The Costs of Curbing Speculation: Evidence from the Establishment of "Investment Grade"

Asaf Bernstein[†]

June 2019

Abstract

Severe economic distress that provokes regulators to curb speculation by financial institutions may have unintended costs for non-financial firms. In 1936 the Comptroller of the Currency unexpectedly announced just such a regulation, stating that supervised banks were no longer eligible to purchase securities rated below "investment grade". Using a differences-in-differences design I provide the first evidence on the costs of the establishment of federal rating-based investment restrictions. I find a sudden persistent rise in speculative bond yields after the announcement, even comparing bonds within the same firm, and a substantial decline in equity value for firms reliant on external speculative debt financing. Anecdotal and empirical evidence suggests that effects of the regulation were exacerbated by the reliance on ratings. Firms reduced the size of their debt issuances in order to "game" the ratings, leading to reduced investment and slower asset growth in subsequent years. Since these restrictions were broad, affecting almost half of even publicly traded corporate bonds, they likely had important macroeconomic implications and may have even played a role in the size of the 1937-1938 recession.

[†]University of Colorado at Boulder – Leeds School of Business; 995 Regent Drive Boulder, CO 80302; Email: asaf.bernstein@colorado.edu; Phone: (781) 718-7804. I would like to thank Antoinette Schoar for financial support as well as Walter Friedman, Peter Temin, Peter Koudjis, Sergey Chernenko, Adrien Verdelhan, Xavier Giroud, Randolph Cohen, Carola Frydman, Eric Hilt, Felipe Severino, Stephen Murphy, Darren Kisgen, Nils Wernerfelt, Daan Struyven, Tony Cookson, Brain Waters, and seminar participants at the 2016 SFS Finance Cavalcade, 2017 EHA Annual Meeting, 2018 AFA Annual Meeting, CU-Boulder, and MIT finance lunch for helpful comments. Previous versions of this paper circulated under the titles "More Than Just Speculation: The Costs of Restrictions on Speculative Investing" and "Costs of Rating-Contingent Regulation: Evidence from the Establishment of 'Investment Grade'".

"Bank regulators were eager to encourage banks to invest only in safe bonds. They issued a set of regulations that culminated in a 1936 decree that prohibited banks from investing in 'speculative investment securities' as determined by 'recognized rating manuals.'...Essentially, the creditworthiness judgements of these third-party raters had attained the force of law." – White (2010)

1 Introduction

The aftermath of the Great Recession has reinvigorated debate about the regulation of speculative investing by banks and the role of ratings assigned by credit rating agencies (CRAs) in implementing that regulation. For example, in response to the recent passage of rules banning speculation by banks, via the "Volcker Rule", former congressman Jeb Hensarling argued that the regulation could make it "more expensive for businesses to grow"[1], while former Federal Reserve Chairman Paul Volcker argued that "proprietary trading of financial instruments – essentially speculative in nature –[is] engaged in primarily for the benefit of limited groups of highly paid employees and of stockholders"[2]. This debate is made even more contentious by the historical reliance on CRAs to determine what investments are deemed "speculative". In a speech to the Securities and Exchange Commission (SEC) Thomas McGuire, Executive Vice President at Moody's Investor Services, noted that "[b]y using securities ratings as tools of regulation, governments fundamentally change the nature of the product agencies sell". One potential unintended consequence is that it may incentivize firms to engage in detrimental actions in order to "game" the ratings. This debate is not a new one in U.S. history, but one that has its origins in a 1936 regulation passed in response to the Great Depression that prevented banks from buying bonds rated below "investment grade" by CRAs. This controversial policy constituted the inception of federal rating-based investment restrictions and a watershed moment in the debate surrounding CRAs as a tool to curb bank speculation. While the 1936 ruling has been widely considered a seminal milestone in the influence of CRAs in the U.S. economy (Harold 1938; West 1973; Partnoy 1999; Sylla 2002; Kisgen 2006; Flandreau et al. 2009; White 2010) prior work has not evaluated the direct effect of the passage of the regulation. In this paper I provide the first empirical analysis of the effects of this regulation and provide evidence on the costs to non-financial firms of rating-based regulation, intended to curb speculation, provoked by severe economic distress.

In particular, I examine the unexpected announcement on February 15th, 1936 by the Office of the Comptroller of the Currency (OCC) that banks could no longer purchase bonds rated below "investment

[1] "Lew Challenged over Volcker rule impact", July 10, 2014. Financial Times.
[2] "Commentary on the restrictions on proprietary trading by insured depository institutions", Paul Volcker, February 13th, 2012

grade". Using a differences-in-differences design, I compare firms who finance themselves with speculative vs. investment grade bonds. I find a sudden and persistent rise in speculative bond yields after the announcement, even comparing bonds within the same firm and a 3-5% decline in equity value for firms reliant on external speculative debt financing. The finding of a negative effect on equity prices highlights the importance of evaluating these sorts of regulations during the economic environments when they are implemented. On one hand, higher costs of borrowing[3] may reduce the value of constrained firms (e.g., Livdan et al 2009), but on the other hand, firms suffering from agency problems (Jensen and Meckling 1976) could experience an increase in value. Prior work that examines firm valuation effects on public market bank capital shocks focuses on a period with large capital inflows into high-yield markets (the 1980s), and finds declines in debt, investment and bond prices, but increases or no effect on equity values (Kilger and Sarig 2000; Tang 2009; Lemmon and Roberts 2010)[4]. This evidence might lead a researcher to predict that in the 1930s regulators could have managed banks' risk-taking without imposing significant costs on non-financial firms, achieving the best of both worlds. By contrast, I find that the 1936 regulation had substantial costs for non-financial firms. Since almost half of even publicly traded corporate bonds were affected, my paper suggests this was not only a watershed moment in the history of CRA influence but is likely to have had broader implications for our understanding of the development of the U.S. economy.

Though the ruling was provoked by the Great Depression, by the spring of 1936 it had been more than 6 years since the initial market crash, and high yield corporate bond rates had fully recovered to the levels seen prior to the downturn. In fact, relative to the downturn, both chronologically and in bond yield recovery, the timing of this ruling was similar to those for more modern regulations, such as the initial 2014 passage of the Volcker Rule[5]. By contrast, the 1980s have been described as an "overheated" (Kaplan and Stein 1993) credit boom for high yield corporate debt likely to be very different than periods of economic recovery following distress. Theory predicts that effects on firm value of capital restrictions are driven by the trade-off between agency costs and financial constraints. During recoveries agency

[3] A body of literature shows that constraints on the purchase of a given security can cause declines in the value of those directly-affected securities (e.g., Kisgen 2006; Kisgen and Strahan 2010; Ellul et al. 2011; Aslan and Kumar 2015; Almeida et al 2017), which would predict a rise in the costs of public debt market borrowing to this regulation.

[4] Lemmon and Roberts (2010) attribute differential responses of access to high yield credit among debt and equity as "consistent with agency-based theories highlighting overinvestment", while Kilger and Sarig (2000) interpret the opposite responses of bond and stock prices to Moody's rating refinements during a similar time period as evidence that more expected risk is bad news for bonds, but good news for shareholders, since they own residual claims to the value of the firm. Empirical evidence in each are consistent with both interpretations and support theoretical predictions of declines in debt issuance, investment and bond prices, but increases in equity values in their time period.

[5] Unfortunately, since most banking regulations, including the Volcker Rule, are anticipated and include multiple regulatory implications beyond just restricting bank provision of capital in public markets, analyses of effects on firm equity values are challenging in modern markets. For these reasons Bao et al. (2018) can't look at the effect on firm value, but they do show increased bond illiquidity after downgrades following passage of the Volcker Rule.

problems are reduced by firm exit, managerial replacement, and restructuring (Graham et al. 2011) and access to capital may still be more fragile than during periods of market booms, suggesting the potential for very different effects of these sort of regulations in recoveries relative to booms.

Since I only have a single event, a natural concern might be that results are confounded by concurrent economic trends. To alleviate these concerns, I show that in the days prior to the announcement there is no evidence of differential trends in the equity returns of firms using speculative vs. investment grade bond financing. There are also no significant equity price movements in either direction for firms utilizing investment grade financing in the days preceding or following the announcement. Results hold comparing firms with bonds just above versus firms with bonds just below the investment grade cut-off and when computing excess returns by controlling for industry returns in the post period. Placebo tests comparing firms with higher rated bonds vs. firms with lower rated bonds within speculative or investment grade reveal no equity price response. Neither do risky firms without public debt. These placebos provide compelling evidence that results are not driven by co-incident shocks that could have differentially affected firms based on risk exposure. Instead, the evidence suggests that the regulation itself was responsible for the observed reduction in firm equity values.

To explore the drivers of this reduction in equity values I then rerun the analysis focusing on secondary market bond prices. I find that bond yields rise 0.9-1.6% for speculative grade, relative to investment grade bonds, suggesting an increase in costs of financing for firms utilizing speculative grade bonds. Just like with equities, these results hold when comparing bonds just above and below the thresholds and when controlling for issue-level loadings on average aggregate bond returns. Since many firms had multiple liquid bonds with different ratings, I can include all the previous controls while also comparing bonds that are above and below investment grade within the same firm before and after the regulation. Again, I find that yields rise for speculative grade bonds, providing evidence of an increase in the financing costs faced by non-financial firms from rating-contingent regulations that restrict bank investment[6]. On the other hand, bond yields rise substantially less than equity prices decline. This suggests that much of the fall in firm value is driven by not only changes in the observed cost of financing, but also a reduction in the quantity of valuable investments undertaken. Large responses of quantities and more muted responses of bond prices to capital shocks in public markets for high yield debt are consistent with results found in Chernenko and Sunderam (2011), though the authors do not evaluate the effects on equity values. In my setting effects on quantities are less well identified, but I do find

[6] This is also consistent with evidence showing declines in the value of directly-affected securities including CMBS (Stanton and Wallace 2013) and municipal bonds (Cornaggia et al. 2018).

slower debt, investment, and asset growth and reduced equity volatility for firms reliant on speculative debt financing following the regulation.

Responses of quantities to this regulation also appear to be exacerbated by additional distortions created by regulatory reliance on CRAs. Firms appear to reduce the size of their debt issuances in order to "game" the ratings. This is consistent with evidence in modern markets that ratings-targeting can affect firms' capital structure and investment decisions (Kisgen 2006; Kisgen 2009; Begley 2015; Kisgen 2018). In fact, I document the very first instance in U.S. history of a firm near the investment grade cut-off altering the size of its debt issuance with the objective of receiving an investment grade rating. The firm reduced the size of its debt issuance, and likely its subsequent investment, rather than providing a higher interest rate. This anecdotal case is also supported by the empirical evidence. Speculative bonds that are closer to the investment grade cut-off have a smaller rise in yields after the announcement, even when comparing bonds within the same firm, while equity volatility responses for firms with bonds near the cut-off are if anything larger. This is consistent with firms near the cut-off reducing debt issuance and investment more aggressively in order to pick-up an investment grade rating.

In addition to those contributions my research fits into a broader literature examining how agency costs, financial constraints, ratings, and access to bank capital affect firm value. For example, empirical research indicates that more easily available capital can lead firms to make value-destroying investments due to agency problems (Kalcheva and Lins 2007; Lie 2015), but overall evidence on the effects of constraints on stock risk and returns are more mixed. Whited and Wu (2006), Gomes et al. (2006), and Livdan et al. (2009) show that proxies for constrained firms are associated with higher stock returns and risk, while Lamont et al. (2001) find the reverse[7]. Previous research has also found that rating downgrades, which could potentially alter available demand for firm debt, are correlated with changes in firm value (Holthausen and Leftwich 1986; Dichev and Piotroski 2001), but Vassalou and Xing (2005) note that the timing of downgrades in these papers is not random. After adjusting for time-varying default risk there may not be abnormal equity returns following bond downgrades at any level. More clearly, prior research has shown that disruptions to *private* arms-length financing tends to reduce bank-dependent firms' equity values (Chava and Purnanandam 2009), but it is unlikely such estimates provide clear insights into the effects in *public* capital markets. Arms-length relationship lending is monitored specifically to reduce agency problems (Diamond 1991; Hoshi et al. 1993), while in public markets banks represent just another set of potentially informed investors. Despite that, my research shows that

[7] Hahn and Lee (2009) documents higher returns in univariate regressions, but no difference after controlling for firm size. As Hahn and Lee (2009) note much of the variation in findings may stem from the difficulty in separating effects of financial constraints from those of financial distress.

reductions in bank capital available for even public transactions, caused by regulation intended to curb speculation, has important implications for the value of non-financial firms.

2 Historical Background

2.1 The Introduction of Rating-Contingent Regulation

In 1909 John Moody was inspired by the success of credit ratings used by mercantile credit report agencies in the 19th century and contemporaneous corporate bond rating systems in Vienna and Berlin to publish his first "Moody's Manual" with ratings of the securities of railroad companies. Moody's had also settled on a set of ratings which he would not significantly alter until the 1980s, with Aaa constituting the highest rated securities followed by Aa, A, Baa, Ba, B, Caa, Ca, and C respectively. The volumes on railroads were so successful in 1914 he started publishing ratings for the securities of utility and industrial companies. Poor's Publishing Company who had been successfully selling comprehensive manuals of firm statistics for more than a half century quickly joined the ratings business in 1916, followed soon afterwards by Standard Statistics in 1922, and Fitch Publishing Company in 1924. Thus, by the mid-1920s the names of the credit rating agencies who still constitute the largest players in the industry had been established: Moody's, Poor's, Standard, and Fitch[8]. By 1928 Hickman (1957) estimates that over 98% of all corporate debt was rated by at least one of these firms. In fact, ratings were so comprehensive in the mid-1920s to find another period with as many firms with rated debt you would have to wait 70 years until the latter half of the 1990s (Fons 2004).

Though rating agencies were already a large business by the 1920s, they did not become a part of regulation until the 1930s. In 1931 Gustav Osterhus noted that Federal Reserve began using bond ratings in the 1930s in their examination of banks' portfolios for the first time, but the first explicit rating-contingent regulation occurred in the fall of 1931 when the OCC specified that banks with bonds rated Baa or higher would be carried at cost while those below that level would require fractional write-offs for capital requirements. In 1932 insurance regulation followed suit, but specified that all bonds rated Ba or higher would be marked at cost, while those lower rated would be marked-to-market. Therefore, as suggested by the analysis of Fons (2004) and Flandreau (2010) this established the first instance of national rating-contingent regulation, but did not definitively establish the "investment grade" barrier at the Baa level or prevent investment in securities below any specific threshold.

[8] Standard Statistics and Poor's Publishing would merge in 1941 to become the name we associate now: Standard & Poors.

The clear establishment of what we now know as the investment grade barrier at "Baa" occurred in the spring of 1936. On February 15th, 1936 the OCC issued a ruling stating that national federal reserve member banks could not invest in "speculative" securities as indicated by rating agency manuals, where speculative was interpreted by Moody's in their weekly release to constitute all bonds rated "Ba"[9] (or the equivalent for the other rating agencies) or lower[10]. It is worth noting that since the ruling applied only to the purchase of speculative corporate bonds, not bonds already held on the balance sheet of banks, it did not require a mass selling of speculative grade bonds. In response to this ruling The Securities Tabulation Corporation of New York released a report of every single eligible bond, which showed that about half of all bonds traded on the NYSE (and more than half of all non-NYSE listed bonds) would no longer be eligible for purchase by banks. Unlike the ruling in 1931, which was minimally mentioned in the media, this announcement was followed by multiple editorials in the *Wall Street Journal* and *New York Times* which were critical of the ruling, in addition to numerous complaints by bankers[11]. The ruling was considered so important that for the first time rating agencies started rating bonds prior to issuance, rather than waiting until they were already trading in the secondary market, which had been the standard up to that at point in history. It is perhaps not surprising then that in 1938 Gilbert Harold noted that "it is unanimously asserted by the ratings agencies that the use of bond ratings today is greater than ever before and that the use and reliance on the ratings is growing year by year".

