

Managing South Africa's Exposure to Eskom

How to Evaluate the Credit Risk from the Sovereign Guarantees?

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Abstract

The South African government offers various support mechanisms to support Eskom, the state-owned electric utility, and the independent power producers in providing low-cost electricity, including credit and payment guarantees. Guarantees constitute contingent liabilities to the government and pose risks to government finances. This note illustrates the methodologies explored by South Africa to assess the credit risk from guarantees extended to Eskom. To manage and closely monitor this risk, a dedicated Credit Risk directorate in the Asset and Liability Management division at the National Treasury of South Africa has implemented a risk assessment and management framework, supported by the World Bank Treasury. The team developed a sector-specific internal credit rating methodology to assess Eskom's creditworthiness. Additionally, the team developed a scenario analysis methodology to assess Eskom's ability to service debt from cash flows and cash reserves.

The scenario analysis tool is currently used on an ad hoc basis to feed into the various scenarios that are considered for the budget process. Risk assessments are reported to the Fiscal Liabilities Committee on a quarterly basis for risk monitoring and to support recommendations for taking on new contingent liabilities, such as government guarantees. The Fiscal Liabilities Committee advises the minister of finance and is responsible for the determination of the processes and policies for approving guarantees and guarantee-like transactions. The Fiscal Liabilities Committee is generally mandated to promote the optimum management of the government's contingent liabilities, including guarantees. The implementation of further risk mitigation and monitoring tools, such as risk-based guarantee fees, budget allocations, and a contingency reserve account, is under discussion.

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Abbreviations

ALM	Asset and Liability Management
FLC	Fiscal Liabilities Committee
GTAC	Government Technical Advisory Centre
IPP	Independent power producer
NERSA	National Energy Regulator of South Africa
NTSA	National Treasury of South Africa
PD	Probability of distress
PPA	Power purchase agreement
PPP	Public-private partnership
SOC	State-owned companies

1. Introduction

Contingent liabilities are obligations that emerge only upon the materialization of an uncertain event. The uncertainty surrounding the timing and the magnitude of the event are both factors outside the control of the government and have the potential to create unexpected pressures on government finances.² To avoid unnecessary adjustments in an unplanned and/or untimely manner during the fiscal year, governments need to identify, measure, and manage risks from contingent liabilities. In many countries, the energy sector is one of the key sources of risk exposure of the government. The energy sector generates significant investment needs and is expensive to finance. Therefore, governments sometimes choose to provide guarantees to entities responsible for undertaking investments for the generation, transmission, and distribution of energy to help them become profitable or sustainable. Also, energy utilities are often owned by the government. All of this is true in South Africa where the energy sector is dominated by Eskom, a state-owned and vertically-integrated electric utility. Additionally, there are independent power producers (IPPs) that are increasingly becoming important actors in generating electricity from renewable sources. Eskom has entered into power purchase agreements (PPAs) with these IPPs.

The objective of this note is to illustrate credit risk assessment practices explored in South Africa and provide guidance to risk managers in other countries. The work presented in this note draws on the activities of a project carried out by the World Bank Treasury³ in collaboration with the National Treasury of South Africa (NTSA) for assessing and managing the contingent liabilities of the Government of South Africa stemming from Eskom's guaranteed debt portfolio. The main counterpart of the project is the Credit Risk Directorate of the Asset and Liability Management (ALM) division in NTSA. The project is part of the Government Debt and Risk Management program which aims to provide assistance to middle-income countries to improve macroeconomic and fiscal management by reducing vulnerability to financial and other shocks.⁴

This note draws on a framework for risk assessment and management presented in a World Bank policy research working paper on contingent liabilities risk management (Bachmair, 2016). The four steps outlined in the paper are highlighted and extended, with an emphasis on sections related to credit risk analysis and quantification. This note may be considered an extension of the working paper and provides a more focused country case for South Africa.

While the focus of the paper is on explicit guarantees, i.e. contractual obligations signed by the sovereign, the methodology could easily be extended to implicit guarantees, since the underlying credit

² For South Africa, Bachmair and Bogoev (2018) assessed contingent liabilities and their impact on debt dynamics. The realization of contingent liabilities may increase government debt by 0.6 to 0.8 percent annually over the next years.

³ The project was supported under the Government Debt and Risk Management (GDRM) program: <http://treasury.worldbank.org/bdm/htm/GDRMProgram.html>

⁴ The Government Debt and Risk Management program is financed by the Swiss State Secretariat for Economic Affairs and covers projects in 15 other countries. More information on the program can be found at: <http://treasury.worldbank.org/bdm/htm/GDRMProgram.html>.

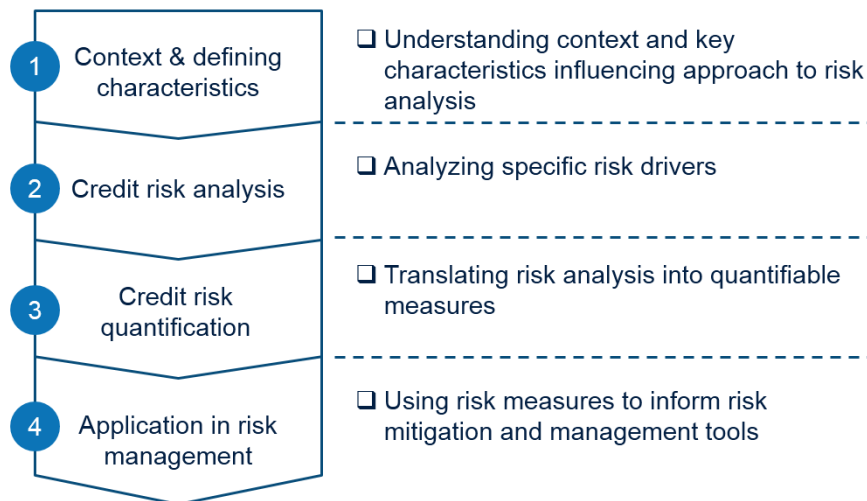
risk drivers are similar. Efforts at NTSA to improve contingent liability risk management are an ongoing process, hence some of the issues presented are work in progress.

