Christian C. Opp, Marcus M. Opp, and Milton Harris

Rating agencies in the face of regulation

"The story of the credit rating agencies is a story of colossal failure."
Henry Waxman (D-CA), Chairman of the House Oversight and Government Reform
Committee.

Massive downgrading and defaults during the 2008/2009 financial crisis have led politicians, regulators, and the popular press to conclude that the rating agencies' business model is fundamentally flawed. The popular argument goes as follows. Issuers of securities naturally prefer higher ratings for their issues, because these reduce their cost of capital. Because the issuer pays the rating agency to provide a rating, rating agencies can capture some or all of the benefit to the issuer of providing high ratings. This results in "huge conflicts of interest" (Krugman, NYT 2010) between rating agencies and investors, because rating agencies have an incentive to inflate their ratings relative to the information available.

Paying for ratings does not always work

Recent academic studies provide a more nuanced perspective. For example, although rating standards in the residential mortgage-backed securities (MBS) market declined in the years leading up to the 2008/2009 crisis (Ashcraft-Goldsmith-Pinkham-Vickery, WP 2010), they stayed conservative for corporate bonds. Similarly, exotic, structured securities receive a much higher percentage of AAA ratings (e.g., 60% for collateralized debt obligations or CDOs) than do corporate bonds (1%, see Fitch, Brochure 2007: "Inside the ratings," Information brochure, Fitch). These facts are difficult to explain based purely on conflicts of interest inherent in the issuer-pays model. Moreover, the simple conflict-of-interest story ignores the importance of reputation for credit rating agencies.

Mechanical regulator rating use is to blame

But if it is not the conflict of interest between investors and credit rating agencies that caused the apparent inflation in ratings during the financial crisis, what does explain this event? We argue the culprit is the mechanical use of ratings in government regulation of financial institutions. The cost of regulatory compliance for these institutions, e.g., capital and reserve requirements, is reduced to the extent that they invest in highly rated securities instead of lower rated securities. Some or all

of the regulatory cost reduction can be captured by the rating agency in the form of higher fees for a rating. This outsourcing of regulatory risk assessment to credit rating agencies provides them with a source of revenue that is unrelated to the informativeness of the rating which can produce incentives for rating inflation that are not abated by the agencies' reputation concerns. Even if rating agencies cannot fool investors into believing that higher rated securities are less risky, they can still capture (some of) the regulatory cost reduction for higher ratings by issuing more high ratings. (Incorporating the regulatory use of ratings into the analysis is also appealing because there is extensive empirical evidence that regulatory implications of ratings are a first-order concern for marginal investors; that is, ratings affect market prices through the channel of regulation, independent of the information they provide about the riskiness of securities (Kisgen-Strahan (RFS 2010) and Ashcraft-Goldsmith-Pinkham-Hull-Vickery (AER 2011)).)