Though the regulation was controversial and the timing surprising, this regulation was provoked by reasonable concerns about the role that excess risk-taking by banks played during the Great Depression. Perhaps not surprisingly, periods of recovery from economic distress appear to be associated with regulations intended to curb bank speculation. Two examples of this are illustrated in Figure 1. I plot Baa rated corporate bond yields for the 15 years surrounding the Great Depression and Great Recession on the same graph. I chose the starting years so that the 1929 wall street crash and 2007 collapse of Lehman Brothers are approximately aligned. As can be seen both the 1936 ruling and initial 2014 passage of the Volcker Rule occurred around 6-7 years after the initial market crash. They also occur after the initial distress had abated and markets have recovered. In fact, in the both cases corporate bond yields have fully recovered to the levels seen prior to the relevant crisis by the time the regulations are passed.

While bond markets may have recovered, empirical evidence suggests firms with severe agency problems were more likely to fail during the Great Depression, thus exiting the sample of firms in

[9] Harold (1938) writing at that time noted that "recognition of bonds as 'investment grade' by the United States Comptroller of the Currency (and by most of the state banking Superintendents) goes no lower than the Baa rating".
[10] It was understood that the ruling would apply to state banks as well, which was formalized in a letter sent February 26th, 1936.
[11] "Banks oppose eligibility rules for investments", Wall Street Journal, March 13, 1936; "Security regulations opposed by bankers", Wall Street Journal, June 25, 1936

operation during the recovery, and replace management, both of which contributed to a period when agency problems may have been fairly muted (Graham et al. 2011). In addition, access to capital may still have been more fragile than during periods of market booms. Since theory suggests the effects on firm values of restricting capital are driven by the trade-off between agency problems and financial constraints, it is important to examine the effects of such regulations during the types of economic periods when they are mostly likely to be implemented. This is one of the benefits of examining the 1936 regulation, since it occurred during a period of recovery following severe economic distress, when such policies are most likely to occur.

Another benefit of examining this time period is that, unlike modern markets, there is no evidence of bunching above the investment grade cut-off, which allows for a straight forward comparison of bonds just above and below the cut-off. This can be seen in Figure 2, where in Figure 2a I plot the long-term credit ratings distribution from S&P from 1981-2012 and in Figure 2b I plot the distribution of Moody's ratings in the three years prior to the 1936 ruling. As can be seen in Figure 2a, and has been documented more thoroughly by Kisgen (2006), firms appear to engage in behaviors to push themselves above the investment grade cut-off, causing a substantial dip in the distribution of ratings around the cut-off. This suggests that firms just above and below the cut-off are likely to be quite different in the modern time period. This may not be surprising given the history of ratings since the 1930s. In the 1970s issuers began paying for ratings and the agencies became designated as nationally recognized statistical rating organizations (Jiang et al. 2012; Bruno et al. 2016; Behr et al. 2017). By the 2000s explicit rating-contingent triggers were pervasive in bond covenants and in the regulation and management of institutional investors[12]. Even absent explicit rating-based regulations, the investment grade cut-off had been established over 80 years prior and may have also become a coordination mechanism for firms (Boot et al. 2006). Given all that, it isn't surprising that firms engage in behaviors that appear consistent with ratings-targeting, especially around the investment grade cut-off (Kisgen 2009). By contrast, I show in Figure 2b that there is no evidence of bunching around the investment grade cut-off in the years prior to the 1936 ruling. This supports the idea that this ruling established the important of the investment grade cut-off and the potential validity of the proposed empirical design in this paper.

[12] For example, Standard and Poor's (2002) survey around 1,000 investment grade issuers in the U.S. and Europe and found that nearly half have borrowing arrangements that include credit rating contingent triggers. The Federal Reserve also noted 46 regulations explicitly referencing CRAs in 2010. Chen et al. (2014) also note that in 2005 a redefinition of the Lehman Brothers Index which lead to relabeling of some bonds as investment grade, but which had no regulatory implications, cause changes in bond prices because of institutional investor reliance on ratings.

2.2 The Importance of Institutional Investors

Just as they do today institutional investors constituted the majority of investors in corporate bonds[13]. Goldsmith (1958) shows that in 1939 about 65% of all corporate debt was held by institutional investors, almost all of which was held by commercial banks, life insurance companies, and trust departments. In the market for the primary issuance of corporate debt, institutions, and especially banks, played an even bigger role. About a month after the Comptroller announced restrictions on investment in speculative bonds by Reserve Member banks the *New York Times* made a special note of the importance of banks in the primary issuance market for corporate bonds.

> *The importance of banks as outlets for new securities has seldom been more pronounced than now. The greatest proportion of almost all the new bond issues marketed in the last six months has found its way into the vaults of banks, insurance companies or other institutional buyers. It is estimated that 85 to 90 per cent of recent bond offerings has been absorbed by those buyers, of which Reserve Bank members have accounted for the largest part.*
>
> New York Times March 22, 1936

The role of banks as investors in speculative corporate bonds is not surprising since they were likely to be sophisticated. While over the 1930s insurance companies and trust companies became larger investors in all asset classes, even in 1939 Moody's noted that the movement of banks out of bonds could not be easily replaced by existing institutional investors.

> *It may be that some banks could successfully shift bonds to insurance companies and other non-bank buyers. Considering the volume of bonds held by all banks, it is unlikely that all the banks could successfully shift any considerable amount of bonds to nonbank buyers.*
>
> Moody's Investor Services (1939)

As Moody's noted non-bank buyers were unlikely to be able to easily move into the bonds held by banks. Harold (1938) notes that while insurance and trust companies were not usually officially restricted from investing in speculative securities they were oftentimes discouraged in the form of increased reserve requirements and "suggested" guidelines[14] and in general were not as natural investors as banks in securities that required more market expertise. This speaks to a more general point about the relative importance of banks in credit provision that is true even in the modern time period.

I would expect this reduction in credit demand to be particular difficult for firms reliant on external financing, especially corporate debt placements with banks, which at the time varied

[13] Based on estimates from the Flows of Funds Accounts in the United States.

[14] Even in the 1920s investment trusts used ratings to reassure investors of the quality of their portfolios (Flandreau 2010). For instance Robinson (1929) points out that the trust company Untied States Shares Corporation in 1927 signaled the soundness of its investment policy when it was initially created by stating that no securities held would be rated below Moody's B, at most 10% securities would be below Moody's Ba, at most 50% would be below Moody's Baa, and at least 20% would be above A.

substantially by industry. Most manufacturing firms financed themselves using internal cash flows, while transportation companies, such as railroads, and utilities were highly dependent on external financing. According to Koch (1943) manufacturing companies retained 58% of their savings from 1930-1933 to finance operations, while transportation and public utilities retained only 37%. Also, while data is not available for transportation companies he finds that from 1921-1929 and 1934-1939 for large manufacturing firms 89% and 81% respectively of all financing was generated internally. He also shows that from 1900-1934 almost all net corporate debt issued by railroads was purchased by banks, while for utility companies this was about 53% and for other industrial companies it was only 19%. Calomiris and Hubbard (1995) also look at the revealed preference for internal financing by looking at the response of firms to undistributed profits taxes in 1936 and 1937 and find that manufacturing firms were likely to rely heavily on internal financing, even in the presence of large incentives to reduce their retained earnings. Based on the variation in reliance on external financing by industry I would expect non-manufacturing firms, and especially those in transportation or utilities industries to be more affected by the ruling restricting investment by banks[15].

2.3 Liquidity of 20th Century Bond Markets

In the modern period bonds are traded predominantly in opaque over-the-counter (OTC) markets, while stocks are traded on organized exchanges. The lack of transparency and liquidity in corporate bond prices makes it difficult to carry out high frequency analysis of bond price movements looking back even two or three decades[16]. This was not always the case. Until the mid-1940s the majority of trading in stocks *and* bonds occurred on organized exchanges with most listed on either the New York Stock Exchange (NYSE) or the New York Curb Exchange (NYCE)[17]. Based on Hickman (1957) we know that in 1936 approximately 78% of all corporate bonds were listed on a major exchange and from the *New York Times* in February 1936 average daily trading volume for U.S. stocks and corporate bonds on the NYSE were $2.6 million and $15.0 million respectively. Since bonds, like stocks, traded in large volumes on organized exchanges there was substantial transparency and liquidity in prices. Despite the enormous technological advances that have occurred over the last half-century Biais and Green (2007)

[15] I would not necessarily expect these specific industries to be more affected by rating-contingent regulation in the modern period, but I would expect this to be the case for industries in the modern time period that are similarly dependent on external financing.

[16] The Lehman Brothers Fixed Income Database and similar databases which go back to the 1970s are only available at a monthly frequency (Acharya, et al. 2010)

[17] The New York Curb Exchange was the precursor to the modern American Stock Exchange.

find that because bonds were trading on exchanges trading costs for corporate bonds in the 1940s were as low or lower than they are even today.

3 Data Description

3.1 Credit Ratings

For all firms with bond prices in 1936 any new bonds issued, old bonds dropped, or ratings changes were entered at an annual frequency from *Moody's Industrial Manual, Transportation Manual,* and *Utilities Manual* and all ratings changes (included new and withdrawn ratings) at a weekly frequency from *Moody's Investment Weekly*. Moody's issued bond ratings not firm ratings so there is some discretion in how to assign the firm rating associated with a given equity security. I assign one rating to each firm which can be used to match to the stock price. The objective is to measure the rating a firm would receive if it tried to issue a bond after the event date. Since new bonds were typically issued subordinate to existing debt a firm's lowest bond rating is a good proxy for the best rating they could expect to receive if they issued new bonds, so I use this as the measure of a firm's rating[18].

3.2 Secondary Market Prices

All equity market data comes from the Center for Research in Securities Prices (CRSP) for all New York Stock Exchange-listed stocks for 1935-1936. Summary statistics on the matched sample of CRSP with Moody's manual ratings can be seen in table 1 for all 721 matching firms. As we would expect firms with speculative grade debt tend to be smaller and have more volatile stock returns than firms able to issue investment grade debt. They also have similar market betas, but speculative firms tend have higher loadings on SMB and HML, which would be consistent with investment grade firms being large value firms, while speculative firms tend to be smaller high growth firms.

In the 1930s almost all corporate bonds were traded on major exchanges, where the two largest markets were the New York Stock Exchange (NYSE) and New York Curb Exchange (NYCE). Prices from these exchanges were published on a daily basis in the financial section of the *New York Times*. Comparing a sample of entries between the *New York Times* and other periodicals confirms consistency across periodicals of the quoted values. From these pages I manually collected company names, bond prices, price changes, volumes, and descriptions for the time period surrounding the event date. Data

[18] As shown in the paper results are robust to using the highest bond rating instead.

was generally collected at a monthly frequency based on week-end data[19], except for February 1936 where data was collected at a daily frequency. Consistent with what we would expect we can see in table 2a that yields are rising monotonically in ratings, and conditional on trading, bonds for most ratings are quite liquid.

3.3 Balance Sheet Information

To look at the long-run real effects of the comptroller's ruling I hand-collect data at an annual frequency on the book value of total assets, long-term debt, and net property, plant and equipment (PP&E) from 1932-1940 for 422 firms that appear in the 1935 *Moody's Industrial Manual, Moody's Transportation Manual,* or *Moody's Utilities Manual* and have NYSE stock price information available for the same period in CRSP. From table 2b we can see that the book value of long-term debt and net PP&E constitute around half of all total firm book value in 1935.

3.4 Aggregate Bond Quantity Data

In 1937 the National Bureau of Economic Research (NBER) commissioned a study of the anticipated effects of the 1936 ruling entitled "The Investment Experience of Banks in Selected Cities, 1926-1936". After checking with the archivist for the NBER it appears that this study was either never completed or has been lost. In that spirit but as part of a different NBER study in the 1950s Braddock Hickman (1957) collected an incredibly comprehensive database on bond issuance and default from the early 1900s to the 1940s covering over 90% of all issued bonds with detailed data on contract details, par amounts, ratings, state legality, et al. This data was aggregated and summarized in a number of papers, but unfortunately all the original data was lost. The data collected by Hickman includes all bonds rated and unrated, listed and unlisted, and, as far as I am aware, represents the most comprehensive data on debt issuance broken down by rating that exists for the period.

4 Empirical Methodology

In this paper I employ a difference-in-differences methodology to explore the effect of rating-contingent regulation restricting bank investment in speculative bonds. I look at the period immediately surrounding the 1936 OCC announcement and compare secondary market bond and stock prices by either

[19] The week-end data means that all bonds with any transactions in the week are included even if transactions did not occur on the specific day collected.

the security rating itself (bond response) or the minimum rating of the bonds of the firm (equity response). For intuition I first run separate pooled regressions by category (ex. equally weighted average stock returns of just investment grade firms) and plot the cumulative residual from the following specification

$$R_t = \alpha + \beta_{\text{Mkt}} R_{Mkt,t} + \beta_{\text{HML}} R_{HML,t} + \beta_{\text{SMB}} R_{SMB,t} + \epsilon_{i,t} \quad (1)$$

where *R* is the excess equity returns for the specified portfolio, on day *t*, after adjusting for the Fama-French factor controls[20], excess market returns, *Mkt*, high minus low book-to-market, *HML*, and small-minus-big market capitalization firms, *SMB*. Regressions coefficients are estimated based on daily data from 1/17/35-1/17/36 and all cumulative residuals are based on out of sample tests beginning one-month before the event date. As noted by Kolari and Pynnonen (2010) the standard deviation of portfolio returns can be used to assess the significance of the event-window average abnormal return, since the cross-sectional dependence that exists among returns on individual events is incorporated in the time series variation.

To control for variation at the firm-level I rerun the following panel regression of the same event,

$$y_{i,t} = \alpha_i + \kappa\, \mathrm{E_t} + \lambda\, \mathrm{S_i} + \delta\, \mathrm{S_i}\, \mathrm{E_t} + \mathrm{X_t'}\beta_i + \epsilon_{i,t} \quad (2)$$

where $y_{i,t}$, is the outcome of interest which are either stock returns, bond yields, % change in bond yields, absolute value of equity returns or absolute value of idiosyncratic equity returns, depending on the specification, $\mathrm{E_t}$ is a dummy variable equal to one after February 15th, 1936 (inclusive), $\mathrm{S_i}$ is a dummy variable equal to one if the bond is speculative grade at the end of 1935 or if the left hand side is equity related it equals one if the minimum bond rating of the firm is speculative grade at end of 1935, X_t are time-varying controls, such as Fama-French factors, and β_i are security-specific loadings on those controls (ex. Fama-French factor loadings). This allows me to include firm or issue-level fixed effects to control for any time invariant difference across securities in expected returns, prior to the ruling, and relying on the common trends assumption of a difference-in-difference regression[21]. In additional robustness exercises I also include in equation (2) 2-digit SIC code industry fixed effects interacted with event fixed effects or in the case of firms with multiple bonds with different ratings I include issuer-level fixed effects interacted with event fixed effects. In this latter specification the identification comes from comparing bonds within the same company before and after the OCC announcement.

[20] Factor returns are taken from Ken French's website and are based on the factors as defined in Fama and French (1993).
[21] Empirical results are all robust to excluding the event dummy and using the cumulative abnormal returns and a null of 0% rather than the difference-in-differences framework.

