South African Journal of Economic and Management Sciences
ISSN: (Online) 2222-3436, (Print) 1015-8812

A motivation for banks in emerging economies to adapt agency ratings when assessing corporate credit

Authors:
Tanja Verster[1]
Riaan de Jongh[1]
Simon Greenberg[2]
Erika Fourie[1]
Dries de Wet[1]

Affiliations:
[1]Centre for Business Mathematics and Informatics, North West University, Potchefstroom, South Africa

[2]Independent Validation Unit, Group Risk, ABSA, Johannesburg, South Africa

Corresponding author:
Tanja Verster,
tanja.verster@nwu.ac.za

Dates:
Received: 20 Sept. 2018
Accepted: 20 Nov. 2018
Published: 25 Mar. 2019

How to cite this article:
Verster, T., De Jongh, R., Greenberg, S., Fourie, E. & De Wet, D., 2019, 'A motivation for banks in emerging economies to adapt agency ratings when assessing corporate credit', *South African Journal of Economic and Management Sciences* 22(1), a2818. https://doi.org/10.4102/sajems.v22i1.2818

Background: This article considers whether South African banks should utilise the credit ratings provided by US-based credit rating agencies when assessing the creditworthiness of corporate borrowers.

Aim: A review is conducted of the relevant literature and specifically the methodologies used by the credit rating agencies for ranking corporates in emerging markets.

Setting: The three largest international credit rating agencies are Fitch Ratings, Moody's Investor Services, and Standard and Poor's. These agencies' credit ratings cover the global spectrum of corporate, sovereign, financial and other public entities and the securities and obligations they issue. The analytical frameworks used to produce these ratings are referred to as credit rating methodologies.

Method: A review of Moody's ratings for South African corporate entities was undertaken to examine claims of a sovereign ceiling influencing the external ratings obtained by these institutions in emerging markets.

Results: Only 14 of the 200 global South African ratings pierced the sovereign ceiling.

Conclusion: The study concludes that the use of unmodified external ratings by banks to assess a corporate borrower should be discouraged. High-level suggestions are provided on how the methodologies and data used by the external agencies may rather be used to arrive at more suitable internal ratings.

Keywords: Sovereign ratings; credit ratings; country ceiling; emerging markets; modification of external ratings.

Introduction

This article assesses the applicability of credit ratings provided by the three (primarily) US-based rating agencies (Moody's Investor Services, Standard and Poor's, and Fitch Ratings) in assigning creditworthiness of corporate entities in emerging markets. When a corporate client approaches a bank for a loan, the bank assesses the creditworthiness of the corporate. More specifically, the bank must assess the risk involved in the specific transaction, usually by establishing a credit rating for the corporate. This is an inherently difficult exercise because corporates seldom fail, so default data are sparse. However, it is important to model these rare events as accurately as possible because of the effect corporate failures could potentially unleash on the country's economic milieu.

Many factors are considered in the assessment of risk from the bank's point of view; one example is: if the corporate is part of an international conglomeration, would the parent provide implicit support for the loan or not? Most banks have established their own internal rating systems to deal with these sorts of problems, which allow them to establish credit ratings that can be converted into a probability of default (PD) estimate, which could be used in subsequent pricing and capital calculations. External ratings can also be used in these internal rating systems.

External rating agencies rate emerging entities by taking a generic global lender's view (i.e. the ratings are not conditional on the lender type or position) and take only into account the borrower and transaction characteristics. The ratings issued by the external agencies also seem to depend on the sovereign rating through a full or partial application of sovereign ceilings. Emerging markets' sovereigns typically have low credit ratings and the corporates within such a country are almost always ranked at the same level or lower.

The following questions may thus be asked:

- Is the use of unmodified external ratings appropriate for banks operating in emerging markets and lending in local currency to local corporates?
- If external ratings should be adjusted to make them relevant in the local context, how could this be undertaken?

These issues are deliberated by:

- Reviewing the methodologies used by the rating agencies to rate the creditworthiness of corporates.
- Scrutinising the available literature on the appropriateness of these ratings.
- Reflecting on the present banking practice when using these ratings.
- Learning from the state of affairs in South Africa.
- Providing suggestions on the incorporation of agencies' data and methodologies into internal ratings models.

The conclusion of our article is that banks operating in emerging markets should not use unmodified external ratings of corporates to determine their creditworthiness; rather, banks should consider how the methodologies and data of the external agencies might be used to arrive at more suitable internal ratings.

Overview of rating agency methodology

Before evaluating the applicability of rating agency methodologies, an overview is given of these methodologies.

The three largest international credit rating agencies are Fitch Ratings (Fitch), Moody's Investor Services (Moody's) and Standard and Poor's (S&P). These agencies' credit ratings cover the global spectrum of corporate, sovereign, financial, and other public entities and the securities and obligations they issue (for more detail see Fitch 2014; Moody's 2016b; S&P 2016). The analytical frameworks used to produce these ratings are referred to as credit rating methodologies. Several methodologies that relate to a particular industry, sector, class of issuer or transaction exist and each methodology could result in one or more rating types (e.g. global issuer rating, PD rating, bond fund ratings, counterparty risk assessment ratings). Furthermore, an issuer rating can be split into various categories (e.g. long term, medium term, short term, domestic, foreign, secured and unsecured). Taking Moody's as an example, the agency has more than 600 methodologies with more than 100 rating types.

Santos (2012) provides a summary of the generic corporate methodologies used by Fitch, S&P and Moody's. The analytical framework, or rather the credit rating methodology, establishes the key analytical factors that the agency believes are the most important determinants of credit risk for the relevant sector. All three of the major credit rating agencies use their own methodologies, but in general they are similar. Quantitative as well as qualitative assessments of various criteria are used, followed by a process of weighting and tweaking, which finally results in a single rating score. The two main factors considered are economic and political factors. Economic factors may relate, among others, to income levels, international trade involvement, level and composition of debt, economic structure, flexibility and growth. The political dimension includes, for example, political stability, the history of debt-related policy actions, and the degree of democratisation or quality of institutions.

Moody's Sovereign Rating Methodology (Moody's 2015b), for example, uses four key factors to determine the sovereign risk: economic strength (e.g. GDP per capita), institutional strength (e.g. inflation levels), fiscal strength (e.g. government debt as a ratio of government revenue) and susceptibility to event risk (e.g. political risk).

Moody's Mining Rating Methodology (Moody's 2014, 2018) uses five key factors to determine a mining corporate's credit rating: scale (e.g. revenue), business profile (e.g. competitiveness), profitability and efficiency (e.g. Earnings before Interest and Taxes [EBIT] margin), leverage and coverage (e.g. debt/earnings before interest and tax and amortisation [EBITDA]) and financial policy (e.g. financial risk tolerance).

