WORLD BANK GROUP

March 2023

REPUBLIC OF MADAGASCAR

JOINT WORLD BANK-IMF DEBT SUSTAINABILITY ANALYSIS

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REPUBLIC OF MADAGASCAR: JOINT BANK-FUND DEBT SUSTAINABILITY ANALYSIS	
Risk of external debt distress	Moderate[2]
Overall risk of debt distress	Moderate
Granularity in the risk rating	Some space to absorb shocks
Application of judgment	No

Madagascar, classified as having medium debt carrying capacity, is still assessed at moderate risk of external debt distress and moderate risk of overall (external plus domestic) debt distress. This is unchanged from the assessment at the time of the program request and first review. We continue to assess Madagascar's risk of external debt distress as "moderate" as a shock to exports pushes Madagascar's debt (burden) indicators above the relevant thresholds, but no external public and publicly guaranteed (PPG) debt ratios breach their thresholds under the baseline., while its debt-carrying capacity rests near the lower end of the medium-range. The overall risk of debt distress continues to be assessed as "moderate" as well, since the overall debt-to-GDP ratio breaches its benchmark under various stress scenarios. The government has some space to scale-up investment, assuming ongoing efforts to improve domestic resource mobilization, continued reliance on concessional external financing, and progress in developing domestic bond markets and in the implementation of the governance reform agenda. Risks remain tilted to the downside, including social and political volatility ahead of the 2023 presidential elections and the heightened risk of a materialization of contingent liabilities, which could lead to a faster than expected deterioration in external and public debt indicators. However, the distance to risk thresholds under current baseline projections suggests some space to absorb additional shocks.

[1] Prepared by the IMF and the World Bank. This DSA follows the Guidance Note of the Join Bank-Fund Debt Sustainability Framework for Low Income Countries, February 2018.

[2] Madagascar's Composite Indicator (CI) is 2.77, which corresponds to a medium debt-carrying capacity as confirmed by the October 2022 WEO data and the 2021 Country Policy and Institutional Assessment (CPIA).

Public Disclosure Authorized

PUBLIC DEBT COVERAGE

1. The DSA includes public and publicly guaranteed external and domestic debt. Public and publicly guaranteed (PPG) debt comprises external and domestic debt in a fairly comprehensive manner, including: all external liabilities owed by the central bank; all borrowing from the IMF; government guarantees (such as the US$ 20 million or 0.13 percent of GDP guarantee to Air Madagascar for the leasing of new aircrafts reported in the 2023 budget law); non-guaranteed domestic debts owed by state-owned enterprises (SOEs) in cases where the government has at least 50 percent of the shares (e.g., JIRAMA and Air Madagascar);[3] domestic arrears (which increased from 0.25 percent of GDP in 2021 to about 1.8 percent of GDP in 2022 as a result of a dispute with oil distributors during which oil distributors withheld the payment of oil taxes);[4] external legacy arrears of about 1.4 percent of GDP (related to HIPC);[5] and direct guarantees provided by the central government (Text Table 1). Borrowing by local governments requires the authorization from the Ministry of Finance and no request for such authorization has been submitted to date. The measure of debt is on a gross basis and the currency criterion is used to distinguish between domestic and external debt.[6] The authorities publish data on a quarterly basis on both domestic and external debt. Reporting of debt statistics on public enterprises needs to be strengthened further, particularly by: (i) requiring all public enterprises to submit financial statements to the Ministry of Finance within legal limits; (ii) compiling information about public enterprises including debt statistics and monitoring-related risks; and (iii) publishing this information online in budget documents and fiscal risk statements.[7]

Text Table 1. Madagascar: Public Debt Coverage Under the Baseline Scenario

	Subsectors of the public sector	Sub-sectors covered
1	Central government	X
2	State and local government	X
3	Other elements in the general government	
4	o/w: Social security fund	
5	o/w: Extra budgetary funds (EBFs)	
6	Guarantees (to other entities in the public and private sector, including to SOEs)	X
7	Central bank (borrowed on behalf of the government)	X
8	Non-guaranteed SOE debt	X

2. Notwithstanding the comprehensive coverage of debt statistics, a contingent liability shock of 7.2 percent of GDP is simulated to account for potential liabilities. This reflects the default setting

[3] Although legislation allows it, public enterprises do not hold direct external non-guaranteed debt.

[4] These arrears do not trigger an "in distress"-rating given their domestic nature.

[5] The arrears to private external creditors (less than 0.1 percent of GDP) do not trigger an "in distress"-rating given their *de minimis* nature and as the restructuring with the majority of creditors has been completed and the government is judged to be engaging in "good faith"; the arrears to official-bilateral creditors (Algeria and Angola, for a total of 1.3 percent of GDP) do not trigger an "in distress"-rating as they are deemed away under the Fund's Lending into Official Arrears Policy.

[6] Locally issued debt denominated in local currency held by non-residents and locally issued debt denominated in foreign currency held by residents are insignificant, meaning that results would be similar if done on a residency basis.

[7] Under the Sustainable Development Finance Policy (SDFP), Madagascar has been implementing reforms in areas of debt transparency (by publishing a contingent liabilities registry), fiscal sustainability (by implementing measures to reduce irrecoverable tax arrears and strengthen the tracking and recovery system for outstanding amounts), and debt management (by adhering to a non-zero debt ceiling in FY22) and successfully completed its Performance and Policy Actions (PPAs) under the SDFP in FY22. In FY23, Madagascar is expected to continue to implement reforms in these areas by adopting through decrees, a new framework for the evaluation and management of fiscal risks as well as a system for tax management.

for PPPs and financial markets and a country-specific calibration for possible additional SOE liabilities (Text Table 2).

- The baseline reflects estimated end-2021 domestic debt for SOEs in which the government has a majority stake (i.e., debt of 3.4 percent of GDP for JIRAMA and of 3.5 percent for other SOEs).[8] In addition, Air Madagascar has accumulated debt to external suppliers of US$ 29 million due to COVID-19 related pressures. Therefore, the default amount of 2 percent of GDP (which captures risks associated with JIRAMA and other SOEs) was adjusted upwards to reflect Air Madagascar's external liabilities (US$ 29 million or 0.2 percent of GDP), bringing the total to 2.2 percent of GDP.

- Exposures to PPPs are set to zero since estimates of the PPP-related capital stock fall below 3 percent of GDP, the threshold for the PPP shock to be activated (the stock related to the Ravinala Airport is estimated at only 1.8 percent of GDP). The authorities may develop more PPPs going forward, especially in the area of hydroelectric power, and the potential vulnerabilities associated with such PPPs could increase rapidly, at which point the PPP shock may be triggered.

- The default value of 5 percent is programmed for financial markets. Most banks are financially solid with deposits exceeding loans and majority foreign shareholders. Dollarization of deposits and credits is not pronounced, and banks' foreign assets generally exceed their foreign liabilities.

Text Table 2. Madagascar: Coverage of the Contingent Liabilities' Stress Test

		Default		Used for the analysis	Reasons for deviations from the default settings
1	**The country's coverage of public debt**	The central, state, and local governments, central bank, government-guaranteed debt, non-guaranteed SOE debt			
2	Other elements of the general government not captured in 1.	0	percent of GDP	0.0	
3	SoE's debt (guaranteed and not guaranteed by the government) 1/	2	percent of GDP	2.2	Captures potential contingent liabilities, including an external liability of US$ 29 million (0.2 percent of GDP) associated with Air Madagascar.
4	PPP	35	percent of PPP stock	0.0	Exposures through PPPs are set to zero as PPPs comprise less than 3 percent of GDP.
5	Financial market (the default value of 5 percent of GDP is the minimum value)	5	percent of GDP	5.0	
	Total (2+3+4+5) (in percent of GDP)			7.2	

1/ The default shock of 2% of GDP will be triggered for countries whose government-guaranteed debt is not fully captured under the country's public debt definition (1.). If it is already included in the government debt (1.) and risks associated with SoE's debt not guaranteed by the government is assessed to be negligible, a country team may reduce this to 0%.

3. **Madagascar is benefitting from recent debt service relief initiatives, which are reflected in the DSA, as well as from continued support by the World Bank.** The current assessment reflects debt relief from the IMF under the Catastrophe Containment window of the IMF's Catastrophe Containment and Relief Trust (CCRT) delivered between April 2020 and April 2022 (amounting to some US$ 32 million). From May 2020 to December 2021 Madagascar benefitted from the Debt Service Suspension Initiative (DSSI), under which some US$ 20 million in debt service was deferred; repayments on these will start in 2024. Over 2022, the World Bank has committed US$ 1.3 billion under highly concessional credit terms

[8] While JIRAMA is working with the World Bank on the implementation of its recovery plan, to be conservative, we do not account for the potential benefits of this plan on the domestic debt forecast owing to its long horizon. In particular, we assume that JIRAMA's debts remain at the same ratio to GDP through the entire forecast horizon (2.3 percent of GDP). This implies that successful implementation of the plan is an upside risk for the baseline, while non-implementation of the plan could result in still-high arrears and larger projected operational transfers.

and grants.[9] A large share of these commitments is directed to the South of Madagascar where a large-scale humanitarian crisis is unfolding. Considering increased commitments, IDA lending disbursements are assumed to increase.

