



FISCAL AFFAIRS

HOW TO

NOTES

**How to Assess Fiscal Risks from
State-Owned Enterprises
Benchmarking and Stress Testing**

Fiscal Affairs Department

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Benchmarking and Stress Testing

Prepared by Fiscal Affairs Department Staff: Anja Baum,
Paulo Medas, Alberto Soler, and Mouhamadou Sy

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HOW TO ASSESS FISCAL RISKS FROM STATE-OWNED ENTERPRISES: BENCHMARKING AND STRESS TESTING

Introduction

The size and operation of state-owned enterprises (SOEs) can imply significant risks for governments. SOEs are present in virtually every country in the world and are major players in domestic economies and in global markets. In some countries, they number in the thousands and are owned by national or subnational governments. SOEs are among the largest corporations in some advanced economies and comprise a third or more of the largest firms in several emerging markets. Many operate with systematic losses and carry significant liabilities. If SOEs face adverse shocks and financial distress they can impact the government budget or balance sheet through numerous transmission channels (see Baum, Medas, Soler, and Sy 2020). For instance, government bailouts have been sizable in the past in many countries. IMF (2020) found, for a sample of countries, that bailouts average 3 percent of GDP and can reach more than 10–15 percent of GDP in some cases.

Nevertheless, in general, the analysis of fiscal risks from individual SOEs is underdeveloped. Assessment of financial soundness of SOEs, when done, usually focuses on a few financial indicators based on the most recent financial report. Typically no comparison to other SOEs is done; however, such a comparison could provide a critically important perspective on the relative performance of the company, a determination of whether public money is being used efficiently, and a first assessment of fiscal risks (for example, if the SOE is excessively leveraged when compared to its peers). In addition, forward-looking risk assessments of SOEs are rare, or they are done in an ad-hoc manner and when the SOE is already asking for government support.

This How to Note describes a newly developed SOE risk assessment tool to help country authorities

This note accompanies Baum, Medas, Soler, and Sy (2020). The template can be found here <https://www.imf.org/-/media/Files/Publications/WP/2020/Datasets/wp20213.ashx>. The authors would like to thank Nikolay Gueorguiev, Catherine Pattillo, Carolina Renteria Rodriguez, and other IMF colleagues for excellent comments. The authors would also like to thank Eslem Imamoglu and Paulomi Mehta for excellent research assistance.

and IMF country teams. The analysis can provide inputs for annual budgets and medium-term fiscal planning. This includes providing estimates of possible transfers to and from SOEs to the budget and possible financing needs. The note outlines the main steps and elements of the template to assess fiscal risks for governments from individual SOEs. The first step is to collect financial information on SOEs and their relation to the government budget, and to provide a benchmark against other SOEs in similar sectors. A second step is to do a forward-looking analysis based on baseline forecasts and stress scenarios, to identify and analyze possible risks and their impact on government accounts.

The note is structured as follows. Section II outlines linkages between SOEs and public accounts, both in terms of flows and stocks.¹ Section III presents a first overview of the template. Section IV discusses benchmarking of SOE financial indicators. Section V discusses baseline and stress scenarios to provide a more in-depth analysis of fiscal risks. Annex 1 presents the structure of the template.

SOEs' Link to Public Accounts

There are several links between SOE performance and public accounts, both in terms of flows and stocks. SOEs are government assets and, hence, part of its net worth. They generate a flow of net income to the government budget, the sign and size of which is ultimately driven by their performance and financing structure. Net income is mainly determined by taxes and dividends on the revenue side, and subsidies and transfers on the expenditure side. Government assets include loans to SOEs, which generate interest receipts. Government liabilities may be impacted if the government takes over SOE debt, which triggers interest payments on the expenditure side. All these assets and liabilities can be subject to valuation effects, which

¹The relationship between budget accounts and SOEs depends on the type of coverage. For this analysis, fiscal risks and costs (when risks materialize) refer to the risks to the level of government that owns the SOE.

Table 1. Direct Links to Government Accounts

Public Revenue	Public Expenditure	Net Financial Position
Variations in taxes and royalties	Higher subsidies or transfers triggered by indexation schemes, bailouts, or explicit contingent liabilities	Realization of explicit contingent liabilities of SOEs
Accumulation of tax arrears	Higher interest payments triggered by debt guarantees	Hidden liabilities
Variations in dividends	Equity purchases with below-market returns	Additional borrowing to fill gross financing needs
Credit risks in loans to SOEs	Cancellation of government loans to SOEs	Positive valuation effects on SOE liabilities or negative effects on SOE assets

Note: Transfer of fixed assets is not listed but could be a nonfinancial flow to/from the budget. A positive (negative) sign denotes an increase (decrease) in financial worth. Liabilities considered in the table are only firm, but contingent liabilities may become firm as underlying risks materialize.

tend to be correlated with SOE performance.² In terms of the consolidated public sector, SOE liabilities lower public net worth and can be a key driver of financial sustainability.

SOEs are a source of contingent liabilities for central or subnational governments. They can be explicit, when they are formalized by a legal contract or an explicit commitment, or implicit, when there is an expectation that the government may step in and help the firm even if there is no legal obligation.³ A debt guarantee granted to an SOE is a typical example of an explicit contingent liability. Sometimes explicit contingent liabilities directly assumed by SOEs (for instance, public-private partnership contracts) are also implicit contingent liabilities for the government.⁴

SOE financial distress can impact fiscal outcomes indirectly. Indirect effects operate through the linkages of SOEs with the rest of the economy. For example, when SOEs carry out a significant share of public investment and the latter slows down, multiplier effects may follow for the real economy, prices, and public revenues. If SOE distress impacts the public budget, its equity and loans may be repriced or written off because of negative expectations on the SOE's financial performance. Lower net financial assets on SOE balance sheets affect public net worth and solvency negatively, and governments' liabilities may also be higher if a part of SOE debt is assumed by the government.

Governance and financial and operational vulnerabilities of SOEs exacerbate fiscal risks and raise their

potential fiscal costs. SOEs continuously experience external shocks of different size and length. These shocks can have a macroeconomic origin (for example, a slowdown in private consumption, with cross-cutting effects) or be market-specific (for example, the fall in the relative price of the product sold by the SOE). Fiscal impacts of these shocks are determined not only by their severity, but also by the ability of SOEs to weather them. In turn, the latter depends on the financial situation of SOEs, including their overall liquidity and solvency conditions, their exposure to international prices and exchange rate fluctuations, their market position, and their perceived capacity to generate future incomes and honor non-financial obligations.

Assessment and quantification of SOE fiscal risks are increasingly done by means of forward-looking analytical tools. SOE risk analysis can only be done based on standardized and comprehensive financial information, and medium-term business and financial plans. This information sheds light on financial vulnerabilities and the kind of shocks that can trigger the most significant consequences for government accounts. Analysis should ideally combine backward-looking and forward-looking elements, i.e., the current financial position of the company, market dynamics and, when available, data on past distress episodes, with scenario-design or sensitivity analysis.

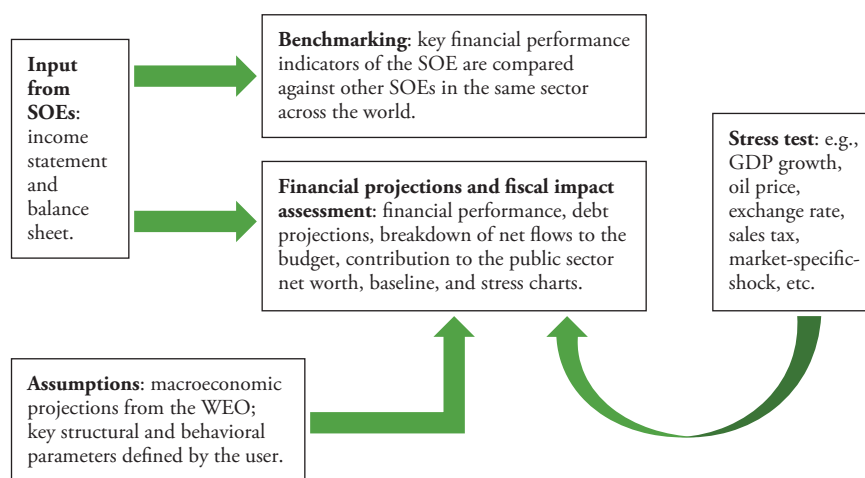
The Template: Overview

The template builds on previous FAD work on fiscal risk assessment and quantification. Its primary reference is a previous template customized for the Indonesian authorities a decade ago (FAD, 2008), but also builds on further work developed in recent years,

²The contribution of SOEs to government revenues is significant in some countries, particularly in oil exporters.

³The expectation of a bail-out may be particularly strong if the SOE has limited access to capital markets or if it has strategic importance for the government, such as providing core services (for example, water or electricity), and faces financial distress.

⁴Contingent liabilities are not part of the government balance sheet, but they should be appropriately disclosed (see IMF's Fiscal Transparency Code).