Although the credit ratings and the associated methodologies are publicly available, it is not possible to obtain a precise understanding of how a particular rating was determined. In most instances, the methodology and detailed quantitative rules associated with the methodologies are provided, but the precise approach used to determine the final rating is proprietary to the relevant agency. These publicly available methodologies simply outline key qualitative and quantitative factors used by the agency in determining ratings.

Qualitative factors include, but are not limited to:

- the quality of the financial policy
- the effectiveness of management
- political and reputational risk
- business diversification.

Quantitative factors include, but are not limited to:

- annual revenue
- profitability as measured by earnings before interest and tax and amortisation (EBITDA) divided by annual revenue
- profitability as measured by net income divided by tangible assets
- leverage as measured by debt divided by total capital
- economic variables such as GDP growth.

The common use of the term 'credit rating' normally refers to global credit ratings. The terminology used by Moody's (2016b) is 'Global Scale Ratings' (GSR). These include all of the rating types and are intended to be comparable across industries, markets, obligation type, countries and geography. Such a credit rating is the evaluation of credit risk in order to rank an institution's ability to honour its debt obligations.

Credit ratings issued by agencies are relative rankings of creditworthiness, meaning that an issuer or issue with a higher ranking is considered to be of better creditworthiness than an issuer or issue with a lower ranking (S&P 2016). The agencies themselves make it clear that ratings should be regarded as *opinions*, not *facts*, and therefore cannot be described as 'accurate' or 'inaccurate' (Fitch 2014).

While global credit ratings are intended to provide a measure of relative creditworthiness of institutions across industries and countries, national credit ratings are also issued for some of the institutions with global credit ratings. National credit ratings provide a measure of relative creditworthiness of institutions within a specific country. The terminology used by Moody's (2016b) to indicate these types of ratings is 'National Scale Ratings' (NSR). Fitch uses the term 'National Ratings' (Fitch 2014) and S&P refer to 'National Scale Credit Ratings' (S&P 2016). Moody's assigns NSRs to provide greater differentiation among a country's issuers when GSRs are concentrated in the lower portion of the scale, typically for emerging economies. The NSR can be mapped to the GSR rating, using the sovereign rating of the particular country as the anchor point. Note that NSRs have no inherent absolute meaning in terms of default risk or expected loss; rather, they should be regarded as ordinal rankings of creditworthiness relative to other domestic issuers within a given country (Moody's 2016a). A historical PD or an expected loss consistent with a given NSR can be inferred from the GSR that was used at that specific time, since these mappings are documented by the agencies. However, both the PD and the expected loss of an NSR may change if and when a country's national scale is remapped (Moody's 2016a).

Credit rating agencies typically rate all institutions within a country at or below the sovereign rating. A few exceptions exist, but then the institution is not ranked higher than at most two notches above the sovereign rating. The principal reason is that sovereigns are viewed by the agency as the lowest credit risk in their local market or currency (Moody's 2015a). Although rating agencies deny the strict application of sovereign ceilings to the global credit ratings of corporates in the particular country, it is typically the case as shown in Sections 4 and 5.

Not all countries and institutions have external ratings since rating agencies only provide ratings for entities that approach (and pay) the agency for such a rating.

Literature review

The following discussion of the literature will refute the use of *unmodified* external ratings for banks operating in emerging markets and lending in local currency to local corporates.

Credibility of rating agencies' ratings

Rating agencies' ratings should not be considered accurate, even by their own accord, and are intended as *opinions* about the riskiness of entities.

Rating agencies have been severely criticised on various fronts, principally stemming from the 2008/2009 financial crisis (Ryan 2012) and events that occurred thereafter (e.g. the crisis in the sub-prime mortgage market in the United States developed into a full-blown international banking crisis with the collapse of the investment bank Lehman Brothers). Scully and McLaughlin (2017) noted that the crisis could not have happened without the rating agencies. Credit rating agencies were unable to foresee the economic crisis, and often exacerbate a crisis by making sudden downward adjustments amidst the turmoil (Haspolat 2015). The predictive quality, accuracy and timeliness of the credit ratings of securities have also been questioned (Nguyen & Knyphausen-Aufseß 2014).

Although agencies stress that their ratings should be regarded as opinions and that they cannot be evaluated as 'accurate' or 'inaccurate', many studies conclude that the external ratings should definitely not be regarded as 'accurate' (see e.g. Fourie et al. 2013; Fuhrmann 2011; Haspolat 2015; Nguyen & Knyphausen-Aufseß 2014).

Another key criticism is that the institutions themselves must pay the credit rating agencies to rate their securities, which creates potential conflicts of interest. Ryan (2012) reserves severe criticism for the rating agencies, observing that there is a lack of competition and accountability, a dearth of truly independent external credit rating agencies, and a frequent adjustment of ratings (mostly *during* crises).

Banks and external ratings

Credit-granting institutions, particularly banks, should not *only* use the external ratings provided by the agencies to determine the creditworthiness of institutions, but rather incorporate these external ratings into internal rating models.

Fuhrmann (2011) warns institutions not to rely on external ratings and emphasises that institutions should perform their own due diligence in determining the safety levels of debt and related securities. The opinions of the credit rating agencies can help banks reach a conclusion, but as events of the last decade illustrated, the agencies can be just as off base as any other institution when it comes to the more extreme credit events.

Treacy and Carey (2000) argue that a bank typically has close relationships with its customers and therefore possesses more comprehensive information than external credit rating agencies. In a similar vein, Kräussl (2003) warns against a growing reliance on credit rating agencies that could undermine the credit risk analysis expertise within the banking community in the long run, since portfolio managers and controllers could become increasingly habituated to relying on external risk assessments rather than on their own research.

Guidelines given by the Prudential Regulation Authority (PRA) of the United Kingdom on the use of external agencies'

ratings in the internal ratings-based (IRB) approaches expect firms using external agency ratings to still have their own internal rating scales and use all other relevant information (PRA 2015). The PRA specifically warns not to automatically assign obligors ratings based on the external agency ratings. They further expect the institution to ensure that it does not adjust its individual ratings with the objective of making them closer to the external ratings, as this would be counter to the philosophy of an internal rating approach (PRA 2015).

Emerging markets

In emerging markets, the corporate ratings are heavily influenced by sovereign risk through the application of a sovereign 'lite' ceiling. Literature opposes the use of unmodified external agencies' credit ratings to determine the creditworthiness of local institutions for local lending, specifically in emerging countries.

