Firm Value and the Costs of Rating-Contingent Regulation: Evidence from the Establishment of "Investment Grade"

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Abstract

I assess unintended consequences for non-financial firms of rating-contingent regulation, without confounding factors prevalent in modern markets, by examining the 1936 unexpected inception of federal bank investment restrictions for bonds rated below investment grade. Using a difference-in-differences design, I find a persistent rise in speculative bond yields, even comparing bonds within the same firm, and declines in equity value and idiosyncratic volatility for firms reliant on external speculative debt financing. The increase in yields is lower for bonds near investment grade suggesting firms reduce volatility and deviate from otherwise optimal behavior to avoid higher funding costs from the regulation.

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1 Introduction

The aftermath of the recent financial crisis has reinvigorated debate about the reliance of regulators on ratings assigned by credit rating agencies (CRAs). 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". In other words, one potential unintended consequence of rating-contingent regulation is that these regulations could sub-optimally alter the behavior of non-financial firms. In 2010, the Federal Reserve found more than 46 regulations explicitly referencing CRAs and, in response to the broad reliance on rating-contingent regulation, section 939A of the Dodd-Frank Act instructed all federal regulators in July of 2011 "to remove any reference to or requirement of reliance on credit ratings". Despite the strong response of policy makers, when the SEC actually asked investors, issuers, and other market participants in 2008 for feedback about removing credit ratings from regulation they found that 79% opposed removing the rating-contingency of regulation (Baklanova 2009). With proponents on both sides of the debate it would be helpful to examine the empirical evidence, but cleanly identifying the costs to non-financial firms of rating-contingent regulation using modern financial market data is challenging.

In this paper, I exploit a natural historical experiment to assess the unintended effect on non-financial firm value of rating-contingent bank investment restrictions, without confounding factors prevalent in modern markets. 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 grade" by rating agencies. This was the first instance of federal rating-contingent investment restrictions and established the investment grade cut-off. Using a difference-in-differences design where I compare firms who finance themselves with speculative vs. investment grade bonds immediately around the announcement, I find negative cumulative abnormal returns for firms reliant on external speculative debt financing. During the days prior to the announcement there is no evidence of differential trends in the equity returns of these groups or 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 and firms without debt, but that have high equity volatility, reveal no equity price response providing 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 a reduction in firm equity value.

To explore the drivers of this reduction in equity value I then rerun the analysis focusing on secondary market bond prices. I find that bond yields rise for speculative grade relative to investment grade bonds, suggesting an increase in direct 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 a large number of firms had multiple liquid bonds with different ratings[2] I am able to 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 the increase in direct financing costs faced by non-financial firms from rating-contingent regulation that restricts bank investment.

Despite the increase in direct costs of bond financing and fall in firm equity value, it is unclear what happens to overall equity risk, since firms could potentially substitute financial leverage for operational leverage or increase asset volatility through riskier investments, in order to circumvent the regulatory constraints. To test this explicitly I look at the daily absolute equity return deviation as a proxy for equity volatility and firm risk utilizing the same difference-in-differences design. I find that despite the fall in equity value for firms reliant on speculative debt financing and the rise in yields for speculative bonds, which one would normally associate with rising risk, I actually find that firms reliant on speculative financing have persistent reductions in equity volatility following the announcement. This reduction is driven entirely by a reduction in idiosyncratic, not systematic, risk. This is consistent with equity volatility falling because of firm-specific changes in behavior rather than aggregate changes in risk that are coincident with the announcement. In addition to providing additional evidence that the decline in equity and bond prices were unlikely to be driven by an increase in risk, it also suggests that this regulation caused an overall reduction in firm equity risk taking.

It appears that the observed decline in equity risk is driven not only by constraints induced by the regulation, but also firms' endogenous responses to the regulation itself. I find and document anecdotal evidence of the first instance of a U.S. firm near the investment grade cut-off altering the size of its debt issuance in order to pick-up an investment grade rating. This represents an increase in the implicit or indirect financing cost, since the firm reduced the size of its debt issuance, and likely its subsequent

[2] Another nice feature of this time period is that virtually all major corporate bonds were listed on exchanges, traded on secondary markets, and were rated by CRAs so that liquidity in bond markets then were comparable to what they are now and far and above anything that existed for most of the intervening decades (Biais and Green 2007).

investment, rather than facing an increase in the direct cost of financing via promising 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 their overall risk taking more aggressively in order to pick-up an investment grade rating and minimizing the direct costs of financing. The cost to the firms though is likely to be sub-optimal investment behavior that deviates from their pre-regulation, and less constrained, decisions. This behavior is consistent with overall trends which show smaller debt issuance amounts as well as slower overall debt, investment, and asset growth for firms reliant on speculative debt financing. This implicit cost via changes in actual investment risk is also supported by changes in the factor loadings of these firms. Theory tells us that factor loadings are affine functions of leverage, so if all changes in equity volatility are driven by reductions in financial leverage, then we should observe a reduction in all factor loadings. In fact, I find heterogeneity in factor loadings responses inconsistent with an effect driven solely by changes in financial leverage. This suggests that the regulation led not only to a change in the debt issuance of firms, which altered overall equity volatility, but also changes in the underlying asset composition such that the distribution of real asset volatility is altered. These results indicate that rating-contingent regulation leads to increases in indirect, in addition to direct, costs of financing and changes in the underlying firm behavior as these firms attempt to alleviate the costs associated with the regulation.

2 Literature Review/Marginal Contribution

Overall this paper provides three significant contributions to the broad and growing body of work looking at the effect of ratings on investors and issuers. First, to the best of my knowledge, I present the first empirical evidence that rating-contingent investment restrictions reduce firm equity value, not driven by unobservable declines in firm fundamental value. There is an expansive literature looking at how the downgrade of a firm's debt from investment grade to speculative grade alters firm value, but downgrades are also anticipated by the market and endogenously determined by firm risk. It is probably not surprising then that while some studies find that rating downgrades alter firm value (ex. Holthausen and Leftwich 1986, Dichev and Piotroski 2001), Jorion and Zhang (2008) find that after controlling for rating fixed effects there is no larger abnormal return following downgrades at the investment grade barrier than there is for any other downgrade and Vassalou and Xing (2005) find that after adjusting for default risk there is no abnormal equity return following bond downgrades at any level. A number of papers (Faulkender and

Petersen 2006, Kisgen 2006, Tang 2006, Lemmon and Roberts 2009, Sufi 2009, Ellul et al. 2011, Kisgen 2012, Chernenko and Sunderam 2012, Almeida 2017) find evidence that ratings, and in particular attempts to maintain an investment grade rating, can alter debt issuance and investment amounts, but none provide evidence that any reductions in investment reduce firm equity value. The effect on equity value is not obvious from theory since in a frictionless world, such as that presented in Modigliani and Miller (1961), ratings could alter firm decisions about capital structure and investment, but have no effect on overall firm value. In the presence of agency costs (Jensen and Meckling 1976) less debt could increase firm value, while on the other hand, financing constraints could reduce a firm's ability to engage in positive NPV investment opportunities. Lemmon and Roberts (2009) is the only one of those papers to explore the effect on equity value, and if anything they find some weak evidence that a *reduction* in ability to issue debt and invest by firms using speculative debt financing actually *increases* firm equity profitability and has no measurable effect on firm equity value during the late 1980s. While Graham and Harvey (2001) find that CFOs self-report that credit ratings are one of the most important factors they consider when deciding on capital structure, Lemmon and Roberts (2009) suggest their results may actually be driven by agency problems. In contrast, this paper shows evidence that a *reduction* in the ability to issue debt by firms requiring speculative debt financing *reduces* firm equity value. As suggested by Lemmon and Roberts (2009) themselves this difference in findings may come from limited external validity for equity effects in their paper driven by unusual conditions present in bond markets during the time of their study in the late 1980s. They also rely on a matching method between rated and unrated firms and shocks, such as the collapse of Drexel, that occur over multiple years, and may have been anticipated well in advance of the complete collapse. While this methodology has a number of advantages in the majority of the paper, for the minor subsection spent on equity values, it is less clear that the results offer simple casual interpretation given confounding macroeconomic changes concurrent with those shocks, and certainly are unlikely to have the power necessary to run an event study adjusting for risk when looking at equity returns. Perhaps the challenges associated with controlling for changes in investment opportunities or the timing of the shocks for equity markets may also explain why a substantial literature exists looking at how credit ratings alter bond prices and costs of debt financing (Tang 2006, Kisgen and Strahan 2010, Ellul et al. 2011, Chernenko and Sunderam 2012, Almeida 2017), but not the effects on firm equity values. It is challenging to examine changes in secondary market equity values in response to regulations since they are typically anticipated, but the surprise nature of the inception of the 1936 regulation provides another benefit to examining this historical period.

Second, as was just mentioned there is a broad literature looking at the effect of rating changes on bond prices, but this paper is the first to separately identify just the effects driven by rating-contingent

bank investment restrictions. From figure 1a and Kisgen (2006) it is clear that in modern markets firms respond aggressively to well established rating cut-offs, especially investment grade, by avoiding being just below investment grade, but in figure 1b I show that similar behaviors do not appear to be present in the years prior to 1936. This may not be that surprising since at this time investors, not issuers, paid for ratings, the investment grade cut-off had not yet been clearly established, and rating-contingent bond contract triggers were not prevalent. The modern bunching away from the investment grade cut-off presents a problem for many modern empirical studies since a firm that is just above versus just below the cut-off are likely to be very different among unobservables, invalidating regression discontinuity designs. It also means that in modern markets the investment grade cut-off has been well known for over 80 years, so an inability to reach a rating threshold, such as "investment grade", could provide a negative signal about firm management or operations (Kisgen 2006, Opp et al. 2010) which could reduce firm value independently of any credit supply effects. This is amplified by the fact that in modern markets issuers pay for ratings and so an inability to reach a specific rating is more likely than it was historically to convey signals of managerial quality. Even for papers which appear to do an effective job of examining cases were credit rating changes were likely to be orthogonal to firm fundamentals and minimized the likelihood of signaling, changes in ratings are likely to alter equity and debt prices for multiple reasons. For example, even an exogenous shock to ratings, would have difficulty disentangling changes in firm value caused by rating-contingent regulation, from direct increases in borrowing rates caused by explicit rating-contingent triggers pervasive in modern bond covenants[3]. In addition to explicit covenants, debt or executive employment contracts may include implicit provisions that depend on credit ratings, making completely excluding this channel in modern markets unrealistic. In addition, multiple federal agencies during the modern period have had a vast number of regulations tied to credit ratings, such as the 46 regulations explicitly referencing CRAs noted by the Federal Reserve in 2010, which affect access to commercial paper markets, auditing behavior, and capital requirements just to name a few. In addition, investors, customers, and employees are all aware of ratings and it is likely to alter their relationship with the firm. Even the existence of indices based on ratings alters the flow of funds from multiple sources and could prove to be a coordinating mechanism (Boot et al. 2006) that could alter firm value. Understanding what happens to firm asset prices when ratings change in modern markets is critically important and depends on the confluence of these multiple effects. The existing literature looking at bond prices is well suited for that problem. When trying to understand the policy implications of regulation that ties bank investment restrictions to ratings though they do not offer the ability to run the counterfactual for just that

[3] 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.

channel. By taking advantage of this historical event though I am able to separately identify the effect on the costs of financing coming through just this channel.

