Credit Ratings Accuracy and Analyst Incentives

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Abstract

The financial crisis has brought a new focus on the accuracy of credit rating agencies (CRAs). In this paper, we highlight the incentives of analysts at the CRAs to provide accurate ratings. We construct a model in which analysts initially work at a CRA and can then either remain or move to a bank. The CRA uses incentive contracts to motivate analysts, but does not capture the benefits if the analyst moves. We find that rating agency accuracy increases with CRA monitoring, bank profitability (a positive "revolving door" effect), and can be non-monotonic in the probability of an analyst leaving.

The recent financial crisis has prompted an investigation into the business of credit rating agencies (CRAs). With the rise of structured finance products, the agencies rapidly expanded their ratings business. This expansion seems to have come at the expense of ratings accuracy, as the CRAs increasingly gave top ratings to structured finance products shortly before they collapsed (Adam Ashcraft, Paul Goldsmith-Pinkham, and James Vickery, 2010). The academic literature has focused, unsurprisingly, on the reasons that ratings quality suffered, pointing to the lack of sophistication of investors (e.g. Vasiliki Skreta and Laura Veldkamp, 2009), the conflicts of interests that CRAs face (Patrick Bolton, Xavier Freixas and Joel Shapiro, 2010), and regulatory arbitrage (Lawrence J. White, 2010). In this paper, we focus on a different channel for fluctuations in CRA accuracy: the labor market for ratings analysts and their incentives to provide accurate ratings.

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In the Senate Permanent Subcommittee on Investigations hearings in April 2010, a wealth of email correspondence from the top three rating agencies was made public. Among these emails was the following, dated 10/31/2006, from a Standard & Poor’s employee:

While I realize that our revenues and client service numbers don’t indicate any ill effects from our severe understaffing situation, I am more concerned than ever that we are on a downward spiral of morale, analytical leadership, quality and client service.

This email was not alone in bemoaning personnel issues. Indeed, there is a whole section of the Subcommittee report entitled “Chronic Resource Shortages.” Moody’s reported labor costs as the largest and fastest-growing operating expense.¹ White (2010) documents that in 2009, Moody’s, Standard and Poor’s, and Fitch each had slightly more than 1,000 analysts to rate about 400,000, 1,400,000, and 700,000 bond issues, respectively. As Louise Story (2010) reports, analysts fled the ratings agencies for investment banking jobs.

At the height of the mortgage boom, companies like Goldman offered million-dollar pay packages to workers like Mr. Yukawa who had been working at much lower pay at the rating agencies, according to several former workers at the agencies.

This “revolving door” between CRAs and investment banks has been a policy concern; the Dodd-Frank financial reform bill (2010) addresses the conflicts of interests of analysts working on deals with an issuer just before being hired by that issuer and puts in place disclosure requirements.

The CRAs lacked adequate staff, motivation, and quality personnel just at the time when their business was booming the most. Why did they not increase salaries and expand hiring? We argue that the answer lies in their incentives: When business is booming the most, CRAs have the smallest pay-off from being accurate.

In this paper, we examine the analyst labor market and analyst incentives through the lens of market fundamentals. We construct a simple model in which analysts live for two periods and initially work at a rating agency, learning the ratings business. They can then move on to a bank or remain at the rating agency. The CRA can use incentive

¹ According to Moody’s Annual Report 2007, p.42, “Compensation and benefits continue to be Moody’s largest expense, accounting for approximately $103 million in growth from prior year.”
contracts to motivate novice analysts to train harder, but does not capture the fruits of
the training if the analyst moves on. We take for granted that CRAs cannot compete
with investment banks on salary. This may be because CRAs cannot write sufficiently
high-powered incentive contracts and/or because CRAs’ marginal returns from labor are
lower.

We demonstrate that rating agency accuracy increases with the CRA’s ability to moni-
tor analysts. Ratings accuracy also increases with investment bank profitability, as analysts
seek more training in order to reap a higher payoff if they move to an investment bank
(a benefit from the “revolving door” effect). Perhaps most subtle, we show that accuracy
is non-monotonic in the probability of an analyst getting a job at an investment bank.
For high probabilities, the CRA’s investment in the analyst is unlikely to pay off, and
many well-trained analysts leave. For low probabilities, the dominant effect is that of the
increased probability of getting a job at an investment bank, providing the analysts with
greater incentives to work harder.