5 Results

5.1 Non-Financial Firm Equity Values

On Saturday February 15th, 1936 the OCC announced that banks would be restricted from investing in speculative grade debt[22]. In response to the news, the first full trading day following the announcement was the largest daily volume on the NYSE in the two years surrounding that date (Figure A1). In Figure 3 I explore the effects of the announcement on firm equity values using the differences-in-differences design on daily cumulative abnormal stock returns (CARs) detailed in equation 1. I show in Figure 3a that firms using speculative bond financing see a sudden and persistent decline of 3-6% in their equity value immediately following the ruling, relative to those firms using investment grade debt financing. In Table 3 I show that these findings are not sensitive to the choice of controls for systematic risk[23]. This includes having no controls (column 1), just controlling for excess market returns (column 2), controlling for 3-Fama French Factor portfolio returns with different factor loadings by firm (column 3), or comparing only firms within the same industries (column 4). Overall, I find a 43-103 basis point *per day* abnormal return for firms requiring speculative debt financing over the first six days following the event. These estimates, just like Figure 3, suggest a 3-6% reduction in non-financial firm equity values caused by the regulation.

Since I have only a single event I am careful to provide evidence that supports the validity of the parallel trends assumption in this differences-in-differences design. In Figure 3a and 3b I show no evidence of significant pre-trends in the difference in CARs, or their separate CARs, between firms based on their use of speculative vs. investment grade debt financing. In Figure 3b I also show no response of firms using investment grade financing to the announced regulation. Concurrent macroeconomic news, not related to the investment grade cut-off, should affect all firms, not just those with speculative debt financing, providing comfort that observed effects are from the regulation.

It is possible that firms using speculative debt financing are just more sensitive to shocks, so in Table 4 I show that effects of the regulation appear to occur non-linearly right around the investment grade cut-off. Results hold including all bonds except those just below the cut-off (column 1) or comparing only bonds just above and below the cut-off (column 2), but I find no effects comparing bonds of differing ratings that are all either above (column 3) or below (column 4) the cut-off. If higher risk

[22] Though at this time markets were open on Saturdays it is unclear if it was announced before or after markets closed so for my analysis I include the 15th as the event date, but all analysis is robust to the use of Feb 17th instead.
[23] Appendix tables A1 and A2 also show that effects are largely unchanged when considering alternative methods of clustering, estimation window of factor loadings, estimation window of the treatment period, or using maximum instead of minimum bond ratings within each firm.

firms were more sensitive to some alternative economic news then this should have caused a larger decline for those firms after the announcement in columns 3 and 4. The fact that results only hold when comparing firms of higher vs. lower ratings *across* but not *within* investment/speculative grade supports the assertion that the observed decline in equity values is driven by the regulation, not any omitted alternative concurrent exogenous shock.

This is also supported by placebo tests on firms without publicly listed bonds presented in Figure 4 and Table 4 columns 5-6. I run the same analysis as before, but now purposefully incorrectly assign firms without public bonds as those using speculative debt financing. Whether looking at the full sample of firms or only those with high stock return volatility, I find no evidence of any effects for these firms. Firms with no public debt, but high stock return volatility, have exposure to risk much higher than investment grade firms, and similar to firms financing themselves with speculative grade bonds. Despite this I find absolutely no evidence of declines for this group immediately following the announcement of the regulation, again supporting the conclusion that observed effects on equity values were driven by the OCC ruling.

Just as I showed that firms without publicly-listed bonds should be unaffected by the ruling, I would also expect the effects to be larger for firms more reliant on these markets for their financing. At the time this varied substantially by industry. Most manufacturing firms financed themselves using internal cash flows, while transportation companies, such as railroads, and utilities were highly dependent on external public bond markets[24]. In Table 5 I show that all of the decline in value for firms using speculative relative to investment grade bonds is driven by firms in industries more reliant on these markets. That fact that I find declines in equity market value for firms requiring speculative bond financing following the regulation in industries reliant on external financing again supports the notion that the observed decline in market values is coming from the ruling.

Taken together I provide clear evidence that the OCC ruling caused a significant decline in non-financial firms' equity values. Treated and untreated firms have parallel trends prior to the regulation, untreated firms have no response following the announcement, effects occurs non-linearly at the investment grade cut-off, high risk firms without public bonds are unaffected, and effects are concentrated in industries reliant on public bond markets.

[24] According to Koch (1943) manufacturing companies retained 58% of their savings from 1930-1933 to finance operations, while transportation and public utilities retained only 37%. For large manufacturing firms from 1934-1939 81% of all financing was generated internally. Calomiris and Hubbard (1995) also look at the revealed preference for internal financing by looking at the response of firms to undistributed profits taxes in 1936 and 1937 and find that manufacturing firms were likely to rely heavily on internal financing. I would not necessarily expect these specific industries to be more affected by rating-contingent regulation in the modern period, but I would expect this to be the case for industries in the modern time period that are similarly dependent on public capital markets.

5.2 Bond Yields and Costs of Debt Financing

Evidence in the prior section shows that regulations to curb bank speculation have significant spillovers that reduce the equity market value of non-financial firms, but it does not tell us the mechanism which caused the reduction in value. In this section I look at how the regulation affected the costs of debt financing by examining secondary market bond yields. As noted by Gilbert (1938) at the time of the ruling "[i]t is well known in bond circles that many new issues would be offered to the public at higher figures if the ratings on the corporation's existing issues were higher". If this is true empirically then it could explain some of the decline seen in equity values. In Tables 6 and A3 I show that yields on speculative bonds rise by 0.86-1.6% (0.0012-0.0025pps), relative to investment grade bonds, following the announcement[25].

Just as in the case of equities, results are robust to looking at those bonds just above or below investment grade, even controlling for issue-level factor loadings (DEF) on average bond market returns (column 2). As was the case for equity returns this suggest it is unlikely results are driven by systematic changes in yields based on coincident macroeconomic shocks occurring at the same time as the OCC announcement. In the case of bonds though we can take the identification strategy one step further. Approximately 10% of firms (with 15.8% of bonds) have bonds that trade on the same dates with different ratings such that at least one is above and one is below investment grade around the announcement. In columns 3 I limit the analysis to this subgroup of firms and include issuer-level fixed effects interacted with the event fixed effects, while still including issue-level fixed effects and issue-level factor loadings on DEF. This specification allows us to compare the change in yields of bonds at the same firm with different ratings before and after the OCC announcement. Not surprisingly power falls significantly, but I still find that speculative bonds see an average increase in yield of 1.6% following the announcement. While these results indicate that yields rose substantially following the regulation, they are still quite a bit smaller than the observed fall in firms' equity values. This suggests that a significant portion of the total decline in firm equity value may have been driven by not only changes in the costs of debt financing, but also reductions in value-improving investments.

[25] I restrict my analysis to February of 1936 and I compute the % change in the bond yield following the OCC announcement relative to the mean bond yield in 1936, but prior to the announcement. In all specifications it is important to exclude "stale" bond prices, which include any cases with 1 or less sales in a day of a given bond issue. Previous versions of this paper used a balanced panel, but these dramatically understate results since most bonds do not trade on a given day causing substantial attenuation in all regression results.

5.3 Firm Growth and Investment Response

While it would nice to use accounting data to cleanly estimate the effects of the regulation on firm investment, unfortunately the frequency of data observation becomes annual instead of daily, making causal interpretation more suspect. It is still a useful exercise though to explore the data, imperfect as it is, and see how it aligns with the more cleanly identified results using secondary market prices. In table 7 I use the same differences-in-differences design, comparing firms that use speculative relative to investment grade public bond financing before and after the regulation, including both firm and industry interacted with the year being after the regulation fixed effects. I find that firms requiring speculative bond financing experience slower debt, investment, and asset growth in the years following the regulation. These firms issue 21% less debt and grow net PP&E and assets 6.4% and 7.7% slower, respectively, over the years 1936-1940. This large decline in "quantities", instead of prices, is consistent with previous results shown in Lemmon and Roberts (2009) and Chernenko and Sunderam (2012), and when combined with the more cleanly identified analysis of secondary market prices, is suggestive of persistent long-term costs to non-financial firms of rating-contingent regulation restricting bank investments.

Unlike the higher frequency secondary market analysis in the days immediately following the ruling, these long-term estimates are more likely to be confounded by coincident changes in the macroeconomic environment in the years following the ruling. To marginally reduce this concern, I rerun the analysis in table A4 comparing firms with debt financing just above (Baa) and below (Ba) the investment grade cut-off. Again, I find firms requiring speculative financing have significantly lower growth rates of long-term debt and assets[26]. While all the results focusing on accounting variables are subject to identifications concerns that are avoided in the more formal secondary market analyses presented previously, it is still comforting to find simple results largely consistent with the more well-identified findings, even readily acknowledging the limitations of such an exploration.

As another approach to analyze changes in expected firm behavior, that allows for use of more high frequency data, I explore how the regulation affected firm equity volatility. I use the same methodology as is employed in the previous sections utilizing secondary market prices, but the dependent variable is an estimate of volatility based on the absolute value of daily stock returns[27]. In table 8 column

[26] The growth rate of net PP&E is measured with substantially more noise than either debt or total assets, so it may not mean much that the results are no longer statistically significant in this specification. This is especially true since results including all firms or only those on the investment grade border are not statistically different from each other, and asset growth, of which PP&E is the largest component still has a statistically significant decline.

[27] As noted in Bernstein, Hughson, and Weidenmier (2017) the standard deviation of daily returns is approximately linear for reasonable values in the absolute value of daily returns.

1 I find a persistent statistically significant average decline of -0.0053 for firms who are likely to finance themselves with speculative debt. To obtain a back of the envelope calculation for the magnitude I can scale the value by $\sqrt{\pi/2}$ to obtain an estimate of the decline in the daily standard deviation of about 66bps. Since the median daily equity volatility for firms that financing themselves with speculative debt is approximately 6.5% this suggests that there is close to a 10% (percent) persistent reduction in equity volatility for these firms. In columns 2 and 3 I break down returns into those driven by systematic changes in volatility vs. those at the firm-level and show that results are driven by firm-level changes, not systematic overall changes in risk[28]. I also show in column 4 an 8.9% percent decline in firm-driven volatility consistent with the back-of-the-envelope estimates obtained from column 1. Not only are these findings consistent with the reduced growth seen in firm balance sheets, but also provides additional support that observed declines in firm equity values are not driven by an unrelated concurrent increase in expected risk.

5.4 Distortions from Regulatory Reliance on Ratings

Overall effects of the OCC's regulation appear to have been amplified by additional distortionary incentives created by the regulatory reliance on ratings. This is illustrated by a contemporaneous account of the effect the regulation had on firm behavior. The *New York Times* noted just a month after the announcement that a firm may have avoided issuing bonds they knew would be designated as "speculative" by the rating agencies.

> *A conspicuous example of pre-offering rating occurred with the proposed issue of $40,000,000 of Jones & Laughlin Steel Corporation 4 per cent bonds…Two leading agencies rated these bonds just below the 'line' of eligibility as investments for member banks. While it is not held that these ratings were solely responsible for the original postponement of the offering, some observers strongly believe they played an important part in it.*
>
> New York Times, March 22, 1936

It appears that Jones & Laughlin Steel Corporation may have postponed its offering after it discovered it would be rated just below the eligibility line for investment grade. Consistent with this interpretation, Jones & Laughlin Steel I find that the firm still made the offering a month later in April of 1936 but only issued $30 million instead of the original $40 million. By doing so was able to attain a Baa, or investment

[28] The systematic component of volatility is the predicted returns based on regressing daily stock returns on industry-level fixed effects interacted with time fixed-effects and Fama-French factors with firm-level factor loadings that are estimated prior to the OCC announcement. I then take the absolute value of these predicted returns which I call the systematic component and the absolute value of the residual returns from that regression I call the idiosyncratic returns. The idiosyncratic returns are not necessarily idiosyncratic since if leverage changed after the announcement that would alter the risk factor loadings and would show up as idiosyncratic volatility not systematic volatility, but instead is meant to capture any changes not driven by aggregate movements in volatility and consistent factor loadings.

grade, rating. It is interesting to note that Jones and Laughlin Steel decided to reduce the size of the bond issue, and perhaps investment, rather than raise the promised yield to attract additional investors. This appears to document the first instance of a firm attempting to "game" ratings.

Empirical analysis of firm issuance behavior, bond yields, and equity volatility suggest such distortions had broader effects than just this one anecdotal case. I show in figure 5 that aggregate investment grade issuance increased relative to speculative grade in the years after the 1936 ruling. For example, Aaa and Ba issuance moved almost in lockstep in the years from 1930-1935, but Aaa issuance rose more than 3 times faster from 1936-1940. From figures 5a and 5b we can see that this was not driven by a wedge in the number of issues but by the average issuance size. Just as was the case for Jones and Laughlin Steel Corporation firms may have reduced their issuance sizes in order to avoid the rating-contingent regulation. In Table 6 column 4 I re-run the prior analysis on bond yields, looking at bonds with different ratings within the same firm, but separate the speculative bonds into those right near the cut-off and those further away. I find for bonds further from the investment grade border there is a significantly larger 3.9% rise in yields. Though no longer statistically significant the point estimates for bonds at the Ba level are similar to those in the previous specifications, so it is still consistent with a rise in yields among these bonds, but it is clear that the costs of financing rose substantially more for speculative bonds further from the border. In Table 8 column 5 I look at equity volatility for firms with bonds closer vs. further from the border and in contrast find if anything a smaller effect for firms with lower rated bonds. Taken together it appears that firms with bonds near the investment grade cut-off had a smaller increases in yields, but if anything had larger reductions in issuance size and volatility. These would all be consistent with firms near the cut-off altering their financing or investment behavior to "game" the newly established investment grade cut-off.

6 Conclusion

Overall this paper provides the first evidence on the effects of the 1936 inception of federal rating-based restrictions on bank investment as well as the first causal empirical evidence that rating-contingent regulations reduce firm equity values. While there is some limited prior evidence of the potential for positive effects for firm equity values, these are not during recoveries following economic downturns. Regulations to curb bank speculation are often prompted by prior distress, which tend to alleviate some agency costs, making the negative effects estimated in this paper particularly relevant for policy decisions. At a minimum they provide evidence the effects of such regulations are likely to be time-varying and depend on the degree of agency problems vs. financial constraints for firms and the

economy overall. In addition, I demonstrate that this regulation leads to increases in costs of debt financing smaller than the fall in equity values. This is supported by the finding of slower investment and asset growth in subsequent years and a fall in equity volatility. I also show it appears to be exacerbated by the rating-based nature of the regulation, raising concerns about the role of CRAs as a means of implementation. This is consistent with an important role played by changes in firm behavior to the regulation and highlights the risks from evaluating only changes in the assets directly affected by bank investment restrictions.

In a report on the effects of the Volcker Rule, Duffie (2012) raises concerns that "firms would face higher costs for raising new capital", while Thakor (2012) laments that it is "likely to lead to higher costs of capital for businesses and potentially lower capital investments by these borrowers". This paper is not meant to be a direct test of the overall effect of the Volcker Rule, since this regulation is more liquidity focused and differs along a number of other dimensions, but results are largely consistent with a significant cost for non-financial firms of the portion of such regulations that limits bank participation and complements a growing literature highlighting the importance of banks in speculative corporate debt markets. I also find that firms are aware of these costs and willing to take actions to avoid these rating-contingent regulations. To the extent that such restrictions are tied to ratings, as they were in the past, the evidence presented in this paper suggests that costs from the endogenous response of firms should be an important consideration in any policy meant to improve risk management and monitoring. During a recession firms could be incentivized to reduce investment even more than they normally would in order to prevent themselves from falling below the investment grade level. Given these results, it is likely that continuing to understand the role the costs of rating-contingent regulation play in local and in general equilibrium should be an important area of future exploration for policy makers and finance academic researchers alike. In addition, given the broad scope of this specific regulation, with almost half of even publicly listed bonds affected, it is likely that there were important macroeconomic implications of this regulation. It may have even played a role in the size of the 1937-1938 recession. Though an analysis of that is beyond the scope of the empirical design of this paper, it presents another interesting opportunity for future economic historians.