2. Framework for risk assessment and management

To design a framework for assessing and managing risk from contingent liabilities such as guarantees, government risk managers can follow a four-step process (figure 1, and Bachmair, 2016):

- Context and defining characteristics: Risk managers need to identify the volume of exposure to risk, the types of risks they are exposed to (e.g. credit risk, demand risk, exchange rate risk, etc.), and require a clear understanding of the context they are operating in (e.g. data availability, resources, and capacity).
- Risk analysis: Key risk drivers relevant to the beneficiary and its industry are identified, and the degree of risk is assessed.
- Risk quantification: Outputs from risk assessment (e.g. ratings) are translated into quantified measures that allow for comparability with policy alternatives (e.g. risks expressed in nominal terms which may feed into the budgeting process).
- Application of risk management tools: Insights from risk analysis and quantification are used to design and implement risk mitigation and monitoring tools (e.g. decision-making process for issuing new guarantees, structuring guarantee agreements (including, for example, guarantee fees), budgeting for potential losses, etc.).

Figure 1: A framework for credit risk assessment and management



Source: Bachmair, 2016

Subsequent sections describe how this framework applies to NTSA’s credit risk management for Eskom.

a) Defining context and key characteristics

The South African context of credit risk management can be described along four critical factors, including the characteristics of the guarantee portfolio, the definition of risk exposure, data availability, and internal resources and capacity.

i) Characteristics of the guarantee portfolio

The South African government has outstanding guarantees to state-owned companies (SOCs) operating in various sectors, public-private partnerships (PPPs) and IPPs. The total limit of guarantees currently authorized by the government amounts to R 675.8 billion (14.7 percent of GDP) against which SOCs have so far borrowed R 300.4 billion (6.5 percent of GDP).⁵

The portfolio is highly concentrated in Eskom, which accounts for 73 percent of the authorized guarantee limit to SOCs and 74 percent of current exposure (i.e. disbursed and guaranteed borrowing, Table 1). Eskom is fully owned by the government and is a virtual monopolist for electricity generation in South Africa, accounting for 95 percent of electricity generated (the remaining electricity is generated by IPPs which sell their output to Eskom). Eskom is vertically integrated; it generates, transmits, and distributes electricity to commercial and residential customers.⁶ Eskom's generation is heavily dependent on coal, accounting for about 85 percent of generation capacity, followed by nuclear and hydro power sources. Eskom is regulated by the National Energy Regulator of South Africa (NERSA) which sets tariffs for electricity sold by Eskom. The government explicitly guarantees various long-term debt instruments of Eskom, including foreign currency loans and bonds, as well as domestic bonds.

Table 1: Government guarantees in South Africa

R billion	2015/16		2016/17		2017/18	
	Guarantee	Exposure ²	Guarantee	Exposure ²	Guarantee	Exposure ²
Public institutions	469.9	255.8	475.7	290.4	466.0	300.4
<i>of which:</i>						
<i>Eskom</i>	<i>350.0</i>	<i>174.6</i>	<i>350.0</i>	<i>202.8</i>	<i>350.0</i>	<i>220.8</i>
<i>SANRAL</i>	<i>38.9</i>	<i>27.2</i>	<i>38.9</i>	<i>29.4</i>	<i>38.9</i>	<i>30.1</i>
<i>Trans-Caledon Tunnel Authority</i>	<i>25.8</i>	<i>21.2</i>	<i>25.6</i>	<i>20.9</i>	<i>25.7</i>	<i>18.7</i>
<i>South African Airways</i>	<i>14.4</i>	<i>14.4</i>	<i>19.1</i>	<i>17.8</i>	<i>19.1</i>	<i>11.8</i>
<i>Land and Agricultural Bank of South Africa</i>	<i>6.6</i>	<i>5.3</i>	<i>11.1</i>	<i>3.8</i>	<i>9.6</i>	<i>6.6</i>
<i>Development Bank of Southern Africa</i>	<i>13.9</i>	<i>4.4</i>	<i>12.5</i>	<i>4.1</i>	<i>12.3</i>	<i>4.2</i>
<i>South African Post Office</i>	<i>4.4</i>	<i>1.3</i>	<i>4.4</i>	<i>4.0</i>	<i>0.4</i>	<i>0.4</i>
<i>Transnet</i>	<i>3.5</i>	<i>3.8</i>	<i>3.5</i>	<i>3.8</i>	<i>3.5</i>	<i>3.8</i>
<i>Denel</i>	<i>1.9</i>	<i>1.9</i>	<i>1.9</i>	<i>1.9</i>	<i>2.4</i>	<i>2.3</i>
<i>South African Express</i>	<i>1.1</i>	<i>0.5</i>	<i>1.1</i>	<i>0.8</i>	<i>0.8</i>	<i>0.8</i>
<i>Industrial Development Corporation</i>	<i>2.0</i>	<i>0.2</i>	<i>0.4</i>	<i>0.2</i>	<i>0.5</i>	<i>0.1</i>
<i>South African Reserve Bank</i>	<i>3.0</i>	<i>–</i>	<i>3.0</i>	<i>–</i>	<i>–</i>	<i>–</i>
Independent power producers	200.2	114.0	200.2	125.8	200.2	122.2
Public-private partnerships³	10.3	10.3	10.0	10.0	9.6	9.6

1. A full list of guarantees is given in Table 11 of the statistical annexure in the Budget Review

2. Total amount of borrowing and accrued interest for the period made against the guarantee

3. These amount only include the national and provincial PPP agreements

Source: NTSA, 2018 Budget Review

⁵ Numbers are compiled based on the latest available information at the time of publishing NTSA's Budget Review 2018 (February 21, 2018).

⁶ Distribution to residential customers is mostly channeled through municipalities. These residential customers, hence, have payment obligations to municipalities which in turn have to pay Eskom. Eskom does however, have direct sales to residential customers although this constitutes a very small percentage.

In addition to credit guarantees to Eskom, the government provides payment guarantees to IPPs as they contract with Eskom through PPAs for up to 20 years.⁷ Under these payment guarantees, NTSA is obliged to purchase power from IPPs if Eskom is unable to honor its obligations from PPAs. If a project were terminated early, the government may be required to pay project sponsors. The maximum payment from the government due to early termination is currently estimated at about R 122.2 billion (2.7 percent of GDP) (see Box 1 for a discussion of guarantees related to IPPs).

Box 1: Assessing risks from government guarantees related to independent power producers (IPPs)

The Government of South Africa supports increased use of renewable energy sources for the generation of electricity. The government has instituted an IPP scheme for renewable energy. Currently, 112 IPPs have been awarded. IPPs sell all energy generated to Eskom. The government is sharing in the risk IPP shareholders are taking by providing guarantees. The government is guaranteeing two types of risks:

- Eskom's inability or unwillingness to pay for energy sold by IPPs, and
- termination of IPPs by government.

NTSA perceives the risk of materialization of these guarantees to be limited (NTSA, 2018).