In related work (Bar-Isaac and Shapiro, 2010) that treats labor-market incentives as
a black box but endogenizes reputation effects, we argue that CRA accuracy is likely to
be countercyclical. The results in this paper—focusing on analyst incentives—are broadly
supportive of that conclusion. Other related papers include Jérôme Mathis, James McAn-
drews, and Jean-Charles Rochet (2009) and Roland Strausz (2005). They examine how
a CRA’s concern for its reputation affects its ratings quality in an infinite-period model.
However they do not discuss the labor market or economic fluctuations over the business
cycle. Yeon-Koo Che (1995) examines the revolving door between regulators and the firms
they regulate, finding that this relationship may be socially beneficial.

1 A Simple Model

We consider incentive contracts between a monopoly CRA and analysts. An analyst works
for two periods. In the first period of her employment, she is a novice \( n \) and works at a
CRA, and in the second period, she is seasoned \( s \) and may work at either a CRA or an
investment bank. Analysts are initially identical and their outside options are normalized
to 0. If the analyst is working for the CRA in period \( i \) of her life \( (i = n, s) \) at date \( t \), she
can exert effort \( e_i^t \) to improve her ability. The ability of a seasoned analyst at date \( t \) is
additive in the efforts of both periods of her career: \( e_i^t = e_n^{t-1} + e_s^t \). Effort is unobservable and
is costly to the analyst; it has a quadratic cost \( e_i^t \frac{e_i^t}{2} \). We suppose that the CRA has a noisy
technology to monitor effort. The CRA observes a signal $H$ with probability $l + (1 - l)e_t^f$, where the first term ($l$) represents luck and the other $((1 - l)e_t^f)$ increases in effort. The CRA observes a signal $L$ with the complementary probability. The parameter $l$ captures the CRA’s monitoring ability or the noisiness of the signal. As $l$ approaches 1, the signal approaches complete noise. The CRA wants to incentivize effort, as it improves current accuracy and, possibly, future accuracy (if it can retain the seasoned analyst), and will, thus, write an incentive contract. If the signal $L$ is observed, the CRA pays the analyst’s outside option of 0, and if the signal $H$ is observed, it pays $w_t^f$.

In addition to raising her current expected wage, exerting effort in the first period means that the analyst learns more about the ratings business, which improves her prospects of gaining a more lucrative second-period job at an investment bank. We summarize these expected opportunities from the banking sector by a probability of getting a bank job $\gamma$ and the returns to getting a bank job $b_{e_t^f}$. *We suppose that $\gamma$ does not depend on $e_t^f$, which may be consistent with investment banks not directly observing $e_t^f$ and the CRA having difficulty competing with lucrative investment-bank offers.* If an analyst receives an investment-bank offer, the CRA does not find it worthwhile to compete for the worker. Our interest is in comparative statics with respect to $\gamma$ and $b$ as different ways of capturing changing economic conditions.

This is a simple model of overlapping generations; the CRA employs both novice and seasoned analysts at the same time, and we consider the equilibrium in a steady state. We normalize the mass of novice analysts hired to 1. The average ability of novice and seasoned analysts in the CRA is denoted by $z$. The average ability of CRA analysts affects the CRA’s ratings accuracy. In particular, in each period, the CRA has an investment to rate. Investments can be good with probability $\lambda$ or bad with probability $1 - \lambda$. A good investment never defaults, whereas a bad investment defaults with probability $p$. If the investment is good, the CRA can perfectly identify it as good. If the investment is bad, the CRA identifies it as bad with probability $z \in (0, 1)$. The CRA values both good ratings (as these generate fees) and ratings accuracy (as this helps the CRA to maintain

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2 Opportunities for analysts in the banking sector range from analyzing assets to determine investment opportunities to structuring products ahead of public offerings.

3 Che (1995) has a similar formulation but considers first-period effort as the probability that the worker gets an outside job. We could also interpret our results in this manner.

4 Taking the analyst’s expected utility in an investment-bank position to be linear in $e_t^f$ is convenient and can be micro-founded if, for example, the analyst’s skills developed at the CRA improve her performance at an investment bank that offers an incentive contract.
its reputation and generate fees in the future). A CRA assigns a value 0 to the analyst rating the investment as bad, \( \pi \) to the analyst rating the investment as good, and \(-R\) to the investment getting a good rating and subsequently defaulting (being inaccurate).\(^5\) The variable \( R \) represents the reputation cost. The CRA and the analysts are both risk-neutral and have discount factor \( \delta \). We suppose that \( \delta R \pi - \pi > 0 \), as otherwise there would be no reputational incentive to maintain accurate ratings.

