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LOBBYING – A FINANCIAL PERSPECTIVE

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A Dissertation

By

SEAN KEITH BYRNE

Submitted to Texas A&M International University
in partial fulfillment of requirements
for the degree of

DOCTOR OF PHILOSOPHY

May 2023

Major Subject: International Business Administration (Finance Concentration)

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ABSTRACT

LOBBYING – A FINANCIAL PERSPECTIVE (May 2023)

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U.S. based bank holding companies (BHCs) exert influence at every step in the legislative process where financial regulatory reforms are enacted into law, such as the Dodd-Frank Act, to promulgation of regulations. In Chapter II, we maintain that BHCs, upon facing salient regulation, lobby regulators to have their opinions heard with the goal of favorable regulatory change and to increase non-traditional revenues. We undertook a novel collection of political and financial data from 2003 to 2018, matching 180 pairs of parsed proposed and final regulations. BHCs that participated in commenting on proposed rules are highly successful at having their views noted in the final regulation, and other forms of lobbying increased this success. We fill an instrumental gap in financial literature, as we confirm that BHCs may well lobby regulators to preserve gains in all important, yet risky revenues.

In Chapter III, we ask how these non-traditional revenues and separately, systemic risk, impact BHC value and share price volatility. Surprisingly few scholars have explored the effect of revenues or systemic risk upon BHC value. An increase in the use of aggregate non-tradtional revenues or an increase of systemic risk, using Marginal Expected Shortfall, led to a decline in value of the BHC. It further led to a sharp increase share price volatility, illustrating a process of negative feedback loops.

Lastly, in Chapter IV, it is demonstrated that the U.S. Congress struggles in lifting the statutory debt limit in a timely manner, while tied to appropriations legislation. We maintain that Google Trends Economic Policy Uncertainty (EPU) and Interest Group Competition/conflict take a toll on U.S. Treasury Bill Yield Spread during contentious debt ceiling crises. We did so by employing auto-regressive distributed lag model on a novel collection of financial and political time series data from 2010 to 2016, at daily intervals. Our EPU proxy and Interest

Group Competition/Conflict led to a decrease in Treasury Yield Spreads and increased excess borrowing costs owed by the U.S. Treasury, due in part to the default premium. By examining all three chapters, we touch on the good, the bad, and the ugly of lobbying and political influence in finance.

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TABLE OF CONTENTS

Page

LIST OF FIGURES

LIST OF TABLES

CHAPTER I

INTRODUCTION

THE GOOD, THE BAD, & THE UGLY OF LOBBYING AND FINANCE

Politics play a highly significant role in corporate finance. Corporate political activity (CPA) is defined as, "Corporate attempts to shape government policy in ways favorable to the firm" (Hillman and Hitt, 1999). In these activities, the firm attempts to defend the status quo or change legislation and/or influence political institutions, such as the U.S. Congress, to a favorable policy outcome for the corporation. Importantly, corporations can do so through three methods: making campaign contributions through industry and trade political action committees, lobbying politicians in power on behalf of the firm, and using "revolving door" lobbyists.

Lux, Crook, & Leap (2012) explained “the good, the bad, and the ugly” aspects of CPA (including lobbying, campaign contributions, and more). A "good" aspect includes CPA improving business performance, allowing firms to secure favorable regulation and policy. The “bad” part of CPA pertains to the risks of political activity, where the investment in lobbying or a campaign contribution may not pay off, the lobbyist may not advocate in the contracting firm's best interests, and other competitors may "free ride" the hiring and work of a lobbyist. By “free riding” they gain favorable regulation at no cost in a less concentrated industry. The "ugly" aspects of CPA involve tactics that allow the firm to mitigate political activity risk such as collective action that can include performing political activities under the guise of an industry trade association. Industry trade associations normally include many members and do not, by law, require disclosure of its members or dues. This acts to reduce transparency and the probability of further or new firm specific reprisals and retaliations (Lux et al, 2012, p. 308).

The norm for political activity at most corporations in the United States, depending on their size and industry, is to be involved in campaign contributions and lobbying. Firms hedge their results by giving campaign contributions to both political parties (Fowler, Garro, & Spenkuch, 2020). A heightened interest in public and academic circles focuses on understanding the

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The model journal for this dissertation is the *Journal of Banking and Finance*.

complex effects of CPA and lobbying on shareholder wealth. One of the main forms of political strategies that corporations apply is lobbying.

In accordance with the Lobbying Disclosure Act (LDA) of 1995 and the Senate Office of Public Record, lobbying is defined as the following: "The attempt to persuade legislators to propose, pass, and/or defeat legislation, or change existing laws to provide benefits to parties with special interests."[1]

In the United States, three groups of law exist that affect lobbying directly, inclusive of other political activities, with the purpose of increasing transparency, ethics, and oversight of a lobbyist's actions and influence. The first law, the Foreign Agents Registration Act (FARA), was enacted as law 22 U.S.C. § 611 et seq. in 1938 and is administered by the U.S. Department of Justice. The FARA registration system is far more stringent than the other two lobbying laws, under which selective enforcement is the norm. The law applies to foreign governments and their propaganda and lobbying firms, who specialize in representing these entities, quasi-governmental agencies, and partially government-owned firms. The second law, the 1995 LDA, was enacted to bring transparency to the work of lobbyists but is far less restrictive than FARA. If a firm is strictly a foreign commercial entity, it may take advantage of an exemption under FARA that allows it to register to lobby under the LDA of 1995. There are a multitude of lessons that may be learned from those who practice lobbying on behalf of foreign clients, as their strategies are intricate and complex, yet yield results (You, 2017).

The last or third major group of laws relate to campaign contributions, that are made by both domestic firms and foreign affiliates. Campaign contributions, and the broader area of campaign finance, are governed in the United States, at the federal level, by not one law, but a collection of laws and strategic court cases. From early laws such as the Federal Election Campaign Act of 1971, The Bipartisan Campaign Reform Act of 2002, and a number of federal court cases form the foundation of present day U.S. Campaign Finance law. Amendments to the Federal Election Campaign Act of 1971 led to the creation of the U.S. Federal Election Commission (FEC) in 1975. The mission of this Federal Agency is to oversee three general areas and assist in publicly financing of the U.S. Presidential Election. First, the FEC places limitations on how much may be spent, and by whom, in federal elections. Second, the FEC restricts certain

[1] http://www.senate.gov/reference/reference_index_subjects/Lobbying_vrd.htm

sources of funding from federal campaign use. Lastly, this agency requires disclosure of campaign finances in attempt to deter abuse, yet also educate the electorate. [2]

U.S.-based foreign affiliates, as strictly commercial entities, may politically participate in U.S. elections. In accordance with the U.S. Federal Election Commission law, only employees and management who are U.S. citizens or permanent residents may form, operate, and donate campaign contributions to a political action committee (hereafter, PAC) on behalf of the foreign firm's affiliate operating in the U.S. These individuals may spend up to $5,000/year and up to a biennial total limit of $123,200. Lobbyists, as individuals, and their family members may give contributions, which are often tied to ideology and partisanship. While no guarantee, the Congressperson who receives contributions may share similar political and ideological beliefs as the donor. However, corporate donors often hedge their risk and give to both political parties. This is especially true, when members are up for re-election in highly contentious races, or when there exist much political uncertainty for firms (Bonica, 2014)

A third major political activity is where the lobbyist applies one's hard-won experience, network of contacts, and technical knowledge gained in government after leaving a legislative or regulatory post. Due in part to the complexities of legislative and regulatory issues, these individuals are in high demand and command a premium in salary. Some individuals go as far as returning to government service and then back into private industry. However, with the earlier passage of the Honest Leadership and Open Government Act of 2007 (Public Law 110–81, 121 Stat. 735)-known by its acronym, HLOGA-the Lobbying Disclosure Act of 1995 was amended that placed new restrictions on lobbyists. Among these newer restrictions are those on revolving door lobbyists and cooling off periods (Maskell, 2014). According to some, the law, along with several other restrictions on lobbyists and revolving door lobbyists, acted to drive many lobbyist to go "underground," where they became what is called, "strategic consultants," running and operating a well-honed lobbying campaign without ever picking up the phone or making direct contact with those currently in office, which has become the norm (Holman & Esser, 2019). Before moving further, it is worth mentioning the U.S. Supreme Court Case titled, *The U.S. FEC vs. Citizens United*, because the ruling had the unintended consequence of creating super PACS with access to outside money, without limit, used for advertising principally (Evers-Hillstrom, Arke, & Robinson, 2019).

[2] United States Federal Election Commission, March 11, 2023, https://transition.fec.gov/info/appfour.htm

We maintain that "the Good, the Bad, and the Ugly," apply differently to BHCs and lobbying. "The Good" is that through lobbying upon regulations, banks may at times be successful in forming a regulation that works favorably for themselves or the industry. "The Bad" in this case of BHCs is that the banks may be successful in achieving lenient regulation, that allows for the growth of riskier non-traditional revenues. Finally, "the Ugly", speaks to the interest group lobbyists, and how they may at times, act to impede congressional functioning. Interest group lobbyists are highly adept at creating, maintaining, and breaking gridlock (Victor, 2019). Hence, due to extreme competition among lobbyists and Congressional members in a debt ceiling-appropriations debate, lobbyists and members may inadvertently extend the debate, potentially causing a default on U.S. Treasury bills.

Our second chapter examines how and why banks lobby regulatory agencies. The first research objective inquires if bank holding companies, upon facing salient regulation, often lobby regulators or ex-post lobby to have their opinions and arguments heard. The bank holding companies (BHCs) seek favorable regulatory change. Hence, we explore whether banks that lobby financial regulatory agencies will have their comments cited and published in final regulations as a part of the rulemaking process by the agency.[3] When a bank is cited in a final regulation in the U.S. Federal Register, it is an indication that the bank has offered a substantive, informative, and persuasive argument in its comment. The regulations are normally highly complex in nature. Banks that are successful in being cited also tend to be successful in maintaining or increasing non-traditional income. The second question examines if BHCs that employ revolving door lobbyists increase the probability of being cited in the final regulation.[4] Finally, we inquire and examine whether the lobbying of regulatory agencies by large BHCs influences their nontraditional revenues. Coordinated ex-post lobbying efforts allow BHCs further to increase those revenues, which at the same time may induce higher levels of risk in

[3] Due to the information asymmetry and a need to understand repercussions for the industry, the agency calls for receipt of comments and/or meeting during the notice of proposed rulemaking and comments stage, as a final regulation arrives closer to fruition. Yet, firms do not just accept the regulation normally as initially offered.

[4] Almost 50% of lobbying from 1998 to 2012 took place after the United States Congress passed legislation. This is what we define as ex-post lobbying (You, 2017).

pursuit of certain non-traditional revenue sources. We further examine if hiring revolving door lobbyists allows these large banking conglomerates to not just have their opinion heard but also to have comments and results citations with the goal of favorable regulatory change.

Chapter III examines how over the course of the three decades the banking industry and BHCs have undergone dramatic changes in regulation-acutely experienced during the 2007 to 2009 financial crisis-leading to the creation of new products, services, and revenues in the form of non-traditional revenues. Idiosyncratic risk, if not managed correctly, may imperil a particular bank; however, systemic risk may imperil not just one bank but an entire economy.

BHCs will find it difficult to increase valuation in the form of Tobin's Q without increasing their contributions to the systemic risk of the banking system. Although our sample of data runs from 2003 to 2018, we first investigated if an increase or change in the non-traditional revenue composition has any effect upon bank valuation. This is especially relevant, as banks have undergone a dramatic reshaping of the revenue profiles after adapting to the effects of the 2007-2009 financial crisis, not to mention, the COVID-19 pandemic. Before arriving at our major questions, we examined how the composition of the non-interest, non-traditional revenues have changed over our sample period.

In the backdrop of a bank that is undertaking geographical and revenue expansion and diversification, we then inquired if an increase in systemic risk, as measured by Marginal Expected Shortfall (Acharya, Pedersen, Philippon, & Richardson, 2010, 2016) has any effect upon a bank value. Afterall, banks are keenly aware of their systemic risk levels and bifurcation points (Van Oordt & Zhou, 2019). We find that medium to large BHCs highly adaptable and resilient according to our data. In our final research objective, we seek to understand if an increase in aggregate non-traditional revenue leads to a decrease in BHC share price volatility. In this vein, we inquired if the systemic risk levels, or MES, of a bank increases, and we investigated if this further increases the annualized share price volatility measure, leading to elevated bank specific volatility. Combining relationship based, traditional revenues with an increase in use of non-traditional, transactional based bank revenues through diversification can lead to exacerbated levels risk volatility in BHC share price for bank management, following elevated contributions of systemic risk. [5]

In our last argument, we contend that an upward shift in the systemic risk contribution of a BHC will further exacerbate volatility. This may be owed to risk taking or a negative feedback loop while participating in the non-traditional revenue markets (Adrian & Brunnermeier, 2016; Strobl, 2016). Therefore, the secondary objective of our study is to demonstrate that the share price volatility of a BHC increases with a growing operational presence in non-traditional revenue markets and bank-specific systemic risk.

Our final chapter affords us an incredible base to work from as it relates to the debt ceiling crises, political uncertainty, and interest group competition and conflict. Although banks represent one portion of the donors that contribute with the purpose of stalling negotiations, upon enduring a debt ceiling it is ultimately the U.S. Treasury department that incurs large excess borrowing costs, and directly, the U.S. taxpayer.

One of the first research questions that we entertained in this important ending chapter revolves around somewhat of an anomaly. At the beginning of the chapter, we looked to the history of debt ceiling crises in the United States while taking into consideration the quantitative and theoretical literature surrounding the debt ceiling up to present. We did so to better understand the damaging effects of debt ceiling crises upon the U.S. Treasury Bills, i.e., the short end of the term structure. Our focus then changed to two different yet connected attributes that play a key role during a debt ceiling, as it relates to financial, economic, and political attributes.

Beginning with our second objective, we determine if a delay in raising the debt limit acts to elevate levels of economic policy uncertainty, in turn, negatively influencing the dependent variable, the U.S. three-month Yield Spread. Surprisingly, in many circles the U.S. Treasury Bill is thought to be risk free. Interestingly, in a related paper, municipal bonds underwent a sharp and steep rise to economic policy uncertainty, during times of state level gubernatorial elections (Gao & Qi, 2012). As local firms take a wait and see approach to investing, the demand for

[5] Several authors distinguish in the type of non-traditional revenues, stakeholder revenue and fee-for-service Revenue (Adrian & Brunnermeier, 2016). The former requires banks to hold risky assets, i.e., proprietary trading and investment banking. The latter requires little to no revenue, allowing banks to further leverage their positions, i.e., fees earned from the securities brokerage or insurance (DeYoung & Rice, 2004, DeYoung & Torna, 2013).

municipals bonds incurs a large reduction in reaction to the elevated uncertainty. This reaction gives way to a spike of eight basis points in yield upon municipal bonds. Therefore, local companies decide not to invest until they have a clear understanding of who will win, what policies will be implemented, and how it all will impact the firm. Similarly, in our second objective, we set out to determine if economic policy uncertainty, using Google Trends index, further undergoes a sharp increase due in great part to the Congressional delay in raising or suspending the debt ceiling. We inquired how this ultimately impacts the three-month U.S. Treasury Bill Yield spread.

Just as interest groups and their lobbyists may be pulled into conflict, especially by the legislator with whom they are most allied, interest group competition may turn to conflict, which can lead to gridlock (Binder, 2015; Garlick, 2020; Holyoke, 2009, 2018). Importantly, the last objective of this chapter was to determine what affect interest group competition may impact the work and functioning of Congress. We further determined that if a degree of opposition to current appropriations legislation dominates, together with more protracted, and salient debate, this will negatively influence our three-month U.S. Treasury yield spread. It adds to the delay in arriving at a consensus. On the other hand, support of interest groups and their congressional allies may also increase the three-month U.S. Treasury Yield Spread. In the end, this will give rise to savings via reduced excess borrowing costs (U.S. Government Accountability Office, 2015).

Our contributions to existing and upcoming literature are pronounced through this dissertation, beginning with the second chapter that investigates several forms of lobbying. First, this research involves only large BHCs, and is one of the first studies to do so, as it relates to their influence on regulation.[6] The majority of regulatory lobbying studies have focused on broad swaths of industries and interest groups. Our study advances the knowledge of how multiple mechanisms of influence on regulators, in the form of ex-post lobbying and employing former

[6] BHCs serve as the unit of analysis in this study for several reasons: First, these firms play a crucial economic function and policy role in the United States and globally. BHCs generate income from bank and non-bank sources. BHC revenue sources cross several industries, where they are regulated by multiple U.S. financial agencies.

agency employees, may further enhance the revenues of BHCs. This acts as our second contribution to the field.

The third contribution includes an original data collection that combines multiple political and financial data sources—with the BHC's name on the regulation—that are cited along with the finalized regulation in the U.S. Federal Register by the responsible regulatory agency. We further included lobbying records as they related to lobbying both Congress and regulatory agencies. We also identified if, upon reporting lobbying, any revolving door lobbyist is contracted, including name, and if they have an associated ideological score. We employed a matching algorithm to correctly identify all variations of a BHC name spelling.

Acting as our fourth and final contribution, we translated each FR-Y-9C by transforming all interest and non-interest revenues and expenses into the following three revenue categories: traditional, securitization, and non-traditional (Copeland, 2012). We carried this same transformation of revenues from Form FR-Y-9C, following the taxonomy of Copeland (2012) into our next chapter.

We make several contributions to the literature of BHCs, banking shareholder value, and systemic risk in the second chapter. Our first contribution arises from the quantitative examination of how the non-tradtional revenues of large banks have dramatically changed from 2003 to 2018. Our next contribution arises our second research question: Does an increase in non-traditional revenues in the aggregate form, and/or an increase in systemic risk, negatively impact bank value? Just as Fiordelisi and Molyneux (2010) noted, there are surprisingly few studies on the topic of shareholder value in banking, so we have attempted to fill this gap. Additionally, the literature that relates to the effect of systemic risk on bank value is scarce, yet it does exist. The second contribution emanates from our second research objective. We ask if it is possible for larger bank holding firms to earn revenues in non-traditional, non-interest revenues, while managing systemic risk levels without increasing bank share price volatility? We found that a shift in revenue composition toward non-traditional revenue will lead to an increase in bank specific volatility, while systemic risk maintains a positive relationship with bank volatility. We offer a conclusion that may be of value to banks, regulators, and shareholders.

Our third and final contribution arises from our detailed examination of the component revenues, and how they change over the period of 2003 to 2018. BHCs have not only diversified internationally, since 2003 BHCs have diversified in their number of major, non-traditional individual revenues, such as insurance, re-insurance, and annuity products and services. In the end, we developed a better understanding of the systemically risky behavior, and in our first chapter we learned how lobbyists advocate for similar systemically risky actions in the banking industry.

We contribute to a contemporary literature stream that examines the political, economic, and financial determinants at play in prolonged debt ceiling crises. Although the 2015 debt ceiling crisis was less contentious, it nevertheless proved costly as it relates to excess borrowing costs incurred by the U.S. Treasury. Second, we decompose the total excess borrowing costs owed by the U.S. Treasury as they relate to costly policy uncertainty and interest group competition turned conflict. We gauged the cost and default premium charged by investors for each debt ceiling impasse while employing a robust set of times series analysis methods and estimation techniques. The next unique contribution to the field emanates from testing hypotheses using auto-regressive distributed lag model and an error correction model. While controlling for other external forces in the market, we quantified the amount of time required for the three-month U.S. Treasury bill market to return to equilibrium. The last contribution stems from composing a novel collection of campaign contributions, lobbying, and positions of opposition and support of interest groups. We do so through the use natural language processing algorithms.[7]

[7] We are grateful for the access to several datasets. We were granted access to an API or application interface, where we extracted the entire U.S. Congressional Bill Position data series from Maplight.org. The sources for our lobbying and campaign contribution data series include www.opensecrets.org, the U.S. Senate's Office of Public Records, and the U.S. Federal Election Commission's data on campaign contributions.

CHAPTER II

BANK HOLDING COMPANY LOBBYING ACTIVITY UPON REGULATION AND ITS IMPACT ON NON-TRADITIONAL REVENUE

2.1. Introduction

The Dodd-Frank Act was signed into law as a reaction to the financial crisis of 2007 to 2008 and to bring about significant changes to banking regulation (U. S. Congress, 2010). Key elements of this act included macro and micro prudential regulatory reform in order to prevent the near collapse of the U.S. economy and related global financial markets. The Act also mandated the creation of a number of new financial regulatory agencies (Copeland, 2012). These changes could lead to highly complex, costly, and burdensome regulations, making it nearly impossible for a large number of banks to compete efficiently.

Lobbying, however, does not end when Congress passes the final bills. Large BHCs continued to lobby and perform extremely well past the congressional bill stage, and firms and individuals do not just accept new regulations that a regulatory agency proposes. For bank regulation, such as the Dodd-Frank Act, BHCs frequently lobbied the regulatory agency in an attempt to have their opinions and arguments heard and to encourage favorable changes to the regulation. They exert their influence at every step in the legislative process where financial regulatory reforms are enacted into law, such as the Dodd-Frank Act, and of the promulgation process of creating its regulations.[8]

However, risk taking behavior on the part of BHCs, and inadvertent risk incentives produced by the same regulatory reform and bank regulations remain in the years following reform (Bank of International Settlements, 2019). The ability of BHCs to influence banking and financial regulations globally and nationally draws attention to an inequality of representation that exists in the rulemaking process in the U.S. government and financial regulatory agencies (Igan & Lambert, 2019). Large organizations, specifically large BHCs, are a dominant, well-

[8] Before, during, and after the Dodd-Frank legislation passage, lobbyists working for banks outnumbered congressional members by a ratio of 20 to one. Citigroup, Wells Fargo, and J.P. Morgan spent $116 million in lobbying U.S. Congress from 2010 to 2012. The same three BHCs, over that same period, spent $84.5 million of the total of $116 million while lobbying financial regulators (Rivlin, 2013).

organized force that lobby regulators during the promulgation process. This is especially the case with salient and novel regulation, which carries the potential to impede bank operations.

The primary objective of this study is to investigate if BHCs, upon facing salient regulation, frequently lobby regulators or ex-post lobby in an attempt to have their opinions and arguments heard with the goal of favorable regulatory change. Therefore, this dissertation explores whether banks that lobby financial regulatory agencies will have their comments cited and published in the final regulations. Our second objective, therefore, is to examine whether employing a revolving door lobbyist leads to an increase in the probability of a BHC being cited in the final regulation. Our last objective examines whether the lobbying of regulatory agencies by large BHCs has any effect upon their non-traditional revenues. Coordinated ex-post lobbying efforts allow BHCs to continue or increase those revenues that may be at risk, such as non-traditional revenue sources.[9]

We illustrate several findings. First, a BHC makes use of multiple mechanisms of influence while lobbying regulators. A BHC that participates in commenting on proposed rules will be more successful at having its view mentioned in the final regulation, ensuring that at the very least its opinion has been heard. Second, we find that upon hiring a revolving door lobbyist, externally or internally, who is highly knowledgeable and well-connected, the probability of having a BHC's comment worded into the final regulation will increase (Ban & You, 2019; Bertrand, Bombardini, & Trebbi, 2014). Therefore, an increase in the use of revolving door lobbyists by one more revolving door lobbyist (RDL) increases the likelihood of receiving a further citation of a firm's comment in the related final regulation. The contributions of our research are several. First, this research involves only large BHCs and is one of the first studies to do so. Many regulatory lobbying studies focus on broad swaths of industries and interest groups. The second contribution is that these findings have advanced the knowledge of how the multiple mechanisms of influence on regulators and regulation affect the revenues for BHCs. The third contribution includes an original data collection that combines multiple political and financial data sources, inclusive of nine financial regulatory agencies.

[9] Approximately 50% of lobbying from 1998 to 2012 took place after the U.S. Congress had passed legislation. Firms choose to lobby the regulatory agencies following passage of the enacted legislation in place of further lobbying Congress. We define this form of lobbying as ex-post lobbying (You, 2019).

2.2. Literature Review

The focus of this study is on one specific highly regulated industry, bank holding companies, which tend to be large, have numerous resources, and are highly complex. We build on lobbying of regulation by further analyzing the impact of being awarded or afforded a final citation and its effect upon a BHC's non-traditional revenue. Over the last two decades, there have been vast improvements in the regulatory lobbying literature concerning the understanding of how frequently firms lobby, who they lobby, and how they lobby.

