these documents and condensing them to several pages. We needed to be sure to pull out key points which applied to Bank of America so that all specifications would be met.

3.1.1 Proposed Rule Change

This document was a formal submission for the rule change by FINRA through the Securities and Exchange Commission. The document starts off by summarizing the proposed rule changes, stating that Asset-backed Securities and other similar securities now fall under the definition of TRACE-Eligible Securities and that the document was made to begin the

establishment of reporting, fees, and other requirements (Securities and Exchange Commission, 2010).

The document then explains the procedures of the self-regulatory operations, which basically states that FINRA has a right to propose these changes through this document as well as provide a date that the changes will begin. The reasons for these changes, as declared in the document, are to permit FINRA to collect additional information and observe patterns of trading as well as to facilitate oversight and regulation of the Asset-Backed Securities market. Ultimately, FINRA will determine if dissemination of this information is a viable option, which would provide transparency in the Asset-Backed Securities market. Transparency has contributed to better pricing, valuations, and reduced investor costs in the market for corporate bonds and, similarly, the Asset-Backed Securities market could benefit (Securities and Exchange Commission, 2010).

The last major section of the file details the proposed changes, including newly defined terminology, required components of the reporting, information on dissemination, firm fee details, and several other amendments. The full summary of this document, written by our team, can be found in *Appendix B* (Securities and Exchange Commission, 2010).

3.1.2 Computer to Computer Interface (CTCI) Specifications

Although the *Proposed Rule Change* document had some information on the requirements of the reporting, this document went into much more detail on what fields would be included in the reporting and how those fields should be formatted. Rather than talking about what TRACE is, it focuses more on how TRACE is done.

It begins by introducing TRACE reporting, only in more detail, such as what times the system will open and close, specific timing for reporting, how trades can be modified after submission, notifications that will be sent to confirm every transaction, and more. The document then goes on to describe the format of every trade that's submitted. The submissions need to be divided into three parts, the header (which defines the beginning of the message, its origin, and its destination), the trailer (which defines the end of the message, its

date and time, and the control sequence number which will be validated by NASDAQ), and the text (which is the different field entries which are filled in when a trade is booked) (Financial Industry Regulatory Authority, 2010).

The header, trailer, and text formats are detailed in the document, with special emphasis on the many fields of the text that will need to be recorded after a trade is booked. As a team, we reviewed these field values and created a color-coded document which showed what field values were "Required", what field values were "Optional", and what field values were "Required when Applicable". For those field values which were marked, "Required when Applicable", we bolded items which would make that field required. The summary of the document, which includes formatting information for the header, trailer, and text, can be found in *Appendix C*.

One important item to note is that every trade which is reported will be confirmed by FINRA and will be given a control date and control number. Both of these items need to be collected and stored by the firms for any cancellations or corrections to be made to that particular trade in the future (Financial Industry Regulatory Authority, 2010). Therefore, although there will be no input for those two fields in the initial submission, they will need to exist in the booking to store that information.

3.1.3 Question and Answer

There were several *Question and Answer* documents that were made available to us and we were able to look through these and pull out important information. The FINRA website provided several "Q & A"s designed from questions that they had received from different firms. Also, within Bank of America, several phone calls took place that anyone on the trading floor was welcome to join where the opportunity to ask any lingering questions was granted. Many good points were brought up in those calls, and as a team, we reviewed the call transcripts and pulled out any questions that we had not already acquired answers to.

3.1.4 People as Resources

We weren't at Bank of America long before we realized that many different individuals had information that we were not previously aware of. We communicated with multiple people, in person or by phone, and came to find that many of them had done similar work, yet most still had new information about TRACE that they were able to offer us. Also, in communicating with them, they became aware that we were working on this project and kept us up to date if any new information arose.

3.1.5 Additional Questions and Clarifications

After completing our readings, making comparisons, interviewing employees, and meeting with our liaison, we still had a few lingering questions that we needed answered. Because we weren't sure if this information could be found elsewhere, we initially contacted Bloomberg for clarifications. Ultimately, we were directed to FINRA for help. Several items that we, along with our liaison, needed addressed were explanations of the wording on the different fields to determine if they were required or not, whether or not sample submissions were available for reference, gaining access to a testing environment for submissions, what types of Asset-Backed Securities needed to be reported (if not all of them), the late fees that the firm would incur if reporting was not done on the day it is booked, more information on in-house cross transactions, and detailed questions about reporting specific products.

