# The Power of Rating Agencies
## Follow me, I will be Right *

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**Abstract**

The paper investigates why rating agencies are so successful in rating corporations and, even more, nations, in terms of their fundamentals, when the economics profession itself is split on what constitutes strong fundamentals. Based on some stylized facts of the Ease of Doing Business rankings, the paper constructs a model that shows ratings can create focal points for investors and have a self-fulfilling function, prompting behavior that makes their ratings come out right in retrospect. This paper then comments on the real-world implications of the model and possible extensions of the theory.

## 1 Introduction

Much has been written about the power of rating agencies. It is indeed the case that once a rating agency establishes a reputation, such as Standard & Poor's, Moody's, or Fitch, it gets an enormous amount of influence and power. Corporations and nations make policy changes to try to move up on ratings and often refrain from adopting policies, which they would otherwise want to implement, because of the apprehension that this would lead to a downgrading by some prominent rating agencies. What is the source of this significant influence? It is not evident that rating agencies possess any secret information on nations and firms. It is true that the aggregation of massive data gives some insights, but the extent of their power and influence is nevertheless puzzling. What they evaluate and rate are often fundamentally contested matters. Yet their ratings influence investors, elate bosses of corporations that get a good rating and political leaders of nations rated highly, and anger heads of firms and nations that are rated poorly.

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The problem that this paper deals with is illustrated well by the World Bank's Ease of Doing Business (EDB) index (see, for example, World Bank (2019), and the Foreword to World Bank (2014)), which analyses how easy it is for small and medium-sized firms to get required permissions from government and navigate the regulatory framework of nations to start a business, shut down business in the event of bankruptcy, trade across boundaries, to have contracts enforced, and so on. The World Bank does this exercise with remarkable professionalism. Ten separate indicators are measured. They are then aggregated by adding up the scores received for each of those ten indicators, with each indicator getting the same weight, to get a unique score of how easy it is to do business in a country[1]. The evaluation results in a ranking of all the 190 economies, and also each country's "distance to the frontier" measure, which shows how far the nation is from the potential best. The EDB Report has, over the years, become the World Bank's most awaited and watched publications, sparking celebration and controversy every year after its release in October.

It is believed that moving up on the ranking helps economies attract more investment. Anderson and Gonzalez (2012) do a statistical analysis and show that, on average, across economies, a difference of one percentage point in regulatory quality as measured by the EDB's 'distance to the frontier' scores is associated with a difference in annual Foreign Direct Investment inflows of as much as $250–500 million[2].

One important question that arises from all such exercises, including what is done by Moody's, Fitch, and S&P, is what magical insight these rating organizations have that their evaluation has become so important, triggering behavior changes by players in the market? The United States' economy is one of the most-watched and analyzed economies in the world. Observers, not just in New York and Washington, but also in New Delhi and Beijing, know whatever data and statistics are available. Yet when on August 5, 2011, Standard and Poor's downgraded the US long-term sovereign credit rating from AAA to AA+, this caused huge reactions across the world. Ironically there was a wave of capital outflow from almost all emerging economies, such as India, causing substantial depreciation in the exchange rate (Basu (2015), Chapter 4). Similar comments apply to the way markets were rattled by Moody's downgrading of China's sovereign debt in 2017 (Cang and Matt (2017)).

Economics is a discipline where there is still much controversy about what constitutes good policy, and what are the right and regulations that promote economic prosperity and the implementation of which marks out a nation as having strong fundamentals. What was the major discovery S&P made in the case of United States and Moody's made in the case of China that

[1]An exercise in the spirit of the World Bank's Doing Business is Karolyi (2015). It evaluates the risk of investing in emerging market economies using six separate indicators, which are then aggregated to get one overall ranking.

[2]There is, of course, extensive work on the relation between ratings and returns (see Holthausen and Leftwich (1986), Hand et al. (1992), Goh and Ederington (1993))

informed market players of what they did not know and trigger a reaction?

After collating masses of data on different countries, the World Bank decides which indicators are useful and which bad, often in areas where mainstream economics is conflicted. Why does the World Bank's Doing Business ranking trigger capital outflows and inflows?

There is a rich literature on what rating agencies do and how they affect markets, enhance or stall investments, and how some rating agencies misuse their power (see Sangiorgi and Spatt (2017) for a detailed survey). From Kreps and Wilson (1982) and Milgrom and Roberts (1982) who discussed some early, abstract, theoretical ideas, to recent papers explicitly on ratings, such as Veldkamp (2006), Baghai and Becker (2018), Josephson and Shapiro (2020), there are efforts to explain the basis of the power of credit rating agencies. There is also some literature based on concerns similar to what motivates this paper wit on feedback loops, self-fulfilling prophecies, and multiple equilibria. There has been important work on how default risks can be endogenous and change as the rating changes (Boot et al. (2006)). There are theoretical models on feedback loops being created through the learning channel (Sangiorgi and Spatt (2017)). There is theoretical and empirical work on feedback from credit ratings to firm values caused by contractual triggers (Manso (2013) and Kraft (2015)). In a recent paper based on a debt-financing game, we get another kind of feedback loop (Goldstein and Huang (2020)). In response to ratings done by credit rating agencies, firms change their investment decisions, and via that affects their credit quality.