### 1.1 Analysis

Solving the maximization problem for a novice and for a seasoned analyst, we obtain that their effort choices at time \( t \) are:

\[
e^t_n = w^n_t (1 - l) + \delta \gamma b
\]

\[
e^t_s = w^s_t (1 - l).
\]

Given these choices, the average ability at the CRA—which employs \( (1 - \gamma) \) seasoned analysts of ability \( e^{t-1}_n + e^t_s \), for each novice analyst of ability \( e^t_n \)—is given by

\[
z_t = \frac{e^t_n}{2 - \gamma} + \frac{1 - \gamma}{2 - \gamma} (e^{t-1}_n + e^t_s).
\]

Finally, we can write down the CRA’s problem, which is to choose \( w^n_t \) and \( w^s_t \) in each period \( t \) in order to maximize its discounted sum of expected profits. Notice that \( w^n_t \) and \( w^s_t \) affect the profits only in period \( t \) and in period \( t + 1 \), and so the period-by-period maximization problem is

\[
\max_{w^n_t, w^s_t} \pi \lambda + (\pi - \delta R \pi)(1 - \lambda)(1 - z_t) + \delta (\pi \lambda + (\pi - \delta R \pi)(1 - \lambda)(1 - z_{t+1})) - w^n_t (l + (1 - l)e^t_n) - (1 - \gamma) w^s_t (l + (1 - l)e^t_s),
\]

where the first line is the period \( t \) gains from a good report \( (\pi (\lambda + (1 - \lambda)(1 - z_t)) \) minus the reputation cost of being inaccurate \( (\delta R \pi (1 - \lambda)(1 - z_t)) \); the second line is the same.

\(^5\)The CRA is not paid for bad ratings here. This is a version of the shopping effect described in Bolton, Freixas, and Shapiro (2010) and Skreta and Veldkamp (2009). Mathis, McAndrews, and Rochet (2009) assume that no issue takes place if the rating is bad and that the CRA is not paid in this case, which is equivalent to our approach.
for period $t+1$; and the third line captures wage costs in period $t$ for novice and seasoned workers. After substituting for the analysts’ efforts, $e^n_t$ and $e^s_t$, and the average analyst ability at the CRA, $z_t$, we can solve for the CRA’s choice of wages, $w^n_t$ and $w^s_t$, by writing down the first-order conditions of this problem with respect to these wages. We can then impose the stationarity of the problem, which implies that $w^n_t = w^n_i$, $e^n_t = e^n_i$ and $z_t = z$, and, finally, substitute the wages into equation (3) to obtain an expression for the accuracy level $z$ in terms of exogenous parameters:

$$z = \frac{1}{2} \left[ (\delta R_p - \pi)(1 - \lambda) \left( \frac{2-2\delta}{2-\gamma} + \frac{1-\gamma}{(2-\gamma)^2} \right) \right].$$

We can then consider the comparative statics of ratings accuracy $z$ with respect to the exogenous parameters that affect the analysts’ incentives.

**Proposition 1** The accuracy level of the CRA (i) decreases in the level of noise $l$; (ii) increases with the profitability parameter for investment banks $b$; and (iii) either always increases with the probability of getting an investment-bank job $\gamma$ or first increases up to a cutoff $\gamma^*$ and then decreases; in particular, the latter case arises as $\delta \to 1$.

**Proof.** Claims (i) and (ii) are immediate on taking the derivative of $z$ with respect to the appropriate exogenous parameter.

We can turn to the comparative statics with respect to $\gamma$; the derivative of $z$ with respect to $\gamma$ is proportional to

$$\delta b + (\delta R_p - \pi)(1 - \lambda) \frac{2 - 2\gamma - 2\delta + \gamma \delta}{(2 - \gamma)^3} + \frac{1}{(2 - \gamma)^2} \frac{l}{(1 - l)}.$$  

The sign of expression (6) is equal to the sign of:

$$\delta b (2 - \gamma)^3 (1 - l) + l (2 - \gamma) + (\delta R_p - \pi)(1 - \lambda)(1 - l)(2 - 2\gamma - 2\delta + \gamma \delta).$$

When $\gamma = 0$, expression (7) is equal to $\delta b 8 (1 - n) + (\delta R_p - \pi)(1 - \lambda)(1 - l)(2 - 2\delta) + 2l > 0$. 


The derivative of expression (7) with respect to $\gamma$ is

$$-\delta b^3 (2 - \gamma)^2 (1 - l)$$

$$-(\delta Rp - \pi)(1 - \lambda)(1 - l)(2 - \delta) - l.\tag{8}$$

This expression is negative, so expression (7) is monotonically decreasing in $\gamma$.