It was determined that all Asset-Backed securities will need to be reported on. Also, there are currently no sample submissions and a test environment will not be put in place until December or early January. At the time that the test environment becomes available, a formal announcement will be made and several sample submissions will be posted as a reference. Testing will be free until TRACE goes live.

Although our team was not able to participate in reviewing sample submissions and the test environment, we still needed to work to understand the flow of all the different trades so that Bank of America would be ready to submit every product in their Asset-Backed Securities market.

3.2 Current Trade Booking System

Content removed.

3.3 Recommendations for Change before TRACE Launch

Content removed.

3.4 Future State Considerations

Content removed.

Chapter 4: On-Going Project Work

4.1 Specific Front-End Desk Information in Flowcharts

Content removed.

4.2 Other Desk Flowcharts

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4.3 Looking Deeper into Glitches

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4.4 Conduct in Depth Study of TRACE at the Credit Desk

Content removed.

Chapter 5: Conclusion

Although the deadline for meeting TRACE requirements is not until May, there are a large number of changes that will need to be made on the MBS floor before the launch. Through our research, we also helped give Bank of America a better understanding of what will be expected of them in TRACE reporting. We feel that, with this project, we were able to find major gaps that will effect meeting the requirements and provide solid recommendations for filling those gaps. Although our project included a lot of the initial work necessary for TRACE, we only dented the surface of the effort that will need to go into the technological, cultural and structural alterations necessary for the launch. Ultimately, we believe our work has helped Bank of America gain their footing for what looks to be a demanding and exciting few months.

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Appendix A: Key Informant Interviews

PQP Interviews with Jason Tondreau, Bank of America Liaison

Interview 1: September 10, 2010

Phone Interview

Interviewee: Jason Tondreau

Interviewers: Emily Herries, Jake DeLew, Professor Wang

Topics Discussed:

- His Role in Company
    - Comes from credit trading world where he works on improving technology
    - Doesn't do any trading but works more on the technical side of things
    - Useful to be able to communicate between technology side and trading side
    - Now mortgage technology on top of credit space under Burton
    - All applications that are being made - needed someone there that can communicate
    - Trade capture development team - just one of the groups
    - All of those applications are what he is responsible for
- Current State
    - Technology standpoint - neglected
    - Highly fragmented
    - Not a lot of organization on how things should work or best way to do things for desk
    - Fact finding project
    - Control structures that aren't in place
    - Lots of agendas of things that get half done and then moved on to something else
    - Starting from scratch
        - What do we have in the current state
        - What are the biggest complaints
        - What are the strengths and weaknesses, etc.
    - Ideas: Helping develop a formal tracking system as far as what issues are coming up
    - Credit and mortgage markets still not functioning normally - just lending based markets in general
    - There will always be a market for MBS because mortgages aren't going anywhere

- Project Goals
    - Details still to be ironed out
    - Main goal during A-term is to do background research and come in with a good understanding of MBS
    - Provided us with link to resource
- Set visit date for Wednesday, September 22nd and established start/end dates

Interview 2: September 22, 2010

Face-to-Face Interview
Bank of America Main Building, 1 Bryant Park
Interviewee: Jason Tondreau
Interviewers: Emily Herries, Jake DeLew, Professor Wang

Topics Discussed:

- Technology department provides software for the following:
    - Pricing -> traders are able to plug in numbers for calculations
    - Risk Management
    - Trade capture
- All software programs have
    - Business Analysts
    - Programmers
    - Project Manager (to get project up and running)
- Jason acts as a troubleshooter and communicates between traders and the above team
    - Gathers opinions of software
    - Gathers reports on glitches
- Technology hasn't done a good job servicing them
- Synergies between different desks hasn't been addressed
- Model discrepancies between desks
    - Moving into a unified model
    - Transparency
- Potential Project Objectives
    - Support
        - Issue management and tracking
        - Issues come and go without analysis
        - Nothing to keep errors from repeating
        - Need to identify frequent issues
        - Have the software and reporting in place, just don't have it organized for tracking purposes
    - Regulatory Requirements
        - Starting on February 14th, 2011