Figure 1. Mechanics of the Fiscal Risk Template

Source: Authors.

including as part of the Fiscal Stress Test methodology for the public sector.⁵

The template provides a framework to help assess fiscal risks from non-financial SOEs (Figure 1). It can be used for all SOEs, but, depending on capacity constraints, governments could focus on the ones that are larger or pose large risks. The template combines: (i) a benchmarking of the SOE's financial indicators to assess the relative performance of the company and identify main vulnerabilities; and (ii) a forward-looking analysis of the impact of different scenarios on the SOE and public finances. There are two main scenarios illustrating shocks of different nature, size, and length: a baseline and a stress scenario. The template quantifies the financial performance of the SOE, projects its outstanding debt stock and its impact on public finances over a 6-year horizon. The results can help inform the approval of SOEs' financial plans and risk mitigation measures around budget preparation. It can also provide inputs for public debt sustainability analysis and wider fiscal stress tests, such as those proposed by IMF (2017, 2018), to assess the resilience of the entire public sector to large shocks.⁶

The template provides significant flexibility. The commercial and operating structure of the company, its linkages with international markets, as well as its

financial objectives and dividend policy can be tailored to the individual SOE. When the company operates in a regulated environment or has non-commercial mandates, quasi-fiscal activities can be embedded in the analysis through the sensitivity of sale prices to inflation. In addition, forecasting formulas could be adjusted to allow for expected one-offs or to incorporate other information based on an analysis of longer time series and past stress episodes.

The operationalization of a large set of projections requires some simplifications in the analysis:

- To make the template manageable we abstract from details about the financial and technological structure of the company. For example, the company is assumed to issue only long-term debt in the projection period. Financing gaps can also be financed by incurring arrears, a possibility not contemplated in the current version of the template. From a technological perspective, multi-product SOEs are not considered (which may be relevant for holding companies) and staff downsizing is not an option to reduce costs.
- Governance settings, not specifically analyzed, can be important for how well SOEs can weather shocks. Weak governance could be associated with higher fiscal risks. The template does not cover governance issues beyond the direct financial links.
- The template does not assess indirect fiscal costs. Weak SOE performance could impact the economy. Spillover effects to the financial sector or other SOEs are not analyzed, but they may be relevant

⁵See FAD (2008): *Indonesia: Assessing Fiscal Risk from State-Owned Enterprises* and IMF (2018): *Fiscal Stress Tests for The Gambia*.

⁶The template does not explicitly model PPP or PPA operations. Nonetheless, some elements of these operations can be easily embedded in the formulas if needed (see Annex 1).

Table 2. Key Macroeconomic Projections and Parametric Assumptions

Macroeconomic variables	Domestic and world real GDP growth and inflation; exchange rates; short-term and long-term interest rates of local currency and FX-denominated debt
Market-specific variables	Market-specific contribution to sales growth in volume (optional); oil prices; prices of commodities other than oil
Structural parameters	Share of sales in domestic and foreign markets; share of imported inputs; share of oil in purchased inputs; share of oil and other commodities in sales
Financial parameters	Share of local-currency denominated debt; average maturity; grace period; share of government-guaranteed debt and debt lent by the government in debt by currency of denomination; degree of variability of debt interest rates; crossholdings of assets and liabilities within the public sector; government's participation in the SOE's equity; share of non-financial assets in other non-current assets
Sensitivity parameters	Elasticity of sales in volume to real and world real GDP growth; indexation of sale prices to domestic and foreign inflation; indexation of wages to domestic inflation; elasticity of purchased inputs to volume of sales
Policy parameters	CIT, sales tax, royalties, and fee rates; dividend pay-out ratio; values of liquidity and leverage ratios that may trigger bailouts; share of bailouts to be accounted as deficit
Business plans and asset revaluation (optional)	Multi-annual investment in financial and non-financial assets; expected revaluation of financial and non-financial assets; expected realized capital gains and losses; employment, government subsidies; doubtful receivables; staff recruitment; government's subsidies

for systemically important companies. Nonetheless, these second-round effects can be better captured by fiscal stress test tools.

Inputs and Assumptions

The template's assessment is based on SOEs' standardized and comprehensive economic and financial information, as well as their medium-term business and financial plans. The following information is needed: (i) past SOE financial statements, essentially the Income Statement and the Balance Sheet; (ii) relevant medium-term macroeconomic and market-specific projections;^{7,8} (iii) a set of parametric assumptions regarding the influence of the macroeconomic environment on the SOE performance, its microeconomic fundamentals, and its relations with the public sector. It will be important to ensure that main assumptions and projections (for example, plans of the SOE) are credible and consistent.

Macroeconomic and market-specific projections and parametric assumptions provide the necessary elements for projecting SOE financials in the baseline and stress scenarios. There are several ways macroeconomic variables can affect SOE financials. Some are automatic (for instance, the value of FX-denominated debt in local currency depends on the exchange rate). Other links depend on sensitivity parameters, for instance

the sensitivity of sales volume to real GDP growth.

These parameters are defined by the user based on past data, sectoral studies, or information provided by the company. Using a range of values for these parameters can be useful, particularly if there is large uncertainty. Other parametric assumptions involved in the projections can often be drawn from financial statements of the company, such as the structure of revenues, costs and debt, and its business plan. The main elements of macroeconomic projections and parametric assumptions are shown in Table 2, which include those that are optional.⁹

The stress scenario is constructed by considering deviations in macroeconomic projections and changes in parameters relative to the baseline. By default, parametric assumptions in the stress scenario are the same as in the baseline but can be modified. For instance, the user can set a lower real GDP growth, or the share of imported inputs may be lower in the face of a sharp and protracted exchange rate depreciation. Dividend pay-out rates or effective tax rates can be different in the stress scenario, allowing for a stronger buildup of cash during recessions. The modifications of structural parameters across scenarios should be handled with care to facilitate the interpretation of results and their comparability.

⁷The template uses the IMF's *World Economic Outlook* projections, but users can enter their own projections.

⁸Market-specific factors can also significantly influence sales beyond broader macroeconomic dynamics. For instance, this may happen due to product-cycles, whether the SOE faces increased competition in the market, or a key client undergoes financial difficulties. The user may optionally enter these projections when relevant.

⁹Optional parameters and projections require a good understanding of the dynamics of the market where the SOE operates, as well as its portfolios of assets and clients. These features of the tool can be phased-in and be brought into a more advanced level of analysis.

Benchmarking

The first step of the analysis is to assess the relative performance of the SOE relative to its peers in other countries. Such comparison provides an initial diagnostic of the firm's efficiency and potential risks. For example, if labor costs are significantly higher than in other SOEs in the sector, the SOE may be fulfilling employment goals for the government or reflect technical inefficiencies. SOE leverage that is significantly higher than that of peers may signal excessive risk taking or financially unsustainable operations.

The financial indicators used are grouped according to the following categories:

- *Profitability*: For example, return on equity or assets provide an indication of whether government assets and likely future flows to the government (transfers or payments of dividends) are being used appropriately.
- *Capital structure*: For example, leverage (the ratio of non-current liabilities to total assets) gauges the level of indebtedness of the SOE, the risk of financial distress, and the need for government support.
- *Liquidity*: For example, the current ratio assesses cash needed by the SOE to cope with short-term obligations.
- *Operating efficiency*: For example, revenues and costs per worker (operating revenue per employee or labor cost per operating revenue) assess how the resources of the SOE are used to earn profit.¹⁰

The template allows benchmarking of non-financial SOEs across different sectors. The information is based on the ORBIS database for about 22,000 SOEs around the world.¹¹ Benchmarking can be done across approximately 80 sectors or sub-sectors and by income country group. The indicators are expressed as ratios to ensure comparability across firms. Indicators such as operating revenue per employee are expressed in millions of US dollars. The benchmarks are calculated as the median, top 75th and bottom 25th percentiles of the distribution for each indicator across all countries by sub-sector. This allows identification of the most

typical value and the most "extreme" values and comparison with the last year and the average (last 2-years) of the benchmarked SOE.

Performance across different indicators can vary significantly for each SOE. Figure 2 illustrates the case of an SOE in the electricity, gas, steam, and air conditioning supply sector. The different panels show that the company is relatively profitable (high ROA and ROE). While operating revenue per employee is above the 75th percentile, the firm appears inefficient given exceptionally high labor cost per operating revenue. Similarly, its liquidity—proxied by the current ratio—seems to be adequate, but the firm seems highly leveraged—proxied by the non-current liabilities to assets ratio—compared to other SOEs in the same sector. The high leverage and inefficiency could indicate vulnerabilities.

The benchmarking exercise indicates potential areas of risk, but further analysis may be needed to have a full assessment. Attention should be paid to the size of the sample of comparators, comparability of the countries involved, and cross-country regulation differences. Ongoing restructuring efforts or enhancements in governance should also be taken into consideration.