2.2.1. Ex-post Lobbying

To facilitate intense ex-post lobbying of regulators, congressional members vaguely word laws on purpose, which allows large BHCs to further their influence (You, 2017). Interest groups and banks devote much of their resources toward influencing the entire spectrum of policymaking, not just the U.S. Congress. A regulatory agency must take into consideration and review all comments it deems "substantive," and all agencies must integrate parts of comments into the final regulation (Carey, 2013; Rashin, 2020). The process of rulemaking is one of many duties of a financial regulatory agency that is under the auspices of the Administrative Procedure Act (APA) of 1946 (Carey, 2013).

Lobbyists, through their representation, often provide valuable information to regulators. This helps strike a balance between regulation that functions for industry yet meets the needs of other key participants, including the public (Igan & Lambert 2019; Rashin, 2020). Through tracking comments on proposed regulation and meetings by specific interest groups with regulators, certain authors are able to identify if an opinion was "heard" and acknowledged (Ban & You 2019, p.5).

Barriers to entry exist in regulatory lobbying, where firms continue to lobby once they have begun the process (De Figueiredo & Richter, 2014). When facing regulation that threatens important resources, large firms, including large BHCs, will lobby with a high propensity and intensity (Ban & You, 2019; Libgober & Carpenter, 2018; Rashin, 2020). A fundamental objective of this study is to determine if increases in a BHC's lobbying upon regulation and financial regulatory agencies leads agencies to acknowledge the opinion of the commenting BHC in the final regulation.

A number of other points lend support. First, a significant correlation exists between the frequency of commenting by firms on proposed regulation and actual changes in the final version of the regulation (Golden, 1998; Yackee & Yackee, 2006). Next, the more often comments include new information, data, and industry specific jargon in a concise manner, the more frequently the firms' views are then incorporated into a final regulation (Rashin, 2020, p.28). In a seminal paper, two authors discovered a strong relationship between the number of lobbying report submissions and the number of meetings with the SEC, which are highly associated with the final citations in the Securities and Exchange Commission's (SEC) final rule (Ban & You, 2019).

A number of recent advances in the literature of ex-post lobbying lend a certain degree of strength to our first argument and its direction. One recent author manages to identify if a commenter's arguments and preferences have been included in any changes to a final regulation when compared to its proposed form (Rashin, 2019).

In a subsequent advance, Libgober and Carpenter (2018) made use of the stock market intra-day price reactions of firms commenting upon regulations proposed by the U.S. Federal Reserve. By applying event study methods, they isolated and observed significant excess returns for those firms that commented on proposed regulation and who also had their preferences included in the final regulation. The effect of commenting, overall, for these publicly traded financial firms results in approximately $3.2 to $7.8 billion dollars in excess market returns (Libgober & Carpenter, 2018).

Lobbying of a regulatory agency upon a final regulation does not always lead to the agency acknowledging an opinion or comment by a bank. There exists evidence that stands contrary to this dissertation's first argument that merit discussion. In a random sample, Golden (1998) applied content analysis to analyze 10 proposed regulations, from notice of proposed rulemaking and receipt of comments to final regulation and publication in the Federal Register. She found only eight of the 10 proposed regulations were changed following comments. However, only one proposed regulation underwent significant change, while others underwent minor changes of little substance. Golden (1998) noted that the one regulation that was changed dramatically was most likely owed to private interest groups forming a united front in their objections to the rule. When comparing the findings by Golden (1998) and a more recent study by West (2004), each author arrived at similar conclusions, yet for different underlying reasons. Both authors determined that a private interest group may often frequently comment upon proposed regulation. They further found that this will not guarantee an acknowledgement of a firm's opinion in the final form of the regulation or a change to a final regulation. West (2004) utilized interviews as a primary source, complemented by an examination of 42 proposed amendments to final regulations. Moreover, he noted that of the 16 regulations that were amended before producing the final regulations, only five of the 16 were changed in a significant manner. Those five regulations underwent change, in part, due to comments by private interest groups, and in other part, due to political interference by elected officials.

The mixed results, in particular the findings of Golden (1998) and West (2004), are likely owed to different methods applied by authors when analyzing and attributing changes to final rules by specific interest groups, given the related comments upon proposed regulation. Some of these methods used by past authors include interviews, human coding, and content analysis (Ban & You, 2019).

A further concept that stands contrary to the first argument is that if a large, resourceful firm or BHC finds a proposed regulation to be salient or unfavorable, they may apply several alternative techniques in order to influence the outcome of a rule. A few of these include applying intense congressional oversight to a regulatory agency, ensuring lengthy confirmation battles for agency leadership, and inundating an agency with comments. Financial regulatory agencies are under legal obligation to review all comments received (Rashin, 2020).

The above points in support and contrary to this study's first argument lead us to a testable hypothesis:

> **Hypothesis 2.1 (H2.1):** In securing a citation in a final rule of a U.S. Federal financial regulatory agency, large BHCs will perform ex-post lobbying of regulators in the form of commenting during promulgation.

2.2.2. Revolving Door Lobbyists

The second argument posits that large BHCs that actively comment and are successful in forming a persuasive argument for the regulator will be cited in a final regulation. The first point of support for the above argument contends that BHCs will apply lobbying in a well-coordinated effort at influential stages of the promulgation process, depending upon the topic's level of salience. The methods employed combine various forms of lobbying, including lobbying congress, the use of revolving door lobbyists, and the disbursement of campaign contributions (Ban & You, 2019).

There are several key stages within the rule promulgation process, where the influence of lobbying tends to have much success. Lobbying during on the record and "off the record" meetings heavily influence the content of a proposed rule and possibly blocks a regulation from the regulatory agenda (Krawiec, 2013). Another stage utilized by BHCs is when rules are deemed to be "economically significant." These significant rules must undergo a review process by the Office of Information and Regulatory Affairs (OIRA) in this next key stage, allowing more opportunities for industry to meet with regulators (Haeder & Yackee, 2015).

The second point of support is that the use of RDLs increases a BHC's possibility of a favorable outcome when lobbying regulation (Ban &You, 2019). If the topic is complex or politically salient, BHCs will find it advantageous to hire an external revolving door lobbyist to compose comments or to represent a bank's interests.

Revolving door lobbyists play a key role by using their policy expertise or their valuable connections, acting as key negotiators in a meeting, or composing a comment before finalizing a regulation (Bertrand, Bombardini, & Trebbi, 2014; Vidal, Draca, & Fons-Rosen, 2012). In a recent study by Ban and You (2019), they found that firms that hire former SEC regulators to represent their interests through meetings or comments increase their chances of the firm being cited in a final regulation (Ban & You, 2019, p. 5).

We propose the following hypothesis:

Hypothesis 2.2 (H2.2): The use of a revolving door lobbyist by a BHC to lobby regulation leads to the likelihood of an increase in citations.

2.2.3. Non-Traditional Revenues

The lobbying of financial regulatory agencies by BHCs is an important element of this investigation, yet, just as crucial is studying the impact of this activity by BHCs upon bank revenue, specifically non-traditional revenue. One reason BHCs lobby is that they find non-traditional revenues valuable, and those revenues act as a hedge against market interest rate movements. The traditional intermediation model that relies substantially upon interest income, such as deposit taking and lending, further provides banks with capital to generate non-interest income. Non-traditional revenue allows large BHCs to further diversify their revenue streams, especially in periods of low or volatile interest rates. For example, these low interest rates, typical of post-crisis years, “induce” banks to shift some of their activities from interest generating to fee-based and trading, as their net interest margins tend to compress (Brei, Borio, & Gambacorta, 2020).

Another associated reason is that they complement traditional revenue sources. Although the shift toward non-traditional revenues began more than 20 years ago, banks’ ability to allow for diversification and complement traditional revenues remains, and some non-traditional revenue sources can be less sensitive to overall business conditions than traditional revenues (Bernanke & Kuttner, 2005). For example, several non-traditional, non-interest revenues, including insurance and investment banking, are not directly exposed to macro-economic conditions, such as the interest rate. This contrasts with traditional banking revenue, which consists of net-interest revenue. Traditional intermediation revenue can be highly variable at times due to its relationship with interest rate movements (Bernanke & Kuttner, 2005; Brunnermeier, Dong, & Palia, 2019; DeYoung & Roland, 2001).

Further, in a universal banking model, similar to many BHCs, relationship banking is often combined with transactional based revenue activities. Having both types of revenue under one roof allows a bank to expand product and service lines, leading to increased cross-selling opportunities (Ghosh, 2020). Negative or weakly correlated revenues may strengthen the large BHCs’ benefit of a diversified portfolio of both types of income sources.

Contrary to the above points of support, there are other means, apart from lobbying directly upon the development of a specific regulation, in which BHCs maintain or increase their non-traditional revenue sources, including lobbying for exemptions and the practice of regulatory arbitrage. BHCs may lobby for preferential discretionary treatment under the FDIC’s Prompt Correction Action Guidelines (Igan & Lambert, 2019). BHCs have previously employed regulatory arbitrage to circumvent U.S. regulatory capital requirements to continue derivative trading activities (Acharya, Schnabl, & Suarez, 2013).

This allows for a testable hypothesis:

Hypothesis 2.3 (H2.3): Together with ex-post lobbying, citations of a BHC's comments in an agency's final rule allows BHCs to maintain or increase non-traditional revenue streams.

In conclusion, we build upon the recent advances of two streams of literature that concern the following: lobbying by the banking industry and lobbying of federal financial regulatory agencies. We addressed the impact of lobbying upon regulation and its effect on firm revenue as a natural extension of previous studies from these two literature streams. Specifically, this dissertation investigated a highly regulated industry, bank holding companies, and the impact of lobbying financial regulators upon non-traditional, non-interest revenue sources over the span of 15 years. Yet to be addressed by other authors, we investigated the effect of lobbying of regulation upon non-traditional revenues of BHCs to fill this gap.

2.3. Data and Methodology

2.3.1. Data and Equations

2.3.1.1. Sample Attributes. A comprehensive sample of bank holding companies is included in this study using the Federal Reserve's Board of Governors National Information Center.[10] The FR Y-9C Federal Reserve forms list the quarterly income and expenses of BHCs in interest and non-interest revenue format. This serves as a primary resource for BHC accounting and financial information. The purpose behind the selection of this sample is based on the idea that larger BHCs tend to lobby and comment more (De Figueiredo & Richter, 2014; Gibson, Odabasioglu, & Padovani, 2018).

The bank holding companies sampled were chosen according to our design and taken from the U.S. Federal Reserve website, specifically from the Federal Financial Institutions Examination Council's (FFIEC) Peer Groups One and Nine. In addition to the choice of peer group, two noteworthy changes took place to the main sample. The sample originally began with 82 BHCs of both foreign and domestic origin that consisted of a number of smaller BHCs with less than $25 billion in consolidated total assets from first quarter 2003 to first quarter 2018.

The first sample change resulted in a reduction to 51 BHCs, with the requirement that each BHC have assets greater than $25 billion in the first quarter of 2003, lobby U.S. Congress

[10] www.ffiec.gov/nicpubweb/nicweb/HCSGreaterThan10B.aspx

or U.S. Federal regulatory agencies, and trade publicly for at least three quarters of the sample time of this study. We excluded the BHCs that did not meet the asset size requirements. It has been found that larger banks and bank holding companies, as measured in total assets, have the resources to maintain complex product offerings, such as those found in non-traditional revenue sources (Apergis, 2014). These non–traditional revenues are frequently the subject of multiple regulations found under this study. This is one of the main justifications for increasing the asset size requirement for those BHCs in the quarterly sample.

The second sample change took place through a reduction in frequency of the sample observations. We reduced the observation frequency from BHC-quarter or quarterly to BHC-year or annual observations. This is primarily owed to the high number of observations with zero comment activity at the quarterly level and with banks of total asset size below $25 billion. This left only three BHCs that did not lobby: Sterling Bank, AmSouth Bank, and Comerica.

2.3.1.2. Data Collection: Ex-post Lobbying, Revolving Door Lobbyists, Comments, Citations. The combination of unique lobbying activity reports of BHCs with other forms of ex-post lobbying, including the commenting activity across nine financial regulatory agencies, took place across several stages. The first step involved matching congressional activity, including the more controversial enacted bills and the final vote date for each enacted bill, with BHC lobbying activity. The final vote date served the purpose of determining when ex-post lobbying or lobbying after bill passage begins (You, 2017). In the end, the number of bills collected from www.congress.gov totaled 3,174. The congressional activity including only bills enacted into law and vote date corresponds to the 108th through 111th sessions of the U.S. Congress (2003 to 2018).

The next step in the first stage involved merging all congressional bill and vote data with BHC ex-post lobbying and revolving door lobbyist data to form a large SQL relational database. The Center for Responsive Politics (CRP), served as the source for all BHC related ex-post lobbying data. By merging this data, the author could identify all sample BHC lobbying activity and related expenditures. [11]

The second stage involved collecting and matching BHC comment and meeting activity on proposed regulations and any citation of the BHC in the related final regulation, together with

[11] www.opensecrets.org

BHC ex-post lobbying and congressional data in the same quarter and year. In a further step, the comment upon proposed regulation and the related final regulation were then queried for the names of BHCs used in this study. All comment letter and meeting data between BHC representatives and regulators were collected and sourced from one of five major financial regulatory agencies and four additional agencies. Aside from each U.S. financial regulatory agency website, further sources for comment, meeting, and regulation data include www.regulations.gov and the U.S. Federal Register.

Several tools were instrumental in identifying and matching BHC names within related financial agency regulation. The author applied natural language processing (NLP) and Python related algorithms, including fuzzy logic matching and NLP shallow parsing or "text chunking" (Chopra, Josni, & Mathur, 2016). These non-trivial algorithms allow one to identify commenter names and citations of BHC comments within a final regulation. In the end, the proposed and final regulations consisted of 180 web-parsed pairs of proposed and final regulation.

2.3.1.3. From Interest and Non-Interest to Traditional and Non-Traditional BHC Activity. The author used the FR Y-9 format to divide revenue data into three categories: traditional, non-traditional, and securitization. Copeland (2012) constructed these categories so that any new form of revenue earned falls into either securitization or non-tradtitional revenues. The Federal Reserve requires BHCs to report, using the FR Y-9 forms yearly, while the FR Y-9C is done on a quarterly basis. The FR Y-9 forms display the categories of interest and non-interest revenues and expenses. This analysis applies and builds on the taxonomy of Copeland (2012). The author started by translating interest and non-interest revenue into the three categories of traditional, securitization, and non-traditional revenues, where the latter serves as a key explanatory variable in this study. The non-traditional revenue category includes trading revenues, investment banking and underwriting of securities fees and commissions, venture capital revenues, insurance commissions, and fees and interest income from trading assets less interest expenses (Copeland, 2012).

2.3.2. Equations

To examine Hypotheses 2.1 and 2.2, we used Equation 2.1. Further, to test Hypotheses 2.2 and 2.3, Equation 2.2 was put forth.

$$Citations_{i,t} = B_0 + B_1 Ln(1 + Ex - postlobby)_{i,t-1} + B_2 Comments_{i,t-1} + \delta_1 RDL_{i,t-1} + \phi_C X_{i,t-1} + \upsilon_i + \nu_t + \varepsilon_{i,t} \quad (2.1)$$

$$Non - traditionalRevenue_{i,t} = \gamma_0 + \gamma_1 Ln(1 + Ex - postlobby)_{i,t-1} + \gamma_2 Citation_{i,t-1} + \delta_1 RDL_{i,t-1} + \phi_C X_{i,t-1} + \upsilon_i + \nu_t + \varepsilon_{i,t} \quad (2.2)$$

2.3.3. Variables

To control for effects upon bank performance, Equations 2.1 and 2.2 include control variables that also affect performance, valuation, profitability, leverage, and risk. A vector $(\phi_C X_{i,t-1})$ (+/-) of control variables includes the following: bank (υ_i) (+) and year fixed effects (ν_t) (+) and the residual error term ($\varepsilon_{i,t}$) (-/+).

We made use of a number of control variables, such as total assets (natural logarithm of total assets) that controlled for size, as well as non-interest income share as a performance measure (total non-interest income to total operating income). Next, the tier one leverage ratio and total loans to assets ratio acted as proxies for leverage. We further included measures of performance, such as deposit funding structure (total deposits out of the sum of deposits - money market funding), profitability (return on equity), asset growth (annualized growth in total assets), and expected credit risk (loan loss provision to total assets).

Equation 2.1 examines if multiple forms of ex-post lobbying leads to a higher probability of a regulatory agency citing a BHC's comment in a final regulation. The dependent variable, Citations ($Citations_{i,t}$), also measures the number of citations that integrate substantive comments from BHCs in a final regulation. Comments ($Comments_{i,t-1}$) (+) represents comments on specific proposed regulations composed by BHC representatives and delivered to the financial regulatory agencies. The websites of a number of financial regulatory agencies and the U.S. Federal Register served as sources for these citations of firm comments in the finalized regulation. Independent variables are, from left to right, the Constant (B_0) (+) and the Ex-post

Lobbying variable (*Ex-postlobby*$_{i,t-1}$) (+). Ex-post lobbying focuses upon a specific regulation that is undergoing formation by a financial regulatory body. The form of lobbying may take multiple forms, including comments and the use of revolving door lobbyists. This examination follows the methodology of You (2017) and Ban and You (2019) in calculating these variables. In this equation, Revolving Door Lobbyist ($Revolvingdoorlobbyist_{i,t-1}$) (+) is treated as a dummy variable which will equal "1" if an RDL is used as a lobbyist by a BHC, and "0" if not.

Equation 2.2 begins with the dependent variable BHC Non-Traditional Revenue ($Non - TraditionalRevenue_{i,t}$) for a BHC i during time t. The right side of the equation comprises the constant (γ_0), which precedes the variable Ex-post Lobbying (*Ex-postlobby*$_{i,\ t-1}$). Ex-post lobbying signifies lobbying activity once a bill has been passed and targets the related regulation(s). All remaining variables and expected signs were described in the previous two paragraphs.

2.3.4. Methodology

2.3.4.1. Choice of Estimators

The structure of the data includes 51 unique BHCs across 15 years from 2003 to 2018. This leads one to determine if and what type of panel data estimation procedure is appropriate. The objective of Equation 2.1 is to study the effect of three determinant variables—revolving door lobbyist, ex-post lobbying, and citations upon the non-traditional revenue of each bank holding company across time—while controlling for time invariants and differences between BHCs. We chose fixed effects as the primary estimation model, as the assumptions for random effects are stringent. Further, we estimated using the Breusch-Pagan Lagrange multiplier, in addition to the Hausman estimation procedure, while seeking the more appropriate estimation model.

Given that there exists a large number of zero observations for the comment and citation variables, the results in regression Equations 2.1 and 2.2 were left skewed at "0" in the original quarterly dataset, which continued into the annual sample. As the dependent variable of Equation 2.1 is a count, we found that the negative binomial in Table 2.1 is most appropriate. This is especially true given the excess number of "zero" observations and a somewhat smaller sample at annual frequency. Hence, to ensure we do not have false positives on our coefficients, we

Table 2.1.

Primary regression results for Equations 2.1 & 2.2.

$$Citation_{i,t} = B_0 + B_1 Ln(1 + Ex - postlobby)_{i,t-1} + B_2 Comments_{i,t-1} + \delta_1 RDL_{i,t-1} + \phi_C X_{i,t-1} + v_i + v_t + \varepsilon_{i,t} \text{ (2.1)}$$

$$Non - TraditionalRevenue_{i,t} = \gamma_0 + \gamma_1 Ln(1 + Ex - postLobby)_{i,t-1} + \gamma_2 Citations_{i,t-1} + \delta_1 RevolvingDoorLobbyist_{i,t-1} + \phi_C X_{i,t-1} + v_i + v_t + \varepsilon_{i,t} \text{ (2.2)}$$

Dependent Variable, Equation	Citations (2.1)	Non-traditional Revenue (2.2)
Estimator	Negative Binomial	Ordinary Least Squares
Comments	0.112***	
	(0.0202)	
Citations		0.003
		(0.003)
Ex-post Lobbying	0.051***	0.0150***
	(0.0177)	(0.005)
Revolving Door Lobbyist	0.866***	
	(0.263)	
Ln (Total Assets)	0.342***	0.0509
	(0.0957)	(0.072)
Tier One Leverage	0.086.*	0.00007
	(0.0478)	(0.000)
Total Loans to Total Assets	1.323*	-1.532***
	(0.710)	(0.461)
Share of Deposit Funding	-1.240*	-0.880**
	(0.688)	(0.363)
Profitability	1.895	0.526
	(1.406)	(0.393)
Expected Credit Risk	3.873**	14.48**
	(21.88)	(6.576)
Non-Interest Income Share	0.613**	0.318***
	(0.307)	(0.117)
Annual Asset Growth	-0.122***	0.215***
	(0.333)	(0.061)
Constant	-3.348***	14.18***
	(0.524)	(0.288)
Observations	468	467
R-squared		0.129
Number of Bank Holding Companies	51	51

Note: Robust standard errors appear in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Variables are lagged to illustrate the effect of a one-year lagged period upon the dependent variables for both equations.

further included a Poisson regression model estimation in Table 2.6, which assumes the mean equals variance in parameter. It was decided then to transform at least one variable. Taking the natural log of (1 + ex-post lobbying), assisted to a certain degree in normalizing the variables distribution.

2.3.4.2. Robustness Measures. All independent and control variables in Equations 2.1 and 2.2 were lagged by one period reverse causality. As the total assets' variable is highly correlated with both independent and control variables, this was transformed and orthagonalized. As a final step to ensure the integrity of the panel data, in Equation 2.1 we applied bank-fixed effects, while employing year dummy variables in Table 2.1. In essence, we applied both firm and year fixed effects in each equation or variation. The bank fixed effects control for unobserved heterogeneity across BHCs, such as bank level strategy, managerial talent, and CEO compensation. Year fixed effects, in the form of dummy variables, controlled for changes in the political, regulatory, and institutional environments over the time span of 2003 to 2018. In the end, we applied bank and year fixed effects to both Equations 2.1 and 2.2, in addition to robust and/or clustered standard errors at the BHC level.

2.4. Empirical Results

2.4.1. Descriptive Statistics

Preliminary descriptive results from Table 2.2 demonstrate similar results with respect to comment letters and citations. Just as previously found, similar to Ban and You (2019), citations of BHCs clearly outnumber comments by BHCs upon related proposed regulations. Further inspection leads one to believe that these are also highly salient regulations that affect important revenue sources such as trading, investment banking, and securitization.

The correlation illustrated in Table 2.3 between comments and citations is somewhat high, at 0.44. Summary results indicate an annual maximum of 111 BHC final citations with a minimum of 0 and a standard deviation of approximately 9 citations, while comments has an annual range from a minimum of 0 to a maximum of 21 with a standard deviation of approximately 3. The number of BHCs that are cited in the final rule form of regulation by agencies clearly are similar to the results for firms of larger asset size. Ex-post lobbying has a low level of correlation with citations at 0.05, 0.08 with comments, and 0.129 with non-traditional revenues. While we transformed all non-traditional revenue using the natural log, the raw non-traditional revenue variable has a mean value of $3,654,232,000, with a standard deviation of $7,984,043,000 and a minimum of $4,201,000 with a maximum value of $62,000,000,000.

2.4.2. Discussion of Results

While examining the control variable vector $\phi_C X_{i,t-1}$ in both equations found in Table 2.1, the author found overall that these variables remain statistically significant and consistent with theory. These control regressions are in Tables 2.4 and 2.5 in the Appendix.

The purpose of Equation 2.1, located in Table 2.1, is to examine the likelihood of a BHC to lobby regulators, and to comment on proposed regulation with the intent to have the BHC's argument cited in a final form of a regulation. Our first equation demonstrated that ex-post lobbying and comments are associated in a positive and significant manner with the citation of a BHC in a final form of a regulation. For a 1% increase in ex-post lobbying, the BHC will see an increase in the number of citations by an amount of 0.005 citations. To reiterate, correlation levels are low, yet the correlation between comments and citations is at 0.44. This evidence leads me to accept Hypothesis 2.1.

Located in Table 2.6 of the Appendix, using Equation 2.1, this study has provided additional evidence in favor of accepting Hypothesis 2.1 and Hypothesis 2.2. We included a regression model, using a Poisson estimator and robust standard errors, similar to the suggestion of Cameron and Trivedi (2009). The same three independent variables, as found in Table 2.1, Equation 2.1 are found to be statistically significant (P < 0.01) in Table 2.6.