The present paper belongs to this class of work, but by recognizing the role of some strategic complementarity among investors and using the idea of a focal point or focal set of a game, it comes out with a new explanation. It shows that a large part of the power of rating agencies may be spurious. Though this is a theoretical paper, the argument is intuitive, plausible, and derived from realistic assumptions. Unlike some of the literature cited above, the present paper is more suited to ratings and rankings as applied to nations. The assumption of strategic complementarity is more natural in such a setting, where to be a lone outside investors in a nation is likely to result in poor returns. There is a need in such settings for finding a focal point or a 'focal set' (Basu (2018)) of countries where investors can congregate and boost their returns. Rating agencies fulfill this function of creating a focal set.

Of the literature cited above on feedback loops, a special mention needs to be made of the paper by Boot et al. (2006), since they also make use of the focal point. However, in their paper, the credit rating agency's power is founded on two key components—its 'monitoring role' concerning credit safety, and the fact that investment decisions of some institutional investors have prior guidelines that do not allow them to invest in poorly-rated issues. In our model, none of these are needed. Moreover, by allowing for strategic complementarity and strategic substitutability we get unexpected theoretical results that mirror what happens in reality, especially in the context

of rating and investing in nations, as happens as a result of the World Bank's annual Doing Business report.

The model is developed using simplifying assumptions that allow us to focus exclusively on what drives the central result. There are, of course, additional complexities in reality. Rating agencies do have some specialized knowledge about nations, even when they give the impression of having more knowledge than they actually do. There are often scale economies in information production, and instead of each investor doing this separately, it is useful to have a few rating agencies to do this task (Sangiorgi and Spatt (2017)). After presenting the core theoretical model, the paper briefly discusses how some of these more realistic features can be added. We also spell out some of the real-life implications of our model. These are important because, thanks to an information over-glut, rating and ranking are a growth industry today. We see more and more rankings, not just of firms and nations but colleges, universities, shops, and even individuals. The power of rating agencies and also the profits earned by them have grown sharply with the arrival and rise of the market for structured finance products (Josephson and Shapiro (2020); Piccolo and Shapiro (2017)).

The regulation of rating agencies and, in fact, all firms that live by rating and evaluating others is a major challenge to the law and economics profession. This paper aims not to draft a solution; we are not yet in a position to do so. The aim is to explain the mechanics and source of the power of these agencies. This is not the power that comes from being a monopoly or a collusive oligopoly, which can be dealt with using antitrust law and regulations that prohibit collusion. The power of rating agencies, which can be both good (because they help disseminate information) and bad (because they can be used to exploit and extort) is more subtle and need different kinds of laws. It is hoped that this paper will contribute to this literature by laying bare the subtle, almost psychological sources of power of rating agencies.

By way of developing the intuition, we present some stylized facts on the power of institutional rating agencies by investigating the impact of changes in the World Bank's Ease of Doing Business (EDB) scores on the cross-country Day-to-Day Total Return on shares for stock indexes. We collect 2010-2019 EDB scores from the World Bank, which are announced on October 31 every year, except the latest one, which was released earlier on October 23, 2019. The measure of investment return is captured from the Bloomberg Day-to-Day Total Return on shares for stock indexes. It publishes daily data for 183 stock indexes from 89 economies.

This exercise tries to identify the strategic complementarity element among investors by choosing a short period after the Bank's annual announcements as the event window. The estimation window is from 7 to 60 days before the annual release date of the EDB and event windows are 3, 5, and 10 days after the date. We assume that the countries' fundamentals would not significantly change inside this short event window, after controlling the periodical

and systematical shocks.

Table 1 presents the estimation results. Controlling year, region, and economy fixed effect, we see a one percent increase in the EDB score raises the Day-to-Day Total Return by as much as 2.371% inside the three-day window. Clearly, these market impacts decay as we stretch the event window to post five days, and it eventually becomes statistically insignificant 10 days after the announcement. Nevertheless, their impact is clearly significant and explains the importance attached to the World Bank's EDB ranking exercise.