Forward-looking Analysis: Baseline and Stress Scenarios

Baseline

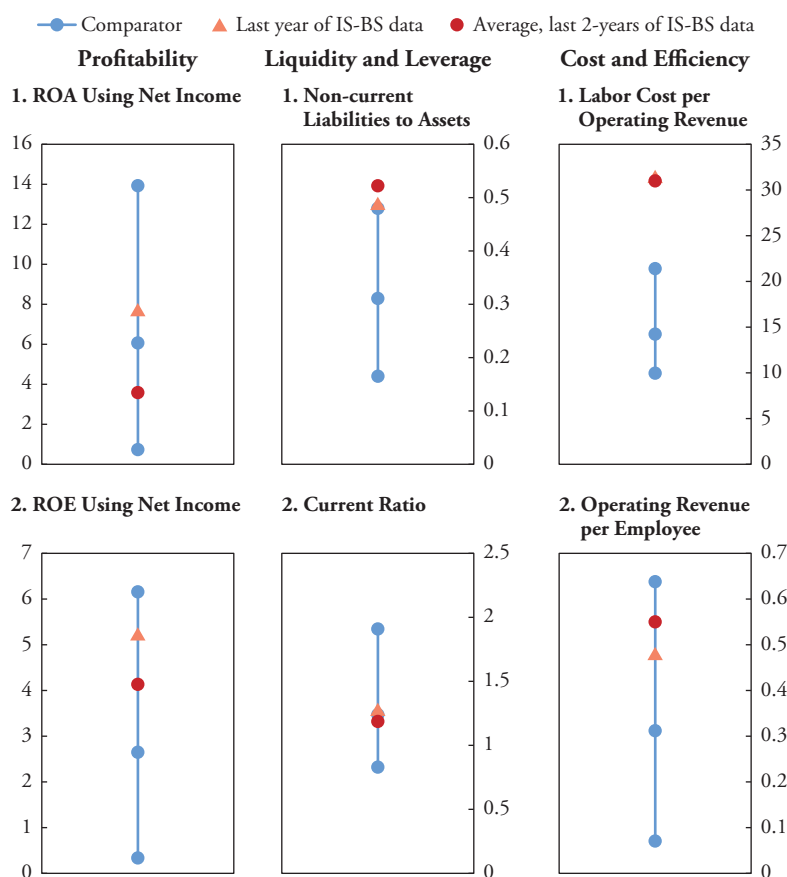
A second step is building a baseline scenario for the SOE's financial indicators. The tool calculates a set of profitability, liquidity, solvency, and efficiency indicators for each projection year, as well as a breakdown of financial flows between the SOE and the budget and its contribution to net public worth. These are based on projections for the Income, Balance Sheet, and Cash Flows Statement over a 6-year period. These statements follow broadly an International Financial Reporting Standards (IFRS) structure, with a low degree of disaggregation compatible with available financial information in most countries.

Financial projections draw on past financial information, macroeconomic and market-specific projections, and parametric assumptions. In the template, macroeconomic developments affect SOE performance through parametric assumptions. For example, sales volumes are linked to domestic and international GDP, while prices are linked to domestic and international

¹⁰A true measure of efficiency should consider all the inputs of the firm. However, revenue per employee is a useful proxy for efficiency, given data constraints, allowing for comparison across SOEs.

¹¹See Baum, Hackney, Medas, and Sy (2019) for the treatment of the data. For the benchmarking exercise, SOEs are defined as *commercial* organizations that are ultimately *owned* by public sector entities. The ownership condition requires that central or subnational governments own or control more than 50 percent of the firm.

Figure 2. Benchmarking State-Owned Enterprises



Source: Authors' calculations.

inflation and, for oil and gas companies, the oil price. Interest income and interest expense is linked to domestic and international interest rates. The rates for royalties and fees, corporate income tax, value added tax/sales tax rate and dividend payout ratio are set by the user. End of the year cash balances are determined considering targeted liquidity ratios. Any cash requirements that cannot be met through borrowing, because the solvency parameters (maximum leverage ratio) would be breached, are assumed to be provided by the government as a capital injection.¹²

The structure of the financial statements (Tables 3–5) are:

¹²There are other possible rules to determine capital injections but combining liquidity and solvency indicators strikes a balance between mitigating the risks of default, and moral hazard considerations. Moreover, since the user can flexibly set the liquidity and leverage thresholds, this allows factoring in different government's preferences and strategies, as well as the fiscal space available for conducting bailouts.

- Income Statement (Table 3). Operating revenue primarily depends on sales, which are sensitive to domestic and foreign GDP growth, market-specific factors, inflation, and the exchange rate. Other operating revenue is linked to inflation. Operating expenses are determined by the sensitivity of personnel costs to inflation and staff recruitment plans, the elasticity of input demand to production, domestic and foreign prices of imported inputs and the exchange rate. Other operating expenses, mainly reflecting overhead costs, are linked to inflation. Non-operating income includes capital transfers from the government (endogenously determined), interest and dividend incomes on the previous year's financial assets, and other non-operating revenues, linked both to inflation, realized capital gains, and, when applicable, receivable write-downs.
- Cash Flow Statement (Table 4). Operating cash flows are obtained by adjusting operating profit by

Table 3. Simplified Representation of SOE Financial Statement: Income Statement

	Operating revenue
	Net sales
	Other operating revenue
–	Operating expenses
	Wages, salaries, and benefits
	Cost of goods and services sold
	Depreciation & amortization
	Other operating expenses
	Royalties and fees
=	Operating loss/income (A)
	Non-operating income
	Capital transfers
	Interest received
	Dividends received
	Other non-operating income
–	Non-operating expenses
	Interest payment
	Others
=	Non-operating loss/income (B)
A+B =	Profit/loss before tax
–	Corporate income tax/benefit
	Profit for the year after tax (C)

Source: IMF staff

non-cash items (that is, depreciation and amortization and changes in receivables, payables, and inventories). Non-operating cash flows comprise the net cash inflows from investing activities and financing activities, principally net acquisition of assets, net borrowing, servicing of interest and distribution of dividends. The items related to changes in the stocks of financial and non-financial assets and liabilities are imported from the Balance Sheet, while property incomes are drawn from the Income Statement. Capital injections are recorded as a separate item, to clearly identify their contribution to final cash balances, and their determination is described below.

- Balance sheet (Table 5). On the asset side, cash holdings reflect cash balances from the cash flow statement, and receivables and inventories are calculated as a ratio of sales, less receivable write-downs.¹³ Property, plant and equipment, and investment property take into account the investment plans of the company, adjusted by revaluation effects and, in the former case, by the depreciation of the capital stock as well. On the liability side, debt dynamics are governed by new borrowing and the debt amor-

¹³Receivables are presented net of write-downs for prudential reasons, as it assumed that there is a very high probability that those receivables considered as doubtful will never generate cash flows for the SOE.

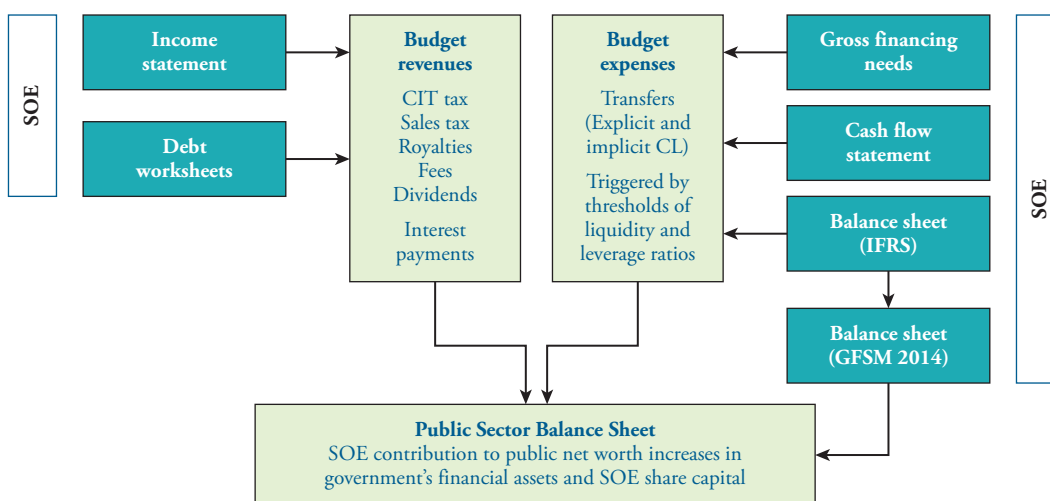
Table 4. Cash Flow Statement

A. Cash flow from operating activities
Net income from operations
Depreciation
Change in account payables/receivables
Change in inventories
Income taxes paid
B. Cash flow from investment activities
Acquisition of property, plant, and equipment
Proceeds from the sale of property, plant, and equipment
Purchase and sale of other assets
C. Cash flow from financing activities
Repayment of debt
Net dividend payments
Net interest payments
A+B+C = Increase/Decrease in cash
+ Cash at beginning of the year
+ Total capital transfers
= Cash at the end of the year

Source: IMF Staff

Table 5. Simplified Representation of SOE Financial Statement: Balance Sheet Statement

Assets
Current assets
Cash & cash equivalent
Receivables
Inventories
Other current assets
Non-current assets
Property and equipment
Investment property
Other non-current assets
Equity & liabilities
Current liabilities
Accounts payable
Employee benefits
Current long-term loans
Other current liabilities
Non-current liabilities
Long-term Loans
Retirement benefit obligations
Other non-current liabilities
Equity
Share capital
Accumulated other non-comprehensive income
Retained earnings

Figure 3. Fiscal Flows and Stocks in the Template

Source: Authors' calculations.

tization profile. Equity reflects retained after-tax profits and any capital increases. Payables are proxied as a stable ratio of purchases of goods and services, and benefit and retirement obligations grow in line with personal expenses. Other non-current assets and liabilities are assumed to be constant. Other comprehensive income captures non-realized revaluation effects on assets and liabilities.

