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Regulatory versus Informational Value of Bond Ratings: Hints from History…[*]

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Abstract

A multivariate analysis can be used in order to investigate the relationship between bond yields, ratings and standard control variables. Replicating such a test on a number of cross-sections may evidence a possible impact of financial regulations relying on ratings. Datasets for American corporate bond issues allow a focus on two key events of the development of rating driven regulations: the valuation of bank and life insurance portfolios introduced in the 1930's and the net capital requirements for broker dealers introduced in the 1970's. The "value" of bond ratings does show some improvement once these regulations have been passed.

Key words: bond ratings, bond yields, financial regulation

JEL codes: G12, G18, G24

Résumé

En se donnant pour cadre la relation entre rendements de marché, notations et variables de contrôle, on peut répliquer un test économétrique de manière à étudier une influence possible de l'utilisation des notations par la réglementation financière. Des échantillons de données sur les obligations d'entreprises américaines permettent de s'intéresser à deux grandes étapes: la réglementation des portefeuilles d'investissement des banques et des compagnies d'assurance dans les années 1930 et celle des marges des courtiers en bourse dans les années 1970. La "valeur" des notations évolue avec la mise en place de ces réglementations.

Mots clés: notations, rendements d'obligations, réglementation financière.

Codes JEL: G12, G18, G24

In the 1930's, a need to police life insurance and bank portfolios led American financial authorities to introduce rules relying on bond ratings provided by a few firms. This regulatory use of privately issued opinions was then left unchallenged. In the early 1970's, the Security and Exchange Commission (SEC) revived this particular regulatory practice, which flourished over the last quarter of the twentieth century. Japanese financial authorities started to rely on ratings in the early 1980's and further international adoption came over the 1990's. A driving force in this globalization process has been the Basel II general framework on bank capital requirements, which uses bond ratings as external credit assessments.

This public use of ratings means a major exogenous fact for the rating game. For example, given the success of bond ratings as a business, one may wonder whether the use of ratings in financial regulations helped on the way (see Partnoy (1999)). Less vehemently, the fact that financial regulation uses ratings may have unduly influenced how ratings were perceived by investors. In parallel to regulatory procedures on the wake of the *Enron* scandal, the SEC submitted to public debate the idea of removing any reference to ratings in its rules (see SEC (2003b)). The Congress however chose to keep with ratings as regulatory inputs and to ask the SEC to oversee rating firms: a Credit Rating Agency Reform Act was passed in 2006 and was implemented by June 2007… A few months later, concerns over the use of ratings in regulations were brought back to limelight by the critical role that ratings played in the rise and fall of structured finance securities. Some major policy documents stated that it was necessary to "reconsider" this use (see, for example, PWG (2008, 7p. 18) and FSF (2008, IV.8 p. 38)). The SEC reacted promptly by releasing a detailed proposal showing how almost every reference it made to ratings could be removed; final rules were enacted in October 2009 (see SEC (2008a, b &c; 2009)). This initiative may lead to a broad policy shift in financial regulations over the coming years.

This paper investigates the concern driving these policy moves. How is it that ratings are recognized by investors? The usual explanations are information specialization by the bond rating firm and information equalizing among investors. If these natural market forces were not at work, regulators would not have considered ratings as straightforward inputs… What made these inputs uncontroversial was the fact that ratings were recognized by investors and this could be evidenced by the relation between bond ratings and yields. Once regulations have been enacted, can the very relationship that motivated regulators' choice still be interpreted the same way? In other words: did the relationship between bond yields, ratings and standard control measures change significantly?

One may take advantage of History by performing identical tests before and after the enactment of these regulations. While this may be done for any relevant regulation, there are two reasons making the study of the early American regulations interesting. First, the impact of yet another regulatory use of rating may be harder to detect given a long track record of similar rulings. The first rules relying on ratings are likely to cause greater effects on the market place. Secondly, on a global scale, the use of ratings by bond markets has been quite contemporaneous to the one by their financial authorities (see Packer (2002) about Japan). The American bond markets provide a more paced sequence of events.

With this in mind, this paper provides a thorough discussion of West (1973), which remains widely quoted for pointing out a straightforward effect of rating driven regulations enacted in the 1930's. I have built over the original datasets and I criticize the way they have been dealt with thanks to modern standardized econometric techniques. This first brings a negative result: I do not find the lasting inflation of non-investment grade bond yields that has been interpreted as an impact of the regulations of the 1930's. By sticking to a multivariate analysis, I go beyond this negative result and show that the explanatory power of ratings reaches a climax on the wake of the most controversial rating driven regulation. To further investigate such a finding, I introduce a similar empirical setting around the regulation of broker dealers at the beginning of the 1970's. Again, the "informational value" of bond ratings increases on the wake of the regulatory move by which the SEC revived rating as key regulatory tools. These two findings are hints of a regulatory value fitting into a theory of ratings as coordination variables: the value of ratings as "focal points" rises once authorities officially endorse them (see Boot et al (2006, p. 112)).

The rest of the paper is organized as follows. Section 1 gives background information on bond ratings as regulatory inputs. Section 2 reviews the existing literature on bond ratings and yields. Section 3 introduces the chosen empirical framework. Section 4 gives the results and the way they are interpreted.

1. Background Information: Ratings as Financial Regulation Tools

An interesting feature of bond markets is that some firms deal with the established business of rating bonds on the basis of their relative financial quality. These bond ratings are meant to proxy for the "expected reliability in meeting future financial requirements" and have become a quite shared measure of default risk. These proxies are meant to be relative and organized in ordinal scales.3 While bond ratings were born at the turn of the twentieth century, regulatory agencies started to use these privately issued opinions in the 1930's. The primary goal of this section is to introduce in full details these first rulings by American insurance and banking regulators. This section also sketches how the reliance on ratings evolved through time and across financial regulation fields.

1.1 Insurance

In 1910, the National Convention of Insurance Commissioners began publications of uniform price lists in order to push forward the use of market prices to value securities in insurance company portfolios. Yet this use of market prices proved problematic during the crises of 1907 and 1914. Over the 1920's, the insurance industry evolved a doctrine holding that "ample secured" bonds should be valued at cost modified by accrued amortization of discount or premium. The use of market prices for "non-amortizable" securities however remained broad.

In an answer to the 1931 crisis, the New York State Insurance Department ruled in 1932 that bonds rated in the first five rating grades by one of the rating agencies would be considered eligible for amortization on a cost basis. The decision was criticized over the 1930's: extensive use of amortization led to dubious valuations in front of quite low market prices. In 1940, the NAIC stated that amortization could be given to bond rated: i) in the first four grades by two rating agencies, ii) in the first five grades by three agencies or iii) in the first five grades by two agencies plus a pricing requirement[4]. In 1953, the NAIC reformulated the eligibility criteria in two tests. "Test 1" was a rating from the first four rating grades of one of the accredited agencies or a number of balance sheet requirements[5]. "Test 2" mainly dealt with earnings requirements[6].

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[3] A convention has eventually emerged among rating providers. This paper builds on this convention by using the most widely known name of a rating category preceded by its *Moody's* transcription. From the highest grade downward, this means using the following scale: Aaa/AAA; Aa/AA; A/ A; Baa/BBB; Ba/BB; B/B; Caa/CCC;… The scale goes down to default grades but this paper will focus on the top grades. Note also that the historical discussion introduced here only deals with broad rating categories (which were refined in the early 1980's with the help of "modifiers" (for example: AA → (AA-, AA, AA+) and Aa → (Aa3, Aa2, Aa1))).

[4] Priced at 55 or better in September, October, and November. This was later changed to a 3.9% yield spread over US government bonds, which was then reduced to 1.5% in 1950.