The important role that the revolving door lobbyist plays in lobbying campaigns for large BHCs is evident. As illustrated in Equation 2.1 in Table 2.1, the use of a revolving door lobbyist by a BHC may indeed lead to a final rule citation and perhaps a favorable change in the final regulation. There is no guarantee that any accompanying rule change will be affirmative, but larger institutions, such as large BHCs, are often able to obtain a favorable rule change (Libgober & Carpenter 2018; Rashin 2020). In interpreting the regression coefficients in Equation 2.1 in Table 2.1, the citation of firm's point of view in the final regulation is statistically significant and more likely to occur, given the regression coefficient of 0.866. Therefore, while holding all constant, employing the services of a revolving door lobbyist, the BHC is more likely to receive a citation in the final regulation than a BHC that does not employ an RDL.[12] To ensure the integrity of our findings, we used the Poisson estimation model with robust standard errors.

Moreover, the pairwise correlation coefficients between the variables revolving door lobbyist, citations, and non-traditional revenue demonstrate statistical significance of below the 5% level. The overall evidence leads me to accept Hypothesis 2.2, where the use of a revolving door lobbyist leads to an increase in a BHC's citations.

One part of the objective of Equation 2.2, found in Table 2.1, is to examine if having a BHC's comment cited in a final regulation leads to an increase in non-traditional revenue. We examined this equation in Table 2.1 using an Ordinary Least Squares (OLS) estimation, in addition to fixed effects upon our panel of data. The OLS estimation model in Table 2.1 demonstrates a positive and significant relation for ex-post lobbying as it relates to the dependent variable, non-traditional revenue. However, the regression coefficients are quite small, if not negligible. For a 1% increase in ex-post lobbying, we find a 0.000148% increase in non-traditional revenue. This leads us to reject the third hypothesis.

Unfortunately, the results from Equation 2.2 illustrate a significant, yet small effect of ex-post lobbying on non-traditional revenue. In Figure 2.1, we demonstrated the impact of BHC ex-post lobbying on non-traditional revenue, after transforming the ex-post variable. In part, due to collecting comments upon proposed rules, our overall sample lacks in size, when compared to other studies that have investigated this area of the literature.

As recommended by Cameron and Trivedi (2009), we applied standard robust errors for our Poisson estimation model in Table 2.6, which is found in the dissertation Appendix. In Table 2.1, we applied a negative binomial estimation regression model, as it allowed us to account to a certain degree for over-dispersion of the dependent variable data, as seen in its conditional distribution. To fortify our results, in light of the smaller magnitude of certain coefficients, we also included an Average Treatment Effects using regression adjustment estimation with a Poisson distribution. We performed these robust measures, noted above, in an attempt to verify

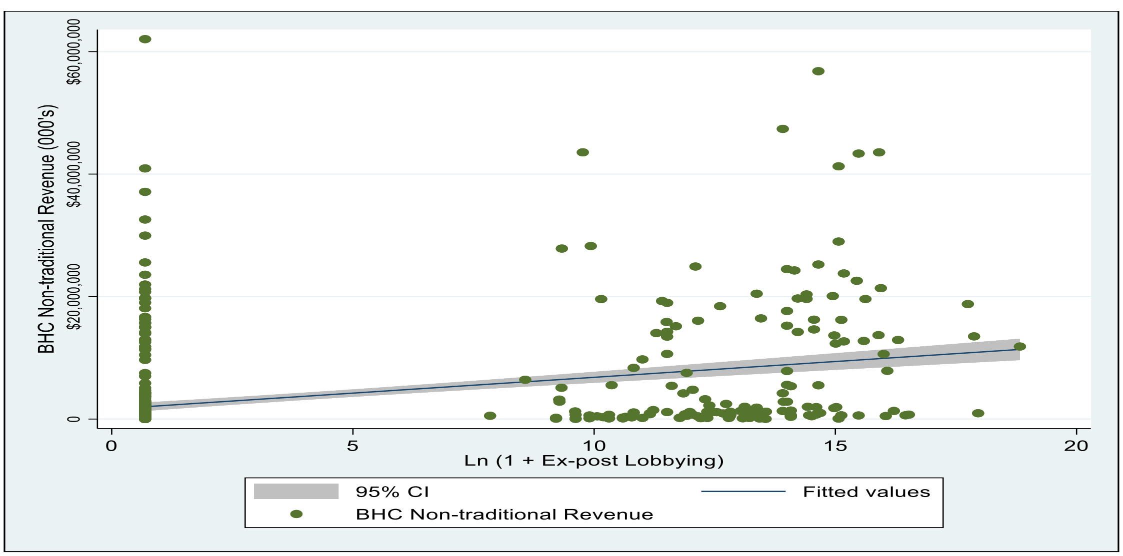
[12] For a one unit increase in the categorical independent variable, revolving door lobbyist, led to an approximate increase in the log count for final citations by 0.866*100. By employing one additional revolving door lobbyist, holding all else constant, will positively increase the likelihood for a BHC to receive an additional citation in the final regulation. (Cameron & Trivedi, 2013).

and better understand the dynamics of our results, especially as they relate to Hypotheses 2.1 and 2.2.

This would especially be the case as it relates to the opposing direction of Equation 2.2, where BHCs who face regulator actions may attempt to deter enforcement by the SEC through lobbying (Igan & Lambert, 2019; Schweizer, 2013). Igan and Lambert (2019) discussed how BHCs lobby in order to reduce the speed of enforcing prompt corrective action. If regulators do not cite a BHC in a final regulation, would this mean that they are still likely to lobby the agency? For this particular type of lobbying, a comment should come first, followed by the inclusion of the BHC's argument in a finalized regulation. However, there is always the possibility of omitted variables or endogeneity, in general, that may weaken the inferences made in this article. Yet, one must undertake some form of assumption in order to progress forward in research. Our work is in keeping with other recent literature on regulation and lobbying. With that said, we undertook counterfactual tests, including treatment effects and frequency tables that are included in the Chapter II Data Appendix.

There are multiple forms of lobbying by BHCs, some of which we did not account for, such as meetings with regulators. These forms include meetings, oral communication, and the

Figure 2.1. BHC ex-post lobbying upon non-traditional revenue with a 95% confidence.



influence of U.S. Congress members upon agency regulators. There is always the possibility that a BHC may not have the comments included in a final citation of a regulation. We found nine out of 86 BHCs, or approximately 10%, from our original quarterly sample lobby regulators while not receiving a final citation. These nine tend to be smaller BHCs that lobby regulators less frequently, as shown by our data. We further performed a treatment effects matching process with Stata software using the “regression adjustment” estimator under a Poisson distribution. This allowed us to compare groups who have lobbied regulators and are cited in a final regulation against groups who have not. Although the sample is small, the average treatment effect estimator is statistically significant ($P<0.01$). These results are found in the Chapter II Data Appendix.

2.5. Conclusion

The first contribution of this research emanates from its unique focus and perspective. A majority of recent studies within this literature stream of lobbying upon regulation have analyzed a broad spectrum of firm types and industry sectors. This study takes a narrower approach by focusing on one unique interest group, BHCs. The first and second research questions that this study pose relate to the propensity of a bank holding company to lobby financial regulators by way of comment or use of a revolving door lobbyist. We find that increasing the propensity of comments and the hiring of a former agency official while lobbying the regulator leads to a higher likelihood of having the BHC’s opinion heard, and their stance mentioned in the final regulation. It is not within the scope of this article to determine if the actual change in the final form of the regulation is favorable or not.

The final question that this study asked is: Do the various forms of lobbying a regulator or being cited in a final regulation following a visitation or comment lead to a change in the non-traditional revenue of a BHC? Following an examination of lobbying of the U.S. Congress by BHCs, Gibson, Odabasioglu, and Padovani (2018), a need for future research into other forms of political participation is identified, which we attempt to fill. Following our interpretation, the coefficients are quite small, leading to negligible effects upon this type of revenue, and the ultimate rejection of our third hypothesis. Nonetheless, we have gained by identifying where we can further improve our study.

Therefore, another contribution this research provides is to fill a part of this gap in the literature by further illuminating where emphasis needs to be placed in future research that draws a clearer connection between lobbying regulation, favorable regulation, and increasing non-traditional revenues. As noted, an increase in ex-post lobbying of a BHC leads to a small, significant increase of a BHC's total non-traditional revenue based on our regression results. We must reject the notion at present, as we cannot confirm that BHCs may lobby regulators to preserve gains in all important revenue sources. The causal path needs to be drawn more precisely with other instruments and variables.

The final contribution of this research is the creation of an original data set. Spanning the years 2003 to 2018, the financial and political activity of each sample BHC is identified on a quarterly basis. The SQL database combines three forms of BHC political participation: lobbying, both ex-ante, or before passage; and ex-post, revolving door lobbyists; and regulations across nine financial regulatory agencies. The use of unique natural language processing matching algorithms identify which banks are mentioned in each of the 180 web-parsed pairs of proposed and final form regulations.

There exist a number of limitations in our study. One limitation relates to the sample size of this study and the related comment and citation activity of BHCs. When comparing the 51 BHCs to the samples of several recent articles, a large difference in sample size is apparent. This could be one potential reason for the large number of zero observations, in addition to the over-dispersion issue that arises from the dependent count variable in Equation 2.1. Just as previous studies have illustrated, market share and asset size matter when commenting and being cited in a final rule.

Another limitation relates to meeting data in the wake of the Dodd-Frank reform and formulation of related proposed rules. Although all data on commenting is available from 2003 to 2018, meeting data was not. However, with that said, meeting data is quite helpful in identifying and determining parties represented on both sides.

The implications of the evidence presented in this article are wide ranging, touching upon banking, finance, and rulemaking bodies of literature. Two important areas of future study are implicated by this research. The first area asks if the commenting by a BHC leads to a favorable rule change and if this leads to regulatory relief. Another important area that warrants more investigation is the impact of a rule change due to regulatory lobbying on the specific components of non-traditional and traditional revenue. Large bank holding companies will and are always adapting to the present and future regulatory landscape.

CHAPTER III

BANK HOLDING COMPANY NON-TRADITIONAL REVENUES, VALUE, VOLATILITY, AND SYSTEMIC RISK

3.1. Introduction

In this chapter, we examined for the effect of non-interest, non-traditional revenue on bank value, performance, and several forms of risk. Over the last thirty years, the banking industry and bank holding companies have undergone dramatic changes in regulation, experienced the 2007-2009 financial crisis, leading to the creation of new products, services, and revenues in the form of non-traditional revenues. Idiosyncratic risk, one part of total risk, if not treated appropriately through diversification, portfolio optimization, and management, may imperil a particular bank. However, systemic risk may imperil not just one bank, but an entire economy.

The ability and incentives of banks to diversify in terms of assets, revenues, or geography has changed profoundly from before the financial crisis to after, in response to the above-mentioned changes. Early in the 1990's and into the 2000's, as banks evolved theoretical reasons existed for them to diversify and offer various non-traditional products combined with traditional products and services. Banks were able to offer their clients a better range of services, while leveraging managerial skills across products lines, as some non-traditional fee-based products reduced the cost of financial distress (DeYoung & Torna, 2013). Further, we may also apply modern portfolio theory (Markowitz, 1952) and portfolio optimization to banking. Equally as important, the introduction of non-interest, nontraditional revenues, when imperfectly correlated and combined with traditional margin revenue, should decrease bank specific volatility, and increase stability.

However, in the post-crisis era of Dodd-Frank regulation, the incentives and abilities of bank holding companies to diversify have changed. As banks adjusted their risk models to work with new types of revenues and regulations, bank and BHC regulation evolved to keep pace with new and more complex products and risks.[13] Diversification of BHC non-interest, non-traditional

[13] The Dodd-Frank Wall Street Reform and Consumer Protection Act, was passed by the U.S. Congress, and signed by President Obama, on July 21, 2010, (Pub.L 111–203 Statutes at Large,124, Stat. 1376–

revenues in this type of highly competitive environment may indeed lead to a potential conflict, as it creates a reduction in bank specific share price volatility while inadvertently or intentionally increasing systemic risk. Due to an increased presence in key revenue markets, geographical footprint, and well as the ability for managers to herd, banks have become similar (Acharya & Yorulmazer, 2004; Wagner, 2010).[14] They now hold assets that are highly correlated through the likes of shared markets, insurance, lending, underwriting, and/or acting as counterparty. The probability of joint failure is quite high, post-crisis.

The first argument is two-fold, illustrating our first and second hypotheses. First, we maintain that as BHCs increase their use of non-traditional revenues, as BHC revenue activities from the first quarter of 2003 to the first quarter of 2018 demonstrate it will lead to an increase in bank valuation. Moreover, we contend that an increase in systemic risk, as measured by MES, will further affect bank value, acting to decrease Tobin's Q over the same period.

We maintain that a BHC will find it difficult to increase valuation without increasing its contribution to systemic risk of the banking system. However, BHCs, banks, and non-banks are regulated on their level of systemic risk to the system through the use of counter-cyclical regulatory capital charges and mandated liquidity levels. Banks are keenly aware of their systemic risk levels, i.e., the bifurcation point (Van Oordt & Zhou, 2019). The primary objective of our study was to ascertain if the continuing use of new revenue sources and intentional or inadvertent increases in systemic risk contributions explains a change in their market-based valuation.

The next argument is multi-faceted, representing our third and fourth hypotheses. First, we introduced another form of risk apart from systemic risk, in the form of annualized share price volatility. We contend, as BHCs increase their non-traditional revenue composition, bank share price volatility will increase. However, as the systemic risk contribution of a bank increases, this will positively impact their bank specific volatility.

2223). The purpose of this Act was to reign in the underlying risks related to the Financial Crisis of 2007-2009.

[14] Herding, i.e., an adverse incentive to mimic the business models of other large banks, with the incentive of implicit government bailout, upon failing jointly, under the premise of "too many to fail" (Acharya & Yorulmazer, 2004; Wagner, 2010).

Combining relationship based, traditional revenues with an increase in use of non-traditional, transactional based bank revenues through diversification can lead to exacerbated levels risk volatility in BHC share price for bank management, following elevated contributions of systemic risk. Increased volatility may be owed to the nature or risk-return profile of the specific non-tradtional revenue. An excellent example lies with two distinct types of non-traditional revenues, stakeholder revenue and fee-for-service Revenue (Adrian & Brunnermeier, 2016; DeYoung & Torna, 2013; Stiroh & Rumble, 2006). The former requires banks to hold risk assets, such as proprietary trading and investment banking, while the latter requires little to no revenue, allowing for banks to further leverage their positions, such as fees earned from the securities brokerage or insurance (DeYoung & Rice, 2004; DeYoung & Torna, 2013).

In our final argument, we contend that an upward shift in the systemic risk contribution of a BHC will further exacerbate volatility. This may be owed to risk taking or a negative feedback loop while participating in the non-traditional revenue markets (Adrian & Brunnermeier, 2016; Strobl, 2016). Therefore, the secondary objective of our study was to demonstrate that the share price volatility of a BHC increases with a growing operational presence in non-traditional revenue markets and bank-specific systemic risk.

Our findings are several, as we ascertain if the continuing use of new revenue sources and systemic risk contributions explain a change in market-based valuation. We first found that a 1% increase in non-traditional revenue leads to a significant decrease in bank valuation as represented by Tobin's Q (Tobin, 1978). In our second finding, we discovered that a 1% increase in MES leads to a 7.99% or 8% decrease in bank valuation.

Our next group of findings illustrate the effects of annualized share price volatility. We found that an increase in the use of non-traditional revenues acts to decrease bank specific risk. Surprisingly, we also found an increase in systemic risk reinforces high levels of bank share price volatility. This may be due to high levels of correlations and the existence of a volatility feedback loop, where systemic risk further amplifies volatility (Adrian & Brunnermeier, 2016; Mieg, 2020). Our results point to the importance of better understanding the interaction of price volatility and systemic risk in banking and bank holding companies.

Our paper makes several unique contributions to banking and systemic risk literature. Our first contribution arises from our primary research question. It asks if an increase in non-traditional revenues in the aggregate form, and/or an increase in systemic risk, positively impacts bank value. Our focus was not necessarily on the firm or sector level determinants of systemic risk in banking, which allowed us to deliver a unique contribution to the literature of systemic risk and banking value, as we were able to gauge the impact of systemic risk upon bank holding company value. Just as Fiordelisi and Molyneux (2010) noted, there are surprisingly few studies on the topic of shareholder value in banking. We attempted to fill this gap. Additionally, the literature that relates to the effect of systemic risk on bank value is scarce, yet it does exist (Iqbal, Strobl, & Vahamaa, 2015; Strobl, 2016).

The second contribution follows from our second research question. We analyzed the seeming conflict that exists in banking, particularly in larger banks and asked the following question: Is it possible for a bank to earn revenues in non-traditional, non-interest revenues while managing systemic risk levels without increasing bank share price volatility? We found a shift in revenue composition toward non-traditional revenue will lead to an increase in bank specific volatility, while systemic risk maintains a positive relationship with bank volatility. We offer a conclusion that may be of value to banks, regulators, and shareholders.

Our third and final contribution, as illustrated in Figure 1, arises from our detailed examination of the component revenues, and how they change over the period of 2003 to 2018. Not only have BHCs diversified internationally, since 2003, they have also diversified in the number of major non-traditional individual revenues, such as venture capital and annuity products and services.

3.2. Literature Review and Hypothesis Development

3.2.1. Non-traditional Revenues and Bank Valuation

Early and more recent literature support the use of a BHC expanding into non-traditional revenues as value and performance enhancing. First, building upon theoretical intermediation literature, information gathered while monitoring borrowers and lenders serves as an invaluable component and a natural complement to non-traditional revenue activities, such as wealth management, at a low cost (Diamond & Dybvig, 1983). This type of diversification of combining and expanding business into non-traditional revenues has led to economies of scope, where the existing clientele of a bank are offered an array of complementary products or services, including wealth management services and insurance together with traditional commercial banking products (DeYoung & Rice, 2004; Boot & Ratnovski, 2012). More recently, as a bank increases in size and progressively invests in advanced information technologies, economies of scale increase with its ability to process and manage large amounts of data, including information on clients and future clients (Hughes & Mester, 2013; Wheelock & Wilson, 2017).[15]

It is not always the case that a BHC will increase bank value or bank performance after increasing non-traditional revenues. First, there exist vulnerabilities in the formation and operation of a *universal* bank. A number of scholars who approached this issue at an early date outlined the reasons that these activities may prove non-beneficial for a bank's performance, in part, because a number of these activities require significant upfront costs, including switching costs, higher operating costs, and the amount of leverage required to operate income generating activities such as trading desk and securities brokerage (DeYoung & Roland, 2001; Stiroh & Rumble, 2006). Next, while studying large banking conglomerates from 1998-2002 across 43 countries, two authors found that a large financial conglomerate that diversifies across a number of activities is valued lower by the market when compared to those banks that specialize in just a few activities (Laeven & Levine, 2007). Finally, one group of authors examined whether larger banks are valued higher, as measured using Tobin's Q and market to book, when compared to banks of other asset size. These authors found the opposite holds true, especially when the banks undertake trading operations that act to lower value by 1% (Minton, Stulz, & Taboada, 2017).

These arguments allow us to form a demonstrable hypothesis:

> **Hypothesis 3.1 (H3.1):** As BHCs expand their presence into more contemporary, non-interest, non-traditional revenues, a bank's value will increase, as measured by Tobin's Q or a proxy.

3.2.2. Systemic Risk and Bank Valuation

As a large BHC allocates resources toward more non-traditional revenues, it may also inadvertently increase its systemic risk, thereby negatively effecting its market value. While

[15] Stakeholder activities, when the BHC invests part of its own funding, including trading, investment banking, and venture capital, increases risk adjusted profits for a panel of BHCs (Mamun, Meier, & Wilson, 2015). We further noted pure fee-based non-traditional revenue, i.e., insurance and securities brokerage, decreases the probability of failure (DeYoung & Torna, 2013).

examining the effects of systemic and idiosyncratic risk upon financial firm valuation, the effect of systemic risk remains significant and positive. As indicated, we further noted a bi-directional effect between systemic risk and bank idiosyncratic risk, in which the latter is one part of total share price volatility. One author noted that, "systemic risk is dangerous…. gives rise to a moral hazard problem for which managers should increase systemic risk" (Strobl, 2016, p. 383). Next, in a similar yet emerging market study on Pakistani banks and BHCs, systemic risk was measured using Delta Conditional Value at Risk (Adrian & Brunnermeier, 2016; Hanif, Naveed & Rehman, 2019). The systemic risk levels were found to have a positive and significant impact upon firm value, as measured by Tobin's Q. Finally, in a recent work, it was revealed that large BHCs have the capacity to merge and acquire other banks in a move to diversify, and, in doing so, may lead to systemic risk increasing for the acquirer, further leading to an increased bank valuation. The author mentioned that the effect is more pronounced in non-crisis periods (Vaghefi, 2019) and further noted that the acquirer is able to transform the transaction into a private benefit at a public cost. The same author found that the acquisition is undertaken with the intention to raise acquirer's systemic risk level and to further increase the probability of being bailed out (Vaghefi, 2019).

On the other hand, systemic risk may act to decrease market value. It is interesting to note that banks and BHCs with investments in opaque assets, when compared to those with more transparent assets, are valued with a discount (Jones, Lee, & Yeager, 2011). Next, a study that focused on sector specialization in bank lending over multiple countries found that the large, international BHCs that concentrate lending efforts into only one or two sectors may actually increase their correlation of assets (loans). In post-crisis years, two authors determined that the bank adjusted return-to-risk and market-to-book ratios declined in value while increasing in systemic risk as measured by marginal expected shortfall (Beck & DeJonghe, 2013). Finally, in a post-crisis, post-Dodd Frank era, they determined there are a number of market measures of risk, including systemic risk, for large BHCs have increased. The overall levels of risk are higher in the post-crisis period than during the pre-crisis period. At the same time, we noted that market value and the price-to-book ratio have decreased in the post crisis years (Sarin & Summers, 2016).[16]

The above noted points lead to a testable hypothesis:

Hypothesis 3.2 (H3.2): An increase in systemic risk will lead to a decrease in bank valuation.

3.2.3. Non-traditional Revenue and Bank Volatility

A group of authors recently illustrated a perplexing situation, and the reality of what bankers must face, when forming revenue strategy. First, as a bank or BHC actively manages its portfolio of revenues through mean-variance analysis and other more sophisticated models, the objective of the bank is to arrive at an optimal combination of imperfectly correlated traditional and non-traditional revenues that replace the existing revenue portfolio. This should lead to an increase in performance and a decrease in volatility, thereby diversifying a bank's revenues (Yang & Brei, 2019; Ghosh, 2020; Markowitz, 1952). Second, when exposed to a low interest rate environment, the interest margins for banks will compress to a certain degree, which will act to shift revenues from interest or net-interest to non-traditional, non-interest incomes. Banks' profits on security portfolios are expected to increase in these low interest rate environments, which may allow the bank to earn higher yields and greater fee income (Bernanke & Kuttner, 2005; Brei, Borio, & Gambacorta, 2020).[17]

Next, non-traditional activities in the aggregate are expected to reduce or decrease the cost of debt for banks and BHCs. It was revealed that various forms of diversification—including increased exposure to non-traditional, fee based or non-interest revenue, geographical diversification of deposits in the domestic market, and asset diversification—will lead to a

[16] Lastly, when inquiring as to why BHCs enter these non-tradtional activities if they are so volatile, we learned that a focus upon individual, non-aggregate, non-interest revenues increases risk adjusted performance while decreasing variance (Gosh, 2020).

[17] In the United States, since the 2007-2009 crisis, the economy has undergone a sustained low interest rate, causing banks to incur compressed net interest margins (Brei, et al., 2019).

reduction in the yield spread and in the cost of debt (Deng & Elyasiani, 2008).[18] Finally, in another U.S. advanced banking market, Australian banks are unique in part due to the regulatory institutions and past actions during the financial crisis of 2007-2009. Australian banks maintain a positive relation between their non-traditional revenues and total risk (Williams, 2016).

However, results are mixed and any increase in non-traditional revenues, especially more volatile pro-cyclical income streams such as proprietary trading, venture capital, and investment banking—which require banks to supply capital as well—may act to increase bank specific volatility. First, a long line of early literature suggests that actively participating in non-interest income is associated with more volatile earnings and returns to market (Demsetz, Saidenberg, Strahan, 1996; Stiroh, 2006). Second, two authors found that non-interest revenue activities for financial holding companies including commercial and industrial loans, trading, and "other" fee generating activities are more volatile and less profitable on a risk adjusted basis, reducing the benefits of diversification (Stiroh & Rumble, 2006).