Financial projections are then mapped into Government Financial Statistics (GFS) data. The tool provides an accrual statement of operations in a simplified GFS format. This captures an operating balance, net transactions in non-financial assets, and the resulting net lending/borrowing of the company. Gross financing needs are also estimated, based on the net borrowing requirement and the financing needed, to meet the debt amortization schedule. Likewise, a GFS-type balance sheet is drawn from the balance sheet statement, and this allows the calculations of the SOE's contribution to net financial worth and public net worth.

Fiscal Risks and Financial Relations with the Government

A core element of the template is that it provides a baseline projection of the SOE's contributions to the general government overall balance, as well as the impact on government debt and public sector net worth (Figure 3). The impact of SOE performance on the public sector financial position is estimated both with IFRS and GFS. As summarized in Table 1

previously, there are many possible links between the government and SOEs. The template estimates two key measures. One is an estimate of net budgetary inflows: the difference between taxes plus dividends plus interest payments from the SOE, and subsidies and transfers to the SOE. However, because SOEs can affect the balance sheet of the public sector through other ways (for example, changes in the size of assets or liabilities of the company), it also provides an estimate of the full contribution of the company to the public sector balance sheet (PSBS)—in particular, how the operations of the SOE affect the net worth of the entire public sector.¹⁴

The projected impact on budget revenues is derived from the Income Statement and debt projections:

- Corporate income and sales taxes and royalties and fees are calculated by applying tax rates to their respective tax base, i.e., pre-tax earnings in the first case, gross sales for sales tax and fees, and net sales minus production costs for royalties.¹⁵
- Dividends are obtained by applying the exogenous payout ratio to after-tax profits (if positive).

¹⁴The share of assets and liabilities to consolidate in the broader public sector balance sheet (and calculate impact on net worth) can be entered by the user as financial assumptions.

¹⁵Royalties should only be considered for commodity-producing companies, particularly oil.

- Interest payments are estimated by applying an endogenous effective interest rate to the outstanding stock of government loans to the SOE.¹⁶

Budget outflows (or bailouts) to SOEs reflect subsidies or capital transfers:

- Subsidies compensate for operating losses and are an expense for the government.
- The government is assumed to use capital transfers or injections to address liquidity needs of the company that cannot be met through additional borrowing as it would breach the leverage threshold.¹⁷ For simplicity, it is assumed that capital transfers take the form of equity purchases and are fully disbursed in cash. Capital injections are recorded as transfers (and higher deficit) when they are not expected to have a reasonable rate of return (GFSM 2014).¹⁸ The user can enter any share of these injections that are to be recorded “above the line” (government spending) as part of the parametric assumptions. If all or part of capital injections are expected to be remunerated at or above market rates, then they are reported as an increase of government’s financial assets.

The projected capital injections depend on liquidity and solvency thresholds. These thresholds should be set considering the ability of the firm to manage volatility and impact on the economy more generally. Users should specifically consider lowering the leverage cap and/or increasing the liquidity floor when: (i) the strategic importance of the SOE for the government is greater (for example, if a disruption in operations will affect poorer households or the economy); (ii) market access of the company during a financial distress episode is expected to be disrupted; (iii) the government’s capacity to monitor managerial performance and mitigate moral hazard is high; (iv) the government’s fiscal space to undertake deficit-generating transfers. The thresholds are defined in terms of the quick

¹⁶See Annex 1 for more details about the derivation of the effective interest rate.

¹⁷Liquidity and leverage thresholds of the tool are used only to operationalize the linkages between the SOE’s performance and government’s accounts. In practice, bail-out decisions are entirely discretionary. Moreover, lack of governmental willingness to assume the cost of implicit contingent liabilities can be signaled by setting very low liquidity floors or very high leverage thresholds.

¹⁸For example, if the governments do not expect to be repaid, or the rate of return is lower than for other investments comparable in terms of risks and maturity—or is lower than the cost of borrowing by the government.

liquidity and debt to equity ratios, respectively.¹⁹ The end-year cash balances before new borrowing are then compared with the target balance implied by the quick ratio floor, resulting in a liquidity gap that can be filled either through new borrowing or capital injections.²⁰ The company fills the liquidity gap by borrowing until the debt-to-equity cap is reached. When equity is negative, new borrowing is not allowed. Beyond the debt-to-equity ceiling, the residual liquidity gap is filled with capital injections.

It is worth noting that the template can also be applied to quantify the impact of a portfolio of SOEs on public accounts. The analysis for each individual SOE can be aggregated to assess their net fiscal inflows into the budget. This approach can be particularly useful when cross-subsidies across companies are substantial.

Main Outputs

The tool summarizes projections for a set of liquidity, solvency, and profitability indicators over the projection horizon. These projections are made for two cases: (i) use of capital injections by the government, if necessary, to meet the liquidity and solvency thresholds; and (ii) absence of capital injections, so that liquidity needs are exclusively filled by borrowing. The liquidity floor is always met in both examples, but the leverage cap may be breached in the second one. This counterfactual exercise provides an indication of the implications if the government does not provide financial support.

As an illustration, Table 6 shows projections of selected financial indicators for the same electricity SOE discussed above between 2018 and 2024, and in the absence of capital injections. The floor of the liquidity ratio is set at 0.6 in 2019. The company’s

¹⁹As for early warning values, the debt-equity ratio varies across industries, but usually values above 1.5–2 denote high risks. The preferred quick ratio is above 1, and values below 0.5 tend to denote high risk. The quick liquidity ratio is given by cash and deposits, plus receivables and other current liquid financial assets, divided by current liabilities. The debt-to-equity ratio equals total liabilities divided by shareholder’s equity. This double threshold seeks to strike a balance between short-term risks (liquidity shortages) and medium-term risks (solvency).

²⁰Note that the liquidity gap implies constraining the way gross financing needs are met. In general, gross financing needs can be met either through a net reduction of assets or the incurrence of liabilities. Another option to fill this gap is slowing down net purchases of assets, including through divestment. The template also allows a resort to this option, as net investment plans in financial and non-financial assets are entered exogenously by users.

Table 6. Selected SOEs' Performance Indicators (excluding transfers)

	2018	2019	2020	2021	2022	2023	2024
Profitability							
ROE	15.5	2.1	-0.8	-1.0	-0.3	-0.3	0.2
ROA	4.8	0.6	-0.2	-0.3	-0.1	-0.1	0.1
Liquidity							
Current ratio	1.3	1.5	1.3	1.6	1.4	1.5	1.5
Quick ratio	0.1	0.6	0.6	0.6	0.6	0.6	0.6
Solvency							
Debt to equity ratio	2.2	2.5	2.5	2.3	2.2	2.0	1.9
Non-current liabilities to assets ratio	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Efficiency							
Labor cost per operating revenue	31.2	29.4	29.2	29.1	28.9	28.8	28.7
Size							
Assets to GDP	2.7	2.8	2.6	2.3	2.2	2.0	1.9
Liabilities to GDP	1.8	1.7	1.6	1.3	1.2	1.0	0.9

Sources: SOE annual report and authors' calculations.

profitability would significantly decline in 2019, with the ROA being close to zero, mainly due to the reversal of exceptional profits in 2018.²¹ In addition, in 2019 the company's debt amortization increases sharply. This, together with a lower operating cash flow, depletes its cash balances and causes an overdraft. Meeting the liquidity floor would require additional borrowing, as reflected by the jump in the debt-to-equity and the debt-to-GDP ratios. The quick ratio reaches the floor of 0.6. After 2019, profitability gradually improves and allows the debt-to-equity ratio to decline gradually. Assets to GDP also decline over time as well as liabilities, reflecting lower gross financing needs.

In this example, capital injections from the government will be needed. Given that the initial debt-to-equity ratio is higher than the leverage ceiling of 1.5, the liquidity gap in 2019 must be filled with capital injections. Under the baseline, government transfers are more than 0.3 percent of GDP in 2019 (Figure 4). These transfers raise the apparent profitability, and the net financial worth of the company becomes positive. Without transfers, the net contribution of the SOE to the budget in 2019 would have been positive due to indirect tax revenues. However, this would be at the cost of weaker profitability, liquidity and net financial worth of the firm. Despite the net flows to the budget turning positive in 2020, the contribution of the SOE to public net financial worth remains negative for the entire projection period, given relatively long debt amortization periods and the cost of debt service. From 2020 onward, liquidity needs can

²¹2018 profits were exceptionally high because of the writing-off of some provisions.

be met by additional borrowing without breaching the leverage cap. Public net worth would also be impacted negatively by the potential cost of the government providing capital injections, although this is not shown in the chart.