References

Admati, Anat, Peter DeMarzo, Martin Hellwig, and Paul Pfleiderer. “The Leverage Rachet Effect.” *Journal of Finance* 73.1 (2017).

Almeida, Heitor, Igor Cunha, Miguel A. Ferreira, and Felipe Restrepo. “The Real Effects of Credit Ratings: The Sovereign Ceiling Channel” *Journal of Finance* 72.1 (2017).

Anderson, Christopher, and Anil Makhija. “Deregulation, disintermediation, and agency costs of debt: evidence from Japan.” *Journal of Financial Economics* 51 (1999): 309-339.

Aslan, Hadiye, and Praveen Kumar. “The Real Effects of Forced Sales of Corporate Bonds.” *Journal of Monetary Economics* 95 (2019): 1-17.

Baklanova, Viktoria "Regulatory use of credit ratings: How it impacts the behavior of market constituents." *International Finance Review* 10 (2009): 65-104.

Bao, Jack, Maureen O’Hara, and Xing (Alex) Zhou. “The Volcker Rule and corporate bond market making in times of stress.” *Journal of Financial Economics* 130 (2018): 95-113.

Becker, Bo, and Victoria Ivashina. "Reaching for yield in the bond market." *Journal of Finance* 70.5 (2015): 1863-1902.

Begley, Taylor. “The Real Costs of Corporate Credit Ratings.” Working paper (2015).

Behr, Patrick, Darren Kisgen, and J.P. Taillard. “Did government regulations lead to inflated credit ratings?” *Management Science*. 64.3 (2016).

Bernstein, Asaf, Eric Hughson, and Marc Weidenmier. “Counterparty Risk and the Establishment of the New York Stock Exchange Clearinghouse”. *Journal of Political Economy* (2019).

Biais, Bruno, and Richard C. Green. "The microstructure of the bond market in the 20th century." *Tepper School of Business* (2007): 134.

Bongaerts, Dion, K. J. Cremers, and William N. Goetzmann. "Tiebreaker: Certification and multiple credit ratings." *Journal of Finance* 67.1 (2012): 113-152.

Boot, Arnoud WA, Todd T. Milbourn, and Anjolein Schmeits. "Credit ratings as coordination mechanisms." *Review of Financial Studies* 19.1 (2006): 81-118.

Bruno, V., Jess Cornaggia, and Kimberly J. Cornaggia. “Does regulatory certification affect the information content of credit ratings?” *Management Science* 62.6 (2016): 1578-1597.

Calomiris, Charles W., and R. Glenn Hubbard. “Internal finance and investment: Evidence from the undistributed profits tax of 1936-1937”. *Journal of Finance* 68.4 (1995): 443-482.

Calomiris, Charles W., Joseph Mason, and David Wheelock. “Did doubling reserve requirements cause the recession of 1937-1938? a microeconomic approach.” No. w16688. National Bureau of Economic Research, 2011.

Chava, Sudheer, and Amiyatosh Purnanandam. “The Effect of Banking Crisis on Bank-Dependent Borrowers.” *Journal of Financial Economics* 99 (2011): 116-135.

Chernenko, Sergey, and Adi Sunderam. "The real consequences of market segmentation." The *Review of Financial Studies* 25.7 (2012): 2041-2069.

Chen, Zhihua, A.A. Lookman, and N. Schurhoff, and D.J. Seppi. “Rating-based investment practices and bond market segmentation.” *Review of Asset Pricing Studies* 4.2 (2014): 162-205.

Cornaggia, Jess, Kimberly J. Cornaggia, and John E. Hund. “Credit Ratings across Asset Classes: A Long-Term Perspective” *Review of Finance*. Forthcoming.

Cornaggia, Jess, Kimberly J. Cornaggia, and Ryan Israelsen. “Credit Ratings and the Cost of Municipal Financing.” *The Review of Financial Studies* 31.6 (2018): 2038-2079.

Crabbe, Leland, and Mitchell A. Post. "The effect of a rating downgrade on outstanding commercial paper." *Journal of Finance* 49.1 (1994): 39-56.

Davis, James L., Eugene F. Fama, and Kenneth R. French. "Characteristics, covariances, and average returns: 1929 to 1997." *Journal of Finance* 55.1 (2000): 389-406.

Diamond, Douglas. “Monitoring and Reputation: The Choice between Bank Loans and Directly Placed Debt.” *Journal of Political Economy* 99.4 (1991): 689-721.

Dichev, Ilia D., and Joseph D. Piotroski. "The Long-Run Stock Returns Following Bond Ratings Changes." *Journal of Finance* 56.1 (2001): 173-203.

Duffie, James Darrell. "Market making under the proposed Volcker rule." *Rock Center for Corporate Governance at Stanford University Working Paper* 106 (2012).

Duffie, Darrell, and Bruno Strulovici. "Capital mobility and asset pricing."*Econometrica* 80.6 (2012): 2469-2509.

Ellul, Andrew, Chotibhak Jotikasthira, and Christian T. Lundblad. “Regulatory pressure and fire sales in the corporate bond market.” *Journal of Financial Economics* 101 (2011): 596-620.

Fama, Eugene F., and Kenneth R. French. "Business conditions and expected returns on stocks and bonds." *Journal of Financial Economics* 25.1 (1989): 23-49.

Fama, Eugene F., and Kenneth R. French. "Common risk factors in the returns on stocks and bonds." *Journal of Financial Economics* 33.1 (1993): 3-56.

Faulkender, Michael and Mitchell A. Petersen. “Does the Source of Capital Affect Capital Structure?”. The *Review of Financial Studies* 19.1 (2006): 45-79.

Fazzari, Steven, R. Glenn Hubbard, and Bruce C. Petersen. "Financing constraints and corporate investment." (1988).

Fazzari, Steven M., R. Glenn Hubbard, and Bruce C. Petersen. "Investment-cash flow sensitivities are useful: A comment on Kaplan and Zingales." *Quarterly Journal of Economics* 115.2 (2000): 695-705.

Flandreau, Marc, Norbert Gaillard, and Frank Packer. "Ratings Performance, Regulation and the Great Depression: Lessons from Foreign Government Securities." Centre for Economic Policy Research, (2009).

Fons, Jerome. "Tracing the Origins of 'Investment Grade'", Moody's Investors Service (2004).

Friedman, Walter. "Fortune Tellers: The Story of America's First Economic Forecasters." Princeton University Press, 2013.

Goldsmith, Raymond William. "Financial intermediaries in the American economy since 1900." Arno Press, 1975.

Gomes, Joao, Amir Yaron, and Lu Zhang. "Asset Pricing Implications of Firms' Financing Constraints." *The Review of Financial Studies* 19.4 (2006): 1321-1356.

Gormley, Todd A., and David A. Matsa. "Playing it safe? Managerial preferences, risk, and agency conflicts." *Journal of Financial Economics* 122.3 (2016): 431-455.

Graham, John, and Campbell R. Harvey. "The theory and practice of corporate finance: Evidence from the field." *Journal of financial economics* 60.2 (2001): 187-243.

Graham, John, and Mark Leary. "The Evolution of Corporate Cash." *The Review of Financial Studies* 31.11 (2018): 4288-4344.

Graham, J. R. , S. Hazarika, and K. Narasimhan. "Corporate Governance, Debt, and Investment Policy during the Great Depression." *Management Science*, 57 (2011): 2083–2100.

Guthmann, Harry G. "The movement of debt to institutions and its implications for the interest rate." *Journal of Finance* 5.1 (1950): 70-87.

Hahn, Jaehoon, and Hangyong Lee. "Financial Constraints, Debt Capacity, and the Cross-section of Stock Returns." *Journal of Finance* 64.2 (2009): 891-921.

Harold, Gilbert. "Bond ratings as an investment guide." Ronald, 1938.

Haven, T. Kenneth. *Investment banking under the Securities and Exchange Commission*. Vol. 9. No. 3. University of Michigan, School of Business Administration, Bureau of Business Research, 1940.

Hickman, W. Braddock. "Corporate Bonds: Quality and Investment Performance." (1957).

Holthausen, Robert and Richard Leftwich. "The effect of bond rating changes on common stock prices" *Journal of Financial Economics* 17.1 (1986): 57-89.

Hubbard, R. Glenn, Anil K. Kashyap, and Toni M. Whited. Internal finance and firm investment. No. w4392. National Bureau of Economic Research, (1995).

Jensen, M. C. and W. H. Meckling “Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure” *Journal of Financial Economics*, 90 (1976): 651-666.

Jiang, John Xuefeng, Mary Harris Stanford, and Yuan Xie. "Does it matter who pays for bond ratings? Historical evidence." *Journal of Financial Economics* (2012).

Jorion, Phillippe, and Gaiyan Zhang. "Information effects of bond rating changes: The role of the rating prior to the announcement." *Journal of Fixed Income* 16.4 (2007): 45.

Jorion, Phillippe, Zhu Liu, and Charles Shi. “Informational effects of regulation FD: evidence from rating agencies” *Journal of Financial Economics* 76 (2005) 309-330.

Kalcheva, Ivalina, and Karl Lins. “International Evidence on Cash Holdings and Expected Managerial Agency Problems.” *The Review of Financial Studies* 20.4 (2007): 1087-1112.

Kaplan, Steven, and Luigi Zingales. "Do investment-cash flow sensitivities provide useful measures of financing constraints?." *Quarterly Journal of Economics* 112.1 (1997): 169-215.

Kaplan, Steven, and Jeremy Stein. “The Evolution of Buyout Pricing and Financial Structure in the 1980s.” *Quarterly Journal of Economics* 108.2 (1993): 313-357.

Kisgen, Darren. "Credit ratings and capital structure." *Journal of Finance* 61.3 (2006): 1035-1072.

Kisgen, Darren. “Do Firms Target Credit Ratings or Leverage Levels?” *Journal of Financial and Quantitative Analysis* 44.6 (2009): 1323-1344.

Kisgen, Darren, and Philip E. Strahan. "Do Regulations Based on Credit Ratings Affect a Firm's Cost of Capital?." *The Review of Financial Studies* 23.12 (2010): 4324-4347.

Kisgen, Darren. "The Real and Financial Effects of Credit Ratings: Evidence from Moody's Adjustments." Working Paper (2012).

Kisgen, Darren. “The Impact of Credit Ratings on Corporate Behavior: Evidence from Moody’s Adjustments.” Working paper (2018).

Kliger, Doron, and Oded Sarig. “The Information Value of Bond Ratings.” *Journal of Finance* 55.6 (2000).

Koch, Alfred R. “The Financing of Large Corporations, 1920-1939”. *NBER* 1943.

Kolari, James W., and Seppo Pynnonen. “Event study testing with cross-sectional correlation of abnormal returns.” *The Review of Financial Studies* (2010).

Kothari, S.P., and Jerold B. Warner, “Econometrics of Event Studies, Handbook of Corporate Finance: Empirical Corporate Finance”. Elsevier/North-Holland. 2005.

Lamont, Owen. "Cash flow and investment: Evidence from internal capital markets." *Journal of Finance* 52.1 (1997): 83-109.

Lemmon, Michael, and Michael R. Roberts. "The response of corporate financing and investment to changes in the supply of credit." *Journal of Financial and Quantitative Analysis* 45.03 (2010): 555-587.

Lie, Erik. “Excess Funds and Agency Problems: An Empirical Study of Incremental Cash Disbursements.” *The Review of Financial Studies* 13.1 (2000): 219-248.

Livdan, Dmitry, Horacio Sapriza, and Lu Zhang. “Financially Constrained Stock Returns.” *Journal of Finance* 64.6 (2009): 1827-1862.

Manso, Gustavo. “Feedback Effects of Credit Ratings.” *Journal of Financial Economics* 109 (2013): 535-548.

Manso, Gustavo, Bruno Strulovici, and Alexei Tchistyi. “Performance-sensitive debt.” *The Review of Financial Studies* 23 (2010): 1819-1854.

Mitchell, Mark, Lasse Heje Pedersen, and Todd Pulvino. *Slow moving capital*. No. w12877. National Bureau of Economic Research, 2007.

Modigliani, Franco, and Merton H. Miller. "The cost of capital, corporation finance and the theory of investment." *American Economic Review* 48.3 (1958): 261-297.

Moreau, Ludovic. "Regulatory versus Informational Value of Bond Ratings: Hints from History." *CELS 2009 4th Annual Conference on Empirical Legal Studies Paper*. 2009.

Myers, Stewart. “Determinants of Corporate Borrowing.” *Journal of Financial Economics* 5 (1977): 147-175.

Nikolov, Boris, and Toni Whited. “Agency Conflicts and Cash: Estimates from a Dynamic Model.” *Journal of Finance* 69.5 (2014).

Palyi, Melchior. "Bank Portfolios and the Control of the Capital Market." *Journal of Business*. 11.1 (1938): 70-111.

Partnoy, Frank. "The Siskel and Ebert of financial markets: two thumbs down for the credit rating agencies." Working Paper, 1999.

Opp, Christian C., Marcus M. Opp, and Milton Harris. "Rating agencies in the face of regulation." *Journal of Financial Economics* (2012).

Sufi, Amir. "The real effects of debt certification: Evidence from the introduction of bank loan ratings." *The Review of Financial Studies* 22.4 (2009): 1659-1691.

Standard and Poor’s. “Identifying Ratings Triggers and Other Contingent Calls on Liquidity”. 2002.

Stanton, Richard and Nancy Wallace. “CMBS Subordination, Ratings Inflation, and Regulatory-Capital Arbitrage.” *Financial Management* 47 (2018): 175-201.

Sylla, Richard, “An Historical Primer on the Business of Credit Ratings,” in Richard M. Levich, Carmen Reinhart, and Giovanni Majnoni, eds., Ratings, Rating Agencies, and the Global Financial System. Boston: Kluwer, 2002, pp. 19-40.

Rajan, Raghuram G., and Luigi Zingales. “Financial dependence and growth”. No. w5758. National Bureau of Economic Research, 1996.

Tang, Tony T. "Information asymmetry and firms’ credit market access: Evidence from Moody's credit rating format refinement." *Journal of Financial Economics* 93.2 (2009): 325-351.

Thakor, Anjan. “The economic consequences of the Volcker rule.” *Report by the US Chamber’s Center for Capital Market Competitiveness* (20120.

Thompson, Samuel B. "Simple formulas for standard errors that cluster by both firm and time." *Journal of Financial Economics* 99.1 (2011): 1-10.

Vassalou, Maria, and Yuhang Xing. “Abnormal equity returns following downgrades.” Working Paper, 2005.

West, Richard R. "Bond ratings, bond yields and financial regulation: some findings." *Journal of Law & Economics.* 16 (1973): 159.

White, Lawrence J. "Markets: The credit rating agencies." *Journal of Economic Perspectives* 24.2 (2010): 211-226

Figure 1. Economic Recoveries and Bank Investment Restrictions - Great Depression vs. Great Recession

This figure shows corporate costs of debt financing (Baa bond yields) during the booms, busts, and recovery in the 15 years surrounding the Great Depression (red solid line) and Great Recession (blue solid line), to illustrate the timing of regulations intended to curb bank speculation. Yields are taken from the Federal Reserve Bank of St. Louis (https://fred.stlouisfed.org/series/BAA). The date of the initial wall street crash in 1929, Lehman Brothers collapse in 2007, initial passage of the Volcker Rule in 2014, and announcement of the banning of speculative grade purchases by banks in 1936 are depicted as well.

