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The Power and Influence of Rating Agencies
with Insights into Their Misuse *

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Abstract

The paper investigates the source of power and influence of agencies engaged in rating and ranking nations. Their power and knowledge are puzzling since the economics profession is itself split about what constitutes good fundamentals for an economy. Based on some stylized facts of the Ease of Doing Business rankings, the paper constructs a model that shows ratings can contribute to creating a focal point for investors, prompting behavior that makes the ratings come out right in retrospect. The paper then comments on the real-world implications of the model, possible extensions of the theory, and how the power to create focal points can be misused by organizations engaged in rating and ranking nations.

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1 Introduction

Much has been written about the power of ranking and rating nations, corporations, and even individuals. It is indeed the case that once an organization engaged in ranking or rating nations establishes a reputation, such as the World Bank with its Doing Business Report, or Standard & Poor's, Moody's, or Fitch with their sovereign rating exercise, it gets an enormous amount of influence and power. Sovereign 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 agency. 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 finance ministers of nations rated highly, and anger heads of firms and nations that are rated poorly.

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, have contracts enforced, and so on. There are many legitimate criticisms one can make of the conceptual basis of this exercise [1]. However, the World Bank had historically done this exercise with professionalism and transparency. 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[2]. 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. [3]

[1]There are some important criticisms that have been made of the EDB index, such as how, on occasions, the index has unleashed tax-cutting competition among emerging economies, thereby straining their fiscal balance and exacerbating inequality (see Muchhala (2018)).

[2]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.

[3]As we were doing the final round of work on this paper, the Doing Business reports, especially pertaining to 2018 and 2020, have run into controversy, making big news. An investigation by the law firm, WilmerHale, commissioned by the World Bank, revealed efforts, starting in 2017, to manipulate the data to boost some countries' rankings. The altercation that followed was big enough that on September 16, 2021, the World Bank announced it was halting the entire Doing Business exercise. Whether the Doing Business reports will be started again in a new and revised form

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[4]. It is arguable that the power of sovereign rating gets magnified by the fact that a large volume of corporate and financial debt is benchmarked by the credit rating received by the nation where the corporation is located (Ozturk et al. (2016)).

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 5th, 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 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 the United States and Moody's made in the case of China that informed market players of what they did not know and triggered a reaction? There is no doubt that credit rating agencies provide some of the advantages of economies of scale in the knowledge sector. As Kenjegaliev et al. (2016) point out, in the absence of credit rating agencies, individual investors would have to collect all the information for all potential destinations for their investment in deciding where to put the money. With ratings, the task is centralized. Be it Moody's, Fitch, or Standard and Poor's, a few agencies by providing a centralized rating, saves individual investors the burden of data collection. While this is true, in the case of sovereigns, there is ample scope for disputing how this centralized information is then collated into ratings and rankings since the economics profession often disputes what is better policy, in the context of controversial areas like fiscal and monetary interventions and trade and labor market regulations.

remains an open question. Unexpectedly, this event highlights one of the central features of our model, namely, the significance of the rankings to those being ranked. They mean so much to the economies being rated and ranked that they are willing to go great distances, spending money and risking controversy, to alter the results in their favor.

[4]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)).

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 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 a substantial literature based on concerns similar to what motivates this paper, such as 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 is aimed primarily at the rating of sovereign nations, and 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 an explanation, which is surprisingly simple and also realistic. It shows that a part of the power of rating agencies, including the World Bank in its capacity as the creator of the Doing Business ranking, is spurious. However, it is spurious without being useless. We show the rating, despite being spurious, nevertheless plays a useful role. Though this is a theoretical paper, the argument is intuitive, and derived from realistic assumptions. Unlike some of the literature cited above, the present paper is more suited to ratings and rankings [5] as applied to nations. The assumption of strategic complementarity is more natural in such a setting, where to be the lone outside investor 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

[5]We are here using the terms rating and ranking interchangeably as many authors have done. However, one important distinction is worth bearing in mind. When one nation undergoes a rating downgrade all alone, that may be very different from a situation such as a global crisis when a whole host of nations undergo a rating downgrade. In the latter context, the ranking may not change even while the rating changes. This distinction can play an important role in affecting capital flows (see Basu et al. (2013) and De et al. (2021)).

important 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 also 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 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 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 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 organizations 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 brief empirical illustration, we present in the Appendix to this paper some stylized facts concerning 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, with very few exceptions, on October 31st every year. 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 in the Appendix presents more technical details and 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. These market impacts decay as we stretch the event window. Nevertheless, their impact is clearly significant and explains the importance attached to the World Bank's EDB ranking exercise.