First, NERSA, the regulator, assured Eskom that charges for electricity sold by IPPs will be treated as a pass-through cost, i.e. the regulator will approve a tariff to compensate Eskom for the cost of electricity purchased from IPPs.

Second, termination by government is a choice rather than a risk. Furthermore, if IPPs were terminated and termination payments made, the government would acquire an asset which may amortize termination payments made over time.

ii) Definition of risk exposure

The relationship between the government and Eskom is multidimensional. Through various government ministries, divisions, and agencies, the government acts as shareholder, creditor, guarantor, regulator, and customer to Eskom. As a virtual monopolist for electricity generation, and transmission,⁸ Eskom provides an essential service impacting economic activity in South Africa. As such, the government has a

⁷ In terms of legislation, guarantees are issued directly to Eskom by the Minister of Public Enterprises, while the guarantees to the IPPs are issued by the Minister of Energy, with the concurrence of the Minister of Finance, who is the Head of NTSA.

⁸ Half of electricity distribution is by Eskom.

strong interest in Eskom's performance related to multiple aspects, including the provision of electricity to support economic activity, the achievement of social and development objectives such as the provision of electricity to poor households, dividends, environmental hazards, and contingent liabilities.

It is important to differentiate and properly assess and manage the risks the government is exposed to from Eskom's performance. If Eskom was unable to meet its obligations to service guaranteed debt or honor payments for electricity to IPPs, the government is obliged to step in and make a payment to creditors or IPPs.

Given the complex relationship between the guarantor (the government), and Eskom, the clear definition of a credit event is essential. Eskom has not defaulted in the past for any of the guaranteed debt or amounts owed to the IPPs and it may be unlikely to do so in the future. The government has a strong incentive to avoid outright default which may lead to an acceleration of loans and bonds by creditors, a disruption in the electricity supply, contagion to other SOCs, and broader negative macroeconomic repercussions. Hence, the government is likely to step in before an outright default occurs, as long as the government's own fiscal strength enables it to do so. A narrow definition of a credit event would not capture these events as an actual default would not occur vis-à-vis creditors and the guarantee agreement would not be formally triggered.

Hence, the Credit Risk Directorate at NTSA has defined a credit event more broadly as any type of unplanned government support aimed at avoiding default.⁹ These include:

- an unplanned capital injection, beyond any planned injection to support Eskom's capital expenditure program;
- the temporary (or permanent) servicing of debt payments to the creditor (e.g. an annual principal and interest installment); and
- an immediate payment of all guaranteed debt outstanding.

iii) Data availability

NTSA uses a variety of information sources to inform risk analysis. Annual reports and financial statements (income statement, cash flow statement, and statement of financial position) are an essential resource. Statements are prepared according to International Financial Reporting Standards, audited, and are usually available within six months following the end of a fiscal year (ending March 31). In addition to backward-looking financial statements, NTSA receives corporate plans. Corporate plans describe planned performance, and initiatives and capital expenditure programs for a five-year period. Corporate plans also contain projected financial statements.

As no SOC benefitting from guarantees has defaulted in the past, no historic default data are available. However, the Credit Risk Directorate is in the process of compiling a database of credit events consistent

⁹ This is particularly relevant when estimating probabilities of distress and when defining rules for accessing future contingency funds for payouts related to guarantees.

with its definition. Such a database will contain unexpected payments from government to Eskom in order to avoid triggering guarantees.

Additionally, NTSA uses market and third-party information for credit risk assessment. Market information includes secondary market prices and credit spreads for domestic and foreign currency bonds of Eskom. As Eskom is fully government owned, no traded equity prices can be observed. From rating agencies, NTSA uses both rating reports on Eskom as well as rating reports of peer companies outside South Africa (i.e. monopolistic state-owned electric utilities) and rating methodology papers (i.e. Moody's methodology paper for regulated electric and gas utilities) (Moody's Investor Service, 2013). NTSA uses RiskCalc and Credit Edge as additional tools to assess credit risk. RiskCalc is software aiming to estimate default probabilities of privately held companies using the financial ratios of the respective entities. Credit Edge is similar software for publicly traded companies. NTSA employs this information complementarily. Ratings of peer companies and rating methodology papers have been used to develop an internal credit rating methodology (section 2.b.). Market prices are monitored to detect changes in market participants' perception of credit risk which may trigger a review by the Credit Risk Directorate. These are ultimately used to support the determination of the internal risk rating that is assigned to Eskom.

Compared to other SOCs within South Africa and SOCs in other countries, the degree of information available on Eskom is rich. A major challenge in credit risk assessment for SOCs in developing countries is depth and reliability of available information. The choice and design of risk assessment methodologies (discussed below) needs to factor in these constraints.

iv) Internal resources and capacity

The Credit Risk Directorate at NTSA is mandated with assessing the government's credit risk exposure from government guarantees to SOCs, IPPs, and cash balances at commercial banks. Additionally, the team is undertaking analyses of fiscal risks from Public Private Partnerships (PPPs) and various government funds.¹⁰ The Credit Risk Directorate is part of the Chief Directorate for Strategy & Risk Management, one of five Chief Directorates of the ALM division.¹¹

The Credit Risk Directorate is headed by a director and includes four permanent staff, supported by one to two interns on a rotating basis. Staff have predominantly backgrounds in accounting, finance, and economics. The Credit Risk Directorate works closely with staff in the Governance and Financial Analysis and Sectoral Oversight Chief Directorates at the ALM division. These chief directorates are responsible

¹⁰ Including the Compensation Fund, Export Credit Insurance Corporation South Africa, Road Accident Fund, South African Special Risk Insurance Association, and Unemployment Insurance Fund.

¹¹ See the National Treasury website (<http://www.treasury.gov.za/nt/Top%20Structure%20Organisation.pdf>) for details of the organizational structure.

for financial oversight of some SOCs and NTSA's shareholder role. They regularly interact with SOCs under their remit and possess information about SOC performance valuable for credit risk assessment.¹²

Most credit risk analyses are conducted using Microsoft Excel. NTSA is also using RiskCalc and Credit Edge software and employs third party resources, as discussed above.

b) Risk analysis

Government risk managers employ various methodologies to assess credit risk, including credit rating, statistical models, scenario analysis, and structural models.¹³

NTSA has historically relied on credit rating for credit risk assessment. To complement this methodology, NTSA has developed a scenario analysis tool. NTSA has also considered, but rejected, a modified Merton approach. All three methodologies are discussed below. NTSA's use of credit risk assessment methodologies and risk quantification is codified in a methodology paper (NTSA, 2017).

i) Credit rating

In 2009, NTSA started performing credit risk assessment of SOCs that benefit from guarantees. Initially, NTSA developed a standardized score card for all relevant SOCs. To reflect differences in risk drivers by industry, NTSA later differentiated score cards by industry. Due to significant differences in business models, risk drivers, and balance sheet items of financial institutions, NTSA developed a separate score card for development financial institutions. As part of a project supported by the World Bank Treasury, NTSA further tailored its corporate score card. NTSA has finalized a score card for the energy sector to analyze Eskom's credit risk and developed additional sector specific score cards for aviation, infrastructure, transport, defense, and telecommunications.