Several authors (e.g. Luitel, Vanpee & De Moor 2016) claim that the agencies favour their home countries and corporates, alleging that the ratings for other countries and especially emerging markets tend to be conservative. Yalta and Yalta (2018) show that credit rating agencies indicate a strong home country bias towards the United States while there seems to be no special biases against an individual group of countries. The application of the so-called 'sovereign ceiling', applied when agencies rate in-country corporates (Borensztein, Cowan & Valenzuela 2013; Mohapatra, Nose & Ratha 2017), also influences emerging market ratings. Borensztein et al. (2013) regressed S&P corporate credit ratings against four sets of components: dummy variables indicating specific year, industry and country, firm-level determinants of idiosyncratic risk, country-level macroeconomic variables that affect the risk level of all firms in the economy, and the S&P sovereign credit ratings. They concluded that sovereign credit ratings remain a significant determinant of corporate credit ratings, more so in emerging countries. Similar arguments are found by Triandafil and Brezeanu (2008), who examined the influence of sovereign rating on corporate rating (emerging versus developed country). Cantor and Packer (1996) note that apart from affecting large sovereign bond markets, sovereign ratings also influence the credit ratings of private firms.

Nguyen and Knyphausen-Aufseß (2014) review existing research on the relationship between a sovereign's creditworthiness and corporates within as well as beyond its border. They conclude that studies generally agree that higher sovereign credit risk, as reflected in lower sovereign ratings, is associated with a more restricted access to debt capital for corporate borrowers. Nguyen and Knyphausen-Aufseß (2014) also note that, despite the common agreement that the influence of sovereign on corporate ratings exists, there are still deviating notions on the extent to which this influence manifests itself and that more research is needed on this topic. Ferri and Liu (2002) conclude that sovereign ratings have a particularly strong effect on corporate ratings in developing markets and that a country's information quality influences the relationship. Ferri and Liu (2002) further argue that the sovereign ceiling also has an impact on low-rated firms, as rating agencies wish to preserve the graduation in corporate rating levels. Hence, they contend that 'the sovereign ceiling would tend to push down the scale of private ratings rather than affecting only those firms that are right against the constraint'. This observation somewhat contradicts the claim of Durban and Ng (2005) who state that the ceiling only bears relevance for firms with ratings constrained by it. Borensztein et al. (2013) confirm the presence of a sovereign ceiling 'lite' policy by the agencies and conclude that it tends to affect corporate ratings negatively.

Other studies focus on the sectors that are more severely affected by sovereign creditworthiness (Nguyen & Knyphausen-Aufseß 2014). For example, Nguyen and Knyphausen-Aufseß state that, while the export-oriented resources sector is barely affected by sovereign credit risk, the telecommunications sector and the financial sector (both with close regulatory ties) are more likely to be sensitive in this regard. Export-oriented resource sectors like mining firms are predominantly influenced by the industry in which they operate (rather than the country), because mining firms' profits are consistent across the industry, being commodity-price driven. These arguments might be true in most developed economies, but in some emerging economies, specifically in South Africa, mining firms' profits are driven by two main factors, namely commodity prices and currency (i.e. exchange rate, which relates directly to sovereign risk). No research was found on how these region weights differ between emerging and developed economies.

Lewis (2015) suggested a framework to analyse the sovereign credit risk exposure of financial institutions. Nguyen and Knyphausen-Aufseß (2014) also mention the dependence of financial institutions on their government's creditworthiness in times of a financial crisis. This is again confirmed by a recent newspaper article by Bloomberg (Oyamada & Mathis 2018), stating that money managers say rating actions are mostly backward-looking – referring specifically to emerging markets.

The influence of sovereign credit ratings on specifically subnational credit ratings is discussed by Fourie et al. (2013). Fourie, Verster and Van Vuuren (2016) build on this and develop a credit rating methodology for a subnational within a specific country, and therefore in essence omit the sovereign effect completely.

Nguyen and Knyphausen-Aufseß (2014) also note the potential effect of sovereign rating changes on non-financial corporates, but recommend that further research be done regarding a more differentiated perspective on the effects relating to firm-specific characteristics. We are not aware of similar research for non-financial corporates, and research on this topic is required.

Cross-border lending

The use of external agency ratings to measure cross-border risk should be employed with caution.

Although the focus of this article is the assessment of the creditworthiness of corporates by banks within an emerging market country, some remarks on the differences between in-country and cross-border lending should also be made. When considering cross-border lending, an additional risk, namely transfer risk, might arise. Transfer risk is when government imposes restrictions on the transfer of funds by debtors in a country to foreign creditors (Claessens & Embrechts 2002). This phenomenon is almost exclusively related to foreign currency exposure when involved in cross-border lending. Nguyen and Knyphausen-Aufseß (2014) list some examples of transfer risk: governments in financial distress may impose foreign currency payment restrictions on corporations; they may expropriate private assets or impose higher taxes on corporations to compensate for higher sovereign borrowing cost, thereby reducing corporations' ability to serve their debt; and they can implicitly or explicitly render financial support to private borrowers in distress, that is, grant payment guarantees. Claessens and Embrechts (2002) found that although internal and external ratings (measuring transfer risk and sovereign risk) are driven by similar factors and both underestimate cross-border risk, external ratings are somewhat slower in adjusting to specific events.

Current banking practice

The agencies' ratings are commonly used by banks because of regulatory pressures, as a benchmark, and for low default portfolios. Adjustments are prevalent.

On the one hand, the rating agencies have extensive experience and on a global scale banks do not necessarily have better information or methodologies to rate corporates than do the agencies. On the other hand, banks should not be outsourcing their risk mangement responsibilities by using unmodified external ratings. A methodology is required to enable the internal use of external ratings.

Under the Basel guidelines, banks that use the regulatory Advanced Internal Ratings Based approach (AIRB approach) are not compelled to use external agency ratings or PDs. However, external ratings are currently widely used by banks, either directly or as a benchmarking tool for internal rating models. In the interest of consistency across industries, it is important to develop guidelines for the use and adjustment of external agency ratings in emerging markets, taking into account both borrower and lender characteristics.

Although regulators do promote the development of internal rating systems, this is not uniform across the globe. The standardised approach to regulatory capital calculation is the only one available in many countries and is dependent on the rating agency ratings. In many developing countries, the banks do not have an option to use the Foundation Internal Ratings-Based (FIRB) or AIRB approach for regulatory capital calculation. In the absence of internal rating systems, the de facto approach is to use agency ratings for impairment or pricing purposes.

Even where FIRB or AIRB approaches are available, regulators are reluctant to approve internal rating systems in low-default environments, where the performance of the system cannot be explicitly illustrated on data representative of the bank's portfolio. So, although an FIRB/AIRB bank will have internal rating systems, it will often continue using rating agency ratings for sub-portfolios where there is insufficient data to build an internal system.

Furthermore, even where the internal rating systems are approved and implemented, agency ratings continue to be used indirectly as a benchmarking tool. Regulations require FIRB/AIRB internal rating systems to be benchmarked and agency ratings are a readily available source of benchmarking data. However, in terms of our research, the use of unadjusted agency ratings is not suitable for the benchmarking of internal rating systems (specifically in South Africa).