Finally, as noted previously, there is a significant literature showing that ratings alter investment behavior, but this is the first paper to show that rating-contingent regulation alters a firm's chosen equity and asset volatility. The reduction in equity volatility suggests that firms are not able to bypass rating-contingent regulation by shifting from financial to operational leverage or taking on riskier projects. Instead it appears that firms near the investment grade cut-off reduce their risk taking even more by either reducing their financial leverage or via changes in their operational risk taking, in order to pick-up an investment grade rating and avoid the direct costs of the regulatory restrictions. This is consistent with work by Gormley and Matsa (2016) who show that managers may take on value destroying reductions in firms' risk. This also builds on work by Kisgen (2006) who shows that in modern markets firms alter their capital structure and investment behavior near rating cut-offs in order to improve their ratings. I show the first instance of firm behavior altered in response to rating-contingent regulation, but also that the previously observed changes in capital structure and dollar investment driven by ratings lead to changes in overall equity and asset volatility as well as operational changes in risk taking. It also suggests that for even relatively small changes in investment caused by trying to maintain or improve ratings, for example during a recession, there could be substantial deviations in the overall composition and risk of projects undertaken. This could exacerbate firms' hesitation to engage in positive NPV opportunities during times of distress, which could have important implications for modern macroeconomics.

3 Historical Background

3.1 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[4]. Moody's had also settled on a set of ratings which he would not significantly alter until the 1980s[5], with Aaa

[4] John Moody had also just recently sold the manual business he established in 1900 to Roger Babson and Freeman Putney Jr. following its bankruptcy in the face of the panic of 1907. His original manuals had no ratings, just financial information on firms, so the ratings in his 1909 manual may have been in part an attempt to get around his non-compete agreement with Babson and Putney as much as it was a response to a market demand for a simple rating system for corporate debt.

[5] In the 1980s the ratings were refined to include a "+" and "-" next to each rating category thus effectively doubling the number of rating buckets (Tang 2006).

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 on firms 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[6]. 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)[7].

Though rating agencies were already a large business by the 1920s, they did not become a part of regulation until the 1930s. In the 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. Thus 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.

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[8] in "speculative" securities as indicated by at least 2 (out of 4) rating agency manuals, where speculative was interpreted by Moody's in their weekly release to

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

[7] Harold (1938) even noted that there was trader who was nicknamed "Triple-A James" because he would only buy securities with the highest rating of "Aaa".

[8] It is worth noting that the ruling applied only to the purchase of speculative corporate bonds, not bonds already held on the balance sheet of banks. This is critically important since the passage of this ruling did not require a mass selling of speculative grade bonds on the part of the banks.

constitute all bonds rated "Ba"[9] (or the equivalent for the other rating agencies) or lower[10]. The Securities Tabulation Corporation of New York in response to this ruling released a report showing that about half of all bonds traded on the NYSE would no longer be eligible for purchase by member banks and more than half of all non-NYSE listed bonds would no longer be eligible. 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].

Contemporaneous accounts also began to take note of the effect the regulation had on firm behavior. In particular, the *New York Times* noted just a month after the announcement that a firm 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 still made the offering a month later in April of 1936 but only issued $30 million instead of the original $40 million, but in doing so was able to attain a Baa, or investment grade, rating. It is interesting to note that Jones and Laughlin Steel decided to reduce the size of the bond issue rather than raise the promised yield to attract additional investors. It is reasonable to suppose that the additional $10 million may have been invested in projects that would be beneficial for the equity value of the firm but

[9] Fons (2004) notes that the *American Banker* interpreted the cut-off for investment grade as being bonds rated A or higher, but Moody's over this time period consistently stated that bonds rated Baa or higher were considered investment grade. This matched up with the bonds included in later publications by other firms of "eligible" investment grade securities and even though the specific reference to investment grade ratings were officially removed in 1938 Harold writing in the same year 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". It seems that while the 1931 OCC ruling for fractional write-offs set at Ba or lower may not have unconditionally established the "investment grade" cut-off (which became commonplace to reference only after 1936 (Fons 2004)) or caused bunching by firms, it is plausible that once the OCC made the announcement in 1936 the most recent cut-off, of Baa, was likely to be the most plausible. Inevitably though it is an empirical question though and one where an understanding among the marginal investor that the cut-off was Baa is supported by the results in this paper.

[10] This ruling was quickly extended formally to state member banks as well 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

which were foregone, because of the unobserved counterfactual direct cost of issuing debt designated as "speculative" grade. 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". This appears to also document the first instance of changes in firm behavior in response to the investment grade cut-off and rating-contingent regulations.

3.2 The Importance of Institutional Investors

Just as they do today institutional investors constituted the majority of investors in corporate bonds[12]. 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)

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

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[13] 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 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[14].

3.3 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

[13] 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.

[14] 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.

prices makes it difficult to carry out high frequency analysis of bond price movements looking back even two or three decades[15]. 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)[16]. 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) 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. Therefore in some ways analysis of the current movement of corporate bond prices might have more in common with the 1930s than much more recent history.

4 Data Description

4.1 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 need to 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 are 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[17]. Based on figure 1b there does not appear to be any evidence of bunching above the investment grade cut-off in the years prior to the 1936 OCC announcement which is consistent with the investment grade cut-off not yet being clearly established and the fact that rating-contingent bond contract triggers were not prevalent at this time.

[15] 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)
[16] The New York Curb Exchange was the precursor to the modern American Stock Exchange.
[17] As shown in the paper results are robust to using the highest bond rating instead.

4.2 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.

Since almost all corporate bonds were traded on exchanges in the 1930s transactions on the two major exchanges, the New York Stock Exchange (NYSE) and New York Curb Exchange (NYCE), 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 a number of other periodicals confirmed at least the consistency across periodicals of the quoted values. From these pages I manually collected company names, bond prices, changes, volumes, and descriptions for the time period surrounding the event date. Data was generally collected at a monthly frequency based on week-end data[18], 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, as measured by either median or mean, and conditional on trading bonds at most ratings are fairly liquid.

4.3 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.

[18] 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.

4.4 Insurance Company Portfolio Holdings

Insurance companies were the fastest growing institutional investor class in the 1930s in addition to being one of the most transparent. *The Annual Report of the Superintendent of Insurance of New York State* published every asset held by every insurance company headquartered in that state at the end of year. In addition to legal requirements on the accuracy of the positions there was also a publication at the time called *The Institutional Holdings of Securities* which published and sold the positions of all insurance companies all over the country. Since this book was used by traders to find institutions they could buy bonds from there were strong incentives to have accurate information. Therefore it is comforting to note that all positions cross-checked across all years and books between *Institutional Holdings* and the superintendent match. The other convenient feature of insurance companies at the time was the high concentration of assets in just a few companies. For example, just Metropolitan Life and New York Life held about 1/3rd of all U.S. insurance company holdings. For these two firms I collected every corporate bond held at the end of 1935 and 1937 from the *Annual Report of the Superintendent of Banking*. These bonds were then matched by company and bond information to the other previous bond and firm-level data sources.

4.5 Aggregate Bond Quantity Data

In 1937 the National Bureau of Economic Research (NBER) commissioned a study of the 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 Braddock Hickman continued the work of Harold Fraine's 1937 dissertation and 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.

5 Empirical Predictions and 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. In particular, I look at the period immediately surrounding the February 15th, 1936 OCC announcement and compare secondary market bond and stock prices by either 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[19], 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[20]. In additional robustness exercises I also include in (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

[19] Factor returns are taken from Ken French's website and are based on the factors as defined in Fama and French (1993).

[20] 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.

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.

6 Results

6.1 Equity Market Value

The OCC announced that banks would be restricted from investing in speculative grade debt in a memo sent to banks on Saturday February 15th, 1936[21]. If the news was unexpected we might expect the stock market volume to trade based on the information and volume to spike and that is exactly what we see. In fact, the first full trading day following the announcement on February 17th, 1936 is the largest daily volume on the NYSE in the two years surrounding the date (figure 2) and that week, even excluding the 17th , is the highest trading volume week in that two year period as well. In figure 3 I explore the cumulative abnormal stock returns following the announcement. Since firm ratings are likely to pick up risk differences between firms by definition I am careful throughout the analysis to test the assumption of common trends. One encouraging result is that in figure 3 prior to the announcement there is no clear evidence of statistically significant deviations between the investment and speculative grade firms. Then as we would expect if this was bad news for speculatively financed firms, that week was associated with a sudden statistically significant -4% negative cumulative abnormal return for speculative grade (Ba-C) firms relative to investment grade (Aaa-Baa) firm. The decline in speculative grade (Ba-C) firms is significant whether comparing to investment grade (Aaa-Baa) firms or with the null of 0% cumulative abnormal returns. By contrast investment grade (Aaa-Baa) firms rise slightly after the announcement but the gains are not statistically significant at conventional levels. The fact that I find no evidence of differential trends in the equity returns of these groups and no evidence of significant equity price movements in either direction for firms utilizing investment grade financing in the days preceding or following the announcement provides support for the difference-in-differences design.

The decline in the value of firms requiring speculative financing is confirmed in the results of the panel regression specification 2 shown in table 3. Column 1 estimates a 69 basis point *per day* abnormal return for firms requiring speculative debt financing over the first six days following the event, giving a cumulative decline of 4.1%. Consistent with figure 3 there is no statistically significant change in stock market value for firms able to finance themselves with investment grade debt. In columns 2-6 I show that results are robust to the choice of the method of clustering standard errors, the choice of Fama-French

[21] 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.

factors as a control, and industry x event fixed effects. It seems reasonable to assume that since the event had a large effect on the market overall it might make sense to cluster errors by day to account for time variation in the residual variance. In table 3 columns (2) and (3) we can see that standard errors are robust to firm, day, or no clustering. We also know from Thompson (2010) that since double clustered standard errors are equal to $\hat{V}_{firm} + \hat{V}_{time,0} - \hat{V}_{white,0}$ clustering by firm in this case is a more conservative method than either clustering by time or by both firm and time, so I use that as a baseline for all other specifications. There could also be some concern that the choice of risk-adjustment could be driving results. In table 3 columns (4) and (5) I address this by considering no risk adjustment and using only the market excess return as a factor. In both cases speculative grade firms continue to underperform and the coefficient estimate is within error. There is of course still a concern that there are latent risk factors not being correctly adjusted for, which happen to move coincidentally in the same week as the comptroller ruling. As another robustness check to avoid concerns about industry specific risk news in the week following the announcement[22] I re-run the baseline regression with 2-digit SIC industry dummies interacted with the event fixed effects so that the regression is only looking at return differences between investment grade and speculative grade firms in the week following the announcement within industry. Again speculative grade firms continue to underperform in the following week.

If the results are driven by the OCC announcement and not by unobserved risk differences between investment grade and speculative grade firms then we should expect a difference in returns for firms near the investment grade border who have similar risk profiles, but different ratings. These predictions are consistent with the results we observe in table 4 column 1 and figure 4 where I compare firms just above (Baa) and below (Ba) the investment eligibility criteria. Ba (speculative grade) firms have negative cumulative abnormal returns of ~2% while Baa (investment grade) firms have weakly positive cumulative abnormal returns. The difference between them is statistically significant as is the speculative grade returns relative to the null of 0%. Since all rating differences should contain latent risk information, but only the investment grade barrier should matter for the ruling, I consider a placebo test where I compare buckets within investment grade and within speculative grade to see if they result in statistically significant event returns. In columns (2) and (3) we can see that despite the differences in ratings, and factor loadings we can see in table 1, the event interacted with speculative grade dummies are not significant, while for column (1) which compares just across the investment grade barrier they are significant. We would also expect firms without debt, even with high risk, not to respond to the OCC announcement since they don't use debt financing. In figure 5 and table 5 columns 3 and 4 I run these

[22] For example Monday February 17th, 1936 included the announcement of a Supreme Court case which affected utilities companies.

placebo tests and show that whether we consider all firms without debt or the riskiest quartile of firms without debt, *No Debt High Volatility*, the firms who do not use debt financing do not significantly underperform either investment grade firms or the 0% benchmark following the comptroller announcement[23]. In columns 1 and 2 of table 5 I show that these results are robust to restricting the choice of pre-event period to 2 months before the announcement or using the maximum instead of the minimum rating of all firm debt issues. The results weaken slightly when using the maximum rating, which is not surprising since new bond issues tend to be junior to existing issues and so the minimum rating is likely to be a more plausible measure typically. In columns 5 of table 5 and figures 3-5 I show that these declines are persistent and significant after the announcement, rather than showing signs of mean reversion after the initial decline in stock market value.