As an example of the volatility of non-traditional revenue, especially non-interest revenue, early authors determined 29.7% for the coefficient of variation of the non-interest income they examined (NII/TA) (DeYoung & Roland, 2001). A more recent group confirmed these previous findings, finding that a coefficient of variation of the non-traditional, non-interest to total assets ratio were considerably more volatile in the aggregate, at 117.9% of the more traditional interest income (Brunnermeier, Dong, & Palia, 2019).

We propose the following hypothesis.

Hypothesis 3.3 (H3.3): An increase in non-traditional revenues will act to increase bank volatility, as illustrated in the annualized share price volatility.

3.2.4. Systemic Risk and Bank Volatility

We argue that an increase of systemic risk may lead to an increase in bank volatility. Underlying part of this argument are the issues of risk-taking incentives, franchise value,

[18] Geographical, revenue, and asset diversification through various means, including mergers and acquisitions, may offer better investment opportunities, creating synergies thereby enhancing value (Deng, et al. 2008, Minton, Stultz, & Taboada, 2017).

corporate governance, and moral hazard. [19] One study gives great insight into the problem of market discipline and moral hazard, as it relates to franchise value, market value, bank specific risk, and systemic risk (Strobl, 2016). In studying the years 2000-2014 at a monthly frequency—including 92 commercial banks, BHCs, and other financial institutions—the author identified multiple important relations, including those variables with substantial relationships to MES (systemic risk) and leverage. Moreover, a bi-directional Granger relationship exists between both forms of risk, where idiosyncratic risk is one part of total share price volatility. The same author found that systemic risk acts to increase and further augment idiosyncratic risk or price volatility. In the above study, it was emphasized that "systemic risk is dangerous…. And gives rise to a moral hazard problem for which incentives managers should increase systemic risk" (Strobl, 2016, p. 383). This leads to a further exacerbation of volatility levels.

Second, a similar emerging markets study of Pakistani banks that used a more sophisticated and robust estimation method of measuring systemic risk further found that systemic risk, as measured by Delta Conditional Value at Risk, has a significant one-way effect of positive impact and Granger causing idiosyncratic risk. The authors employed a systems general methods of moments model that illustrates a strong persistence in both types of risk, idiosyncratic and systemic (Hanif, Naveed, & Rehman, 2019). In fact, the earlier findings from previously noted authors, including the drivers of systemic risk in large banks and BHCs are reiterated and verified (Hanif et al., 2019). These authors noted that the systemic risk is most likely due to "levering up," moral hazard, and risk enhancing actions on the part of bank management (Iqbal et al., 2015). In the end, the increasing bank specific risk may be a potential outcome of increased systemic risk taking, which could be facilitated by a negative feedback loop, as experienced in a financial crisis (Adrian & Brunnermeier, 2016; Brunnermeier, Dong, & Palia, 2019).

It is important to establish that an increase in systemic risk can also lead to a surprising decrease in bank specific risk, specifically bank share price volatility. First, by using data on

[19] Franchise value represents the present value of the future profits that a firm is expected to earn as a going concern. Banking franchise value may arise from advantages in regulation/market or in bank specific sources, such as superior technology. Its value is lost in bankruptcy (Demsetz, Saidenberg, Strahan, 1996).

global systemically important banks (GSIBs), it has been found that an increase in non-interest income increases systemic risk contribution levels, as measured by long run marginal expected shortfall. On the other hand, it has also been found that GSIBs' increase of non-interest activities actually reduces large banks' idiosyncratic risk (Williams and Fenech, 2018).

Given the aforementioned arguments, we present a fourth valid hypothesis:

Hypothesis 3.4 (H3.4): An increase in systemic risk contribution will lead to a higher level of BHC share price volatility.

3.3. Methodology and Data

3.3.1.Data and Equations

3.3.1.1. Sample Attributes. The sample for this paper included 82 BHCs over a fifteen-year time period, ranging from first quarter, 2003, to first quarter, 2018. This comprehensive sample made use of data from the Federal Reserve's Board of Governors National Information Center .[20] The FR Y-9C Federal Reserve forms list the quarterly income and expenses of BHCs in interest and non-interest revenue format. Assets and any other related monetary figures are listed in thousands of U.S. dollars. The reports were made possible through inter-agency collaboration with the Federal Institutions Examination Council (FFIEC). The sample consisted of a number of large foreign and domestic bank holding companies operating in the United States, whose total consolidated assets exceeded $10,000,000,000.

A secondary source of data for confirmation of BHC financial and accounting information, which allows for assurance of data quality and integrity, Bank Holding Regulatory Reporting Database, located through the Wharton Research Data Service (WRDS). This database is based on data provided by the Chicago Federal Reserve website in coordination with the U.S. Federal Reserve.

There are several requirements that needed to be included in the main sample, including the following: first, a BHC should have at least 10 billion US dollars in consolidated assets each quarter from 2003 to 2018. Second, it must trade publicly for at least three quarters of the sample

[20] https://www.ffiec.gov/nicpubweb/nicweb/HCSGreaterThan10B.aspx .

period. Third, each BHC must fall into either Peer Group 1 or Peer Group 9 for any given quarter.

The final source of data for this research was the Center for Research in Security Prices, LLC, (CRSP), an affiliate of the University of Chicago, Booth School of Business. CRSP allowed us to gather all data related to security prices, and shares outstanding, which are used in most market related measures of our research paper.

There is a reason why we chose large bank holding companies from the Federal Reserve's related Peer Groups 1 and 9 with consolidated assets of $10 billion and greater. According to several authors, these larger BHCs, relative to smaller BHCs, tend to enter into the more contemporary products and services or new geographic markets. There exist substantial fixed costs or up-front investments for entrance into the non-traditional, non-interest related income generating activities (DeYoung & Roland, 2001; DeYoung & Torna, 2013; Stiroh & Rumble, 2006). For those banks that meet asset size and resource requirements, this may allow banks to take advantage of economies of scale or scope, yet still require larger operational presence or resources. In actuality, as mentioned previously, a number of non-bank activities have and are still allowed, post-crisis of 2007-2009 and post-Dodd-Frank, thanks in part to certain opportunities and limits made possible by amendments to the Bank Holding Company Act of 1956 and the GLBA of 1999 (Apergis, 2014, Claessens, Ratnovski, & Singh, 2012; Copeland, 2012).

3.3.1.2. From Interest and Non-Interest to Traditional and Non-traditional BHC Activity. The author used the FR Y-9 format to divide revenue data into three categories: traditional, non-traditional, and securitization. Copeland (2012) constructed these categories so that any new form of revenue earned falls into either securitization or non-tradtitional revenues. The Federal Reserve requires BHCs to report yearly using the FR Y-9 forms, while the FR Y-9C is done on a quarterly basis. The FR Y-9 forms display the categories of interest and non-interest revenues and expenses. This analysis applies and builds upon the taxonomy of Copeland (2012). The author began by translating interest and non-interest revenue into the three categories of traditional, securitization, and non-traditional revenues, where the latter serves as a key explanatory variable in this study. The non-traditional revenue category includes the following: trading revenues, investment banking and underwriting of securities fees and commissions, venture capital revenues, insurance commissions and fees, and interest income from trading assets less interest expenses (Copeland, 2012).[21]

3.3.1.3. Equations. Equation 3.1 allows for the analysis and exploration of Hypothesis 3.1 and 3.2, whereas Equation 3.2 allows for the examination of Hypotheses 3.1 and 3.2.

$$Tobin'sQ_{i,t} = \alpha_0 + \alpha_1 Non - traditional\ Revenue_{i,t-1} + \alpha_2 MarginalExpectedShortfall_{i,t-1} + \phi_C X_{i,t-1} + \upsilon_i + \nu_t + \varepsilon_{i,t} \quad (3.1)$$

$$BankVolatility_{i,t} = \beta_0 + \beta_1 Non - traditionalRevenue_{i,t-1} + \beta_2 MarginalExpectedShortfall_{i,t-1} + \phi_C X_{i,t-1} + \upsilon_i + \nu_t + \varepsilon_{i,t} \quad (3.2)$$

3.3.1.4. Variables. We initially included control variables in Equations 3.1 and 3.2 to control for effects upon bank performance, risk, and stability. By performing an initial set of regressions of control variables upon dependent variables, we leveled the playing field by regressing solely the control variable upon each relevant dependent variable. A vector $(\phi_C X_{i,t-1})$ (+/-) of control variables includes the following: bank (υ_i) (+) and year (ν_t) (+), fixed effects, and the residual error term ($\varepsilon_{i,t}$) (-/+). The control variables use the variable total assets (natural logarithm of total assets) to control and proxy for bank size, non-interest income share (total non-interest income to total operating income), level of BHC capitalization, and also serve as a regulatory capital measure (tier one leverage ratio), asset mix (total loans to assets ratio), and share of deposit funding structure (total deposits out of the sum of deposits - money market

[21] In the final category, "interest income from trading assets, the interest expense term is equal to the fraction of interest income from trading assets to total interest income, multiplied by total interest expense, assuming all interest expenses are proportionally divided across interest income revenue sources" (Copeland, 2012, p. 92).

funding), profitability (return on equity), and annualized growth in total assets and expected credit risk (loan loss provision to total assets).[22]

Equation 3.1 allowed us to examine if an increase in non-traditional revenue and/or an increase in systemic risk, as measured by marginal expected shortfall, impacts the value of a BHC, as measured by Tobin's Q ($Tobin'sQ_{i,t}$) of BHC i in time t. We followed Deng and Elyasiani (2008) in defining Tobin's Q. This variable measures valuation of a BHC, which proxies for market value of a firm's assets over its replacement cost. All non-market figures were derived from the Federal Reserve's Quarterly Consolidated Form FRY-9C.[23] While forming our measure of Q, we employed the Center for Research in Security Pricing (CRSP) based daily share prices for all BHCs. The dependent variable, Tobin's Q measures valuation of a BHC, which is representative of the market value of a firm's assets over its replacement cost. The formula that we employ is Tobin's Q = [{Book Value of Assets + BHC Market Capitalization (quarterly average market price per share * quarterly average number of shares outstanding) – book value of equity} / {(book value of assets}].

The first of two main explanatory variables, MES, or Marginal Systemic Risk, measures a bank's exposure to systemic risk, as originally proposed by Acharya, Pedersen, Philippon, and Richardson (2010, 2016). Mathematically, the MES of bank *i* at time *t* represents the following formula: $MES_{i,t}(Q) = E[R_{i,t}|R_{m,t} < VaR^{Q}_{m,t})]$. It is conditional on the industry or market undergoing a systemic crisis, where Q equals 5%. The authors of the MES measure note that one can infer what will happen during an actual systemic crisis. Furthermore, when measuring this systemic risk proxy, it is representative of a shortfall in the entity's equity price. We identified the markets 5% worst days for the period and then averaged corresponding returns on those days for each unique BHC_i. Further, the found MES superior to Value at Risk, as it identifies shortfalls, or loss is equities, beyond the traditional 5%. The second explanatory variable

[22] The expected coefficient signs emanate from papers that were utilized in this dissertation. Specifically, this paper refers to the works of Beck and De Jonghe (2013), De Jonghe, Diepstraten, & Schepens, (2015), Copeland (2012), Apergis (2014), Ghosh (2020), and Brunnermeier et al., (2019).

[23] FRY9C data item BHC2170 represents our one component in Tobin's Q calculation, Total Assets, book value. Book Value of Equity equals BHCK3519 on the FRY9C. Federal Financial Institutions Examination Council's NIC web page, offers data, a data dictionary, financial, and institution characteristics specific to bank and financial holding firms.

measures aggregate Non-Tradtional Revenue(s) of BHC_i. This variable represents bank and bank holding company revenues that entail net-interest and non-interest income activities alike. This is the aggregate form of non-traditional revenue, where one finds contemporary or newer bank generating activities, where most revenues relate to capital markets. For Non-Tradtional Revenues, we included securitization (originate to distribute), trading revenues, investment banking and underwriting of securities, fees and commissions, venture capital revenues, insurance commissions and fees, reinsurance products, and interest income from trading assets, less interest expenses (Copeland, 2010). We did so after having transformed the FRY9C BHC quarterly statements, as we note in a following section. To reiterate with expected effect in parentheses, the right hand side begins with the first independent variable, non-traditional revenue ($Non-traditional\ Revenue_{i,t-1}$), and then the second independent, a measure of systemic risk, ($MarginalExpectedShortfall_{i,t-1}$) (-).

Equation 3.2 begins with the dependent variable, Bank Volatility ($Bank\ Volatility_{i,t}$) for a BHC *i* during time *t*. Bank Volatility captures the annualized standard deviation of a bank's daily stock returns over the span of a calendar year captures a bank's total risk exposure. The right side of the equation 3.2, reading from left to right, consists of a constant β_0, followed by BHC non-traditional revenue ($Non-traditional\ Revenue_{i,t-1}$) (-). What follows next is a measure of systemic risk ($MarginalExpectedShortfall_{i,t-1}$) (-) that acts as the second independent variable.

3.3.2. Methodology

3.3.2.1. Choice of Estimators. The structure of the data included 82 unique BHCs across a 15-year time period from first quarter, 2003, to first quarter, 2018. Given the unbalanced panel data, the selection of an appropriate estimation procedure was important. The objective of Equation 3.1 was to study the effect of changes in non-traditional variables and any systemic risk contribution upon the response variable of each bank holding company across time, while controlling for time invariants and differences between BHCs. The same is true for Equation 3.2, which examined for any effect of a shift in non-traditional revenues upon bank share price volatility. We also examined for the effects of a BHC's contribution to systemic risk and its impact upon bank share price volatility.

We chose fixed effects as the primary estimation model, as the assumptions for random effects are stringent. In order to seek the more appropriate estimation model for our unbalanced panel data, we performed a Breusch Pagan Lagrange multiplier test, together with a Hausman procedure. Both tests pointed to the choice of a fixed effects estimations model.

3.3.2.2. Robustness Measures. We undertook, several measures for the integrity of our results. All independent and control variables in Equations 3.1 and 3.2 were lagged by one period to mitigate possible reverse causality. The control variable, total assets, was transformed and orthagonalized. The principal reason for doing so was that total assets serve as a proxy measure for firm size and is highly correlated with a number of key determining variables. As a final step to ensure the integrity of the panel data in Equation 3.1, we applied bank-fixed effects, while employing year dummy variables, in essence applying both firm and year fixed effects. The bank-fixed effects controlled for unobserved heterogeneity across BHCs, such as bank level strategy, CEO compensation packages, and independence of the board. Year-fixed effects, in the form of dummy variables, controlled for changes in the political, regulatory, and institutional environments over the time span of 2003 to 2018. One can visualize the impact of the 2007-2009 and 2010 financial crises, which represent years when the economy and the financial markets suffered a great deal. We applied a yearly dummy variable for year-fixed effects. This may be one of the reasons why we found a number of years with highly significant coefficients, i.e., 2007-2010. In the end, this author applied bank and year fixed effects to both Equations 3.1 and 3.2, including clustered standard errors.

Lastly, bank or BHC and year level fixed effects were applied to each of Equation 3.1 and 3.2 in Table 3.1. In the spirit of robust examination, we performed and included the results of random effects for Equations 3.1 and 3.2, in Table 3.6. Table 3.6 is found in the Data Appendix, as our final table for this chapter. In Table 3.6, we further included a pooled ordinary least squares model, which offers an important alternative point of view for our third hypothesis. This also allowed for a robust and alternative form of estimation, using between and within estimation, as there are a number of large BHCs that enter and exit the sample. Beyond, for the purpose of thorough and robust proper examination, we included bank and year fixed effects in each of the fixed effects panel data regressions.

3.4. Empirical Results

3.4.1. Revenue Trends - Traditional and Non-traditional Income Generating Activity

Using these statistics allowed us to complement the percentage composition of non- traditional revenue components illustrated in Figure 3.1, and to make more informed conclusions in relation to any annual trends in revenue or dependent/independent variable data.

By taking the difference between Figure 3.2 and Figure 3.1, this allowed us to derive the change in the composition of each revenue, as a proportion of total Non-Traditional Revenue, including securitization. Hence subtracting each revenue percentage composition, found in Figure 3.2, demonstrates a percentage change of each component of the total of all Non-Traditional Revenue. Figure 3.1 indicates that there have been a number of surprising changes in the components of non-traditional revenues, including securitization. As a percentage change of total non-traditional revenue from 2003 to 2018, first quarter, using our sample of 82 BHCs, securitization revenue out of total non-traditional revenue decreased by 3.50%. Additional reductions in key revenues over the 15-year sample period include investment banking, representing a large reduction of 6.91%, and insurance/re-insurance related products, which decreased by 0.40%. Increases in other notable non-traditional revenue, as a percentage of total, including trading, were up by 8.73% in 2018, annuity revenue increased by 1.058%, and venture capital had a slight increase of 0.39%.

3.4.2. Descriptive Statistics

Table 3.3, raw descriptive statistics, and Table 3.4, the pairwise correlation matrix are located in our Data Appendix. These preliminary results point to the underlying volatility of non-traditional revenues and their impact on bank value and systemic risk. Our findings, especially as

Figure 3.1. Composition of Aggregate BHC Non-Traditional revenues, in percent for 2003.

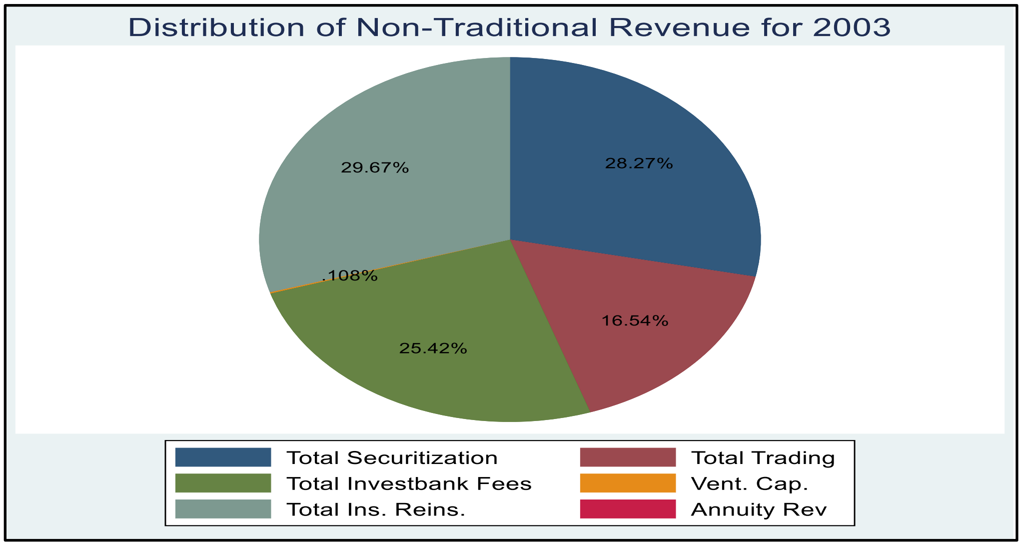
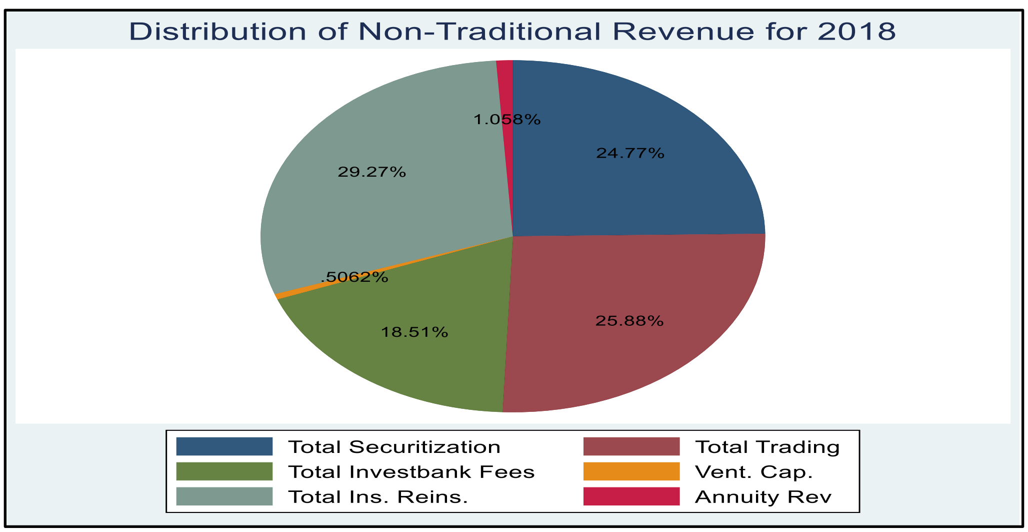


Figure 3.2. Composition of Aggregate BHC Non-Traditional revenues, in percent for 2018



it relates to Bank Value, Tobin's Q, and systemic risk, or MES, are similar to several other groups of authors (Brunnermeier et al., 2019; Minton, Stulz, & Taboada, 2017; Nissim & Calomiris, 2012).

Tobin's Q, on average for the sample declined in value over the course of fifteen years, ranging from 12.063 in 2003, first quarter, to a value of 7.86, in 2018. Mean value for Tobin's Q for this sample was 10.13, with an almost equal standard deviation of 10.75, which measured the

Table 3.1

Regression Equation 3.1 & 3.2 Bank Value and Volatility, Fixed Effects

Dependent Variable: Tobin's Q

$$\text{(3.1)}\ Tobin'sQ_{i,t} = \alpha_0 + \alpha_1 Ln(Non - traditional\ Revenue)_{i,t-1} + \alpha_2 MarginalExpectedShortfall_{i,t-1} + \phi_C X_{i,t-1} + \upsilon_i + \nu_t + \varepsilon_{i,t}$$

$$\text{(3.2)}\ BankVolatility_{i,t} = \beta_0 + \beta_1 Ln(Non - traditionalRevenue_{i,t-1}) + \beta_2 MarginalExpectedShortfall_{i,t-1} + \phi_C X_{i,t-1} + \upsilon_i + \nu_t + \varepsilon_{i,t}$$

Equation & Dependent Variable	(3.1)Tobin's Q	(3.2)Bank Volatility
Model	Fixed Effects	Fixed Effects
Ln (Non-traditional	-0.228*	0.0022**
Revenue)	(0.134)	(0.0009)
Marginal Expected	-7.994**	0.358***
Shortfall	(3.508)	(0.0226)
Ln (Total assets)	2.669***	0.0029
	(0.291)	(0.0019)
Tier One Leverage	-0.0004	0.000002
	(0.0016)	(0.00001)
Total Loans to Total	-2.469	-0.0067
Assets	(1.622)	(0.0104)
Share of Deposit	-7.183***	0.0028
Funding	(1.228)	(0.0080)
Profitability	0.371	-0.0501***
	(1.040)	(0.0067)
Expected Credit Risk	70.50***	0.523***
	(22.07)	(0.142)
Non-interest Income	-1.189***	-0.0015
Share	(0.448)	(0.0029)
Annual Asset Growth	3.122***	0.00013
	(0.301)	(0.0019)
Constant	-28.17***	-0.0502
	(4.983)	(0.0321)
BHC Fixed Effects	Yes	Yes
Time Fixed Effects	Yes	Yes
Observations	3,234	3,234
R-squared	0.132	0.469
Number of Bank Holding Companies	78	78
BP-LM Test: Tobin's Q, 12467.50 / Bank Vol, 15.10		
Probability>chibar^2	0.0000	0.0001
Hausman Test		
Probability>chi^2(8); Chi^2 Coefficient = Tobins Q, 214.49; Chi^2(9) Bank Vol, 6406.09	0.0000	0.0000

Note. In this table, we performed regression results utilizing Equation 3.1 and Equation 3.2, which use a Fixed Effects estimation model and our panel data, while including the additional year level fixed effects. Robust standard errors appear in parentheses *** p<0.01, ** p<0.05, * p<0.1.

value of a BHC by using Tobin's Q of market value of a bank's assets over its replacement cost.[24] There exists a great degree of variability in value, as measured by Q. Interestingly, there is a pairwise correlation between the Tobin's Q of a BHC and its systemic risk measure, MES, at 0.034 at a 5% significance or better.