[5] Depending of industry, debt ratio of 50 to 75% of total capitalization; plus a 1.5 average of before tax earnings coverage over five preceding years and similar 1.5 coverage in either of the last two years.

[6] An earnings on fixed charges ratio equal to 1 on average over 5 year and in either of the last 2 years. For railroad bonds, current assets equal to 125% of current liabilities. For public utilities and industrials, each year

While criteria may have changed, the reliance on privately issued bond ratings has not been open to question. The modern National Association of Insurance Commissioners (NAIC) bond classification system adopted in the early 1990's is equating "top quality" with the first 3 rating grades and "high quality" with the fourth one (Moody's (2004, 2 p. 3)).

1.2 Banking

By 1930, the Federal Reserve had begun using bond ratings in their examination of member bank portfolios[7]. This use could be considered "informal"; in 1931, the Comptroller of the Currency officially adopted ratings as proper measures of the quality of the national banks' bond accounts: bonds rated Baa/BBB or above would be carried at cost; bonds with lower ratings would however be marked to market with the help of fractional write-offs[8]. This ruling was in tune with previous insurance practices introduced above and then was well received at the time (see WSJ (1931a &b); Harold (1938, p. 27) quotes J. Moody's comments). During the following years, many State banking superintendents adopted the Comptroller's plan (see Harold (1938, pp. 27-28)).

In 1935, Amendments to the Federal Banking Act specified that all national banks were subject to the orders of the Comptroller's Office as for the securities they might purchase for their own accounts. On February, 15th 1936, the Comptroller issued a new ruling stating that "the purchase of investment securities in which the investment characteristics are distinctly and predominantly speculative, or investment in securities of a lower designated standard than those which are distinctly and predominantly speculative, is prohibited". A footnote added that "the terms applied herein may be found in recognized rating manuals" (see Harold, (1938 p. 30)).

This more radical decision spurred unprecedented hostility about the use of bond ratings as tools to influence the structure of commercial banks portfolios (see WSJ (1936a &b)). It also created confusion about what the footnote exactly meant because it was relying on an unsettled market convention: *Moody's* kept interpreting the ruling as pointing to Baa/BBB as a cutoff but the *American Banker* considered A/A (see Moody's (2004, pp. 1-2)). The Comptroller refused to make this point clear and then stated that ratings were not "the sole criterion, or even a necessary criterion, for judging whether or not a particular bond was eligible for purchase by a national bank"; nonetheless, controversies did not quiet down (see WSJ (1936c, d &e)).

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adjusted earnings equal to mandatory principal payments and sinking fund requirements (excluding final maturities), or working capital equal to 100% of long-term debt. Further modifications were made for new enterprises or special obligations (see Atkinson (1967, 3 p. 37 - 1 p. 39)).

[7] In Osterhus (1931), a member of the Federal Reserve Bank of New York introduced a system for weighting a bank's entire portfolio based on credit ratings, so that the portfolio's "safety" or "desirability" could be expressed in a single number, referred to as a "desirability weighting." Harold (1938, 3p.25) mentions the use Harold (1938, 3p.25) mentions the use of systems similar to this one by several branches of the Federal Reserve.

[8] Mimeographed ruling issued by J.W. Pole, then Comptroller of the Currency, not dated, although was made on September 11, 1931 according to *The Commercial and Financial Chronicle* (No.133, 09/12/1931, p. 1672).

The footnote was deleted only but a few days after all federal banking authorities had published an agreement more in tune with the original 1931 ruling[9]. A joint statement by the Secretary of the Treasury, the Board of Governors of the Federal Reserve System, the Directors of the Federal Deposit Insurance Corporation, and the Comptroller of the Currency was made on June, 27th 1938. Following this 1938 Agreement, bonds would be divided into groups and the first four rating grades would provide a privileged status (by being valued at their purchase price or at par and by being therefore insulated from day-to-day price fluctuations)[10].

The use of ratings by all federal banking authorities was now clearly set. For individual banks, this meant that informational requirements and uncertainties would be minimized for investments in the top four rating categories while lower rated or even unrated bonds would require an added burden of justification. In 1949, the Executive Committee of the National Association of Supervisors of State Banks joined the Federal authorities in reaffirming the process outlined by the 1938 statement (see Federal Reserve (1949)). This process has remained at the heart of American banking regulations to date. For example, White (2009, p. 3) mentions that its application to saving institutions in 1989 brought selling pressures to the junk bond market.

The regulation of insurance investment however took some years to adjust its own system to this new convention. Remember from section 1. 1 that, up until 1953, insurance companies could consider bonds that were rated one notch below the "cut-off" required by banking authorities. This precision aside, the use of ratings by financial regulators was now affirmed more than ever. It would then be left unquestioned and find new applications.

1.3 Securities Law

Post-world war II decades brought a standstill ended by the SEC adopting Rule 15c3-1 on broker-dealers as an answer to the credit crises of the early 1970's. This rule set forth "haircut" requirements based on the credit ratings assigned to the asset. A "haircut" is the percentage of a financial asset's market value a broker-dealer is required to deduct for the purpose of calculating its net capital requirement[11]. This ruling was nothing more than another use of ratings in checking on the

[9] The deletion became effective on July 1st 1938.

[10] Book value for bonds of Group I (Aaa to Baa inclusive); current market value plus any unrealized 50 cent depreciation on them should be charged against net bank capital for Group II (Ba or below or unrated securities of equivalent value), Group III referred to securities in default while group IV was for equities (see Federal Reserve (1938)). Note also that, as in the original 1931 rule, American sovereign and sub-sovereign issues are not concerned by this process.

[11] Partnoy (1999, footnote 344 p. 690) refers to *Notice of Revision Proposed Amendments to Rule 15c3-1 under the Securities Exchange Act of 1934*, Release No. 34-10, 525, 1973 SEC LEXIS 2309 (Nov. 29, 1973): "The Commission to a limited extent has also recognized the usefulness of the nationally recognized statistical rating organizations as a basis for establishing a dividing line for securities with a greater or lesser degree of market volatility." SEC (2003, note 9 p.6), as most other sources, points to the final enactment: *Adoption of Amendments*

"safety and soundness" of a financial intermediary investments. SEC (2003, note 9 p.6) mentions two historical precedents: (i) certain securities exchanges, including the New York Stock Exchange (NYSE), already utilized ratings to calculate haircuts following their respective net capital rules (NYSE Rule 325(c)(5) and (c)(6)); (ii) a number of states also used the concept of ratings to limit the investment discretion of certain fiduciaries and relied only on ratings provided by firms designated as reliable by the state. However, for the first time it included the creation of a Nationally Recognized Statistical Rating Organization (NRSRO) status.

The existence of this NRSRO status paved the way for numerous uses of ratings by the SEC and by other regulatory bodies. There have then been credit-rating dependent rules and regulations promulgated under the Securities Act of 1933, the Securities Exchange Act of 1934, the Investment Company Act of 1940, and various banking, insurance, pension, and real estate regulations (for a tentative overall picture see SEC (2003a, pp. 6-8)).

SEC (2008b, c, &d) give details on all the uses of ratings by the SEC. Yet another example of safety and soundness regulation is the use of ratings to check on money market fund portfolios. In the 1980's, the Agency somewhat innovated by using ratings to deal with the very process of security offerings on which the Securities Exchange Act had focused: good ratings would now screen high quality offerings for which the issuance requirements would be eased[12].

1.4 Collateral policy

In a detailed discussion of the 1930's banking regulations introduced in section 1.2, Palyi (1938, 3 p. 75) noted that a "carrot" came with the "stick" of the new rules for valuing bank's portfolio (relevant in a context of mandatory examinations by comptrollers). This carrot was the fact that once investment grade securities were officially recognized as safe investments, little argument could prevent them from being posted as collateral (see Federal Reserve (1937)).