## 2 The Basic Model

Let $N = \{1, 2, ..., n\}$ be the set of nations, where $n \geq 2$. Each nation can have strong fundamentals or weak fundamentals, which is represented by the partition $(N_1, N_2)$ of $N$. That is, $i \in N_1$ means $i$ has strong fundamentals and $i \in N_2$ means $i$ has weak fundamentals. Let $n_i$ denote the numbers of countries in $N_i$ for i equal to 1 or 2. Let $\gamma \equiv \frac{n_1}{n}$. That is, a randomly chosen nation has probability $\gamma$ of being of good fundamentals.

Let $I = \{1, 2, ..., t\}$ be the set of investors, where $t > 1$. Each investor has one dollar, which it must invest in one nation. Other things remaining the same, an investment in a nation with strong fundamentals gives a higher return to the investors. However, the problem arises from the fact that the investors do not know the partition $(N_1, N_2)$. That is, they do not know which countries have strong fundamentals and which ones weak. This is where rating agencies come in. Rating agencies claim they can, by their research and extensive data collection, find out how strong a nation is and rate nations accordingly. For simplicity, we assume that there are just two ratings $A$ and $B$, where $A$ signals strong fundamentals and, as a consequence, signals that an investor is more likely to earn a higher return by investing in such a nation as opposed to a $B-$rated nation.

An ideal rating agency gives a nation rating $A$ if and only if that nation is an element of $N_1$. But in our model, and we believe that this is the case in reality, there is no way for a rating agency to be certain which nation has strong fundamentals. The puzzle of the success of rating agencies in real life is that the economics profession itself is conflicted about what constitutes good policies and thus makes an economy's fundamentals strong. Is a corporate tax rate of 10% too low, and is a tax rate of 80% too high and damaging for the economy? Is Keynesian fiscal policy good enough, or do we need an unconventional monetary policy, especially in the light of the Great Recession (Rajan (2013) and Svensson (2011))? Are strong labor laws good for the economy or bad (Besley and Burgess (2002) and Basu et al. (2010))? There is ample debate on all such matters. However, the rating agencies seem to know what the answers are, collect data, and then rate and rank countries. What is surprising is that investors trust rating agencies and

follow their advice, and it seems to work.

What we want to show is that this outcome, to wit, the success of the rating agency is compatible with rating agencies having little or no knowledge of fundamentals. It is worth pointing out here that the results in this paper, such as the theorems presented below, do not depend on what the objective function of the rating agencies is. Our propositions are if-then claims, taking the form of showing what would happen if rating agencies are interested in enhancing their reputation. We believe that our results are important and relevant because they draw attention to some surprising results, and these are significant for policy-making since enhancing one's reputation is usually an essential ingredient for whatever it is that one wishes to ultimately achieve. It is, for instance, difficult to be sure exactly what it is that the World Bank seeks to maximize. However, from various statements the Bank puts out in its defense, it is evident that in publishing the annual Ease of Doing Business report, the Bank takes pride in its reputation for ranking nations accurately. Of course, as we point out in section 4, the reputation can occasionally be used by rating agencies to achieve other objectives. This paper can be a useful ingredient for studying such deviant behavior. Proceeding now to the main analysis, we shall make the extreme assumption that the rating agencies have no knowledge of fundamentals.

The core of the argument is as follows. As more investors invest in a country, the country does better, and the investors also get a higher return. So the fundamentals of a country matter, but, over and above that, how much one investor earns by investing in a country depends on whether there are others investing in this country. At least in the initial stages, we assume there is this strategic complementarity across investors. An investor who puts money on building railroads in a nation is likely to earn more if other investors put money on building hotels and hospitals. What the rating agency does by putting out ratings is it creates a focal set, in the sense of Schelling's 'focal point' (Schelling (1960))[3]. We shall initially describe a focal point, that is, one focal nation, and then extend this to a focal set. Nations rated A attract more investors, and each investor does better by the virtue of this. Of course, if the nation's fundamentals were strong, the investors would do even better. But they need not ever find that out, and their faith in the rating agency remains unbroken. To formalize this simply, assume that, other things unchanged (this will be clear later), the returns $r$, that the investor earns, from country $i$, depends on the total number, $m$, of investors investing in that country. Hence, $r = r(m)$. In keeping with what was argued above, we make the following assumption.

[3]The idea of focal point as an instrument for selecting a specific Nash equilibrium is widely acknowledged (Sugden (1995); Crawford et al. (2008)), even though there is a dispute about what it is that becomes focal. Further, games that have payoff asymmetries may find it hard to coordinate onto a specific Nash equilibrium. However, we shall be concerned here with a relatively flat, colorless domain where the established rating agency's announcement is prominent and hence becomes focal. Also, in our model, the players, namely, the investors need not even know the full game that is being played. They just trust the rating agency about where one should invest in getting the highest expected return, and that trust becomes self-fulfilling.