Non-traditional Revenue began in 2003 at $1,750,526, climbed to $3,200,000 in 2009 and $3,100,000 in 2011, before falling to $1,981,425 in the fourth quarter of 2017 to close slightly lower in first quarter, 2018. Moreover, the pairwise correlation between Tobin's Q and Non-Traditional Revenues was 0.041, at a significance of 5% or better. We measured Bank Volatility by the annualized standard deviation of the BHC share price. The mean value of the sample was 0.05 with a standard deviation of 0.62, which is quite high. The Bank Volatility of the sample BHCs ranged from 0.01 to 37.31 on average over the span of 2003 to 2018. The highest measure of the annual mean bank volatility was 25% in 2009. During the remainder of the years from 2010-2018, average volatility ranged between 2% to 4% for all 82 banks. The pairwise correlation between Bank Volatility and Non-Traditional Revenue -0.006 is not significant. On the other hand, the pairwise correlation coefficient between MES and Bank Volatility is larger and significant at 5% or below, with 0.168.

Marginal Expected Shortfall (hereafter, MES) is a measure of systemic risk contribution by a bank to the system in the face of a potential crisis. MES for our sample ranged from 0.00 to 0.67, with the standard deviation being 0.03. As we take the mean value of all BHCs in samples across time, it may be noted that MES in absolute terms increased upwards of 0.60 in 2008 and 2009. Over the period 2015 to 2018, the sample BHCs incurred a mean MES of 0.01 to 0.02, rising in the latest quarter of the sample. Some of the highest observations recorded were of Wachovia, First Citizens, and Pinnacle, during the years 2006-2009. The pairwise correlation coefficient between non-traditional revenue and MES is not significant at 0.022.

[24] The minimum for Tobin's Q range was 0.21, belonging to Franklin Resources, which clearly displayed an undervaluation or discount. In contrast, the maximum value within our range for Tobin's Q, was 207.27, belonging to Taunus Corporation. Taunus displayed a market premium at the most fundamental level. Barclays and JP Morgan maintained relatively higher levels of value, Bank of America, and larger banks, such as Citigroup, tended to maintain a much more modest level for Tobin's Q.

3.4.3. Discussion of Main Results

The purpose of the fixed effect panel regression performed for Equation 3.1 and Equation 3.2, found in Table 3.1, is twofold. First, we analyzed the impact of non-traditional revenue in aggregate form upon a BHC's value measured by Tobin's Q. This corresponds with our first hypothesis (H3.1), which says that as BHCs expand their presence into more contemporary, non-interest, non-traditional revenues, it will increase a bank's value, as measured by Tobin's Q or a proxy. Second, we analyzed the second hypothesis (H3.2) that maintains an increase in systemic risk, or MES, will lead to a decrease in bank valuation.

In Table 3.1, while following Equation 3.1, for a 1% increase in aggregate non-traditional revenue activities, leads to a decrease of 0.228/100 or 0.00228% in the value of a BHC, as measured by Tobin's Q with a level of 10% significance. While applying random effects in Table 3.6, upon Equation 3.1, we found that an expansion of non-traditional revenue leads to a similar decrease in bank value, which is significant at 5%. The decrease is of similar magnitude as found in the fixed effect model. We therefore cannot accept the first hypothesis 3.1 (H3.1) based on our findings.

Whether it is due to the opaque nature of certain bank non-traditional revenues, such as the more complex trading of assets, asset backed securities, and other structured securitizations, the opaqueness tends to inhibit market discipline by making markets less information efficient and banks more difficult to value. (Jones et al., 2011; DeYoung & Torna, 2013). As noted in our descriptive statistics section, we found that on average our measure of bank value declined from 2003 to 2018. Several groups have experienced similar discounts and declining values for BHCs, as banks take on more complex, non-interest, non-traditional income streams (Laeven & Levine, 2007; Nissim & Calomiris, 2012; Minton, Stulz, & Taboada, 2017).

While analyzing the second independent variable in Equation 3.1, Marginal Expected Shortfall, a measure of systemic risk contribution indicated a strong negative relationship with Tobin's Q or BHC market valuation. We made this finding while applying a fixed effects model to the panel data, located in Table 3.1. Our main regression table found a 1% increase in the level of marginal expected shortfall, or systemic risk, which demonstrates a significant negative impact on BHC value, with a 0.0799 or 8% decrease in Tobin's Q of -7.994/100. The relationship between MES and Tobin's Q is significant and positive with a pairwise correlation coefficient of 0.034. As a robust measure, the random effects model found in Table 3.6 further confirms our finding of a negative relationship. We accept the second hypothesis (H3.2) and reject the null. The negative relationship in Equation 3.1, between systemic risk and Tobin's Q BHC value, while contrary to the finding by Strobl (2016), remains in line with the findings of several groups of authors (Jones, et al., 2011; Sarin & Summers, 2016). The BHC mean systemic risk levels of our sample, beginning in 2015, reduced into a range of 0.01 to 0.02. This may speak to the implementation of regulator capital charges on systemically risk and the partial success of regulator and industry.

Our Equation 3.2 served several functions, just as Equation 3.1 is examined using Table 3.1. First, we examined if an increase in non-traditional revenue leads to a subsequent increase of Bank Specific Risk in the form of Share Price Volatility. This directly relates to our third hypothesis H3.3**,** where an increase in non-traditional revenues acts to increase bank volatility. Beyond this, we examined if an increase in systemic risk, while expanding these revenues and operational presence, acts to increase BHC share price volatility as the dependent variable. This pertains to our final and fourth hypothesis (H3.4); that maintaining higher levels of systemic risk leads to an increase in bank share price volatility.

While employing our fixed effects model, in Table 3.1, including bank and year fixed effects, we found that a 1% increase in use of aggregate Non-Traditional Revenue corresponds to an increase in bank volatility by 0.0000221%, with a 1% significance. We accept our third hypothesis (H3.3). This agrees with the results of both early and more recent literature. We found the coefficient of variation of non-interest to total assets to be considerably higher (117.9%) than the previous 29.7% calculated by DeYoung and Roland (2001).[25] However, in Table 3.6, we applied a random effect model, in addition to a Pooled Ordinary Least Squares model, to further examine our third hypothesis 3.3, as a matter of robustness. Our finding using random effects is insignificant and negative. Upon applying the Pooled Ordinary Least Squares panel regression model, we found a 1% increase in the use of non-traditional revenue corresponds to a decrease in bank volatility of 0.000897%, which is significant at 10%. It is evident that the fixed effects

[25] This offers an alternative perspective to our third hypothesis. It also illustrates a frequent conflict that large banks face. An increased use of non-traditional revenue may lead to reduction in bank specific volatility. This presents somewhat of a conflict as one diversifies, while attempting to lower risk, as it may lead to higher systemic risk (Wagner, 2010).

model is by far the more practical and robust method. Hence, we maintain our conclusion as it relates to the Hypothesis 3.3.

The relationship between Marginal Expected Shortfall and bank volatility is significant at 5% or less with a significant pairwise correlation coefficient of 0.168. A 1% increase in the systemic risk measure contribution, as measured by marginal expected shortfall, corresponded to an increase in bank volatility or share price volatility of 0.358%. While the results are analyzed independently in the fixed effects panel data regression, we confirmed our findings. An increase in systemic risk levels will exacerbate and increase Bank Volatility, especially given an already volatile foundation. Given this evidence, we accept our fourth hypothesis (3.4). Our finding of increased systemic risk, leading to further BHC volatility is shared by Strobl (2016) and Hanif, et al. (2017). The effect of systemic risk, in the form of MES, where there is positive reinforcement upon Bank Volatility, points to the possible existence a negative feedback loop, such as experienced in a financial crisis (Adrian & Brunnermeier, 2016; Brunnermeier, et al., 2019).

Above and beyond this result, we note that the leverage and expected credit risk variables both increased in coefficient size across multiple regressions for Equation 3.1 and Equation 3.2 in Tables 3.1. We discovered that the control regressions, located in Tables 3.4 and Table 3.5, in the Data Appendix, employed a fixed effects panel data estimation to be consistent with current theoretical findings. Finally, in Table 3.6, we performed a number of robustness checks, using alternative regression models upon the panel data, such as random effects and pooled ordinary least squares analysis. Our sample changed a number of times, due in part to mergers and acquisitions, or the Total Asset threshold. [26]

3.5. Conclusion

Our paper makes several unique contributions to banking and systemic risk literature. Our first contribution arises from our primary research question. We ask if an increase in non-traditional revenues in the aggregate form will lead to an increase in bank value as measured by Tobin's Q. Before arriving at regressions, we made an interesting discovery. Preliminary raw

[26] In the end, we did perform several regressions that relate the component or individual revenues to Bank Value, Systemic Risk, and Volatility, but for brevity we did not include. These regressions confirm our findings at an aggregate level for both Traditional and Non-Tradtiional Revenues.

statistics illustrated a decrease in the BHC mean Tobin's Q BHC value, declining sequentially, quarter after quarter, from 2003 to 2018. This could most likely be due to basic bank activity and market fundamentals or bank risk taking culture (Strobl, 2016). We found the opposite of our hypothesis, where the use of contemporary non-traditional revenues leads to a decrease in value, which is most likely owed to declining values of bank activities and a changing market conditions. In the end, we find that total Non-Traditional Revenue, is value reducing.

The second question we pose is the following: will an increase in systemic risk lead to an increase or decrease in BHC value? We discovered highly significant results, which point to the destabilizing effect of systemic risk. Moreover, an increase in systemic risk leads to a significant decrease of 8% in bank value.

Although our focus does not include the firm or sector level determinants of systemic risk in banking, this research objective allows us to deliver a contribution to banking shareholder value and systemic risk, as we are able to gauge the impact of the increasing use of non-traditional revenue upon bank value. Further, we explore the increase in contribution of a BHC's systemic risk upon bank holding company value. The literature regarding the effect of systemic risk on bank shareholder value, using Tobin's Q, is scarce, yet it does exist (Iqbal, Strobl, & Vahamaa, 2015; Strobl, 2016).

The second contribution likewise follows from our second research question. We analyzed a somewhat perplexing conclusion in banking: We found that a further increase in systemic risk contribution will act to increase bank volatility. We also determined that a 1% increase in systemic risk leads to 0.358% increase in bank volatility with a significant level of correlation, which suggests the existence of a volatility feedback loop and possible systemic risk taking (Adrian & Brunnermeier, 2016; Mieg, 2020; Renn, 2019).

Our third and final contribution, as illustrated in Figure 3.1 and Figure 3.2, arises from our detailed examination of the component revenues, and how they changed over the period of 2003 to 2018. Bank holding companies have diversified in the number of major non-traditional individual revenues they hold, including the introduction of venture capital and annuity related revenues, as noted in Figure 3.1. As noted in a recent 2018 BIS report, it seems apparent that systemic risk contribution among the largest BHCs, including a large number of our sample banks, have continued to meet capital and counter cyclical capital requirements by retaining the necessary regulatory capital (Bank of International Settlements, 2019).

One limitation that we faced was that our sample of BHCs, unfortunately, do not have similar revenue profile and strategies, which is evident in the top four US bank holding companies. Due to heterogeneity in revenue in the group of 82 BHCs, we encountered a great deal of non-reporting, or specific banks did not participate in underlying or component non-traditional revenues. A second limitation was finding large enough banks, given asset size, that have sufficient resources to undertake non-traditional revenues, whether in terms of assets or revenues. One of the reasons our regression coefficients were quite small in several regression panels may be owed to small sample size.

It is noted that no one regulation perfectly fits all. In applying a systemic risk measure, it is of upmost importance to use shorter time periods, similar to what may be termed dynamic or continuous, as in dynamic conditional correlation or dynamic conditional beta (Engle, 2019). We make this comment as movement in capital markets and between banks subsidiaries, including bank strategies, are in a state of constant flux. As it relates to changes in revenue strategies, BHCs and subsidiaries respond rapidly. In order to appropriately measure systemic risk, there is need to modify current methods, or, to derive a more appropriate measure, as the volatility spillovers seems to have become the new normal. We look forward to applying other facets of value, performance, and systemic risk measures. To do so will allow us to understand better the systemic risk-return profiles of each major underlying component revenue of the total non-traditional revenue stream of a BHC. Our findings leave little doubt that the incentives and ability of banks to diversify risk have transformed in the post-crisis, Dodd-Frank era of regulation.

CHAPTER IV.
THE DEBT CEILING CRISES, ECONOMIC POLICY UNCERTAINTY, AND INTEREST GROUP CONFLICT – INITIAL EVIDENCE

4.1 Introduction

> *"We have been in this situation before, and I worry about a (debt ceiling) accident….." (Former Treasury Secretary Jack Lew, 2015).*[27]

Major events that are at least partially inspired by politics, such as the debt ceiling crisis of 2011 and the debt ceiling crisis of 2021, come with great economic and financial costs. The great financial crisis of 2007 to 2009 forced the government of the United States, like many other advanced economies, to rescue and re-capitalize their financial institutions (Gori, 2019). The financial crisis was followed by the highly contentious debt ceiling crises of 2011 and 2013, where the U.S. Treasury implemented extraordinary measures. The economic policy uncertainty that many investors experienced led investors to embed a default premium on the U.S. Treasury bill yield.

Due to the mechanics of the U.S. Treasury debt market, especially the Treasury bill markets, we know from related financial literature that when the atmosphere surrounding a debt ceiling crisis is tied to appropriations, it becomes salient and conflictual, and the Treasury bill market shows signs of stress (Ozdagali & Peek, 2013; Schick, 2008). Moreover, the yield on the four-week Treasury bill surpasses the yield on the thirteen week and twenty-six-week U.S. Treasury bill. Investors begin to embed a default premium for the additional risk they are undertaking. By this point, as investors embed a default premium, it is a signal that they are uncertain about the U.S. Treasury's ability to pay interest and principal payment upon maturity (Cashin, Klee, & Syron, 2017).

One group of authors found that political uncertainty can have a negative impact upon stock market asset prices. The authors further discovered that the cost of an asset may include three risk premiums, including those due to political, capital, and impact risks (Pastor &

[27] Treasury Secretary Lew speaks in an interview with CNBC on October 19, 2015.

Veronesi, 2012). As asset prices decrease in the face of higher policy uncertainty, the yields for bonds may rise. Moreover, investors in municipal bond markets undergo great uncertainty during gubernatorial elections (Gao & Qi, 2012). The authors learned that the yield on municipal bonds increases in the face of higher policy uncertainty. Investors become wary of any potentially new policies that may follow in the wake of a newly elected governor.

Given the great amount of investment at stake, not to mention the reputation of the U.S. Treasury bill and the full faith and credit of the U.S. government, it is surprising that there are few studies related to the impact of the debt ceiling crisis on economic policy uncertainty and U.S. Treasury short term debt. This is especially true of the more contemporary debt ceiling impasses, inclusive of 2015. Therefore, we attempt to fill this important need by offering our first research objective.

In the first research objective, we examined whether economic policy uncertainty increases, as measured using Google Trends (Bontempi, Golinelli, & Squadrani, 2016), to demonstrate a negative influence upon the U.S. Treasury thee-month yield spread.

Next, when contemporary appropriations are accompanied by a required debt ceiling decision, timeliness in the congressional process of collective bargaining is of high importance in arriving at a resolution. Competition among interest groups who have influence with Congress often turns into conflict before arriving at consensus (Holyoke, 2009; 2019).

This can at times lead to congressional/legislative gridlock (Binder, 2015). Yet little work has been performed upon the appropriations bills tied to debt ceiling crises (Lorenz, 2020). However, the implications are clear opposition by powerful groups and allies at the incorrect time may be costly. It can bring Congress to a state of gridlock and stalemate, both entailing great costs as they relate to the U.S. Treasury debt markets, default premiums, and excess borrowing owed by the U.S. Treasury.

In our second research objective, we investigated if this competition and conflict in the form of interest group opposition leads to a decrease in the U.S. Treasury bill yield spread, as we have seen in previous debt ceiling crises. This opposition will further raise total excess borrowing costs to the U.S. Treasury and taxpayers (U.S. Government Accountability Office, 2015).

Our analysis is one of the first to examine the political, economic, and financial determinants that play key roles in our understanding of each prolonged debt ceiling crises in our sample period. We can identify the costs incurred during what many thought to be the less contentious debt ceiling crisis of 2015 using a benchmark security that did not suffer from a spillover effect. Second, we can decompose the total excess borrowing costs owed by the U.S. Treasury, as they relate to elevated uncertainty and interest group competition turned conflict.

4.2. Literature Review

4.2.1. Economic Policy Uncertainty

We maintain that as the next congressional appropriations debate and debt ceiling crisis lengthens and approaches a breach date, economic policy uncertainty (Hereafter, EPU) will increase, as will short term U.S. Treasury bill yields. This will depress the yield spread of the U.S. Treasury bill and increase the excess borrowing costs

We define economic policy uncertainty as an economic risk related to unfinished, incomplete future government policies, including for the United States, U.S. congressional legislation, and agency regulation (Al-Thaqeb & Algharabali, 2019). An increase in this form of unpredictable risk leads to a higher probability that investors, businesses, and individuals will delay spending. It is important to note that ambiguity and conflict are often owed to poor-quality information in the hands of the decision maker (Bontempi et al., 2016). Investors seek and gather better quality information via news or the internet.

We discover a negative risk premium of asset costs in the stock market, due in great part to elevated EPU (Pastor & Veronesi, 2013). The cost of assets decompose into three risk premiums: capital, impact, and political shocks. This builds a foundation where an investor may require a risk premium to compensate for the political uncertainty as the state of the economy varies (Pastor & Veronesi, 2013). As asset prices decrease in the face of higher policy uncertainty, the yields on bonds will increase. The yield on municipal bonds increases when investors face higher policy uncertainty (Gao & Qi, 2012).

Next, while measuring investor reactions to Congressional Roll Call votes, we found a strong impact of congressional gridlock on legislative uncertainty (Meng, 2020). An increase in legislative gridlock leads to greater unpredictably in Congressional voting and greater legislative uncertainty. The same increase in legislative uncertainty gives further rise to higher bond yields, increased corporate financing costs, and fewer analyst recommendations. In the end, the impact of Congressional gridlock on legislative uncertainty is stronger than that of economic policy uncertainty, political polarization, or presidential ideology (Meng, 2020, p.16).

Counter to the above supporting argument, not all exogenous shocks impact financial systems equally. While the magnitudes may differ, the time required to return to equilibrium may vary as well. For example, increases in economic policy uncertainty may be much stronger in impact upon general economic factors, such as employment, than equivalent decreases in EPU upon that economic activity (Foerster, 2014). Other examples of economic policy uncertainty that lead to asymmetric effects include the international trade and insurance markets (Al-Thaqeb & Algharabali, 2019).

There is a great need to counter policy uncertainty with timely information to keep pace with the current state of the economy, which includes the current level of economic policy uncertainty. To do so in this study, we made use of an early indicator of EPU, Google Trends.

This leads us to this testable hypothesis:

Hypothesis 4.1 (4.1): In midst of a salient debt ceiling, economic policy uncertainty - Google Trends negatively influences the three-month U.S. Treasury yield spread.

4.2.2. Interest Group Competition and Conflict

In our second research objective we examined the relationship between interest group competition and any influence the interest groups may have upon the U.S. Congress, as it confronts a debt ceiling crisis. We argue, as the number (or funding) of interest groups in opposition increases to an appropriation-debt ceiling related bill, this lengthens the debate before arriving at a consensus (Holyoke, 2019; Schick, 2008), serving as a potential setback in negotiations. In turn, as exhaustion of extraordinary measures grows close, this leads to an increase in investor uncertainty. An increase in uncertainty will negatively affect U.S. Treasury bill yield spreads (Cashin et al., 2017). This is not to say that there will not be groups in support of a bill.

First, we address interest groups, their congressional allies, and competition between sides. During contentious times, such as appropriations, and when action is required upon the debt ceiling, interest groups and their lobbyists are competing. The level of competition between groups and allies, together with funding, can swiftly change to “outright conflict,” where these actions act to delay the work of the U.S. Congress (Holyoke, 2009, 2019). In this scenario, as

Congressional members are risk averse, the lobbyists will have a negative influence on allied and non-allied congress members alike. This negative influence that surrounds the policy may quickly transform into costly legislative gridlock (Binder, 2015).

Next, one author hypothesized that a committee chair must ascertain how much opposition or support a bill will garner among other legislators. Lobbying for the bill acts as a signal to the chair in terms of the proposal's legislative potential (Lorenz, 2020; Phinney, 2017). The more resistance to a proposal from other members and groups, the more risk averse the members of the committee will be (Holyoke, 2019).

Finally, it is well known that policy is biased toward the status quo for several reasons. These reasons include the relative scarcity of a lawmaker's attention, the time required to invest in the success of a new proposal, and the difficultly in deriving bipartisan support (McKay, 2012).[28]

In contrast, there exist aspects in common for those supporting a policy change. Committee chairs and members, and members at large in the U.S. Congress, can surmise the legislative viability of a proposal. These interest groups, however, must present an argument, resources, diversity of interests, and allies that are far more superior to that of the opposition. Therefore, we maintain that as support grows for a proposal, there exist at least two reactions. Support may lower policy uncertainty, increasing the level of the yield spread. An increase in support for a congressional measure may directly influence the yield spread in a positive manner.

Complex public policies, including spending bills, may affect several distinct interest groups in a different manner, including those groups with different viewpoints (Garlick, 2016; Mahoney & Baumgartner, 2015). Consequently, many a "strange bedfellow" end up in opposition or support of a policy (Phinney, 2017). In addition to resources, many advocacy groups tend to align themselves with one party or a coalition, efficiently using public embarrassment and the threat of replacement as a tactic (Garlick, 2016).

Next, interest groups that are highly supportive and successful in their strategy are also able to perform functions better than other members (Garlick, 2016). We cannot underestimate

[28] It requires 3.5 lobbyists working in favor of a new proposal to counteract the work of one lobbyist in opposition to the same proposal. On average, only 3% of all bills introduced into Congress become law. A proposal that continues to survive, speaks well to the strength of this (McKay, 2012).

the power of highly efficient interest groups in the division of labor that is needed to achieve successful support and education of allied members (Baumgartner & Mahoney, 2015). The 1986 Tax Reform Act serves as a prolific example. The Congressional allies and interest groups that supported this measure were able to overcome incredible odds, in addition to what we would term "negative lobbying."

We propose the following hypothesis:

> **Hypothesis 4.2 (H4.2):** As Total of Interest Groups in Opposition increase in number or in funding, this will lead to a decrease in the U.S. Treasury three-month yield spread. The opposite will hold for Total Interest Groups in Support.

We make a brief note in relation to excess borrowing costs owed to the U.S. Treasury and U.S. taxpayer. We further assert that investors will grow more uncertain about the U.S. Treasury's ability to continue to make payments on outstanding Treasury Bills. As the projected breach date grows near, investors will begin to charge a "default" risk premium on short-term Treasury Bills. This will decrease the yield spread, while the yield on the Treasury Bills increases. As these bills mature in the final weeks of each crisis, re-issued bills will offer higher yields. The U.S. Treasury will incur excess borrowing costs. The re-issued bills will remain outstanding until each bill matures, adding substantial excess interest costs.

If there exists a change where the support by interest groups grows for the current legislation at hand, the debate will tend to arrive at a consensus in a faster or more consistent manner. Investors will react favorably. For example, in 2015 the Treasury Bill yields began to decrease as the yield spread increased. If members of Congress are able to reach collective consensus on budget/appropriations, this will lower excess borrowing costs owed to the U.S. Treasury. This was especially the case, given supportive concessions made to improve funding various agencies and programs in 2015 (Nipanni & Parnes, 2017).

4.3. Data and Methodology

4.3.1. Data Sample Attributes and Collection

We employed a comprehensive sample of a combination of financial, economic, and political variables data that underwent transformation to daily frequency. The full sample encompassed 768 daily observations, where we obtained U.S. Treasury bill data from several sources in order to calculate each three-month U.S. Treasury Bill bid-ask spread, yield and yield spread.

The time required to resolve each contentious and costly debt limit debate dictates the event period for each of the three occurrences of the recent debt ceiling crises that were studied. Following historical precedent, the resolution of each crisis normally includes appropriations related legislation together with a component dedicated to the suspension or lifting of the statutory debt ceiling (Schick, 2008). Each event period requires a pre-event and post-event period of approximately 90 days using the U.S. Treasury calendar. The entirety of the sample, when all three periods are combined, ranges from December 1, 2010, to January 29, 2016.