As mentioned previously since at this time non-manufacturing firms, and especially those in transportation or utilities industries, were more reliant on external financing I would also expect to see that the decline in firm value is largest among these firms. In fact, in table 6 column 1 I show that all of the decline in firm value following the announcement is being driven by non-manufacturing firms that require speculative financing. Since most non-manufacturing firms were either in the transportation or utilities sector it is not surprising that interacting the event with dummies for being in either of these industries yield similar results. That fact that I find declines in equity market value for firms requiring speculative bond financing following the restriction of bank investment concentrated in industries reliant on external financing again supports the notion that the observed decline in market value is coming from the announcement of this rating-contingent regulation.

6.2 Bond Yields and Direct Costs of Regulation

In the previous section I showed that the equity market value of firms that rely on external speculative debt finance fell following the OCC announcement, but didn't show why. In this section I look at how direct costs in the form of explicit increased borrowing costs, as proxied by secondary market bond yields, changed for speculative grade debt. In tables 7 and 8 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[24]. In column 1 of table 7 I show that in

[23] Results plotting unrated bonds decline following the announcement just like speculative bonds, but even though the magnitude is similar the decline is not statistically significant given the small number of observations. Results are available upon request.

[24] 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 required a balanced panel, but these dramatically

comparison to all investment grade bonds, speculative grade bonds see a statistically significant increase in yield of 0.857%, but in column 2 I use only bonds rated just above investment grade, Baa, as the control group and obtain a slightly larger estimate of a 1.231% (percent not percentage) increase in yields. In either case the results are consistent with an observed increase in the explicit cost of capital for firms funding themselves with speculative debt following the announcement. The specification in column 3 then includes the DEF factor, which is just the average bond returns less the risk-free rate, where loadings are allowed to varying at an issue-level, as well as including bonds only just above and below the investment grade border (those bonds rated Baa or Ba) but obtains virtually identical estimates for the rise in yields estimated in 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 macro-economic shocks occurring at the same time as the OCC announcement. In the case of bonds though we can take the identification strategy a step further than we could with equities. In particular, approximately 10.0% of firms with 15.8% of bond issues have bonds that trade on the same dates with different ratings such that at least one is above and one is below investment grade. In columns 4 and 5 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 we still find that speculative bonds see an average increase in yield of 1.642% following the announcement which is statistical significant at the 10% level. While it is difficult to say much given the limited power, in column 5 I break down the results by rating grade and in this case for bonds further away from the investment grade border there is a 3.864% rise in the yields that is significant at the 1% level. 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 explicit costs of financing rose substantially more for speculative bonds further from the border.

Rerunning this analysis in table 8, but focusing on bond yield levels instead of % changes provides qualitatively similar results, but allows for more straight forward interpretation of the economic magnitudes of the treatment effects. In columns 1 to 3 I show that for specifications mirroring those in table 7 I find that yields on speculative bonds rise 12-25bps because of the OCC announcement. Just as was the case table 7 when I break the treatment effect down by speculative ratings in column 4 of table 7 point estimates remain similar for Ba as in the rest of the table, but I lose significance, and for bonds B and lower the effects rise substantially. In this case the OCC ruling causes a 62bps rise in funding costs

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understate results since most bonds do not trade on a given day causing substantial attenuation in all regression results.

for firms financing themselves with bonds B and lower. In all cases the results suggest substantial increases in direct and explicit funding costs as proxied by a rise of 0.8%-3.9% (percent) in the cost of borrowing, but despite these increases it seems unlikely that by themselves they could explain the 3-5% (percent) decline in overall firm equity value estimated previously. The larger increase in funding costs for bonds further from the border also suggest a role for some indirect costs associated with the regulation that likely influenced firm behavior.

6.3 Equity Return Volatility and Indirect Costs of Regulation

As noted in the previous section it appears that increases in the direct costs of finance are unlikely to be fully responsible for the fall in equity market values following the OCC announcement among firms financing themselves with speculative debt. In particular, it appears that speculative bonds closer to the investment grade border experienced smaller increases in yields. One possible explanation is that in response to the regulation firms may have altered their financing or investment behavior in an attempt to improve their bond ratings and avoid the direct costs of the regulation. In this case firms closer to the border would have smaller changes in observed costs of financing since a larger number actually alter their behavior enough to avoid the rating-contingent regulation entirely. To test this explicitly, in this section I analyze changes in equity volatility using the same methodology employed in the previous sections but where the dependent variable is an estimate of volatility based on the absolute value of daily % stock returns[25]. In table 9 column 1 I find that over the full period from February 15, 1936 to December 31st, 1936 there is a persistent statistically significant average decline of -0.0053 for firms who are likely to finance themselves with speculative debt. To obtain one back of the envelope calculation for the magnitude we can scale the value by $\sqrt{\frac{\pi}{2}}$ 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 over the next 10 months. In column 2 of table 9 I restrict the post period to just through the end of March of 1936[26] and obtain slightly smaller estimates of -0.00365, but which are still significant at the 1% level. The decline in equity volatility is consistent with firms

[25] 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.

[26] Unlike in the case of equity prices I can only estimate volatility in each period, rather than observing a forward looking measure which is why I focus on slightly longer periods following the initial announcement. Qualitative results remain similar throughout and are available upon request. The equivalent forward looking asset would likely be equity option implied volatilities, but high frequency prices are unfortunately not available.

altering their behavior in order to try to avoid the rating-contingent regulation, but also provides additional validity for the results in the previous sections. In particular, we found previously that equity and bond prices fall (equivalent to yields rising) for speculative grade bonds relative to investment grade bonds (or firms using such financing) following the OCC announcement. One concern could be that perceived risk rose discontinuously at the exact same time as the announcement for firms financing themselves with bonds below investment grade, but we show in this section that those same firms not only didn't see a rise in risk, but actually had a decline in their equity volatility following the announcement.

The proposed explanation for the decline in volatility for firms financing themselves with speculative debt is that just like the anecdotal case of Jones and Laughlin Steel presented earlier that some of these firms altered their behavior in an attempt to reduce their risk and avoid the regulation. If the decline in volatility was driven by changes in the risk in a firms industry or the economy as whole though it seems unlikely to be consistent with that narrative. To explore this more thoroughly I decompose daily stock returns in systematic and idiosyncratic components, where the systematic component 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. The more natural interpretation is that the systematic component does not include choice variables, while the idiosyncratic component does. In column 3 of table 9 I rerun the specification in column 2 but focus on just the absolute value of idiosyncratic returns. I obtain a statistical significant decline in idiosyncratic volatility that is nearly identical to the overall decline from column 2. I then rerun the analysis in column 4 but focus on just the systematic component of returns and find a point estimate an order of magnitude smaller that is not statistically significant. These results are consistent with proposed explanation where some firms with speculative grade debt alter their financing or investment behavior in an attempt to reduce their risk and avoid the direct costs of the regulation. In doing so they deviate from otherwise optimal policies and reduced firm value, just like Jones and Laughlin Steel did when they had to forgo some investment opportunities when they reduced their debt issuance size by 25%. This indirect cost of the introduction of rating-contingent regulation that restricted bank investment appears to be substantial in magnitude and could explain some of the large equity value decline seen for firms reliant on speculative debt financing. For completeness in columns 5 and 6 I rerun the analysis

looking at the % change in the absolute value of idiosyncratic component of returns and find that speculative grade firms see a decline of 8.6-9.4% (percent) in this idiosyncratic volatility consistent with the back-of-the envelope estimates obtained earlier. It is also worth noting that volatility point estimates are actually slightly larger, though not significantly so, for firms with speculative bonds rated Ba relative to those B and lower. Combining this with the smaller yield increase among these bonds again suggests for some of these firms the reduction in volatility is sufficient to adjust their rating to investment grade, just as Jones and Laughlin Steel did, thus avoiding explicit increases in the cost of their debt, but still suffering from the suboptimal financing or operational behavior that let them reduce their risk.

While it would nice to use accounting data to cleanly estimate exactly how firms reduced their equity volatility, unfortunately the frequency of data observation becomes annual instead of daily and clean identification is not feasible given the data limitations. It is still a useful exercise to explore the data, imperfect as it is, and see how it aligns with the more cleanly identified results using secondary market prices. In figure 6 I show that insurance companies slowly moved into Ba bonds to replace banks who left the market, but contemporaneous accounts suggest they were only able to slowly and imperfectly move into the speculative bond space. Consistent with this prediction I show in figure 7a 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 7b and 8 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 it is consistent with firms initially only able to issue speculative grade reducing their issuance sizes in order to avoid the rating-contingent regulation. Investment grade bonds average issuance size increased after the ruling, with 3 out of the 4 increasing more than 75% , while speculative grade firms on average experienced much smaller growth and Ba bonds even decreased in size. The Hickman (1957) data doesn't have sufficient information on standard deviation to allow for a formal test of this difference, but based on the standard deviation in the sub-sample of issuances I hand collected shown in table A1, a difference-in-differences in the Hickman data would be statistically significant at conventional levels. In table A2 I show additional evidence consistent with real long-term cost to firms requiring speculative financing, since even controlling for firm and industry fixed effects following the ruling, firms requiring speculative financing experience slower growth rates of book debt, assets, and investment. Based on table A2 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. Since in column 4 we see no change in the book debt to total assets ratio it suggests that the entire reduction in relative investment and asset growth can be explained by the fall in long-term debt financing. This large decline in long-term credit

supply is consistent with previous results shown in Lemmon and Roberts (2009) and Chernenko and Sunderam (2012), and when combined with the more formal analysis of secondary market prices are 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 macro-economic environment in the years following the ruling. To marginally reduce this concern I rerun the analysis in table A3 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[27]. 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.

Another approach to explore evidence of changes in real effects and operational risk taking, instead of just financial leverage, is to examine how equity return factor loadings changed after the announcement. If operational risk taking is held constant then asset volatility shouldn't change. Since equity factor loadings are affine functions of financial leverage, a change in financial leverage that does not also because a change in operational risk, will leave asset volatility constant, and should lead to a proportional change in all equity factor loadings. In table 10, I explore the validity of this assumption by examining the change in factor loadings on the Fama-French factors using pooled regressions interacted with a dummy variable equal to 1 if the firm is dependent on speculative debt financing and if the period is after the announcement. As was noted previously in table 1 speculative firms have positive factor loadings on all three factors, with market factor, HML, and SMB loadings of 1.112, 0.825, and 0.996 respectively. From column 2 we see that the announcement is associated with statistically significant reductions of 28.6% and 21.6% in the loadings on HML and SMB respectively, which are consistent with substantial declines in risk taking coming from a reduction in financial leverage. On the other hand, the reduction in the market factor loading is statistical insignificant, the point estimate is a decline of only 2.1%, and the differential decline is statistically significantly different from the HML and SMB reductions. A similar lack of a statistically significant decline in market factor loading is shown in column 1, when the other factors are excluding, suggesting it is not driven by their inclusion. Heterogeneity in the reduction in factor loading suggests that the overall reduction in equity volatility is driven not only by a

[27] 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 significant in this specification. This is especially true since results in columns 3 of tables 10 and table 11 are no statistically different from each other and asset growth, of which PP&E is the largest component still has a statistically significant decline.

decline in financial leverage, but also a change in the composition of operational risk undertaken, which alters the composition among the risk factors. In other words this suggests that not only did the announcement alter the amount of financial leverage taken on by firms, but also, likely sub-optimally, alter the composition of the type of projects undertaken with a shift towards more relative exposure to overall market risk and less related to HML and SMB.