Our model

We incorporate our idea in a simple model that includes a large number of potential issuers (firms), a rating agency, and a large number of regulated investors who compete to purchase the issued securities. Issuers of securities within a given class (e.g., corporate bonds or mortgage backed securities) are of heterogeneous quality. In particular, there are two types of issuers, "good" issuers with positive NPV projects and "bad" issuers with negative NPV projects. The average NPV of all issuers is assumed to be negative. Each issuer knows its own type, but this information is not available to the credit rating agency or investors. The credit rating agency tries to identify the types (good or bad) of issuers by collecting costly information. The information technology generates a noisy binary signal (A or B), whose accuracy is larger the more the rating agency spends on information acquisition. Given its information, the rating agency assigns one of two ratings, A or B, to an issuer that requests a rating. The rating may be the same as the signal or not, e.g., the rating agency can report an A rating even if its signal is B.
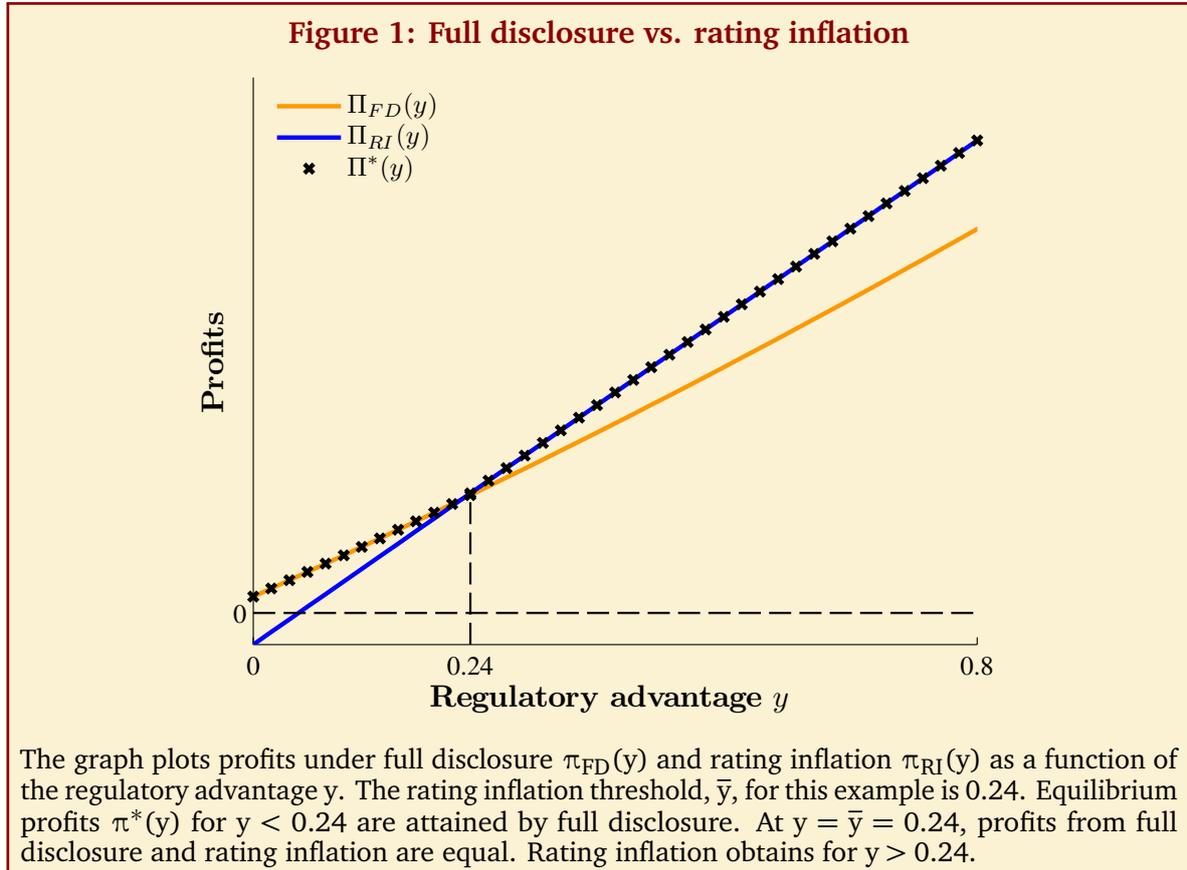
As is the case in reality, issuers may request a rating for free, but, after seeing the rating, must choose whether to pay the rating agency to publish it. They will do so if and only if the rating allows the firm to sell the issue to investors at a price that covers the firm's investment cost plus the rating agency's fee. Regulated investors purchase issues at this price if and only if they expect at least to break even on the purchase, including any savings in regulatory compliance if the issue receives an A rating (investors will not purchase B-rated securities, because these will have negative NPV and offer no savings in regulatory compliance). We refer to the investors' savings in regulatory compliance as the regulatory advantage, denoted y, of an A rating.