The pre-event period normally begins when the first letter or communication is made public by the U.S. Secretary of Treasury. The purpose of this letter is to urge the U.S. Congress to act in an expeditious manner, so as not to delay raising the statutory debt limit to meet the needs of any appropriated obligations and to avoid default. To maintain consistency, we began the event period with the first letter sent to the U.S. Congress by the Secretary of the U.S. Treasury Department, stating that the department had begun a Debt Issuance Suspension Period (DISP) that relies upon the use of many extraordinary measures to keep the government funded. We ended each event period with the resolution by way of Congressional legislation, as Congress passes a measure to increase or suspension the statutory debt limit.[29]

We transformed quarterly lobbying expenditures into a daily average and then combined this with each group type (organization type) daily total from campaign contributions. By

[29] The event window related to the three debt ceiling crises includes the following: May 5, 2011, to August 2, 2011, May 17, 2013, to October 16, 2013. April 16, 2015, to November 2, 2015. Government funding was expected to last until August 2, 2011, October 17, 2013, and November 3, 2015, respectively (Austin, 2015).

introducing this daily figure and transforming its frequency, this introduced several structural breaks for each of our political variables.

Our data collection took place across three stages. The Center for Responsive Politics as well as the U.S. Senate Office of Public Record offers tools and data for lobbying records in bulk. First, we collected three forms of political variables, which included lobbying, campaign contributions, and public positions by firms and organizations, in opposition to, or support of, the appropriations legislation. Moreover, we gleaned public positions of interest groups in opposition or support from U.S. Senate lobbying records, Maplight.org, and interest group scores (Lorenz, Furnas, & Crosson, 2020). All interest groups who lobbied on each bill also gave campaign contributions.

Lastly, we combined all data, including financial data, such as the U.S. Treasury from the U.S. Federal Reserve, using the Constant Maturity Series, which is based on actual market observations. We collected data on the overnight index swap rate (three-month contracts) from Bloomberg L.P. from 2010 to 2016. We further gathered daily observational data from the Center for Research in Security Prices and the New York Federal Reserve Bank.

4.3.2. Equations We use Equation 4.1 and 4.2, to examine each hypothesis.

Equation 4.1. Dynamic Ordinary Least Squares (DOLS) – ARDL

$$Log(TreasuryYieldSpread_t) = \alpha_{1i} Log(TreasuryYieldSpread_{t-i}) + \alpha_{2i} \log(GoogleTrends - EPU)_{t-i} + \alpha_{3i} TotalGroupinSupport_{t-i} + \alpha_{4i} TotalGroupsOpposition_{t-i} + \alpha_{5i} ScaledNetTotGroupFunding_{t\text{-}i} + \phi_{ct} + \varepsilon_t$$

Equation 4.2: Error Correction Model - ARDL

$$Log(\Delta TreasuryYieldSpread_t) = \alpha_{0+} \sum_{j=1}^{p} \alpha_{1j} Log(\Delta TreasuryYieldSpread_{t\text{-}j}) + \sum_{j=1}^{q} \alpha_{2j} Log(\Delta GoogleTrends - EPU_{t\text{-}j}) + \sum_{j=1}^{q} \alpha_{3j} (\Delta TotalGroupsOppos_{t\text{-}j}) + \sum_{j=1}^{q} \alpha_{4j} (\Delta TotalGroupsSupport_{t\text{-}j}) + \sum_{j=1}^{q} \Delta\alpha_{5j} (\Delta ScaledNetTotGroupFunding_{t\text{-}j}) + \lambda_1 (TreasuryYieldSpread_{t-j}) + \lambda_2 (EconomicPolicyUncertainty\text{-}GT_{t\text{-}j}) + \lambda_3 (TotalGroupsSupport_{t-j}) + \lambda_4 (TotalGroupsOppose_{t-j}) + \lambda_5 (ScaledNetTotGroupFunding_{t\text{-}j}) + \lambda_6 ECT_{t-j} + \phi_{ct-j} + \varepsilon_t$$

4.3.3. Variables

We employed the following variables to examine the role and effect of interest group competition and economic uncertainty on the Treasury Yield Spread, as the nation endured a debt ceiling crisis. Before defining our variables, we employed the following mathematical notation in Equations 4.1 and 4.2 from the preceding section 4.3.2. We used the function *Log (x)*, where *Log (x) = Log(x)* or $Log_e(x)$. In other words, we employed the implicit natural logarithm of variable x, using the base of ***e***. Moreover, we made use of another important function using the following notation, "Δ ". This notation represents the first difference operator or $Log\ (Y_t) - Log\ (Y_{t-1})$. The ε_t signifies the error terms that form our residuals. In the end, the error terms, i.e., the residuals in the ARDL model, should be normally distributed with little to no autocorrelation, or homoscedastic, i.e., white noise.

For Equation 4.1 and Equation 4.2, the α_{ni} coefficients are a combination of contemporaneous and lagged variables, where the number of lags are yet to be chosen. Importantly, in Equation 4.2, the α_{ni} coefficients represent short-run estimates, while the coefficients preceded by λ_n represent our long-run estimates. While the α_0 coefficient indicates the constant of each equation 4.1 and equation 4.2. λ_6 in equation 4.2 precedes the error correction term, or the non-zero negative adjustment term, which speaks to the time required for the dependent variable and the system to return to a state of equilibrium.

We formed the dependent variable, the U.S. Treasury Yield Spread, three-month ($TreasuryBillYieldSpread_{t-j}$) (+/-) by taking the difference in the yield of a three-month contract (the three-month Constant Maturity Yield) from the overnight index swap rate (three-month contract). If the debt ceiling crisis influences the spread in a negative manner, the spread will decrease, as investors embed a default premium.

To control for important determinants of the U.S. Treasury Debt Market, we included a vector of exogenous variables, ϕ_{ct}. We used primary dealer Treasury Bill transactions, ($Transactions_{t-j}$) (+), to account for factors such as supply and level of activity between secondary and primary markets (Liu, Shao, & Yeager, 2009). Next, we made use of the bid-ask spread, ($Bid\text{-}AskSpread_{d-j}$) (-), to account for changes in liquidity (Fleming, 2001; Cashin et al., 2017). Importantly, we derived the Bid-Ask Spread by first converting all bid and ask yield data into a price format. While following U.S. Treasury convention, the bank discount formula that we employed for each bid or ask price equals (100*(1-(bid/ask yield * days left to maturity)/360) (U.S. Treasury, 2022).

Lastly, to control for multiple structural breaks, we included our dummy variables that take on a value of -1, 0, or 1, to control for multiple structural breaks (Bai & Perron, 2003). As the structural breaks occur at the end of quarter, each dummy variable value corresponds to a unique fiscal quarter during the event period year. We further interacted the dummy variables with our key independent variables, as well.

The variable Google Trends EPU ($GoogleTrends - EPU_{t-j}$) (-) represents economic policy uncertainty and/or policy uncertainty. We used the more popular search queries for a given debt ceiling crisis. For example, we sought popular queries using the terms, "United States Debt Limit Crisis of 2011/2013" or "Debt Limit." Google normalizes its search volume data daily. According to Google.com, the Search Volume Index data is scaled from 0 to 100 and is based on a topic proportional to all searches on all topics. Hence, on any given day, the search volume for a query falls between 0 and 100. A 0 represents little interest or not enough interest in the search term, while a 100 indicates the highest relative popularity (Bontempi et al., 2016).

Our final variable group that was examined for the effect of interest group competition and conflict on the dependent variable, the Treasury Yield Spread. We expected the Total Groups in Opposition or Support and Scaled Net Total Group Funding variable to capture two aspects of the level of competition and conflict. These included the first set of variables, Total Groups in Opposition ($TotalGroups\text{-}Opposition_{i,t-j}$)(-), and Total Groups in Support ($TotalGroups\text{-}Support_{i,t-j}$)(+). The second group/set also illustrated either interest group activity, in opposition or support, in the form of Total interest group funding, as a net measure. Therefore, we subtracted Total Funding of Groups in Opposition ($TotalFunding\text{-}GroupsinOpposition_{t-j}$) (-) from Total Funding of Groups in Support ($TotalFunding\text{-}GroupsSupport_{t-j}$) (-) to form the final variable, Scaled Net Total Group Funding ($NetTotGroupFunding_{t-j}$) (- /+) variable.[30]

To examine the robustness of our findings, we replaced Google Trend's uncertainty measure with two other uncertainty measures. These include Twitter Economic Uncertainty

[30] To avoid arriving at results that contained extremely small coefficients for Scaled Net Total Group Funding (in Opposition or Support), we scaled our funding variable by dividing Net Total Group Funding by 1,000.

index (*TwitterEPU*$_{t-j}$) (-), based upon brief text messages of the Twitter social network (Baker, Bloom, Davis, & Renault, 2021). This index seeks Tweets that contain terms related to "Economic" and "Uncertainty." Second, we included a news-based uncertainty measure, using daily periodicity. This categorical index focuses upon fiscal policy, i.e., the Debt Ceiling Index (*DebtCeilingIndex*$_{t-j}$) (-) (Baker, Bloom, & Davis, 2016).

4.3.4. Overview of Methods

To understand the effects of a debt ceiling crises on the U.S. Treasury market, we employed event studies, autoregressive distributed lag models (ARDL) and error correction models. It is important to elaborate upon our decision-making process briefly, as we made distinct and unique decisions to do so.[31]

Before testing for stationarity of each variable, we began our descriptive statistical analysis located in Table 4.1. We then performed a key examination of the relationships between each pair of variables, pairwise correlation found in Table 4.2 As part of our pre-estimation stage, we graphed and visualized each variable to consider, any trend, drift, or cycle that may appear, in addition to testing for any structural breaks that may occur. For example, each of the political variables had a structural break.

In the next step, to ensure each variable was stationary, we employed the augmented Dickey Fuller test in Table 4.3 (Dickey & Fuller, 1979). We then examined each variable and each equation for the optimal number of lags using the Stata VARSOC command. Our focus was primarily upon Aikaike's information criterion (AIC), and the Schwarz Information Criterion (SIC) (Akaike, 1979; Schwarz, 1978).[32] It is important to strike a balance between allowing enough lags for each variable's data generation process, while minimizing the value of information criteria values per variable (Lutkepohl, 2005).

One advantage of the autoregressive distributed lag (ARDL) model is that it allows for a combination of variables of mixed order of integration. We included a mix of variables in levels form, I(0), and variables that have been first differenced, I(1) in the ARDL model. Yet a variable

[31] Normally Table 4.7, reflects the results of DOLS. This is normally performed first. Further, Table 4.4, represents one of the last procedures that is undertaken. It corresponds to the Bounds test.

[32] We omit the results of our optimal lag choice using multiple information criterion, for brevity.

of the integrated order of 2, or second differenced, I(2), is not acceptable for use with the ARDL models. Moreover, ARDL models are also well-known for their ability to work with small samples (Kripfganz & Schneider, 2018). The first stage ARDL entails using the intertemporal dynamic Ordinary Least Squares' estimation, i.e., DOLS (Stock & Watson, 1993).

We entered the appropriate number of optimal lags before using Equation 4.1. We have included these results from Equation 4.1 in Table 4.7. As a part of the results and output from Equation 4.1, Stata produced an (n x 1) matrix of maximum number of optimal lags that should be used for each variable in Equation 4.2, the second stage of the ARDL model.

We began the second stage by evaluating a non-restricted form of the Error Correction Model(ECM), again using OLS estimation of Equation 4.2. Upon performing the regression of the Error Correction Model, we then performed the Bounds test (i.e., the "ec test" post-estimation command). Stata's program for ARDL provides the upper and lower bounds of the Bounds test, which we then compare with our F-statistic. If the F-statistic surpasses the upper bound of the asymptotic critical value, we are able only then to determine if a long run equilibrium relationship exists, i.e., cointegration (Kripfganz & Schneider, 2018; Pesaran, Shin, & Smith, 2001). The results of our ARDL Bounds test are included in Table 4.4. If cointegration was indicated, we then separated and interpreted the results into long-run estimates that are found in Table 4.5. We incorporated the rest of these results, including short-run estimates of the ECM ARDL model and the adjustment coefficients in Table 4.6. In the end, of upmost importance, we performed several measures of post-estimation diagnostics to ensure the integrity of the end results. These are in Table 4.8.

To calculate excess borrowing costs, we employed Ordinary Least Squares estimated regressions. For example, for our uncertainty proxy, we employed the independent variable Google Trends - EPU. We then used the OLS regression where the dependent variable equals change in U.S. Treasury Yield Spread. The second step included calculating the cost of each 4-week, 13-week, and 26–week auctions that coincided with each event period. We did so by multiplying each unique auction, including the total dollar amount sold, by the change in spread (dependent on the previous OLS regression). Lastly, we summed the excess borrowing costs by U.S. Treasury bill auction and maturity (U.S. GAO, 2015). We further performed the same process for interest group competition, i.e., Total Groups in Opposition, or Scaled Net Group Funding. This allowed us to derive and quantity excess borrowing costs.

4.3.5. Choice of Estimators

The Autoregressive Distributive Lag model is advantageous, as it allows for the use of small to medium sample sizes, in addition to making it possible to examine variables of mixed order of integration including I(1) and I(0) variables. The ARDL model first makes use of the OLS estimation when using Dynamic Ordinary Least Squares or DOLS (Stock & Watson, 1993). The use of DOLS allows one to work with time series data. We chose only to apply the first-difference transformation to these variables if they were non-stationary in level form in an attempt to retain long run estimates (Table 4.7). This type of dynamic model produces asymptotically efficient coefficients, as the model accounts for serial correlation and endogeneity properly with minimal bias. In the second stage, the Error Correction Model allowed us to arrive at the Bounds test where we could determine if cointegrated relationships existed. The Error Correction model further employs Ordinary Least Squares estimation (Menegaki, 2019). Equally important, the ARDL model further allows for in-sample prediction, where we derived the amount of time required for the Treasury Yield Spread to return to equilibrium following the debt ceiling crises. Our examination serves as initial evidence only, and for this reason we do not perform a Vector Error Correction Model.

4.3.6. Robustness Measures

To ensure robustness results, we verified the quality of our results, first by using GoogleTrends as our measure of Economic Policy Uncertainty, and then replaced this variable with two other uncertainty measures to ensure that our regression coefficients are similar, including direction and magnitude. Moreover, we employed the Johansen Cointegration Rank test, using a Maximum Likelihood Estimation approach to verify the number of cointegrating vectors for each crisis. Lastly, we made use of orthogonalized impulse response functions, to confirm the timing and magnitude of our findings.

4.4. Empirical Results

4.4.1. Descriptive Statistics

The descriptive statistics located in Table 4.1, demonstrated substantial volatility in the movement of the U.S. Treasury Yield Spread across each event period. The average yield spread was approximately 0.083 with its standard deviation at 0.042, or almost 50% of the average yield spread. The yield of our three-month U.S. Treasury bill peaked right before resolution in 2011, 2013, and further in 2015.

Our measure for economic policy uncertainty, Google Trends-EPU, was highly reactive to events. Although the average across all three events measured, represented the volume of the

Table 4.1.

Descriptive Statistics

Variables	Observed	Mean	Standard deviation	Minimum	Maximum
U.S. Treasury yield spread	744	0.0825	0.041	-0.038	0.223
Google Trends policy uncertainty	508	8.38	16.35	0.00	100
Categorical index debt ceiling	474	41.68	24.68	3.00	168
Twitter uncertainty index	481	122.85	112.76	5.90	775.66
Scaled net total funding by group type – support, opposition	765	-$45,147	$81,607	-$253,425	$201,435
Dummy variable (quarterly)	461	-0.57	0.730	-1.000	1.000
Bid – Ask spread three-month U.S. Treasury bill	744	0	0.000	0.000	0.020
U.S. Treasury bill transactions (in millions of U.S. dollars)	765	$73,055	$14,048	$47,119	$129,735
U.S. Treasury bill three-month yield	744	0.060	0.060	0.000	0.350
Overnight swap index rate three-month contract	765	0.140	0.060	0.070	0.390
Total groups in support	762	50.86	61.08	0	198
Total groups in opposition	762	57.91	51.16	0	148
U.S. Treasury bill 4 weeks face value auction (000's)	145	$35,170,000	$10,100,000	$4,730,000	$54,700,000
U.S. Treasury bill 13 weeks face value auction (000's)	145	$27,630,000	$3,843,000	$16,800,000	$34,600,000
U.S. Treasury bill 26 weeks face value auction (000's)	145	$25,020,000	$2,444,000	$17,000,000	$29,300,000
U.S. Treasury bill 52 weeks face value auction (000's)	35	$22,490,000	$3,864,000	$9,770,000	$24,900,000

search intensity for the specific term on any given day during the event. Interestingly, the standard deviation of Google Trends is double the value of the mean. With that said, it is common to find zero as the search volume on a given day. The Overnight Swap rate performed as expected, suffering little spillover effect. Interestingly, Total Groups in Support, using the maximum statistic, outnumbered Total Groups in Opposition. Moreover, we note that the mean of our variable Total Groups in Opposition exceeded mean of the variable Total Groups in Support. This speaks to the strength of lobbying in opposition.

Table 4.2 allowed to account for missing values, and potentially uncover relationships/associations of interest. Table 4.2 is representative of our pairwise correlations, while using a comprehensive sample spanning from 2010 to 2016. Our first finding is non-trivial. Table 4.2 illustrates several variables, which were quite telling. The variables Net Group Funding and Total Groups in Support remain correlated with the dependent variable, the U.S. Three – Month Treasury Yield Spread, at a level of 0.42 and 0.72, respectively. Each of the aforementioned correlations were significant at 5% or better.

Table 4.2.

Pairwise Correlation – Variables of Interest - Debt Ceiling Crisis Events

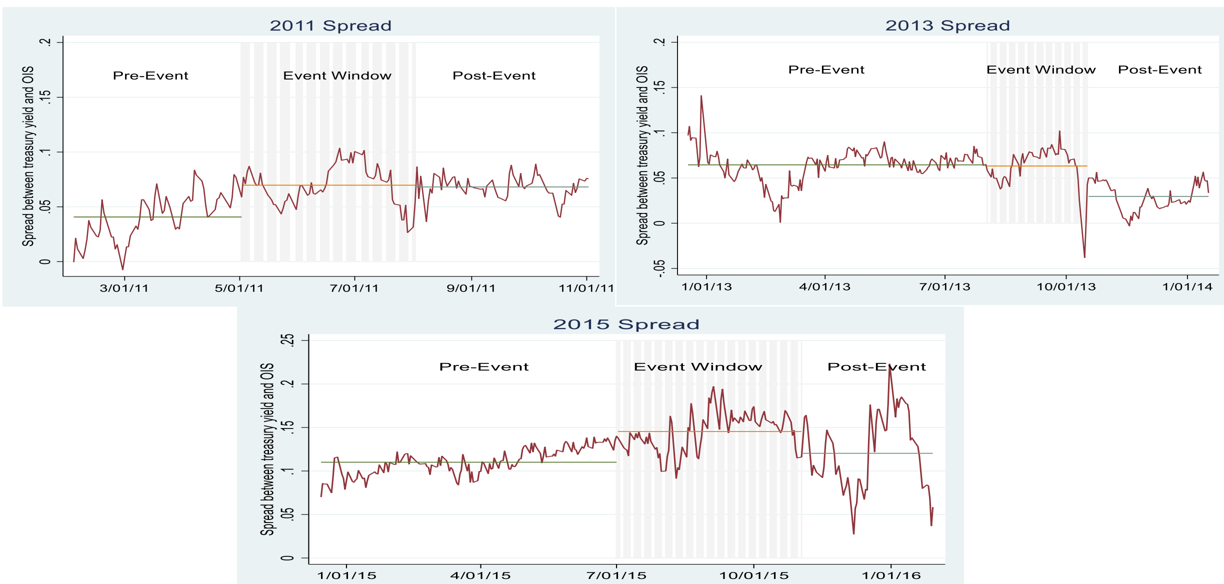
Variables	Treasury yield spread	Google trends EPU	Debt ceiling EPU	Twitter EPU	Net group funding	Dummy (d1)	Bid-ask spread	T-Bill transact	Total groups opposed	Total groups support
Treasury yield spread	1.00									
Google trends EPU	0.14*	1.00								
Debt ceiling EPU	-0.02	0.50*	1.00							
Twitter EPU	0.18*	0.22*	0.43*	1.00						
Net group funding	0.42*	-0.14*	-0.28*	-0.21*	1.00					
Dummy (d1)	-0.36*	0.34*	-0.07	-0.19*	-0.52*	1.00				
Bid-ask spread	0.07	-0.01	0.06	0.12*	-0.02	-0.22*	1.00			
T-bill transacts	-0.37*	0.20*	0.35*	0.06	-0.22*	0.09	0.01	1.00		
Total groups support	0.72*	0.08	-0.28*	-0.04	0.74*	-0.56*	0.02	-0.23*	1.00	
Total groups opposed	0.11*	0.45*	0.25*	0.19*	-0.45*	0.68*	0.01	-0.06	0.00	1.00

Note. Levels of significance for p values: *** p<0.01, ** p<0.05, * p<0.1.

The Google Trends – EPU and the Twitter Economic Uncertainty (EU) (Baker et al., 2021) maintained a high level of pairwise correlation with the Debt Ceiling Index variable (Baker et al., 2016). Finally, we found a high correlation between Net Group Funding and Total Groups in Support, at a 0.74, again significant at 5% or better.

In Figure 1, the three-month U.S. Treasury bill yield spread underwent steep decreases on each occurrence of the debt ceiling crises, as the delay continued in Congress and the breach date neared. This led to sharp declines in the yield spread during each of the event periods. At times, the substantial decrease in the Yield Spread continued well into the post-event period, before returning to equilibrium.

Figure 4.1. The Impact of Debt Ceiling Occurrences upon three-month Treasury Yield Spreads



When performing our stationarity and pre-estimation tests, our objective was to arrive at a stable model with normal residuals and little to no serial correlation or heteroskedasticity. Otherwise, our purpose was defeated. After performing our descriptive statistics and pairwise correlation, we employed unit root/structural break tests upon each of our variables.

Table 4.3, located on the following page, illustrates the Augment Dickey Fuller tests that were performed on all nine variables. We did so, first at levels, and then first differenced. We implemented this test using one lag. The only variables proved non-stationary, at level, were related to our interest group competition variables. Upon first differencing the aforementioned, all variables were stationary across each of the three debt ceiling crises.

The non-stationary variables are the Total Groups in Opposition and the variable Scaled Net Total Group Funding. This is owed in part to including the average lobbying at a daily periodicity, and then combining average daily lobbying with our daily time series of campaign contributions. Hence, we introduced structural breaks at each quarter's end. This corresponded to the Federal quarterly lobbying filing date. Each interest group that lobbied also gave contributions.

Table 4.3.

Stationary Tests – Augmented Dickey Fuller Test

Debt Crisis Year	2011		2013		2015	
Variable at level*	T-Statistic	P Value	T-Statistic	P-value	T-Statistic	P-value
U.S. Treasury bill yield spread	-3.87	0.00.	-3.19	0.02	-4.28	0.00
Google trends - EPU	-4.16	0.00	-4.44	0.00	-4.87	0.00
Total groups in opposition	-1.19	0.68	-0.13	0.95	-1.93	0.32
Total groups in support	-2.94	0.04	-4.58	0.00	-2.30	0.01
Scaled net total group funding	-1.78	0.39	-2.02	0.28	-9.88	0.00
Transactions	-3.46	0.01	-3.67	0.00	-4.84	0.00
Log (bid-ask new spread)	-12.01	0.00	-11.88	0.00	-9.89	0.00
Twitter EPU	-5.00	0.00	-7.68	0.00	-3.58	0.01
Debt ceiling index EPU	-5.69	0.00	-6.90	0.00	NA	NA
Variables in first difference*						
U.S. Treasury bill yield spread	-11.86	0.00	-14.02	0.00	-14.72	0.00
Google trends - EPU	-11.56	0.00	-14.98	0.00	-8.26	0.00
Total groups in opposition	-9.78	0.00	-12.14	0.00	-11.94	0.00
Total group in support	-12.68	0.00	-11.00	0.00	-11.75	0.00
Scaled net total group funding	-15.00	0.00	-19.65	0.00	-18.50	0.00
Transactions	-9.54	0.00	-11.45	0.00	-11.86	0.00
U.S. Treasury bills bid-ask new spread	-14.51	0.00	-20.66	0.00	-18.76	0.00
Twitter EPU	-10.95	0.00	-20.07	0.00	-10.93	0.00
Debt ceiling index EPU	-17.69	0.00	-17.69	0.00	NA	NA

Note. The following stationarity tests are only one portion of the pre-estimation procedures that we performed.