Credit professionals take into account agency ratings as part of the credit-approval process, over and above the ratings produced by the internal system. Where the gap between the internal and agency rating is concerning, this is challenged and illustrated.

A scientific analysis of the rating or PD assignment methodologies followed by external rating agencies for sovereigns, banks, non-bank financial institutions and corporates is ultimately sought. In the process, the characteristics of the intended consumers of these ratings must be assessed to determine whether they are consistent with those of South African banks.

South African case study

South Africa's sovereign rating clearly plays a definitive role in the determination of the ratings of local corporates. This section provides further evidence and motivation for some of the statements made in the literature section. These are:

- Global external agency ratings do not differentiate well in terms of institutional creditworthiness within a country, as a result of the compression effect of the sovereign rating.
- The influence of the sovereign rating therefore dominates and negatively influences the external ratings of corporates, especially in emerging markets.
- Only a limited number of South African institutions have been assigned an external agency rating.

Therefore, it is recommended not to use the unmodified external rating to assess the creditworthiness of corporates within South Africa.

South African sovereign ceiling and institutions' ratings

Only 14 of the 200 global South African ratings pierced the sovereign ceiling.

In the remainder of this section, only the Moody's ratings are reported on for conciseness and as illustration. South Africa's sovereign long-term issuer rating (domestic) assigned by Moody's is Baa2. The associated short-term issuer rating (domestic) assigned is P2. Both are part of the lower investment grade broad-risk group.

Moody's has assigned 305 ratings to 65 institutions in South Africa. When municipalities and other government entities are excluded from this total, 252 ratings are available for 48 institutions. Of these 305 (252) ratings, 200 (166) are global ratings, of which 37 (20) are global long-term domestic issuer ratings.

Only 14 of the ratings issued pierced the sovereign ceiling of Baa2 (P2). The ratings that did pierce the South African ceiling are listed in Table 1.

Remarks:

- The sovereign domestic issuer long-term rating of South Africa is Baa2; the short-term rating is P2. None of the ratings that pierce this ceiling are issuer ratings and the comparability of the 'backed' ratings is debatable because the issuer ratings are secured ratings.
- Long-term ratings pierce the sovereign ceiling by no more than one notch (and short-term ratings by no more than two notches).
- Note that the focus of this research is on local (domestic) currency ratings. The main distinction between local and foreign currency ratings is that local (domestic) currency ratings describe the capacity and willingness of the government to honour its debt/bonds payable in local currency in a timely manner, whereas foreign currency ratings relate to the default risk of bonds/debt issued in a foreign currency (Peter & Grandes 2005). When considering domestic or implied domestic ratings, only 13 ratings pierced the sovereign long-term domestic issuer rating, of which 8 were listed explicitly as a domestic rating. Note that when all the ratings are considered, only 14 of the 200 global ratings pierced the sovereign ceiling.
- Note that only ratings with domicile (country) indicated as 'South African' were considered. Even though the country of the Bank of China is listed as domicile 'South Africa', this is not a South African-based company.
- Some of the Top 40 JSE listed companies appear to have no external rating. An initial analysis indicated that less than 50% of the Top 40 companies are assigned a Moody's/Fitch/S&P rating. Initial analysis also revealed that in some of the Top 40 JSE listed companies, the domicile is listed other than South Africa (e.g. Billiton is listed as an Australian company).

TABLE 1: Moody's credit ratings piercing the Baa2 level of the sovereign rating (September 2016).

Company name	Rating class/type	Rating	Foreign/domestic
Colgate Palmolive	Backed commercial paper (foreign)	P-1	Foreign
Toyota Financial Services	Backed senior unsecured MTN (domestic)	(P)Aa3	Domestic
Investec Bank	Counterparty risk assessment	Baa1(cr)	Implied domestic
SABSA Holdings	Backed senior unsecured MTN (domestic)	(P)A3	Domestic
	Backed senior unsecured (domestic)	A3	Domestic
MMI Group	Insurance financial strength	Baa1	Implied domestic
Standard Bank	Counterparty risk assessment	Baa1(cr)	Implied domestic
Bank of China (Johannesburg)	Senior unsecured MTN	(P)A1	Domestic
	Senior unsecured (domestic)	A1	Domestic
	Other short term (domestic)	(P)P-1	Domestic
Old Mutual Life Assurance	Insurance financial strength (domestic)	Baa1	Domestic
FirstRand Bank	Counterparty risk assessment	Baa1(cr)	Implied domestic
Nedbank	Counterparty risk assessment	Baa1(cr)	Implied domestic
Mercedes-Benz SA	Backed senior unsecured MTC (domestic)	(P)A3	Domestic

Source: Extracted from Moody's, 2016f, *Moody's Investor Services website: Homepage*, viewed 28 September 2016, from https://www.moodys.com.

MTN, medium term note; MTC, money transfer company; SA, South Africa.

When a rating pierces the South African sovereign rating, it is in general only one of the institution's ratings that pierces. For example, Moody's assigned nine global ratings in total to Standard Bank. Only one of the nine assigned ratings, namely the Counter Party Risk Assessment rating, was higher than the South African sovereign rating of Baa2 (or P2), whereas the remaining eight ratings are exactly equivalent to the sovereign rating.

Rating changes in some sectors severely restricted by sovereign risk

Confirmation of the literature stating that some sectors (e.g. financial) are more severely affected by sovereign creditworthiness than others (e.g. mining).

Consider rating changes by Moody's for mining and banking institutions in South Africa. The rationale for any rating changes for the mining companies was connected with specific mining factors whereas for banks they were primarily related to sovereign risk. For example, on 16 September 2016, Moody's (2016c) affirmed AngloGold Ashanti's Baa3 rating (changed the outlook to positive from stable), mainly because of an improvement of the debt/EBITDA ratio. Moody's (2016d) also affirmed the Ba1 rating of Gold Fields and changed the outlook from stable to positive, because of the improvement of financial ratios. Moody's remarked that the rating could be adjusted upwards if Gold Fields's cash flow improves.

Moody's (2016e) confirmed the ratings of the five largest South African banks to a negative outlook on 10 May.

According to Moody's, in light of the correlation between sovereign and bank credit risk, the banks' standalone credit profiles and ratings are inevitably constrained by the rating of the government. On the question of what could move the banks' ratings up or down, the following is reported by Moody's (2016e):

> As indicated by the negative outlook on the sovereign rating, any deterioration in the creditworthiness of South Africa would exert downward pressure on the banks' ratings, in view of their sizeable holdings of sovereign debt securities. In addition, the banks' ratings could be downgraded if operating conditions worsen more than currently anticipated, leading to significantly higher loan loss provisions that prompt deterioration in the banks' earnings and capital metrics that exceed the agency's expectations. Conversely, any upwards rating momentum of the banks' ratings is currently limited as their baseline credit assessments are constrained by the sovereign rating (p. 2).