7 Conclusion

Overall this paper provides the first causal empirical evidence that rating-contingent regulation reduces equity prices, is able to disentangle the effect on firm value of bank investment restrictions driven by these ratings, from other effects of rating changes in modern studies, and demonstrates that this regulation leads to changes in firm risk taking in the form of changes in equity and asset volatility overall and compositionally. To explore the direct and indirect costs to non-financial firms of rating-contingent regulations intended to restrict bank investments. I use a difference-in-differences design in the period directly around the unexpected announcement of the establishment of rating-contingent regulation at the investment grade cut-off on February 15th, 1936. By exploring the inception of rating-contingent regulation in the 1930s I am able to avoid many of the empirical challenges faced by modern researchers. Prior to the 1936 announcement investors, not issuers, paid for ratings, rating-contingent covenants were not prevalent, and there is no evidence of the bunching that is evident in modern ratings distributions that can confound clean empirical analysis. I am also able to highlight direct and indirect costs of rating-contingent regulation that restricts bank investment.

I compare equity prices, bond yields, and equity volatility for speculative vs investment grade bonds, or firms financing themselves with bonds of this grade, before and after the announcement. I find that the announcement reduces equity prices and raises yields, but reduces equity return volatility for firms reliant on speculative bond financing. Control and treatment groups experience parallel trends in days leading up to the announcement and the control group shows no difference from zero in the response following the announcement, lending credibility to the research design. Results are robust to controlling for a number of standard risk factors, and placebo tests with bonds of different ratings, but in equivalent investment or speculative groups, or among high risk firms without debt show no results. For bond yields I am able to compare bonds within the same firm, but with different ratings, and still find a rise in funding costs for speculative debt. Using this identification strategy I also find that direct increases in the costs of financing, in the form of higher yields, are smaller for bonds near the investment grade cut-off. Since I show that the equity volatility declines are caused by declines in idiosyncratic volatility these results are

consistent with additional indirect costs of the regulation. Since regulatory costs are rating-contingent, firms alter behavior from what would otherwise be optimal, reducing firm value relative to the world without the rating-contingent regulation, in an attempt to avoid the direct costs of the policy. The result is that many firms with bonds near the cut-off are able to avoid the direct costs of the regulation by altering their behavior in a way that reveals itself in reduced equity volatility, but still face indirect costs from deviating from their otherwise optimal policy. This result is also consistent with anecdotal evidence of a firm that reduced the size of its debt issuance in order to pick-up an investment grade rating and slower overall debt, asset, and investment growth in subsequent years for firms relying on external speculative debt financing. It is also supported by evidence of differential changes in equity return factor loadings suggesting operational changes in the choice of investment risk composition.

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 test of the Volcker Rule but results are largely consistent with a relatively significant direct cost for non-financial firms of exclusion of bank participation and complements a growing literature highlighting the importance of banks specifically in speculative corporate debt markets. Just as importantly I show that firms are aware of these direct costs and willing to take serious measures 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 indirect costs from the endogenous response of firms should be an important consideration in any policy meant to improve risk management and monitoring. While the direct costs could result in higher funding costs for these firms, the indirect costs could result in substantial changes in their financing and/or investing behavior. 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 these direct and indirect costs of rating-contingent regulation play in local and in general equilibrium should be an important area of future exploration for policy makers and academic researchers alike.

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Figure 1a. S&P Long-Term Credit Ratings Distribution 1981-2012

This figure shows the distribution of the 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- and the black solid line is the two bucket moving average of the distribution indicated with the red bars for above and below investment grade separately.

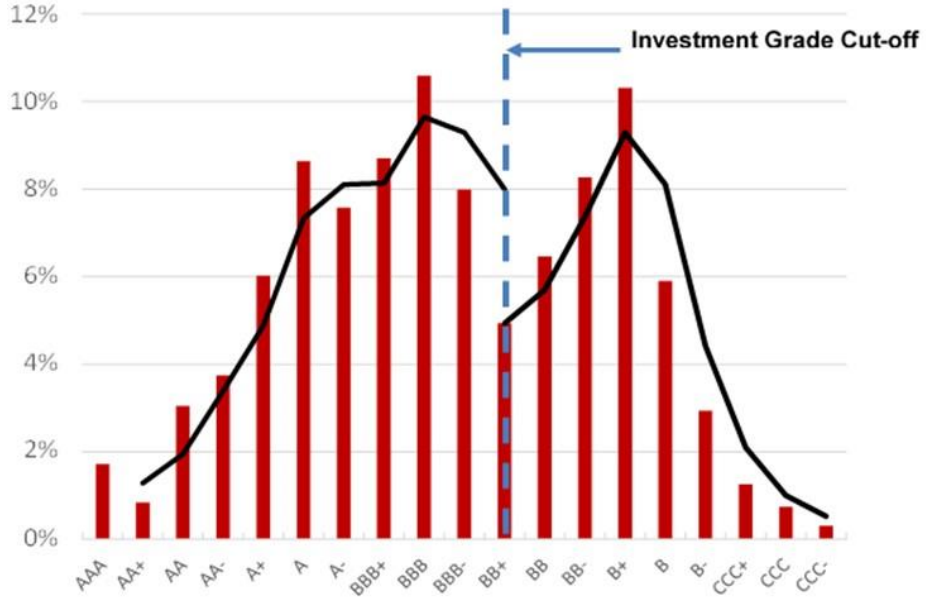


Figure 1b. Moody's Bond Rating Distribution for 1932-1935

This is 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.

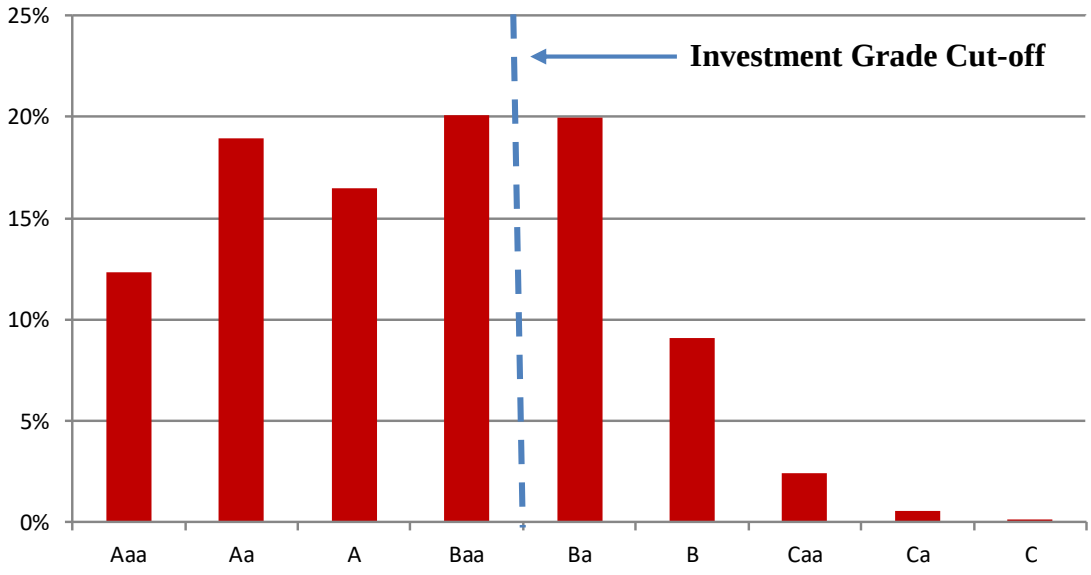
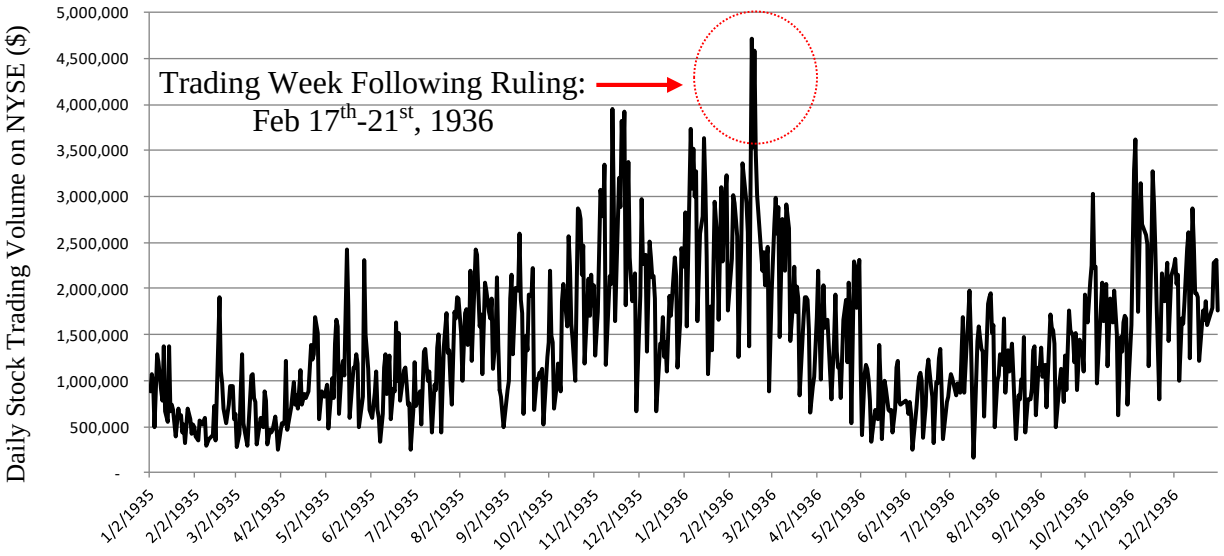


Figure 2. NYSE Daily Stock Volume ($) 1935 and 1936

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.



Summary Statistics for NYSE Daily Stock Volume ($) 1935-1936

Mean	1,455,619	
Median	1,310,660	
Stdev	793,323	**Date**
Max	4,718,448	2/17/1936
2nd Highest	4,578,280	2/19/1936

Figure 3. Cumulative Abnormal Stock Returns: Investment (Aaa-Baa) vs Speculative (Ba-C) Grade

These figures display the mean cumulative abnormal returns and t-statistic from the residual of the 3-Fama French factor regression shown in equation (1), but run at a firm level in the time period surrounding the ruling by the Office of the Comptroller of the Currency (OCC) restricting bank investment to bonds rated at least Baa or higher (aka "investment" grade). Standard errors are clustered at the day level and within each investment grade group. 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 bonds rated C or higher by Moody's Investor Services in 1935 are included in the analysis. 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. Mean of Cumulative Abnormal Stock Returns by Bond Grade