NTSA's rationale for choosing credit rating reflected various factors. A credit score card is intuitive and its outputs (credit ratings) are easy to communicate, not least because of policy makers' familiarity with credit ratings of the sovereign by rating agencies. A credit score card is relatively easy to develop and maintain. No advanced quantitative analysis is required. Accounting skills are more important than statistics. This matches the background of staff in the Credit Risk Directorate. Also, NTSA has limited access to historical information, partly because no default of relevant SOCs has occurred in the past.

Eskom is also rated by the three most prominent international rating agencies, S&P, Moody's, and Fitch. The credit rating undertaken by these rating agencies is considered by NTSA. However, NTSA believes the risks it is exposed to are not fully reflected in rating agencies' assessment. Rating agencies consider the implicit and explicit government support provided as a potential reason for an upgrade. From the

¹² The government's role as shareholder is managed by the different government departments that are Executive Authorities for the various SOC with the Department of Public Enterprises being the shareholder for the largest SOCs including Eskom. NTSA is shareholder for some SOCs but also plays an oversight role for all SOCs.

¹³ See (Bachmair, 2016) for a discussion of alternative methodologies.

government’s perspective this explicit and implicit support constitutes a risk.¹⁴ Furthermore, NTSA believes it has access to information about entities that rating agencies do not (e.g. due to its role as shareholder).

The credit score card for the energy sector assesses business risks and financial risks (Table 2). As Eskom operates in a highly regulated environment, the regulatory environment and adherence to regulation are key risk factors. Financial risks are grouped into categories, with debt capacity ratios and liquidity ratios as the most significant risk drivers. NTSA’s methodology paper guides credit analysts in their assessment. The methodology paper standardizes risk assessment across the directorate, various analysts, and beneficiary entities by providing scoring guidance and weights for each risk factor. For qualitative factors, scoring guidance describes the sub-factors analysts should take into consideration. For example, when assessing the operating environment, scoring guidance refers to “[...]inflation, interest rates, fuel prices and gross domestic product as well as microeconomic factors such as competition within the sector, demand for the entity’s product offering and supply of raw material utilized by the entity” (NTSA, 2017). For financial risk indicators, ranges are provided to guide scoring for each financial ratio.

Table 2: Scoring factors in energy score card in South Africa

Business risk indicators	Financial risk indicators
<ul style="list-style-type: none"> • Industry Prospects <ul style="list-style-type: none"> ○ Operating Environment ○ Regulatory Framework • Corporate Governance <ul style="list-style-type: none"> ○ Adherence to applicable legislation ○ Management Quality • Market Position <ul style="list-style-type: none"> ○ Diversification ○ Size (capacity) 	<ul style="list-style-type: none"> • Profitability <ul style="list-style-type: none"> ○ Operating margin ○ Net profit margin ○ Revenue growth • Debt capacity <ul style="list-style-type: none"> ○ Debt to assets ratio ○ Debt to equity ratio ○ Interest cover ratio • Efficiency <ul style="list-style-type: none"> ○ Cost to income ratio • Cash flow adequacy <ul style="list-style-type: none"> ○ Funds from operations to total debt ratio • Liquidity <ul style="list-style-type: none"> ○ Cash ratio ○ Quick ratio ○ Current ratio

Source: NTSA

Credit analysts then present their recommendation to a rating committee, consisting of other credit analysts and chaired by the director of the Credit Risk Directorate. Final ratings are assigned on a scale from one to nine (Table 3). While the rating methodology paper has undergone external audits, the

¹⁴ Despite this potential notching of entities due to (government) support mechanisms, most rating agencies also disclose a stand-alone rating, i.e. a rating of creditworthiness of an entity based on its stand-alone strength, excluding government support.

ratings themselves do not. However, rating reports are subject to an annual performance audit conducted on the ALM division. It is very important for the Credit Risk Directorate that assesses risks to be independent from the Fiscal Liabilities Committee which makes recommendations to the minister of finance on responding to new guarantee requests. The output of the Credit Risk Directorate also forms part of the annual performance audit conducted on ALM.

Table 3: Credit rating scale in South Africa

Risk ratings	Extent of risk exposure	Likelihood of materialization
1	Extremely low risk	Remote
2	Low risk	
3	Moderate risk	
4	Marginal risk	
5	Special attention	Possible
6	Substandard	
7	High risk	Probable
8	Very high risk	
9	Imminent default/in default	

Source: NTSA

ii) Scenario analysis

Over time, the Credit Risk Directorate’s familiarity with credit rating increased. At the same time demands from management increased. Management was particularly interested in the quantification of credit risk and the use of risk assessment tools based on quantitative analysis. In an ongoing project supported by the World Bank Treasury, the Credit Risk Directorate developed a scenario analysis tool. The Credit Risk Directorate employs scenario analysis complementary to credit rating, and in response to specific requests by management or other units within NTSA. The scenario analysis tool aims to offer insights into Eskom’s financial health and its ability to service debt obligations if certain scenarios materialize.