BACKGROUND

RECENT DEBT DEVELOPMENTS

Text Table 3. Madagascar: Breakdown of Total PPG Debt (2016–21)

Creditor	2016	2017	2018	2019	2020	2021
	Amount (US$m)					
Domestic debt, *of which:*	**1,683**	**1,840**	**2,124**	**1,961**	**1,864**	**1,950**
Securities inc. BTA, BTF, BTS[1]	526	732	758	772	791	752
Debt to the Central Bank	337	297	272	217	189	168
Arrears	210	146	71	42	22	34
SOE debt	570	628	991	911	848	985
Other	40	36	32	19	15	10
External debt, *of which:*	**2,845**	**3,262**	**3,548**	**3,801**	**4,750**	**5,422**
Multilateral	2,052	2,276	2,368	2,459	2,740	2,957
Paris Club	137	165	189	219	282	315
Non-Paris Club	324	290	308	368	388	418
Commercial & Guaranteed	23	83	204	190	355	384
Debt borne by BFM on behalf of the government	310	449	479	564	985	1,347
Total PPG debt	**4,528**	**5,102**	**5,672**	**5,762**	**6,615**	**7,372**
	Percent of GDP					
Domestic debt, *of which:*	**15.0**	**14.5**	**16.1**	**13.9**	**14.4**	**13.8**
Securities inc. BTA, BTF, BTS	4.7	5.8	5.7	5.5	6.1	5.3
Debt to the Central Bank	3.0	2.3	2.1	1.5	1.5	1.2
Arrears	1.9	1.2	0.5	0.3	0.2	0.24
SOE debt	5.1	4.9	7.5	6.5	6.6	7.0
Other	0.4	0.3	0.2	0.1	0.1	0.1
External debt, *of which:*	**25.3**	**25.7**	**26.8**	**27.0**	**36.8**	**38.5**
Multilateral	18.3	17.9	17.9	17.5	21.2	21.0
Paris Club	1.2	1.3	1.4	1.6	2.2	2.2
Non-Paris Club	2.9	2.3	2.3	2.6	3.0	3.0
Commercial & Guaranteed	0.2	0.7	1.5	1.4	2.7	2.7
Debt borne by BFM on behalf of the government	2.8	3.5	3.6	4.0	7.6	9.6
Total PPG debt	**40.3**	**40.1**	**42.9**	**41.0**	**51.2**	**52.3**
	Percent of total					
Domestic debt, *of which:*	**37.2**	**36.1**	**37.4**	**34.0**	**28.2**	**26.5**
Securities inc. BTA, BTF, BTS	11.6	14.4	13.4	13.4	12.0	10.2
Debt to the Central Bank	7.4	5.8	4.8	3.8	2.9	2.3
Arrears	4.6	2.9	1.3	0.7	0.3	0.5
SOE Debt	12.6	12.3	17.5	15.8	12.8	13.4
Other	0.9	0.7	0.6	0.3	0.2	0.1
External debt, *of which:*	**62.8**	**63.9**	**62.6**	**66.0**	**71.8**	**73.5**
Multilateral	45.3	44.6	41.8	42.7	41.4	40.1
Paris Club	3.0	3.2	3.3	3.8	4.3	4.3
Non-Paris Club	7.1	5.7	5.4	6.4	5.9	5.7
Commercial & Guaranteed	0.5	1.6	3.6	3.3	5.4	5.2
Debt borne by BFM on behalf of the government	6.8	8.8	8.4	9.8	14.9	18.3
Total PPG debt	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Sources: Malagasy authorities; and IMF staff estimates.

[1]BTA are Treasury bills with less than one year maturity.

Note: BTF and BTS are Treasury bonds with maturity ranging over 1 year

[9] The new terms under IDA20 are applicable since July 2022.

4. The end-2021 PPG debt-to-GDP ratio is projected to have reached 52.3. percent, an increase of almost 12 percentage points relative to the latest pre-pandemic year (2019). To a large extent the increase is due to an increase in the primary deficit and a decline in GDP growth following the COVID-19 pandemic, occurring on the back of relative stability in this ratio since 2015 (see Text Figure 1 and Table 2). The majority of Madagascar's PPG debt continues to be external in nature, with almost 60 percent of external debt owed to multilateral sources including the World Bank, African Development Bank, and IMF.

MACROECONOMIC ASSUMPTIONS

5. Madagascar's near-term economic prospects are adversely affected by COVID-induced scarring, a season of cyclones, and elevated global energy and food prices. For 2022, staff is now projecting real GDP growth of 4.2 percent, a significant downward revision relative to what was projected in the previous DSA (see Text Table 4). However, real GDP per capita is expected to surpass its 2019 level by 2023 due to a stronger-than-expected recovery in 2021. The primary deficit is estimated to have widened significantly in 2022 due to a disagreement with oil distributors and the delayed payment of oil customs taxes. This late payment explains the strong improvement in the primary balance projected in 2023. Staff expects a gradual decline in fiscal imbalances over the medium-term and a slow increase in public debt. Based on a gradual tax revenue recovery, and an increase in capital spending, the primary deficit would gradually improve over the medium term. Under these assumptions, public debt would stabilize around 55 percent of GDP over the medium term.

- Output is projected to grow modestly by 4.2 percent in 2023 due to the combined effects of inflationary pressures, political uncertainty, and slowing global growth prospects. Growth is expected to peak over the medium-term at 4.8 percent in 2024, with some deceleration thereafter—towards the estimated rate of potential growth (which following the recent Climate Macroeconomic Assessment Program (CMAP), staff now project at 4.5 percent to better account for the adverse impact of natural disasters on productivity).[10] The secondary sector is expected to remain the main driver of growth thanks in particular to an increase in mining activities. Primary sector output would grow by around 3 percent per year on average, reflecting the adverse effects of climate change. These growth prospects are conditional on a scaling-up of both public and private investment (the latter driven by the current governance reform agenda).

- Both government and private investment rates over the medium term were revised slightly downward relative to the prior DSA (Figure 4) and our forecasts continue to be significantly more conservative than those envisaged by the Plan Emergence Madagascar (PEM) reflecting current constraints on investment implementation capacity.

- Headline inflation rose from about 4 percent in 2020, to 10.8 percent y-o-y in November 2022, reflecting high international prices and the direct and indirect effects of a 43-percent fuel price increase in July. Inflation is expected to reach 11.2 percent and 9.3 percent in 2022 and 2023 following monetary policy tightening. Inflation rates are expected to be somewhat higher than prior projections over the forecast horizon.

[10] In fact, downward revision of potential GDP reflects a combination of factors including *inter alia*, long lasting impact of repeated natural disasters, impact of the COVID-19 pandemic on learning outcomes, as well as slower-than anticipated pace of implementation of reforms.

- In line with the stronger inflationary pressures, we have also revised up government borrowing costs, reflecting the higher cost of borrowing observed globally as well as domestically (since the first review, the central bank has raised the marginal lending facility rate by 290 basis points).

- The primary deficit is expected to be higher than previous estimates for 2022 but staff expect a significant improvement in the primary balance in 2023 as a result of the delayed payment of overdue oil customs taxes by oil distributors; over the medium term, projections continue to be in line with previous DSAs. Primary deficits are expected to remain contained going forward, reflecting gains in revenue mobilization including: (i) continued streamlining of VAT and free-zone companies' exemptions; (ii) improvements to the taxpayers' database; (iii) strengthening controls in customs administration; (iv) broader use of electronic tax declarations and payments and the digitalization of related procedures; and (v) continued clearance of tax arrears. On the expenditure side, non-interest current expenditure is projected to remain around 9 percent of GDP. Capital expenditure would significantly increase, exceeding 9 percent of GDP over 2025-27 compared to less than 6 percent pre-pandemic, reflecting the authorities' effort to boost investment as part of the PEM.

Text Table 4. Madagascar: Baseline Macroeconomic Assumptions for DSA

	2022		2023		2024		2025		2030	
	last DSA	current	last DSA	current	last DSA	current	last DSA	current	last DSA	current
Real GDP growth (percent)	5.4	4.2	5.1	4.2	5.0	4.8	5.0	4.7	5.0	4.5
Inflation, GDP Deflator (percent)	6.1	7.4	6.9	9.5	5.6	8.3	5.4	7.5	5.0	5.4
Non-interest CA deficit (percent of GDP)	4.5	5.0	4.0	4.9	3.5	4.5	3.4	4.2	2.8	2.3
Primary deficit (percent of GDP)	4.9	6.1	3.0	2.0	3.0	2.4	2.4	3.3	2.9	4.0
Revenue and grants (percent of GDP)	13.9	13.6	14.5	14.6	14.1	15.3	14.1	15.3	14.5	14.1
Primary (noninterest) expenditure (percent of GDP)	18.8	19.7	17.4	16.6	17.1	17.6	16.5	18.6	17.4	18.1

Sources: Malagasy authorities; World Bank and IMF.

6. **Financing assumptions broadly reflect the authorities' Medium Term Debt Strategy but are conservative with respect to external financing.** One of the main targets of the strategy for end-2023 includes a limit on the share of external public debt relative to total public debt that should not exceed a maximum of 86 percent (it is estimated at around 74 percent at end-2021, where it is expected to reach 80 percent over the projection horizon).[11] The financing assumptions of this sustainability analysis deviate from the medium-term debt strategy on domestic financing due to the more conservative approach on the volumes of available external financing on concessional terms. The resulting increased reliance on domestic financing along with SOE debt gives rise to higher financing costs.[12] To mitigate the potential liquidity pressures, the authorities will continue to develop the domestic debt market and will prioritize securing external financing on concessional terms (including grants), which would keep debt servicing costs at manageable levels and is in line with their debt strategy.[13] External commercial borrowing is

[11] The other main targets consist of (i) the average maturity of locally-issued debt being over 10 months (estimates put it around one year for 2022); (ii) the share of new external debt falling due within a year should be less than 25 percent of the stock of external debt (it is estimated to be around 12 percent in 2022); and (iii) the share of new domestic debt falling due within a year should be less than 75 percent of the stock of domestic debt (it is estimated at almost 56 percent in 2022).

[12] Financing in 2023 includes the issuance of special T-Bills by the government to clear liabilities associated with the 2022 fuel requisitions on behalf of JIRAMA (around 0.44 percent of GDP).

[13] To reflect recent increased use of medium-term locally-issued debt instruments and further developments in the debt market, the local financing share of medium-term bonds has been revised upwards to 30 percent from 2020–2025 (close to its current share based on end-2021 estimates), with continued growth thereafter, and longer-term bonds (e.g., between 4-7

expected to slowly scale back up from 2031 onwards as Madagascar's fundamentals are projected to strengthen.