2 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 γ of being of good fundamentals.

Let $I = \{1, 2, ..., t\}$ be the set of investors, where $t \geq 2$. 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[6]. 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 the models developed here can be useful 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, reputation can occasionally be misused by rating agencies to achieve other objectives. This paper can be a useful ingredient for studying such deviant behavior.

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 took pride in its reputation for ranking nations accurately. For this exercise, the World Bank collects data from 190 economies. Much of the data pertaining to the *de jure* law, that is, the law as in the books of the nation; and a relatively small part of the data pertains to the *de facto*, that is, what happens on the ground. To that extent, the Bank does not have to use much statistical data, but whatever data are used are collected and then collated meticulously. At least so was the case till the report of 2017 ran into the controversy of data manipulation. Indeed the controversy shows that the World Bank is also vulnerable to misusing the reputation it had built up. Hence, the model developed here can provide beneficial ingredients for studying such deviant behavior.

[6]Note that in the model in this section, the rating agency knows nothing, and the only reason investors look for a signal is their need to find a focal point to coordinate. The rating agency has no interest in taking them from one focal point to another. However, in a more complex model where agents have partial information about the countries, the model will depend on what the rating agency seeks to maximize. If its aim is fully aligned with that of the investors, then the analysis will carry over as-is from this model. Otherwise, we will get variations depending on what it is that the rating agency seeks to maximize. Without detailed modeling, we address some of this below when we talk about how rating agencies can misuse their power.

Before proceeding to the main analysis, it is useful to capture the standard belief about what rating agencies do. The returns from investment in a nation depend on many things. The strong or weak fundamentals are just one component. But other things remaining the same, clearly, you will want to invest in a nation with strong fundamentals. If an investor believes that the rating agency has a better idea about which nation has strong fundamentals than the investor has and that the rating agency is honest in giving ratings (we will later have occasion to question both assumptions), then it will make sense to follow the ratings given by the rating agency and use it to make the investment. This is the gist of the traditional view as to why investors make use of the ratings provided by the rating agency in making its decision about where to invest.

The traditional view gets drowned out by other considerations once we inject a little reality into the model. The core of our 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, there is likely to be 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. And those investing money in hotels and hospitals are likely to earn more if the railroad investor invests money in the country. Individual investors may not be fully aware of this and may not even have information about how other investors are investing and in which countries they are putting their money. But they will all have an incipient need for coordination.

What the rating agency, in the above setting, does is to help investors coordinate[7]. Effectively, by putting out ratings, what the rating agency does is to help create a focal set or a focal point, in the sense of Schelling (Schelling (1960))[8]. Our aim is to show how a set of nations, with some mild conditions, can acquire a focal stature by virtue of the action taken by the rating agency, whether or not that is done deliberately or unwittingly. We shall initially describe a focal point based on one nation and then extend the idea to a focal set.

The idea is simple. If a nation rated *A* attracts more investors, then each investor may do better by virtue of nothing else but others being attracted to this nation. Of course, if the nation's

[7]It is possible to think of other reasons why investors may have a natural inclination to take the advice of rating agencies. This can happen to justify their investment decision. If the decision, backfires they can point fingers at the rating agency. Inserting such additional dimensions would, of course, make the modeling more complex but would, we believe, not disturb our main results.

[8]The idea of a 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 order to get the highest expected return, and that trust becomes self-fulfilling.

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, assume that the return R_i that an investor earns by investing in country i depends on the fundamentals of i and also on the total number, m, of investors investing in that country. In m investors invest in a nation, assume that this in itself gives each investor a return of $r(m)$. Hence, if m_i investors invest in nation i, each investor earns an aggregate return of $R(i)$ defined by:

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

where $x > y$. That is, other things unchanged, it is more profitable to invest in a nation with strong fundamentals. Further, we make the following assumption.