As any scenario analysis tool, this model consists of inputs, a cash flow engine, and outputs/results (Figure 2).¹⁵

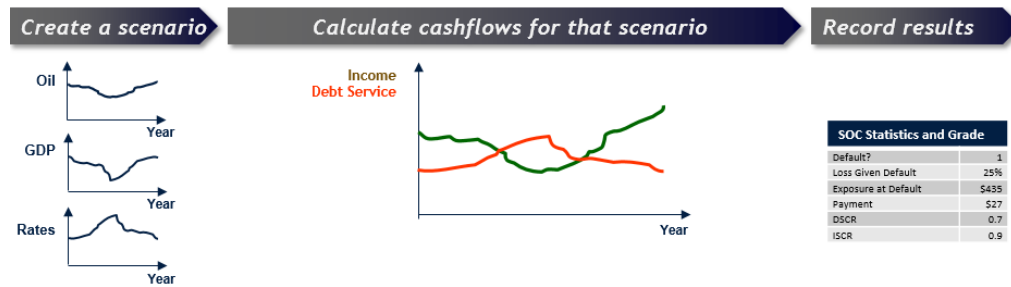
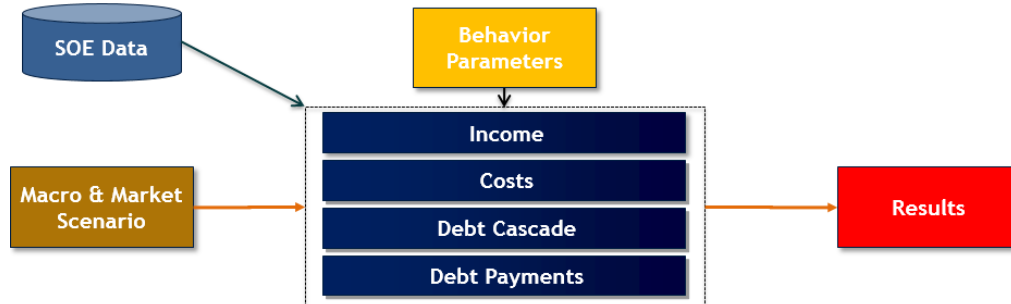
Inputs include:

- Macroeconomic and industry specific variables. These include economic growth (as measured by Gross Domestic Product), inflation (Consumer Price Index and Producer Price Index), interest rates (Repo rate), and commodity prices (oil prices and coal prices).

¹⁵ Readers who may be familiar with the World Bank/IMF Medium Term Debt Management Strategy analytical tool will note that the structure of the model is identical. However, instead of simulating debt service cash flows, this model simulates cash flows of a corporation.

- Eskom’s corporate plan. Corporate plans include projections of financials (income statement, cash flow statement, and statement of financial position).

Figure 2: Scenario analysis model for Eskom



Source: Risk Integrated, authors

NTSA constructs four to five scenarios: one consistent with Eskom’s corporate plan; one based on NTSA’s baseline, consistent with the macroeconomic model used for budgeting; and two to three downside scenarios where specific macroeconomic risks materialize.

The cash flow engine then estimates Eskom’s cash flows for each scenario. For example, a slowdown in economic growth would impact demand for energy and hence the quantity of electricity sold by Eskom. Another example would be an increase in generation costs if commodity prices increased.

In addition to the macroeconomic and industry specific variables considered, NTSA may consider adding idiosyncratic variables that are specific to Eskom. Such factors could include decisions on tariff increases by the NERSA or the payment behavior of customers, such as municipalities.

One output of the tool is illustrated in Table 4.¹⁶ Based on an opening cash balance, and cash flows from operations and investment activities, the tool shows whether Eskom would have sufficient cash to service its debt payment obligations under different scenarios. A cash shortfall may require government action.

¹⁶ Note that numbers have been changed to preserve confidentiality.

Table 4: Illustration of aggregated cash flows in scenario analysis model in South Africa¹⁷

R'billions	FY18	FY19	FY20	FY21	FY22
Opening balance	100,00	33,00	3,00	11,00	50,00
Cash from operations	90,00	120,00	170,00	200,00	210,00
Cash from financing activities	-127,00	-100,00	-127,00	-101,00	-198,50
<i>Total debt payments needed</i>	<i>-130,00</i>	<i>-105,00</i>	<i>-130,00</i>	<i>-100,00</i>	<i>-210,00</i>
<i>Required Repayment loans</i>	<i>-30,00</i>	<i>-25,00</i>	<i>-40,00</i>	<i>-60,00</i>	<i>-120,00</i>
<i>Required Interest to be paid</i>	<i>-100,00</i>	<i>-80,00</i>	<i>-90,00</i>	<i>-70,00</i>	<i>-110,00</i>
Interest received	3,00	3,00	2,00	2,00	1,50
Other financing activities	-	2,00	1,00	-3,00	10,00
Cash available for investment	-37,00	20,00	43,00	99,00	11,50
Investment activities	-80,00	-100,00	-90,00	-110,00	-60,00
Net borrowings	50,00	50,00	55,00	50,00	60,00
Cash available to pay debt	163,00	108,00	141,00	150,00	271,50
Required debt payments	-130,00	-105,00	-130,00	-100,00	-210,00
Shortfall/Cash remaining	33,00	3,00	11,00	50,00	61,50

Source: NTSA, authors

iii) Modified Merton model

Robert Merton pioneered structural models for credit risk assessment (Merton, 1977). Structural models assume default of an entity occurs when an entity's asset value falls below the value of its debt.

A guarantee may be viewed as a put option.¹⁸ A guarantee is a put option on the assets of the firm with an exercise price equal to the face value of the debt. If an entity's asset values are larger than debt, full repayment of debt can be expected and the put option is not exercised. If, however, an entity's asset values fall below the value of debt, the creditors exercise the put option. The guarantor has to buy the entities' assets at the exercise price.

The Black-Scholes' theory to price options (Black, Scholes, 1973) can be applied to price the guarantee as a put option. To price the put option, the volatility of assets and growth rate of assets are important inputs. Given that Eskom is fully government owned, no market prices for its equity¹⁹ can be observed, and there is no forward-looking measure of its volatility. Hence NTSA considered a modification. Historical book values were used to estimate the firm's volatility and the exercise price for a put option.²⁰

NTSA considered employing such a modified Merton model to complement credit rating and scenario analysis. NTSA, however, decided against using this model. NTSA assessed the marginal insights gained

¹⁷ Numbers have been changed and do not reflect the actual situation.

¹⁸ A put option gives the owner the right, but not the obligation, to sell an asset for a pre-specified price (the exercise price) on or before a certain maturity date.

¹⁹ Equity prices may be used as proxies for asset values in the Merton model.

²⁰ For example, an assumption was made for the value of the debt service coverage ratio at which Eskom would be unable to service debt and hence experience credit distress.

not to justify the cost of maintaining an additional model. Also, NTSA perceived weaknesses in the methodology, including the reliance on historical volatility of book values. Such reliance would not consider business cycles and structural changes. NTSA's analytical process is described here for the benefit of a reader considering such an approach for credit risk assessment in their country.

iv) Summary of credit risk assessment methodologies and their use by the NTSA

All three credit risk assessment methodologies discussed in this paper exhibit strengths and weaknesses. NTSA primarily relies on credit rating, uses scenario analysis as a complementary tool, and discontinued using a modified Merton approach.