Stress Scenario

The next step is to use different stress scenarios to assess possible fiscal costs to the government. This could reflect temporary or permanent shocks to macroeconomic, market, or company-specific variables. SOEs can also be affected by financial distress in other parts of the public sector (spillovers effect). The principal transmission channels through which these shocks operate are the following:

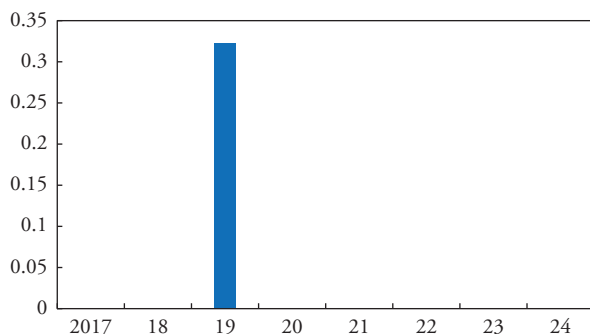
- Negative shocks to real (domestic or foreign) GDP growth and inflation reduce gross sales.²² A negative shock to domestic inflation will reduce the value of sales, but also the expenditure on goods, services, and wages, for which the degree of indexation is entered by the user. The net effect will depend on the starting operating profit and the sensitivities of different line items to inflation. Similarly, the impact of oil prices will depend on whether the firm is an oil producer or not.²³
- Negative shocks on the indexation of sales prices to inflation can increase financing needs. These shocks

²²Since the share of receivables to gross sales is likely to be pro-cyclical, the impact of the growth shock on the cash-flow will often be higher than on operating income (which is reported on an accrual basis), unless payables experience a similar increase.

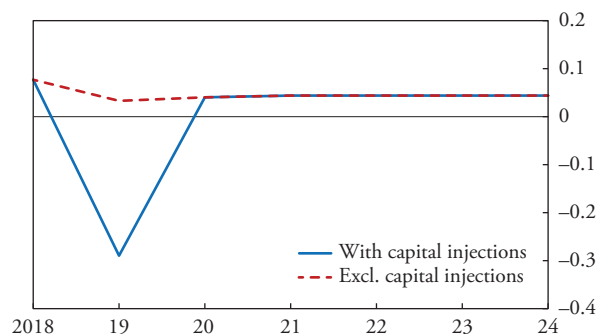
²³The tool offers the possibility of assessing risks for oil companies and can be easily expanded to other commodities. See Annex 1 for more details.

Figure 4. Fiscal Cost of Government Bailouts

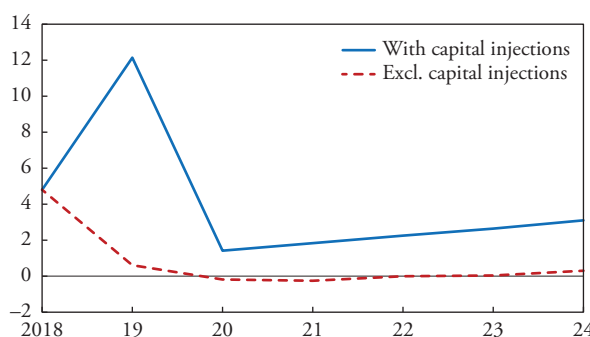
**1. Capital Injections
(Percent of GDP)**



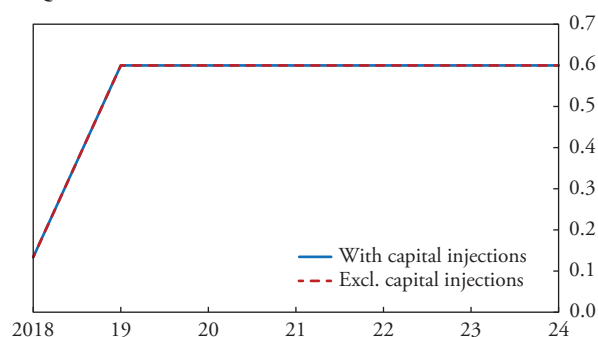
**2. Net Flows to Budget
(Percent of GDP)**



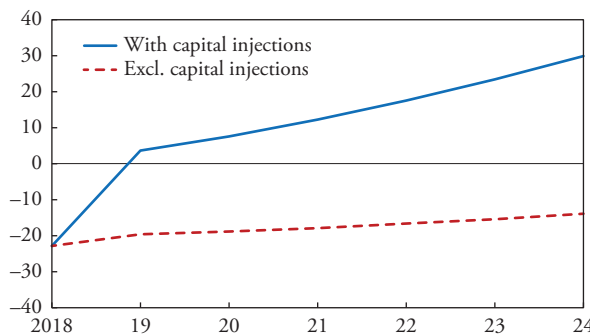
3. ROA



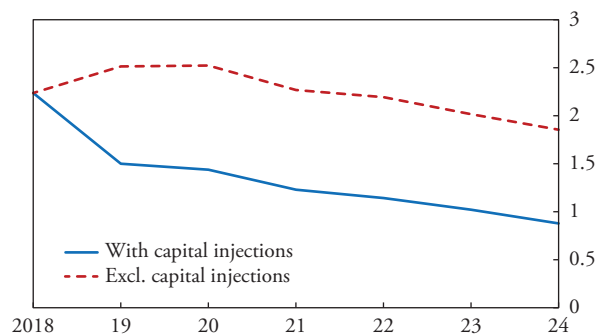
4. Quick Ratio



**5. Contribution to Public Net Financial Worth
(Millions of local currency)**



6. Debt-to-Equity Ratio



Source: Authors' calculations.

can be induced by the government if regulated prices are only weakly indexed to inflation, while inflation is fully passed through onto the company's costs. Alternatively, the shock can also reflect a reduction in the market power of the company, that manifests itself in lower mark-ups. Operating profits worsen, and in general this leads to higher financing needs and debt accumulation.

- A negative shock to households and corporate liquidity can trigger a slowdown in payments by

buyers. This shock increases the ratio of receivables to gross sales and can raise the rate of receivables at risk. As a result, cash flows deteriorate, and the liquidity gap widens.²⁴ Note that this type of shock can capture relevant interlinkages between SOEs or between SOEs and private companies, as a result of

²⁴When the share of receivables at high risk is higher than zero, the SOE is assumed to write them off. When this share is negative, some of the receivables classified in previous periods as doubtful are recovered, and this gives rise to a decrease in the stock of doubtful receivables, and positive non-operating revenue.

which liquidity shortages in one spread quickly into others through an increase of doubtful receivables.

- An exchange rate depreciation versus the USD generates several effects with net effect depending on the operations of the firm: (i) an increase in revenue of any foreign sale in local currency; (ii) higher import costs in local currency; (iii) an increase in the value of foreign-denominated assets and liabilities in local currency; (iv) an increase in the amount of interest and amortization payments of foreign-denominated debt; (v) for a given borrowing requirement in local currency, a reduction in the value in USD of any new foreign borrowing.
- An increase in medium- and long-term interest rates, domestic or foreign, will raise the interest costs of debt issued in domestic currency. The more sensitive interest rates are to market conditions, the more the shock is transmitted to interest payments.
- The financial viability of the SOE can also be affected by higher levels of taxation or dividend payout ratios. Higher tax and dividend payout ratios increase the amount payable by the SOE to the government, but this could be offset by higher government transfers if the SOE has larger liquidity needs that cannot be met through borrowing. Stress scenarios can be quantified for different tax and dividend policies, providing insight about their impact on the SOE's vulnerabilities.

For the same electricity SOE, we present a stress scenario with a sharp economic slowdown caused by heightened turbulences in international financial markets. This entails a negative growth shock in 2019, which is gradually reversed by 2024. The exchange rate experiences a temporary 20 percent depreciation between 2019 and 2020, driving inflation upwards. Domestic and foreign interest rates also increase because of currency depreciation and a higher risk premium on corporate debt.

Profitability is severely impaired by the macroeconomic shocks (Figure 5). 90 percent of the SOE's sales are in the domestic market, which is severely affected by the shock. Sales fall sharply in volume. Costs surge on the back of the sharp depreciation, which more than offsets the fall in oil prices. Additionally, the low indexation of regulated domestic prices to inflation impedes a substantial pass-through of costs into sales prices, which further squeezes profits. Moreover, higher interest rates push up the debt service. The delinquency rates of receivables jump during the shock, as liquidity-constrained clients incur arrears. All these