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

Note that Assumption 1 captures the idea of strategic complementarity. This will be relaxed later. Henceforth, we denote $x - y$ with Δ.

It is now easy to write down a plausible sufficient condition such that if that was satisfied, a rating agency that knows nothing could 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, for now, 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 an 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 create a focal point. It is this contribution of the focal point that often dominates other consequences it may or may not have. The rating agency's contribution belongs to the category of what Posner (2000, p. 4) refers to as "non-legal mechanisms of cooperation" (see alsov McAdams (2015)). The story about its having special knowledge about the fundamentals of economies is largely a chimera. This is not to deny that it can have such knowledge, but that is not as crucial as its power to create a focal point.

The analysis can be extended to a case where the rating agency chooses a small set of nations (instead of one nation) to which it gives a rating of A. This could end up creating a kind of 'focal subset.' This is related to the idea of a CURB set (see Basu and Weibull (1991) and Basu (2018)) but not the same. The broad idea is this. Suppose the rating agency gives a rating A to $m(< n)$ nations. If investors randomly pick an A-rated nation and invest in it, it is likely that each nation will have t/m investors. It is easy to specify conditions under which no investor will have an interest in deviating unilaterally to invest in a B-rated country. A sufficient condition for this is $r(t/m) - r(1) > \Delta$.

An interesting empirical hypothesis emerges from the above discussion that will be worth developing further and testing in the future. Much of this paper is written without making any explicit claims about what it is that the rating agency tries to maximize. The if-then propositions we derive do not require any explicit assumption on this. Our general belief is that rating agencies try to enhance their reputation. That is, they want the followers to do well by following them. As we remark later, this, in fact, allows them to occasionally exploit the power they gain by their reputation. But here is an interesting implication of their aim to enhance their reputation. It is easy to see from the above analysis that once the rating agency acquires the reputation whereby investors follow its ratings advice, that is, invest in nations or corporations rated A, the rating agency can increase the returns earned by the investors by giving fewer nations a rating of A. This will cause a greater heaping of investment in the few nations getting A and thereby give each investor a higher return. It follows that rating agencies will, in general, have a propensity to give more nations or corporations a lower rating than they deserve. We may refer to this as the 'downgrade bias.' It will be interesting to test empirically if rating agencies have a downgrade bias, as suggested by our model.

The model constructed in this section is based on many strong assumptions to make the central logic transparent. Reality is, of course, more complex. Thus, for instance, to take advantage of the simple structure of strategic-form games, we assume that all the investors simultaneously decide which nations to invest in. If we allowed for sequential entry by investors in different countries, the model would get more complicated. In a simple such case, the primary result will remain unchanged. The early entrants will find that they do not get any immediate advantage by investing in a highly-rated nation. But as other investors come in, the gains of

strategic complementarity will kick in, and the early investors will believe that their decision to follow those ratings was the right one. If the lags are long, the results will be more complicated, and our model would have to be thought of as a benchmarking exercise that will need to be modified to apply better to the context.

Another element of realism is to recognize that investors face strategic complementarity and also strategic substitutability. Further, rating agencies give top ratings to not just one but many countries and corporations. As it turns out, these two are related matters. Additionally, it is not the case that investors and rating agencies know nothing about economies' fundamentals. In reality, they have partial knowledge.

In the next section, we generalize the model to help with future advances and empirical studies of rating agencies. But even before going to that, we should point out that, just as our model helps us understand how rating agencies can help investors coordinate on their investments (often without even being aware that this is the source of their success), it can also shed light on the role they play in market crashes, such as the East Asian crisis of 1997. Ferri et al. (1999) had argued that the East Asian collapse was made more severe by the role rating agencies played. (see, also, Rodrik and Velasco (2000), Stiglitz (2002), and Basu (2003)).