Credit rating is flexible and intuitive. Scores can be translated into probabilities of distress (PDs) using PD tables (Chapter 2.c.) and credit scores incorporate qualitative information. However, they are mostly based on information from financial statements. Also, using credit ratings and PDs offers limited information on the short-term impact of credit events on the fiscus.²¹ The use of corporate plans as part of the analysis enables a forward-looking approach to be incorporated into the assessment. In South Africa, credit rating is used to assess Eskom's ability to service guaranteed debt (see risk management tools chapter below). When rating Eskom, NTSA undertakes a stand-alone rating, not factoring in potential implicit government support. Rating agencies, however, sometimes notch entities' ratings upward if they perceive strong government support.

Scenario analysis allows to estimate the potential impact on the fiscus for a relatively short time period,²² and is used forward looking, incorporating corporate plans. On the other hand, results from scenario analysis cannot be easily translated into PDs²³ and the models require more time and capacity to develop and maintain.

A modified Merton model can capture an intuitive and well-known theoretical concept and it is easy to apply. However, the results may be questioned in the absence of trading in Eskom's stock and the reliance on infrequent book values.

c) Risk quantification

Historically, NTSA performed limited risk quantification. Credit ratings allow for a ranking of SOCs assessed (i.e. an SOC rated 8 is less creditworthy than an SOC rated 7). However, the Credit Risk Directorate at NTSA is in a process to improve risk quantification using insights from risk assessment as described above. Improved risk quantification will improve reporting and help in the design of risk

²¹ Credit rating is used to derive probabilities of distress. They focus on the likelihood rather than the severity of a credit event. Also, probabilities of distress may only be expected to converge towards observed distress frequencies in sufficiently large and well diversified portfolios, or over the long term. In the short term (e.g. the budget period), observed default frequencies may be significantly different from estimated PDs due to the small number of beneficiaries in the guarantee portfolio of NTSA and the potential correlation among them.

²² In South Africa, budget projections are conducted for a three-year period.

²³ Unless stochastic modeling was used and probability distributions and correlations among scenario parameters were estimated.

management tools currently under discussion (such as risk-based guarantee fees, the provisioning for financial losses in the budget, and proactively dealing with elevated risks).

Initially, NTSA started converting internal risk ratings into probabilities of distress. As NTSA does not have an internal data base of historic credit events for SOCs it is exposed to, it relies on third-party information. First, NTSA assigns an internal credit rating on a scale from one to nine (described in Chapter 2.b.). Second, the internal credit score is translated into a credit rating on rating scales used by rating agencies. An internal conversion table is used (Table 5). The proper conversion of risk ratings from an internal to an external scale is a key factor in this process and it is dependent on the experience of credit analysts and a robust rating methodology.

For example, an internal credit score of five translates to a credit rating of Ba2 on Moody's rating scale. Third, PDs are inferred from Moody's published default frequencies by rating and time horizon (Moody's Investor Service, 2018).²⁴ Moody's default frequencies are adjusted as the definition of credit event at NTSA differs from Moody's.²⁵ Table 6 illustrates probabilities of initial distress by rating and time horizon adapted to the South African context (i.e. probabilities of Eskom being in distress in a given year for the first time, and not having experienced distress in any previous year). In addition to PDs based on the historic and expected performance of Eskom, NTSA will also use results from stressed scenarios (discussed in Chapter 2.b.) to infer stressed PDs.

Table 5: Table matching internal credit ratings and Moody's ratings

Internal risk ratings	Moody's ratings	Rating definitions
1	Aaa	Highest credit quality with the smallest degree of risk
2	Aa2	High credit quality and are subject to low credit risk
3	A2	Upper-medium grade and are subject to moderate credit risk
4	Baa2	Medium grade and are subject to moderate credit risk
5	Ba2	Obligations have questionable credit quality
6	B2	Obligations are speculative and subject to high credit risk
7	Caa2	Obligations are of poor standing and subject to very high credit risk
8	Ca	Obligations are highly speculative and are usually in default on their obligations
9	C	Obligations are lowest rated class and are in default

Source: National Treasury of South Africa

NTSA is currently working on estimating the economic value of guarantees; at the moment, the annual expected losses are calculated for a three-year period.

Annual expected losses are the product of exposures, PDs, and loss given default (LGD). NTSA is using annual debt service payments to represent exposure,²⁶ and annual PDs derived from PD tables (such as Table 6). LGDs depend on the ability of the government to recover payments made under a guarantee

²⁴ The time horizon chosen will depend on the objective. It may be the entire maturity of the loan or bond guaranteed or a shorter period for fiscal planning.

²⁵ In Moody's default frequency tables, an entity defaulting in year one is no longer represented in the sample of entities in year two (i.e. it can only default once). However, in the context of South Africa, entities may experience a credit event in year one (and the government steps in to make a periodic debt service payment) and may or may not experience a credit event in year two (see Chapter 2.a. for a discussion of the definition of a credit event).

²⁶ Consistent with its definition of a credit event.

from the guarantee beneficiary, and an entity's ability to cover at least part of its debt service payments when they occur. At the moment, LGD is assumed at 100 percent.

Table 6: Probabilities of initial distress by rating and time horizon in South Africa

	Moody's rating	Internal rating	Year 1 (%)	Year 2 (%)	Year 3 (%)	Year 4 (%)	Year 5 (%)	Year 6 (%)	Year 7 (%)	Year 8 (%)	Year 9 (%)	Year 10 (%)
Investment Grade	Aaa	1	0.003	0.006	0.012	0.023	0.039	0.057	0.076	0.093	0.103	0.107
	Aa2	2	0.022	0.047	0.073	0.108	0.136	0.150	0.150	0.141	0.129	0.120
	A2	3	0.062	0.151	0.183	0.255	0.314	0.351	0.365	0.360	0.347	0.334
	Baa2	4	0.174	0.352	0.350	0.444	0.511	0.549	0.563	0.563	0.563	0.573
Sub-investment grade	Ba2	5	1.110	2.111	1.954	2.294	2.418	2.342	2.136	1.890	1.676	1.543
	B2	6	3.904	5.729	4.471	4.884	4.874	4.509	3.930	3.289	2.705	2.253
	Caa2	7	15.894	11.760	7.339	7.021	6.300	5.349	4.341	3.411	2.643	2.070
	Ca	8	54.147	10.977	5.315	4.427	3.569	2.793	2.133	1.603	1.202	0.918
	C	9	100.000	-	-	-	-	-	-	-	-	-

Source: National Treasury of South Africa, Risk Integrated, Moody's

Going forward, NTSA intends to calculate the present value of expected losses for the lifetime of a guarantee. To do so, annual expected losses need to be discounted to the present and summed up.