**Assumption 1** Strategic Complementarity: If $m' > m''$, then $r(m') > r(m'')$.

However, there is more to aggregate return than $r(m)$. What an investor wants to maximize will be defined as 'aggregate profit', $R$. The aggregate profit, $R$, an investor earns by investing in country $i$ is given by:

$$R = \begin{cases} r(m_i) + x & \text{if } i \in N_1 \\ r(m_i) + y & \text{if } i \in N_2 \end{cases} \tag{1}$$

where $m_i$ is the number of investors investing in country $i$ and $x > y$. That is, other things unchanged, it is more profitable to invest in a nation with strong fundamentals. Note that Assumption 1 captures the idea of strategic complementarity. This will be relaxed later. Henceforth, we denote $x - y$ with $\Delta$.

It is now easy to write down a plausible sufficient condition such that if, that was satisfied, a rating agency that knows nothing can announce a rating so that once all investors follow the advice, the advice will be self-fulfilling in the sense that any investor who ignores this advice will earn a lower return. The sufficient condition is given by

$$r(t) - r(1) > \Delta \tag{2}$$

By definition, $\Delta > 0$. By Assumption 1 of strategic complementarity and the fact that $t > 1$, we know that $r(t) > r(1)$. In other words, (2) could be well satisfied and we assume that it is.

**Theorem 1** In an economy where condition (2) is satisfied, if a rating agency rates any nation $i$ as $A$, then if all investors are guided by this rating and choose to invest in $i$, then if any investor decides to unilaterally deviate and invest in some other nation, that investor will earn a lower return.

Given the above discussion, the proof is obvious. The worst the rating agency can do is pick a nation $i \in N_2$ and labels it as $A$. If it does so, and all investors invest in $i$, each will earn a return of $r(t) + y$. If one of the investors had deviated and picked some other nation to invest in, the investor's highest return would generate $r(1) + x$. By condition 2, we know that $r(t) + y > r(1) + x$, which means the deviating investor will earn a lower return.

To put it in game-theoretic terms, the investors in this economy are locked in a game. The game has lots of Nash equilibria, and so the possibility of coordination failure is high. What the rating agency does is to create a focal point. Its contribution is entirely in the creation of a focal

point. It belongs to the category of what (Posner, 2000, p. 4) refers to as "non-legal mechanisms of cooperation (see also McAdams (2015))". The story about its having special knowledge about the fundamentals of economies is a chimera. The analysis can be easily extended to a case where the rating agency chooses a small random set of nations (instead of one nation) to which it gives a rating of $A$. This could end up with creating a 'focal subset' (Basu and Weibull (1991) and Basu (2018)). If investors randomly pick an $A$-rated nation and invest in it, no one would achieve a higher return by deviating unilaterally.

The model constructed in this section is based on many strong assumptions to make the central logic transparent. Reality is of course more complex. Investors face strategic complementarity and also strategic substitutability. Rating agencies give top rating to not one but many countries. As it turns out, these two are related matters. Further, it is not the case that investors and rating agencies know nothing about economies' fundamentals. In reality, they have partial knowledge. In what follows, we generalize the model along these lines to help with future advances and empirical studies of rating agencies.

## 3 Generalized Model with Strategic Substitution

One simple and admittedly simplistic way to introduce some strategic substitutability is to assume that when too many investors invest in one country, strategic substitutability sets in. The arrival of yet another investor diminishes the returns earned by other investors already investing in this nation. Hence, here on, we inject a little more realism to the characterization of the function:

$$r = r(m) \tag{3}$$

Recall $r$ is the investor's return when $m$ investors are investing in a nation. Earlier, we treated this as a monotonically increasing function. We shall now assume that there are increasing returns to start with, but as there occurs over-crowding of investors, decreasing returns set in.

**Assumption 2** Inverted-U-Shaped Return: There exists an integer $d$, where $1 < d < t$ such that $d > m'' > m'$ implies $r(m'') > r(m')$ and $d < m' < m''$ implies $r(m'') < r(m')$.

Figure 1 illustrates a possible 'return function', $r(\cdot)$. We have deliberately described a case where $r(1) > r(t)$. This allows us to easily demonstrate why the earlier strategy of the rating agency of picking one nation for giving a rating of $A$ may not work now.