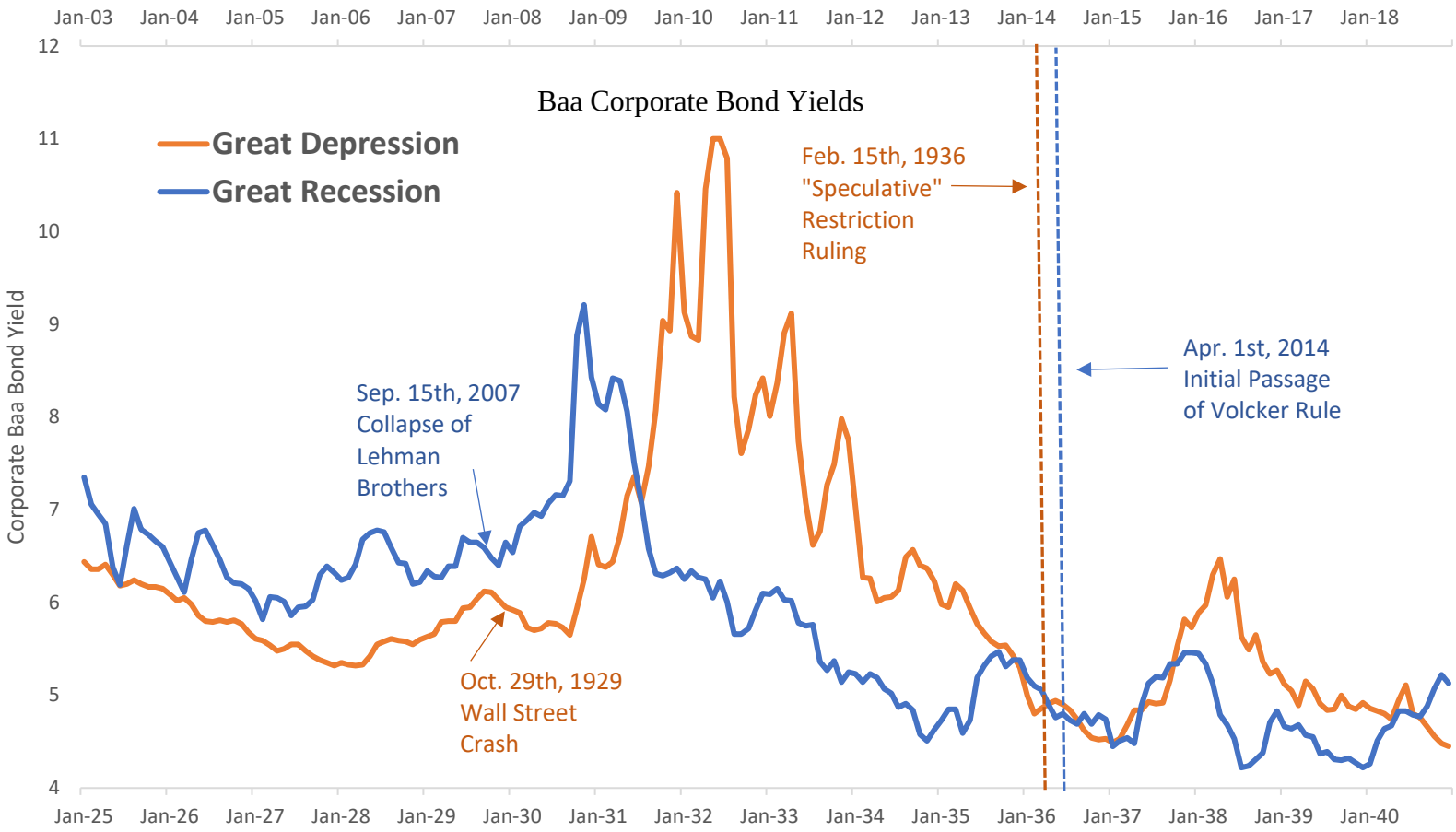


Figure 2. Ratings Distributions and the Investment Grade Cut-off

These figures show the distribution of corporate credit ratings. Figure 2a depicts the distribution monthly S&P Domestic Long Term Issuer Credit Ratings from Jan-1981 to Sep-2012 from Compustat's Ratings Database and the associated endogenous response to the investment grade cut-off. The red bars show the percent of all issuer-months with the designated long-term credit rating. The blue dashed line depicts the investment grade cut-off which begins at BBB-. Figure 2b shows the distribution of annual corporate bond credit ratings given by Moody's Investors Services taken from 1932-1935 *Moody's Industrial Manual*, *Moody's Transportation Manual*, and *Moody's Utilities Manual* for 3,646 bond-year observations.

Figure 2a. S&P Long-Term Credit Ratings Distribution 1981-2012

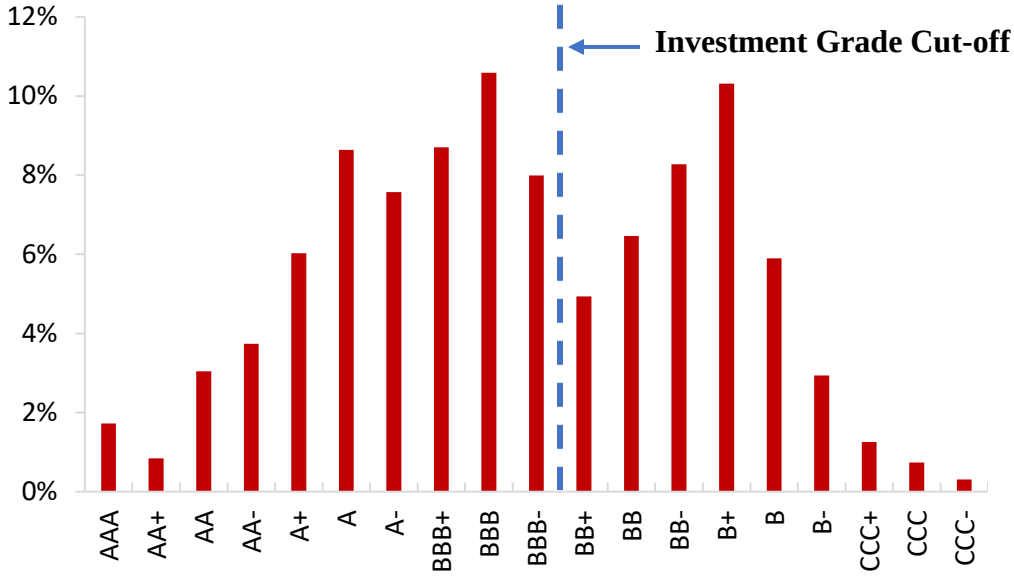


Figure 2b. Moody's Bond Rating Distribution for 1932-1935

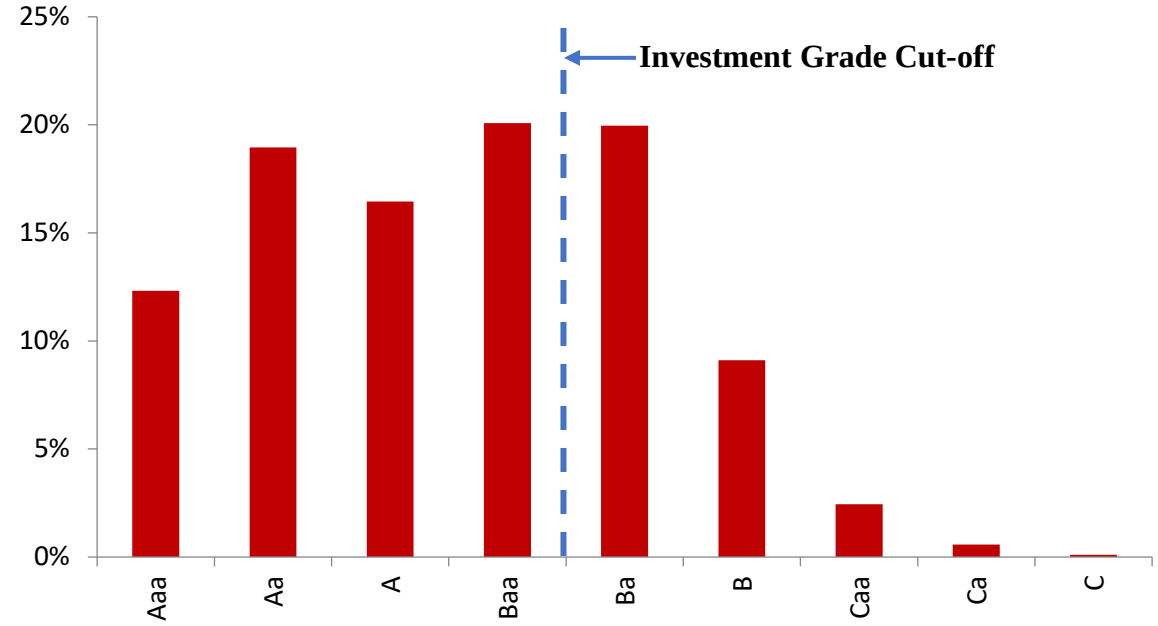


Figure 3. Equity Value: Investment vs Speculative Debt Financing

These figures display the effect on equity values of the 1936 ruling banning bank "speculation". Figure 3a is the difference in cumulative abnormal stock returns (CARs) from the residual of the 3-Fama French factor regression shown in equation (1) for firms financing themselves with speculative relative to investment grade public bonds. Regressions control for Figure 3b displays the CARs for each group separately. The estimation period runs from Jan 1st, 1935 - March 17th, 1936 and results are displayed for a 1-month window before and after the comptroller ruling on Feb 15th, 1936. All data on stock returns are taken from the Center for Research in Security Prices (CRSP) and bond ratings are collected from the 1935 *Moody's Industrial Manual, Moody's Transportation Manual,* and *Moody's Utilities Manual*.

Figure 3a. CARs: Speculative – Investment Grade Financing

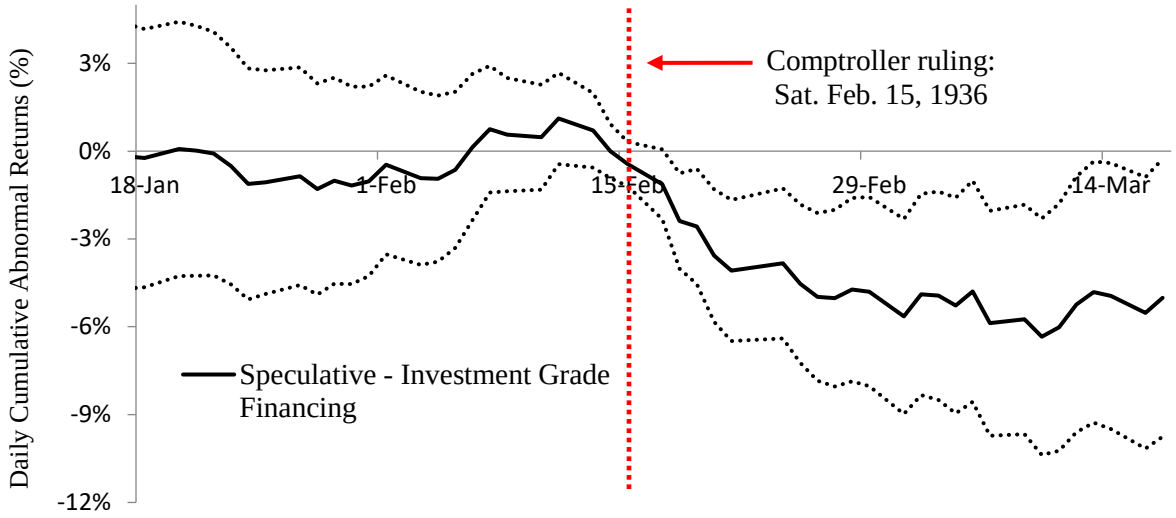


Figure 3b. Cumulative Abnormal Stock Returns (CARs)

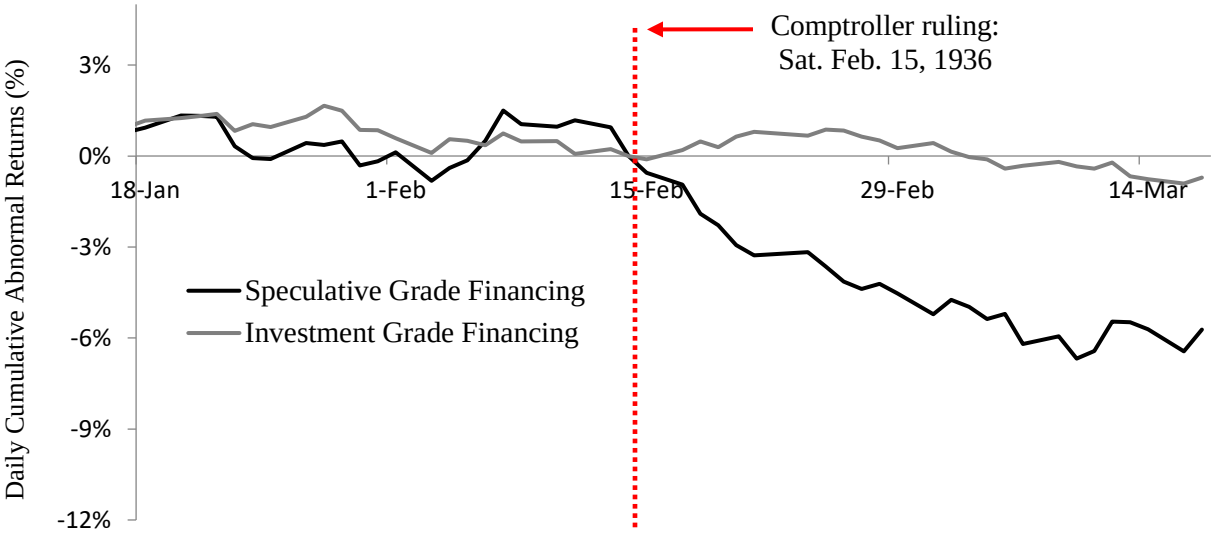


Figure 4. Equity Value: Firms without Publicly Traded Bonds Placebo Test

These figures display the effect on equity values of the 1936 ruling banning bank "speculation" for firms not reliant on the public debt market. In particular, this depicts the cumulative abnormal stock returns (CARs) from the residual of the 3-Fama French factor regression shown in equation (1) for firms without any publicly traded bonds. Firms without debt and with high volatility are plotted separately as a placebo test to show that stock price movement is not driven by the release of macroeconomic news that differentially affects high risk stocks. The estimation period runs from Jan 1st, 1935 - March 17th, 1936 and results are displayed for a 1-month window before and after the comptroller ruling on Feb 15th, 1936. All data on stock returns are taken from the Center for Research in Security Prices (CRSP) and bond ratings are collected from the 1935 *Moody's Industrial Manual, Moody's Transportation Manual,* and *Moody's Utilities Manual*.