While there has been much debate on the possible shortcomings of using ratings to guide bank's portfolio evaluations, it must be said that ratings have always been thought as guides. Examinators could end up departing from a straightforward use. Although to a limited extent, this point could be made about the 1930's regulations, it holds even more for the modern Basel II framework thanks to the alternatives to third party ratings (pilars 2 and 3). On the contrary, once collateral policy starts using ratings, these privately issued opinions serve as the basis for numerous

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to Rule 15c3–1 and Adoption of Alternative Net Capital Requirement for Certain Brokers and Dealers, Release No. 34–11497 (June 26, 1975), 40 FR 29795 (July 16, 1975).

[12] This means allowing "shelf registration" and using short form Securities Act registration statements (forms S-3 and F-3). In 1982, this was first allowed for investment grade non convertible domestic bond issues but was later transposed for foreign issues and then for Asset Backed Securities (ABS). Note also that, independently from these regulations and starting in 1984, rule 415 of the Securities Act gave this eligibility to every mortgage related security rated in the two top notches of the rating scale by a registered rating firm (NRSRO).

transactions between the central bank and the market place: they are unequivocally endorsed as screens for quality.

The attitude of the European Central Bank (ECB) makes this point clear. The European Operational Framework came out of a compromise between numerous central bank practices and emerged as "collateral intensive" (see IMF (2008, figure 1 p.16 and Appendix 3 p. 55)). Although the European Central Bank (ECB) always pointed out that third party rating providers were only one source of information out of four in the European Credit Assessment Framework (ECAF), it felt required to create its own "ECAF relevant" designation for third party ratings. Note that the implementation of the BASEL II framework in Europe had reached a point to which most of the concerned rating providers had already been registered by banking regulators (as External Credit Assessment Institutions (ECAI)). Nonetheless, the use of ratings in collateral policy proved so critical that it led the ECB to create both a designation process and a monitoring framework (see ECB (2006 &2007)).

The crisis of structured finance also brought this point to limelight. Other major central banks answered to financial difficulties by working on their collateral policy. In so doing, their increasing straightforward reliance on rating providers caught public attention. While the Bank of England rulings explicitly named the three leaders of the global rating business (*S&P*, *Moody's* and *Fitch*)), the Board of the Federal Reserve used a sentence implicitly doing the same thing (see (see IMF (2008, box 5 p. 63) and Bluementhal (2009)). To detractors deeply convinced that these firms had fuelled market disruptions with structured finance securities, this reliance was to say the least puzzling (see (Bluementhal (2009)).

Although discussing on collateral policy brought a global point of view, overall, this section focused on how American financial authorities came to use ratings in an increasing number of rules. The regulatory use of ratings has first been mirrored in Japan in the early 1980's and ratings as regulatory tools have been promoted internationally through the advancement of the Basel II scheme for the global standardization of bank regulations. Providing a global picture of the official uses of ratings is a difficult task (see IMF (1999, Table A6.2 p.156) and BIS (2000) for tentative tables; JFRAC (2009) gives a thorough listing). Beyond such a task, remember that outside the United States most bond markets previously worked without privately issued bond ratings. On a global scale, the adoption of ratings by economic agents has thus been quite contemporaneous to the one by their financial authorities. With this in mind, the United States provides an interesting historical experiment.

From publishers of opinions on creditworthiness, rating firms ended up providing information as to the future treatment by financial regulations. A theory of rating agencies as "regulatory licenses providers" has even been formulated (see Partnoy (1999, p. 681)). This generalizing effort aside, numerous observers have wondered about the potential impacts of the use of ratings by financial regulation. With such a concern in mind, a straightforward field of investigation is the relation between ratings and yields.

2. Literature Review: Bond Ratings and Yields

Bond ratings are ultimately valued because they are recognized as a shared measure of bond default risk by investors. Investigating their relationship with bond yields then makes sense in order to elaborate on the rationality of their use[13]. Bond yields can be *offering* yields at issuance on the primary market, *actual* yields as quoted on the second market or *realized* yields once the bond came to expire.

Looking at *realized yields* is an *ex post* analysis. For example, considering bond issues over 1900-1943, Hickman (1958, table 1 p. 10) came to the conclusion that, *on average*, actual loss rates did not completely eliminate the higher yields that had been accorded to lower rated bonds. This finding was then restudied and contested by Fraine &Mills (1961). It however remained a piece of evidence that could be interpreted as a claim for a more active trading of high yield debt securities[14]. Along with the rise of the high yield (or "*junk*") bond market from 1977, further investigations focused on whether investors in speculative bonds could be more than satisfactorily compensated for default risk (see, for example, Fitzpatrick &Severiens (1978)). Producing evidence on the overcompensation for default risk by high yield debt securities would usually go along with noting that demand for these securities had been constrained by legal restrictions for a number of institutional investors (see, for example, Altman (1989, 4 p. 921))[15].

Focusing on realized yields, the use of ratings by safety and soundness regulations has then been used to justify evidence going against the efficiency of bond markets. Proving a superiority of high yield investment is however not a straightforward exercise. The early literature dealt with averages of lifespan realized returns and results proved sensible to variations in risk premia, to changes in the level of interest rates and to early redemptions (see Fraine (1937) versus Dewing (1926, p. 1,192 -1,195) and Fraine &Mills (1961) versus Hickman (1958)). Modern contributions introduced annualized returns and more refined analysis building on the risk/reward trade-off (see, for example, Fons (1987), Altman (1989) and Blume et al. (1991)). Yet the computation of default rates remained quite controversial. For example, Asquith et al. (1989) criticized earlier studies for not taking into account exchanges and for poorly dealing with the aging effect on bonds. Precisely, building on data from Fraine &Mills (1961), Fridson (1994, pp. 49-50) shows that the "odd" finding in Hickman (1958) was driven by a small share of "irregulars offerings" (in other words, offered through contract modifications in already outstanding issues and through exchanges related to corporate reorganizations).

[13] In order to study the behavior of bond market agents, it has been a convention to focus on the annual rates of return implied by bond prices or *yields* as they are referred to.

[14] Fridson (1994, p. 43) notes that even severe critics of M. Milken and Drexel Burnham conceded this interpretation to *junk* bond market makers. The legend also says that reading Hickman (1958) in business school led M. Milken to start his now famous career.

[15] Harold (1938, p. v) provides an early statement of the basis of this kind of argument: "Following the Comptroller of the Currency statement on 02/15/1936, it became common knowledge in bond circles that bond rated below that of "a business man investment "(BBB, Baa, B**, B1+) could almost never be sold to a bank."

When evidencing a superiority of high yield investment has been recognized as a challenging task, focusing on historical yields appears less welcome. For example, in a follow-up study to the famous work of Stigler (1964) on registered securities and the 1933 Securities Act, Jarell (1981, pp. 654) acknowledges that using data from the Hickman studies brings little results and advocates an analysis of yields and market variability. Turning to an *ex ante* analysis may indeed prove a more straightforward way to deal with a possible impact of relevant regulations. This means looking either at *offering* yields or at *actual* yields and the relevant literature can be introduced with the help of the following questions:

a) Do bond yields react to a change in bond ratings?

b) Are bond ratings relevant to explain bond yields?

Dealing with a) means introducing a temporal analysis and then requires continuous data from the second market (see, for example, Weinstein (1977)). This can become quite a challenge since bond markets do not always prove liquid. Researchers have then naturally turned to the stock market for real time quotations (see, for example, Hand et al. (1992)). Jorion et al. (2005) used investigations of this kind to show an impact of the first regulation clearly giving an informational advantage to rating firms over equity investors[16].