If the returns function in the economy is described by Figure 1 and the rating agency gives only one nation an $A$ rating and all the investors invest in that nation, the highest that each investor

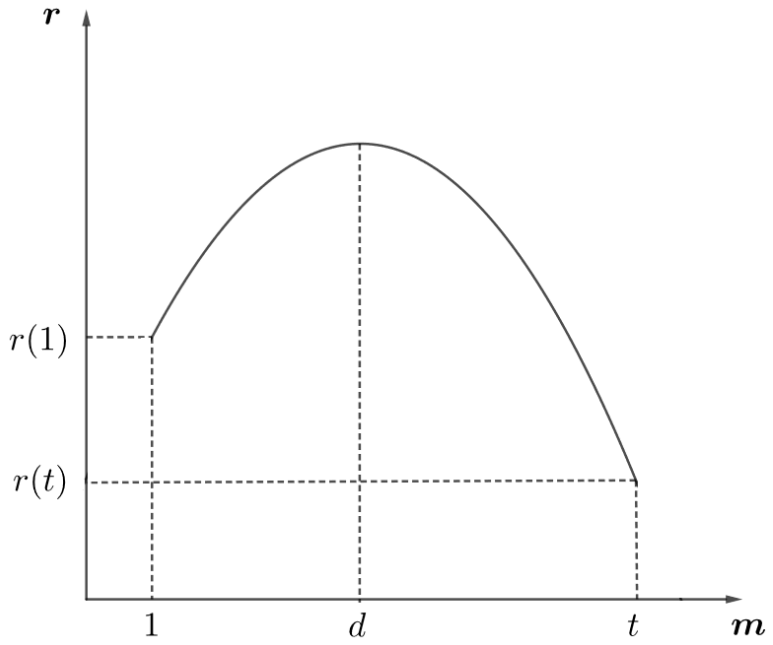


Figure 1: Generalized Model with Strategic Substitution

earns will be $r(t) + x$. $r(t)$ comes from the investor clustering effect, and $x$ is from the nation's fundamentals if the fundamentals are strong.

What makes this complication worthwhile is that it gives us insight into why all reputed rating agencies provide such similar ratings. There is a lot of writing on herd behavior (see, for instance, Welch (1992), Ferri and Morone (2014)). Our model provides a new angle on this.

If now one investor deviates and invests in another nation, the worst it can do is $r(1) + y$. It is obvious that an individual investor may do better by deviating unilaterally. If the returns function were different, and if $r(t) - r(1) > \Delta$ , giving a rating $A$ to a single nation would create a focal point with no investor is deviating. However, the returns could be even higher if the rating agency gave an $A$ rating to multiple nations.

To see this most simply, we shall make an assumption.

**Assumption 3** Uniformly Distributed Investors: If $\mu$ nations are given a rating of $A$ by the rating agency, and $k$ investors decide to invest in the $\mu$ nations, each nation gets investment from $\frac{k}{\mu}$ investors. In short, investors are uniformly distributed.

Given Assumption 3, the rating agency wanting to maximize investors' return, should give a rating of $A$ to $t/d$ nations. We are assuming $t/d \leq n$. Suppose now all investors invest in $A$-rated

nations. If it happens, so that,

$$r(d) - r(1) > \Delta \tag{4}$$

then no one would want to deviate, and all investors obtain the highest return they can get.

It is worth pointing out that if condition (4) does not hold, even then an investor deviating to invest in a randomly chosen $B$-rated country will, on average, do worse. To see this, assuming that the $A$-rated countries were chosen at random, the expected return earned by the investor who deviates will be given by $r(1) + F$, where $F \equiv \gamma x + (1 - \gamma)y$ denotes the expected return based on the nation's fundamental, as the rating agencies do not have any insights into a nation's fundamentals. Since this is less than $r(d) + y$, no investor has reason to *expect* a higher earning by deviating to a $B$-rated nation. In other words, (4) is a sufficient condition. We do not necessarily need it. A similar observation applies to condition (2).

Let us write down this finding formally.

**Theorem 2** Given assumptions 2 and 3, a rating agency wanting to maximise investor return will give an $A$-rating to $min\{t/d, n\}$ nations. If all investors invest in these $A$-rated nations, no one will want to deviate.

Since our aim was to show real plausible scenarios where rating agencies with no real knowledge can still give the impression of possessing knowledge, we have demonstrated this by using some strong assumptions. It is, however, possible to weaken many of these assumptions. As an illustration, consider relaxing Assumption 3. Let us replace it with a more realistic assumption, namely, that if $\mu$ countries (randomly chosen by the rating agency) are rated $A$, each investor chooses one from these $A$-rated nations randomly to invest. It is then clear that the expected return for each investor will be

$$R(\mu) \equiv F + r(1)(1 - \frac{1}{\mu})^{t-1} + r(2)(\frac{1}{\mu})(1 - \frac{1}{\mu})^{t-2} + ... + r(t)(\frac{1}{\mu})$$

The overall expected return consists of two parts. The first will be the expected return based on the nation's fundamentals. We wrote this as $F \equiv \gamma x + (1 - \gamma)y$ earlier. The second term consists of the expected returns based on the number of investors that invest in the same nation.