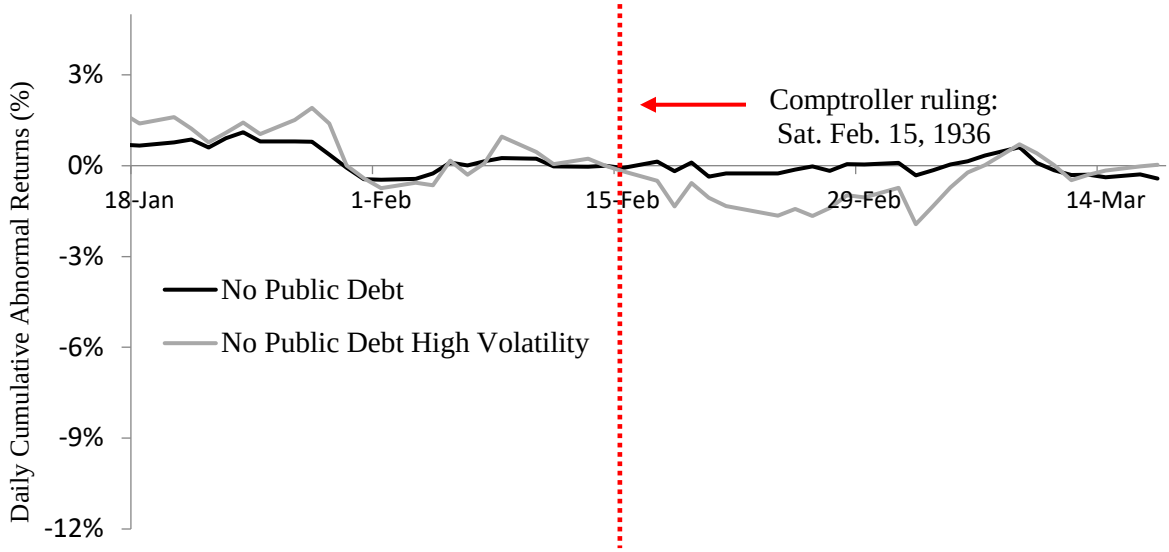


Figure 5. Cumulative New Bond Offerings by Initial Rating 1930-1940

This plots the cumulative (millions) of new offerings by initial rating as taken from the tables in Hickman (1957) with speculative grades denoted by dashed lines. Figure 5a shows the results in dollars while 5b shows the raw number of new corporate bond issues by rating grade.

Figure 5a. Cumulative New Bond Offerings ($)

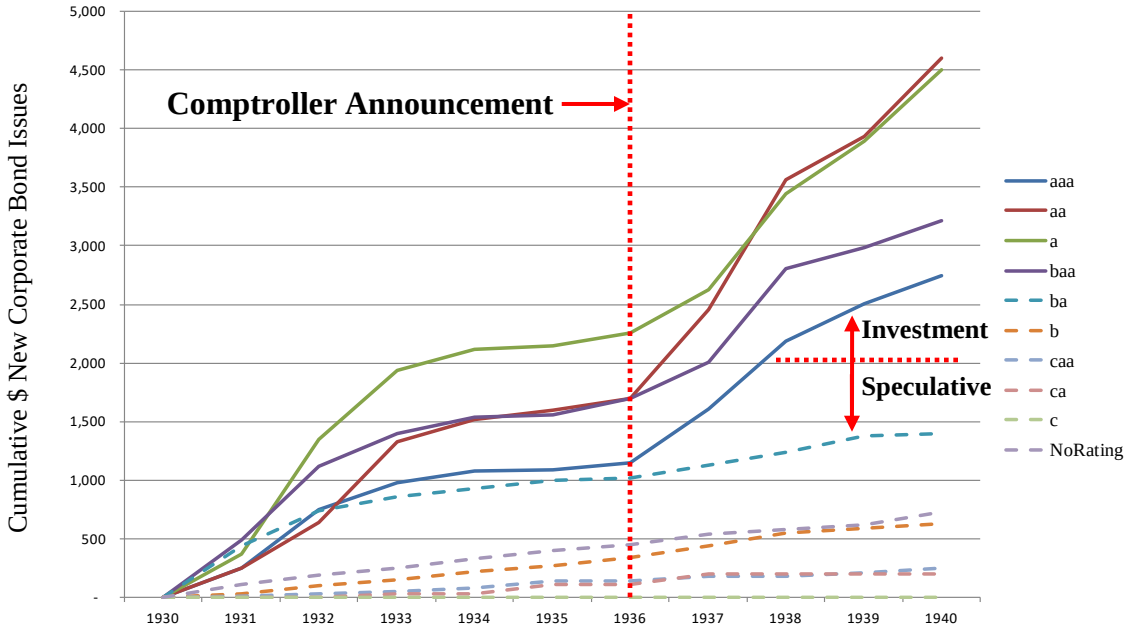


Figure 5b. Cumulative New Bond Offerings (#)

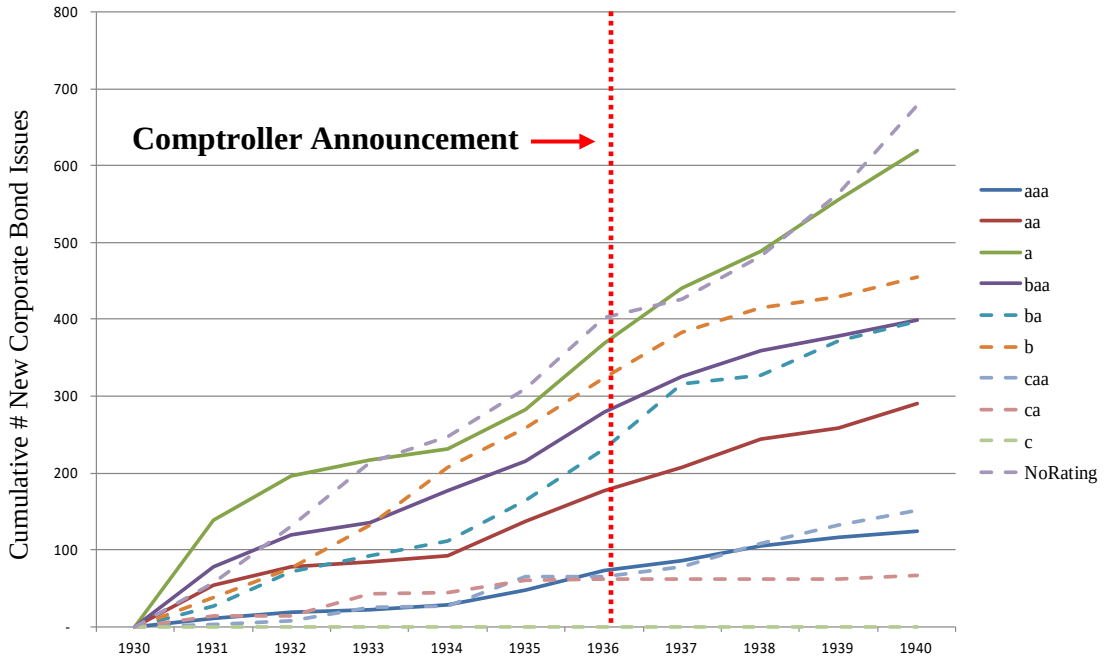


Table 1. Matched CRSP-Moody's Sample Statistics

Summary statistics for a sample of 721 firms from the Center for Research in Securities Prices (CRSP) matched with ratings from the 1935 *Moody's Industrial Manual*, *Moody's Transportation Manual*, and *Moody's Utilities Manual* broken down by rating. Each of the ratings refers to minimum bond rating for each firm. For firms without debt they have also been split into the highest quartile by volatility, *No Debt High Vol*, and the lowest quartile by volatility, *No Debt Low Vol*. Financial firms were not rated by Moody's at the time so they have been listed separately.

	Aaa	Aa	A	Baa	Ba	B	Caa	Ca	C
Mean β_{Mkt}	0.57	0.66	0.90	1.25	1.28	0.97	1.03	0.47	-1.84
Mean β_{smb}	0.21	-0.15	0.07	0.22	0.55	0.94	1.34	2.24	3.35
Mean β_{hml}	0.11	0.24	0.43	0.42	0.54	0.91	0.50	1.86	2.08
Mean Log(Market Cap)	5.22	5.02	4.64	4.29	3.78	3.35	2.99	2.97	2.61
Mean Ann. Volatility	25%	33%	36%	50%	67%	103%	122%	141%	279%
# Observations	10	13	19	56	43	43	19	6	2

	Investment Grade	Speculative Grade	No Debt All	No Debt High Volatility	No Debt Low Volatility	Unrated	Missing	Financial
Mean β_{Mkt}	1.04	1.02	0.99	1.11	0.61	0.94	0.31	0.91
Mean β_{smb}	0.14	0.97	0.46	1.04	0.11	0.81	0.19	0.55
Mean β_{hml}	0.37	0.79	0.08	0.33	-0.04	0.35	0.46	0.43
Mean Log(Market Cap)	4.55	3.42	4.06	3.40	4.73	3.64	3.70	3.80
Mean Ann. Volatility	42%	98%	50%	92%	23%	86%	82%	72%
# Observations	98	113	422	106	105	61	2	25

Table 2a. Matched Bond Price – Moody's Sample Summary Statistics

Summary statistics for a sample of 954 bond issues for 542 firms that match between ratings obtained from the 1935 *Moody's Industrial Manual, Moody's Transportation Manual,* and *Moody's Utilities Manual* and all bonds with positive sales on a given day from Jan 12th, 1935- Feb 21st, 1936 listed on the *New York Stock Exchange* or *New York Curb Exchange* which are hand collected from the *New York Times* at monthly or daily frequency (daily closer to the Feb. 15th, 1936 OCC announcement).

	Aaa	Aa	A	Baa	Ba	B	Caa	Ca
Mean Yield (%)	3.75	4.20	5.09	6.72	10.98	19.83	34.96	52.54
Median Yield (%)	3.71	4.11	4.66	5.39	7.79	13.11	29.05	62.42
Mean Log Sales ($1k par)	2.35	2.59	2.76	3.12	3.12	3.15	2.83	3.58
Median Log Sales ($1k par)	2.30	2.56	2.71	3.14	3.14	3.14	2.71	3.64
# Issues	107	174	198	146	178	131	15	5
# Issuers	54	68	137	72	104	91	12	4
# Observations	1,342	2,456	2,334	3,719	3,299	1,588	523	135

Table 2b. Financial Statement Summary Statistics for 1935

Summary statistics for a sample of 422 firms from the 1935 *Moody's Industrial Manual, Moody's Transportation Manual,* and *Moody's Utilities Manual* that have detailed financial information, including total assets, long-term debt, and property, plant, & equipment (PP&E) from 1932-1940 matched to those that also have stock prices in the Center for Research in Securities Prices (CRSP).

	Mean	Median	Stdev	#Firms
Total Assets ($Mil)	125.2	30.1	233.0	422
Long-term Debt ($Mil)	28.9	2.5	70.4	422
Long-Term Debt/Assets	0.55	0.50	0.30	422
Net PP&E/Assets	0.51	0.51	0.24	422

Table 3. Curbing Bank Speculation and Non-Financial Firm Equity Values

This table depicts the effect on equity values of the 1936 ruling banning bank "speculation". Column 1 is a differences-in-differences regression of daily excess stock returns for firms financing themselves with speculative relative to investment grade public bonds before and after the announcement of the regulation. Column 2 is the same, but controls for the stock market excess return. Column 3 is the panel regression specified in equation 2 which allows for different factors loadings on the 3 Fama-French factors for every firm. Column 4 reruns the baseline regression in Table 3 column (1) but also includes 2-digit SIC code interacted with event fixed effects. This table focuses on the baseline results where regressions are run over the period from Jan 1st, 1935 – February 21st, 1936 with the event window defined as 5 days following the announcement from February 15, 1936-February 21, 1936. All analyses run include security-level fixed effects. All data on stock returns are taken from the Center for Research in Security Prices (CRSP) and bond ratings are collected from the 1935 *Moody's Industrial Manual*, *Moody's Transportation Manual*, and *Moody's Utilities Manual*. Standard errors clustered at the security-level are reported in parentheses. P-Values: *10%; **5%; ***1%.

Dependent Variable: Excess Stock Returns	No Controls (1)	1 Factor (2)	3 Factors (3)	Industry Controls (4)
Event x Speculative Financing	-0.0059***	-0.0043**	-0.0069***	-0.0103***
	(0.0019)	(0.0021)	(0.0019)	(0.0020)
Event	0.0018*	0.0002	0.0013	0.0071***
	(0.0011)	(0.0012)	(0.0011)	(0.0010)
Issue FEs	Yes	Yes	Yes	Yes
Mkt-Rf	No	Yes	Yes	Yes
SMB & HML	No	No	Yes	Yes
Event x Industry FEs	No	No	No	Yes
Observations	70,867	33,136	70,867	70,867
Adj. R-squared	0.000	0.07	0.09	0.09

Table 4. Difference-in-differences Validation

This table validates the differences-in-differences methodology used in this paper to examine the effect on equity values of the 1936 ruling restricting bank investment to bonds rated at least Baa or higher (aka "investment" grade). Column 1 is a differences-in-differences regression of daily excess stock returns for firms financing themselves with speculative relative to investment grade public bonds before and after the announcement of the regulation after controlling for concurrent returns of the 3 Fama-French portfolios. For this column speculative bonds include on those rated "B". Column 2 is the same as 1, but investment grade includes only "Baa", while speculative grade includes only "Ba". Column 3 is a placebo test where bonds rated "Aaa-A" are defined as investment grade, while bonds rated "Baa" are incorrectly assigned as speculative. Column 4 is similar, but assigns "B-C" as speculative grade and "Ba" incorrectly as investment grade. Column 5 is the same as column 1, but all firms with bonds rated Ba or lower are omitted and replace with all firms without any public bonds as a placebo test. Column 6 is the same as column 5, but includes a speculative only those firms without public bonds, but of similar equity volatility to firms with speculative grade bonds. This table focuses on the baseline results where regressions are run over the period from Jan 1st, 1935 – February 21st, 1936 with the event window defined as 5 days following the announcement from February 15, 1936- February 21, 1936. All data on stock returns are taken from the Center for Research in Security Prices (CRSP) and bond ratings are collected from the 1935 *Moody's Industrial Manual*, *Moody's Transportation Manual*, and *Moody's Utilities Manual*. All analyses run include security-level fixed effects. Standard errors clustered at the security-level are reported in parentheses. P-Values: *10%; **5%; ***1%.

			Placebo test #1: No treatment		Placebo test #2: No public debt	
Dependent Variable:	Aaa-Baa vs. B	Baa vs. Ba	Aaa-A vs. Baa	Ba vs. B-C	No Debt All	No Debt Hi Volatility
Excess Stock Returns	(1)	(2)	(3)	(4)	(5)	(6)
Event x Speculative Financing	-0.0098***	-0.0055***	0.0019	-0.0036	0.0017	-0.0034
	(0.0027)	(0.0026)	(0.0022)	(0.0031)	(0.0012)	(0.0022)
Event	0.0013	0.0021	0.00015	-0.0035	-0.0004	0.0013
	(0.0011)	(0.0015)	(0.0016)	(0.0022)	(0.0006)	(0.0011)
Issue FEs	Yes	Yes	Yes	Yes	Yes	Yes
FF Factor Controls	Yes	Yes	Yes	Yes	Yes	Yes
"Investment" Grade	Aaa-Baa	Baa	Aaa-A	Ba	Aaa-Baa	Aaa-Baa
"Speculative" Grade	B	Ba	Baa	B-C	No Debt All	No Debt Hi Vol
Observations	47,521	33,136	33,080	37,787	172,429	69,214
Adj. R-squared	0.12	0.18	0.23	0.07	0.11	0.08

Table 5. Heterogeneity by Industry Reliance on Public Bond Markets

This table shows that the effect on equity values of the 1936 ruling banning bank "speculation" was concentrated in industries reliant on public bond markets. Column 1 is a differences-in-differences regression of daily excess stock returns for firms financing themselves with speculative relative to investment grade public bonds before and after the announcement of the regulation. Column 1 interacts the event and dummy for having the lowest rated corporate bond be speculative grade (Ba or lower) with a dummy variable, *External Finance Dependent*, that equals one if firm is not in the manufacturing sector, as a proxy for firms that are more reliant on external financing from public bond markets. Column (2) is the same as (1) but *External Finance Dependent* equals one if the firm is in the Railroad or Transit sectors. Column (3) is the same as (2) but only for the Railroad sector. Column (4) is the same as (2) but *External Finance Dependent* equals one if the firm is in the Transportation or Utilities sectors. This table focuses on the baseline results where regressions are run over the period from Jan 1st, 1935 – February 21st, 1936 with the event window defined as 5 days following the announcement from February 15, 1936-February 21, 1936. All data on stock returns are taken from the Center for Research in Security Prices (CRSP) and bond ratings are collected from the 1935 *Moody's Industrial Manual*, *Moody's Transportation Manual*, and *Moody's Utilities Manual*. All analyses run include security-level fixed effects. Standard errors clustered at the security-level are reported in parentheses. P-Values: *10%; **5%; ***1%.