7. **Realism tools suggest that our assumptions are in line with reasonable bounds.** Across a range of realism checks staff's underlying assumptions do not appear to raise any flags (Figure 4). The projected fiscal path is not in the tail of the historical distribution, while projected growth for 2022 is below the range of potential growth paths under various fiscal multipliers; however, as for all countries, the magnitude and multifaceted effects of the COVID-19 pandemic are not well-captured by that aspect of the analysis.

8. **The outlook remains uncertain with risks tilted to the downside.** The main risks stem from the possibility of further adverse shocks to Madagascar's terms-of-trade (higher prices for rice, wheat, and/or energy); supply chain disruptions; renewed COVID-19 outbreaks; and natural disasters (mainly cyclones for the north and droughts for the south), resulting in losses in lives, livelihoods, and physical capital. Protracted weak budget execution in health and education spending (alongside reversals in the governance reform agenda) could also result in social and political volatility, especially ahead of the 2023 presidential elections. Weak investment implementation capacity could further curtail growth. All downside risks would have negative implications for debt sustainability. Upside potential includes the unlocking of large-scale projects in the energy sector and extractive industry; the implementation of the PEM's agenda, which could improve the growth potential and attract additional investment.

DRIVERS OF DEBT DYNAMICS

9. **Over the medium term (and absent adverse shocks), Madagascar's ratio of PPG debt-to-GDP is projected to remain relatively constant at its current level of around 60 percent**. The PPG external debt-to-GDP is also projected to remain relatively constant at its current level of around 45 percent (Figure 3). Projected primary deficits going forward represent the main force driving debt up, while the favorable interest-growth differential helps to keep the debt-to-GDP ratio relatively constant (aided by trends in prices and the exchange rate), with the framework assuming some real appreciation over the medium term driven by the Balassa-Samuelson effect.

10. **The medium-term projections for public and private capital spending have been revised slightly downwards and average 5-year real growth was revised down by about 0.5 pp relative to prior DSA to better account for the effects of natural disasters** (Figure 4). Over the upcoming years, the authorities still plan to scale up infrastructure spending, with institutional reforms to better prioritize projects and improve execution rates. Despite a small downward revision compared to the previous DSA, reflecting more conservative forecasts, the projected contribution of public investment to real GDP growth over the next 5 years is roughly the same as in the previous DSA. Private investment is expected to remain relatively constant over the medium term (21 percent of GDP in 2027) with some upside risk if structural reforms accelerate and public investment helps crowd-in additional private investment.

years) are assumed to reach a share of 3 percent in 2026-30, which rises to 9 percent by 2036-40. On the external front, concessional financing dominates all other types of sources throughout the projected period, albeit declining as of 2027.

COUNTRY CLASSIFICATION AND DETERMINATION OF STRESS TEST SCENARIOS

11. **Madagascar's debt carrying capacity continues to be classified as medium, although its composite indicator score remains near the cutoff for weak debt-carrying capacity.** Based on the calculation of the LIC-DSF's composite indicator (reflecting the CPIA index, real growth rates, reserve coverage, remittances, and world growth) Madagascar continues to be rated as having medium debt-carrying capacity (Text Table 4). The CI score is at 2.77 and is estimated using the October 2022 WEO and 2021 CPIA (the CI was 2.82 in the last DSA). Text Figure 2 summarizes the classification scheme and displays the associated thresholds.

Text Figure 1. Madagascar: Composite Indicator Cut-off Values and Respective Debt Burden Thresholds & Benchmarks

Cut-off values			
Weak	CI <	2.69	
Medium	2.69	≤ CI ≤	3.05
Strong	CI >	3.05	

EXTERNAL debt burden thresholds	Weak	Medium	Strong
PV of debt in % of			
Exports	140	180	240
GDP	30	40	55
Debt service in % of			
Exports	10	15	21
Revenue	14	18	23
TOTAL public debt benchmark			
PV of total public debt in percent of GDP	35	55	70

12. **Stress tests generally follow standardized settings (except for the growth shock) and include tailored shocks for natural disasters and commodity export prices.** The contingent liability stress test is based on the quantification of potential contingent liabilities (including SOE-related concerns that extend beyond the baseline SOE debt coverage as detailed in ¶2), and the standardized stress tests apply the default settings. However, the growth test continues to warrant adjustment, as done in prior DSAs. Given the high levels of uncertainty, the social and political volatility ahead of the 2023 presidential elections, and with risks tilted heavily towards the downside, the growth shock simulates a *two* standard deviation shock instead of one (i.e., a reduction of 6.8 percentage points).[14] Madagascar also remains exposed and vulnerable to natural disasters, like cyclones and droughts, whose impact is captured by the natural disaster shock.[15] Since commodities (e.g., vanilla, nickel, cobalt) comprise about half of goods and services exports, we also include a commodity shock stress test. The standardized settings of this stress test are customized to Madagascar's country-specific circumstances. In particular, we assume an illustrative fall in prices equivalent to 10 percent of commodity exports, with no mitigating effect on imports, alongside declines in real GDP growth of 1.55 percent and in fiscal revenue of 2.32percent of GDP (default values). The shock occurs in 2023 and unwinds gradually by 2032. Residual financing is assumed to be at less favorable terms than under the baseline. For external debt, the interest rate and maturities are assumed to be 25 percent higher and lower, respectively. For overall public debt stress tests, limited

[14] The magnitude of the shock to growth is comparable to the prior DSA (conducted at the time of the first review), but the shock is now first hitting in 2023 (rather than 2022).

[15] We apply the default settings for this one-off shock in the template, namely a 10 percentage-point rise in the public external debt-to-GDP ratio alongside a fall in real GDP growth (1.5 percent) and exports (3.5 percent), in 2021.

recourse to domestic sources in the short run leads to consideration of a scenario in which 65 percent of additional financing comes from external sources while the interest rate for residual domestic financing would be 100 basis points above baseline.[16]

Text Table 5. Madagascar: Calculation of Debt-Carrying Capacity

Components	Coefficients (A)	10-year average values (B)	CI Score components (A*B) = (C)	Contribution of components
CPIA	0.385	3.240	1.25	45%
Real growth rate (in percent)	2.719	3.417	0.09	3%
Import coverage of reserves (in percent)	4.052	40.611	1.65	59%
Import coverage of reserves^2 (in percent)	-3.990	16.493	-0.66	-24%
Remittances (in percent)	2.022	2.373	0.05	2%
World economic growth (in percent)	13.520	2.898	0.39	14%
CI Score			2.77	100%
CI rating			**Medium**	

Note: 10-year average values are based on an average over 2017-2026.

DEBT SUSTAINABILITY RESULTS

EXTERNAL DEBT SUSTAINABILITY

13. **Under the baseline, external PPG debt remains well below the thresholds associated with Madagascar's medium debt-carrying capacity** (Table 1, Figure 1). External PPG debt is projected to rise 38.5 percent of GDP end-2021 to about 48 percent of GDP in 2032. Debt-creating flows include sizable current account deficits over the medium term (owing to declines in the trade balance and falling inflows from official transfers) and less advantageous endogenous debt dynamics (due to higher interest rates).[17] In PV terms, external PPG debt is projected to rise from 18percent of GDP end-2021 to about 27 percent of GDP in 2032. The long-term rise in PV terms is the result of our assumption that borrowing will become less concessional over time, as well as sizeable gross financing needs. Together with expiring grace periods for some loans (including prior IMF financing), this explains why debt service indicators rise substantially off their low base. Nonetheless, all indicators remain well below the applicable thresholds for Madagascar (Figure 1).

14. **Under stress scenarios the PV of external debt-to-exports ratio is above the applicable threshold** (Table 3; Figure 1). The analysis suggests that Madagascar is most vulnerable to export shocks. Under such shocks, the PV of external debt-to-exports ratio breaches the applicable threshold for a sustained period from 2026 onwards.

15. **The granularity assessment suggests that Madagascar has some space to absorb shocks** (Figure 5). All baseline debt indicators remain well below their thresholds under a median shock, but two indicators (PV of external PPG debt-to-GDP and debt-service-to-revenue) would exceed them under a

[16] We view this as reasonable given the current development of Madagascar's domestic bond market and its ongoing engagement with international donors and investors.

[17] The residual includes reserve accumulation, unrepatriated mining receipts, and potentially other misclassified BOP entries.

more extreme scenario. This suggests that Madagascar has some space to absorb shocks, unchanged from the assessment at the time of the first review (March 2022).

16. External private sector debt is not assessed to pose a significant threat to external sustainability (Table 1). The risks associated with the levels of external private debt, which was recently revised upward, appear contained.[18] Around 80 percent of the private debt is associated with the mining sector, whose income is in foreign currency (providing it with a natural hedge); the majority of its debt is medium-to-long term; and a sizeable portion of its debt is with its affiliated headquarters or global groups. Moreover, much of mining companies' loans do not bear large interest payments and many of the debt instruments are not required to be fully reimbursed to parent companies until liquidation. Private external debt is projected to rapidly decline as the loans related to major mining projects are repaid, with the stock of external private debt falling by over half by 2030. Still, such debts will be closely monitored going forward for potential risks and, in line with recent DSAs, we have conservatively assumed that more borrowing would be needed to sustain mining exports towards the end of the DSA horizon, contributing to private debt equivalent to about 5 percent of GDP in 2040.

TOTAL PUBLIC DEBT SUSTAINABILITY

17. Under the baseline, total public debt levels are projected to remain well below the benchmark (Table 2; Figure 2). Total public debt (both external and domestic) is projected to remain just below 60 percent of GDP over the medium-term horizon. In PV terms, total public debt-to-GDP is expected to rise from 32.5 percent at end-2021 to about 0 percent over the medium term, still well below the benchmark of 55 percent for medium debt carrying-capacity countries.

18. The projected rise in the PPG debt-service-to-revenue-and-grants ratio could introduce liquidity risks. To contain risks along this dimension, the authorities should continue to prioritize securing external concessional financing, as done in recent years and in line with their medium-term debt strategy, as well as continuing to accelerate domestic debt market development to bring down borrowing costs. If strong donor support continues, liquidity risks can be mitigated.