It is easy to see that though, under this formulation, the rating agency may not rate exactly $t/d$ nations $A$, it will do so for a multiplicity of nations. Without going into formal derivation, the basic idea is easy to see. If only one nation is rated as $A$, we have $R(1) = F + r(t)$. From Figure 1, it is obvious that as $\mu$ is raised starting from 1, $R(\mu)$ will rise, at least to start with. Hence there will be more than one nation rated $A$.

# 4 Implications: Multiple Rating Agencies, Partially Informed Investors and the Power of Extortion

What we want to draw attention to here are some features of rating behavior in reality on which our focal point approach can shed light. To this extent, note that, what the World Bank does, namely, rating the ease with which small businesses can function in different nations, is unique. It has no competitor in this, whereas multiple agencies do similar rating exercises in most other settings.

Thus far, we have been concerned with the case of there being only one rating agency. However, it is easy to introduce multiple agencies in our model, and doing so gives us important insights into why all prominent rating agencies give such similar ratings to corporations, bonds, and nations. This is indeed a striking feature of ratings, and much has been written about how credit rating agencies watch one another's evaluations, and of there being herding behavior among them (Scharfstein and Stein (1990); Stolper (2009) and Lugo et al. (2015)).

If we consider the three most prominent credit rating agencies, S&P, Moody's, and Fitch, it is notable how all give similar ratings. The converged ratings would be fine and not be evidence of herd behavior if they all gave similar grades, and all got it right. But if they all provide similar ratings and all get it wrong, one would have reason to suspect that the scores are not measuring fundamentals and that there is an element of herd behavior. There is indeed evidence of this. Much has been written about how all of them failed to anticipate the Great Recession of 2008 Hill (2010). One possible reason all of them failed was that they were looking at one another and trying to behave similarly.

In our focal point model, the convergence of ratings happens quite naturally. Rating agencies want to uphold their reputation. While it is true that credit rating agencies used, initially, to be paid by the investors—the 'subscriber pay' model, they are now paid by issuers, the corporations being evaluated and rated Kashyap and Kovrijnykh (2016). It is arguable for all this what maximizes their income is if they offer value. That is, investors who go by the rating agencies' ratings manage to get the best returns from their investment. Rating agencies indeed claim that that is what they try to maximize (see Hill, 2010 and Sangiorgi and Spatt (2017)).

Keeping this in mind, it is easy to see why agencies give such similar ratings. Let us use the simple model that uses the Inverted-U-Shaped Return (Assumption 2) and gives us Theorem 2. We saw that the rating agency assigned an $A$-rating to $t/d$ nations (assume $t/d < n$). Now in case there are several rating agencies, assume that investors will randomly choose a country that gets an $A$-rating by at least one rating agency. We can use variants of this assumption, such as supposing that investors want to choose a country that gets the most $A$-ratings and chooses randomly from among them. It is easy to see that all rating agencies rating the same set of $t/d$

countries $A$ is an equilibrium, given that each rating agency wants to deliver maximum return to investors. A single agency that steps out and rates some other country $A$, will dilute returns earned by investors.

If we assume that rating agencies have some private information about the nations' fundamentals, the above extreme result could get diluted by some rating agencies picking countries that others do not. This will give the more realistic outcome of some convergence of ratings but not total convergence. There is another way to get this result while retaining the zero information on fundamentals setup, as in our benchmark model above. This is by recognizing the power of rating agencies to extort, which is discussed later in this section.

This focal point approach also explains another puzzling fact about the world of ratings that some observers have noted, namely, that there are not too many rating agencies. Unlike popcorn sellers and ice-cream vendors, rating agencies in all economies seem to be very few. As White (2002) noted, "a striking fact about the structure of the [rating agency] industry is the persistent fewness." This observation is a consequence of the fact that one of the essential purposes of rating is to create a focal set of nations to attract investors and boost their returns. Outliers play no role in this. Moreover, once one has a few firms helping achieve this focus, there is no need for others.

Our approach reaches another topic that has been prominent in at least the popular discourse on rating, namely, the power that rating agencies have and their ability to misuse this power and indulge in profiteering in ways that are in some sense illegitimate (Cespa (2008), Garcia and Sangiorgi (2011)). As the New York Times columnist Thomas Friedman had noted rather colorfully, 'There are two superpowers in the world ... the United States and Moody's Bond Rating service... and believe me sometimes it is not clear who's more powerful'. Some of these powers come in specific ways; for instance, by the existence of "credit triggers" whereby parties hurt by a downgrade can demand being paid some damage Cormier (2002). This has led to extensive discussions in the context of financial crashes during the Great Recession and also from a long time ago, arguments for reigning in some of their powers (Bottini Jr (1993), Choi (1998)).