To understand this, suppose that condition (2) above holds, the rating agency currently gives a rating A to a nation belonging to N_2. All investors flock to this nation, and the return each one earns is $r(t) + y$. No one has any reason to move. Now bring in what is true in reality, namely, that fundamentals drift and change over time. To keep this simple, assume that the return one earns from a nation in set N_1 purely because it has strong fundamentals (denoted by x in the model) changes over time. If we think of d as the date, then x depends on d and is denoted by $x(d)$. Let us suppose the model above is built for time 0. Hence, what is denoted by x above is actually $x(0)$. Thereafter as d increases, $x(d)$ increases. Suppose at time d', $x(d') + r(1)$ exceeds $y + r(t)$. What will happen after this time, d'? For some time, nothing may happen. All was indeed well for East Asians well into the early months of 1997.

But then, let us suppose some investors experiment by investing in some other economy (suppose in N_1). They will discover that they can earn more by doing so, since $x(d') + r(1) > y + r(t)$. This can cause the equilibrium to begin to break down. Seeing this, the rating agency would have a self-interest (to preserve its reputation) to downgrade its currently A-rated country. But that will, in turn, cause a rush to exit from the earlier A-rated nation. This will make this nation appear even worse as an investment destination, since the $r(t)$ will now crash, with investors fleeing to the newly A-rated nations.

This is what happened in East Asia in 1997. The rating agencies downgraded Indonesia, Korea, and Thailand to below investment-grade after the crisis became full-blown. And that, in turn, "exacerbated, for these countries, the cost of borrowing abroad, and caused the supply of

international capital to them to evaporate" (Ferri et al. (1999)), thereby making the crisis even worse.

Financial crises, such as the East Asian crisis of 1997, are complex phenomena with many dimensions. As suggested here, our model can be extended to elucidate on the tipping point aspect of these crashes.

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 $r(1) > r(t)$. There is no reason why this will always be so, but 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 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 perspective 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

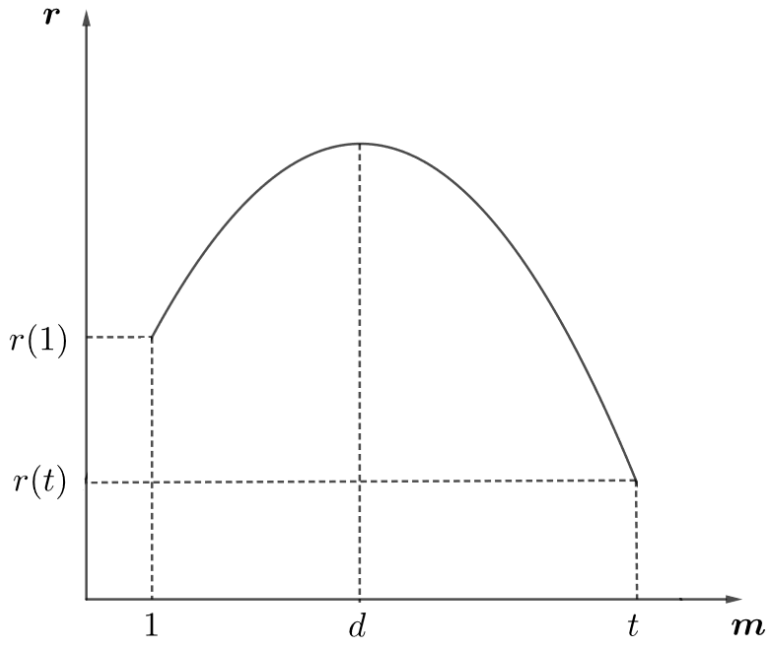

Figure 1: Generalized Model with Strategic Substitution

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 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 μ nations are given a rating of A by the rating agency, and k investors decide to invest in the μ 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 illustrate clearly that there can be plausible scenarios where rating agencies with no real knowledge can still give the impression of possessing knowledge, we 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 μ countries (randomly chosen by the rating agency) are rated A, each investor chooses one from these A-rated nations randomly to invest. Unlike in Assumption 3, it is not the case that each A-rated nation will get the same number of investors, namely, $\frac{k}{\mu}$, but there will nevertheless be a heaping of investment on the A-rated nations. Given the randomness of the selection from among the A-rated nations, the expected return for each investor will clearly be:

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

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 $R_i(1) = F + r(t)$. From Figure 1, it is obvious that as μ is raised starting from 1, $R_i(\mu)$ 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. Let us begin by noting 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 grades 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 subprime mortgage securities default and the subsequent Great Recession of 2008 (Kenjegaliev et al. (2016); 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 (see 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 (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 zero information on the fundamentals set up, 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 earlier crises, concerning how to reign in some of their powers (Bottini Jr (1993), Choi (1998)).