19. Total public debt is most vulnerable to growth shocks and such stress tests lead to a breach of its benchmark (Figure 2; Table 4). Under both the growth shock and the commodity price shock the PV of total public debt-to-GDP, is projected to reach levels well above the 55 percent benchmark for medium debt-carrying capacity countries like Madagascar.

RISK RATING AND VULNERABILITIES

20. Madagascar is assessed as being at moderate risk of external debt distress (unchanged from the previous assessment conducted at the time of the first review). No thresholds are breached under the baseline scenario. However, an exports shock leads to a breach of the PV of debt-to-exports threshold. A granularity assessment suggests that Madagascar has some space to absorb shocks.

[18] In 2020 INSTAT completed a survey on the external private sector, including on its external debt obligations. The last survey had been conducted in 2013 and covered a smaller sample of firms and only included debts reported by companies' headquarters offices, which did not offer a complete view of the debt obligations of their Malagasy operations. The results uncovered large deviations relative to prior forecasts; prior IMF forecasts had estimated there was SDR 2 billion in external private debt at end-2018; the new data estimated that it had reached SDR 4 billion.

21. The overall assessment is that Madagascar is at moderate risk of overall debt distress (unchanged from the previous assessment conducted at the time of the first review). The PPG external debt has a moderate risk assessment (¶20), while the PV of overall debt-to-GDP indicator breaches its benchmark following a growth or commodity price shock. Moreover, liquidity pressures could arise if more concessional external financing is not secured or if domestic debt market development is delayed, including under the baseline and under a natural disaster shock.

22. Conditional on the mobilization of concessional external financing, this assessment is supportive of Madagascar's current plans to scale up its borrowing. A steeper-than-expected increase in borrowing in line with a rapid execution of the government's ambitious medium-term borrowing plan would carry significant risks, especially in the absence of securing additional external concessional financing. Also, poorly selected public investments and less favorable financing terms could affect debt vulnerability. The state of SOE liabilities could also influence future assessments. Less grant financing and a switch to a less concessional mix of borrowing would raise the debt burden, especially when measured in PV terms, as well as debt service risks. The domestic debt market should continue to be developed in order to lower borrowing costs and reduce exchange-rate risk. Finally, external private debt could increase in less ringfenced sectors (e.g., banking) that would increase the vulnerabilities associated with such debt. As mentioned in prior DSAs, in addition to debt sustainability, other crucial considerations for the pace of borrowing include the economy's vulnerability to terms-of-trade shocks, natural disasters, general absorptive capacity, public financial management, and public investment management.

23. Structural reforms and improvements in debt coverage statistics remain paramount, especially in light of the CI score, which is near the weak debt-carrying capacity threshold. Efforts to enhance external statistics could improve private debt coverage. Also, Madagascar's ability to preserve and build its debt-carrying capacity rely on strengthening the capacity and quality of its institutions, including on the Public Financial Management-front where identification and mitigation of fiscal risks (relating to fuel subsidies, SOEs, PPPs, and pensions), the transparency and accountability of public sector institutions, and more effective and rules-based management of public investment within a credible medium-term expenditure framework are key.

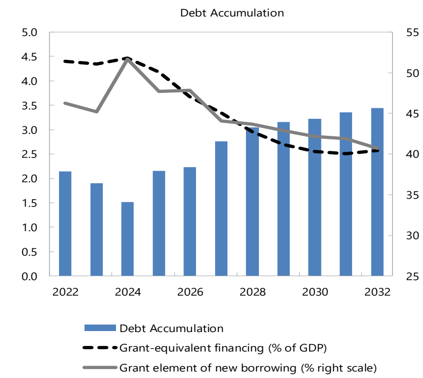
AUTHORITIES' VIEWS

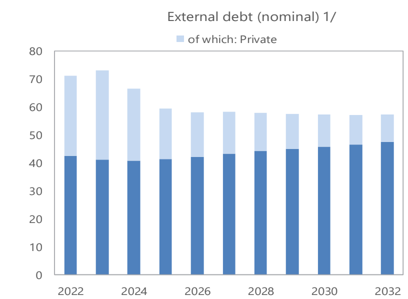
24. The authorities broadly agreed with staff's assessment of the debt sustainability analysis. Although they agreed on the need to rely on more concessional debt, they emphasized the need for more financing to invest in development and resilience to climate change. They also believe the DSA's assumptions are too pessimistic and (i) a gradual acceleration of growth toward 7 percent in 2025 is feasible, (ii) Madagascar's CI score should improve with their efforts to strengthen public sector management and institutions.

Table 1. Madagascar: External Debt Sustainability Framework, Baseline Scenario, 2019–2042
(In percent of GDP; unless otherwise indicated)

	Actual			Projections								Average 8/	
	2019	2020	2021	2022	2023	2024	2025	2026	2027	2032	2042	Historical	Projections
External debt (nominal) 1/	67.0	80.5	69.0	71.1	73.0	66.5	59.4	58.0	58.2	57.3	48.1	55.3	61.2
of which: public and publicly guaranteed (PPG)	27.0	36.8	38.5	42.5	41.1	40.8	41.3	42.1	43.2	47.5	42.8	27.4	43.6
Change in external debt	-3.5	13.5	-11.5	2.0	1.9	-6.5	-7.1	-1.4	0.2	0.1	-3.8		
Identified net debt-creating flows	-2.1	8.9	-5.0	0.9	1.4	-0.1	-0.2	-0.9	-1.2	-1.8	-2.5	-1.7	-0.8
Non-interest current account deficit	1.8	4.9	4.6	5.0	4.9	4.5	4.2	3.3	3.0	2.3	1.1	2.4	3.4
Deficit in balance of goods and services	4.7	9.0	10.1	8.9	8.0	6.4	5.8	5.3	5.2	4.2	2.6	5.7	5.7
Exports	28.7	19.7	23.0	30.6	33.6	33.0	33.6	30.5	29.4	26.9	23.6		
Imports	33.4	28.7	33.1	39.5	41.6	39.4	39.4	35.8	34.5	31.1	26.2		
Net current transfers (negative = inflow)	-5.7	-6.5	-6.8	-5.5	-4.7	-4.4	-4.1	-4.1	-4.0	-3.6	-2.9	-5.8	-4.1
of which: official	-3.1	-2.5	-0.7	-2.5	-2.7	-2.6	-2.0	-1.3	-1.0	-0.1	0.0		
Other current account flows (negative = net inflow)	2.7	2.4	1.3	1.6	1.6	2.6	2.5	2.0	1.8	1.6	1.4	2.5	1.8
Net FDI (negative = inflow)	-2.6	-1.9	-1.7	-2.0	-1.5	-1.9	-2.1	-2.2	-2.3	-2.6	-2.6	-3.4	-2.3
Endogenous debt dynamics 2/	-1.2	5.9	-7.9	-2.2	-2.0	-2.6	-2.3	-2.0	-1.8	-1.5	-1.0		
Contribution from nominal interest rate	0.5	0.5	0.4	0.6	0.8	0.6	0.6	0.6	0.6	0.8	1.1		
Contribution from real GDP growth	-3.0	5.2	-4.1	-2.8	-2.8	-3.3	-2.9	-2.6	-2.5	-2.4	-2.0		
Contribution from price and exchange rate changes	1.3	0.2	-4.2	...	...	...	...	...	...	...	...		
Residual 3/	-1.4	4.6	-6.5	1.2	0.6	-6.4	-6.9	-0.4	1.4	2.0	-1.4	6.4	-0.3
of which: exceptional financing	0.0	-0.1	-0.2	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0		
Sustainability indicators													
PV of PPG external debt-to-GDP ratio	...	...	18.7	19.9	20.8	20.8	21.2	21.7	22.6	26.8	27.3		
PV of PPG external debt-to-exports ratio	...	...	81.0	65.0	61.8	63.0	63.0	71.1	76.8	99.7	115.6		
Total external debt service-to-exports ratio	...	...	177.0	178.8	174.3	163.5	159.1	157.1	163.7	190.9	181.7		
PPG debt service-to-exports ratio	11.1	17.6	4.4	3.6	4.4	4.1	4.2	4.9	4.9	5.9	9.0		
PPG debt service-to-revenue ratio	29.4	35.1	9.6	10.0	12.4	10.5	10.7	10.9	10.5	11.3	14.2		
Gross external financing need (Million of U.S. dollars)	699.6	1044.7	1802.1	1205.6	1248.5	1106.2	1254.3	907.4	795.7	1020.8	1488.4		
Key macroeconomic assumptions													
Real GDP growth (in percent)	4.4	-7.1	5.7	4.2	4.2	4.8	4.7	4.7	4.6	4.5	4.2	2.6	4.5
GDP deflator in US dollar terms (change in percent)	-1.8	-0.4	5.5	0.4	0.6	2.4	3.4	3.2	3.5	4.7	4.3	0.0	3.4
Effective interest rate (percent) 4/	0.7	0.7	0.6	0.9	1.2	0.9	1.0	1.1	1.2	1.6	2.2	0.9	1.2
Growth of exports of G&S (US dollar terms, in percent)	-7.2	-36.4	30.4	38.9	15.4	5.3	10.4	-2.1	4.3	7.7	7.6	4.0	10.0
Growth of imports of G&S (US dollar terms, in percent)	-2.5	-20.5	28.7	24.8	10.6	1.6	8.3	-1.8	4.3	7.3	7.2	3.4	7.7
Grant element of new public sector borrowing (in percent)	...	...	...	46.3	45.2	51.7	47.7	47.9	44.1	40.7	53.8	...	44.9
Government revenues (excluding grants, in percent of GDP)	10.8	9.9	10.5	11.1	11.9	12.7	13.3	13.8	13.8	14.0	15.0	9.6	13.3
Aid flows (in Million of US dollars) 5/	696.0	603.5	391.6	770.1	777.3	846.6	1058.0	1141.1	1239.1	1659.6	2008.7		
Grant-equivalent financing (in percent of GDP) 6/	...	...	...	4.4	4.3	4.5	4.2	3.7	3.3	2.6	0.9	...	3.4
Grant-equivalent financing (in percent of external financing) 6/	...	...	...	66.1	67.9	71.5	63.1	58.7	52.7	42.0	54.4	...	55.0
Nominal GDP (Million of US dollars)	14,105	13,051	14,555	15,233	15,969	17,137	18,561	20,040	21,699	34,237	81,472		
Nominal dollar GDP growth	2.5	-7.5	11.5	4.7	4.8	7.3	8.3	8.0	8.3	9.5	8.7	2.6	8.1
Memorandum items:													
PV of external debt 7/	...	...	49.2	48.5	52.7	46.5	39.2	37.6	37.6	36.6	32.6		
In percent of exports	...	...	213.7	158.6	156.6	140.9	116.7	123.2	128.1	136.0	138.2		
Total external debt service-to-exports ratio	20.3	25.7	41.1	16.0	13.2	11.8	13.8	11.5	10.2	12.3	14.1		
PV of PPG external debt (in Million of US dollars)			2716.4	3027.8	3318.0	3560.5	3929.5	4343.1	4895.9	9182.6	22223.7		
(PVt-PVt-1)/GDPt-1 (in percent)				2.1	1.9	1.5	2.2	2.2	2.8	3.4	0.0		
Non-interest current account deficit that stabilizes debt ratio	5.2	-8.6	16.1	2.9	3.0	11.0	11.3	4.6	2.8	2.1	4.9		