Since the revenue earnings of the rating agency comes from what the agency is paid by the nations or corporations that are being evaluated and ranked; there is great scope for the nation being evaluated to "pay" the agency for a higher rating. These "payments" are seldom direct payments, but bilateral favors offered to the agencies or individuals in the agencies. By the same argument, the rating agency can make countries behave in specific ways by using the threat of downgrading or promise of upgrading.

Interestingly, this can give rise to some dispersal in ratings. Suppose all rating agencies rate the optimal number of countries (in the above model $t/d$) with A. These countries attract just the

right amount of investment, and the investors get the highest returns possible. Assume each of these countries also receives a profit from more investors coming to the country. In other words, we are assuming that what benefits investors typically benefits the nation in which the investment occurs. There is some evidence that more foreign direct investment tends to boost the economy's GDP. So all nations are keen to get a higher rating. Hence, B-rated countries can try to strike a deal with a rating agency to be upgraded to A. If it succeeds in such a bilateral deal, the number of nations being rated A will rise (in the above model be $t/d + 1$). This will shave off a bit of the rating agency's reputation, but that may be a price-worth paying.

Further, if all rating agencies can collude and choose the $t/d$ nations that offer the rating agencies the best deal, they will get the benefit of extortion without losing any reputation. Our model suggests some of this will be happening with rational (and ruthless) agents. It will be interesting to investigate if this is indeed happening in reality.

# 5 Model of Investors with Heterogeneous Private Beliefs

We have thus far assumed total ignorance on the part of investors and rating agencies. In reality, rating agencies and even investors themselves would know which nations have strong fundamentals and which ones weak. It is possible to do this exercise allowing for generalized partial information (Sun and Tang (2020)). We shall here give a flavor of what partial information can do. This also clarifies that our main result of a spurious feedback loop would survive such a generalization.

Assume that out of the $t$ investors, $c(< t)$ are informed or clever (that explains the '$c$'). These clever investors do in-house research and know the partition $(N_1, N_2)$; that is, they know the set of nations that have strong fundamentals. These investors face a choice; they can either heed the rating agency's advice or have confidence in their own research and pick a nation in $N_1$ to invest. If they all do the later, we shall assume, in the spirit of Assumption 3, that each nation in $N_1$ has $\frac{c}{n_1}$ clever investors investing in them. The $(t - c)$ uninformed investors have two options: heed the rating agency's advice or choose a nation randomly and invest in it.

Let us, as in the earlier section, assume that there is just one rating agency and that it is entirely uninformed[4]. There are several interesting equilibria that can arise. First note that it is possible to have an equilibrium like in section 2, where the fact that some investors are knowledgeable makes no difference.

To see this, suppose the rating agency gives an $A$ rating to a nation in $N_2$, and all the investors, the informed and the uninformed invest in that nation. Clearly, if condition (2) above is satisfied, this is an equilibrium. No investor can do better by unilaterally deviating. The

[4]Giving the rating agency partial information will not change anything fundamentally but be more complex.

uninformed investor by deviating will earn, on expectation, $r(1) + \gamma x + (1 - \gamma)y$. The informed investor, by deviating, will earn $r(1) + x$. But neither of these exceed their current income $r(t) + y$ if condition (2) is satisfied.

Interestingly, this same model can have other equilibria. Suppose now, the rating agency again happens to pick a nation in $N_2$ and rate it $A$ and all the other nations as $B$, which is the least efficient outcome. Suppose now all the uninformed investors just go by the rating, and the informed ones ignore the rating and use their own information. Then each uninformed investor earns $r(t - c) + y$ and each informed investor earns $r(\frac{c}{n_1}) + x$.

Since we are writing these expressions ignoring the fact that the argument for the $r$ function is strictly always an integer, we will need to keep this in mind when using the above expressions. Thus if $\frac{c}{n_1} > 0$ is very close to zero, it is safe to treat it as 1, since whichever nation the informed investor chooses from $N_1$, it will have at least one investor. It is evident that neither the uninformed investor nor the informed investor will want to deviate if the following conditions are valid:

$$r(t - c) + y \geq \frac{n_1}{n - 1}[r(\frac{c}{n_1} + 1) + x] + (1 - \frac{n_1}{n - 1})[r(1) + y] \tag{5}$$

and

$$r(\frac{c}{n_1}) + x \geq r(t - c + 1) + y \tag{6}$$

It is now easy to see that there are parametric conditions under which both (5) and (6) are true. To see this, suppose $c = 1$ and $n_1$ is sufficiently large so that $\frac{c}{n_1}$ is close to zero. Then keeping in mind that, strictly, the argument is the $r(\cdot)$ function is an integer, equations (5) and (6) respectively, then become