Given data limitations with bond market quotations, a focus on b) makes sense for an historical investigation. This involves a cross examination of bond ratings, control variables and yields. This kind of analysis can be fed by data either on offering yields at issuance or on actual yields computed from the prices on the second market[17]. A review of literature may be: West (1973), Liu &Thakor (1984), Ederington et al. (1987), Reiter &Ziebart (1991), Brister et al. (1994), Levingston et al. (2003). The focus is on evidencing an informational value of ratings, in other words on testing the following null hypothesis:

(h_o) : "Bond ratings do not have an explanatory power"

For example, Ederington et al. (1987) "explores the information content" of *Moody's* and *S&P* ratings beyond publicly available accounting variables by relating them to the yield to maturity. The authors used a non-linear least square procedure on data concerning bonds traded on February, 28th 1979 and 1981. Also, Levingston et al. (2003, pp. 4-6) uses a latent variable methodology and yields on new industrial bond issues to focus on whether bond ratings contain non-publicly available information.

[16] Implemented on October 23, 2000, regulation Full-Disclosure (F-D) prohibits American public companies from doing selective disclosures to a broad category of "investment professionals". Rating firms were granted an exclusion from this list and these authors investigates whether this brought a strategic advantage by looking for a greater impact of rating change announcements on stock prices.

[17] While mixing studies using actual yields and offering yields has been common (see Liu &Thakor (1984, footnote 4 p. 348) criticizing this point), studies focusing on the impact of multiple ratings on yields at issuance have usually been set aside (see, for example, Liu &Moore (1987), Billingsley et al. (1985), Hsueh &Kidwell (1988), Thompson &Vaz (1990)).

An early contribution to this body of literature did something else than focusing on an informational content of ratings. Fisher (1959) produced classical a study of corporate bond yields using a log/log transformation of the common Ordinary Least Square (OLS) regression analysis. West (1973) picked up on that study by looking at the relationship between the regression residuals and *Moody's* ratings. As opposed to 1927, 1932 and 1937, the behavior of these residuals could be linked to the investment grade status in 1949 and 1953. This result could be interpreted as an impact of the regulations enacted in the 1930's (see, *supra*, section 1.2).

When this result has often been mentioned or commented, the issue of sorting the investigated informational value from a regulatory value has then been poorly faced. To my knowledge, such a concern can only be found in Brister et al. (1994). Echoing the literature dealing with realized yields, the authors focus on a straightforward reading of existing regulations and proceed with several tests on offering yields over 1982-1987. The goal is to find an *ex post* piece of evidence by showing how non-investment grade bond yields are above the levels that could be expected by judging on default risk. While the discussion in West (1973) did share this focus on the investment grade distinction, the methodology had a more neutral perspective taking advantage of the spacing of cross-sections in Fisher (1959). This more neutral perspective means studying the relationship between yields and ratings before and after the enactment of regulations. It can be formulated by investigating the following "meta-null hypothesis":

(H_O): "The explanatory power of ratings does not systematically change over years"

Departing from a focus on the over-inflation of non-investment grade bond yields, this concern about the robustness of the relationship between ratings and yields makes two tasks interesting. First, the "two stage" methodology of West (1973) is somewhat peculiar and an open question is whether a more conventional multivariate design would bring the same findings. Secondly, a similar empirical setting can be worked out in order to check whether these findings hold for cross-sections surrounding the 1975 regulation of broker dealers by the SEC.

The following empirical analysis undertakes these two tasks. This goal is of course constraining. I have mentioned above the dynamics of the relationship between rating and yields as an alternative. Another one is to build tailored tests to check the impact of an exogenous event on the value of ratings[18]. Kisgen &Strahan (2009) discusses on cumulative yields per rating category over the weeks following the official designation of the Canadian DBRS by the SEC in February 2003. These authors evidence an impact driven by cases where DBRS was less conservative than already designated rating firms and larger around the investment grade cut-off. They interpret their findings as pointing to an effect of rating based regulations on firm's cost of capital. Sharing an historical perspective with this paper, Gaillard (2008, pp. 93-111) introduces a broad discussion on cumulative

[18] This was first done for checking whether the unannounced refinement of *Moody's* rating scale in April 1982 had any impact (see Kliger &Sarig (2000) and Tang (2009)).

yields per rating category over the weeks following rating driven regulation enactments in 1931 and in 1936 and concludes to a limited impact.

3. Empirical Framework

As in Merton (1974, p. 449), let us start with the assumption that:

$$Y_i = f(C_i, X_i, YREF_i, \varepsilon_{1i}) \quad (1)$$

where, Y_i : yield to maturity on the issue i
C_i : issuer's creditworthiness
X_i : issue i "other characteristics"
$YREF_i$: yield on the chosen risk free issue
ε_{1i} : random error

A first step is to change the target variable in order to focus on the spread between the yield on the issue *i* and the yield on the chosen risk free issue[19]:

$$YSprd_i = Y_i - YREF_i = f(C_i, X_i, \varepsilon_{2i}) \quad (2)$$

A second step is to raise the issue of ratings' relevance. West (1973) did it in a way that can be interpreted as a special case of the following Levene's test:

$$\varepsilon_{2i} = f(C_i, R_i, X_i, \varepsilon_{3i}) \quad (3)$$

There is however no reason against including ratings in equation (2) and the starting overall specification should be:

$$YSprd_i = f(C_i, R_i, X_i, \varepsilon_{4i}) \quad (4)$$

where, $YSprd_i$: yield spread on the issue i
C_i : issuer's creditworthiness
R_i : bond rating of the issue i
X_i : issue i other characteristics
ε_{4i} : random error

The empirical analysis will run two specifications of this general model, respectively on five cross sections surrounding the 1930's rulings and on three cross sections surrounding the early 1970's enactment. Data issues are introduced before turning to the choices guiding the specification of this overall model.

[19] The spread is absolute as opposed to relative $(Y_i - YREF_i)/ YREF_i$).The basis of $YREF_i$ is the yield on US Treasury bonds, which of course are not exempt from risk but have extensively been used as a pure rate approximation. The methodology used while computing the spread is aimed at being a replication of the one displayed in Fisher (1959, appendix A p.52) with the slight change of building the Treasury yield curve thanks to CRSP fixed term indices (as opposed to using yields from the board of the Federal Reserve).

3.1 Data

In order to deal with 1930's regulations, building datasets starts by computing data from the Appendix of L. Fisher's PhD dissertation thesis (see Fisher (1959, appendix D p.66)). These original datasets are several samples of average yield spreads according to prices on bond issues outstanding on the New York Stock Exchange (NYSE) on December 31st. These "risk premia" are given *per issuer* and along with financial ratios. Replicating R. West's work, these datasets have been matched with the relevant issues of the *Moody's* manuals[20].

In order to deal with the 1970's ruling, the starting point has been data communications by *S&P* and *Moody's* according to their archiving of American corporate bond rating histories. These datasets provide bond ratings outstanding on December 31st 1971, 1973 and 1975. At the end of 1973, the use of ratings by the SEC has been recently proposed and at the end of 1975, the rule 15c3–1 has been on for 6 months (see, *supra*, note 8). When information on the bond issue bearing the rating was missing, it has been found in the *Mergent Fixed Income Securities Database* (*FISD*). In order to get information on the issuing company, the resulting datasets were merged with the *Compustat North America Industrial Annually* database. The next step is to compute actual yields. To be able to do so, bond prices have been hand-computed following the New York Stock Exchange (NYSE) quotations as reported by the *Bank and Quotation Report*. Last but not least, the outcome was a number of datasets plotting ratings, prices, etc., *per bond issue*. To ensure comparability with the tests for the 1930's, weighted average yield spreads *per bond issuer* had to be computed. The respective outstanding amounts were found in the relevant issues of the *Moody's Industrials* and *Public Utilities* manuals[21]. Table 1 displays the respective populations per rating categories.