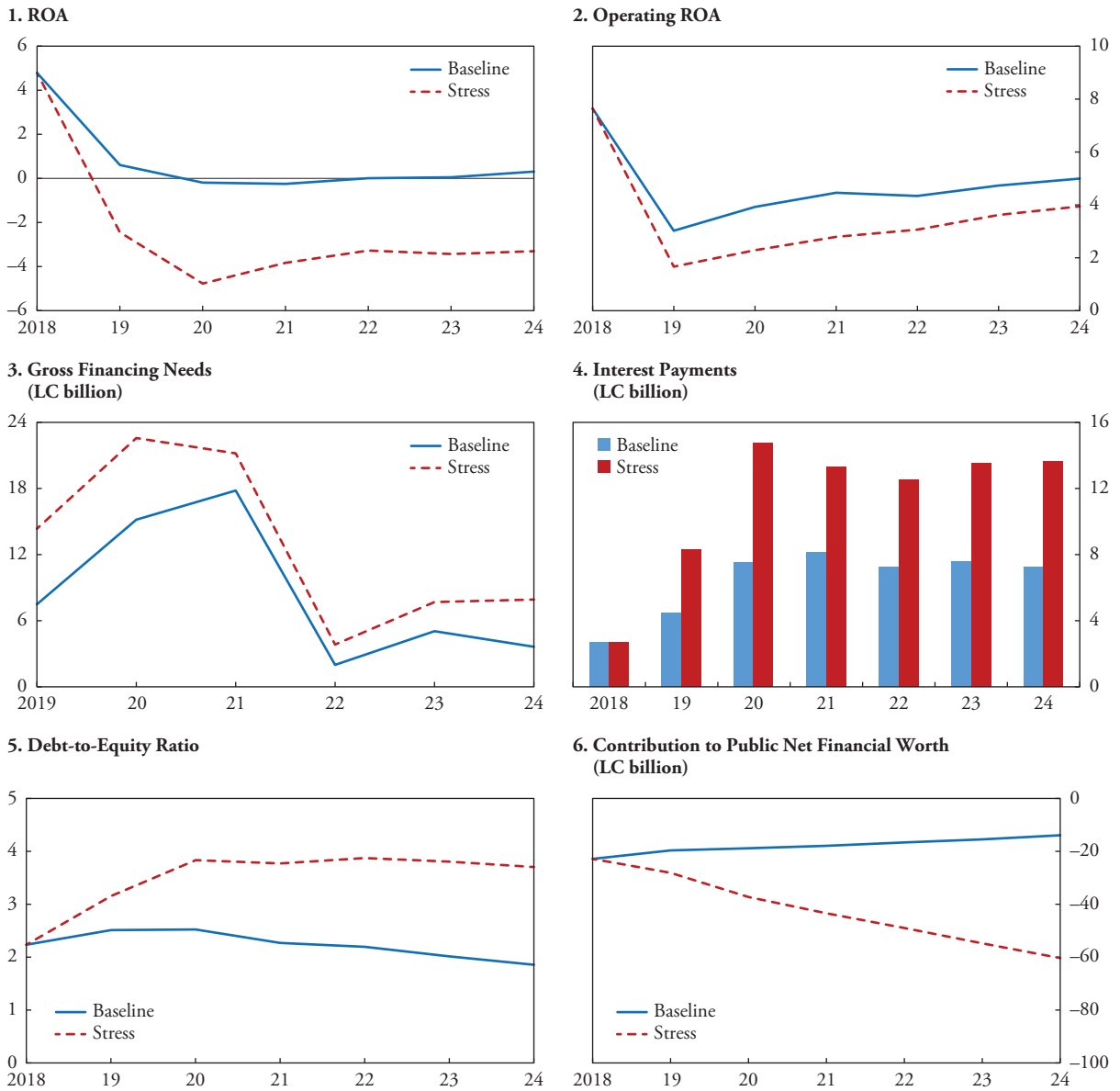
factors turn profitability (return on assets) negative and hurt the SOE's operating cash flow.

Lower profitability exacerbates the firm's liquidity pressures and, absent capital injections, would raise leverage to unsustainable levels. Weaker net income translates into higher financing needs and larger liquidity gaps.²⁵ Filling them by borrowing the full amount, coupled with a negative valuation effect of FX-denominated debt (50 percent of outstanding debt in 2019) would increase the debt-to-equity ratio to almost 4, possibly leading the firm to lose access to debt markets. Moreover, interest payments would go up, preventing the ROA to return to its baseline after the shock.

The contribution to the government's budget becomes even more negative over a protracted period (Figures 6 and 7). Negative pre-tax profits mean the firm will not pay CIT until 2022, whereas lower sales tax payments reflect the fall in gross sales. There are no projected dividends until 2023 and they are smaller than in the baseline afterwards. Capital injections surge between 2019 and 2020, given that the starting high leverage ratio limits borrowing. The net present value of net inflows into the budget deteriorates from -0.1 percent to -0.3 percent of the pre-shock GDP (Figure 7), reflecting the increase in capital injections and a decrease in revenues.

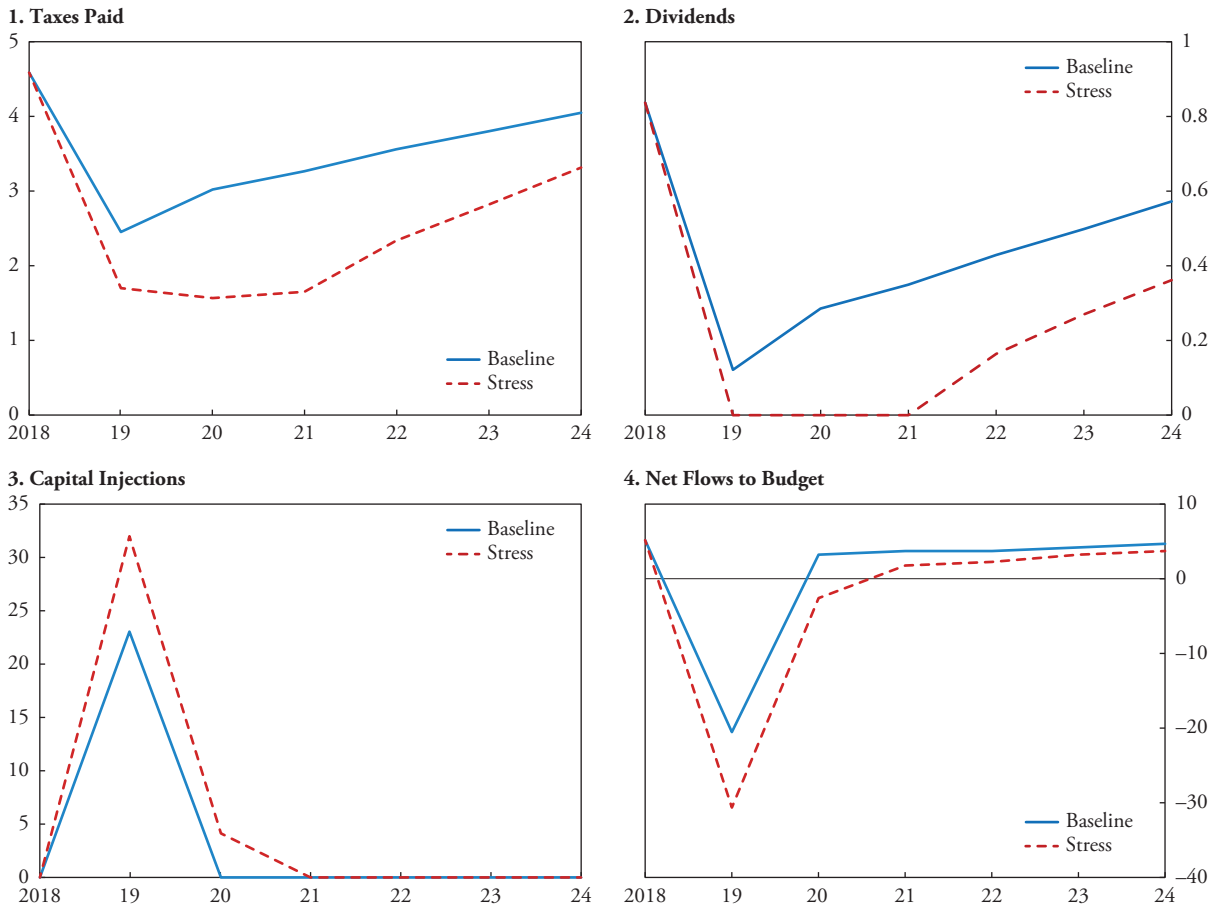
²⁵The liquidity and leverage thresholds are maintained at 0.6 and 1.5, respectively, as in the baseline scenario.

Figure 5. Selected Financial Indicators (Baseline and Stress Scenarios without Transfers)



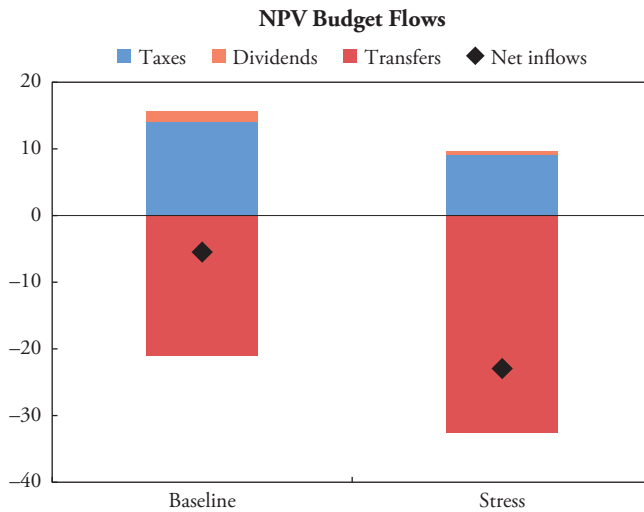
Source: Authors' calculations.

Figure 6. Breakdown of the SOE's Contribution to the Budget
(LC billion)



Source: Authors' calculations.

Figure 7. NPV of SOE Net Contribution to the Budget
(LC billion)



Source: Authors' calculations.

ANNEX 1. STRUCTURE OF THE TEMPLATE: INPUTS AND OUTPUTS

Input 1—Basic

The following data are entered: main country and sector of operation of the SOE, and last year of observed financial data. By default, it is assumed that the template generates projections from the next year onwards. Verify that formulas are in place for all projection years across the template.

Input 2—Income Statement

The user enters available observations from the Income Statement for at least the last two years.

Input 3—Balance Sheet

The user enters available observations from the Balance Sheet Statement for at least the last two years.