The rating agency chooses its fee, how much to spend on generating information, and how to assign ratings given the resulting information signal to maximize its expected revenue from selling ratings net of its cost of generating the signal, given the behavior of firms and investors. Having a monopoly on issuing ratings, the rating agency sets its fee to make investors just willing to purchase A-rated securities and firms just willing to purchase A ratings. If ratings are sufficiently informative, the average project NPV of the firms with A ratings becomes positive (i.e., a high enough fraction

of A-rated firms is good). In this case, the rating agency captures the regulatory advantage from investors and some of the NPV of the A-rated firms' projects.
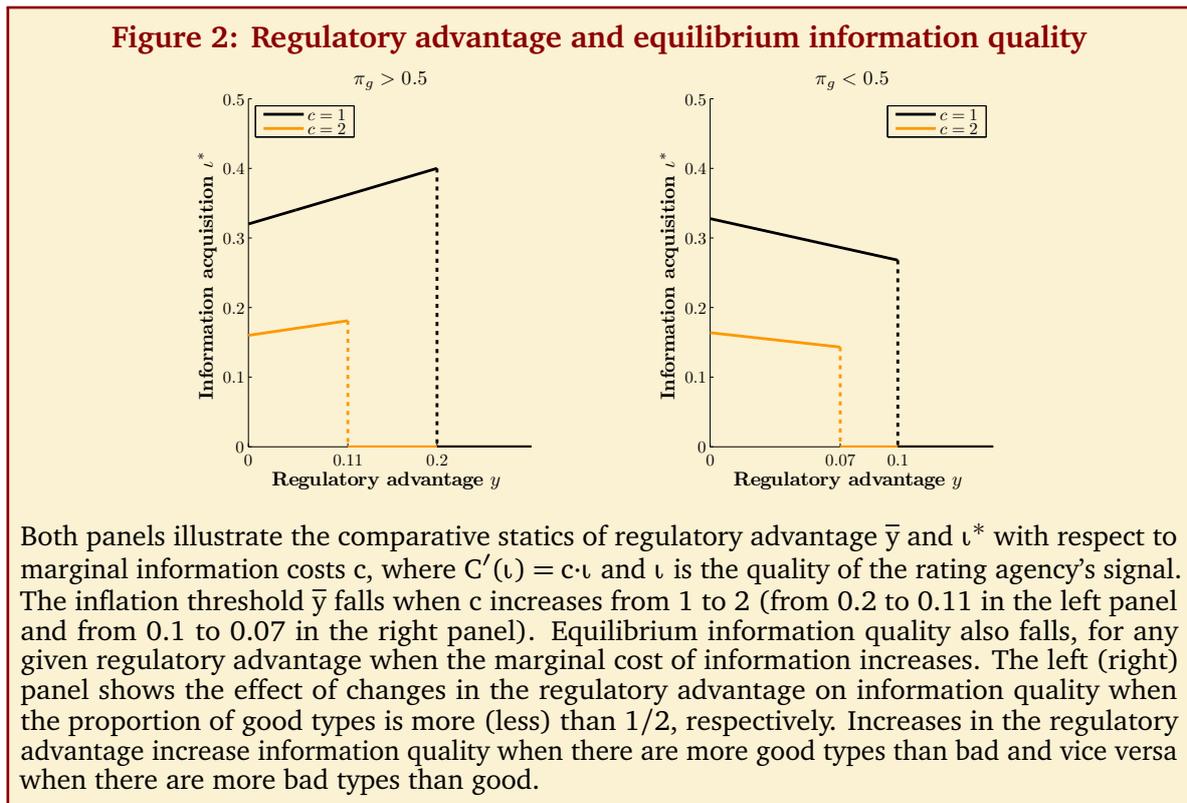
Rating inflation can make sense under regulation