Table 1 – Sample Size and Rating Categories

	RATING	1927	1932	1937	1949	1953	1971	1973	1975
Investment grades	Aaa/ AAA	10	3	4	1	2	9	11	15
	Aa/ AA	9	4	5	12	16	24	31	32
	A/ A	15	4	8	15	29	50	57	79
	Baa/ BBB	18	14	27	16	21	15	14	18
Non-investment grades	Ba/ BB	14	10	19	13	8	3	4	3
	B/ B	--	10	10	2	4	4	6	5
	Caa/CCC	--	--	2	--	--	--	--	--
	Total (N)	66	45	75	59	80	105	123	152

-- : unrelevant

[20] Unfortunately, this did not lead to a perfect replication… the differences are however sufficiently small to be overlooked. Compare datasets size in Table 1 to the following ones inferred from West (1973, table 2 p. 166): 67 (1927); 44 (1932); 84 (1937); 63 (1949); 81 (1953).

[21] These are averages *given all variables in our model*. Doing so, ratings from *Moody's* and *S&P* are treated as equivalent. Observations do remain distinct in case of (a) a different level of proxies for bond covenants or (b) a difference between *S&P* and *Moody's* ratings (a split rating; a limited access to historical data makes it very rare in the present setting).

3.2 Variable selection

Table 2 summarizes data definitions and sources. With equation (4) in mind, the main concern is to account for credit risk (C_i). A first and conventional step is to focus on financial ratios. This can lead to a broad discussion and to a quite extensive set of relevant predictors (see, for example, Chan &Jengadesh (2001, Appendix p. 23)). Note however that the exercise is neither about finding the best approximation for credit risk nor about aiming at the best ratings determinants. The goal is to find a set of control variables that can be viewed as a potential standard for a typical investor: a balance has to be stricken between accuracy and simplicity. A minimal requirement is to pick financial ratios from at least each of the following broad categories: i) liquidity, ii) profitability and iii) capital structure. An example is: i) liquidity: the volume of bond outstanding[22], ii) profitability: the 9 years net income variation coefficient and iii) capital structure: the ratio of equity market value on par value of debt. These variables and a proxy for financial reliability make the Fisher (1959) model.

The building of new datasets for the early 1970's brought the opportunity to depart from a straight use of this Fisher (1959) model. Previous studies could be interpreted as pointing out the choice of: i) liquidity: firm size, ii) profitability: interest coverage or operating margin and return on assets, iii) any measure of leverage (see Livingston *et al.* (2008, p. 17 and table 1 p. 39)). This said, looking for a standard way to analyze default risk, the success and common use of the Z score models must be outlined (see Altman (1968) and Altman (2000)). It has indeed been quite common to plot Z scores against ratings. Brister et al. (1994) replicated a Z score methodology in order to use the computed scores as default risk proxies in a cross examination of ratings and yields. This two stepped process started with a Multi Discriminant Analysis, which went along with several hypotheses and computational complexity. Rather than focusing on the output of a Z score model, the inputs make an interesting set of predictors for credit risk. For instance, Altman &Rijken (2004) uses these Z score determinants to build an "agency rating prediction model" and to run ordinal logit regressions. This model was also including the number of years since a company was first rated by a company (see Altman &Rijken (2004, p. 2686)). This can be considered as adding a proxy for financial reliability to a set of widely acknowledged financial ratios. This "agency ratings prediction model" is then particularly interesting in an investigation parallel to one dealing with the Fisher (1959) model.

Still with equation (4) in mind, dealing with issue characteristics other than default risk (X_i) is a rather difficult task. The bond prospectus may include numerous features and their relevance for the bond pricing process is open to discussion (see Kose et al. (2008)). A cautious strategy can then be to gather a sample of bond issues with similar features and hence focus on ratings and default risk variables (see Livingston et al. (2003, 2 p. 22)). In a similar manner, Fisher (1959) took care of these characteristics during the computation of yield spreads. Building the datasets for the 1970's,

[22] Original purpose of the volume of bond outstanding was to account for marketability but has then traditionally been interpreted as a proxy for liquidity.

information on the subordination and security level of bond issues could be gathered and is summarized thanks to two dummies variables (SUB and SEC). There is unfortunately no account of other common features such as the presence of a call and/or the one of a sinking fund.

Last but not least, Fisher (1959) focused on industrial bond issues. Gathering data on the early 1970's gave the opportunity to get a broader view: original datasets covered corporate bond issues and then mixed industrials and utilities issues, which are usually considered as two different realms (especially when dealing with financial ratio analysis). Instead of splitting the datasets, what is proposed here is the other option of including a dummy variable coding for public utilities (UTILITY) to the model. Table 2 summarizes variable definitions and data sources.

Table 2 – Variables Definitions and Sources

	Name	Definition	Source
Numerical	AYSprd	Weighted averages (*given all variables in the models* and using outstanding volumes on 31st) of absolute yield spread (Yi – YREFi)	Fisher (1959, appendix D p.66) *Bank and Quotation record* *CRSP* Monthly Treasury fixed term indices and Fama risk free rate *Moody's* manuals
	PROFa	Net income after all charges and taxes: 9 years variation coefficient (=standard deviation / arithmetic mean)	Fisher (1959, appendix D p.66, x1)
	PROFb	Retained earnings / Total assets	Compustat Industrials Annually (data 36 / data 6)
	PROFc	Earnings before interest and taxes / Total assets	Compustat Industrials Annually ((data 170 + data 15) / data 6))
	LEVa	Market value of equity / par value of debt	Fisher (1959, appendix D p.66, x3)
	LEVb	Market value of equity / book value of total liabilities	Compustat Industrials Annually ((data 24 * data 25) / data 181)
	LIQUIa	Bond outstanding volume	Fisher (1959, appendix D p.66, x4)
	LIQUIb	Book value of total liabilities / US equity market capitalization	Compustat Industrials Annually (data 181) and CRSP database
	LIQUIc	Working capital / Total assets	Compustat Industrials Annually (data 179 / data 6)
	BCKGRNDa	Period of solvency since creation or last default episode	Fisher (1959, appendix D p.66, x2)
	BCKGRNDb	Years since a firm was first rated by an agency	*S&P* and *Moody's* communications
Categorical	RATING	Effect codings for bearing *Moody's* and/or *S&P*'s ratings	*Moody's* manuals *S&P* and *Moody's* communications
	SPLIT	Dummy coding for: "two different ratings levels *given all other predictors*"	*Moody's* manuals *S&P* and *Moody's* communications
	SUB	Dummy coding for subordination	*S&P* dataset and Mergent FISD
	SEC	Dummy coding for security	*S&P* dataset and Mergent FISD
	UTILITY	Dummy coding for public utilities	Compustat issuer codes

3.3 Model specification

Using the previous remarks and building on equation (4):

$$YSprd_{i,} = f\ (LIQUw_i, PROFx_i, LEVy_i, BCKGRNDz_i, R_j, X_j, \varepsilon_{4ai}) \quad (4a)$$

Where, $YSprd_i$: yield spread on issue i
$LIQUw_i$: Liquidity proxy "w" for issuer of i
$PROFx_i$: Profitability proxy "x" for issuer of i
$LEVy_i$: Leverage proxy "y" for issuer of i
$BCKGRNDz_i$: financial background proxy "z" for issuer of i
R_i : bond rating level for issue i
X_i : other characteristics of issue i
ε_{4ai} : random error