        - FINRA initiative to require members to report trades
        - T+1 timing
        - Divided into 2 main parts
            - Can the systems in place do the job? Will we rely on Bloomberg or build something else?
            - TRACE data is highly useful trader information; Capture data when it goes live; Already done in credit are, leverage it
    - Information Storage and Retrieval
        - Understanding who maintains data on all risk and valuation systems in both sides and the data flows involved
        - Risk Viewer project data, data appears to be the biggest issue here
    - Risk Reporting
        - Risk reporting requirements are being captured directly and reported on
        - Helping work through the desk on the hundreds of reports needs to be done
        - Fragmented process
        - Normalization of risk data -> hierarchy of risk
    - Trade Capture
        - Normalization of captured data
        - Booking trades on a large variety of different products - it needs to be mapped out so they can get a handle on volumes
        - Losing a lot of important information without a robust and defined system
        - Constantly changing, nothing is uniform
        - What has helped the credit space? Counterparty reports, trades done away reports, volume reports
    - PnL and Middle Office
        - PnL and MO teams in organization need technology help
            - ABX/CMBS spread conversion
                - Manual process based in excess spreadsheet used to convert prices to spreads for EOD PnL and Risk valuation
                - Push to work towards a more automated solution
            - Hedge Sheets
                - Need to sort through these spreadsheets on the desk which are used for pricing and publishing
            - Eblotter/Vblotter quick tickets
                - Very few trade booking tools have been adapted for the MTG users to streamline trade booking on the MTG desk
                - Need to get VBlotter design looking at MTG users, not just credit

Appendix B: FINRA TRACE Proposal

- FINRA Proposal - Document Information
  - Pages 1-28 Summary of complete proposal which includes relevant information
  - Pages 29-56 are Exhibit 1, the complete notice of proposed rule changes for publication
  - Pages 57-74 are Exhibit 5, or the written rules
- Text of Proposed Rule Change
  - Designate asset-backed securities, mortgage-backed securities and other similar securities (collectively defined hereinafter as "Asset-Backed Securities") as Trade Reporting and Compliance Engine ("TRACE") TRACE-Eligible Securities
  - Establish reporting, fee, and other requirements
  - Summation of Rules
    - 6710
      - "TRACE-Eligibility Security" now includes Asset-backed securities
      - Add more terms
    - 6730
      - Provide for reporting of Asset backed transactions
    - 6750
      - Information on transaction will not be disseminated (spread widely/dispersed)
    - 6760
      - Requires sponsor or issuing entity to provide notice as required under rule & to modify notification requirements to accept a mortgage pool number (when necessary)
    - 7730
      - Establish transaction reporting fees at same rate of current corporate bonds
      - Identify size for identifying trade reporting fee
      - A transaction in an agency pass-through MBS is not a List or Fixed Offering Price Transaction or a Takedown transaction
    - 6700 Series (except 6740 and 7730)
      - Technical, administrative, and clarifying changes (pg. 57 in document)
- Procedures of the Self-Regulatory Organization
  - FINRA authorized it on April 16, 2009
  - Filed the proposed rule change, no other action required
  - Announced date of February 14th, 2011 for these rules to take effect
- Purpose of Changes
  - "Asset-backed security" is broadly defined

- Permits FINRA to obtain additional transaction information and observe patterns of trading
- Facilitates oversight and regulation of the Asset-Backed Securities market
- FINRA plans to study data to determine volume and trading in various types of ABS
- Real-time dissemination allows for transparency in the debt securities markets
  - Has contributed to better pricing, valuations, and reduced investor costs in corporate bonds
- Over time, FINRA has right to decide if dissemination of some transaction info is warranted

