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REPUBLIC OF MADAGASCAR

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STAFF REPORT FOR THE 2017 ARTICLE IV CONSULTATION, FIRST REVIEW UNDER THE EXTENDED CREDIT FACILITY ARRANGEMENT, AND REQUESTS FOR WAIVER OF NONOBSERVANCE OF PERFORMANCE CRITERION, MODIFICATION OF PERFORMANCE CRITERION, AND AUGMENTATION OF ACCESS—DEBT SUSTAINABILITY ANALYSIS

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Prepared by the Staffs of the International Monetary Fund and the International Development Association[1]

Risk of external debt distress:	**Moderate**
Augmented by significant risks stemming from domestic public and/or private external debt?	**No**

Madagascar's risk of external debt distress is assessed to be 'moderate,' in line with the last DSA at the time of the ECF program request in July 2016. Debt dynamics have improved slightly since then, mainly because of more favorable financing assumptions following a successful donor conference in late 2016. The public DSA suggests that the dynamics of Madagascar's total public and publicly-guaranteed (PPG) debt are sustainable, although weak fiscal revenue generation, possible exchange rate shocks, and contingent liabilities related to state-owned enterprises remain potential sources of vulnerability.

[1] Prepared by IMF and World Bank staff, in consultation with the country authorities, during the mission in May/June 2016. This DSA follows the IMF and World Bank Staff Guidance Note on the Application of the Joint Fund-Bank Debt Sustainability Framework for Low-Income Countries, November 5, 2013 (available at http://www.imf.org/external/pp/longres.aspx?id=4827).

INTRODUCTION

1. **This joint DSA has been prepared by IMF and World Bank staff**. It is based on the framework for LICs approved by the respective Executive Boards. The framework takes into account indicative thresholds for debt burden indicators determined by the quality of the country's policies and institutions.[2] The assessment comprises a baseline scenario and a set of alternative scenarios.

2. **This DSA includes public debt and guarantees of the central government.** The DSA does not include the debt of local government or state owned enterprises (other than through direct guarantees provided by the central government). The measure of debt is on a *gross* rather than *net* basis. And the *residency* criterion is used to determine the split between external and domestic debt.

RECENT DEVELOPMENTS AND CURRENT DEBT SITUATION

3. **The trend toward an increasing reliance on domestic debt was reversed in 2016** (Figure 1). A smaller amount of loans from development partners during the 2008-13 crisis made the government more dependent on domestic borrowing to finance budget deficits. Domestic debt, including domestic budgetary arrears, grew from 7.6 percent of GDP in 2008 to 12.9 percent in 2015. With the government regaining the confidence of the international donor community, external financing has become more readily available and is reducing the need for domestic borrowing and domestic debt had declined to 11.7 percent of GDP in 2016. Total public debt rose from around $2.7 billion (31 percent of GDP) in 2008 to $3.7 billion (41 percent of GDP) in 2015 and then remained stable at that amount (a decline to 39 percent of GDP) in 2016 (Table 1). These debt levels are substantially less than the pre-HIPC peak of 95 percent of GDP. The debt service to revenue ratio has been trending upward.

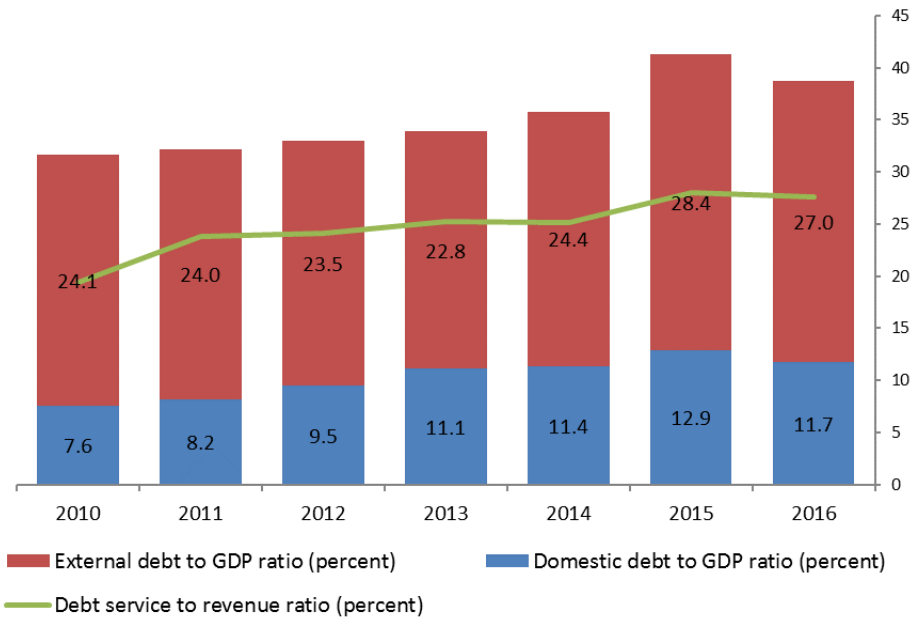
4. **A stronger than expected exchange rate, on average more favorable borrowing terms, and a delayed commercial loan led to a better-than-expected outcome in 2016.** A spike in vanilla prices boosted export revenues and the real effective exchange rate appreciated by about 3½ percent in 2016 (January to December).[3] The 2016 debt level was further reduced by a change in IDA lending terms that led to the front loading of grant disbursements (part of which will be offset in subsequent years) and a commercial loan (with an AfDB guarantee) that was delayed and is now projected to be disbursed in 2017. The authorities have also largely