Structural breaks may well alter the interpretations of a variable's state, when determining order of integration, I(0), I(1), and I(2) (Leybourne, Mills, & Newbold, 1998). We then performed the following tests that consider the unit root with structural breaks, including Zivot-Andrew's test. The Zivot-Andrews Unit Root test takes only one structural break into account (Zivot & Andrews, 1992). This afforded us, at the very least, an initial understanding of any unknown breaks. We employed dummy variables, and an interacted dummy variable, which made it evident that there exists a balance in explanatory power. If we used too many dummy variables, we began to lose explanatory power of our model. This was especially true in the presence of structural breaks (Banerjee, Arcabic, & Lee, 2017).

Table 4.4 illustrates our tests for cointegration at the 5% and 10% levels of significance for each Debt Ceiling Crisis event. In accordance with the Bounds table and resulting bands of asymptotic critical values provided by Pesaran et al. (2001, p. 300), we identified at least one co-integrating relationship for one of the three debt ceiling occurrences. We made use of the Stata ARDL package (Kripfganz & Schneider, 2018), which was a beginning step as it related to overall cointegration. According to our bounds test, 2011 proved inconclusive. The F-statistic of 2.562 for our 2011 ARDL model, lies between the lower bound of I(0), or 2.50, and the upper level bound, I (1) or 3.72. This corresponds with a 10% significance level. For 2013, our F-test value indicated cointegration.

Table 4.4.

Critical Bounds of the F-statistic for 2011, 2013, and 2015 Debt Ceiling Crisis Events

Debt Ceiling Crisis Year	2011	2013	2015
ARDL (p, q) optimal lags in selected order	(2 0 0 1 2)	(1 0 0 0 2)	(2 4 0 0 4)
Co-integration results:	Inconclusive	Co-integrated	Inconclusive
F-test of joint significance	2.562	5.537	3.564
Significance level of bounds test employed	10%	5%	10%
Critical values bounds of the F-statistic (Pesaran et al., 2001) band	90%	95%	90%
Asymptotic critical values (lower bounds, upper bounds)	I(0) 2.50, I(1) 3.72	I(0) 2.95, I(1) 4.31	I(0) 2.43, I(1) 3.66

Note. For the bounds test, we employed the default of unrestricted intercept, and no trend. (Pesaran et al., 2001)

The 2013 F-test statistic surpassed the upper bound I(1), or 4.31, with a value of 5.537, at 5% significance. In 2015, the F-test statistic was once again inconclusive. We arrived at an F-test value of 3.564 that is just shy of the upper bound, I(1), or 3.66, at a 10% significance level.

Because we did perform several iterations, it points(ed) to the need to verify our results using other tests for cointegration. By employing robust standard errors, i.e., Newey-West heteroskedasticity and autocorrelation consistent estimators, we derived between one to three significant long run variable estimates per event.

In the end, we reject the null hypothesis of no cointegration or H0: $\lambda_0 = \lambda_1 = \lambda_2 = \lambda_n = 0$ for one of three event periods, 2013 debt ceiling crisis, as we employed Equation 4.2, the Unrestricted Conditional Error Correction Model. The other two debt ceiling crises, 2011 and

Table 4.5.

Error Correction Model

Long Run Estimates	2011	2013	2015
Estimation method	OLS	OLS	OLS
Dependent variable: Ln (U.S. Treasury Yield Spread):			
Ln (Economic policy uncertainty -	-0.038**	-0.096	-0.015
Google trends) (level)	0.022	0.108	0.026
Total groups in opposition	-0.268	-5.233	-0.010
(First difference)	0.218	3.960	0.007
Total groups in support	0.086**	-0.003	0.037*
(level)	0.043	0.228	0.020
Scaled net total group funding	-0.003*	-0.032*	-0.007**
(First difference)	0.002	0.018	0.004

Note. We applied Newey-West robust errors to improve consistency of estimates and to reduce autocorrelation and heteroscedasticity. Levels of significance for p-values are:*** $p<0.01$, ** $p<0.05$, * $p<0.1$.

2015, remain inconclusive. We were still able to glean substantial information from the results of the ARDL model.

Table 4.5 serves as one of the key focal points of our ARDL cointegration work, where our focus remains upon long-term relationships between the independent and dependent variables. We found that the natural logarithm of Economic Policy Uncertainty, Google Trends in level form, impacted the U.S. Treasury Yield Spread. This coincided with our first hypothesis, H4.1. For the 2011 debt ceiling crisis, the policy uncertainty measure, Google Trends – EPU, took a dramatic toll upon the U.S. Treasury Yield Spread. A 1% increase in the Google Trends –

Economic Policy Index led to a 3.8% decrease upon the dependent variable, the Treasury Yield Spread. The heightened uncertainty and long delay tended to exacerbate excess borrowing costs as investors became nervous about the U.S. Treasuries capacity to make interest payments in a timely manner.

To our surprise, 2013 and 2015 did not illustrate any significant relationship while employing Equation 4.2 of the error correction model. In the long run, this may be true, as a substantial reaction by Google Trends begins normally within two to four week preceding the breach date. Hence, it may be a short-term reaction. There is long-run evidence to suggest accepting the first hypothesis, yet it is not complete.

Next, Total Groups in Support was highly significant across two of the three events, 2011 and 2015. For example, in 2011, a 1% increase in the number of supporting interest groups led to an 8.6% increase in the U.S. Treasury Yield Spread, using a log-level interpretation. In 2015, we found a similar effect upon the U.S. Treasury Yield Spread.

To our surprise, we did not find evidence of cointegration nor a significant relationship in our error correction model regression for Total Groups in Opposition. However, to reiterate, opposition took two forms in this study. Scaled Net Total Group Funding is another formidable signal of opposition or support. A negative coefficient indicated that funding of groups in opposition is larger than the funding for groups in support. This is further supported by the underlying data. Scaled Net Total Group Funding is found to be of long-term significance.

In 2011, again, employing a log-level interpretation for a 1% increase in Negative (Scaled) Net Total Group Funding led to a 0.30 % decrease in the Treasury Yield Spread. In 2013, the effect was more pronounced leading to a 3.2% decrease. The 2015 crisis was still costly, to echo the work of Cashin et al. (2017). However, there was more support for the appropriations and debt ceiling measure in 2015 (H.R.1314-Bipartisan Budget Act of 2015). Again, from Table 4.5, a 1% increase in Scaled Net Total Group Funding, led to a 0.70% decrease in the 2015 Treasury Yield Spread. At the very least, this strong relationship allows us to accept Hypothesis 4.2, at least as initial evidence.

In our next section, we review our findings located in Table 4.6, of the Error Correction Model that further entails Equation 4.2. These include the short-term estimates, the adjustment

Table 4.6.

Short-Term Estimates of the ARDL- Error Correction Model

Variables/ event year	2011	2013	2015
Estimation method	OLS	OLS	OLS
Ln (U.S. Treasury yield spread)	-0.203		0.189
(one lag) (first difference)	0.218		0.119
Ln (Google trends – EPU)			0.041**
(first difference)			0.020
Ln (Google trends – EPU)			0.049***
(First difference) (one lag)			0.017
Ln (Google trends – EPU)			0.028*
(First difference) (two lags)			0.015
Ln (Google trends - EPU)			0.043***
(first difference) (three lags)			0.012
Total groups in opposition			
(second difference)			
Total groups in support	0.057		
(first difference)	0.045		
Scaled net total group funding	0.002**	0.001**	0.007***
(first difference)	0.001	0.004	0.003
Scaled net total group funding	0.002***	0.005**	0.004**
(first difference) (one lag)	0.001	0.002	0.002
Scaled Net Total group funding			0.002*
(first difference) (two lags)			0.001
Scaled net total group funding			0.002***
(first difference) (three lags)			0.001
Adjustment term			
Ln (U.S. Treasury yield spread)	-0.226***	-0.367**	-0.285***
(one lag)	.0.092	0.086	0.081
Exogenous (control) variables			
Dummy variable (quarterly)	0.057	-1.031	0.161***
(level)	0.055	0.604	0.051
Dummy * Ln(Google Trends – EPU)		0.382**	-0.040*
(Level)		0.604	0.021
Dummy * Total groups in opposition		-1.99	-0.082
(Level)(First difference)		1.61	0.102
Dummy * scaled Net total group	-0.002	-0.005	-0.003*
funding (level)	0.002	0.006	0.001
Ln (bid ask spread - U.S.	0.013	0.445***	-0.016
Treasury bill) (level)	0.060	0.058	0.012
Ln (U.S. Treasury bill transactions)	-0.055	-0.210	0.064
(level)	0.148	0.383	0.062
Constant	-0.150	4.094	-1.302
	1.505	4.443	0.639
Observations	65	70	86
R-squared	0.319	0.776	0.442

Note. Levels of significance for p values are: *** p<0.01, ** p<0.05, * p<0.1.

factor, and a vector of exogenous control variables. The negative speed of adjustment coefficient, i.e., the Error Correction Term, measured how much time is required for the dependent variable, the natural logarithm of the U.S. Treasury Yield Spread, to return to its original state of equilibrium. In Table 4.6, the negative speed of adjustment coefficient is found to be -0.226 for the 2011 debt ceiling crisis. In other words, a 22.6% correction takes place in one day, and returns towards equilibrium, where equilibrium represents 1.00 or unity. This implies that that U.S. Treasury three-month Yield Spread required four to five days or 4.42 days to return to long-run equilibrium. Although the debt ceiling crisis took place from May to early August of 2011, we believe this is an accurate approximation. Following August 2, 2011, the S&P Rating Agency downgraded the U.S. Treasury bill on August 5, 2011. The 2013 debt impasse involved a large adjustment factor of negative 0.367, which indicated a significant, yet faster return to normalcy for the yield spread, of 2-3 days, or 2.72 days. Lastly, our 2015 debt-ceiling crisis illustrated a convergence toward equilibrium, at 3.51 days exactly.

For the ECM, each of these adjustment factor coefficients is negative, significant, and corresponds to the natural logarithm of the Treasury Yield Spread, lagged by one day. This autoregressive feature of the ARDL model illustrated that, in 2011, a 1% change in the lagged yield spread reduced the current period’s yield spread by 22.6% (a log-log interpretation). Total Groups in Opposition and the variable Scaled Net Total Group Funding are integrated to the first order. This was in part owed to combining average daily lobbying with our daily time series of campaign contributions. Hence, we introduced structural breaks at each quarter end.

The OLS estimated regression results that relate to our control variables in Equation 4.2, Table 4.6 are in line with theory. We believe the fit of each regression of the error correction model could have been improved. Our R-squared statistics for 2011, 2013 and 2015 were 0.319, 0.776, 0.442, respectively.

Table 4.7.

Three Debt Ceiling Crises - Dynamic Ordinary Least Squares (DOLS)

Debt Ceiling Crisis Year	2011	2013	2015
Estimation Method	OLS	OLS	OLS
Ln(U.S. Treasury yield spread)	0.571***	0.797***	0.944***
(one lag)	0.151	0.166	0.120
Ln(U.S. Treasury yield spread)	0.202		-0.239**
(two lag)	0.156		0.124
Ln(economic policy uncertainty -	-0.038*	.	0.021
Google trends) (level)	0.022		0.014
Ln(economic policy uncertainty -		-0.527	0.005
Google trends) (one lag)		0.071	0.012
Ln(economic policy uncertainty -			-0.012
Google trends) (two lag)			0.012
Ln(economic policy uncertainty -			0.016
Google trends) (three lags)			0.013
Ln(economic policy uncertainty -			-0.055***
Google trends) (four lags)			0.014
Total groups in opposition	-0.267	-0.303	-0.008
(level)(first difference)	0.238	2.204	0.008
Total groups in support	0.028	0.216	0.046*
(level)	0.034	0.152	0.026
Total groups in support	0.057		
(one lag)	0.034		
Scaled net total group funding	-0.001	-0.004	-0000
(Level)(first difference)	0.001	0.005	0.002
Scaled net total group funding	-0.000	-0.003	-0.002*
(one lag)	0.001	0.005	0.002
Scaled net total group funding	-0.002**	-0.007**	-0.002
(two lags)	0.001	0.004	0.002
Scaled net total group funding			-0.001
(three lags)			0.002
Scaled net total group funding			-0.003**
(four lags)			0.001
Dummy variable (quarterly)	0.057	-1.45	0.144***
(orthogonalized)	0.050	1.08	0.051
Dummy * Ln (Economic policy uncertainty -		0.555**	-0.030
Google trends) (level)		0.284	0.024
Dummy * total groups in opposition		2.850	-0.120
(level)(first difference)		2.234	0.135
Dummy * scaled net total group funding	-0.002	-0.002	-0.003*
(level)	0.002	0.011	0.002
Ln(U.S. Treasury bid ask spread - three month)	0.018	0.394***	-0.008
(level)	0.233	0.382	0.011
Ln (U.S. Treasury bill transactions)	-0.242	0.383	0.082
(level)	0.163	0.764	0.067
Constant	-0.332	-4.776	-1.51
	1.734	6.465	0.718
Observations	65	61	74
R-squared	0.755	0.541	0.72

Among our political variables in Table 4.7, Equation 4.1, we did not arrive at significant coefficients upon the variables for Total Groups in Opposition, or Support. However, as discussed previously, we used two forms of variables to indicate the level of interest group competition, including total groups in opposition or support, and the Scaled Net Total Group Funding. The variable Scaled Net Group Funding led to a decrease in the Treasury Yield Spread. This serves, together with evidence from other tables, sufficient evidence to allow us to accept Hypothesis 4.1.

The variable Scaled Net Group Funding comprises campaign contributions and lobbying.

Table 4.8.

Post-Estimation Diagnostics

Post-Estimation Diagnostics	2011	2013	2015
Durbin Watson d-statistic	(14, 65) 1.87	(14, 70) 1.62	(9,86) 1.98
ARCH-LM (Chi2)	0.143	0.528	0.047
Probability of chi	0.705	0.467	0.828
Breusch–Pagan/Cook–Weisberg test for heteroscedasticity	1.63	9.37	7.46
Continued: H_0: constant variance (HET test)	0.202	0.002	0.006
OV test – Ramsey reset - Omitted variable test	F(3, 48) = 0.67	F(3, 53) = 55.84	F(3, 74) = 2.87
Probability greater than F	0.572	0.000	0.044
Variance inflation factor (mean)	5.12	15.42	10.65
Residuals are normal	Normal	Normal	Normal
Use of AIC or BIC to perform DOLS/ECM	AIC	AIC	AIC

Again, it proved to be highly significant across all three events, at varying lag lengths. In 2011, for a 1% change in the second lag of Scaled Net Total Group, at two lags, this led to a decrease of 0.20% in the Treasury Yield Spread, our dependent variable. The same 1% change in Group Funding, in 2013 led to a 0.70 percent decrease. Finally, in 2015, the impact of a 1% increase in Scaled Net Total Group Funding - Groups in Opposition is highly persistent at one lag and four lags. At one lag, the change in the group funding variable led to a .20 % decrease, and a .30% decrease, respectively, in the dependent variable, the Treasury Yield Spread.

Surprisingly, we found a lack of significance in the variable Total Group Opposition, across all three debt ceilings. However, in this paper, opposition to the legislation, at hand, exists in several forms, as previously discussed. Interestingly, as reported earlier, there existed more an overall level of support from groups, in 2015, due to concessions. In the final Table 4.7, we found that for a 1% increase in Total Groups in Support, led to a 4.6% increase in the yield spread, significant at the 10% level. This represented less overall opposition, and reduced borrowing costs or savings in interest payments by the U.S. Treasury.

Lastly, we turn our attention to post-estimation diagnostics located in Table 4.8. We cannot reject the null hypothesis of heteroscedasticity in our model for 2011 and 2013. Yet, for each regression, we consistently applied the Newey West Heteroscedastic and auto correlated consistent (HAC) standard errors (Newey & West, 1987). For example, we employed Newey West robust standard errors while performing regressions found in Table 4.5., Table 4.6., and Table 4.7.

It was only through the rigorous use of post-estimation diagnostics, that we were able to obtain overall stable models, and normal residuals with minimal heteroscedasticity and auto-correlation. We tested for the autocorrelation and auto-regressive conditional heteroscedasticity, as we implemented Engle's (1982) ARCH-Lagrange Multiplier test. We were able to reject the null hypothesis of existing autocorrelation in all crises. In 2013, we are able reject the hypothesis of autocorrelation and heteroskedasticity, with a Chi score of 0.528, and a probability of 0.467. With that said, heteroskedasticity was unavoidable yet remained minimal. In both 2013 and 2015 the probability of the Breusch–Pagan/Cook–Weisberg test, i.e., constant variance fell below 0.10 in significance (Breusch & Pagan, 1979). For stability we employed Cumulative Sum Test of Residuals (CUSUM) that remained well within the 95% confidence band. Our median Variance Inflation Factor, was consistently below or near a value of ten, and minimal multicollinearity.

4.4.2. Excess Borrowing Costs owed to the U.S. Treasury and Taxpayers

We use an OLS estimator to calculate excess borrowing costs due to the elevated yield and default risk premium on short term Treasury Bills. We discussed our method in detail on p.13. Importantly, the following excess borrowings costs are owed to increase in the level of uncertainty owed to the extensive delay in raising the debt ceiling. The costs incurred for 2011, 2013 and 2015 are $11,700,000, $15,000,000, and $13,500,000, respectively. The costs owed to interest group opposition (Scaled Net Total Group Funding in Opposition) are $3,676,674, $1,300,000, and $7,900,000, respectively. These costs remained outstanding for some time, as a

Figure 4.2. Impulse Response Functions for the 2011 Debt Ceiling Crisis

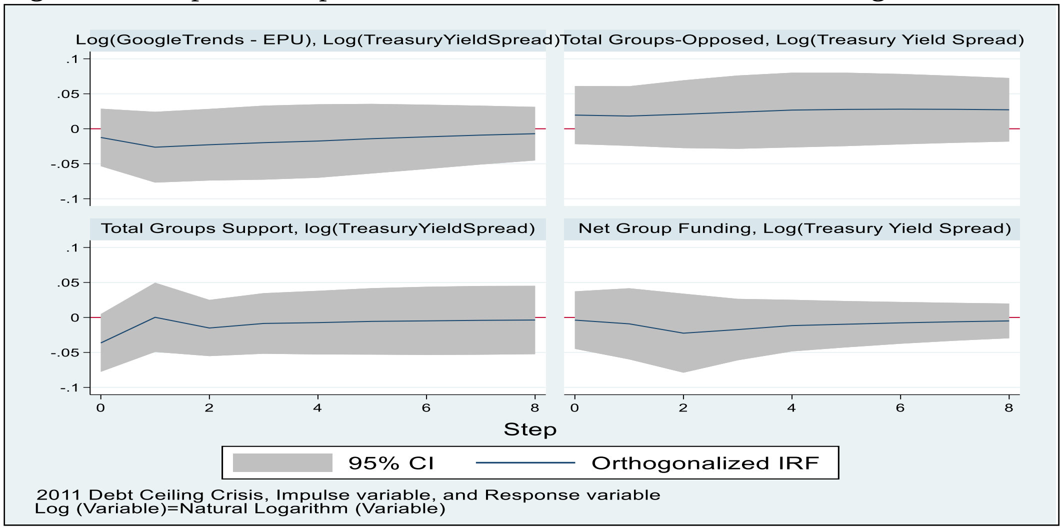


Figure 4.3. Impulse Response Functions for the 2013 Debt Ceiling Crisis

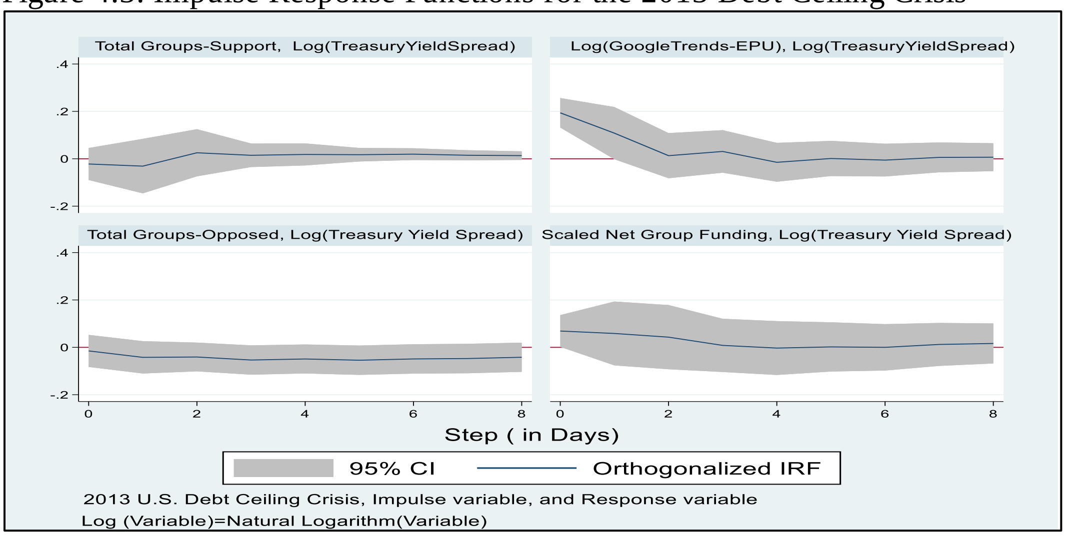
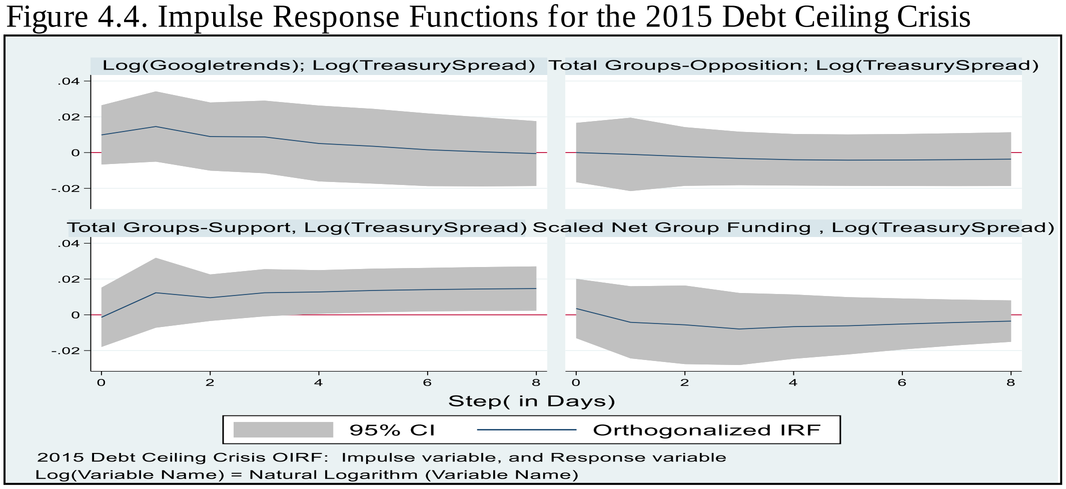


Figure 4.4. Impulse Response Functions for the 2015 Debt Ceiling Crisis



number of bills matured around the breach date and were re-issued at an excess default risk premium.

4.4.3. Measures of Robustness

We substituted Google Trend's economic policy uncertainty (EPU) measure with two other uncertainty measures to ensure the reliability of this variable. These included the Twitter Economic Uncertainty Index ($TwitterEPU_{t-j}$) (-), based on brief text messages of the Twitter social network (Baker, Bloom, Davis, & Renault, 2021). This index seeks Tweets that contain terms related to "Economic" and "Uncertainty." Second, we included a news-based uncertainty measure, using daily periodicity. This categorical index focuses upon fiscal policy, i.e., the Debt Ceiling Index ($DebtCeilingIndex_{t-j}$) (-) (Baker, Bloom, & Davis, 2016). The latter group of authors notes how the Twitter measure still substantially reflects people's reaction to news. We arrived at significant independent variables; however, Google Trends consistently created a better fit, i.e., as it relates to the R-squared statistic over all three events. Google Trends-EPU performed well, acting as an early indicator.

Second, one cannot perform a Johansen Cointegration Rank test directly if the variables are of mixed order of integration (Johansen, 1988; Shreshta & Bhatta, 2019). Our intention was to verify the total number of cointegrating relationships for each event, while using the Johansen Cointegration Rank test. As an example, in 2015, the trace statistic falls below the 5% critical values of 15.41 with a trace statistic of 13.54, where it is significant at both 1 and 5% levels. The 2015 trace and eigenvalues correspond to a rank of three (vectors). The Johansen Rank test illustrates, two/three cointegrating relationships for each event of 2011 and 2013 (Johansen, 1988).