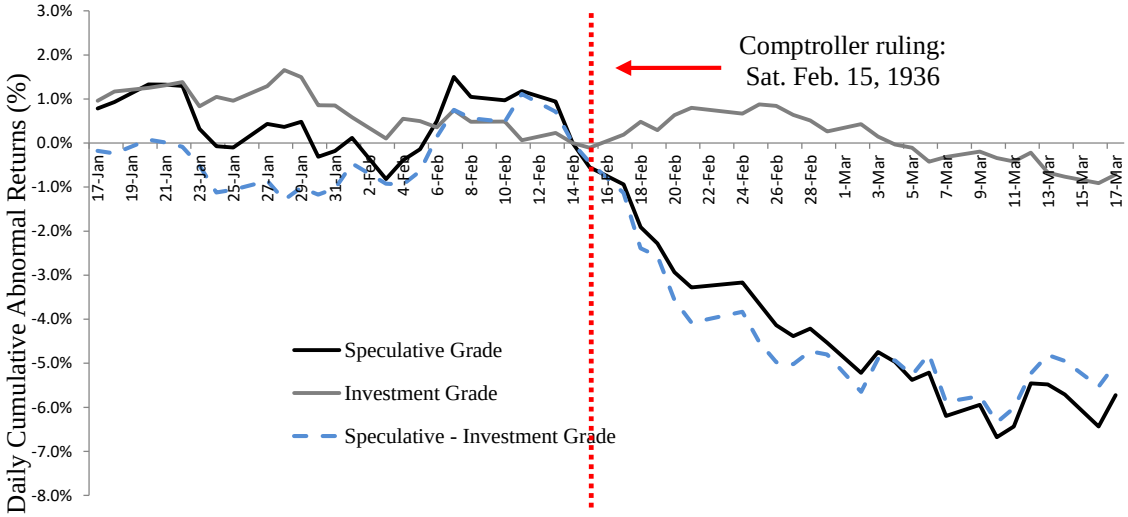


Figure 3b. T-Statistic of Cumulative Abnormal Stock Returns by Bond Grade

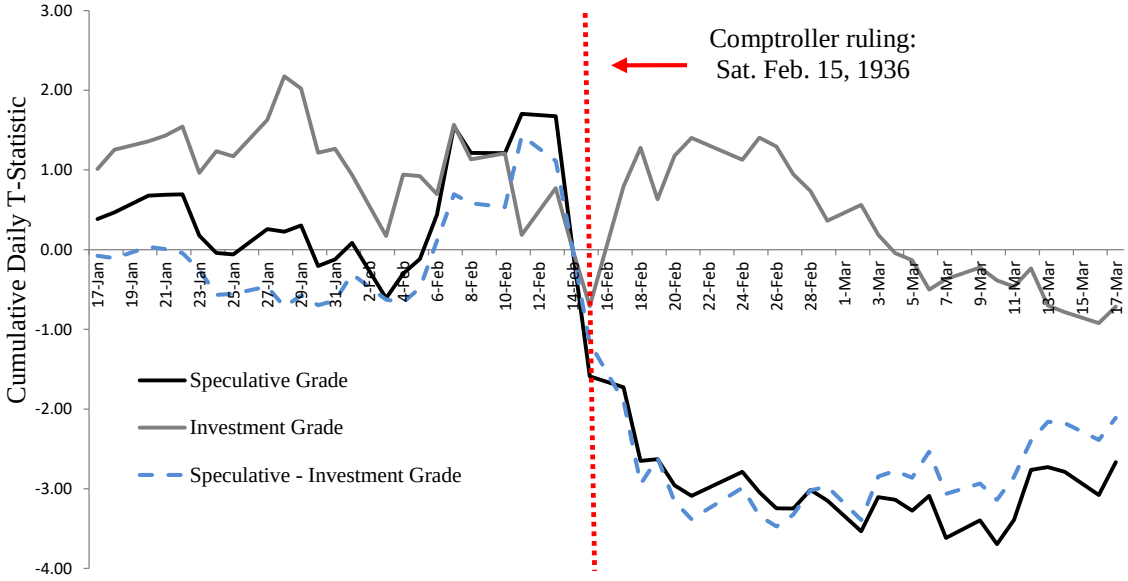


Figure 4. Cumulative Abnormal Stock Returns: Investment (Baa) vs Speculative (Ba) Grade

These figures display the mean cumulative abnormal returns and t-statistic from the residual of the 3-Fama French factor regression shown in equation (1), but run at a firm level in the time period surrounding the ruling by the Office of the Comptroller of the Currency (OCC) restricting bank investment to bonds rated at least Baa or higher (aka "investment" grade). Standard errors are clustered at the day level and within each investment grade group. 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 bonds rated either Baa or Ba by Moody's Investor Services in 1935 are included in the analysis. 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 4a. Mean of Cumulative Abnormal Stock Returns by Bond Grade

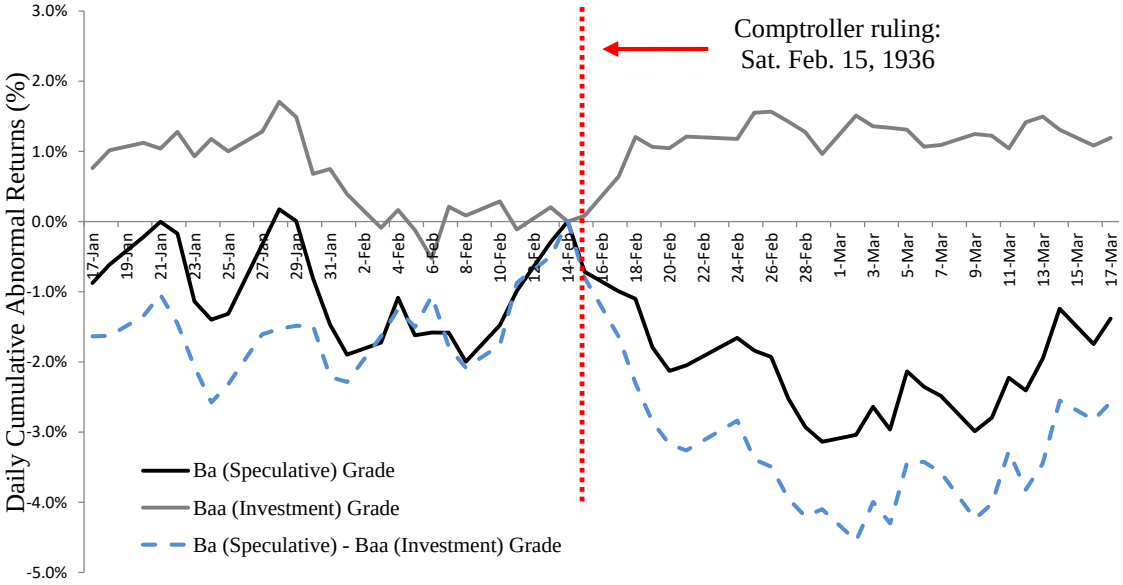


Figure 4b. T-Statistic of Cumulative Abnormal Stock Returns by Bond Grade

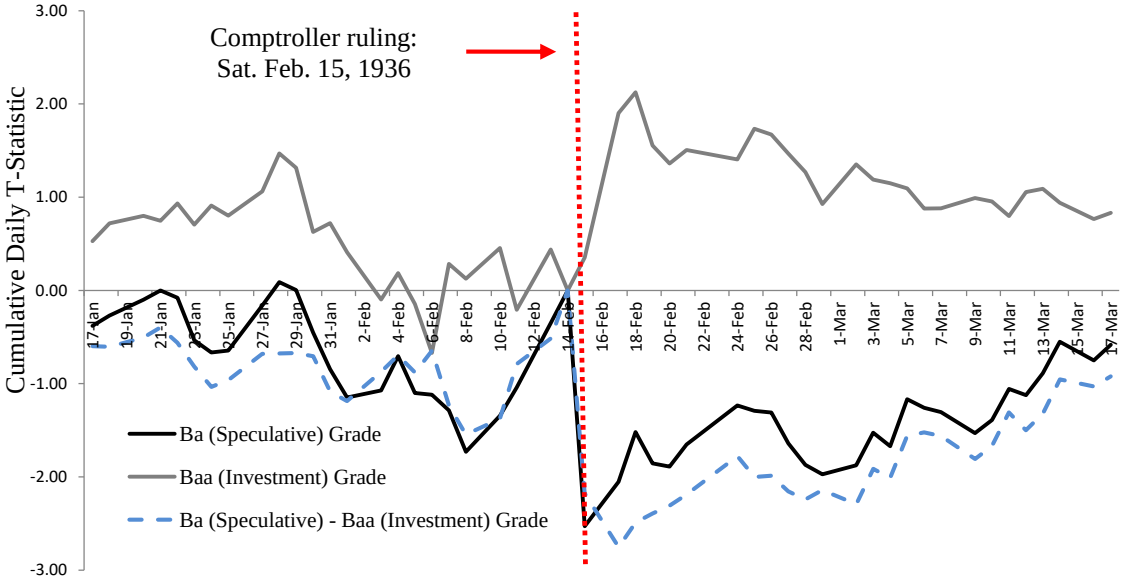


Figure 5. Cumulative Abnormal Stock Returns: No Debt Firms as Control

These figures display the mean cumulative abnormal returns and t-statistic from the residual of the 3-Fama French factor regression shown in equation (1), but run at a firm level in the time period surrounding the ruling by the Office of the Comptroller of the Currency (OCC) restricting bank investment to bonds rated at least Baa or higher (aka "investment" grade). 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. Standard errors are clustered at the day level and within each investment grade group. 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 bonds rated C or higher by Moody's Investor Services in 1935 are included in the analysis. 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 5a. Mean of Cumulative Abnormal Stock Returns by Bond Grade

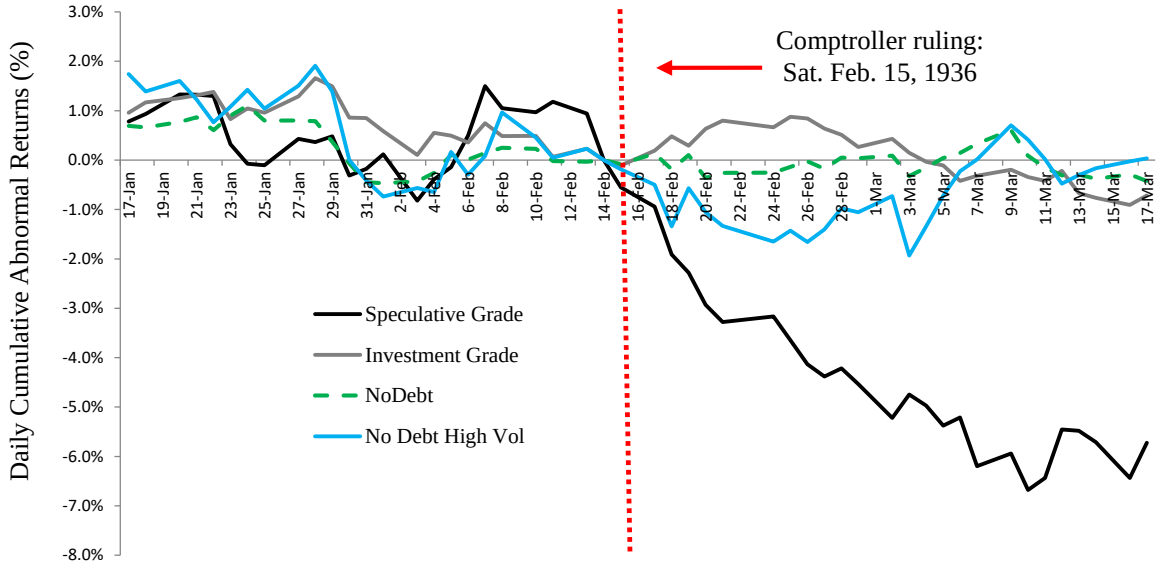


Figure 5b. T-Statistic of Cumulative Abnormal Stock Returns by Bond Grade

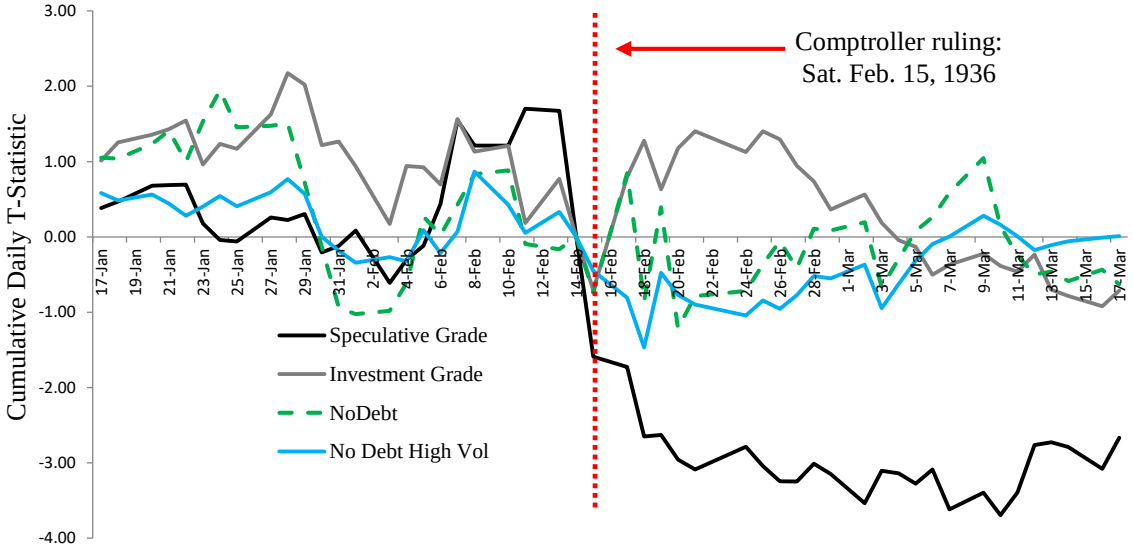


Figure 6. %Δ Met and New York Life Holdings 1935-1937 by Rating Type

This plots for domestic corporate railroad bonds with the same rating in 1935 and 1937 the % change in holdings in those bonds by Metropolitan Life Insurance Company and New York Life Insurance Company (the two largest insurance company in the early 20th century) between Dec 31st, 1935 and Dec 31st, 1937 as reported in the *Annual Report of the Superintendent of Insurance for the State of New York*. All bond ratings from Moody's Investors Services and are collected from the 1935 *Moody's Industrial Manual, Moody's Transportation Manual,* and *Moody's Utilities Manual*. These two companies accounted for 1/3rd of all insurance company holdings nationwide at the time.