To use a simple example, imagine a guarantee on a one-year loan, with a face of value 100 and no interest payments. Assume the likelihood of the entity not being able to repay, or PD, at 15 percent. Further assume that if the entity were unable to repay the loan, it would have cash of 30 (LGD) to service at least part of the loan. In this case expected loss = 100 x 15 percent x 70 percent = 1.05. At a discount rate of 10 percent, the present value of expected loss would be 1.05/1.1 = 0.95. Table 7 provides an illustrative example over a multi-year period.

Table 7: Illustrative example of expected loss from a guarantee

Year	1	2	3	4	5	6	7	8	9	10
Credit rating	6	6	6	6	6	6	6	6	6	6
Annual PD	1.11%	2.81%	3.63%	4.50%	5.19%	5.59%	5.67%	5.49%	5.15%	4.78%
LGD	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
Principal outstanding end of year	100	100	100	100	100	100	100	100	100	100
Principal payment	0	0	0	0	0	0	0	0	0	10
Interest payment	5	5	5	5	5	5	5	5	5	5
Annual expected loss	0.03	0.07	0.09	0.11	0.13	0.14	0.14	0.14	0.13	2.51
Discount rate	5.0%	5.5%	6.0%	6.5%	7.0%	7.5%	8.0%	8.5%	9.0%	9.5%
NPV of annual EL	0.03	0.06	0.08	0.09	0.09	0.09	0.08	0.07	0.06	1.01
NPV of EL	1.66									

Source: Risk Integrated, authors

Note that expected loss may underestimate the value of a guarantee. The value of a guarantee may not only reflect the losses in expectation but also a risk premium due to the riskiness of losses. Risk averse market participants would require to be compensated for taking the risk of significantly larger than expected losses.

Importantly, the quantification of credit risk of Eskom beyond assigning credit ratings is work in progress and has not been finalized. NTSA has finalized the conversion of credit risk to PDs and is also considering estimating expected losses based on output from credit rating, as well as scenario losses as an output of scenario analysis. Measures such as expected loss and scenario losses can inform risk management tools discussed in the subsequent section, including risk-based fees, contingency reserves, and medium-term budgeting.

d) Application of risk management tools

South Africa could employ a combination of tools to manage the risks arising from the guarantee portfolio. These tools can be classified as risk mitigation and monitoring tools. Risk mitigation tools aim to limit the credit risk exposure *ex ante*, that is at the guarantee issuance stage through limits, and risk transfer mechanisms of the guarantee as well as during the lifetime of the guarantee through fees. Budget provisions and reserve accounts reduce the impact of the risk materialization on the budget so that the government does not have to borrow unexpectedly. Accounting for contingent liabilities from guarantees in the budget also improves decision making. Risk monitoring tools consist of financial tables recognizing the contingent liabilities and monitoring the risk exposure through internal or public reports. The use of risk management tools requires some form of assessment (qualitative and/or quantitative) of the creditworthiness of the beneficiary and the credit risk exposure in order to anticipate worsening credit risk situation.

i) Fiscal Liabilities Committee

NTSA discusses South Africa's contingent liabilities portfolio at the Fiscal Liabilities Committee (FLC) that meets every quarter. FLC is composed of representatives from ALM Division (Credit Risk team, Governance and Financial Analysis, Sectoral Oversight), Budget Division, Public Finance Division, Intergovernmental Relations Division, Legal Services, and Economic Policy. The objective of the Committee is to promote sound management of the government's contingent liabilities. The decisions of the Committee are recommendations made to the Minister of Finance who ultimately is the one with the legal powers to either approve or reject them. The Committee's responsibilities center on two areas: development and adoption of tools to manage credit risk, and policy and operational decisions for the actual implementation of those tools. Thus, FLC is responsible for the determination of policies and processes for approving guarantees and guarantee-like transactions. The FLC uses credit risk mitigation tools including the adoption of credit risk fees and the determination of a limit for the amount of total government debt and explicit contingent liabilities. One of the committee's mandates is to explore how

and whether to establish a contingency reserve account, funded or unfunded.²⁷ FLC is the instrument through which NTSA undertakes the general oversight of explicit and implicit contingent liabilities. Operational tasks of the FLC involve setting the conditions under which guarantees will be issued, engaging in appropriate actions in the case of defaults, and ensuring the implementation of the decisions by the Minister of Finance. The FLC would therefore also monitor adherence to these conditions and recommend appropriate action to the Minister in the case of non-adherence.

The output obtained from the credit risk analysis and quantification explained in previous sections serves as the basis for the advice the Credit Risk Directorate provides to the FLC on the state of contingent liabilities from guarantees (see Table 8 for an illustrative example) and alerts the committee to any improvement or deterioration on the quality of risk exposure from the overall guarantee portfolio. The Committee has deliberated on the risk-based fee policy, which was submitted to the Minister for approval. The Minister has approved the policy although it is yet to be implemented. Currently NTSA does not have a guarantee limit and the FLC is yet to make a decision on the matter.

Table 8: Illustrative example of credit scoring results for the guarantee beneficiaries

1	2	3	4	5	6	7	8	9
Extremely Low	Low risk	Moderate risk	Marginal risk	Special Attention	Substandard	High risk	Very high risk	Imminent default/in default
				SOC 2	SOC 3		SOC 8	
IPPs			SOC 1			SOC 5		SOC 9
		PPPs		DFI 2		SOC 6		SOC 10
			DFI 1		SOC 4	SOC 7		
SSF 1				SSF 4				SSF 5
			SSF 2					
			SSF 3					

IPPs: Independent Power Producers, SSF: Social Security Fund, PPP: Public-Private Partnerships, SOC: State-Owned Company, DFI: Development Finance Institution

²⁷ Funded would be where actual appropriations are made and transferred to an account, which is ring-fenced where unfunded, would be where the possible funding of credit events is incorporated into the existing contingency reserve that is a line item in the budget. The contingency reserve is only used in the case of emergency.

ii) Monitoring and reporting

The Credit Risk Directorate presents information on individual ratings for the guarantee beneficiaries and also on a consolidated basis to determine the quality of government's portfolio of contingent liabilities. It also feeds into various internal and external reports NTSA regularly prepares. Reports targeted at external audiences (e.g. the Parliament, the public, the South Africa Reserve Bank, international financial institutions, investors, Office of the Accountant General) consist of NTSA's Annual report, Debt Management Report, quarterly contingent liability report and Budget review. They contain consolidated guaranteed debt stock numbers, annual financial statements, total guarantees issued, and amounts drawn during the previous period. The 2016 Budget Review included for the first time two new categories of obligations: public-private partnerships (PPPs) and PPAs. These published reports contribute significantly to NTSA's accountability and transparency. It is worth noting that due to possible negative impact on the entity, Eskom's risk rating and other individual risk ratings are internal and not publicly available.