It is easy to see that the rating agency, if it invests in producing information, will report its signal truthfully, because otherwise there is no point in producing the information. The rating agency will, therefore, pursue one of two strategies: **rating inflation**, i.e., produce no information at zero cost and rate all issues as A; or **full disclosure**, i.e., produce some information, report it truthfully, and sell ratings on all securities that receive A signals. The advantage of rating inflation is that it maximizes the volume of ratings sold and has no information cost. The disadvantage is that the NPV of the resulting A-rated projects will be the average project NPV in the population, which is negative, reducing the agency's fee below the regulatory advantage y of A-rated securities. Thus, rating inflation will be optimal only when the regulatory advantage is large relative to the cost of producing information and the average NPV of the firms in the population. We denote the threshold for the regulatory advantage above which the rating agency pursues rating inflation by $\bar{y}$. It is important to note that when $y \leq \bar{y}$, there is no attempt by the rating agency to inflate ratings, despite the fact that the issuer pays for its own rating. Rating agency profits for the two strategies are plotted in Figure 1.

Figure 1: Full disclosure vs. rating inflation

The graph plots profits under full disclosure $\pi_{FD}(y)$ and rating inflation $\pi_{RI}(y)$ as a function of the regulatory advantage y. The rating inflation threshold, $\bar{y}$, for this example is 0.24. Equilibrium profits $\pi^*(y)$ for $y < 0.24$ are attained by full disclosure. At $y = \bar{y} = 0.24$, profits from full disclosure and rating inflation are equal. Rating inflation obtains for $y > 0.24$.

More complex securities are more inflated

The threshold $\bar{y}$ is determined by the cost of producing information and the characteristics of the issuers, such as the fraction of good types, denoted π_g, and the profitability of their projects. If the regulatory subsidy for a high rating is close to the threshold, small changes in these parameters can have a huge impact on the informativeness of ratings. In particular, we show that the threshold $\bar{y}$ decreases with increases in the cost of information, the fraction of good issuers in the population, and the profitability of a good project. (Figure 2 illustrates the first two results.) Thus a small increase in any of these characteristics, as well as a small increase in the regulatory subsidy itself, can result in ratings that change from informative to totally useless. In particular, it seems plausible that newer, more complex securities are more costly to rate than traditional securities (such as corporate bonds) for which rating agencies have considerable experience. Our result then implies that ratings of newer, more complex securities may be inflated, while those of traditional securities are not.

Figure 2: Regulatory advantage and equilibrium information quality

Both panels illustrate the comparative statics of regulatory advantage $\bar{y}$ and ι^* with respect to marginal information costs c, where $C'(\iota) = c \cdot \iota$ and ι is the quality of the rating agency's signal. The inflation threshold $\bar{y}$ falls when c increases from 1 to 2 (from 0.2 to 0.11 in the left panel and from 0.1 to 0.07 in the right panel). Equilibrium information quality also falls, for any given regulatory advantage when the marginal cost of information increases. The left (right) panel shows the effect of changes in the regulatory advantage on information quality when the proportion of good types is more (less) than 1/2, respectively. Increases in the regulatory advantage increase information quality when there are more good types than bad and vice versa when there are more bad types than good.

When are ratings informative?

When the regulatory subsidy is not so large as to result in rating inflation, the amount of information produced by the rating agency still varies with the size of the regulatory subsidy as well as with the cost of information and the issuers' characteristics. In particular, an increase in the regulatory subsidy increases the informativeness of ratings, all else equal, if there are more good

issuers than bad issuers ($\pi_g > 1/2$) but reduces informativeness if there are more bad issuers than good ($\pi_g < 1/2$). This is because, when the regulatory subsidy is increased, the rating agency's incentive to rate issues highly increases. Given that the subsidy is small enough so that the rating agency reports truthfully, it will rate more issues highly by rating them more accurately if and only if there are more good issues than bad ones. Not surprisingly, a higher marginal cost of information production decreases the informativeness of ratings. These results are illustrated in Figure 2. The first is seen by comparing the left and right panels. In the left panel of Figure 2, information acquisition increases as a function of y, because the fraction of good types, π_g, is $0.7 > 1/2$. In contrast, the right panel plots a case in which the fraction of good types is $0.2 < 1/2$ so that information acquisition decreases. The second result is shown in both panels upon comparing low ($c = 1$) and high ($c = 2$) marginal information costs.