Input 4—Assumptions

This worksheet, referred to the baseline scenario, calculates by default macroeconomic projections drawing on the IMF's World Economic Outlook (WEO). The user can replace these formulas by projections from other sources. Interest rates of assets and liabilities are not provided and must be entered by the user. It should also verify that the WEO provides projections for all relevant years. But the user can use her own macroeconomic projections

Based on the assumptions entered by the user, the worksheet automatically calculates the growth in the volume of sales in domestic and foreign prices. These variables are used in the Income Statement to project gross sales. The user can also rely entirely on projections of sales in volume and prices from external sources, such as the SOE's management, by replacing the existing formulas by those projections. Additionally, the share of domestic to total sales in local currency (i.e. the sales tax base) is estimated in the same worksheet and applied in the Income Statement. It will be important to ensure the projections are credible and robust (for example including a critical assessment of the projections prepared by the SOE or other external sources).

The assumptions relative to the structure of debt allow for a relatively flexible modeling of new borrowings. For instance, the structure of both loans and debt securities can be replicated by combining different grace periods and maturities of new borrowings (for example grace period plus one-year maturity for debt securities). Grace periods and maturities can be different for borrowing denominated in local and foreign currency. The user can also set different shares of government's loans and government guaranteed debt to total debt for pre-existing debt before the start of projections and new borrowings.

Investment assumptions in the baseline scenario may reflect the original business plans of the company but can also be subject to sensitivity exercises to analyze the effects of alternative investment paths. This possibility becomes more relevant when both SOE and government face severe liquidity constraints, and neither borrowing nor capital injections are a viable alternative. On the other hand, purchases of fixed assets can reflect one-off operations, or the construction of assets over several periods as part of turnkey projects or other PPP contracts.

When entering the assumptions, it is important to ensure they are consistent. For example, a heavy expansion of the SOE's productive capacity can translate into a higher elasticity of sales to GDP than observed in the past. Likewise, exchange rate movements should be key drivers of revaluation effects if a high share of the company's assets is denominated in foreign currency. The assumptions may also be influenced by the legal and regulatory transparency of the environment where they operate (for example an ineffective legal system can entail a higher level of delinquent receivables).

Benchmarking

The sheet automatically compares the SOE to SOEs in the same sector regarding profitability, liquidity, leverage, and efficiency indicators. The comparison is done with the whole sample of countries, and with the sub-set of countries of a similar income country group if data are available.

Stress Test

This worksheet plays an analogous role to Inputs 1–4 but refers to the stress scenario.

The user is asked to design the stress scenario by entering deviations from the baseline of macroeco-

conomic and market-specific variables, by year. These deviations are additive, except for the shock on the level of receivables and their share to materialize, which are multiplicative (that is, the values of expected recovery of receivables in the stress scenario are obtained by multiplying their pre-shock values by these coefficients).

Note that, when defining the size of the shocks, the user can take into consideration both first and second-round effects. This is the typical case of variable interest rates on the company's debt. The immediate impact of a growth shock may be to raise the risk premium of the company if its revenues drop. However, if the shock also entails an exchange rate depreciation, and a significant share denominated in domestic currency is held by foreign investors, an additional increase in rates could be expected. Thus, the user may want to reflect both effects in the deviation of stressed domestic rates from the baseline.

Parametric assumptions and business plans are, by default, the same as in the baseline scenario. However, the user can modify them in the stress scenario if needed, just by replacing the formula in these cells by different numerical values. This degree of flexibility is intended to increase the realism of the scenarios, as behavioral parameters are often asymmetric throughout the baseline cycle. For instance, a high utilization of the productive capacity of the company may imply a low elasticity of sales to real GDP growth, but this elasticity may be considerably higher during an economic downturn, or capital gains should be commensurate to receipts from asset sales. Analogously to Assumptions, this worksheet calculates sales volume growth, domestic and foreign prices developments and the share of domestic to total sales in the stress scenario.

Debt Projections

This worksheet, referred to the baseline scenario, generates debt projections by importing debt data and their related parameters from Input 2, 3 and Input 4-Assumptions.

Outstanding stocks by type of debt are calculated as previous stocks, plus borrowing less amortizations.

Borrowing is imported from the Cash Flow Statement and apportioned between FX and local-currency denominated debt according to parametric assumptions. These also determine the amount of government-guaranteed debt and government loans

out of this borrowing. Borrowing in foreign currency is obtained as a share of total borrowing in local currency, and then converted into foreign currency at the period's exchange rates.

Amortizations of debt outstanding at the beginning of the projection period and debt issued after that year are calculated based on the assumptions about the average maturity of debt and, for new borrowing, grace periods. For the first year of projections, amortizations are given by observed data on current liabilities in Input 3. Since uniform assumptions are applied for the amortization of all local currency- and FX-denominated debt, when debt instruments within each category are very heterogeneous this can lead to some loss of accuracy in the amortization profile. In these cases, the user may wish to replace the formulas that compute the amortization profile of pre-existing debt by the sum of expected amortizations for each instrument.

Interest payments are also calculated in this worksheet. This is done by applying an effective interest rate to the stock of debt outstanding by the end of the last year. The effective interest rate is projected as a linear combination of last year's effective interest rate and the interest rate of marginal borrowing entered in Assumptions. The parameter that captures the variability of interest rates is entered in Assumptions, and it should be understood as a weighted average for the whole stock of debt.

The amortizations and interest payments of government-guaranteed debt and government loans are derived by applying their share in total domestic debt (entered in Assumptions) to domestic debt amortizations and interest payments on domestic debt.

Amortizations and interest payments of foreign-currency debt are calculated in their currency of denomination and converted into local currency at the average exchange rate entered in Assumptions. The value in local currency of the outstanding stock of foreign debt is obtained by applying the end-of-the-year exchange rate entered in Assumptions.

Debt Projections (Stress)

Analogous worksheet to baseline Debt projections but refers to the stress scenario.

Income Statement (Baseline and Stress)

These worksheets import all necessary data from other worksheets of the template and automatically calculate the main components of net income (pre- and after- income taxes). It also calculates the dividends distributed to the government, based on after-tax profits. Line items are projected by making their last observed values grow according to the rates given by the parameters in Input_5 Assumptions and Stress Test.

Among operating revenues, gross sales are determined by combining the growth rate of their volume and prices in domestic and foreign markets, expressed in local currency. Net sales are projected by subtracting sale taxes from gross revenues. Other revenues are obtained by indexation to domestic inflation but could be augmented by the growth rate of gross sales if the turnover of the primary and secondary activities of the company are correlated. Subsidies are entered exogenously by the user in Input 5 Assumptions and Stress Test.

Among operating expenses, personnel ones grow along inflation (adjusted by a degree of indexation entered by the user) and employment plans, and costs of goods and services depend on the volume of inputs purchased (linked, in turn, to the volume of production) and their prices in domestic and foreign markets. Other operating expenses are indexed to inflation, but their formula can be adjusted to add some contract-specific items, such as availability payments in PPPs.

Non-operating revenues are given by: i) interest receipts are obtained by applying short and long-term interest rates (domestic and foreign) to asset holdings; ii) dividends are indexed to nominal GDP growth; iii) capital transfers are determined in the Cash Flow Statements; iv) other revenues have two components: a first one is linked to inflation, and a second one to realized capital gains, as entered exogenously by the user.

Non-operating expenses mainly comprise interest payments (imported from Input 4_Debt and Debt Stress) and other expenses, which have a symmetric structure to other non-operating revenues. Other non-operating expenses non linked to inflation also comprise receivable write-downs, and they could be augmented by an additional row that captures the realization of contingent liabilities (legal claims, termination payments in PPP contracts, etc.).

The CIT paid is obtained by applying the exogenous rate to the pre-tax profit, once subsidies and capital transfers are excluded -they are assumed to be exempted from the tax base, but the user can easily modify the formula if this does not hold for a specific firm-.

Sometimes the user may identify outliers (i.e. exceptionally high or low values) in the last observations of some line items in the Income Statement. This can only be done if the time series of past observations includes at least three or four years. In these cases, it is important to adjust the projection of the concerned line item to avoid carrying the anomaly into the whole projection period. This adjustment can be made, for instance, by linking first year's projection to the data which precedes the outlier rather than to the outlier, or to an average of values in the last 3–4 years.

Cash Flow Statement (Baseline and Stress)

These worksheets also operate automatically. They comprise three blocks.

- Calculation of end-year cash balances. This is done by aggregating operating, investment and financial cash-flows, plus capital injections, to end of last year's cash balances. Deriving these projections does not require making any assumption on the growth rates of the variables but linking them to the relevant line items of the Income Statement/Debt worksheets and changes in the Balance sheet stocks. Operating cash flows are obtained by adjusting operating revenues and costs by receivables, payables, changes in inventories, depreciation, and income taxes. Investment cash flows reflect net transactions in property, plant and equipment and investment property. Financial cash-flows stem from differences in the stock of debt, as well as net interest and dividend payments.
- Calculation of borrowing and capital injections. First, the template estimates equity and cash balances before new borrowing and capital injections and computes the liquidity gap as the distance to the liquidity target. Overdrafts are ruled out by formula. Then, the tool determines the level of cash balances necessary to reach the targeted quick ratio, and the liquidity gap as the difference between this target and the cash balances before borrowing and capital injections. Subsequently, the tool quantifies the share of borrowing and capital injections to fill the liquidity gap and, simultaneously, complying

with the leverage cap.¹ The liquidity gap will be first filled with borrowing, and only residually with capital injections. The tool also estimates the amount of these injections which help the company to address its guaranteed debt service, under the assumption that these needs are the first to be met by means of capital injections.