Dependent Variable:	Ext Fin 1	Ext Fin 2	Ext Fin 3	Ext Fin 4
Excess Stock Returns	(1)	(2)	(3)	(4)
Event x Speculative Financing	-0.0126***	-0.0125***	-0.0121***	-0.0087**
x Ext. Fin. Dependent	(0.0038)	(0.0045)	(0.0047)	(0.0040)
Event x Speculative Financing	0.0032	-0.0026	-0.0030	-0.0022
	(0.0030)	(0.0021)	(0.0021)	(0.0022)
Event x Ext. Fin. Dependent	0.0047**	0.0098***	0.0103***	0.0030
	(0.0026)	(0.0025)	(0.0026)	(0.0023)
Event	-0.0029**	-0.0125***	-0.0122**	-0.0005
	(0.0013)	(0.0045)	(0.0011)	(0.0013)
Issue FEs	Yes	Yes	Yes	Yes
FF Factor Controls	Yes	Yes	Yes	Yes
External Finance Dep.	Non-Mfg.	RR&Transit	RR	Trans/Utils
Observations	71,192	71,192	71,192	71,192
Adj. R-squared	0.063	0.063	0.063	0.066

Table 6. Curbing Bank Speculation and Non-Financial Firm %ΔBond Yields

This table examines the percent change in daily bond yields around the comptroller announcement on February 15th, 1936 for investment vs. speculative grade bonds as rating by Moody's. This table focuses on the baseline results where regressions are run over the period from Feb 4th, 1936 – February 21st, 1936 with the event window defined as 5 days from February 15, 1936- February 21, 1936. All bonds rated C or higher by Moody's Investor Services in 1935 are included in the analysis. Data includes all bonds listed on the *New York Stock Exchange* and *New York Curb Exchange* and are collected from the *New York Times* collected at daily frequency surrounding the event. Column (1) estimates a regression of the percent change in daily bond yields, $\%\Delta Bond\ Yield$, relative to the mean yield in 1936 but prior to the regulation, regressed on issue-level fixed effects and the interactions of a dummy variable, *Speculative*, equal to one if a bond's rating is worse than Baa with a dummy variable, *Event*, equal to one if time period is after regulation was announced. Column (2) is the same as 1 but includes only bonds rated Ba or Baa in the regression. Column (3) is the same as 1 but includes fixed effects for each firm (issuer) interacted with the *Event* dummy to allow for comparison of bonds with speculative vs. investment grade ratings within the same firm. This regression also allows for different factors loadings on the Fama-French factor DEF, which is just the average return of all bonds in excess of the short-term treasury bill rate. Column (4) is the same as 4, but now breaks down speculative ratings into a dummy variable for bonds that are rated Ba and a dummy variable for bonds that are B or lower. All analyses run include security-level fixed effects. Standard errors clustered at the security-level are reported in parentheses. P-Values: *10%; **5%; ***1%.

Dependent Variable:	%ΔBond Yield (1)	%ΔBond Yield (2)	%ΔBond Yield (3)	%ΔBond Yield (4)
Event x Speculative Bond	0.857**	1.239**	1.642*	
	(0.446)	(0.639)	(0.987)	
Event x Ba Dummy				0.9935
				(0.513)
Event x B and lower Dummy				3.864***
				(1.348)
Event	-1.119***	-0.138	-9.574***	-8.925***
	(0.326)	(0.576)	(0.987)	(0.397)
"Investment" Grade	Aaa-Baa	Baa	Aaa-Baa	Aaa-Baa
"Speculative" Grade	Ba-C	Ba	Ba-C	N/A
Issue FEs	Yes	Yes	Yes	Yes
DEF Factor	No	Yes	Yes	Yes
Issuer x Event FEs	No	No	Yes	Yes
Observations	5,696	2,840	1,085	1,085
Adj. R-squared	0.265	0.409	0.795	0.796

Table 7. Curbing Bank Speculation and Non-Financial Firm Balance Sheets

This table looks at the long-run real effects on debt issuance, asset growth, and investment from the Office of the Comptroller of Currency announcement on February 15th, 1936, restricting bank investment to bonds rated at least Baa or higher (aka "investment" grade). All data come from the *Moody's Industrial Manual*, *Moody's Transportation Manual*, and *Moody's Utilities Manual* which have detailed financial information, including total assets, long-term debt, and property, plant, & equipment (PP&E) from 1932-1940. These are matched to corporate bond ratings from the same manuals, but only for 1935 and SIC code industry classifications from the Center for Research in Security Prices (CRSP). All data is at the annual frequency. Column (1) regresses the logarithm of the book value of long-term debt on a dummy variable, *Event*, equal to one if the year is 1936 or later interacted with a dummy variable, *Speculative Dummy*, equal to one if the lowest rated corporate bond of the firm is Ba or lower. It also includes firm fixed effects and industry interacted with event dummy fixed effects, where industry grouping is based on four digit SIC codes. All interactions are included in the specification and are available upon request. Column (2) is the same as column (1) but looks at the logarithm of total book assets. Column (3) is the same as column (1) but looks at the logarithm of the book value of net property, plant, and equipment. Column (4) is the same as column (1) but looks at the ratio of the book value of long-term debt to total book asset value. All analyses run include firm-level fixed effects. Standard errors clustered at the firm-level are reported in parentheses. P-Values: *10%; **5%; ***1%.

Dependent Variable:	ln(Long Term Debt) (1)	ln(Assets) (2)	ln(PP&E) (3)
Event x Speculative Financing	-0.212***	-0.064***	-0.077**
	(0.075)	(0.025)	(0.033)
Event	-0.9007**	0.0130	-0.0764
	(0.3796)	(0.1260)	(0.1689)
Firm Fixed Effects	Yes	Yes	Yes
Industry x Event Fixed Effects	Yes	Yes	Yes
Observations	1,186	1,186	1,186
Adj. R-squared	0.941	0.990	0.986

Table 8. Curbing Bank Speculation and Non-Financial Firm Equity Volatility

In this table I run a difference-in-differences analysis on proxies for firm equity return volatility for firms with bonds rated above vs. below investment grade around the Office of the Comptroller of Currency announcement on February 15th, 1936, restricting bank investment to bonds rated at least Baa or higher (aka "investment" grade). All data on stock returns are taken from the Center for Research in Security Prices (CRSP) and bond ratings are collected from the 1935 *Moody's Industrial Manual, Moody's Transportation Manual,* and *Moody's Utilities Manual*. All firms with bonds rated C or higher by Moody's Investor Services in 1935 are included in the analysis. Column (1) estimates a regression of the absolute value of daily returns, $|R_{i,t}|$, regressed on the interactions of a dummy variable, *Speculative*, equal to one if firm's minimum bond rating is worse than Baa with a dummy variable, *Event*, equal to one if time period is after regulation was announced. The regression is run from 1/1/36-3/31/36 where the post announcement period is all dates after (and including) 2/15/1936 and includes firm-level fixed effects. Column (2) is the same as 1, but now the dependent variable is the absolute value of daily idiosyncratic returns, $|R_{i,t}^{idio}|$. Idiosyncratic returns are measured as the residual after regressing daily stock returns on 2 digit SIC code interacted with time fixed effects and firm-specific factor loadings on each of Fama-French Factors, SML, HML, and market excess returns. Column (3) is the same as 2, but now the dependent variable is the absolute value of the systematic component of returns, $|R_{i,t}^{sys}|$. This is computed as the raw stock return minus the residual component from column 2. Column (4) is the same as 2, but the dependent variable is the percent change in the absolute value of idiosyncratic returns, $\%\Delta|R_{i,t}^{idio}|$. This is computed as the current absolute value of idiosyncratic returns divided by the mean absolute value of idiosyncratic returns in 1936, but prior to the regulation. Column (5) is the same as 4, but now breaks down speculative ratings into a dummy variable for firms whose worst rated bond is Ba and a dummy variable for firms whose worst rated bond are B or lower. All analyses run include security-level fixed effects. Standard errors clustered at the security-level are reported in parentheses. P-Values: *10%; **5%; ***1%.

Dependent Variable:	$\|R_{i,t}\|$ (1)	$\|R_{i,t}^{idio}\|$ (2)	$\|R_{i,t}^{sys}\|$ (3)	$\%\Delta\|R_{i,t}^{idio}\|$ (4)	$\%\Delta\|R_{i,t}^{idio}\|$ (5)
Event x Speculative Financing	-0.00365***	-0.00376***	-0.00035	-8.869***	
	(0.00105)	(0.00087)	(0.00036)	(2.919)	
Event x Ba					-9.359***
					(3.598)
Event x B and lower					-8.567***
					(3.281)
Event	-0.00141***	-0.00079*	0.00165***	-2.541	-2.541
	(0.00051)	(0.00042)	(0.00204)	(2.309)	(2.309)
Estimation Window	1/36-3/36	1/36-3/36	1/36-3/36	1/36-3/36	1/36-3/36
Issue FEs	Yes	Yes	Yes	Yes	Yes
Observations	15,797	15,797	15,797	15,797	15,797
Adj. R-squared	0.175	0.248	0.160	0.047	0.047

Appendix A: Supplementary Tables & Figures

Figure A1. NYSE Daily Stock Volume ($) 1935 and 1936

The sum of all daily dollar trading volume of U.S. stocks on the New York Stock Exchange is plotted for all trading days in 1935 and 1936. The first trading week following the February 15th, 1936 comptroller restriction on speculative investment is highlighted. All data on stock trading volume is taken from the Center for Research in Security Prices (CRSP). Summary statistics covering the period 1935-1936 are displayed below.

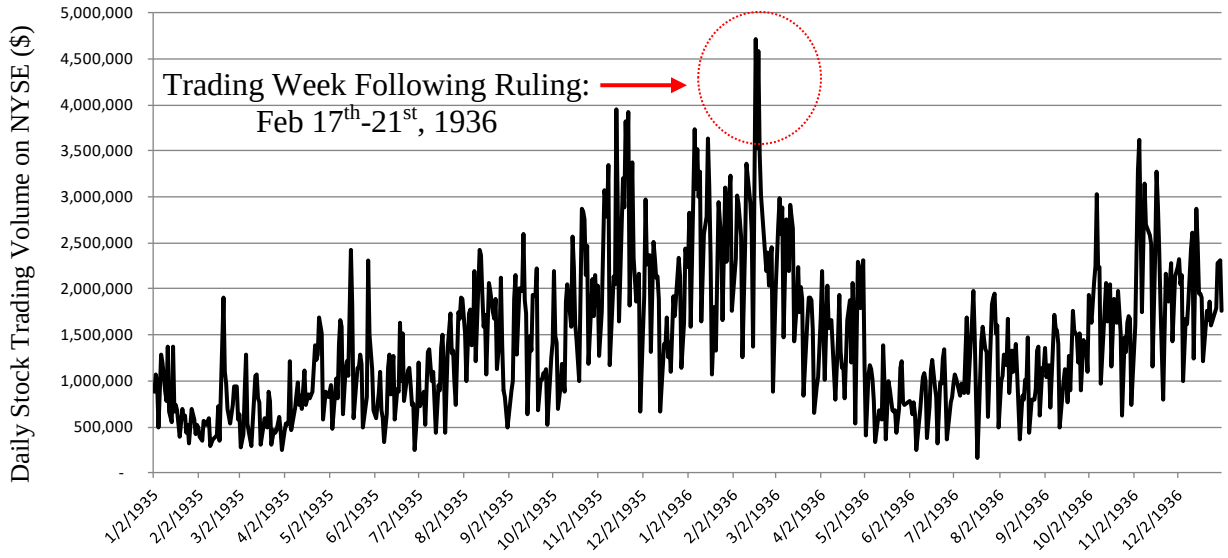


Table A1. Curbing Bank Speculation and Non-Financial Firm Equity Values – Clustering

This table shows that the observed the effect on equity values of the 1936 ruling banning bank "speculation", is not driven by the choice of clustering of standard errors. Column 1 is a differences-in-differences regression of daily excess stock returns for firms financing themselves with speculative relative to investment grade public bonds before and after the announcement of the regulation. This follows the panel regression specified in equation 2 which allows for different factors loadings on the 3 Fama-French factors for every firm. Standard errors are clustered at the security-level. Column 2 is the same as column 1, but clusters errors at the daily level. Column 3 is the same as column 1, but has robust non-clustered standard errors. This table focuses on the baseline results where regressions are run over the period from Jan 1st, 1935 – February 21st, 1936 with the event window defined as 5 days following the announcement from February 15, 1936- February 21, 1936. All analyses run include security-level fixed effects. All data on stock returns are taken from the Center for Research in Security Prices (CRSP) and bond ratings are collected from the 1935 *Moody's Industrial Manual*, *Moody's Transportation Manual*, and *Moody's Utilities Manual*. Standard errors are reported in parentheses. P-Values: *10%; **5%; ***1%.

Dependent Variable: Excess Stock Returns	Baseline (1)	Day Cluster (2)	No Cluster (3)
Event x Speculative Dummy	-0.0069***	-0.0069***	-0.0069***
	(0.0019)	(0.0015)	(0.0020)
Event	0.0013	0.0013	0.0013
	(0.0011)	(0.0016)	(0.0009)
Issue FEs	Yes	Yes	Yes
FF Factor Controls	Yes	Yes	Yes
Observations	70,867	70,867	70,867
Adj. R-squared	0.09	0.09	0.09

Table A2. Curbing Bank Speculation and Non-Financial Firm Equity Values – Additional Robustness Tests

This table shows that the observed the effect on equity values of the 1936 ruling banning bank "speculation", is not driven by the choice of window size or firm-level rating definition. Column 1 is a differences-in-differences regression of daily excess stock returns for firms financing themselves with speculative relative to investment grade public bonds before and after the announcement of the regulation. This follows the panel regression specified in equation 2 which allows for different factors loadings on the 3 Fama-French factors for every firm. Unlike the baseline specification the estimation period in this case runs for only 3 months event going from November 21st, 1935-February 21st, 1936, but with the event window defined as the same in the baseline: the 5 days following the announcement from February 15, 1936- February 21, 1936. Column 2 is the same as column 1, but uses the original baseline estimation window from January 1st, 1935-February 21st, 1936 and a longer event window including 5 days before and after the announcement on February 15th, 1936. Column 3 is the same as the baseline regression in Table 3 column 3, but uses the maximum rating of all the bonds in a firm instead of the minimum. All analyses run include security-level fixed effects. All data on stock returns are taken from the Center for Research in Security Prices (CRSP) and bond ratings are collected from the 1935 *Moody's Industrial Manual, Moody's Transportation Manual,* and *Moody's Utilities Manual*. Standard errors clustered at the security-level are reported in parentheses. P-Values: *10%; **5%; ***1%.