Furthermore, following Fisher (1959), a new target variable is defined as follows:

If there is any $k \geq 1$, such as $LIQUw_i = LIQUw_{i+1} = (\ldots) = LIQUw_{i+k}$

AND $PROFx_i = PROFx_{i+1} = (\ldots) = PROFx_{i+k}$

$(\ldots)$

AND $X_i = X_{i+k}$

Then, $AYSPRD_i = \sum_{j=i}^{i+k} \omega_j\ YSprd_{j,} \Big/ \sum_{j=i}^{i+k} \omega_j$, where ω_j: outstanding volume on issue *j*

Otherwise, $AYSPRD_i = YSprd_{i,}$

For datasets intended to deal with 1930's regulation enactment, the first task is to provide a close discussion of West (1973) by running regressions following equations (2a) and (3a):

$$Log\ (AYSprd_i) = \alpha_{2a} + \beta_{2a1} Log(1/PROFa_i) + \beta_{2a2}\ Log(LEVa_i) + \beta_{2a3} Log(LIQUIa_i) + \beta_{2a4}\ Log(BCKGRNDa_i) + \varepsilon_{2a\,i} \quad (2a)$$

$$\varepsilon_{2ai} = \alpha_{3a} + \beta_{3a1} Log(1/PROFa_i) + \beta_{3a2}\ Log(LEVa_i) + \beta_{3a3}\ Log(LIQUIa_i) + \beta_{3a4}\ Log(BCKGRNDa_i) + RATING_i + \varepsilon_{3ai} \quad (3a)$$

where, α, β : constants
ε : random error

Equation (2a) is a standard ordinary least square (OLS) regression case that allows a check on how the present empirical setting replicates the one of Fisher (1959). Controlling for the variability in regression residuals, equation (3a) is a Levene's test handled thanks to Generalized Linear Model statistical routines. Equation (3a) checks on the relevancy of the tailored "two stage" analysis found in

West (1973). Furthermore, the results of this close discussion motivate a straightforward multivariate setting using the following ANCOVA equation:

$$\text{Log}(\text{AYSprd}_i) = \alpha_{4b} + \beta_{4b1}\text{Log}(1/\text{PROFa}_i) + \beta_{4b2}\text{Log}(\text{LEVa}_i) + \beta_{4b3}\text{Log}(\text{LIQUIa}_i) + \beta_{4b4}\text{Log}(\text{BCKGRNDa}_i) + \text{RATING}_i + \varepsilon_{4bi} \quad (4b)$$

To deal with the regulation of broker dealers in the early 1970's, similar multivariate estimations are run on genuine datasets. This time they are based on the Altman &Rijken (2004) rating prediction model:

$$\text{Log}(\text{AYSprd}_i) = \alpha_{4c} + \beta_{4c1}\text{Log}(1\text{-PROFb}_i) + \beta_{4c2}\text{Log}(1\text{- PROFc}_i) + \beta_{4c3}\text{Log}(\text{LEVb}_i) + \beta_{4c4}\text{Log}(\text{LIQUIb}_i) + \beta_{4c5}\text{Log}(1\text{-LIQUIc}_i) + \beta_{4c6}\text{Log}(\text{BCKGRNDb}_i) + \beta_{4c7}\text{SUB}_i + \beta_{5c8}\text{SEC}_i + \beta_{4c9}\text{SPLIT}_i + \beta_{4c10}\text{UTILITY}_i + \text{RATING}_i + \varepsilon_{4ci} \quad (4c)$$

where, α, β : constants
ε : random error

4. Results

For each of the cross-sections surrounding rating driven regulations of the 1930's, table 3 provides a summary of statistical outputs. The first set of columns gives results for the Fisher (1959) model alone (equation 2a). It can be seen that this model performs well and in line with previously reported results given in annex A. However, in the second set of columns (equation 3a), the study of residuals shows that these regressions are not perfect: non constant variance remains in all years except 1927. A further result is that ratings help explaining this non constant variance in 1932, 1937 and 1953. Yet note that the coefficients for non-investment grades are not statistically significant. This finding provides a critique of the analysis found in West (1973).

Going beyond such a critique means focusing on the fact that ratings can help reduce the non-constant variance in the residuals of the regressions using the Fisher (1959) model. Ratings could be treated as an originally omitted variable. But, as pointed out before writing equation (4), there is no reason to omit ratings in a straightforward multivariate analysis. For this reason, the first columns of table 4 give the results of an ANCOVA analysis with ratings as a categorical variable and with covariates relying on Fisher (1959) (equation 4b). When residuals did exhibit non-constant variance, a weighted analysis has been performed. In straight line with the results displayed in table 3, this

analysis was not needed for 1927. In all other cases, non constant variance has been addressed as far as can be judged by using the predictors in the original regressions[23].

	Table 3 - A Critique of West (1973)									
	Explaining variability in: LOG(AYSPRD)					*Explaining variability in: ABS(ε2a)*				
PREDICTORS	1927	1932	1937	1949	1953	1927	1932	1937	1949	1953
Constant	1,750 ***	2,380 ***	2,100 ***	1,500 ***	2,320 ***	0,930 *	0,810 *	0,387 **	1,310 ***	0,818 ***
LOG(1/PROFa)	-0,210 ***	-0,310 **	-0,263 ***	-0,327 ***	-0,187 -				-0,264 *	
LOG(LEVa)	-0,417 ***	-0,486 ***	-0,567 ***	-0,425	-0,483 ***		0,152 -			
LOG(LIQUIa)	-0,181 ***	-0,287 ***	-0,261 ***	-0,314 ***	-0,355 ***				-0,116 **	
LOG(BCKGRNDa)	-0,178 ***	-0,072	-0,222 ***	-0,080 ***	-0,315 ***			0,168 ***		
Aaa /AAA							0,435	0,435 **		-0,622 **
Aa /AA							-0,436 *	0,568 ***		0,254 **
A/A							-0,287	-0,334 **		-0,160
Baa /BBB							-0,025	-0,092		-0,059
Ba /BB							0,327 *	-0,148		0,187
B /B							-0,014	-0,003		0,400
Caa /CCC								-0,426		
Standard error	0,346	0,56	0,507	0,462	0,531	0,648	0,572	0,519	0,558	0,562
R^2 (%)	73,20	73,80	74,80	72,40	69,30	5,17	23,22	27,69	15,90	13,15
Adjusted R^2 (%)	71,50	71,10	73,30	70,30	67,70	0,00	11,09	20,13	12,90	7,29
N	66	45	75	59	80	66	45	75	59	80

*** = p value < 5%, ** = p value < 10%, * = p value < 15%, ~ = p value < 20%

Given this weighted analysis, the R^2 displayed in Table 4 are not straightforward goodness of fit measures[24]. With this disclaimer in mind, the overall performance seems to have benefited from introducing rating along with the Fisher (1959) model. Furthermore, this overall performance increases to reach a peak in 1937 and then decreases so that the level in 1953 is similar to the one in 1927. West (1973, note 22 p.165) stated that including ratings with the help of dummies and running a multivariate analysis led to an unfortunate perturbation in the estimation of coefficients for predictors. Introducing a RATING variable in the multivariate analysis has certainly put BCKGRNDa to a test. However, the three other covariates perform well and when coefficients are significant their sign is similar to the one in the Ordinary Least Square setting. Last but not least, the statistical significance of RATING is always validated.

[23] Further details about this analysis are available upon request to the author

[24] The reported value are not $R^2 = 1 - (\text{Residual Sum of Square/Total Sum of Square})$ but approximations defined by $R^2 = (pF) / (pF + n - p - 1)$ where p is the number of predictors in the model.