Once rating agencies have the power to actually influence the behavior of investors and thereby impact the return we can get from investing in different countries, they acquire new ways to misuse this power. Thus just before they downgrade or upgrade a sovereign, given that this can influence the return one earns from that sovereign, the rating agency may have an interest in secretly leaking its rating change in advance to selected entities. One can find fascinating examples of selective leakages, such as what happened during the downgrade of Cyprus in August 2011 by Fitch (see Michaelides et al. (2015)). These avenues of misuse of power can be

theoretically, and this can provide important insights into regulation.

Apart from the above argument, note that, 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 have some ideas about 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 latter, 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[9]. 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 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

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

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, 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 uninformed 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 and sovereign ratings. When the economics profession is conflicted about what constitutes strong fundamentals, it is somewhat puzzling to see how rating agencies pronounce on the fundamentals and have their reputation grow. This paper was an exercise in economic theory but it considered a setting which is realistic and 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." Historically, and despite some recent controversy, the World Bank's Ease of Doing Business rankings have played a powerful role, prompting emerging economies, for good or for bad, to change policies in an effort to climb up the rankings chart.

In this paper we 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 part or even wholly, spurious. But even when spurious, these ratings cannot be ignored because they can be self-fulfilling. Moreover, there is no denying that they end up playing a useful role, though different from the role that they were meant to play.

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. Most importantly, we get a new understanding of how rating agencies can and on occasions do exploit their power. They can use their power to extort some weaker nations or corporations, and flatter the powerful ones, and use this ability to make bilateral profitable gift exchanges. The focal point approach also gives us new insights into why there are so few rating agencies; and why all of them exhibit herd behavior and give such similar ratings.

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. Though behavior and ratification rather than the regulation of rating agencies was

the central focus of the paper, comments on regulation were made in several contexts throughout the paper. This was deliberate because the approach taken in this paper gives us new insights into why and in what ways rating agencies misuse their power and influence. It is hoped that this paper will provoke follow-up empirical work and more theoretical research on how to regulate rating agencies in order to enhance overall social welfare.

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Appendix: Stock Market Returns and Doing Business Score

In doing this simple empirical exercise, we follow the focal point approach and relax many of the standard assumptions in the finance literature. We show that investors' actions are affected by the rating immediately after the announcement; the strategic complementarity assumption is enough to grant rating agencies coordination power. However, classical cross-countries investment measures, such as foreign direct investment flows, are based on annual census data, which are noisy, making it difficult to identify the investors' behavior shift caused by the Doing Business announcement. Therefore, we use the Day-to-Day Total Return on shares for stock indexes to rule out such interaction. Within such a short window after the announcement, the fundamentals of the countries are unlikely to change much.

We first estimate the local market Day-to-Day Total Return α_{iy} and $\beta_{\mathbf{iy}}$ for each index i, in year y, using Day-to-Day Total Returns ($\mathbf{R}^{\mathbf{US}}_{\mathbf{iy}}$) 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 indices because they are strongly correlated with the other international stock indices and its Ease of Doing Business scores changed less than 1% during the sample period. 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:

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

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:

$$AAR_{iy} = \gamma_0 + \gamma_1 DoingBusiness_{iy} + \gamma\mathbf{X}_{\mathbf{iy}} + \epsilon_{iy} \tag{A1}$$

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 $\mathbf{X}_{\mathbf{iy}}$ is a vector of control variables. $Year\ FE$ and $Economy\ FE$ 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 indices.

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

The Table represents the estimation result of equation A1. The dependent variable is average abnormal return $AAR_{iy} = \frac{1}{T}\sum_{t=1}^{T} AR_{iyt}$, where T indicates the 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 $Economy\ FE$ indicate the year fixed effects and economy fixed effects. * $p \leq 0.10$, ** $p \leq 0.05$, *** $p \leq 0.01$.

	[-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