Suggestions on the incorporation of agencies' data and methodologies into internal ratings models

Three ways of incorporating external agencies' data and methodologies into internal ratings models are discussed below. The first two are based on the data of peers provided by external agencies such as key financial ratios and relative credit health scores, while the third employs the quantitative rules from the methodologies as a benchmark.

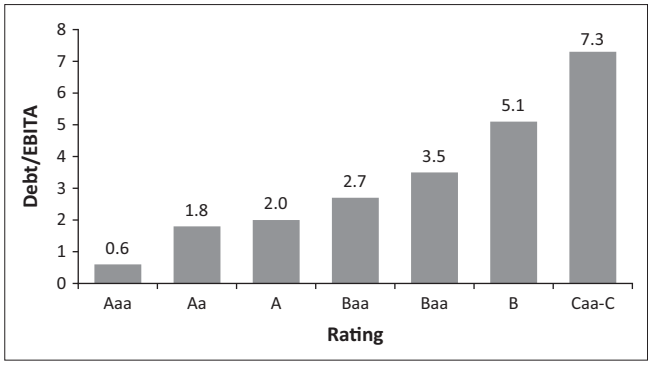
Several authors (e.g. Nguyen & Knyphausen-Aufseß 2014; Ryan 2012) have stated that the publicly available rating methodologies are too opaque. In most instances, the methodology and detailed quantitative rules associated with the methodologies are provided, but exactly how the final rating is determined is proprietary to the agency that issued the rating.

Financial ratios

Adjusting an internal model using industry-specific financial ratios.

Moody's (2013) outlines key financial ratios across industries for global non-financial, non-utility corporates. For example, the distribution of the median of the ratio debt/EBITDA by broad rating category can be summarised as shown in Figure 1.

The median debt/EBITDA ratio for Baa-rated institutions is 2.7. This may be disassembled into industry components, as shown in Figure 2.



Source: Adapted from Moody's, 2013, *Moody's financial metrics key ratios by rating and industry for global non-financial corporations*, Moody's Investors Services, New York

FIGURE 1: Debt/EBITDA by rating category.

Note that the telecommunications industry has the lowest median ratio, but it is still greater than the A aggregate. On the other hand, the transportation sector has the highest debt/EBITDA ratio, exceeding the Ba aggregate. These financial ratios (based on Moody's ratings) can be used to adjust or benchmark internal rating models.

As can be seen in Figure 2 (debt/EBITDA), the interpretation of accounting ratios differs for specific industries, because of industry-specific idiosyncrasies. These industry-specific interpretations may be used in model development on a more granular level. Adjustments can be made to internal models to more accurately reflect the credit risk associated with a counterparty in a specific industry.

Example: Adjusting an internal model for the transportation sector

Suppose the internal model consists of three risk grades, namely 1, 2 and 3, where 1 indicates the lowest default probability. Usually an internal model would be generic for all industries, but the need may arise to adjust the results from such an internal model.

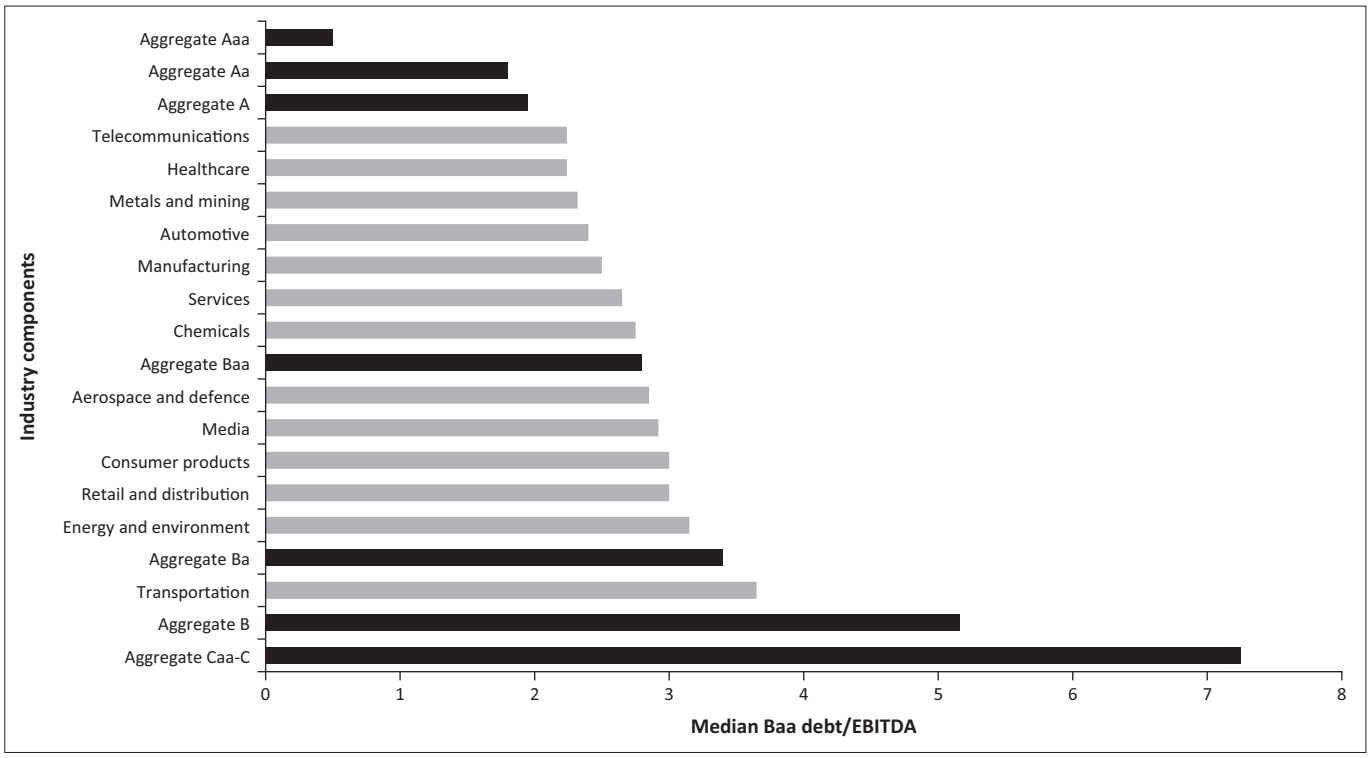
Assuming the current internal model uses a debt/EBITDA ratio of '< 0.6' for a risk grade 1. Further, suppose a large transportation corporation received a risk grade of 2 from the internal model, but this company is known (credit analyst and/or expert knowledge) to be of very low risk. Assuming this transportation corporation has a debt/EBITDA ratio of 1.2. From Figure 2 it is observed that the transportation sector has the highest debt/EBITDA ratio and the credit analyst/expert might decide to adjust the level of '< 0.6' in the internal mode to, for example, 'less than 2'. This will result in the specific transportation corporation in our example receiving a risk grade of 1 rather than 2, to more accurately reflect the credit risk associated with transportation corporations.