We introduced each variable into the underlying vector auto-regression, while employing a decreasing order of exogeneity. Across all three groups of OIRF's we found Total Groups in Support and Scaled Net Total Group Funding in Opposition (or Support) illustrated substantial responses. Google Trends – EPU reacted as we had hypothesized. Overall, the variable Total Groups Opposition is the sole variable that remains relatively stagnant. The response of each variable reacted in a theoretically and empirically consistent fashion with our hypothesized results. The Orthoganalized Impulse Response Functions for 2011 to 2015 confirm the initial evidence of Hypothesis 4.1 and Hypothesis 4.2.

Lastly, our economic policy uncertainty variable, Google Trends – EPU, illustrated substantial influence upon the Treasury Yield Spread in 2013. For a one standard deviation (positive innovation) to the Natural Logarithm of Google Trends, led to 20% decrease in the U.S. Treasury Yield Spread, over the course of four days. The one exception was the variable Total Groups in Opposition, as it remained relatively mute across all three episodes.

4.5. Conclusion

Our first research question affords us a better understanding of the impact of the events that are related to the 2011, 2013, and 2015 debt ceilings, upon the U.S. Treasury three-month excess yields, and the yield spread of the three-month U.S. Treasury bill. We control for changes in liquidity and supply of U.S. Treasury bills, as we examine the underlying dynamics of this market.

Our first objective allows us to fill a gap in the literature by assessing costs and saving owed to an increase in the U.S. Treasury Yield Spread during the highest points of uncertainty and opposition in each of the debt ceiling crises. As we employed the Google Trends as a measure across each event, this allowed us to quantify excess borrowing costs that related to the policy uncertainty premium. We make use of the coefficients from our policy uncertainty measure – Google Trends - EPU, using our first stage model for calculating this portion of excess costs owed to a delay in raising the debt ceiling, i.e., Equation 4.1. Several authors have noted that it is impossible to quantify the cost of political events, as they will often settle before any damage is done (Liu et al., 2009).

Moreover, we are able to quantify the impact of interest group opposition and support upon the U.S. Treasury Yield Spread, during a time that calls for fiscal stewardship, and a swift resolution. Costs of interest group competition, and outright conflict, are quite common in contemporary appropriations legislation.

Our final contribution to the field emanates from testing hypotheses using Auto-Regressive Distributed Lag model that examines cointegration. We quantified the amount of time required for the three-month U.S. Treasury bill market to return to equilibrium, through calculation of the error correction term of the ARDL model. The time required for convergence upon equilibrium for the Treasury Yield Spread for each crises ranged from 2 to 5 days. We are able to compare results with Impulse Response Functions, while confirming the time required for our dependent variable to return to equilibrium.

Limitations include the political data collection of differing periodicity that created structural breaks. Future directions of research include use of mixed frequency data sampling methods to overcome challenges of varying frequencies. Moreover, it would be ideal to include the diversity count of each side in opposition or support, as well as the influence of the U.S. president and administration. While alternatives have been proposed, the current process for raising or suspending the Statutory Debt Limit remains in dire need of change. This must be dealt with sooner rather than later.

CHAPTER V
CONCLUSIONS

In Chapter II, we inquired into the large bank practice of lobbying regulators upon financial regulation. We examined the propensity of a BHC to lobby regulators, as reported in U.S. Congressional and financial regulator reporting, U.S. Federal Register. Further, we analyzed the propensity to comment on proposed regulation with the intent to have a particular BHC's argument cited in a final form of a regulation. Citations of a BHC's comment on a proposed regulation in its related final regulation demonstrate that at a minimum, the opinion of the BHC is heard (Ban & You, 2019; Haeder & Yackee, 2015; Rashin, 2019). At the most, they have garnered a regulatory change in their favor. While using several alternative forms of regression estimation methods including negative binomial, MLE (Tobit), and Poisson, we were able to ensure the validity of results. We later inquired if the use of a revolving door lobbyist, would improve the probability of having their opinion heard, or a citation.

Moreover, we found that increasing the propensity of comments and the hiring of a former agency official while lobbying the regulator led to a higher likelihood of having the BHC's opinion heard, and their stance mentioned in the final regulation. We further examined by way of sample matching and average treatment effects to further the integrity of the models.

Our findings in Chapter III are based on the same group of 82-86 large BHCs that we used in the first chapter. Through the use of multiple panel regression methods, we were able to extract our results in response to our first question, where we examined for the impact of systemic risk and non-traditional revenue upon bank value. Initially using multiple panel regression estimations and firm and year fixed effects, we found that the impact of an increase non-traditional revenue in aggregate leads to a significant and large decrease in bank holding firms value measured by Tobin's Q. While examining our second hypothesis, we found when contemporary BHCs expand their presence into more non-interest, non-tradtional revenue (Stiroh, 2006), it leads to a further decrease in BHC value. For robustness, we employed three unique panel regression estimation methods. We found that overall levels of bank value, the mean Tobin's Q, has declined consistently across the past fifteen year. The relationship with our aggregate level variable, Non-traditional Revenue and BHC value, may have been hampered by the opaque nature of certain complex revenues. Lastly, we inquired into our final two hypotheses that relate to bank share volatility. We found that for an increase in aggregate non-traditional revenue acts to increase bank (share price) volatility. Our results are surprising and contrary to those of one group of authors who discovered that diversification of revenue by large banks reduced bank specific risk, while increasing levels of systemic risk (Williams & Fenech, 2016).

Beyond this, we examined if an increase in systemic risk, whether inadvertent or intentional, led to heighted volatility. We found that as banks diversify or increase their revenues, including geographical diversification and specialization within specific revenues, they may become quite interdependent and correlated.

Third, we examined revenue trends at the bank holding company level, which allowed us to explain how revenue generation has changed including, individual non- Traditional revenues. Surprisingly, certain revenues that are at the heart of the 2007 – 2009 Financial Crisis have not disappeared, such as trading, while others have decreased, such as securitization. While insurance roughly remained the same, it is thought to be one of the less risky revenue streams. For brevity we did not include our regressions upon individual revenues, yet they confirmed our results. Not all non-traditional revenues are made alike, including stakeholder revenues and fees for service revenues. Some require little up-front capital, or “skin in the game” and have different risk return profiles, such as insurance and stock brokerage services. However, for brevity and scope, this was not included in the paper, yet is available upon request.

Our last chapter related to the political and economic consequences of a debt ceiling. While performing an extensive examination upon the debt ceilings of 2011, 2013, and 2015, our findings related the influence and real effects that policy uncertainty and interest group competition have upon the financial markets, and in this case, the U.S. three-month Treasury Bill Yield. Our first research objective was to understand what role economic policy uncertainty, and the role of Congress plays when it delays lifting the debt ceiling, frequently, for the purpose of gaining concessions in appropriations. The longer the delay, and the closer we arrive to the breach date, the greater the degree of uncertainty, especially with regards to unfinish policy, including spending bills, and whether to lift or suspend the debt ceiling. We employed an Economic Policy Index using Google Trends (EPU-GT), established by Bontempi, et al., (2016). For purposes of robustness, we also employed alternative measures, such as the EPU-news based index by Baker, et al. (2016) and the Twitter Economic Uncertainty Index. We looked to our Dynamic Ordinary Least Squares estimation during the event period to complement our results. Our EPU-GT maintained a negative influence upon three-month yield spread, for 2011 and 2015, speaks to the short-term measure of Google Trends versus the news based EPU categorical index for debt ceiling and/or government shutdown. While performing an error correction model, using ordinary Least Squares estimation, we found that 2011 maintained a negative long-term relationship. Again, this may be owed to somewhat less uncertainty that existed as it relates to the 2015 debt ceiling impasse. Hence it demonstrates a positive influence upon the three-month U.S. Treasury Yield Spread. In the end, we used the change in spread, together with auction results, and calculated the cost of total excess borrowing, based upon the negative premiums, using DOLS.

Although polarization has been growing in recent years, interest group competition has been brewing since the founding of the United States. Normally, we would look to the total groups in opposition and support as a signal of strong competition, more so than funding. However, surprisingly, total group funding, especially Total Group Funding in Opposition, illustrated a strong presence across each debt ceiling crisis.

We found that interest group competition adds to the level of uncertainty, as the debate quickly turns into a crisis while competition turns into conflict. We also identified total excess borrowing costs owed to a premium charged by investors as the breach date nears, while uncertainty and conflict among groups rise. This directly and indirectly are the result of the actions of interest groups pulling and being pulled into the conflict over appropriations and debt ceiling decision (Fagan, McGee, & Thomas, 2021) . We find that the Total Interest Group Funding in opposition, negatively impacted the Treasury Yield Spread. Total Groups in Support, especially in 2015, acted to increase the Treasury Yield Spread to a certain degree. This interest group competition plays an important influence upon the yield spread.

Our excess borrowing costs owed to uncertainty and interest group competition totals are in keeping with results; uncertainty is found to have a higher cost than interest group competition during debt ceiling impasses. Each of these costs represent a proportion of the excess borrowing costs owed by the U.S. Treasury and ultimately, to the U.S. taxpayer.

Several authors have noted that it is nearly impossible to quantify the cost of political events, as they will often settle before any damage is done (Liu et al., 2009). We are also able to quantify the impact of interest group opposition during a time that calls for fiscal stewardship and a swift resolution. Costs of interest group competition, and outright conflict, which are quite common in contemporary appropriations legislation, contribute to the elevated three-month U.S.

Treasury yields, a depressed yield curve, and further excess borrowing costs owed to the U.S. Treasury department and U.S. Taxpayers alike. There exist substantial costs as it relates to interest group competition and political opposition to the U.S. debt ceiling and appropriation measures. Although we found larger costs in 2015, this is in part owed to many groups active upon the legislation, as more than 224 amendments were offered during this debt ceiling impasse.

Our last finding relates to the negative adjustment term. The time required to return to normal market operations following respective the resolutions to the 2011, 2013, and 2015 debt ceiling crises ranged from two to nearly five days as a correction period. In 2011, the return to equilibrium required more time, 4.51 days, especially in light of the credit rating downgrade.

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DISSERTATION APPENDIX

A. Chapter II Data Appendix

Table 2.2.

Descriptive Statistics

Variable	Number of observations	Mean	Maximum	Minimum	Standard deviation	Fifth percentile
Non-traditional revenue	592	$3,654,232	$62,000,000	$4,201	$7,984,043	$42,848
Citations	599	2.260	111.000	0.000	8.670	0.000
Comments	599	1.270	21.000	0.000	2.710	0.000
Ex-post lobbying	598	3.340	18.830	0.000	5.780	0.000
Revolving door lobbyist	599	0.500	1.000	0.000	0.500	0.000
Total assets	592	$335,000,000	$2,610,000,000	$15,50,340	$545,000,000	$12,700,000
Tier one leverage	573	11.130	878.920	-2.120	38.910	5.120
Total loans to total assets	592	0.520	0.830	0.020	0.220	0.080
Share of deposit funding	588	0.230	0.890	0.000	0.170	0.000
Profitability	591	0.050	0.670	-0.540	0.070	-0.040
Expected credit risk	592	0.000	0.040	0.000	0.010	0.000
Non-interest income share	592	0.500	4.360	0.070	0.280	0.200
Annual asset growth	540	0.030	4.210	-1.000	0.410	-0.660

Note. Dollar figures are in the thousands (000's) based upon the reporting figures drawn from the Federal U.S. Reserve's FR-Y-9-C quarterly reporting of Bank Holding Companies.

Table 2.3.

Pairwise correlation matrix

	Citations	Comments	Non-traditional revenue	Total assets	Tier one leverage	Total loans to total assets	Share of deposit funding	Profitability	Expected credit risk	Non-interest income share	Ex-post lobbying	Revolving door lobbyist
Citations	1.000											
Comments	0.447*	1.000										
Non-traditional revenue	0.386*	0.456*	1.000									
Total assets	0.346*	0.581*	0.659*	1.000								
Tier one leverage	-0.022	-0.031	-0.046	-0.049	1.000							
Total loans to total assets	-0.195*	-0.273*	-0.425*	-0.304*	0.029	1.000						
Share of deposit funding	-0.044	0.078	-0.127	0.095*	-0.057	-0.161*	1.000					
Profitability	0.025	0.000	0.056	0.002	0.003	-0.012	0.075	1.000				
Expected credit risk	-0.022	-0.032	-0.078	-0.034	-0.008	0.348*	-0.220*	-0.348*	1.000			
Non-interest income share	-0.108	0.117*	0.181*	0.059	0.056	-0.545	-0.011	0.049	-0.160*	1.000		
Ex-post lobbying	0.052	0.083*	0.122*	0.245*	-0.004	-0.027	0.022	0.006	0.030	-0.024	1.000	
Revolving door lobbyist	0.189*	0.259*	0.305*	0.291*	0.035	-0.295*	0.031	0.032	0.054	-0.250*	0.121*	1.000

Note. The correlation coefficients of five percent significance or less are starred, * p < (0.50).

Table 2.4.

Regression Equation 2.1, Control Variables only

Dependent variable: Citations	
$Citation_{i,t} = B_0 + \phi_C X_{i,t-1} + \upsilon_i + \nu_t + \varepsilon_{i,t}$	
Estimator	Negative binomial
Ln (Total assets)	8.694***
	(1.912)
Tier one leverage	-0.711
	(0.508)
Total loans to total assets	-7.828
	(9.249)
Share of deposit funding	-17.870**
	(7.785)
Profitability	41.230
	(28.570)
Expected credit risk	516.700**
	(259.580)
Non-interest income share	10.350
	(7.182)
Annual asset growth	-3.020
	(3.440)
Constant	-11.490
	(7.417)
Observations	468
Number of bank holding companies	51

Note. Robust standard errors appear in parentheses *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 2.5.

Regression Equation 2.2, Control Variables only

Dependent variable: Non-traditional revenue	
$Non - TraditionalRevenue_{i,t} = \gamma_0 + \phi_C X_{i,t-1} + \upsilon_i + \nu_t + \varepsilon_{i,t}$	
Estimator	Ordinary least squares
Ln (Total assets)	0.115*
	(0.070)
Tier one leverage	0.000
	(0.000)
Total loans to total assets	-1.551***
	(0.466)
Share of deposit funding	-0.786**
	(0.365)
Profitability	0.613
	(0.397)
Expected credit risk	19.55***
	(6.446)
Non-interest income share	0.291**
	(0.118)
Annual asset growth	0.207***
	(0.062)
Constant	14.23***
	(0.291)
Observations	467
R-squared	0.105
Number of bank holding companies	51

Note. Standard errors appear in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 2.6.

Average Treatment Effects estimation using regression adjustment – Poisson

Estimator:	Regression adjustment					
Outcome Model	Poisson				Observations	= 599
Final citation ex-post lobby	Coefficient	Standard error	Z	P>|Z|	95% confidence	Interval
0	1.703	.469	3.630	0.000	.783	2.623
1	3.290	.624	5.268	0.000	2.065	4.514

Note. The above treatment effects regression uses regression adjustment. This further includes covariates such as RDL and comments, with dependent and final citations, and predictor as Ex-post lobbying. Lastly, we implemented a Poisson distribution.

B. Chapter III Data Appendix

Table 3.2.

Descriptive Raw Statistics

Variable	Number of observations	Mean	Standard deviation	Minimum	Maximum
Tobin's q	3661	10.130	10.750	0.210	207.270
Franchise value	3662	1.550	1.000	0.030	11.660
Total assets	3662	$196,200,000	$452,000,000	$348,320	$2,610,000,000
Net income share	3662	0.400	0.290	-0.220	9.380
Total loans to total asset	3662	0.580	0.210	0.010	0.960
Share of deposit funding	3658	0.230	0.160	0.000	0.970
Profitability	3661	0.050	0.090	-1.960	1.040
Expected credit risk	3662	0.000	0.010	0.000	0.060
Annual asset growth	3380	0.090	0.320	-1.000	4.210
BHC volatility	3669	0.050	0.620	0.010	37.310
Non-traditional revenue	3662	$2,265,566	$7,131,532	-$40,433	$91,346,218
Leverage	3590	11.140	46.710	-2.250	1771.00
Marginal expected shortfall(absolute)	3669	0.030	0.030	0.000	0.670
Net interest margin	3662	0.020	0.010	-0.030	0.080
Annuity revenue	3669	$20,234	$76,976	-$28,000	$1,041,000
Insurance & re-insurance	3669	$326,024	$2,439,270	-$165,000	$44,399,302
Venture capital	3669	$24,553	$178,230	-$1,312,000	$4,279,000
Investment banking	3669	$501,837	$1,620,445	-$36,432	$16,278,000
Trading	3644	$587,273	$2,438,748	-$17,289,123	$29,365,060
Securitization	3644	$450,871	$1,348,363	-$5,085,852	$17,678,071
Traditional revenue	3669	$5,890,461	$14,653,688	$0	$134,700,000

Note. Several variables such as Total Assets, Non-traditional Revenues, including aggregate and individual sources, are interpreted as (000’s)

Table 3.3.

Pairwise Correlation Matrix

Variables	Tobin's q	Franchise value	Total assets	Non-interest income share	Total loans to total assets	Shares of deposit funding	Profitability	Expected credit risk	Annual asset growth	Bank volatility	Non-traditional revenue	Tier one leverage	MES
Tobin's q	1.000												
Franchise value	0.416*	1.000											
Total assets	0.073*	-0.121*	1.000										
Non-interest income share	0.061*	0.181*	0.183*	1.000									
Total loans to Total assets	-0.261*	-0.181*	-0.340*	-0.556*	1.000								
Shares of deposit funding	0.036*	0.102*	0.093*	0.018	-0.160*	1.000							
Profitability	0.038*	0.332*	0.006	0.095*	-0.080*	0.037*	1.000						
Expected credit risk	-0.052*	-0.211*	0.014	-0.084*	0.231*	-0.147*	-0.329*	1.000					
Annual asset growth	0.178*	0.027	-0.054*	-0.018	-0.037*	-0.073*	0.041*	0.015	1.000				
Bank volatility	0.006	-0.033*	-0.005	0.042*	0.003	-0.030	-0.023	0.149*	-0.010	1.000			
Non-traditional revenue	0.041*	-0.100*	0.652*	0.234*	-0.409*	-0.073*	0.068*	-0.007	-0.018	-0.006	1.000		
Tier one leverage	-0.056*	-0.014	-0.028	0.069*	-0.031	-0.040*	-0.004	-0.010	0.006	-0.001	-0.019	1.000	
MES	0.034*	-0.193*	0.056*	0.003	-0.011	-0.025	-0.224*	0.269*	-0.028	0.168*	0.022	-0.012	1.000

Note. Pairwise correlation coefficient report significance where equals or less than .05 significance level *p<0.05.

Table 3.4.

Initial Regressions, Equation 3.1 and 3.2. Control Variables Only

(3.1) $Tobin'sQ_{i,t} = \alpha_0 + +\phi_C X_{i,t-1} + \upsilon_i + \nu_t + \varepsilon_{i,t}$

(3.2) $BankVolatility_{i,t} = \beta_0 + \phi_C X_{i,t-1} + \upsilon_i + \nu_t + \varepsilon_{i,t}$

Dependent Variable	(3.1)Tobin's q	(3.2)Bank volatility
Model type	Fixed effects	Fixed effects
Ln(total assets)	4.080*	0.003*
	(2.411)	(0.002)
Tier one leverage	-0.006	0.000
	(0.018)	(-0.000)
Total loans to total assets	-8.326	0.053***
	(17.170)	(0.013)
Share of deposit funding	-17.110	-0.048***
	(12.650)	(0.009)
Profitability	81.500***	-0.005***
	(1.630)	(0.001)
Expected credit	567.700***	2.362***
risk	(185.400)	(0.135)
Non-interest income	-36.910***	-0.001
share	(4.896)	(0.004)
Asset growth	3.446	0.000
	(3.124)	(0.002)
BHC fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Constant	-43.580	-0.039
	(43.180)	(0.032)
Observations	3,259	3,259
R-squared	0.503	0.119
Number of uniquebkid	79	79

Note. Robust standard errors appear in parentheses *** p<0.01, ** p<0.05, * p<0.1, and were clustered at the BHC level.

Table 3.5.

Regression Equation 3.1 and 3.2 Control Variables

(3.1) $Tobin'sQ_{i,t} = \alpha_0 + \phi_C X_{i,t-1} + \upsilon_i + \nu_t + \varepsilon_{i,t}$

(3.2) $BankVolatility_{i,t} = \beta_0 + \phi_C X_{i,t-1} + \upsilon_i + \nu_t + \varepsilon_{i,t}$

Equation & dependent variable	(3.1) Tobin's q	(3.2) Bank volatility	(3.2) Bank volatility
Model	Random effects	Random effects	Pooled OLS
Ln(Total assets)	1.412**	-0.000	-0.001*
	(-0.620)	(-0.000)	(-0.001)
Tier one leverage	-0.009	0.0000	-0.000**
	(-0.018)	(0.000)	(0.000)
Total loans to total assets	-43.840***	-0.000	-0.016**
	(-5.545)	(-0.007)	(-0.006)
Share of deposit funding	3.444	-0.026***	-0.009
	(-5.739)	(-0.007)	(-0.007)
Profitability(ROE)	75.580***	-0.005***	-0.004**
	(-1.561)	(-0.001)	(-0.002)
Expected credit	419.500**	2.274***	2.232***
risk	(-169.500)	(-0.130)	(-0.336)
Non-interest income	-28.200***	-0.001	-0.006
share	(-3.741)	(-0.003)	(-0.004)
Annual asset growth	3.938	-0.001	-0.001
	(-2.914)	(-0.002)	(-0.00)
Constant	16.580	0.044**	0.069***
	(-12.260)	(-0.017)	(-0.014)
BHC fixed effects	No	No	Yes
Year fixed effects	No	No	No
Observations	3,259	3,259	3,259
R-squared			0.110
Number of uniquebkid	79	79	79

Note. Robust standard errors appear in parentheses *** p<0.01, ** p<0.05, * p<0.1, and were clustered at the BHC level.

Table 3.6.

Regression Equation 3.1 and 3.2. Chapter 3. Random Effects and Pooled OLS

(3.1) $Tobin'sQ_{i,t} = \alpha_0 + \alpha_1 Ln(Non-traditional\ Revenue)_{i,t-1} + \alpha_2 MarginalExpectedShortfall_{i,t-1} + \phi_C X_{i,t-1} + \upsilon_i + \nu_t + \varepsilon_{i,t}$

(3.2) $BankVolatility_{i,t} = \beta_0 + \beta_1 Non-traditionalRevenue_{i,t-1} + \beta_2 MarginalExpectedShortfall_{i,t-1} + \phi_C X_{i,t-1} + \upsilon_i + \nu_t + \varepsilon_{i,t}$

Equation & dependent variable	(3.1)Tobin's q	(3.2)Bank volatility	(3.2)Bank volatility
Model	Random effects	Random effects	Pooled OLS
Ln (Non-traditional revenue)	-0.309**	-0.000	-0.00*
	(0.134)	(0.001)	(0.001)
Marginal expected shortfall	-8.369***	0.637***	0.646***
	(2.868)	(0.020)	(0.130)
Ln (Total assets)	0.645***	-0.001	
	(0.224)	(0.001)	
Orthoganalized total assets			0.000
			(0.001)
Tier one leverage	-0.001	-0.000	-0.000
	(0.002)	(0.000)	(0.000)
Total loans to total assets	-3.205**	-0.002	-0.008
	(1.516)	(0.005)	(0.005)
Share of deposit funding	-11.680***	-0.015***	-0.012**
	(1.143)	(0.005)	(0.006)
Profitability	1.842*	-0.050***	-0.050***
	(1.058)	(0.007)	(0.012)
Expected credit risk	59.000***	1.050***	1.078***
	(20.490)	(0.130)	(0.267)
Non-interest income share	-0.781*	-0.003	-0.004*
	(0.455)	(0.003)	(0.002)
Annual asset growth	3.785***	0.003	0.0029
	(0.298)	(0.002)	(0.004)
Constant	7.143*	0.042***	0.043***
	(3.989)	(0.011)	(0.011)
BHC fixed effects	No	No	No
Time fixed effects	No	No	No
Observations	3,234	3,234	3,234
R-squared			0.357
Number of bank holding companies	78	78	78

Note. Robust standard errors appear in parentheses *** p<0.01, ** p<0.05, * p<0.1, and are clustered at the bank level.

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