- Summary of Proposed Amendments
  - Revise definition of "TRACE-Eligible Security" and "Reportable TRACE Transaction"
  - Add 9 defined terms relating to Agency Pass-through MBS
  - Proposes more liberal trade reporting requirements for ABS than those in effect for corporate bonds
  - Not to disseminate transaction information on ABS
  - Characterize a member who is a sponsor or issuing entity of ABS as a managing underwriter, requiring such persons to provide notice as required under the rule
  - Apply fees
- Proposed Changes
  - General Terminology
    - "TRACE-Eligible Security"
      - Dept security, U.S. dollar denominated, issued by US or foreign private issuer, and is issued by an Agency or GSE (now including Asset Backed Securities)
      - Exclusions: U.S. Treasury Securities, foreign sovereign securities, other securities not issued by private issuer, and Money Market Instruments
    - "Asset-Backed Security" (pages 8-10)
      - Defined by Securities Act Regulation AB as any of the following:
        - mortgage-backed security
        - collateralized mortgage obligation
        - synthetic asset-backed security
        - any instrument involving or based on the securitization of mortgaged or other credits or assets
    - "Reportable TRACE Transaction"
      - ALL transactions, including the initial sale of an Agency Pass-Through MBS from an issuing entity or sponsor to an underwriter or initial purchaser, are Reportable TRACE transactions

        - FINRA highlights the importance of the "origination process" including manner in which such securities are sold initially
- "Sponsor"
    - Person/corporation that decides to issue a security and determines its structure, pool and features
    - Person who initiates and organizes an asset-backed securities transaction by selling or transferring assets, either directly or indirectly, including through an affiliate, to the issuing entity
- "Issuing Entity"
    - Actual issuer of the MBS
    - Also known as the "Special Purpose Entity" ("SPE")
    - Established solely to issue the Asset-Backed securities and hold the pool of assets that back the asset-backed security
- "TBA"
    - To Be Announced
    - Refers to a transaction in an Agency Pass-Through MBS where the parties agree to specific terms (i.e. face amount of security, coupon, maturity, etc) but do not identify specific mortgage pool(s) of mortgages that will be delivered on settlement date
- "Agency Pass-Through MBS"
    - MBS issued by an agency or GSE
    - Timely payment of principal and interest is guaranteed
    - Represent ownership interests in a pool or pools of residential mortgage loans
    - Security structured to "pass through" the principal and interest payments made by mortgages to the owners of the pools on a pro rata (proportionate allocation) basis
- "Remaining Principal Balance"
    - Total unpaid principal on a pool of mortgages
- "Factor"
    - Used to calculate the *remaining principal balance* of an Asset-backed security that is backed by a pool of mortgages
    - Decimal value representing the proportion of the outstanding principal value of a security to its original principal value
- "Specified Pool Transaction"
    - Transaction in an Agency Pass-Through MBS that requires the seller to deliver at settlement one or more pools of mortgages that are identified by their unique pool ID numbers and original principal value
- "Stipulation Transaction"

- At time of execution, parties agree that seller will deliver to the buyer and Agency Pass-Through MBS of a specified face amount and coupon from a specified Agency or GSE that represents a pool of mortgages, at a specified price
- Pool or pools must meet certain conditions for "good delivery"

▪ "Dollar Roll"
- Simultaneous transactions that are executed in accordance with an agreement between a buyer and seller of an Agency Pass-Through MBS
- Buyer pays initial purchase price, agrees to settlement date, agrees to reverse purchase transaction at different price at later date, & deliver to the initial seller of such securities the same or substantially similar securities

o Reporting Requirements
▪ Members executing ABS transactions will have until the end of the business day (TRACE system closes at 5pm EST)
▪ Trades placed after system close will have until the end of the next business day to report
- End of day reporting time frame chosen to provide flexibility and ease compliance burdens

▪ Dollar Amount of Commission
▪ Security Identification
- CUSIP Number
  - If no CUSIP, a similar numeric identifier such as mortgage pool number or FINRA symbol
    - A FINRA symbol will be assigned upon request

▪ Size (Volume)
- The principle value of the collateral of the mortgages backing the security
  - Original face value at issuance, remaining principal balance thereafter
- If par value is not used to measure the size (volume) of a transaction
  - Original face value of the security and the Factor used at the Time of Execution
    - Factor that was most recently published to market participants

▪ Price
- Price will be reported
  - If price is not available, report the contract amount and accrued interest