Note that this example is only on how to adjust one financial ratio for one transportation company. This needs to be done by a credit analyst or expert for each company for each financial ratio. Usually the adjustments are done per industry (the same type of suggested adjustments are usually grouped per industry). Nevertheless, the expert will decide if the 'industry suggestions' will be applied for all the companies in a specific industry. In our example above, the 'industry suggestions' showed that in general the debt/EBITDA ratio of transportation companies are higher. The expert needs to decide if this guideline will be applied to all transportation companies and they also need to decide to what degree the guideline will be applied.

Credit health score

Evaluating the creditworthiness of a chosen entity relative to a unique group of industry peers.

The Credit Health Score (CHS) (S&P 2013) is a workflow tool designed to aid the evaluation of the creditworthiness of a chosen entity relative to a unique group of industry peers. The key analytical element of the CHS tool is the relative



Source: Retrieved from Moody's, 2013, *Moody's financial metrics key ratios by rating and industry for global non-financial corporations*, Moody's Investors Services, New York

FIGURE 2: Components of Baa-rated institutions debt/EBITDA.

credit health score. The CHS is a relative quartile ranking (top, above average, below average and bottom) that expresses the creditworthiness of the entity relative to its unique peer group. The CHSs are delivered at three levels for each entity: overall score for the entity, financial panels' scores (operational, solvency, liquidity panels) and fundamental metrics scores. The CHS methodology consists of three steps and is summarised below.

Step 1: Create a unique peer group for the entity that must be rated

The first step creates a unique peer group for the entity that must be rated. For example, for AngloGold, a typical peer will be Gold Fields. Usually a minimum of 5 and a maximum of 41 companies are chosen as peers.

Step 2: Perform comparisons of fundamental metrics within the peer group

The second step performs a comparison of fundamental metrics within the peer group. S&P (2013) utilises a total of 24 fundamental metrics to analyse an entity's relative credit health. These fundamental metrics are grouped into three equally weighted panels: operational-related metrics (e.g. EBITDA/revenue), solvency-related metrics (e.g. net debt to EBITDA and debt/EBITDA), and liquidity-related metrics (e.g. total revenue).

Step 3: Apply an iterative scoring methodology

In Step 3 an iterative scoring methodology is applied. If the financial metric of the entity falls in the first quartile of all the peers (identified in Step 2), two points are added, if in the second quartile, one point is added, if in the third quartile one point is subtracted, and if in the fourth quartile two points are subtracted. This is done for all three metrics (operational, solvency and liquidity) and averaged over these three for a final CHS. The CHS seeks to provide a consistent, quick snapshot of an entity's relative financial performance versus a unique group of peers or companies.

Example: Adjusting an internal model for a transportation corporation using CHS

Using the same large transportation corporation from our previous example, suppose the corporation has a debt/EBITDA ratio of 1.2. This CHS will show the relative debt/EBITDA ratios of its peers (other transportation corporations) as well as the combined result of all financial ratios considered. For illustrative purposes we can assume that the debt/EBITDA ratio of other large transportation corporations have a median value of 3.8 (motivated from Figure 2). It can then be concluded that this transportation corporation (taking into account the debt/EBITDA ratio) ranks in the top quartile of its peers. Therefore, relative to its peers, it seems that this company is one of the most creditworthy transportation corporations.

This comparison with peers could also be used to adjust the internal model. The peer analysis as done by the CHS score usually accentuates the difference between industries as a result of industry-specific idiosyncrasies. Adjustments (based on the peer analysis) can be made to internal models to more accurately reflect the credit risk associated with a counterparty in a specific industry (similarly to the previous example).

Again, this example showed how to adjust one financial ratio for one transportation company. This needs to be done by a

credit analyst or expert for each company for each financial ratio. Usually the adjustments are done per peer group, but the expert needs to decide if a specific peer group guideline will be applied to all companies, as well as to what degree the guideline will be applied.

Incorporation of quantitative rules from external methodologies into internal models

Adjusting the internal rating of an entity to an alternative benchmark model created for a sector using the key financial ratios (quantitative rules) used by a rating agency's industry for that sector.

The third implicit use is to create an alternative model (benchmark model) using financial ratios (quantitative rules) from the external methodology. The first step will be to score the entity with the existing internal rating model. The second step will be to score the entity with the external agency methodology but only using the quantitative rules (this is usually financial ratios). The final step will be to compare these two scores, using the model in the second step as a benchmark model to adjust the internal rating model or to validate the internal rating model. These steps are discussed in more detail below, with an illustrative example.

Example: Adjustment for mining sector

Step 1: Score with internal rating model

- Choose an industry, for example mining.
- Determine which financial ratios are used in the internal rating model to rate this industry; assume EBITDA/assets (70%) and EBITDA/interest expense (30%). The weight of each financial ratio is indicated in brackets.
- Assume the internal rating model for mining (for illustrative purposes) (see Table 2).
- Run the South African mining companies through the internal rating model.
- Example: Company XYZ has a ratio of 13% of EBITDA/asset and a ratio of 16% for EBITDA/interest expense.
- Internal rating model will give score 2 for EBITDA/Asset and score 1 for EBITDA/interest expense = 70% × 2 + 30% × 1 = final score of 1.7 (rounded to 2).
- Add the qualitative component (if applicable).

Step 2: Score with external rating methodology (using quantitative rules)

- Research the external rating methodology used for rating this industry (mining).
- Determine which financial ratios are used in external rating methodologies to rate this industry.
- The Moody's Mining methodology (Moody's 2014) (see Table 3).
- The detail can be found in (Moody's 2014), for example for Factor 4: Leverage and Coverage (35%) (see Table 4).
- Assume a simplified external model for mining: only two financial ratios are used, say debt/EBITDA (75%) and debt/total capital (25%). Assume simplified quantitative rules of the external agency methodology for mining can be found in Table 5.
- Obtain a mapping (expert-based) from the internal rating/score to external rating (see Table 6).
- Run the South African mining companies through this external rating model (using only financial ratios).
- **Example:** Company XYZ has a debt/EBITDA ratio of 5 (resulting in a score of 3) and a debt/total capital ratio of 40% (resulting in a score of 2).

TABLE 2: Assumed internal rating model for mining (illustrative example).

Score	EBITA/assets	Score	EBITA/interest expense
1	> 15%	1	> 15%
2	$5\% \le \frac{E}{A} \le 15\%$	2	$3\% \le \frac{E}{A} \le 15\%$
3	< 5%	3	< 3%

TABLE 3: Moody's mining methodology.