Definition of external/domestic debt	Currency-based
Is there a material difference between the two criteria?	No





Sources: Country authorities; and staff estimates and projections.

1/ Includes both public and private sector external debt.

2/ Derived as [r - g - ρ(1+g)]/(1+g+ρ+gρ) times previous period debt ratio, with r = nominal interest rate; g = real GDP growth rate, and ρ = growth rate of GDP deflator in U.S. dollar terms.

3/ Includes exceptional financing (i.e., changes in arrears and debt relief); changes in gross foreign assets; and valuation adjustments. For projections also includes contribution from price and exchange rate changes.

4/ Current-year interest payments divided by previous period debt stock.

5/ Defined as grants, concessional loans, and debt relief.

6/ Grant-equivalent financing includes grants provided directly to the government and through new borrowing (difference between the face value and the PV of new debt).

7/ Assumes that PV of private sector debt is equivalent to its face value.

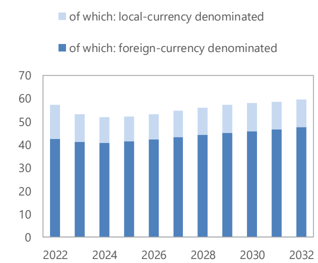
8/ Historical averages are generally derived over the past 10 years, subject to data availability, whereas projections averages are over the first year of projection and the next 10 years.

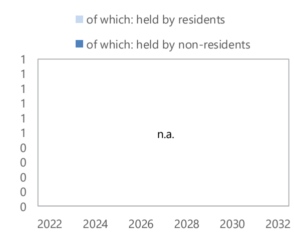
Table 2. Madagascar: Public Sector Debt Sustainability Framework, Baseline Scenario, 2019–2042
(In percent of GDP; unless otherwise indicated)

	Actual			Projections								Average 6/	
	2019	2020	2021	2022	2023	2024	2025	2026	2027	2032	2042	Historical	Projections
Public sector debt 1/	**41.0**	**51.2**	**52.3**	**57.1**	**53.1**	**51.9**	**52.2**	**53.1**	**54.6**	**59.4**	**53.1**	**41.6**	**55.5**
of which: external debt	**27.0**	**36.8**	**38.5**	**42.5**	**41.1**	**40.8**	**41.3**	**42.1**	**43.2**	**47.5**	**42.8**	**27.4**	**43.6**
Change in public sector debt	-1.9	10.2	1.1	4.8	-4.1	-1.1	0.3	0.9	1.5	0.8	-3.7		
Identified debt-creating flows	**-2.5**	**6.2**	**-1.1**	**5.6**	**-3.2**	**-0.7**	**0.2**	**0.3**	**0.8**	**0.1**	**-0.7**	**0.0**	**0.4**
Primary deficit	**0.7**	**3.2**	**2.2**	**6.1**	**2.0**	**2.4**	**3.3**	**3.1**	**3.9**	**3.9**	**2.4**	**1.7**	**3.7**
Revenue and grants	13.9	12.4	11.2	13.6	14.6	15.3	15.3	15.1	14.8	14.2	15.0	**11.5**	**14.5**
of which: grants	3.1	2.5	0.7	2.5	2.7	2.6	2.0	1.3	1.0	0.1	0.0		
Primary (noninterest) expenditure	14.7	15.6	13.4	19.7	16.6	17.6	18.6	18.2	18.6	18.1	17.4	**13.2**	**18.2**
Automatic debt dynamics	**-3.0**	**3.1**	**-4.4**	**-0.5**	**-5.3**	**-3.5**	**-3.4**	**-3.4**	**-3.5**	**-4.3**	**-3.5**		
Contribution from interest rate/growth differential	-2.8	2.2	-4.2	-3.0	-3.1	-2.8	-2.9	-2.9	-2.9	-3.2	-2.5		
of which: contribution from average real interest rate	-0.9	-0.9	-1.4	-0.8	-0.8	-0.4	-0.5	-0.6	-0.5	-0.6	-0.2		
of which: contribution from real GDP growth	-1.8	3.1	-2.8	-2.1	-2.3	-2.4	-2.3	-2.3	-2.3	-2.5	-2.3		
Contribution from real exchange rate depreciation	-0.2	0.9	-0.2	...	...	...	...	...	...	...	...		
Other identified debt-creating flows	**-0.3**	**-0.1**	**1.2**	**-0.1**	**0.0**	**0.3**	**0.3**	**0.5**	**0.5**	**0.4**	**0.4**	**0.1**	**0.3**
Privatization receipts (negative)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Recognition of contingent liabilities (e.g., bank recapitalization)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Debt relief (HIPC and other)	0.0	0.0	0.0	-0.1	-0.1	0.0	0.0	0.0	0.0	0.0	0.0		
SOE debt	-0.3	-0.1	1.2	0.0	0.1	0.4	0.3	0.5	0.5	0.4	0.4		
Residual	**0.6**	**4.0**	**2.3**	**1.7**	**-3.0**	**-1.0**	**-0.4**	**0.1**	**0.0**	**-0.4**	**-3.9**	**2.2**	**-0.3**
Sustainability indicators													
PV of public debt-to-GDP ratio 2/	**...**	**...**	**33.1**	**36.3**	**33.4**	**32.4**	**32.6**	**33.2**	**34.5**	**39.4**	**38.3**		
PV of public debt-to-revenue and grants ratio	**...**	**...**	**295.5**	**267.6**	**229.0**	**212.4**	**213.4**	**220.0**	**233.6**	**277.8**	**255.0**		
Debt service-to-revenue and grants ratio 3/	**5.7**	**7.2**	**9.0**	**19.7**	**40.0**	**43.1**	**44.1**	**44.2**	**43.9**	**41.8**	**49.4**		
Gross financing need 4/	1.2	4.0	4.3	6.9	9.5	9.3	10.3	10.3	10.8	10.3	10.2		
Key macroeconomic and fiscal assumptions													
Real GDP growth (in percent)	4.4	-7.1	5.7	4.2	4.2	4.8	4.7	4.7	4.6	4.5	4.2	**2.6**	**4.5**
Average nominal interest rate on external debt (in percent)	1.0	0.9	0.7	0.9	1.1	0.8	0.8	0.8	0.9	1.0	1.3	**0.8**	**0.9**
Average real interest rate on domestic debt (in percent)	-6.1	-4.1	-6.2	-3.9	-7.1	-1.3	-1.1	-1.4	-1.1	-1.6	0.8	**-6.0**	**-2.1**
Real exchange rate depreciation (in percent, + indicates depreciation)	-0.9	3.0	-0.6	...	...	...	...	...	...	...	...	**1.3**	**...**
Inflation rate (GDP deflator, in percent)	6.5	4.3	6.6	7.4	9.5	8.3	7.5	6.9	6.2	5.3	4.9	**6.4**	**6.6**
Growth of real primary spending (deflated by GDP deflator, in percent)	12.7	-1.1	-9.6	53.5	-12.2	11.4	10.1	2.9	6.8	4.3	2.6	**4.5**	**8.4**
Primary deficit that stabilizes the debt-to-GDP ratio 5/	2.7	-7.0	1.0	1.3	6.1	3.5	3.0	2.3	2.4	3.2	6.1	**-1.1**	**3.1**
PV of contingent liabilities (not included in public sector debt)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		

Definition of external/domestic debt	**Currency-based**
Is there a material difference between the two criteria?	**No**

Public sector debt 1/





Sources: Country authorities; and staff estimates and projections.

1/ Coverage of debt: The central, state, and local governments, central bank, government-guaranteed debt, non-guaranteed SOE debt . Definition of external debt is Currency-based.

2/ The underlying PV of external debt-to-GDP ratio under the public DSA differs from the external DSA with the size of differences depending on exchange rates projections.