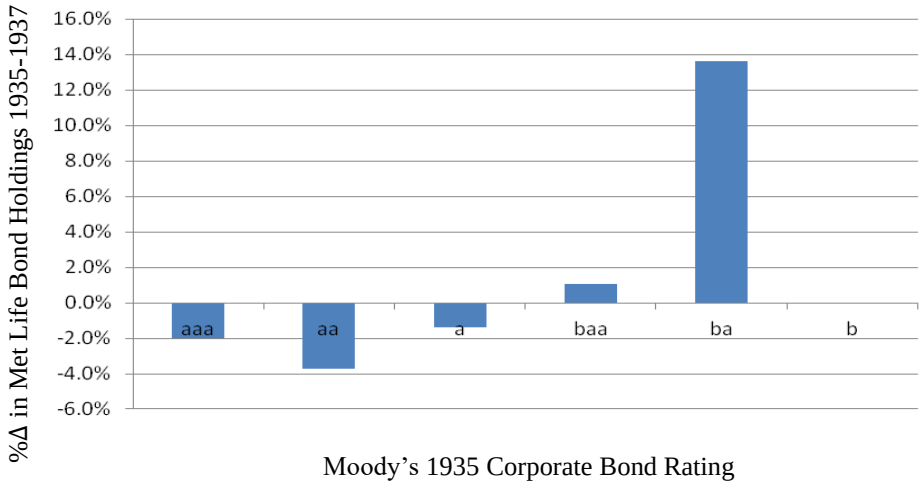


Figure 7. Cumulative New Bond Offerings by Initial Rating 1930-1940

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 11a shows the results in dollars while 11b shows the raw number of new corporate bond issues by rating grade.

Figure 7a. Cumulative New Bond Offerings ($)

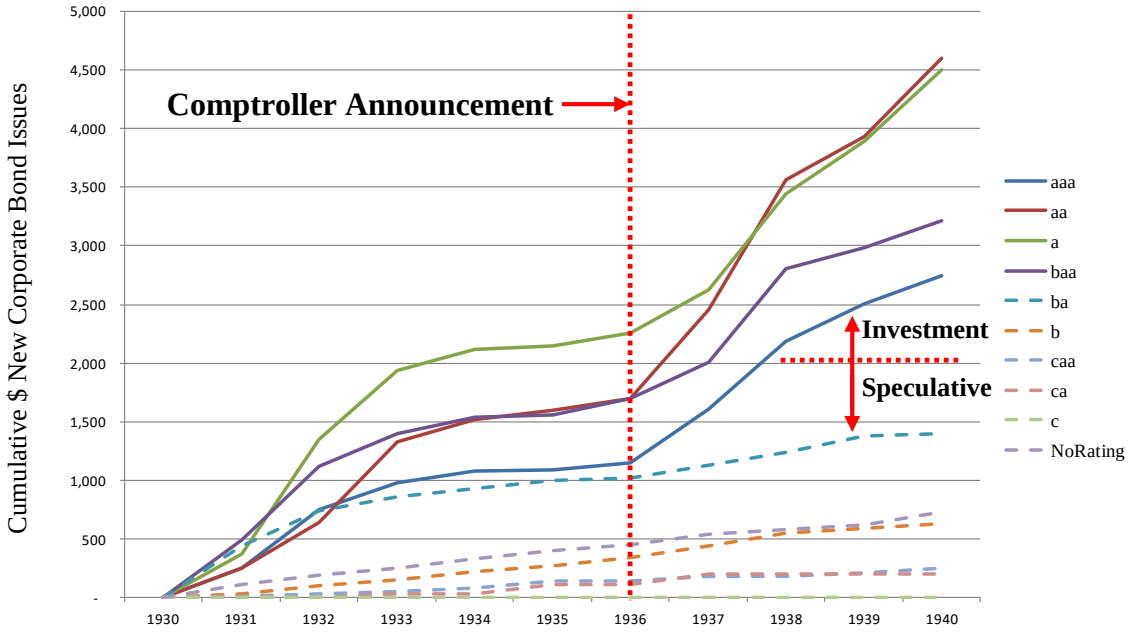


Figure 7b. Cumulative New Bond Offerings (#)

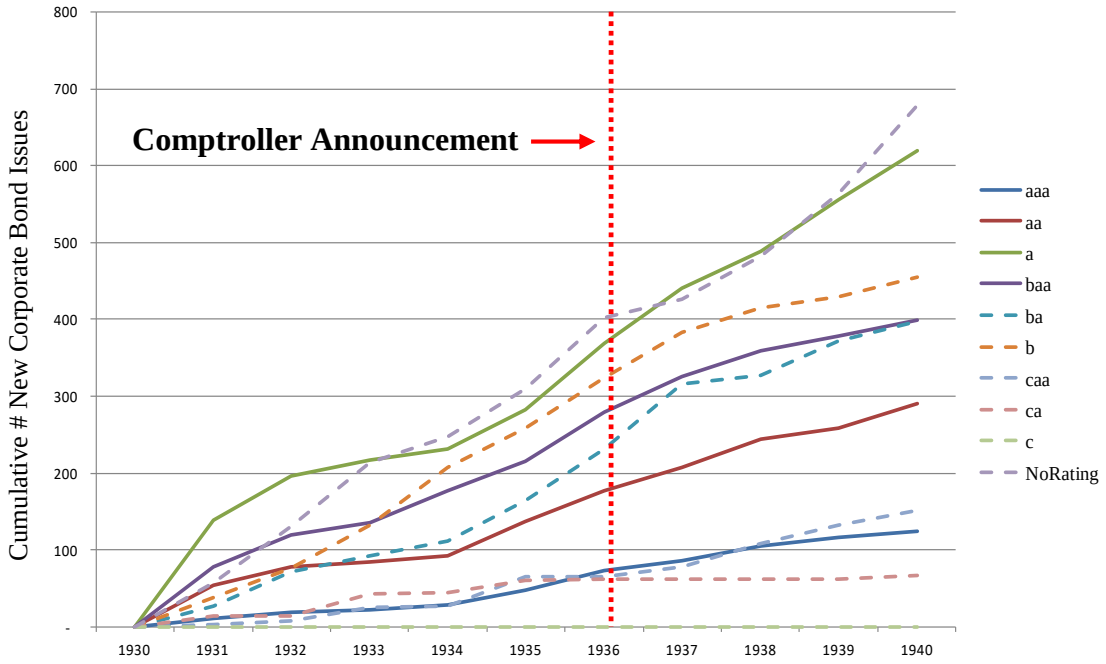
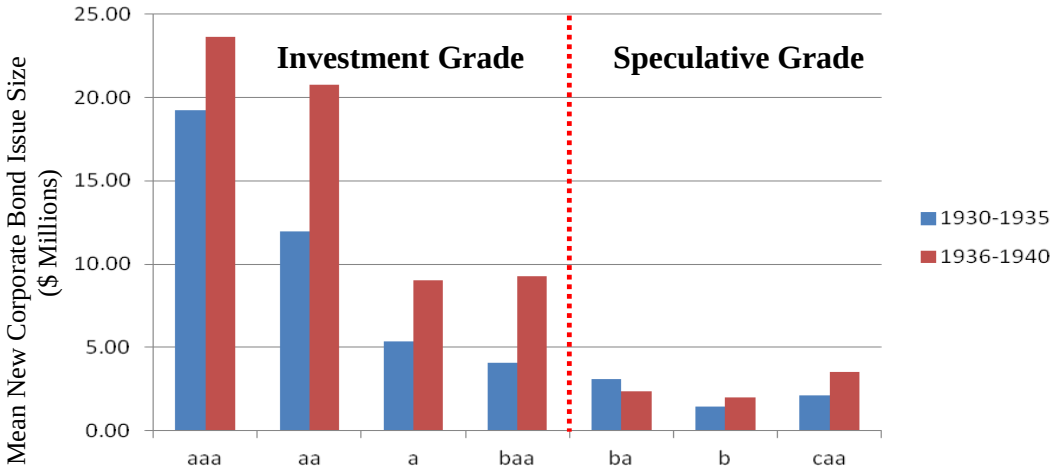


Figure 8. Average Issuance Size by Initial Rating 1930-1940

This plots the mean size ($ millions) of new offerings by initial rating as taken from the tables in Hickman (1957) with speculative grades denoted by dashed lines for 1930-1935 and 1936-1940. The table directly below shows the numeric values used in the table



	aaa	aa	a	baa	ba	b	caa
1930-1935	19.26	11.98	5.37	4.05	3.09	1.42	2.11
1936-1940	23.61	20.78	9.00	9.26	2.38	1.96	3.55
Change	4.35	8.79	3.63	5.20	-0.71	0.54	1.43

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. Difference-in-differences Excess Stock Returns for Firms with Speculative Grade Debt

In this table regression specification (2) is run on daily excess stock returns 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). 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 from February 15, 1936- February 21, 1936. Specification (2) is the panel regression specified in equation 2 which allows for different factors loadings on the 3 Fama-French factors for every firm. All firms with bonds rated C or higher by Moody's Investor Services in 1935 are included in the analysis. 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*. Column (1) is the baseline results comparing stock returns of investment grade vs speculative grade firms following the comptroller ruling with standard errors clustered at the firm level. Column (2) clusters standard errors at the day level. Column (3) has no clustering of errors. Column (4) drops all factor controls. Column (5) uses the market excess return as the only factor. Standard errors reported in parentheses. Column (6) reruns the baseline regression in Table 3 column (1) but also includes 2-digit SIC code interacted with event fixed effects. P-Values: * 10%; ** 5%; ***1%.