The internal reports NTSA prepares target audiences such as the Minister of Finance, the Director General of NTSA, and senior management. These contain more detailed, sensitive information such as the findings of the credit risk analysis per institution, the credit risk rating matrix of guarantee beneficiaries based on their riskiness, the evolution of the credit risk exposure consolidated on a portfolio basis and actions envisaged for mitigating these risks.

As indicated previously, in 2017 the Credit Risk Directorate drafted a paper titled "Credit Risk Assessment Methodology: Electricity Sector" which shared its scorecard methodology within the NTSA (all units within the ALM Division and members of the FLC). This initiative contributes to institutional memory by capturing the credit risk team's thinking and describing in detail the selected methodology. It also helps build credibility in NTSA's credit risk management expertise by increased transparency and accountability. The methodology paper provides a basis from which the team can improve and introduce more advanced methodologies if necessary.

iii) New risk management tools under consideration

The Credit Risk Directorate aims to adopt risk management tools that would take into account the output of the credit risk assessment. These consist of making recommendations that may influence FLC decisions such as i) initiating and influencing discussion on risk appetite combined with guarantee limit, ii) making recommendations with respect to a contingency reserve account, iii) determining a risk-based guarantee fee policy and fee, and v) improving reports to FLC by adding more quantitative information on the performance on the guarantee portfolio and by individual company.

Guarantee fees

South Africa employs guarantee fees to compensate the government for the credit risk that it undertakes, to reduce moral hazard from the guarantee beneficiaries. Currently, the fees received by government form part of the overall departmental revenue and is not ring-fenced to fund credit risk materialization. NTSA is planning to charge lower fees for good credit quality to encourage the

improvement of SOC balance sheets. In 1996, NTSA issued guidelines for the issuance of government guarantees, which are set to equal the benefits on borrowing cost margin of public entities borrowing without a guarantee. In practice, NTSA had introduced both an annual fee to new guarantees to recover the administrative costs and a commercial levy that was initially 0.5 percent and gradually increased to 3 percent by 2003. This fee would be applied yearly based on the disbursed guarantee amount. NTSA had the discretion of reducing or waiving the fee. In 2005, this structure was revised to charge a fixed annual guarantee fee of 0.30 percent on the disbursed guarantee with an annual administration of R75,000 for guarantees of less than five years and R50,000 for guarantees of more than five years. This meant the fee would not be based on the credit quality.

The development of more advanced and improved methodologies to assess the credit risk from guarantees recently led the Credit Risk Directorate to develop a framework to apply risk-based fees on the guarantees issued to SOCs. Consequently, in 2018, NTSA has adopted a new guarantee fee policy, with the intention to charge guarantee beneficiaries a risk-based fee, to be determined by the credit quality of the SOC. This new policy, which is yet to be implemented, envisions that the annual fee to be charged will depend on the entity's internal credit risk rating, the remaining maturity of the SOC's guarantee, and the outstanding amount of the guarantee. Additionally, the fee policy includes provisions to share the risk with the line ministry responsible for the SOC in cases where the beneficiary does not comply with the guarantee conditions or defaults on the underlying debt instrument. The new rule dictates that a fee waiver would be possible only when the SOC's financial outlook deteriorates due to a change in government policy. Additionally, a late fee payment penalty may be introduced.

The new guarantee fee policy refers to the possible establishment of a contingency reserve account as a buffer, fed mainly by the guarantee fees.

Additional tools being discussed

The team also intends to report credit related information on a portfolio basis (e.g. in addition to reporting on the volume and quality of exposure in the budget review, also share the weighted probability of credit event, amount of payment from the fiscus given credit event and maximum probable payments). And the team also intends to recommend actions for worsening credits to other stakeholders, including recommendations of actions or focus areas for the involved entity to improve the quality of the credit risk exposure.

Measures discussed in Chapter 2.c. (credit scores, PDs, scenario analysis, economic value of guarantees) can be used to inform the respective credit risk management tools. Indeed, once the work on the scenario analysis is finalized, NTSA will have developed the technical capacity and expertise to provide sound quantitative input to expand its toolkit and improve reporting. On the other hand, the adoption of some of the measures under discussion might prove to be difficult due to the need to incorporate qualitative factors into the guarantee decisions.

3. Conclusion

It is essential for a government to understand and monitor the contingent liabilities from its guaranteed debt portfolio in order to actively manage and monitor these risks, take precautions against increasing risks and provision for any possible materialization of risks.

The South African experience is a good illustration on how a government might develop methodologies to evaluate its exposure to credit risk from sovereign guarantees and enrich its risk management toolkit.

The methodologies discussed in this note and explored by the South African government consist of defining the risk exposure from guarantees issued to Eskom, identifying the key risk drivers, and undertaking risk analysis through three different approaches, namely credit rating, scenario analysis, and the Modified Merton model.

The note also illustrates how a strong risk assessment platform can help refine the risk management tools employed by a government and strengthen its risk monitoring practices.

South African experience shows that assessing and managing contingent liabilities is an iterative process and requires a tailor-made approach.

Bibliography

Bachmair, F. F. 2016. Contingent Liabilities Risk Management: A Credit Risk Analysis Framework for Sovereign Guarantees and On-Lending. World Bank Policy Research Working Paper Series.

Bachmair, F.F.; Bogoev, Jane. 2018. Assessment of contingent liabilities and their impact on debt dynamics in South Africa. Discussion paper of the Macroeconomics, Trade, and Investment Global Practice. World Bank.

Black, Fischer; Scholes, Myron. 1973. The Pricing of Options and Corporate Liabilities. The Journal of Political Economy.

Merton, Robert. 1977. An analytical derivation of the cost of deposit insurance and loan guarantees. Journal of Banking and Finance.

Moody's Investor Service. 2013. Rating Methodology. Regulated Electric and Gas Utilities.

Moody's Investor Service. 2018. Annual Default Study: Corporate Default and Recovery Rates, 1920 – 2017. Moody's.

National Treasury of South Africa. 2017. Methodology for Conducting Credit Risk Assessments on State-Owned Companies Operating Within the Electricity Sector.

National Treasury of South Africa. 2018. Budget Review 2018. Pretoria, South Africa.