	Table 4 - More Than A Critique of West (1973)								
	Explaining variability in: LOG(AYSPRD)						*Explaining variability in: LOG(AYSPRD)*		
PREDICTORS	1927	1932	1937	1949	1953	PREDICTORS	1971	1973	1975
Constant	1,032 ***	1,491 ***	1,070 ***	1,276 ***	1,182 ***	Constant	-3,992 ***	-5,070 ***	-4,658 ***
LOG(1/PROFa)	-0,127 ***	-0,284 ***	-0,108 ***	-0,265 ***	0,024				
						LOG (1-PROFb)	0,849 ***	0,447 ***	0,406 **
						LOG(1-PROFc)	0,159	0,495	0,963 ~
LOG(LEVa)	-0,288 ***	-0,164 **	-0,401 ***	-0,312 ***	-0,349 ***				
						LOG(LEVb)	0,016	-0,252 ***	-0,223 ***
LOG(LIQUIa)	-0,099 ***	-0,114 *	-0,135 ***	-0,171 ***	-0,127 ***				
						LOG(LIQUIb)	-0,253 ***	-0,332 ***	-0,262 ***
						LOG(1-LIQUIc)	-0,191 ~	0,293	-0,120
LOG(BCKGRNDa)	-0,074	0,019	-0,026	-0,137 **	-0,203 ***				
						LOG(BCKGRNDb)	-0,048 ***	0,035	-0,038 *
Aaa /AAA	-0,379 ***	-1,133 ***	-1,200 ***	-0,744 ***	-0,585 **	Aaa /AAA	0,008	-0,388 ***	-0,659 ***
Aa /AA	-0,086	-0,613 ***	-1,082 ***	-0,317 ***	-0,766 ***	Aa /AA	-0,069	-0,341 ***	-0,317 ***
A/A	-0,102 ~	-0,198	-0,171 ~	-0,351 ***	-0,426 ***	A/A	0,019	-0,214 **	-0,037
Baa /BBB	0,162 ***	0,240 **	0,240 ***	-0,071	0,175 **	Baa /BBB	-0,203	0,041	0,213
Ba /BB	0,405	0,971 ***	0,667 ***	0,520 ***	0,755 ***	Ba /BB	0,038 ***	0,316	0,764 ***
B /B		0,733	0,650 ***	0,963	0,847	B /B	-0,207	0,586	0,036
Caa /CCC			0,896						
						SUB	-0,309 ***	-0,379 **	0,012
						SEC	-0,193	-0,093	0,013
						UTILITY	-0,198	-0,233 ***	0,076
						SPLIT	0,107	0,122	0,382
Standard error	0,311	0,697	0,677	0,652	0,829	Standard error	0,513	0,66	1,036
R^2 (%)	79,85	87,76	91,89	84,63	81,08	R^2 (%)	69,97	70,99	90,69
Adjusted R^2 (%)	77,03	84,61	90,62	81,80	78,64	Adjusted R^2 (%)	64,91	66,92	89,66
N	66	45	75	59	80	N	105	123	152

*** = p value < 5%, ** = p value < 10%, * = p value < 15%, ~ = p value < 20%

The second set of columns on table 4 deals with genuine cross-sections at the beginning of the 1970's (equation 4c). Considering that the detailed discussion of West (1973) has shown that the multivariate analysis was appropriate, here are the results of an ANCOVA setting involving ratings and the Altman &Rijken (2004) model. Again, a weighted analysis has been found helpful. To justify this analysis, non constant variance in residuals has first been evidenced by using all the predictors in the model and the *Standard & Poor's* Industry Classification (SIC) codes. Using weights has been successful in correcting non constant variance as far as can be judged by this limited set of control variables[25]. The goodness of fit measures indicate fair results. The performance remains similar in 1971 and 1973 and rises in 1975. Only RATING and two covariates (LIQUIb and 1-PROFb) have an explanatory power for every investigated year. LEVb, LIQUIb and SUB proved significant twice; UTILITY is significant only once. 1- PROFc, SEC and SPLIT never have an explanatory power.

By looking at the results of these two multivariate settings, one has to reject the first null hypothesis for every investigated year and admit: (ha) = "ratings have an explanatory power". But "an explanatory power" may not be enough for a categorical variable. Since the chosen ANCOVA models do not include interactions, the significance of RATING can be further assessed with the help of Tukey multiple comparison tests. Table 5 gives a summary of the produced results. The process is iterative: after picking the top rating category as a reference, the relevance of sorting this category (Aaa/ AAA) from the next ones is tested; then the relevance of the second one (Aa/ AA) against the remaining categories; and so on. These tests control for the fact that a categorical variable may reach statistical significance by chance.

Overall, the rating scale is often poorly validated. Note however that what is tested is the significance of the rating categories *given all other variables in the model*. This overall result is then hardly surprising given the pertinence of both the Fisher (1959) and the Altman &Rijken (2004) models. A further disclaimer is that small samples are not well suited to study the significance of rating categories.

On the left-hand side of Table 5, as soon as 1927, the only rating category to exhibit statistical significance is the first of the non-investment grades (Ba/ BB). Well before the passing of any financial regulation, one may conclude to an investment grade effect, which would then be validated for the next 4 years. This investment-grade effect would predate any rating-driven regulation. This said, the aim of these tests is to look at the pertinence of the whole rating scale. The core result here is then a climax in 1937. This result strongly differs from West (1973) pointing to over-inflated non-investment grade yields in 1949 and in 1953. Note also that this means drawing attention to the widely debated ruling by the Comptroller of the Currency in 1936 instead of focusing on the joint restatement

[25] A variable coding for industry codes is the only control for an omitted variable in the non constant variance analyses. SIC codes are given in Compustat Industrial Annually (DNum). The weighted analysis successfully address concerns about residuals *only once* a limited number of outliers have been taken out (2 in 1971; 1 in 1973 and 2 in 1975). Descriptive statistics and results produced here are then for samples without these outliers. As previously stated, the complete breakdown of this analysis is available upon request to the author.

by all federal banking authorities in 1938 (see, *supra*, section 1). On the right hand side of Table 5, there is no sign of a particular relevance for the first of non-investment grades. In 1971 and 1973, the only rating categories that prove significant are either one rank above (Baa /BBB) or one rank below (B /B). Once again, the main result is that most of the rating scale proved significant beyond the 5% level in 1975 as opposed to the two previous years.

Table 5 – A Closer Look at the Significance of the Rating Scale

*** = *p* value < 5%, ** = *p* value < 10%, * = *p* value < 15%
-- : unrelevant

1927	Aaa AAA	Aa AA	A A	Baa BBB	Ba BB	B B
Aaa/ AAA	--	--	--	--	--	--
Aa/ AA		--	--	--	--	--
A/ A			--	--	--	--
Baa/ BBB	***			--	--	--
Ba/ BB	***	***	***		--	--
B/ B	--	--	--	--	--	--

1932	Aaa AAA	Aa AA	A A	Baa BBB	Ba BB	B B
Aaa/ AAA	--	--	--	--	--	--
Aa/ AA		--	--	--	--	--
A/ A			--	--	--	--
Baa/ BBB	**	***		--	--	--
Ba/ BB	***	***	***	***	--	--
B/ B	***	***	***	*		--

1937	Aaa AAA	Aa AA	A A	Baa BBB	Ba BB	B B
Aaa/ AAA	--	--	--	--	--	--
Aa/ AA		--	--	--	--	--
A/ A	***	***	--	--	--	--
Baa/ BBB	***	***	**	--	--	--
Ba/ BB	***	***	***	***	--	--
B/ B	***	***	***	***		--
Caa/ CCC	***	***	***	***		