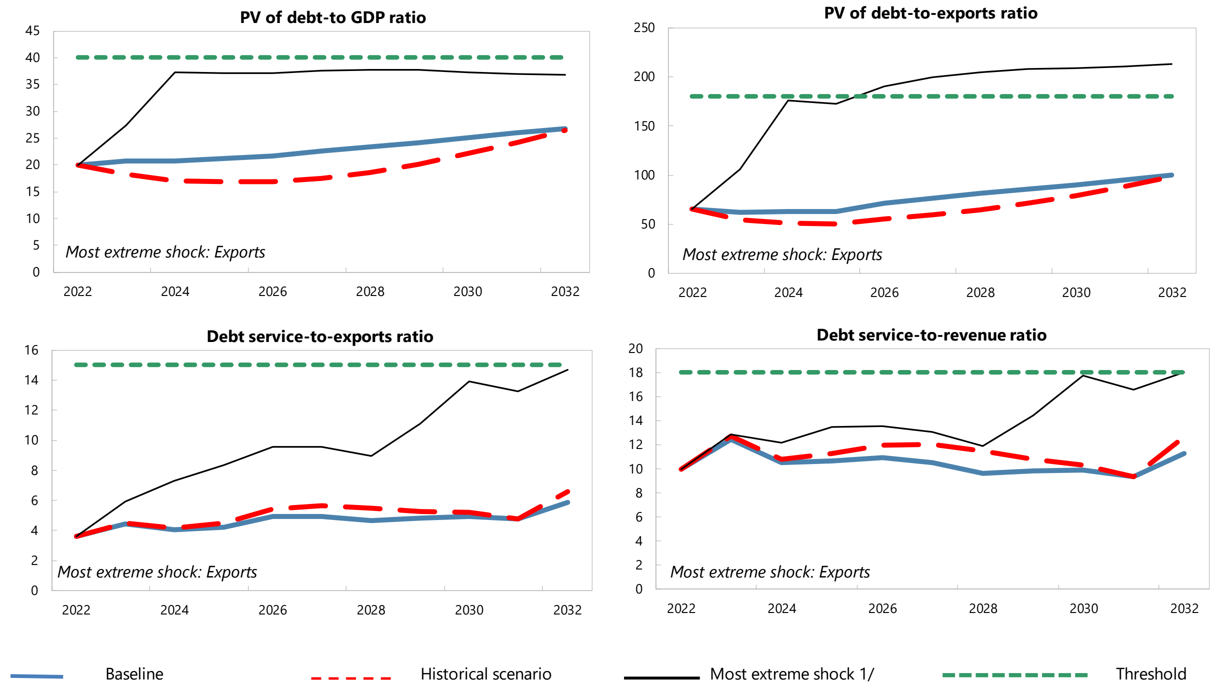
3/ Debt service is defined as the sum of interest and amortization of medium and long-term, and short-term debt.

4/ Gross financing need is defined as the primary deficit plus debt service plus the stock of short-term debt at the end of the last period and other debt creating/reducing flows.

5/ Defined as a primary deficit minus a change in the public debt-to-GDP ratio ((-): a primary surplus), which would stabilizes the debt ratio only in the year in question.

6/ Historical averages are generally derived over the past 10 years, subject to data availability, whereas projections averages are over the first year of projection and the next 10 years.

Figure 1. Madagascar: Indicators of Public and Publicly Guaranteed External Debt Under Alternatives Scenarios, 2022–2032



Customization of Default Settings	Size	Interactions
Standardized Tests	Yes	
Tailored Stress		
Combined CL	Yes	
Natural disaster	No	No
Commodity price	Yes	Yes
Market financing	n.a.	n.a.

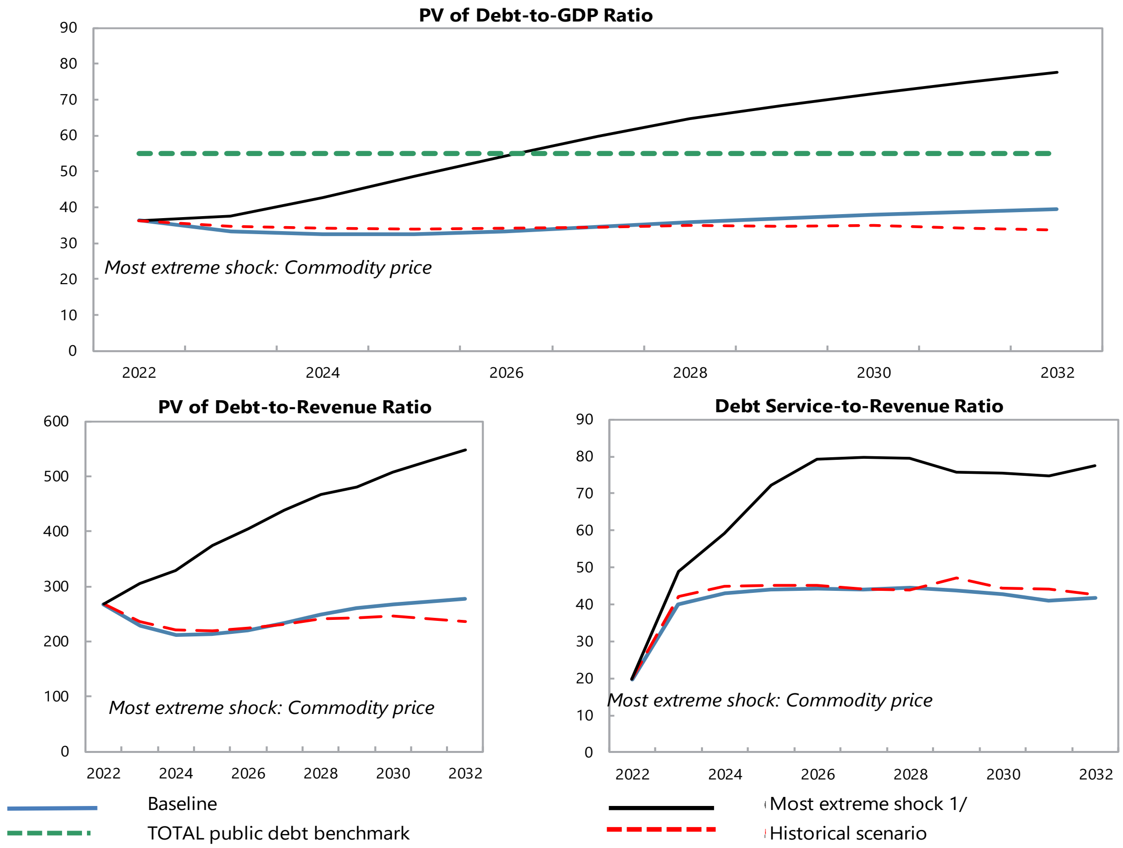
Note: "Yes" indicates any change to the size or interactions of the default settings for the stress tests. "n.a." indicates that the stress test does not apply.

Borrowing assumptions on additional financing needs resulting from the stress tests*	Default	User defined
Shares of marginal debt		
External PPG MLT debt	100%	
Terms of marginal debt		
Avg. nominal interest rate on new borrowing in USD	1.1%	1.4%
USD Discount rate	5.0%	5.0%
Avg. maturity (incl. grace period)	29	22
Avg. grace period	5	5

* Note: All the additional financing needs generated by the shocks under the stress tests are assumed to be covered by PPG external MLT debt in the external DSA. Default terms of marginal debt are based on baseline 10-year projections.

Sources: Country authorities; and staff estimates and projections.
1/ The most extreme stress test is the test that yields the highest ratio in or before 2032. The stress test with a one-off breach is also presented (if any), while the one-off breach is deemed away for mechanical signals. When a stress test with a one-off breach happens to be the most exterme shock even after disregarding the one-off breach, only that stress test (with a one-off breach) would be presented.

Figure 2. Madagascar: Indicators of Public Debt Under Alternative Scenarios, 2022–2032



Borrowing assumptions on additional financing needs resulting from the stress tests*	Default	User defined
Shares of marginal debt		
External PPG medium and long-term	51%	65%
Domestic medium and long-term	16%	15%
Domestic short-term	33%	20%
Terms of marginal debt		
External MLT debt		
Avg. nominal interest rate on new borrowing in USD	1.1%	1.4%
Avg. maturity (incl. grace period)	29	22
Avg. grace period	5	5
Domestic MLT debt		
Avg. real interest rate on new borrowing	1.5%	5.5%
Avg. maturity (incl. grace period)	2	2
Avg. grace period	1	1
Domestic short-term debt		
Avg. real interest rate	1.5%	3.5%

* Note: The public DSA allows for domestic financing to cover the additional financing needs generated by the shocks under the stress tests in the public DSA. Default terms of marginal debt are based on baseline 10-year projections.

Sources: Country authorities; and staff estimates and projections.
1/ The most extreme stress test is the test that yields the highest ratio in or before 2032. The stress test with a one-off breach is also presented (if any), while the one-off breach is deemed away for mechanical signals. When a stress test with a one-off breach happens to be the most exterme shock even after disregarding the one-off breach, only that stress test (with a one-off breach) would be presented.