        - Crosses
            - For in-house cross transactions, a member must report two transactions for the purchase and sale
        - Settlement Modifiers
            - Modifiers and indicators that will distinguish certain trades executed at special prices or subject to other conditions affecting price
            - This includes the settlement date
            - More details can be found on page 21-22
        - Indicators for specified pool transactions; stipulation transaction; dollar rolls
            - Indicate when reporting a Specified Pool Transaction, a Stipulation Transaction, a Dollar Roll, and a transaction that is both a Dollar Roll and a Stipulation Transaction
    - Dissemination
        - FINRA at this time has proposed not to disseminate information on transactions in ABS
        - FINRA will observe trading patterns and engage in more in-depth surveillance of the ABS market
        - May determine that dissemination of transaction info is warranted with respect to ABS after it has had an opportunity to review data over a period of time
            - This approach was used previously when it implemented dissemination in phases for corporate bonds
    - Other Amendments to Rule 6700
        - Members that are managing underwriters must notify FINRA that a new TRACE eligible security is about to be offered and sold in a primary offering
            - Security identifiers (CUSIP or other) must be provided
        - For new issues, the managing underwriter, another underwriter, or an initial purchaser must provide the following
            - The CUSIP or other identifier as identified above
            - The issuing entity and the sponsor
            - The coupon rate
            - The maturity
            - Whether securities act rule 144A applies
            - The time that the new issue is priced and if different, the time that the first transaction in the distribution or offering is executed
            - A brief description of the issue
    - Fees
        - Trade Reporting Fee

- Sliding scale ranging from $0.475 to $2.375 per transaction based on the size of the reported transaction
- Actual Amounts:
    - Trades up to and including $200,000 par value will be charged a $0.475 fee per trade
    - Trades between $200,001 par value and $999,999 par value will be charged a fee of $0.000002375 times the par value of the transaction
    - $1,000,000 par value or more will be charged a fee of $2.375 per trade
- For Asset-Backed Securities where par value is not used to determine the size of a transaction, *the size would be the lesser of the original face value or the remaining principal balance* (as defined above)
- Transactions in Pass-Through MBS cannot be considered List or Fixed Offering Price transactions or Take Down Transactions for purposes of the reporting fees

Appendix C: CTCI Formatting Specifications

- **Header – consists of 4 lines** (defines beginning of msg, origin, and destination of msg)
  - **Line 0**) Origin of the message
    - 1 to 6 character Entry Originator ID
    - Optional for firms not acting as a service bureau
    - Must contain 4 character MPID (as assigned by FINRA)
    - CR LF – required line delimiter
  - **Line 1**) Branch Sequence Number
    - 1-8 character alphanumeric (embedded spaces, left justified)
    - CR LF – required line delimiter
  - **Line 1a**) Category and destination number of message
    - Message category containing constant "OTHER" for TRACE
    - Space – as a field separator
    - Destination – Required field; Destination code "SP" for all Trade Entry, Cancel, Historical Cancel, Correction, and Historical Correction input messages for securitized products
    - CR, LF – required delimiter
  - **Blank Line**

- **Trailer** (Defines the end of the msg, date/time of the msg, control sequence number)
  - Sequence number validated by NASDAQ to check for number gaps
  - Each station on service bureau line will have individual sequence check
    - i.e. first entry in station 1 will have seq. num. 0001, and first entry station 2 will have s.n. 0001
  - Sequence number can be one of the following formats:
    - S.N. immediately precedes the end-of-text code & is either fixed at 4 digits, zero filled. i.e. 0034 or one to four digits by a "dash" i.e. -34
    - May appear anywhere on last line if it's immediately preceded by letters "OL" i.e. OL 23 or OL23
      - 3rd contiguous character is optional (OLX 23, OLX23)
      - Fill zeros for high-order digits (OL 0023) are optional
      - Space used to separate the S.N. from any following user-defined data
    - 1-4 digit S.N. at beginning of line, followed by space & user-defined string starting with non-numeric character. S.N can be zero filled if desired. (34 AXD, 0034 /120179011)
      - Remainder of field may be used to include user identifiers like date/time

- **Text Field Entries**
  - Color Key
    - Yellow: Fields
    - Red: Required for ALL transaction
    - Green: Optional always
    - Gray: Required under certain circumstances (those circumstances are in bold)