[2] According to the World Bank Country and Policy Institutional Assessment (CPIA) Index, Madagascar is rated as a 'weak' performer in terms of the quality of policy and institutions (the average CPIA in 2013-15 is 3.1), Thus, the indicative thresholds for external debt applicable for that category of countries are: (i) 30 percent for the PV of debt-to-GDP ratio; (ii) 100 percent for PV of debt-to-exports ratio; (iii) 200 percent for the PV of debt to fiscal revenues ratio; (iv) 15 percent for the debt service to exports ratio; and (v) 18 percent for the debt service to revenue ratio. The indicative threshold for the PV of total PPG debt is 38 percent of GDP.

[3] In comparison and as discussed in the previous DSA, the Ariary depreciation in 2015 was the main driver behind an increase in external PPG debt by 3.5 percent of GDP (see Figure 1 and Table 3).

refrained from borrowing externally on non-concessional terms, which helped support debt sustainability.

Figure 1: Debt Level and Service Ratios



5. **The majority of external debt is owed to multilateral creditors on highly concessional terms** (Table 1). About one-third of total debt is held by domestic creditors mainly in the form of treasury bills and debt to the central bank[4]. Domestic arrears have declined over 2016 to about 2½ percent of GDP from around 3½ percent in the previous year. The vast majority of external debt is held by multilateral creditors, in particular the World Bank and African Development Bank.

6. **Private external debt is mainly issued by local subsidiaries of multinational companies.** According to the authorities, external debt owed by *domestically* owned companies and households is negligible. However, there are a number of multinational companies (in mining, banking, telecommunications) with wholly-owned local subsidiaries that have accumulated external debt. While the authorities do not have comprehensive data on such obligations, the largest of these debtors is the Nickel/Cobalt mining company *Ambatovy* with external debt just under $2bn (20 percent of GDP). This obligation caused total external debt to

[4] Much of the debt held by the central bank are in marketable debt instruments (*titre de credit negociable*), obligations that relate to irregular government financing that have been regularized in various conventions and past central bank losses to be covered by the government. Statutory advances, about 30 percent of the debt owed to the central bank, will be gradually reduced.

increase from 24 percent of GDP in 2007 to 39 percent in 2010, with a more gradual increase after that. It is projected that this commercial loan will be fully repaid by 2030.

Table 1: Break-down of Total PPG Debt (end-2016)

Creditor	Amount (US$m)	Percent of GDP	Percent of total
Domestic debt, *of which:*	**1,113**	**11.7**	**30.3**
Treasury bills	473	5.0	12.9
Debt to the Central Bank	337	3.6	9.2
Arrears	214	2.3	5.8
Other inc. loans	89	0.9	2.4
External debt, *of which:*	**2,562**	**27.0**	**69.7**
Multilateral	2,074	21.9	56.4
Paris Club	129	1.4	3.5
Non-Paris Club	337	3.6	9.2
Commercial & Garanties	23	0.2	0.6
Total PPG debt	**3,675**	**38.7**	**100.0**

7. **The government may face some contingent liabilities with respect to state-owned enterprises including the nonbank financial sector, while the banking sector is less likely to generate direct fiscal costs.** While the recapitalization of Air Madagascar is part of the baseline assumptions and thus reflected in projected debt dynamics, contingent liabilities from other state-owned enterprises are not included.[5] The electricity utility, JIRAMA, had long-term debt corresponding to ½ percent of GDP and short-term debt (suppliers' credits, overdrafts etc.) corresponding to 5 percent of GDP at end-2014.[6] The postal savings scheme and possibly the Madagascar Savings Fund (*Caisse d'Epargne de Madagascar, CEM*) may need future recapitalization (probably less than 1 percent of GDP combined). While the government is a minority shareholder in several commercial banks, most banks have financially solid foreign majority shareholders and bank liabilities are mainly composed of deposits that exceed loans. Dollarization of deposits and credits is not pronounced and banks generally maintain foreign assets that are larger than their foreign liabilities.

[5] Debt projections include explicit government guarantees provided for JIRAMA's external borrowing, but amounts are limited. Regarding Air Madagascar, in discussions of a strategic partnership with Air Austral, the government committed to clean Air Madagascar's balance sheet of all past net liabilities, which resulted from past losses. According to the business plan for Air Madagascar, there are no plans for future government guarantees.

[6] Financial statement for 2015 not yet available.

UNDERLYING ASSUMPTIONS

8. **Besides the increasing current account deficit, most key variables driving debt dynamics are forecast to improve over the coming years** (Box 1 and Table 2). The DSA projections are consistent with the authorities' plan to scale-up much needed infrastructure investment and social spending. A big part of this investment will be financed through concessional external borrowing and grants.