Dependent Variable: Excess Stock Returns	Baseline (1)	Day Cluster (2)	No Cluster (3)	No Factors (4)	1 Factor (5)	Industry Controls (6)
Event x Speculative Dummy	-0.0069***	-0.0069***	-0.0069***	-0.0059***	-0.0043**	-0.0103***
	(0.0019)	(0.0015)	(0.0020)	(0.0019)	(0.0021)	(0.0020)
Event	0.0013	0.0013	0.0013	0.0018*	0.0002	0.0071***
	(0.0011)	(0.0016)	(0.0009)	(0.0011)	(0.0012)	(0.0010)
Constant	0.0011***	0.0011***	0.0011***	0.003***	0.0011***	0.0011***
	(0.00001)	(0.00023)	(0.00021)	(0.00001)	(0.00002)	(0.00021)
"Investment" Grade	Aaa-Baa	Aaa-Baa	Aaa-Baa	Aaa-Baa	Aaa-Baa	Aaa-Baa
"Speculative" Grade	Ba-C	Ba-C	Ba-C	Ba-C	Ba-C	Ba-C
Estimation Window	1/1/35-2/21/36	1/1/35-2/21/36	1/1/35-2/21/36	1/1/35-2/21/36	1/1/35-2/21/36	1/1/35-2/21/36
Event Window ('36)	2/15-2/21	2/15-2/21	2/15-2/21	2/15-2/21	2/15-2/21	2/15-2/21
Event Days	[0,5]	[0,5]	[0,5]	[0,5]	[0,5]	[0,5]
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Mkt-Rf	Yes	Yes	Yes	No	Yes	Yes
SMB	Yes	Yes	Yes	No	No	Yes
HML	Yes	Yes	Yes	No	No	Yes
Event x Industry FEs	No	No	No	No	No	Yes
Firm Bond Rating	Minimum	Minimum	Minimum	Minimum	Minimum	Minimum
Clustered Errors	Firm	Day	None	Firm	Firm	Firm
Observations	70,867	70,867	70,867	70,867	33,136	70,867
Adj. R-squared	0.09	0.09	0.09	0.000	0.07	0.09

Table 4. Stock Returns Difference-in-differences Validation

In this table regression specification (2) is run on daily excess stock returns 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). This table focuses on testing the discontinuity at the investment grade (Baa vs Ba) border. Specification (2) is the panel regression specified in equation 2 which allows for different factors loadings on the 3 Fama-French factors for every firm. All bonds rated C or higher by Moody's Investor Services in 1935 are included in the analysis (unless otherwise specified). 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*. Column (1) computes the difference between Baa and Ba firms. Column (2) compares Aaa-A vs Baa firms. Column (3) compares Ba vs B-C firms. Standard errors reported in parentheses. P-Values: * 10%; ** 5%; ***1%.

Dependent Variable:	Cut-off 1	Cut-off 2	Cut-off 3	Cut-off 4
Excess Stock Returns	(1)	(2)	(3)	(4)
Event x Speculative Dummy	-0.0055***	0.0019	-0.0036	-0.0098***
	(0.0026)	(0.0022)	(0.0031)	(0.0027)
Event	0.0021	0.00015	-0.0035	0.0013
	(0.0015)	(0.0016)	(0.0022)	(0.0011)
Constant	0.0002***	0.00011***	0.0019***	0.0006***
	(0.00002)	(0.00001)	(0.00003)	(0.00001)
"Investment" Grade	Baa	Aaa-A	Ba	Aaa-Baa
"Speculative" Grade	Ba	Baa	B-C	B
Estimation Window	1/1/35-2/21/36	1/1/35-2/21/36	1/1/35-2/21/36	1/1/35-2/21/36
Event Window ('36)	2/15-2/21	2/15-2/21	2/15-2/21	2/15-2/21
Event Days	[0,5]	[0,5]	[0,5]	[0,5]
Firm FE	Yes	Yes	Yes	Yes
Mkt-Rf	Yes	Yes	Yes	Yes
SMB	Yes	Yes	Yes	Yes
HML	Yes	Yes	Yes	Yes
Event x Industry FEs	No	No	No	No
Firm Bond Rating	Minimum	Minimum	Minimum	Minimum
Clustered Errors	Firm	Firm	Firm	Firm
Observations	33,136	33,080	37,787	47,521
Adj. R-squared	0.18	0.23	0.07	0.12

Table 5. Excess Stock Returns Event Study - Robustness Tests

In this table regression specification (2) is run on daily excess stock returns 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). Robustness checks of results in Table 3. Specification (2) is the panel regression specified in equation 2 which allows for different factors loadings on the 3 Fama-French factors for every firm. 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*. Column (1) shortens the estimation period to include only as far back as 3 months prior to the announcement. All interactions are included and are available upon request. Column (2) uses the maximum rating of any bond as the firm rating instead of the minimum. Column (3) compares firms with no debt vs those with Aaa-Baa rating. Column (4) compares firms with no debt but the highest quartile by volatility vs Aaa-Baa rated firms. Column (5) alters the event window to include 10 days straddling the comptrollers ruling. Standard errors reported in parentheses. P-Values: * 10%; ** 5%; ***1%.

Dependent Variable:	Est. Window	Max Rating	No Debt All	No Debt Hi Volatility	10-Day Window
Excess Stock Returns	(1)	(2)	(3)	(4)	(5)
Event x Speculative Dummy	-0.0082***	-0.0046**	0.0017	-0.0034	-0.0048***
	(0.0021)	(0.0021)	(0.0012)	(0.0022)	(0.0015)
Event	0.0013	-0.0006	-0.0004	0.0013	0.00022
	(0.0011)	(0.0012)	(0.0006)	(0.0011)	(0.0007)
Constant	0.0018***	0.0011***	0.0004***	0.0010***	0.0011***
	(0.00007)	(0.0002)	(0.000001)	(0.00002)	(0.0002)
"Investment" Grade	Aaa-Baa	Aaa-Baa	Aaa-Baa	Aaa-Baa	Aaa-Baa
"Speculative" Grade	Ba-C	Ba-C	No Debt All	No Debt Hi Vol	Ba-C
Estimation Window	11/21/35-2/21/36	1/1/35-2/21/36	1/1/35-2/21/36	1/1/35-2/21/36	1/1/35-2/21/36
Event Window ('36)	2/15-2/21	2/15-2/21	2/15-2/21	2/15-2/21	2/10-2/21
Event Days	[0,5]	[0,5]	[0,5]	[0,5]	[-4,5]
Firm FE	Yes	Yes	Yes	Yes	Yes
Mkt-Rf	Yes	Yes	Yes	Yes	Yes
SMB	Yes	Yes	Yes	Yes	Yes
HML	Yes	Yes	Yes	Yes	Yes
Event x Industry FEs	No	No	No	No	No
Firm Bond Rating	Minimum	Maximum	Minimum	Minimum	Minimum
Clustered Errors	Firm	Firm	Firm	Firm	Firm
Observations	19,065	70,867	172,429	69,214	70,867
Adj. R-squared	0.10	0.09	0.11	0.08	0.09

Table 6. Heterogeneity in Effects for Firms Reliant on External Financing

In this table regression specification (2) is run on daily excess stock returns 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). Specification (2) is the panel regression specified in equation 2 which allows for different factors loadings on the 3 Fama-French factors for every firm. This table focuses on how firm's equity value responded heterogeneously to the announcement based on how dependent the firm is on external financing. 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*. 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. All interactions are included in the specification and are available upon request. 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. Standard errors reported in parentheses and clustered at the firm level. 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 Dummy	0.24	-0.36*	-0.40*	-0.32
	(0.30)	(0.21)	(0.22)	(0.22)
Event x Speculative Dummy	-1.21***	-1.23***	-1.18**	-0.86**
x External Finance Dependent	(0.39)	(0.50)	(0.54)	(0.44)
Event	-0.23	-0.12	-0.12	0.00
	(0.16)	(0.11)	(0.11)	(0.12)
Constant	0.06**	0.01	0.01	0.00
	(0.03)	(0.02)	(0.02)	(0.02)
External Finance Measure	Not Mfg.	RR&Transit	RR	Trans/Utils
Firm FE	Yes	Yes	Yes	Yes
Mkt-Rf	Yes	Yes	Yes	Yes
SMB	Yes	Yes	Yes	Yes
HML	Yes	Yes	Yes	Yes
Observations	71,192	71,192	71,192	71,192
Adj. R-squared	0.066	0.066	0.066	0.066

Table 7. Effects of Regulation on %ΔBond Yields for Investment vs. Speculative Grade Corporate Bonds

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 Baa or worse in the regression. Column (3) is the same as 2 but includes only bonds rated Ba or Baa in the regression. Column (4) 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 (5) 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. Standard errors clustered at the issuance level are reported in parentheses. P-Values: * 10%; ** 5%; ***1%.

Dependent Variable:	%ΔBond Yield (1)	%ΔBond Yield (2)	%ΔBond Yield (3)	%ΔBond Yield (4)	%ΔBond Yield (5)
Event x Speculative Dummy	0.857**	1.231***	1.239**	1.642*	
	(0.446)	(0.499)	(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***	-1.49***	-0.138	-9.574***	-8.925***
	(0.326)	(0.397)	(0.576)	(0.987)	(0.397)
Constant	-1.656***	-2.289***	-0.835***	-0.812***	-0.871***
	(0.106)	(0.108)	(0.143)	(0.142)	(0.162)
"Investment" Grade	Aaa-Baa	Baa	Baa	Aaa-Baa	Aaa-Baa
"Speculative" Grade	Ba-C	Ba-C	Ba	Ba-C	N/A
Estimation Window	2/4/36-2/21/36	2/4/36-2/21/36	2/4/36-2/21/36	2/4/36-2/21/36	2/4/36-2/21/36
Event Window ('36)	2/15-2/21	2/15-2/21	2/15-2/21	2/15-2/21	2/15-2/21
Issue FEs	Yes	Yes	Yes	Yes	Yes
DEF Factor	No	No	Yes	Yes	Yes
Issuer x Event FEs	No	No	No	Yes	Yes
Observations	5,696	3,706	2,840	1,085	1,085
Adj. R-squared	0.265	0.332	0.409	0.795	0.796

Table 8. Effects of Regulation on ΔBond Yields for Investment vs. Speculative Grade Bonds

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 issuance 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 Dummy	0.00214**	0.00120**	0.00254*	
	(0.00099)	(0.00058)	(0.00135)	
Event x Ba Dummy				0.00147
				(0.00101)
Event x B and lower Dummy				0.00622**
				(0.00274)
Event	-0.00149*	-0.00021	-0.00855***	-0.00748***
	(0.00081)	(0.00485)	(0.00134)	(0.0010)
Constant	0.08339***	0.06092***	0.07435***	0.08461***
	(0.00021)	(0.00013)	(0.00017)	(0.00024)
"Investment" Grade	Baa	Baa	Aaa-Baa	Aaa-Baa
"Speculative" Grade	Ba-C	Ba	Ba-C	N/A
Estimation Window	2/4/36-2/21/36	2/4/36-2/21/36	2/4/36-2/21/36	2/4/36-2/21/36
Event Window ('36)	2/15-2/21	2/15-2/21	2/15-2/21	2/15-2/21
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 9. Effects of Regulation on Equity Volatility and Firm Risk Taking by Debt Rating

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 1/1/35-12/31/36 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 shortens the analysis period to stop 3/31/16. Column (3) is the same as 2, 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 (4) is the same as 3, 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 3. Column (5) is the same as 3, 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 (6) is the same as 5, 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 standard errors are clustered at the firm-level reported in parentheses. P-Values: * 10%; ** 5%; ***1%.