  - Function- **Required** - **MISSING**
    - One of: T, X, Y, R, S, which are defined below
      - Trade Entry
        - (Function T) – All original T-day and T+n trades entered as this format
      - Cancelling Trade Entry
        - (Function X) – For cancelling T-day through T-20 Submissions
        - (Function Y) – Historical Cancels (cancelling after T-20 is up)
      - Correcting Trade Entry
        - (Function R) – Correcting T-day through T-20
        - (Function S) – Historical Corrections
  - Special Processing Flag – **Required When Applicable** - **MISSING**
    - "*P*" for Position Transfer (**authorization required by FINRA before trade submission; approved on trade by trade basis**)
    - *Blank* otherwise
  - Buy/Sell Indicator – **Required** – **ALL SET**
    - **"**B" = reporting firm bought
    - "S" = reporting firm sold
  - Client Trade Identifier – **Required** - **ALL SET (MBS Trade ID)**
    - 20 characters (fill unused positions with spaces)
    - Number is chosen by firm and will not be validated by TRACE
    - **Firms must make sure each trade has a UNIQUE identifier**
  - Contra Client Trade Identifier – **Optional** – **MISSING**
    - User defined trade ref number
  - Quantity – **Required** - **ALL SET**
    - Dollar (face value) amount of trade
    - SP trades, units are not applicable
  - Symbol OR CUSIP– **Required** - **ALL SET**
    - **There will be both a SYMBOL and CUSIP field, only one must be filled**

        - If no CUSIP, must have FINRA assigned symbol
    - Price- **Required** - **ALL SET (adjust calculations)**
        - Reportable price of trade as a percentage of face value
        - Includes markup/markdown
    - Price Override – **Required When Applicable** - **MISSING**
        - **To be used if initial submission is rejected for obscure pricing**
        - 1 character field
        - Override which indicates entered price is, in fact, valid
        - *"O" = Price Override*, otherwise *blank*
    - Seller's Commission - **Required When Applicable** - **ALL SET**
        - **Required when commission is charged on sale trade**, otherwise optional
        - Dollar amount charged by seller
    - Buyer's Commission - **Required When Applicable** - **ALL SET**
        - **Required when commission is charged on buy trade**, otherwise optional
        - Dollar amount charged by buyer
    - Seller's Fees - **Required When Applicable** - **MISSING**
        - **Required field when any additional fee is charged by seller**
    - Buyer's Fees - **Required When Applicable** - **MISSING**
        - **Required field when any additional fee is charged by buyer**
    - Trade Modifier 1 - **MISSING**
        - Blank for SP trade report input; reserved for future use
    - Trade Modifier 2 - **MISSING**
        - Blank for SP trade report input; reserved for future use
    - Trade Modifier 3 - **Required When Applicable** - **MISSING**
        - **Extended hours/Late sale conditions only**
        - Generated by system on output (**NO input**)
            - *Blank* – no system generated modifier
            - *T* = trades executed outside of normal market hours
            - *U* = Trades executed outside of normal market hours and reported late
            - Z = Trades executed during normal market hours and reported late
    - Trade Modifier 4 - **Required When Applicable** - **MISSING**
        - **Required if a trade falls under any of the following**:
            - O = **Specified Pool Transaction**; transaction in Agency P-T MBS requiring delivery at settlement of one or more pools of mortgages identified by pool ID nums and original principal value
            - N = **Stipulation Transaction** (**TBA securities only**); Agency P-T MBS where the parties agree at execution that the seller will deliver to the buyer an APTMBS of a specified face amt and coupon from a

specified Agency or GSE that reps a pool of mortgages, at a specified price, & that pool must meet certain conditions

- L = **Stipulated Dollar Roll** (**TBA securities only**); Simultaneous sale and purchase of an APTMBS for different settlement dates; where initial seller agrees to take delivery, upon settlement of re-purchase transaction, of the same or substantially similar securities
- D = Dollar Roll without Stipulation (**TBA securities only**)