To turn these comparative statics results into testable predictions, we must first relate the model parameters to their empirical counterparts. First note, we should interpret our signals A vs. B relative to publicly available information, e.g., conditional on the size/leverage of the firm and the security class. (This is consistent with the behavior of actual rating agencies which generally provide relative assessments within particular security classes, rather than across security classes. For example, for some firms, the distinction between A and B in our model would refer to the difference between investment-grade and junk status, while, for others, it would represent the difference between Aa and A.) In particular, following the results by Kisgen-Strahan (RFS 2010) and Ellul-Jotikasthira-Lundblad (JFE 2011), the regulatory advantage y is especially large around the investment grade / junk threshold and at the AAA vs. AA threshold. (Kisgen-Strahan (RFS 2010) estimate that the reduction in the debt cost of capital is 54 bps around the investment grade cutoff vs. an average reduction of 39 bps.) This leads to strong incentives to inflate around these thresholds, implying a large drop in rating informativeness.

Secondly, while the previous source of variation in y results from differential regulatory importance across rating grades, differential importance of regulation to the marginal investor across security classes provides cross-sectional variation in y. To the extent that the marginal investor's regulatory constraint binds in one security class (say CMBS, in which the marginal investor is an insurance company), but does not bind in another security class (e.g., MUNI, in which the marginal investor is a retail investor), one would expect cross-sectional differences in the incentives to inflate. Similarly, one could exploit cross-sectional variation in the "tightness" of regulatory constraints across countries. To our knowledge, neither of these avenues has been explored in the empirical literature so far.

Third, time-series changes in regulation provide quasi-natural experiments. Here, one can distinguish between changes in regulation of institutional investors, as exploited in the CMBS sample of Stanton-Wallace (WP 2010), or changes in the regulatory status of a rating agency, such as in Kisgen-Strahan (RFS 2010). In the former case, our analysis predicts the rating inflation in the CMBS market documented in Stanton-Wallace (WP 2010). In the latter case, Kisgen and Strahan investigate empirically the results of the SEC's accreditation of Dominion Bond Rating Services as an NRSRO. This accreditation allowed Dominion's ratings to be used for regulatory purposes,

implying that only post accreditation, a high rating by Dominion offered a regulatory advantage, i.e., $y > 0$. Consequently, our model predicts a shift in the distribution of Dominion's assigned ratings towards better ratings, especially around the relevant cutoffs, post SEC accreditation.

Finally, our model also has implications for the planned overhaul of financial regulation. In contrast to the supranational Basel III guidelines, the recently proposed Dodd-Frank Act aims to eliminate all regulation based on ratings in the U.S. If this fundamental regulatory change is implemented, we would expect a reduction of the regulatory advantage of higher ratings. As a result, our model would predict a systematic downward shift in the distribution of ratings of the current NRSROs, especially around the two identified thresholds. Whether abandoning rating-contingent regulation is preferable from society's perspective depends on the alternatives to rating-contingent regulation, in particular how Dodd-Frank's mandate to use "all publicly available information" is implemented. (For example, the national insurance regulator NAIC started to use risk assessments by market participants (Pimco and Blackrock) for capital regulation of insurance companies (see Becker-Opp (WP 2013)).) We leave this question for future work (Harris-Opp-Opp (WP 2013)).

Leonardo de Vinci (1452–1519): Lady with an Ermine. Italy, 1490. This portrait was commissioned by the Duke of Milan, immortalizing his beautiful and scholarly mistress Cecilia, who he never married although they had a son. In fact, he said that he "no longer wished to touch [Cecilia] or have her nearby, because she was so fat, ever since giving birth." How things have changed for age-old beauties!