Broad rating factors	Factor weighting (%)	Rating sub-factor	Sub-factor weighting (%)
Scale	20	Revenue	20
Business profile	20	Business profile	20
Profitability and efficiency	15	EBIT margin	10
		Return on average tangible assets	5
Leverage and coverage	35	EBIT/interest	7.5
		Debt/EBITDA	15
		Debt/Total capital	5
		(CFO – dividends)/Debt	7.5
Financial policy	10	Financial policy	10
Total	**100**	**Total**	**100**

Source: Adapted from Moody's, 2014, *Rating methodology: Global mining industry*, Moody's Investors Services, London

TABLE 4: Detail of Factor 4 (leverage and coverage) of Moody's mining methodology.

Sub-factor	EBIT/interest expense	Debt/ EBITDA	Debt/total capital (%)	(CFO – dividends)/ debt (%)
Sub-factor weight (%)	7.5	15	5	7.5
Aaa	≥ 16 ×	< 0.75 ×	< 20	≥ 55
Aa	11 × – 16 ×	0.75 × – 1.25 ×	20 × – 30 ×	45 × – 55 ×
A	7 × – 11	1.25 × – 2 ×	30 × – 40 ×	35 × – 45 ×
Baa	4 × – 7 ×	2 × – 3 ×	40 × – 50 ×	25 × – 35 ×
Ba	2.5 × – 4 ×	3 × – 4 ×	50 × – 70 ×	15 × – 25 ×
B	1.5 × – 2.5 ×	4 × – 5.5 ×	70 × – 80 ×	10 × – 15 ×
Caa	1 × – 1.5 ×	5.5 × – 7.5 ×	80 × – 90 ×	5 × – 10 ×
Ca	≤ 1 ×	≥ 7.5	≥ 90	≥15

Source: Adapted from Moody's, 2014, *Rating methodology: Global mining industry*, Moody's Investors Services, London

TABLE 5: Assumed simplified quantitative rules of the external agency methodology for mining.

Score	Debt/EBITDA	Debt/total capital (%)
Aaa	≤ 0.75	≤ 5
Aa	$0.75 < \frac{D}{E} \le 1.25$	$5 < \frac{D}{TC} \le 20$
A	$1.25 < \frac{D}{E} \le 2.00$	$20 < \frac{D}{TC} \le 30$
Baa	$2.00 < \frac{D}{E} \le 3.00$	$20 < \frac{D}{TC} \le 40$
Ba	$3.00 < \frac{D}{E} \le 4.00$	$40 < \frac{D}{TC} \le 50$
B	$4.00 < \frac{D}{E} \le 5.00$	$50 < \frac{D}{TC} \le 70$
Caa to C	> 5	> 70

TABLE 6: Mapping from the internal score to the external rating (illustrative example).

Internal score	External rating
1	Aaa – Aa
2	A to Ba
3	B to C

- The external methodology (only quantitative) would give a score of 75% × 3 + 25% × 2 = final score of 2.75 (rounded up to 3).
- Adjust for industry and country factors (e.g. currency) if applicable.

Step 3: Compare these two scores (from step 1 and 2)

This comparison (internal model's final score of 1.7 vs external methodology, resulting in a score of 2.75) can be used to benchmark the internal rating model or to adjust the internal rating model.

Example: If these scores are the same using the internal rating model as well as the external rating methodology, we can be confident that the internal rating model captures the risk sufficiently. However, in our example, the two scores differ (1.7 vs 2.75) and this could initiate discussion surrounding these differences. The combination of data analysis and expert judgment could then result in possibly adjusting the internal rating model.

Both the internal model and the external rating methodology are a set of quantitative rules. Most of the time, these rules are given per industry (i.e. for each industry, there is a different model). Each company needs to be run through the model. The example given only included two financial ratios. Usually 8 to 20 financial ratios are considered in a quantitative model.

Summary

Rather than using unmodified external ratings, suggestions were presented in this section on how to incorporate methodologies and data of external agencies into internal rating models. The first idea was to calculate key financial metrics ratios from the external agency data, the second suggestion was to calculate a relative CHS using data from the external agency (focusing on peers) and the third idea employs the quantitative rules from the methodologies as a benchmark model. Practical implementation is, however, required to ensure practical or business value.

Guidlines will likely differ on the type of the borrower (sovereign, bank, non-bank financial institution, large corporate) and the industry of the borrower as well as local versus in-country business. It is important to articulate the lender or borrower characteristics (e.g. domicile, legal environment, borrower type, lender type, industry, loan characteristics) that should be incorporated.

Implementation falls outside the scope of this article.

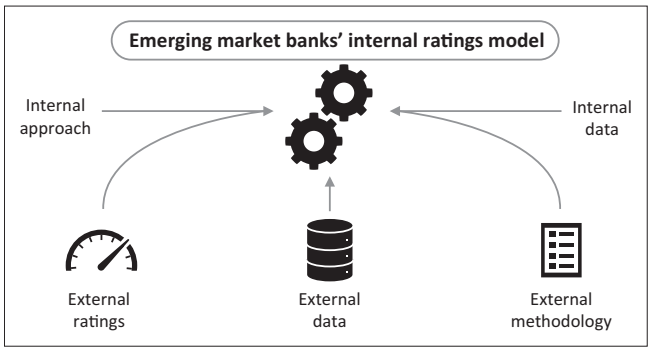


FIGURE 3: Summary of recommended 'local ratings' approach.

Conclusion

The literature emphasises that external ratings provided by rating agencies cannot be regarded as entirely accurate. Also, in emerging markets, the application of the sovereign ceiling to the rating of corporates leads to a compression effect that results in lower ratings, as confirmed by a recent newspaper article (Business Tech 2018).

The case study demonstrates that less than 10% of ratings assigned to local corporates pierce the sovereign ceiling by no more than one notch long term (and by no more than two notches short term). Given the latest widespread criticism on the rating agencies, it is recommended that banks in South Africa refrain from using unmodified external ratings when rating local corporates, but rather adjust these ratings as set out above and summarised in Figure 3.

As far as the adjustment of the external ratings for the use by local banks is concerned, more research is required to address this complicated question appropriately. The methodologies provided by agencies cannot be used to arrive at a final rating. However, aspects of the methodology and the data used might be utilised to benchmark or adjust internal rating models. Section 6 proposed a few possible suggestions.

Acknowledgements

This work is based on research supported in part by the Department of Science and Technology (DST) of South Africa. The grant holder acknowledges that opinions, findings and conclusions or recommendations expressed in any publication generated by DST-supported research are those of the authors and that the DST accepts no liability whatsoever in this regard.

Competing interests

The authors declare that they have no financial or personal relationships that may have inappropriately influenced them in writing this article.

Authors' contribution

All authors contributed equally to this article.