Dependent Variable:	$\|R_{i,t}\|$ (1)	$\|R_{i,t}\|$ (2)	$\|R_{i,t}^{idio}\|$ (3)	$\|R_{i,t}^{sys}\|$ (4)	$\%\Delta\|R_{i,t}^{idio}\|$ (5)	$\%\Delta\|R_{i,t}^{idio}\|$ (6)
Event x Speculative	-0.00532***	-0.00365***	-0.00376***	-0.00035	-8.869***	
	(0.00083)	(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	-0.0039***	-0.00141***	-0.00079*	0.00165***	-2.541	-2.541
	(0.00043)	(0.00051)	(0.00042)	(0.00204)	(2.309)	(2.309)
Constant	0.02908***	0.02545***	0.02427***	0.01150***	-13.928***	-13.928***
	(0.00019)	(0.00028)	(0.00023)	(0.00009)	(0.728)	(0.728)
Estimation Window	1/1/35-12/31/36	1/1/36-3/31/36	1/1/36-3/31/36	1/1/36-3/31/36	1/1/36-3/31/36	1/1/36-3/31/36
Event Window ('36)	2/15-12/31	2/15-3/31	2/15-3/31	2/15-3/31	2/15-3/31	2/15-3/31
Firm FEs	Yes	Yes	Yes	Yes	Yes	Yes
Observations	125,331	15,797	15,797	15,797	15,797	15,797
Adj. R-squared	0.148	0.175	0.248	0.160	0.047	0.047

Table 10. Effect of Regulation on Equity Factor Loadings

In this table I run a differences-in-differences regression on daily stock returns around the OCC announcement on February 15th, 1936, restricting bank investment to bonds rated at least Baa or higher. I utilize specification (1) which is a pooled regression that estimates average factors loadings for all firms. This table focuses on how firm's Fama French factor loadings responded heterogeneously to the announcement. All data on stock returns are taken from CRSP and bond ratings are collected from the 1935 *Moody's Industrial, Transportation, or Utilities Manual*. All interactions are included and available upon request. Column (1) regresses firm stock returns on excess market returns, $R_{m,t} - R_f$, a dummy variable equal to 1 if the firms highest rated bond is speculative grade, a dummy variable equal to 1 after the announcement, and the interaction of all three. Column (2) is the same as 1, but includes equity returns for high minus low, $R_{H,t} - R_{L,t}$, and small minus big, $R_{S,t} - R_{B,t}$, firms to explore how each of these factor loadings changed after the announcement for firms using speculative debt financing. All standard errors are clustered at the firm-level reported in parentheses. P-Values: * 10%; ** 5%; ***1%.

Dependent Variable: Stock Returns	$R_{i,t}$ (1)	$R_{i,t}$ (2)
Event x Speculative x $R_{m,t} - R_f$	-0.0492 (0.0737)	-0.0238 (0.1169)
Speculative x $R_{m,t} - R_f$	0.2836*** (0.1074)	0.0986 (0.0891)
$R_{m,t} - R_f$	1.3042*** (0.0735)	1.0374*** (0.0606)
Event x Speculative x $R_{H,t} - R_{L,t}$		-0.2362*** (0.0885)
Speculative x $R_{H,t} - R_{L,t}$		0.4532*** (0.1070)
$R_{H,t} - R_{L,t}$		0.3715*** (0.0590)
Event x Speculative x $R_{S,t} - R_{B,t}$		-0.2149** (0.1089)
Speculative x $R_{S,t} - R_{B,t}$		0.8472*** (0.1094)
$R_{S,t} - R_{B,t}$		0.1484*** (0.0613)
Estimation Window	1/1/35-12/31/36	1/1/35-12/31/36
Event Window ('36)	2/15-12/31	2/15-12/31
Firm FEs	Yes	Yes
Observations	125,331	125,331
Adj. R-squared	0.0662	0.0761

Appendix A: Supplementary Tables & Figures

Table A1. Sub-sample Average Issuance Size ($ million par) by Initial Rating 1936-1940

This table shows summary statistics issuance size ($ million) for 60 corporate bond issuances from 1936-1940 taken from *Moody's Industrial Manual, Moody's Transportation Manual*, and *Moody's Utilities Manual* which had initial ratings of Baa or Ba.

	Baa	Ba
Mean Issuance Size	14.2	5.8
Standard Deviation	13.1	4.4
Median	10.0	4.6
# Observations	37	23
Standard Error	2.15	0.91

Table A2. Long-Run Real Effects of Investment Restrictions

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. Standard errors clustered at the issuance level are reported in parentheses. P-Values: * 10%; ** 5%; ***1%.

Dependent Variable:	ln(Long Term Debt) (1)	ln(Assets) (2)	ln(PP&E) (3)	Debt/Assets (4)
Event x Speculative Dummy	-0.212***	-0.064***	-0.077**	-0.0173
	(0.075)	(0.025)	(0.033)	(0.0167)
Event	-0.9007**	0.0130	-0.0764	-0.3004***
	(0.3796)	(0.1260)	(0.1689)	(0.0849)
Constant	3.01***	4.46***	3.86***	0.798***
	(0.025)	(0.01)	(0.011)	(0.006)
Firm Fixed Effects	Yes	Yes	Yes	Yes
Industry x Event Fixed Effects	Yes	Yes	Yes	Yes
Observations	1,186	1,186	1,186	1,186
Adj. R-squared	0.941	0.990	0.986	0.795

Table A3. Long-Run Real Effects of Investment Restrictions: Robustness

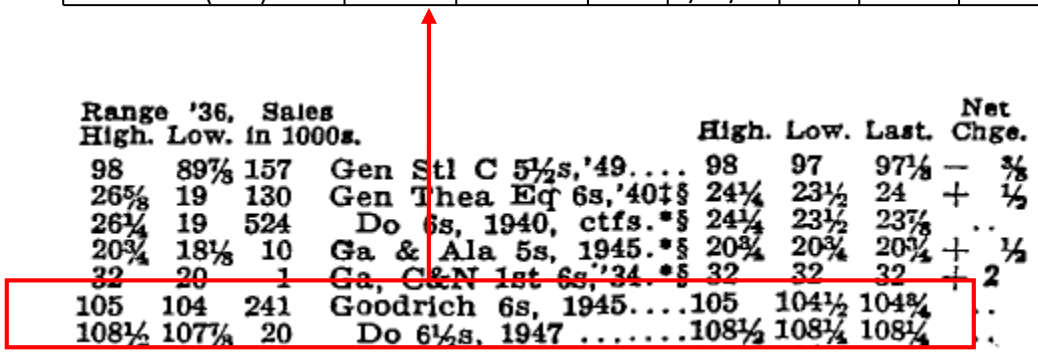
This table looks at the long-run real effects on debt issuance, asset growth, and investment from the Office of the Comptroller of Currency announcement on February 15th, 1936, restricting bank investment to bonds rated at least Baa or higher (aka "investment" grade), but focuses on only those firms 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 issuance level are reported in parentheses. P-Values: * 10%; ** 5%; ***1%.

Dependent Variable:	ln(Long Term Debt) (1)	ln(Assets) (2)	ln(PP&E) (3)	Debt/Assets (4)
Event x Speculative Dummy	-0.157**	-0.051**	-0.029	-0.007
	(0.069)	(0.022)	(0.037)	(0.020)
Event	-0.059	0.078***	0.028	-0.067***
	(0.044)	(0.014)	(0.024)	(0.013)
Constant	3.13***	4.53***	3.86***	0.819***
	(0.03)	(0.01)	(0.02)	(0.01)
Firm Fixed Effects	Yes	Yes	Yes	Yes
Rating Grades Included	Baa-Ba	Baa-Ba	Baa-Ba	Baa-Ba
Observations	552	552	552	552
Adj. R-squared	0.958	0.994	0.985	0.738

Appendix B: Data Collection Examples

B1. Bond Price Data Collection Example

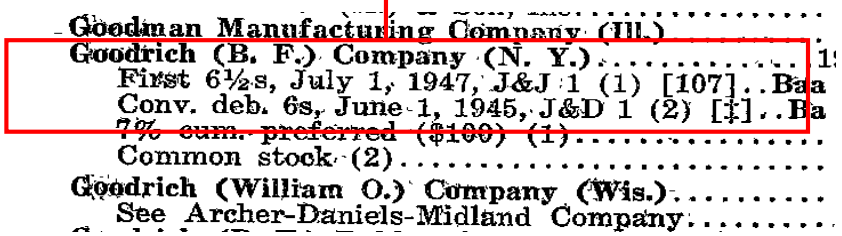
Company Name	Coupon	Maturity	Class	Date	Sales	Last	Change
GOODRICH (B.F.) CO.	6	1945		2/15/36	241	104.75	0
GOODRICH (B.F.) CO.	6.5	1947		2/15/36	20	108.25	0



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	..

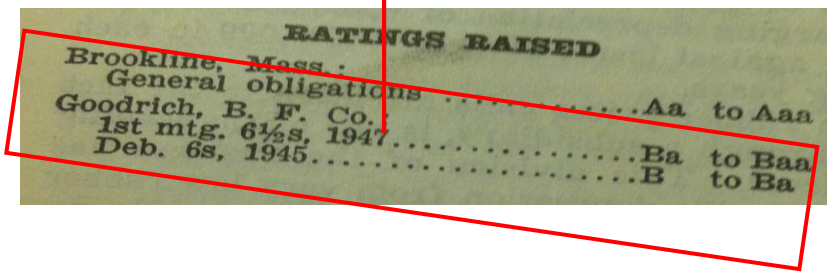
B2. Bond Ratings Collection Example

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

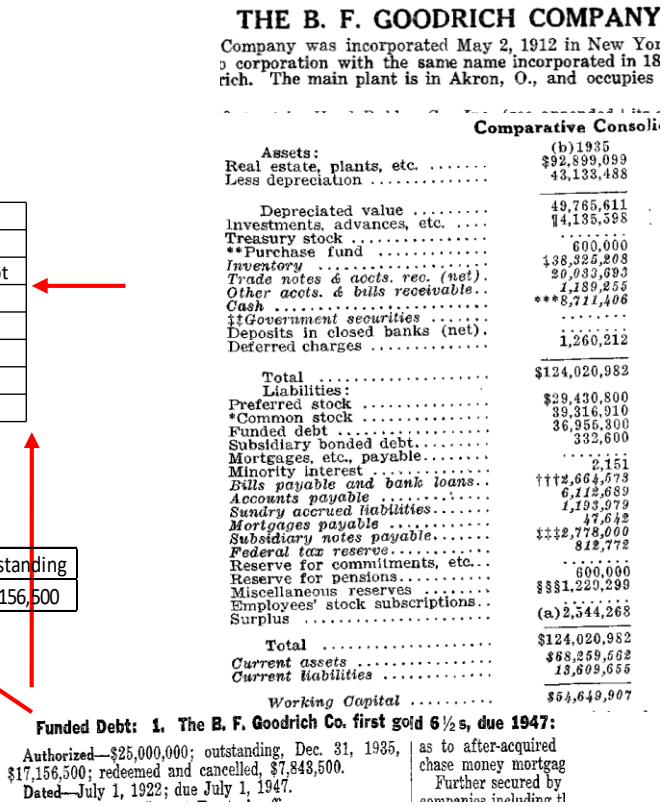


RATINGS RAISED
Brookline, Mass.:
General obligations .....Aa to Aaa
Goodrich, B. F. Co.:
1st mtg. 6½s, 1947.....Ba to Baa
Deb. 6s, 1945.....B to Ba

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 Yor
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	38,325,208
Trade notes & accts. rec. (net)	20,033,693
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	§§§1,229,299
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

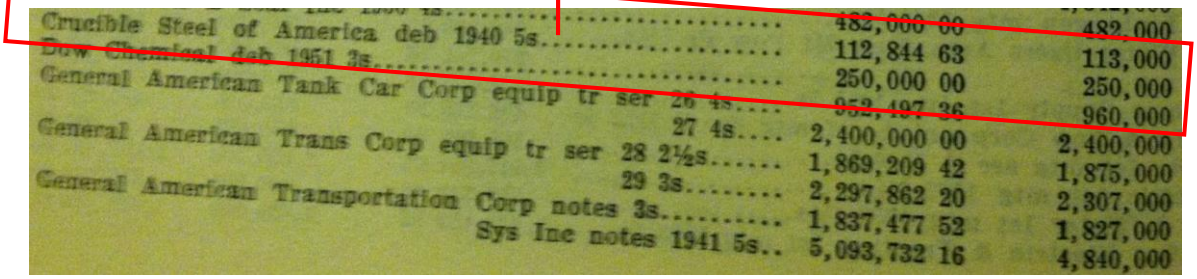
Funded Debt: 1. The B. F. Goodrich Co. first gold 6½s, due 1947:

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