When $\gamma = 1$, expression (7) is equal to $\delta b(1 - l) - \delta(\delta Rp - \pi)(1 - \lambda)(1 - l) + l$. Note that at $\gamma = 1$ we have $w_1 = \frac{(\delta Rp - \pi)(1 - \lambda) - \delta b}{2(1 - n)} - \frac{l}{2(1 - n)^2}$, and so $w_1 > 0$ requires $(\delta Rp - \pi)(1 - \lambda)(1 - l) - \delta b(1 - l) - l > 0$. For $\delta \rightarrow 1$, therefore expression (7) evaluated at $\gamma = 1$ is negative.■

The proposition delivers several new and interesting results. First, the CRA’s accuracy decreases when it less able to monitor its workers (or when their performance is noisier)—that is, when $l$ is low. This is not necessarily related to the economic cycle, but is related to the recent crisis in the sense that the boom came with the rise of structured finance products. Structured finance products are, by their nature, complex and difficult to model (see Joshua D Coval, Jakub W. Jurek, and Erik Stafford, 2009).

Second, when investment banks reap higher returns from the skill set of former CRA analysts (captured in the model by a high value of $b$), novice analysts have higher incentives to work hard. This a positive aspect of the revolving door between CRAs and investment banks and is similar to the effect discussed in Che (1995).

Finally, and most importantly, we see that increasing the probability of getting an investment-banking job, $\gamma$, increases accuracy when these opportunities are rare (the positive revolving-door effect), but can decrease accuracy when there are many opportunities to move on to investment banks. Although novices might work harder to capture returns in the banking sector, the decrease in accuracy has two sources: the direct effect that a greater fraction of the CRA’s analysts are relatively low-ability novices; and the fact that as the CRA loses more seasoned workers to the banks, it has less incentive to train them. Unfortunately, this latter case seems consistent with the anecdotal evidence discussed in the introduction. As issuance rose dramatically, investment banks needed skilled analysts to structure deals for them. And as investment-banks jobs became more available, analysts could spend less time in training and working for the CRA before moving on.
2 Discussion

The simple model draws attention to how changing economic conditions affect analyst incentives and, thereby, CRA quality; however, there are several important aspects that the analysis does not address.

First, the model above focuses on a moral-hazard problem and assumes that analysts are identical. In practice, the pool of actual and potential analysts is likely to be heterogeneous. Investment banks may cream-skin the most able analysts (and take a relatively larger share of them in boom times), exacerbating our results by worsening accuracy at the CRAs. The initial markets for novice analysts may also be plagued by a selection effect—for undergraduates and MBAs interested in financial analysis, CRA positions are likely not to be the most desirable options. However, this effect may be mitigated or overturned to the extent that starting a career at a CRA is seen as a pathway to more lucrative and otherwise hard to obtain investment-banking jobs.

Second, the model does not consider what analysts do when employed at banks. To the extent that they provide proprietary analysis on existing assets to banks and their clients, this might dampen concern about the accuracy of public ratings; however, recent events suggest that this is not the case. If analysts are directly involved in structuring new issues that are then rated, the employment of more and better analysts at the banks may (i) create better issues overall, (ii) help game the ratings system, or (iii) both. The second concern is more pronounced when CRA resources are stretched thin, making them rely increasingly on standardized valuation models in which former analysts (now at investment banks) are well-versed.

Third, Section 1 simplifies the economic environment in which the CRA operates. In particular, the model treats the CRA’s reputational concern as an exogenous variable and the economic fundamentals as constant over time. In Bar-Isaac and Shapiro (2010), we take a complementary approach by endogenizing CRA reputation, explicitly allowing for business cycle fluctuations, and modeling competition between CRAs. That paper, however, takes a more reduced-form approach to the CRA’s problem of investing in analyst quality. Our main finding there is that CRA accuracy is likely to be countercyclical. By modeling the analyst incentive problem, we can gain further insight into CRA quality. First, consider the revolving-doors effect, where a higher potential payoff at investment banks (more likely in a boom) gives analysts incentives to invest in effort. This effect depends very much on timing; the payoff at investment banks is the expected payoff one
period ahead. So early in the boom, this may well encourage analyst effort, but as the boom reaches its peak, it may substantially discourage it. Second, consider the probability of getting a job at an investment bank. If this likelihood is sufficiently high, then the larger it gets (as in the case of going from a recession to a boom), the lower accuracy becomes.

References