- Contra Party ID (CPID) – **Required** - **MISSING**
  - 4 Alpha Character field
  - MPID of Contra Party to trade
  - If Contra is customer use "C" with 3 spaces
  - FINRA member firms cannot qualify each other as a customer
- Contra Party Give Up (CPGU) – **Optional*** - **MISSING**
  - MPID of Contra Party Give Up Firm
  - ***Only an option for* locked-In trade reports (Indicator = "Y")**
  - Non-Locked In (Indicator = "*blank*")
  - Customer "C" *CANNOT* be entered as a give up
- Contra Clearing Number – **Optional*** - **MISSING**
  - ***Only an option when* firm submits trade as locked-in trade report**
  - Clearing broker ID
  - If value entered, TRACE validates NSCC ID
  - If no value, TRACE accepts trade w/o clearing
- Contra Party Capacity - **Required When Applicable*** - **MISSING**
  - **Only *required* when reporting firm submits trade as Locked-In**
  - One character
    - "P" = Principal for trade
    - "A" = Agent for trade
- Reporting Party ID (RPID) – **Required** - **MISSING**
  - 4 characters denoting MPID of reporting party
- Reporting Party Give Up (RPGU) - **Required When Applicable*** - **MISSING**
  - MPID of Reporting Party Give Up Firm
  - Customer "C" cannot be entered
- Reporting Clearing Number – **Optional** - **MISSING**
  - Identifies clearing broker
  - Trace will validate NSCC only if a value is entered
- Reporting Party Capacity – **Required** - **MISSING**
  - 1 character indicator for reporting firm
  - "P" = Principal for this trade
  - "A" = Agent for this trade
- As-Of Indicator – **Required When Applicable** - **MISSING**

        - For As-Of entries, cancellations, or corrections
        - *Blank* = T-day trade
        - *Y* = As-Of (T+n) trade
        - **Y is Required on:**
            - **all Historical Cancels and Historical Corrections**
            - **T-1 and T-20 Corrections**
            - **T-day submissions originally submitted as an As-Of trade**
        - **For corrections of non-As-Of T-day submissions, field is all *spaces***
    - Trade Date - **Required When Applicable** - **ALL SET**
        - **Required if As-Of = Y, date must be T-1 or older**
        - **For regular trades, leave blank**
        - **To cancel or correct a prior trade, trade date MUST be submitted**
        - Date transaction was executed
        - Format: MMDDYYYY
    - Execution Time – **Required** – **ALL SET-ish (timestamp in background needs to be submitted)**
        - Time of execution in military format: HHMMSS
        - i.e. 2:03:02pm = 140302
    - Memo – **Optional** - **MISSING**
        - Alphanumeric, Fill unused positions with spaces.
    - Special Price Indicator - **Required When Applicable** - **MISSING**
        - ***Y* = Intentionally executed at a price not related to current market**
        - *Blank* = Transaction price not special
    - Special Price Memo - **Required When Applicable** - **MISSING**
        - **Required if there is a "Y" in Special Price Indicator field**
        - 50 characters to describe why there was a special price
        - Fill unused positions with spaces
    - Branch Sequence – **Optional** - **MISSING**
        - 8 alphanumeric characters
        - Must be same as branch sequence in header line 1
    - Contra Branch Sequence – **Optional** - **MISSING**
        - **Can only be filled when reporting firm submits the trade as Locked-In**
        - 8 alphanumeric characters
        - Indicates contra firm's branch office
    - Settlement Date – **Required** - **ALL SET**
        - Date the trade settles in format: MMDDYYYY
    - Factor - **Required When Applicable** - **ALL SET**
        - Factor amount for trade
        - **Options:**
            - **Enter value if % other than latest published factor was used**
            - **Use *blank* if latest factor was used**

        - 12 character max
    - Locked-In Indicator - **Required When Applicable** - **MISSING**
        - **Options:**
            - *"Y"* if reporting party entering trade report is reporting for both sides of trade in single report
            - *Blank* otherwise
    - Preparation Time – **Optional** - **MISSING**
        - Time of Trade submission in format: HHMMSS
        - Denotes time submitter prepared trade report or correction
    - Control Date – **Required for Records** - **MISSING (required for storage after submission, not input)**
        - **Needed, in combination with control number, for cancellations and corrections**
        - After submission and acceptance by TRACE, system returns date as trade acknowledgement
    - Control Number – **Required for Records** - **MISSING (required for storage after submission, not input)**
        - **Needed, in combination with Control Date, for cancellations and corrections**
        - After submission and acceptance by TRACE, system returns control number as acknowledgement
        - 10 digits

Appendices D through T

Content removed.