- Estimation of the counterfactual scenario without capital injections, in which liquidity gap is entirely filled through borrowing. All additional borrowing in the counterfactual is assumed to be domestic, its grace period is one year for simplicity and its maturity the same as when capital injections are present. The counterfactual also includes interest payments for additional borrowing, by multiplying the same effective interest rate applicable when capital injections are made to the additional borrowing. Liquidity needs are computed by adjusting the value obtained with capital injections by the higher current long-term liabilities without injections, annual additional amortization, and incremental interest payments.²

Balance Sheet (Baseline and Stress)

Essentially automatic worksheets. They include two blocks: (1) balance sheet in simplified IFRS terms,³ where projections are made; and (2) mapping of IFRS balance sheet into GFSM 2014.

Balance sheet items with a high turnover are linked to the Income Statement. This is the case of receivables and inventories (linked by means of stable ratios to gross sales) or payables (linked through an analogous ratio to the cost of goods and services). Defined benefit

¹The necessary level of cash balances to meet the liquidity threshold, defined in terms of the quick ratio, may be negative. This may happen if receivables are high by comparison to current liabilities, and/or the targeted ratio is low. This situation is ruled out by the template though, as it would imply an overdraft. In these cases, a minimum level of positive balances is required, and this will imply that final liquidity is above its threshold.

²This counterfactual should be understood as a mere approximation to a full-fledged scenario and does not compute, for example, the effects of possible higher spreads on the SOE debt, or the shortening in the average life of debt as a result of worsening financing conditions.

³If the probability of receivables becoming delinquent is deemed to be high enough, the user may write them off just by registering the associated losses in “other non-operating expenses” in the Profit and Loss Statement, and cancelling them on the Asset side of the Balance Sheet. Care should be taken that these write-offs are not computed as an increase in cash in the Cash Flow Statement.

liabilities are linked to the wage bill, as this tends to be the basis for their calculation.

End of period cash balances are imported from the Cash Flows and Cash Flows Stress.

Long-term liabilities and current long-term liabilities are imported from the Input 4_Debt, the latter being given by next period’s amortizations. When amortizing debt is denominated in foreign currency, they are valued in local currency at end-of-period exchange rate.

Fixed and financial assets follow their own accumulation equations. According to them, the value of the stock at the end of every period is equal to the value at the end of the previous year (less depreciation, for fixed assets), plus net acquisitions in each period. Net acquisitions by year are entered by the user in each period in Assumptions.

Some assets (receivables, fixed and financial assets) are subject to revaluation effects in each period, their amount being entered in Assumptions and Stress Tests. These three types present specificities regarding the application of revaluation:

- Receivables. A stock of doubtful receivables is automatically estimated every period, and the value of receivables calculated by formula is adjusted by changes in this stock. This is done under the assumption that there is a very high probability that doubtful receivables do not generate any cash flow for the company in the next period. In the baseline scenario, the value of this stock is entered in Assumptions under “provision for doubtful receivables,” while in the stress scenario they are generated by the shock on the expected share of receivables to materialize. When the value of this parameter is lower than one, it denotes an increasing balance in the stock, whereas values higher than one imply decreasing doubtful receivables.⁴
- Fixed assets. The revaluation effect adds to the value of the undepreciated stock at the end of the previous period and is part of the value at the end of the current period.
- Financial assets. The treatment is similar to fixed assets, although depreciation is zero for these assets. Note that revaluations, as entered by the user

⁴If the user estimates that a share of receivables is only at moderately high risk and writing-off some of them may be premature, it can proceed in the following way: i) use the face value of receivables, without adjusting them by the value of the provision; ii) include the provision in the line “Other current liabilities” in the Balance Sheet; iii) make sure that the changes in the value of the provision are not considered in the cash flow statement.

in Assumptions, should take into consideration both developments in assets denominated both in local and foreign currency, as well as exchange rate movements.

Other current and non-current asset and liabilities are held constant at the level of the last observed value, given the heterogeneity of these items.

Shareholder's equity encompasses three main elements:

- Shareholder's capital fed by capital injections.
- Accumulated gains, the net inflows of which are imported from the Income Statement.
- Accumulated Comprehensive Income. In a simplified format, this item captures unrealized valuation effects of assets and liabilities including those caused by exchange rate changes.

The mapping of the IFRS BS into the GFS assumes that equity is calculated residually as the difference of the asset minus the liabilities of the company. This is possible if the equity is fully owned by the government, or if its shares partially owned by other units are not traded. Other simplifying assumptions are also made, such as the valuation of assets at market prices on books or the equality between the face and the market value of debt. Other non-current assets in IFRS may comprise both financial and non-financial assets in GFS terms, and their apportionment is made by a means of a coefficient entered in Assumptions. The SOEs assets and liabilities, once mapped to GFS, are consolidated across public sector units by means of coefficients entered in Assumptions, that are held constant over the projection horizon. Regarding equity, the user enters the initial share owned by the government as an assumption, and the tool recalculates it every period taking into consideration capital injections.

GFS (Baseline and Stress)

Fully automatic worksheet. It is structured into three blocks.

- Calculation of borrowing needs. Revenues and expenses are expressed in accrual terms and linked to the relevant items of the Income Statement. Net transactions of non-financial assets are taken from netting out acquisitions and divestment in these assets as entered in Assumptions and Stress Test, and assuming that these operations are always fully paid in the same year they are accrued.

- The second block depicts net transactions in financial assets and liabilities, their difference matching lending capacity/borrowing needs. These transactions reflect changes in stocks, as projected by the Balance Sheet. Unrealized valuation effects and asset write-downs are removed above and below the line, as these would be part of the Statement of Other Changes in Assets and Liabilities in GFS.
- Derivation of gross financing needs in the absence of capital injections.

Output 1—Performance (Baseline and Stress)

These worksheets summarize, the main financial and economic indicators of the company, regarding profitability, liquidity, solvency, efficiency, and its financial position. Financial indicators are summarized in Table A.1 below. On top of them, the worksheet also calculates some ratios indicative of the company's productivity and efficiency (operating revenue per employee, labor cost per operating revenue and average personnel cost per employee), and the SOE size (number of employees, total assets in local currency, and assets and liabilities to GDP).

Most commonly accepted high-risk thresholds are 0 for profitability ratios; 1.25, 0.8 and 1.2 for the current, quick and interest coverage ratios respectively; 1.5, 0.75 and 0.5 for debt-to-equity, debt-to-assets and non-current liabilities to assets ratio respectively.

Most financial indicators are projected in each scenario in two situations: after capital injections and subsidies, and in a counterfactual where the company bailouts are replaced by additional borrowing (see description of Cash Flows and Cash Flows Stress).as Flows et above).

Output 2—Charts (Baseline and Stress)

In this case, the summary of results is done through charts, which can be selected by means of dropdowns menus.

The charts are imported from two worksheets named RAW CHARTS and RAW CHARTS (ST). In these worksheets, the user will find the data associated to each chart and will be able to modify their content or format.

Annex Table 1.1. Financial Ratios Projected by the Template**Profitability**

Return on equity (ROE) $\equiv \frac{\text{Net income}}{\text{Equity}}$; Return on assets (ROA) $\equiv \frac{\text{Net income}}{\text{Assets}}$;

Operating return on assets (operating ROA) $\equiv \frac{\text{EBIT}}{\text{Assets}}$

Liquidity

Current ratio $\equiv \frac{\text{Current assets}}{\text{Current liabilities}}$; Quick ratio $\equiv \frac{\text{Cash} + \text{Receivables} + \text{Financial assets}}{\text{Current liabilities}}$;

Interest coverage $\equiv \frac{\text{EBIT}}{\text{Interest payments}}$

Leverage

Debt to equity ratio $\equiv \frac{\text{Liabilities}}{\text{Equity}}$; Debt to assets ratio $\equiv \frac{\text{Liabilities}}{\text{Assets}}$;

Non current liabilities to assets ratio $\equiv \frac{\text{Non current liabilities}}{\text{Assets}}$

Contribution to public net financial worth $\equiv \text{Consolidated financial assets} - \text{Consolidated liabilities}$;

Contribution to public net worth $\equiv \text{Non-financial assets} + \text{Contribution to public net financial worth}$

**Output 3—Relations with the Government
(Baseline and Stress)**

This is a breakdown of budgetary and balance sheet ties between the government and the SOE.

On the one hand, these worksheets calculate the net inflows into the budget in accrual for each projection year, in both scenarios. These inflows are derived as the sum of taxes, dividends and interest payments, less subsidies and transfers. Taxes are drawn from the Income Statement, dividends computed as the product of the net income after taxes by the dividend pay-out ratio entered in Assumptions. Subsidies are exogenously entered in Assumptions, and capital transfers determined as the share of capital injections non-commercially remunerated. The NPV of these flows is also estimated, as a percent of the pre-shock GDP. Discount rates draw from the baseline long-term interest rate projections, but they can be modified if they are not deemed to be risk-free discount rates.

In addition, the worksheet displays the stock of outstanding government loans to the SOE, its equity and guaranteed debt. The first two items are assets for the government and consolidated in the public sector-wide balance sheet, and the latter is a contingent liability for the general government.

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