$$r(t - 1) - r(1) \geq \frac{n_1}{n - 1}\Delta \tag{7}$$

$$\Delta \geq r(t) - r(1) \tag{8}$$

Clearly, there exist parametric conditions under which both (7) and (8) are satisfied. Under these conditions, there are multiple equilibria, including one where the informed players ignore the signal given by the rating agency and invest in nations they know have strong fundamentals. In contrast, the uninformed investors are guided by the ratings announced by the rating agency. The strategic complementarity benefits become so large now that it is not worthwhile for an informed investor to deviate unilaterally.

# 6 Conclusion

Credit rating agencies command a lot of reputation and power. Corporations and nations depend on their evaluation and ratings in successfully issuing bonds, raising funds, and getting foreign direct investment and other kinds of capital inflows. This reputation is somewhat of a mystery, especially for complex matters such as the fundamentals of nations. When the economics profession is conflicted about what constitutes strong fundamentals, how can rating agencies pronounce on this, and their reputation grow? This paper was an exercise in economic theory, but it considered a setting similar to the one provided by the World Bank's annual exercise in rating and ranking nations in terms of the "ease of doing business." The paper drew on some of the stylized facts that have emerged from the World Bank's experience. Then, using the concept of focal point or focal set in games, we modeled an explanation for this phenomenon, showing that the reputation of respected rating agencies can be, in large part, spurious. However nevertheless, their ratings cannot be ignored because they can be self-fulfilling.

This focal point approach turns out to be useful because it gives us interesting insights into several other phenomena, observed in the world of ratings. We get a new understanding of how rating agencies can and, on occasions, do exploit their power; why there are so few rating agencies; and why all of them give such similar ratings even when it becomes clear in retrospect that the ratings were flawed.

The model and these insights open up the scope for future work, both theoretical and empirical, on the market for rating and third-party evaluations, and also on how to regulate credit rating agencies.

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# Appendix

Table 1: **Ease of Doing Business Score on Stock Market Indexes Day-to-Day Return**

We first estimate the local market Day-to-Day Total Return $\alpha_{iy}$ and $\beta_{\mathbf{iy}}$ for each index $i$, in year $y$, using Day-to-Day Total Returns ($\mathbf{R^{US}_{iy}}$) of the three main US stock market indexes (INDU, NDX, SPX) from day -60 to day -7 prior to the annual announcement of the Ease of Doing Business Score. We use the three US stock market indexes because they are strongly correlated with the other international stock indexes. The daily abnormal returns ($AR_{iyt}$) are calculated as the gap between the estimated return and the real return for each day $t$ inside the event window $T$:

$$AR_{iyt} = R_{iyt} - (\alpha_{iy} + \beta_{\mathbf{iy}}\mathbf{R^{US}_{iyt}})$$

where $R_{iyt}$ is stock market index $i$'s real total return on post-event day $t$. Finally, we imply within-group identification for the impact of Doing Business Report on average abnormal returns:

$$AAR_{iy} = \gamma_0 + \gamma_1 DoingBusiness_{iy} + \gamma\mathbf{X_{iy}} + \epsilon_{iy}$$

The average abnormal return is constructed as $AAR_{iy} = \frac{1}{T}\sum_{t=1}^{T} AR_{iyt}$, where $T$ stands for event windows [-1, 3], [-1, 5] and [-1, 10]. The $DoingBusiness_{iy}$ is the percent changes of the Doing Business Score in the stock's home-country, and $\mathbf{X_{iy}}$ is a vector of control variables. $Year\ FE$ and $Economy\ FE$ are indicate the year fixed effects and economy fixed effects. We also find similar robust impacts of the changes of Doing Business ranks on the daily closing price of country level stock indexes. * $p \leq 0.10$, ** $p \leq 0.05$, *** $p \leq 0.01$.

| | [-1, 3] window | | [-1, 5] window | | [-1, 10] window | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| *DoingBusiness* | 1.313* | 2.371*** | 0.778 | 1.217** | 0.462 | 0.204 |
| | (0.731) | (0.834) | (0.531) | (0.592) | (0.362) | (0.406) |
| $Year\ FE$ | Yes | Yes | Yes | Yes | Yes | Yes |
| $Economy\ FE$ | | Yes | | Yes | | Yes |
| $Observations$ | 1,575 | 1,575 | 1,575 | 1,575 | 1,575 | 1,575 |
| $Adj.\ R^2$ | 0.185 | 0.229 | 0.121 | 0.207 | 0.066 | 0.150 |