References

Borensztein, E., Cowan, K. & Valenzuela, P., 2013, 'Sovereign ceilings "lite"? The impact of sovereign ratings on corporate ratings', *Journal of Banking & Finance* 37(11), 4014–4024. https://doi.org/10.1016/j.jbankfin.2013.07.006

Business Tech, 2018, *Time to upgrade South Africa's credit rating*, viewed 21 February 2018 from https://businesstech.co.za/news/banking/226283/time-to-upgrade-south-africas-credit-rating-analysts/

Cantor, R. & Packer, F., 1996, 'Determinants and impact of sovereign credit ratings', *Federal Reserve Bank of New York Economic Policy Review* 2, 37–53.

Claessens, S. & Embrechts, G., 2002, 'Basel II, sovereign ratings and transfer risk: External versus internal ratings', Presentation at the Basel II: An Economic Assessment, Bank for International Settlements, Basel, 17–18 May.

Durban, E. & Ng, D.T.-C., 2005, *Board of governors of the Federal Reserve System, US*, viewed 8 October 2016, from https://www.federalreserve.gov/pubs/ifdp/1999/639/ifdp639.pdf

Ferri, G. & Liu, L.-G., 2002, *Do global credit rating agencies think globally? The information content of firm ratings around the world*, viewed 15 November 2016, from http://repec.org/res2002/Ferri.pdf

Fitch, 2014, *Definitions of ratings and other forms of opinion*, Fitch Ratings, New York.

Fourie, E., Verster, T. & Van Vuuren, G., 2016, 'A proposed quantitative credit rating methodology for South African provincial departments', *SA Journal of Economics and Management Sciences* 19(2), 192–214. https://doi.org/10.17159/2222-3436/2016/v19n2a3

Fourie, E., Styger, P., De la Rey, T. & Van Vuuren, G., 2013, 'Review of subnational credit rating methodologies and the applicability in the South African context', *Politeia* 32(3), 74–99.

Fuhrmann, R., 2011, *Investopedia*, viewed 7 November 2016, from http://www.investopedia.com/financial-edge/0911/why-you-shouldnt-trust-ratings-from-rating-agencies.aspx#ixzz4PJUGdn8Y

Haspolat, F., 2015, 'Analysis of Moody's Sovereign credit ratings: Criticism towards rating agencies are still valid?', *Procedia Economics and Finance* 30, 283–293. https://doi.org/10.1016/S2212-5671(15)01296-4

Kräussl, R., 2003, *A critique on the proposed use of external Sovereign credit ratings in Basel II*, Centre for Financial Studies, Frankfurt.

Lewis, J., 2015, *A framework to analyse the sovereign credit risk exposure of financial institutions*, GARP, London.

Luitel, P., Vanpee, R. & De Moor, L., 2016, 'Pernicious effects: How the credit rating agencies disadvantage emerging markets', *Research in International Business and Finance* 38, 286–298. https://doi.org/10.1016/j.ribaf.2016.04.009

Mohapatra, S., Nose, M. & Ratha, D., 2017, 'Determinants of the distance between sovereign credit ratings and sub-sovereign bond ratings: Evidence from emerging markets and developing economies', *Applied Economics* 50(9), 934–956. https://doi.org/10.1080/00036846.2017.1346364

Moody's, 2013, *Moody's financial metrics key ratios by rating and industry for global non-financial corporations*, Moody's Investors Services, New York.

Moody's, 2014, *Rating methodology: Global mining industry*, Moody's Investors Services, London.

Moody's, 2015a, *How sovereign credit quality can affect other ratings*, Moody's Investors Service, London.

Moody's, 2015b, *Rating methodology: Sovereign bond ratings*, Moody's Investors Services, London.

Moody's, 2016a, *Mapping national scale ratings from global scale ratings*, Moody's Investors Services, London.

Moody's, 2016b, *Rating symbols and definitions*, Moody's Investors Services, London.

Moody's, 2016c, *Moody*, viewed 28 September 2016, from https://www.moodys.com/research/Moodys-affirms-AngloGold-Ashantis-Baa3-Ratings-outlook-changed-to-positive--PR_354858

Moody's, 2016d, *Moody's*, viewed 28 September 2016, from https://www.moodys.com/research/Moodys-affirms-Gold-Fields-Ba1-Ratings-outlook-changed-to-positive--PR_354859

Moody's, 2016e, *Moody's*, viewed 28 September 2016, from https://www.moodys.com/research/Moodys-Confirms-the-Ratings-of-the-Five-Largest-South-African--PR_348493

Moody's, 2016f, *Moody's Investor Services website: Homepage*, viewed 28 September 2016, from https://www.moodys.com

Moody's, 2018, *Rating methodology: Mining*, Moody's Investors Services, London.

Nguyen, J.M. & Knyphausen-Aufseß, D.Z., 2014, 'The impact of Sovereign credit ratings on corporations: A literature review and research recommendations', *Financial Markets, Institutions & Instruments* 23(3), 125–178. https://doi.org/10.1111/fmii.12017

Oyamada, A. & Mathis, W., 2018, *Yields speak louder than ratings for emerging-market traders*, viewed 21 February 2018, from https://www.bloomberg.com/news/articles/2018-02-08/yields-speak-louder-than-ratings-for-emerging-market-investors

Peter, M. & Grandes, M., 2005, 'How important is sovereign risk in determining corporate default premia? The Case of South Africa', IMF Working Paper, Volume WP/04/217.

PRA, 2015, *Internal ratings based (IRB) approaches: Supervisory statement SS11/13 (Updated November 2015)*, Bank of England: Prudential Regulation Authority, London.

Ryan, J., 2012, *The negative impact of credit rating agencies and proposal for better regulation*, SWP, Berlin, Working paper FG 1, 2012/Nr.01.

S&P, 2013, *A methodology for determining a relative credit health score*, S&P Capital IQ Global Markets Intelligence, New York.

S&P, 2016, *S&P global ratings definitions*, McGraw-Hill Companies, New York.

Santos, K., 2012, *Corporate credit ratings: A quick guide, the association of corporate treasurers handbook*, viewed 19 July 2016, from https://www.treasurers.org/ACTmedia/ITCCMFcorpcreditguide.pdf

Scully, M. & McLaughlin, D., 2017, *Fin24: Moody's slammed with massive $864m penalty*, viewed February 2017, from http://www.fin24.com/Economy/moodys-slammed-with-massive-864m-penalty-20170116

Treacy, W.F. & Carey, M., 2000, 'Credit risk rating systems at large US banks', *Journal of Banking & Finance* 24(1–2), 167–201. https://doi.org/10.1016/S0378-4266(99)00056-4

Triandafil, C. & Brezeanu, P., 2008, 'Does sovereign risk have an effect on corporate rating? Case-study for emerging versus developed countries', *Management & Marketing* 3(2), 3–20.

Yalta, A.T. & Yalta, A.Y., 2018, 'Are credit rating agencies regionally biased?', *Economic Systems* 42(4), 682–694. https://doi.org/10.1016/j.ecosys.2018.08.001