Dependent Variable:	Est. Window	10-Day Window	Max Rating
Excess Stock Returns	(1)	(2)	(3)
Event x Speculative Dummy	-0.0082***	-0.0048***	-0.0046**
	(0.0021)	(0.0015)	(0.0021)
Event	0.0013	0.00022	-0.0006
	(0.0011)	(0.0007)	(0.0012)
Issue FEs	Yes	Yes	Yes
FF Factor Controls	Yes	Yes	Yes
Estimation Window	11/21/35-2/21/36	1/1/35-2/21/36	1/1/35-2/21/36
Event Window ('36)	2/15-2/21	2/10-2/21	2/15-2/21
Observations	19,065	70,867	70,867
Adj. R-squared	0.10	0.09	0.09

Table A3. Curbing Bank Speculation and Non-Financial Firm ΔBond Yields

This table examines the change in daily bond yields around the comptroller announcement on February 15th, 1936 for investment vs. speculative grade bonds as rating by Moody's. This table focuses on the baseline results where regressions are run over the period from Feb 4th, 1936 – February 21st, 1936 with the event window defined as 5 days from February 15, 1936- February 21, 1936. All bonds rated C or higher by Moody's Investor Services in 1935 are included in the analysis. Data includes all bonds listed on the *New York Stock Exchange* and *New York Curb Exchange* and are collected from the *New York Times* collected at daily frequency surrounding the event. Column (1) estimates a regression of the daily bond yields, $Bond\ Yield_i$, regressed on issue-level fixed effects and the interactions of a dummy variable, *Speculative*, equal to one if a bond's rating is worse than Baa with a dummy variable, *Event*, equal to one if time period is after regulation was announced. This specification only includes bonds rated Baa or worse in the regression. Column (2) is the same as 1 but includes only bonds rated Ba or Baa in the regression. Column (3) is the same as 1 but includes all bonds rated C or better and fixed effects for each firm (issuer) interacted with the *Event* dummy to allow for comparison of bonds with speculative vs. investment grade ratings within the same firm. This regression also allows for different factors loadings on the Fama-French factor DEF, which is just the average return of all bonds in excess of the short-term treasury bill rate. Column (4) is the same as 3, but now breaks down speculative ratings into a dummy variable for bonds that are rated Ba and a dummy variable for bonds that are B or lower. Standard errors clustered at the security level are reported in parentheses. P-Values: *10%; **5%; ***1%.

Dependent Variable:	Bond Yield (1)	Bond Yield (2)	Bond Yield (3)	Bond Yield (4)
Event x Speculative Financing	0.00214**	0.00120**	0.00254*	
	(0.00099)	(0.00058)	(0.00135)	
Event x Ba				0.00147
				(0.00101)
Event x B and lower				0.00622**
				(0.00274)
Event	-0.00149*	-0.00021	-0.00855***	-0.00748***
	(0.00081)	(0.00485)	(0.00134)	(0.0010)
"Investment" Grade	Baa	Baa	Aaa-Baa	Aaa-Baa
"Speculative" Grade	Ba-C	Ba	Ba-C	N/A
Issue FEs	Yes	Yes	Yes	Yes
DEF Factor	No	Yes	Yes	Yes
Issuer x Post FEs	No	No	Yes	Yes
Observations	3,706	2,840	1,087	1,087
Adj. R-squared	0.976	0.865	0.991	0.991

Table A4. Curbing Bank Speculation and Non-Financial Firm Balance Sheets: Only on Investment Grade Border

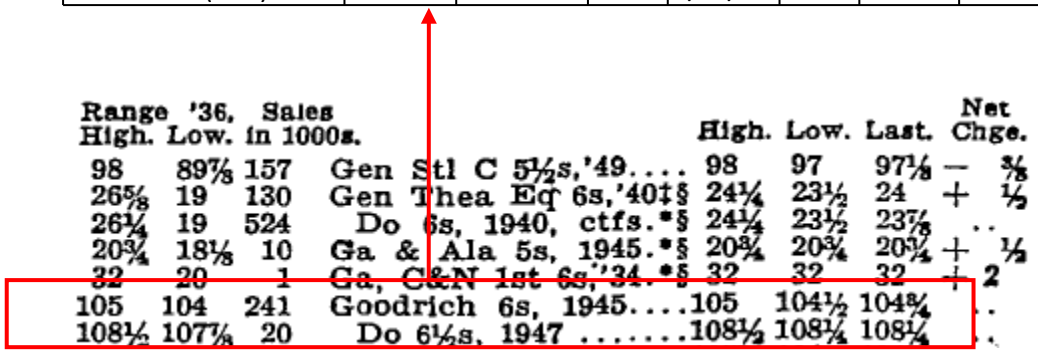
This table looks at the long-run real effects on debt issuance, asset growth, and investment from the Office of the Comptroller of Currency announcement on February 15th, 1936, restricting bank investment to bonds rated at least Baa or higher (aka "investment" grade), but focuses on only those firms whose lowest rated bond were Baa or Ba in 1935. All data come from the *Moody's Industrial Manual, Moody's Transportation Manual,* and *Moody's Utilities Manual* which have detailed financial information, including total assets, long-term debt, and property, plant, & equipment (PP&E) from 1932-1940. These are matched to corporate bond ratings from the same manuals, but only for 1935 and SIC code industry classifications from the Center for Research in Security Prices (CRSP). All data is at the annual frequency. Column (1) regresses the logarithm of the book value of long-term debt on a dummy variable, *Event*, equal to one if the year is 1936 or later interacted with a dummy variable, *Speculative Dummy*, equal to one if the lowest rated corporate bond of the firm is Ba or lower. It also includes firm fixed effects. All interactions are included in the specification and are available upon request. Column (2) is the same as column (1) but looks at the logarithm of total book assets. Column (3) is the same as column (1) but looks at the logarithm of the book value of net property, plant, and equipment. Column (4) is the same as column (1) but looks at the ratio of the book value of long-term debt to total book asset value. Standard errors clustered at the firm level are reported in parentheses. P-Values: *10%; **5%; ***1%.

Dependent Variable:	ln(Long Term Debt) (1)	ln(Assets) (2)	ln(PP&E) (3)
Event x Speculative Dummy	-0.157**	-0.051**	-0.029
	(0.069)	(0.022)	(0.037)
Event	-0.059	0.078***	0.028
	(0.044)	(0.014)	(0.024)
Firm Fixed Effects	Yes	Yes	Yes
Rating Grades Included	Baa-Ba	Baa-Ba	Baa-Ba
Observations	552	552	552
Adj. R-squared	0.958	0.994	0.985

Appendix B: Data Collection Examples

B1. Bond Price Data Collection Example

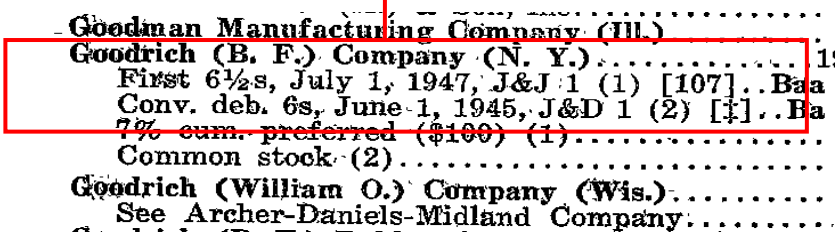
Company Name	Coupon	Maturity	Class	Date	Sales	Last	Change
GOODRICH (B.F.) CO.	6	1945		2/15/36	241	104.75	0
GOODRICH (B.F.) CO.	6.5	1947		2/15/36	20	108.25	0



Range '36, High.	Low.	Sales in 1000s.		High.	Low.	Last.	Net Chge.
98	89⅞	157	Gen Stl C 5½s,'49....	98	97	97⅛	— ⅜
26⅝	19	130	Gen Thea Eq 6s,'40‡§	24¼	23½	24	+ ½
26¼	19	524	Do 6s, 1940, ctfs.*§	24¼	23½	23⅞	..
20¾	18⅛	10	Ga & Ala 5s, 1945.*§	20¾	20¾	20¾	+ ½
32	20	1	Ga, C&N 1st 6s,'34.*§	32	32	32	+ 2
105	104	241	Goodrich 6s, 1945....105		104½	104¾	..
108½	107⅞	20	Do 6½s, 1947 .....108½		108¼	108¼	..

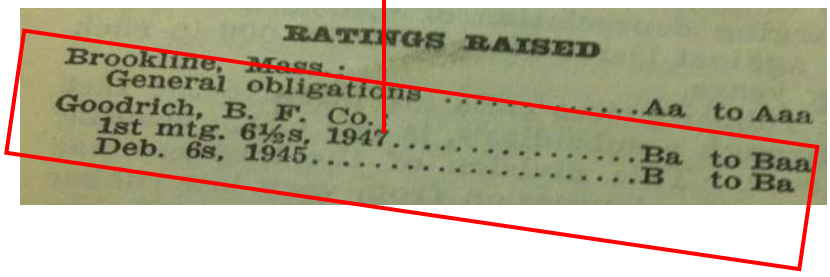
B2. Bond Ratings Collection Example

Company Name	Coupon	Maturity	Class	Date	Rating
GOODRICH (B.F.) CO.	6	1945		6/22/36	Ba
GOODRICH (B.F.) CO.	6.5	1947		6/22/36	Baa



Goodman Manufacturing Company (Ill.)
Goodrich (B. F.) Company (N. Y.)
First 6½s, July 1, 1947, J&J 1 (1) [107]..Baa
Conv. deb. 6s, June 1, 1945, J&D 1 (2) [‡]..Ba
7% cum. preferred ($100) (1)
Common stock (2)
Goodrich (William O.) Company (Wis.)
See Archer-Daniels-Midland Company

Company Name	Coupon	Maturity	Class	Date	Old Rating	New Rating
GOODRICH (B.F.) CO.	6	1945		3/19/34	B	Ba
GOODRICH (B.F.) CO.	6.5	1947		3/19/34	Ba	Baa



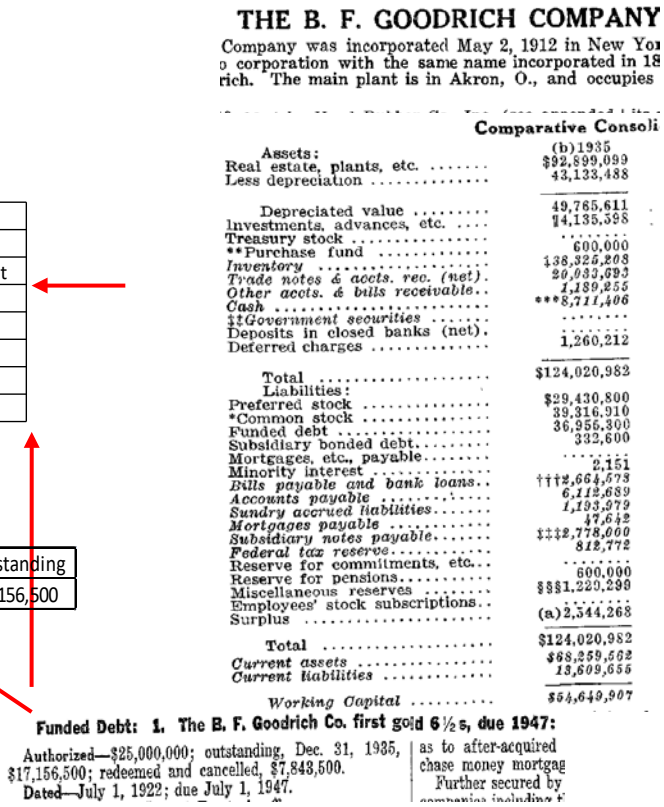
RATINGS RAISED

Brookline, Mass.:
General obligations .....Aa to Aaa
Goodrich, B. F. Co.:
1st mtg. 6½s, 1947.....Ba to Baa
Deb. 6s, 1945.....B to Ba

B3. Balance Sheet Information

Company Name	B.F. Goodrich Co.	B.F. Goodrich Co.
Year	1936	1936
Funded Debt	Funded debt	Subsidiary bonded debt
Funded Debt	36,956,300	332,600
Total Assets	total	
Total Assets	124,020,982	
Fixed Assets	depreciated value	
Fixed Assets	49,765,611	

Company Name	Coupon	Maturity	Class	Date	Outstanding
GOODRICH (B.F.) CO.	6.5	1947		6/22/36	17,156,500



THE B. F. GOODRICH COMPANY

Company was incorporated May 2, 1912 in New Yo
corporation with the same name incorporated in 18
rich. The main plant is in Akron, O., and occupies

Comparative Consoli

	(b)1935
Assets:	
Real estate, plants, etc.	$92,899,099
Less depreciation	43,133,488
Depreciated value	49,765,611
Investments, advances, etc.	¶4,135,598
Treasury stock	.....
**Purchase fund	600,000
Inventory	138,325,208
Trade notes & accts. rec. (net)	20,933,693
Other accts. & bills receivable	1,189,255
Cash	***8,711,406
‡‡Government securities	.....
Deposits in closed banks (net)	.....
Deferred charges	1,260,212
Total	$124,020,982
Liabilities:	
Preferred stock	$29,430,800
*Common stock	39,316,910
Funded debt	36,956,300
Subsidiary bonded debt	332,600
Mortgages, etc., payable	.....
Minority interest	2,151
Bills payable and bank loans	†††2,664,573
Accounts payable	6,112,689
Sundry accrued liabilities	1,193,979
Mortgages payable	47,642
Subsidiary notes payable	‡‡‡2,778,000
Federal tax reserve	812,772
Reserve for commitments, etc.	.....
Reserve for pensions	600,000
Miscellaneous reserves	§§§1,220,290
Employees' stock subscriptions	.....
Surplus	(a)2,544,268
Total	$124,020,982
Current assets	$68,259,562
Current liabilities	13,609,655
Working Capital	$54,649,907

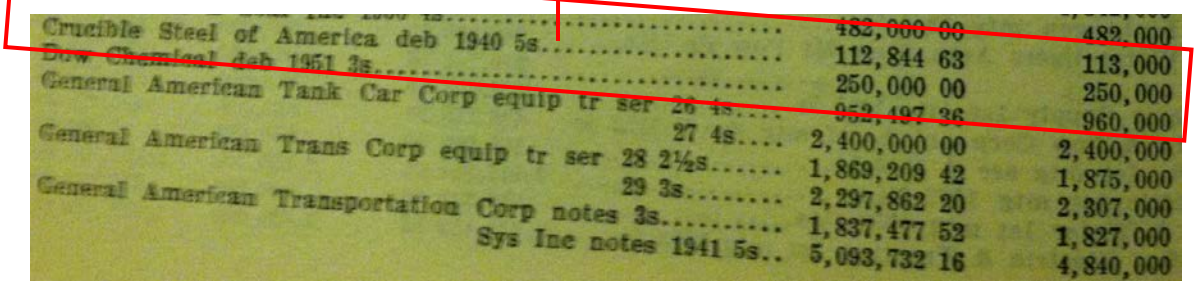
Funded Debt: 1. The B. F. Goodrich Co. first gold 6½s, due 1947:

Authorized—$25,000,000; outstanding, Dec. 31, 1935, $17,156,500; redeemed and cancelled, $7,843,500.
Dated—July 1, 1922; due July 1, 1947.

as to after-acquired
chase money mortgag
Further secured by

B4. Insurance Company Holdings Data

Company Name	Crucible Steel Co of America
Coupon	5
Maturity	1940
Class	deb
Date	12/31/38
Insurance Company	Met Life
Par Held	113,000



Crucible Steel of America deb 1940 5s	112,844 63	113,000
General American Tank Car Corp equip tr ser 26 4s	250,000 00	250,000
27 4s	2,400,000 00	2,400,000
General American Trans Corp equip tr ser 28 2½s	1,869,209 42	1,875,000
29 3s	2,297,862 20	2,307,000
General American Transportation Corp notes 3s	1,837,477 52	1,827,000
Sys Inc notes 1941 5s	5,093,732 16	4,840,000