1949	Aaa AAA	Aa AA	A A	Baa BBB	Ba BB	B B
Aaa/ AAA	--	--	--	--	--	--
Aa/ AA		--	--	--	--	--
A/ A			--	--	--	--
Baa/ BBB				--	--	--
Ba/ BB	***	***	***	***	--	--
B/ B	**					--

1953	Aaa AAA	Aa AA	A A	Baa BBB	Ba BB	B B
Aaa/ AAA	--	--	--	--	--	--
Aa/ AA		--	--	--	--	--
A/ A			--	--	--	--
Baa/ BBB		***	***	--	--	--
Ba/ BB	***	***	***	***	--	--
B/ B	***	***	***	***		--

1971	Aaa AAA	Aa AA	A A	Baa BBB	Ba BB
Aaa/ AAA	--	--	--	--	--
Aa/ AA		--	--	--	--
A/ A			--	--	--
Baa/ BBB			***	--	--
Ba/ BB					--
B/ B				***	

1973	Aaa AAA	Aa AA	A A	Baa BBB	Ba BB
Aaa/ AAA	--	--	--	--	--
Aa/ AA		--	--	--	--
A/ A			--	--	--
Baa/ BBB	**	***	*	--	--
Ba/ BB					--
B/ B	***	***	***		

1975	Aaa AAA	Aa AA	A A	Baa BBB	Ba BB
Aaa/ AAA	--	--	--	--	--
Aa/ AA	***	--	--	--	--
A/ A	***	***	--	--	--
Baa/ BBB	***	***	*	--	--
Ba/ BB	***	***	***		--
B/ B					

These results can be interpreted as invalidating (H_0). Beyond acknowledging that the explanatory power of ratings does change over the selected years, the increase of this explanatory power both in 1937and in 1975 provide two hints of a regulatory value. After introducing a theory of

bond rating as coordination variables, Boot et al (2006, p. 112) mentions an exogenous key point: the fact that institutional investors face restrictions linked to ratings. Along this line of thoughts, the two increases may be interpreted as pointing respectively to the 1936 US Comptroller ruling on bank investment and to the 1975 SEC rule on broker-dealers, which would have increased the value of ratings as "focal points".

5. Concluding remarks

Echoing a casual reading of Hickman (1958) that has had some success, West (1973) exhibits an over-inflation of non-investment grade corporate bond yields in 1949 and 1953 as a lasting and straightforward effect of the 1938 regulation of bank investment. It is then tempting to conclude that the public use of ratings would have altered how investors value bonds. Yet, how come other developments did not challenge such a straightforward effect? Proponents of a "regulatory induced" premium need to investigate why arbitrage by unconstrained investors has not taken place. For example, up to 1953 and under certain conditions, insurers could invest in bonds below the regulatory threshold on which West (1973) and others focused. Of course, one answer may be that these unconstrained investors did not have a sufficient market power to influence a structurally altered market place. Glenn (1976) then introduces a theoretical discussion focusing on the prohibition of short-sales. This burden of proof aside, this paper came back on West (1973) with the help of modern regression routines and did not find evidence of a "regulatory premium" for non-investment grade bond. This paper then criticizes an alleged straightforward effect of rating driven regulations introduced in the 1930's. This contribution is similar to Fridson (1994, pp. 49-50) showing how readers inferring a similar effect from Hickman (1958) were misled (see, *supra*, section 2).

Going beyond such a critique, the focus on non-investment grade bond yields may be removed. Another effect of the ruling could be an increase in the reliance on bond ratings for the pricing *of all bond issues*. Looking at the overall pertinence of ratings for investors in the 1930's and 1970's with no spectacular effect as a guide provides a discussion of the standard literature on the structural relation between ratings and yields. This literature usually interprets the statistical significance of ratings as a proof of their informational value. This paper then looks at how this informational value evolves with the passing of financial regulation using ratings. When the explanatory power of ratings changes over the selected cross-sections, the interesting results are that there is a climax in 1937 and a striking improvement in 1975. These findings deserve the following comments.

Why do yields gravitate more around ratings in these two years? or what may have caused an increased reliance on ratings for these particular years? An appealing idea is that once authorities officially endorse ratings, their value as "focal points" rises (see Boot et al (2006)). However, the question does remain open. First, difficulties in building first-hand datasets led to an unfortunate lack

of cross sections for years after the passing of the 1975 regulation by the SEC. They would have helped to assess whether the 1975 striking improvement lasted or proved a temporary climax as 1937 did. Secondly, this paper was meant to be a discussion of West (1973) and then relied on data from Fisher (1959). This brought a number of methodological choices, which applied to the 1970's extension for the sake of comparability. Overall, the present investigation may then appear disconnected from the modern finance literature on the pricing of debt issues (see, for example, Elton et al. (2001 &2004)). The overall empirical approach is not fundamentally obsolete but there would be a lot to gain in importing more sophisticated credit risk pricing techniques. Thirdly, this finding needs to be further investigated by looking at the dynamics of the relationship between ratings and yields. Given the liquidity of the corporate bond market up to the 1940's (see Biais &Green (2007)), a more promising strategy would focus on how yields react to rating changes before and after the enactments of the 1930's (see Jorion et al. (2005) and Boot et al. (2006)).

These improvements may bring a better view on whether the use of rating in regulations had an impact on their value for investors. Yet an "informational" framework may be restrictive for studying the impact of these financial regulations. For example, recent contributions suggest paying more attention to the capital structure of corporations (see Faulkender &Peterson (2006), Kisgen (2006), Sufi (2009) and Kisgen (2009)). A look at the balance sheet of the regulated financial intermediaries is also well deserved. Musing on the choice of 1930's regulators, Flandreau et al. (2009, p. 23) pioneered this perspective by computing the nominal benefit from booking at face value. Last but not least, in an early comment of the regulations enacted in the 1930's, Harold (1938, pp. 33-34) mentioned a first "practical effect" on non-investment grade yields but also "more far reaching effects" such as the development of other more yielding avenues of investment. About 70 years later, comments on the recent credit crisis often noted that regulatory arbitrage had been a rationale for the boom of structured finance.

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ANNEX - A

Date	Number of observations	Degrees of freedom	R^2	Constant	Elasticities			
					Earnings variability	Period of solvency	Equity to debt ratio	Bonds outstanding
1927–53	366	361	0.750	0.987	+0.307	−0.253	−0.537	−0.275
					(0.032)	(0.036)	(0.031)	(0.021)
1927	71	66	0.756	0.874	+0.233	−0.269	−0.404	−0.169
					(0.048)	(0.062)	(0.039)	(0.031)
1932	45	40	0.726	1.014	+0.248	−0.067	−0.531	−0.286
					(0.128)	(0.114)	(0.092)	(0.071)
1937	89	84	0.731	0.949	+0.286	−0.254	−0.491	−0.271
					(0.051)	(0.061)	(0.060)	(0.038)
1949	73	68	0.786	0.711	+0.228	−0.124	−0.426	−0.329
					(0.100)	(0.076)	(0.084)	(0.046)
1953	88	83	0.773	1.012	+0.228	−0.300	−0.474	−0.363
					(0.091)	(0.089)	(0.085)	(0.043)
1960	106	101	0.803	1.539	+0.219	−0.232	−0.319	−0.218
					(0.048)	(0.060)	(0.044)	(0.035)
1965	115	110	0.747	0.863	+0.287	−0.321	−0.439	−0.245
					(0.076)	(0.092)	(0.053)	(0.043)

Source: Pandini (1969, p 221)