Table 3. Madagascar: Sensitivity Analysis for Key Indicators of Public and Publicly Guaranteed External Debt, 2022–2032
(In percent)

	Projections 1/										
	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
PV of debt-to GDP ratio											
Baseline	20	21	21	21	22	23	23	24	25	26	27
A. Alternative Scenarios											
A1. Key variables at their historical averages in 2022-2032 2/	20	18	17	17	17	18	19	20	22	24	26
B. Bound Tests											
B1. Real GDP growth	20	24	28	28	29	30	31	32	33	35	36
B2. Primary balance	20	21	22	22	23	24	24	25	26	27	28
B3. Exports	20	27	37	37	37	38	38	38	37	37	37
B4. Other flows 3/	20	22	24	24	24	25	26	26	27	28	28
B5. Depreciation	20	26	24	25	25	27	28	29	30	31	33
B6. Combination of B1-B5	20	28	30	30	30	31	32	32	33	33	34
C. Tailored Tests											
C1. Combined contingent liabilities	20	24	24	25	26	27	27	28	29	29	30
C2. Natural disaster	20	26	26	27	28	29	30	30	31	32	33
C3. Commodity price	20	22	23	23	24	25	26	26	27	27	28
C4. Market Financing	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Threshold	40	40	40	40	40	40	40	40	40	40	40
PV of debt-to-exports ratio											
Baseline	65	62	63	63	71	77	81	86	90	95	100
A. Alternative Scenarios											
A1. Key variables at their historical averages in 2022-2032 2/	65	54	52	50	55	60	65	71	79	88	98
B. Bound Tests											
B1. Real GDP growth	65	62	63	63	71	77	81	86	90	95	100
B2. Primary balance	65	63	66	66	74	80	85	89	93	98	103
B3. Exports	65	106	176	172	**190**	**200**	**205**	**208**	**209**	**211**	**213**
B4. Other flows 3/	65	66	72	71	80	86	90	94	97	101	106
B5. Depreciation	65	62	58	58	66	72	76	81	86	91	96
B6. Combination of B1-B5	65	93	79	105	117	125	131	135	139	143	148
C. Tailored Tests											
C1. Combined contingent liabilities	65	71	74	75	84	90	95	99	103	107	112
C2. Natural disaster	65	77	81	83	93	100	105	109	114	119	124
C3. Commodity price	65	65	70	70	79	85	89	93	96	100	105
C4. Market Financing	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Threshold	180	180	180	180	180	180	180	180	180	180	180
Debt service-to-exports ratio											
Baseline	4	4	4	4	5	5	5	5	5	5	6
A. Alternative Scenarios											
A1. Key variables at their historical averages in 2022-2032 2/	4	5	4	4	5	6	6	5	5	5	7
B. Bound Tests											
B1. Real GDP growth	4	4	4	4	5	5	5	5	5	5	6
B2. Primary balance	4	4	4	4	5	5	5	5	5	5	6
B3. Exports	4	6	7	8	10	10	9	11	14	13	15
B4. Other flows 3/	4	4	4	4	5	5	5	5	6	5	6
B5. Depreciation	4	4	4	4	5	5	5	5	5	4	6
B6. Combination of B1-B5	4	5	6	6	7	7	7	8	8	8	9
C. Tailored Tests											
C1. Combined contingent liabilities	4	4	4	4	5	5	5	5	5	5	6
C2. Natural disaster	4	5	4	5	5	5	5	5	5	5	6
C3. Commodity price	4	5	4	5	5	5	5	5	6	5	6
C4. Market Financing	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Threshold	15	15	15	15	15	15	15	15	15	15	15
Debt service-to-revenue ratio											
Baseline	10	12	11	11	11	11	10	10	10	9	11
A. Alternative Scenarios											
A1. Key variables at their historical averages in 2022-2032 2/	10	13	11	11	12	12	11	11	10	9	13
B. Bound Tests											
B1. Real GDP growth	10	14	14	14	15	14	13	13	13	12	15
B2. Primary balance	10	13	11	11	11	11	10	10	10	10	12
B3. Exports	10	13	12	13	14	13	12	14	18	17	**18**
B4. Other flows 3/	10	12	11	11	11	11	10	11	11	11	12
B5. Depreciation	10	16	13	13	14	13	12	12	11	11	13
B6. Combination of B1-B5	10	13	13	13	13	13	12	14	14	13	15
C. Tailored Tests											
C1. Combined contingent liabilities	10	13	11	11	11	11	10	10	10	10	12
C2. Natural disaster	10	13	11	11	12	11	10	11	11	10	12
C3. Commodity price	10	16	13	14	13	12	11	11	11	10	12
C4. Market Financing	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Threshold	18	18	18	18	18	18	18	18	18	18	18

Sources: Country authorities; and staff estimates and projections.
1/ A bold value indicates a breach of the threshold.
2/ Variables include real GDP growth, GDP deflator (in U.S. dollar terms), non-interest current account in percent of GDP, and non-debt creating flows.
3/ Includes official and private transfers and FDI.

Table 4. Madagascar: Sensitivity Analysis for Key Indicators of Public Debt, 2022–2032
(In percent)

	Projections 1/										
	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
	PV of Debt-to-GDP Ratio										
Baseline	36	33	32	33	33	34	36	37	38	39	39
A. Alternative Scenarios											
A1. Key variables at their historical averages in 2022-2032 2/	36	35	34	34	34	34	35	35	35	34	34
B. Bound Tests											
B1. Real GDP growth	36	40	48	51	54	**59**	**63**	**67**	**71**	**74**	**77**
B2. Primary balance	36	34	34	34	34	36	37	38	39	40	40
B3. Exports	36	39	47	47	47	47	48	48	48	48	47
B4. Other flows 3/	36	35	35	35	36	37	38	39	40	40	41
B5. Depreciation	36	37	35	33	32	32	32	32	32	31	31
B6. Combination of B1-B5	36	33	34	34	35	36	38	39	40	41	41
C. Tailored Tests											
C1. Combined contingent liabilities	36	39	38	37	38	39	40	41	42	42	43
C2. Natural disaster	36	42	40	40	40	42	43	44	45	45	46
C3. Commodity price	36	38	43	49	54	**60**	**65**	**68**	**72**	**75**	**78**
C4. Market Financing	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
TOTAL public debt benchmark	55	55	55	55	55	55	55	55	55	55	55
	PV of Debt-to-Revenue Ratio										
Baseline	268	229	212	213	220	234	248	260	268	273	278
A. Alternative Scenarios											
A1. Key variables at their historical averages in 2022-2032 2/	268	236	221	220	224	231	241	243	246	240	237
B. Bound Tests											
B1. Real GDP growth	268	265	296	320	351	391	432	469	496	517	538
B2. Primary balance	268	235	222	222	228	242	256	268	275	279	284
B3. Exports	268	269	308	305	310	322	335	341	340	336	333
B4. Other flows 3/	268	240	232	232	239	252	266	277	283	286	289
B5. Depreciation	268	261	231	221	217	220	223	225	224	222	220
B6. Combination of B1-B5	268	224	224	223	231	246	261	274	282	286	292
C. Tailored Tests											
C1. Combined contingent liabilities	268	267	246	244	250	263	277	288	294	297	301
C2. Natural disaster	268	286	263	262	268	281	296	308	315	318	323
C3. Commodity price	268	306	328	375	405	439	466	481	507	527	547
C4. Market Financing	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	Debt Service-to-Revenue Ratio										
Baseline	20	40	43	44	44	44	45	44	43	41	42
A. Alternative Scenarios											
A1. Key variables at their historical averages in 2022-2032 2/	20	42	45	45	45	44	44	47	44	44	43
B. Bound Tests											
B1. Real GDP growth	20	45	56	62	69	72	76	76	77	76	79
B2. Primary balance	20	41	44	45	46	45	45	44	44	42	43
B3. Exports	20	40	44	46	46	46	46	47	50	47	47
B4. Other flows 3/	20	40	43	44	45	44	45	45	44	42	43
B5. Depreciation	20	40	45	44	44	44	45	43	43	41	42
B6. Combination of B1-B5	20	40	46	45	46	46	47	47	46	44	45
C. Tailored Tests											
C1. Combined contingent liabilities	20	41	53	52	48	46	46	45	44	42	42
C2. Natural disaster	20	41	58	56	50	49	48	47	46	44	44
C3. Commodity price	20	49	59	72	79	80	79	76	75	75	78
C4. Market Financing	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

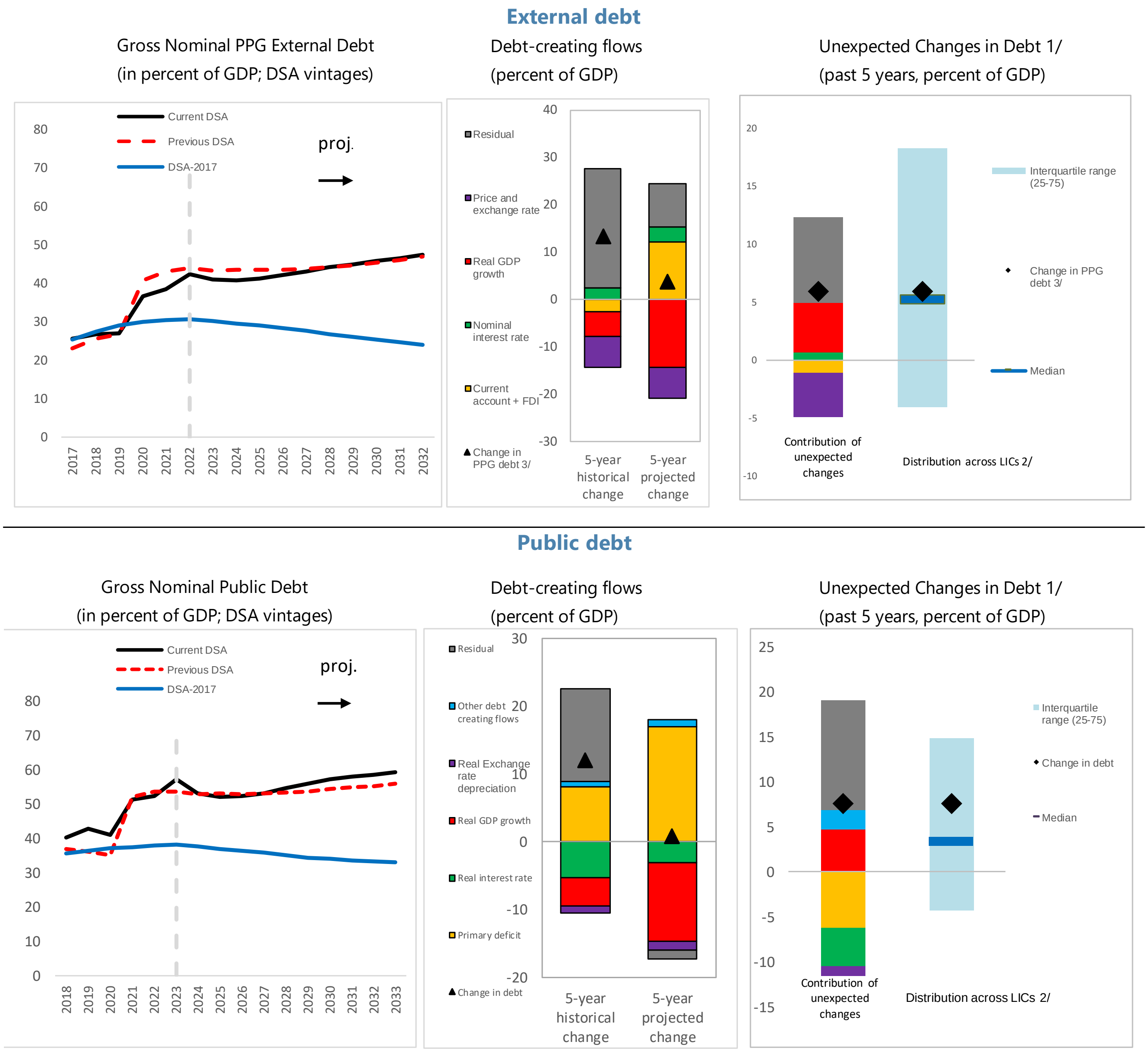
Sources: Country authorities; and staff estimates and projections.

1/ A bold value indicates a breach of the benchmark.

2/ Variables include real GDP growth, GDP deflator and primary deficit in percent of GDP.

3/ Includes official and private transfers and FDI.

Figure 3. Madagascar: Drivers of Debt Dynamics – Baseline Scenario



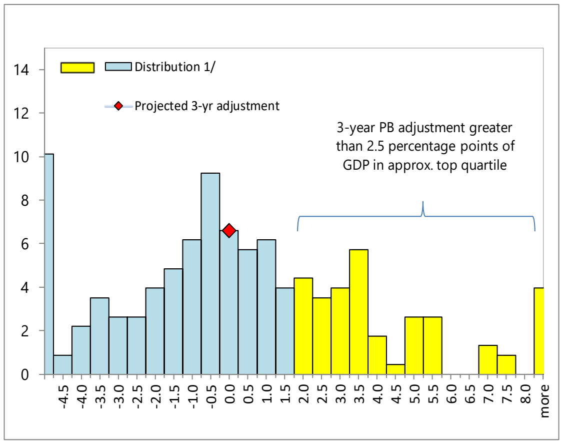
1/ Difference between anticipated and actual contributions on debt ratios.

2/ Distribution across LICs for which LIC DSAs were produced.

3/ Given the relatively low private external debt for average low-income countries, a ppt change in PPG external debt should be largely explained by the drivers of the external debt dynamics equation.

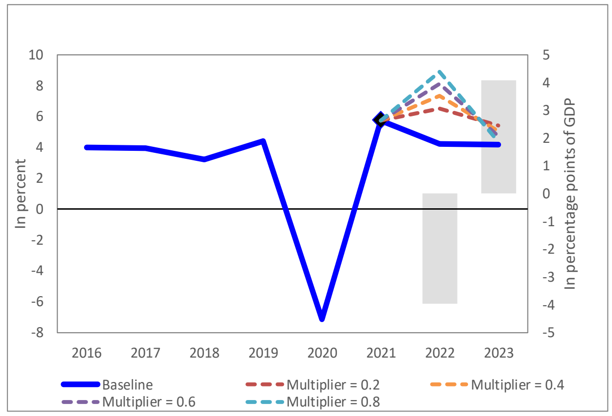
Figure 4. Madagascar: Realism Tools

3-Year Adjustment in Primary Balance
(Percentage points of GDP)



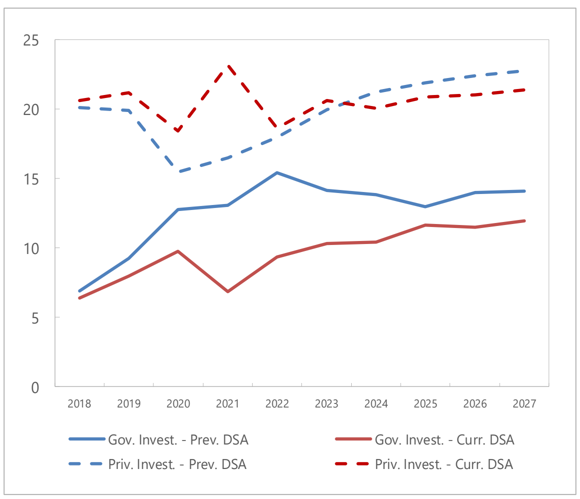
1/ Data cover Fund-supported programs for LICs (excluding emergency financing) approved since 1990. The size of 3-year adjustment from program inception is found on the horizontal axis; the percent of sample is found on the vertical axis.

Fiscal Adjustment and Possible Growth Paths 1/



1/ Bars refer to annual projected fiscal adjustment (right-hand side scale) and lines show possible real GDP growth paths under different fiscal multipliers (left-hand side scale).

Public and Private Investment Rates, Real
(percent of GDP)



Contribution to Real GDP growth
(percent, 5-year average)

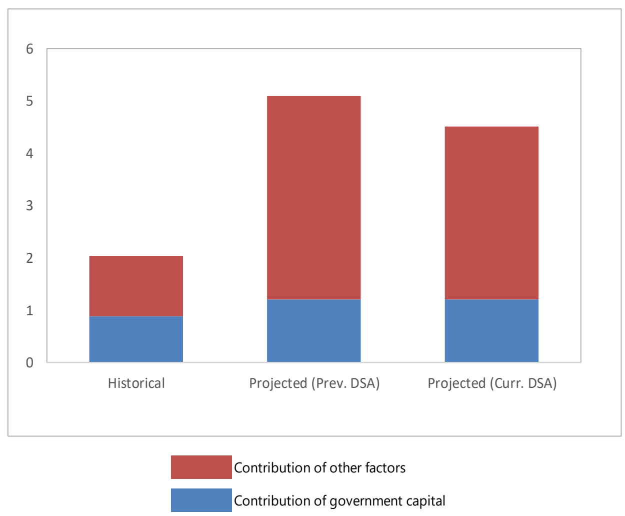
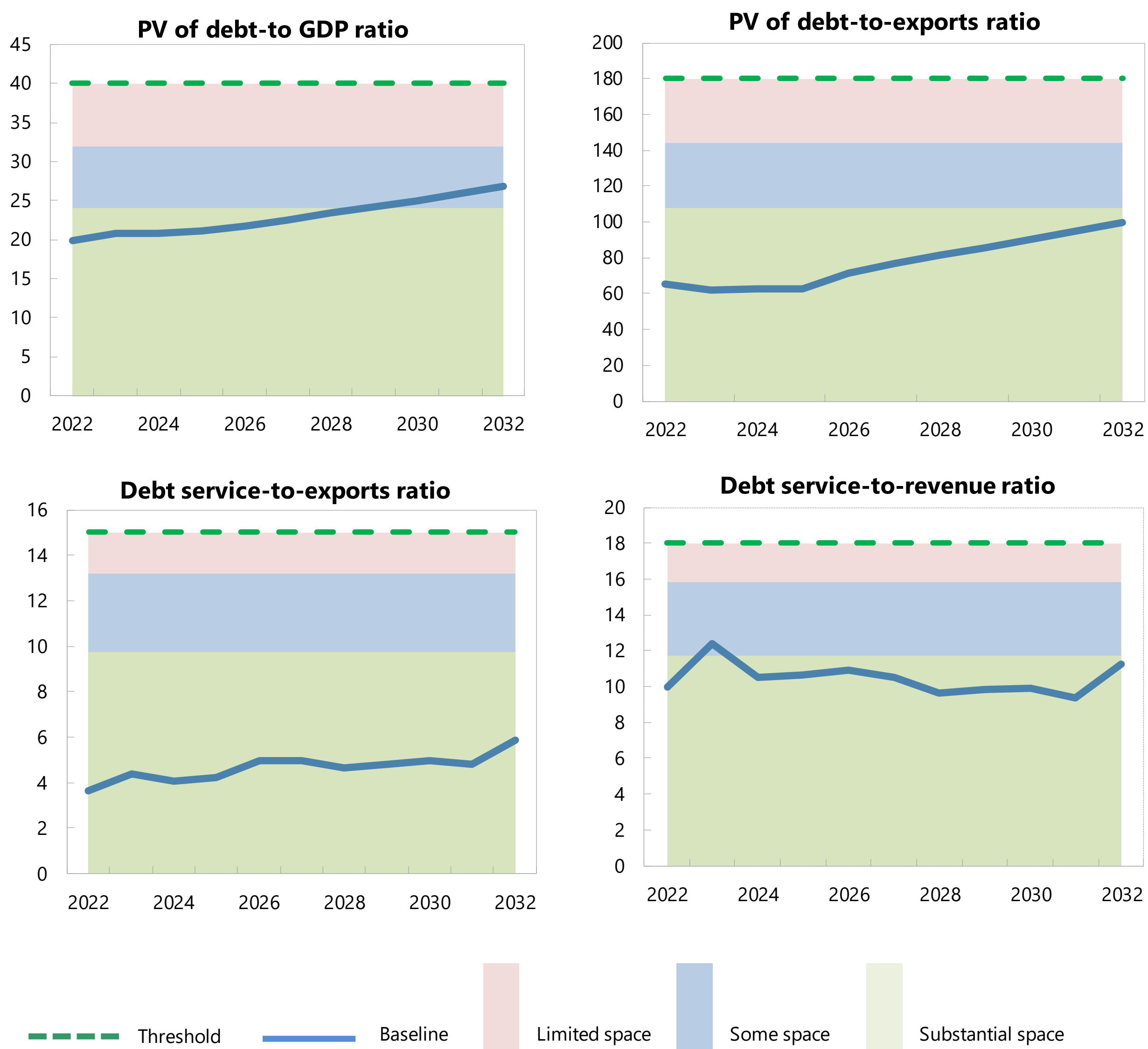


Figure 5. Madagascar: Qualification of the Moderate Category, 2022–2032[1]



Sources: Country authorities; and staff estimates and projections.

1/ For the PV debt/GDP and PV debt/exports thresholds, x is 20 percent and y is 40 percent. For debt service/Exports and debt service/revenue thresholds, x is 12 percent and y is 35 percent.