Box 1. Baseline Macroeconomic Assumptions

Real GDP growth. Growth is projected to peak temporarily just below 6 percent in 2019. Compared to the 2016 DSA, the acceleration is more dynamic in the short-run, based on higher foreign financed investment. Medium-term growth remains roughly unchanged at 5 percent, driven by improved confidence, further re-engagement of development partners, and increased mining exports.

Current account. While the 2016 current account was substantially stronger than expected, it was mostly due to temporary factors. Consistent with faster investment-led growth and additional reconstruction-related efforts, imports have been revised up, which leads to larger current account deficits in the short- and medium term.

Fiscal variables: More financing, including to finance the reconstruction efforts and the restructuring of Air Madagascar in 2017, will allow the government to run slightly higher primary deficits in the short run. While revenue projections have remained unchanged, donor grant support has been revised up substantially, particularly in the short-run.

Table 2: Madagascar; Baseline Macroeconomic Assumptions

		2017	2018	2019	2020	2021	2022
Real GDP growth (percent)	2017DSA	4.3	5.3	5.9	5.5	5.2	5.0
	2016DSA	4.5	4.8	5.0	5.0	5.0	
Non-interest CA deficit (% of GDP)	2017DSA	4.4	4.9	4.6	3.8	3.7	3.5
	2016DSA	3.3	3.7	3.7	3.6	3.5	
Primary deficit (% of GDP)	2017DSA	4.2	3.6	3.4	2.8	2.5	2.4
	2016DSA	3.4	3.3	3.1	2.9	2.7	
Total revenues, excl grants (% of GDP)	2017DSA	11.6	11.8	12.2	12.7	13.1	13.5
	2016DSA	11.2	11.7	12.2	12.7	13.2	
Grants (% of GDP)	2017DSA	3.5	3.6	3.4	2.4	2.3	2.3
	2016DSA	2.8	1.7	2.0	2.1	1.8	
Non-Interest Expenditure (% of GDP)	2017DSA	19.2	19.0	19.1	17.8	17.9	18.1
	2016DSA	17.3	16.6	17.0	17.2	17.3	

Source: World Bank and IMF staff projections.

9. **Following a successful donor-conference in late 2016, expected financing conditions have improved.** At the time of the donor conference in Paris in December 2016, the

authorities received pledges of $6.4 billion (over 60 percent of 2016 GDP). While not all of this amount is available for investment in the near-term, concrete pledges for project financing have nevertheless exceeded assumptions in previous frameworks in 2017-2020.

10. **Semi-concessional and very limited non-concessional borrowing is envisaged throughout the forecast horizon.** Consistent with the ceiling in the program, non-concessional borrowing (with a negative average grant element of 12 percent[7]) is foreseen at $100 million in 2017, of which $55 million will be disbursed before end-June 2017 under a long-delayed loan with an AfDB guarantee and an additional $45m is expected under similar conditions to finance the restructuring of Air Madagascar. Over the medium term, the importance of semi-concessional borrowing is expected to increase, reducing the average grant element of new borrowing from above 45 percent in 2019 to roughly 37 percent in 2037.

11. **The main risks to these assumptions relate to political instability, revenue generation, the exchange rate, and the persistence of donor grant support.** Political instability could weaken economic confidence, with negative implications for key macroeconomic variables, such as growth, the exchange rate and donor support. Continued weak revenue performance would accelerate debt accumulation and a faster-than-expected depreciation of the Ariary would increase the real value of the existing debt stock. Additionally, while the outlook on donor grant support is positive, lack of reform progress going forward could undo these gains. There are reasons to expect that the risks from natural disasters not already incorporated in the baseline to be rather limited (Box 2). Risks are assessed to be symmetric since the exchange rate may continue to surprise on the upside and revenue generation has a significant upside potential given the low base. This would boost the ability to service higher debt levels while structural fiscal reforms could stimulate higher-than-expected donor support also in the medium-to longer-term.

EXTERNAL DSA

Baseline scenario

12. **The level of PPG external debt was roughly $2.5 billion in 2016 and is projected to grow gradually throughout the forecast period**. PPG external debt is forecast to increase from 27 percent of GDP in 2016 to a peak of 36 percent of GDP in 2022 (Table 3). A temporarily higher trade deficit and outflows from the mining sector[8] are balanced by increasing transfer inflows and a moderate increase in net FDI inflows[9], consistent with the authorities' National Development

[7] Such a grant element is the outcome of the following assumptions: 8.5 percent interest rate, 7-year maturity, and two-year grace period. Only part of future commercial loans are assumed to benefit from a guarantee from an external agency.

[8] The large residual in Table 3 is partly related to mining activity. While mining exports are recorded in full in the balance of payment statistics, only a fraction of these receipts actually returns to Madagascar, with the remainder being repatriated to the parent companies.

[9] FDI is assumed to remain substantially below the 2011 and 2012 levels, when major mining projects were being constructed.

Plan. As domestic debt markets deepen (see below), PPG external debt is projected to decline to 25 percent of GDP by 2037.

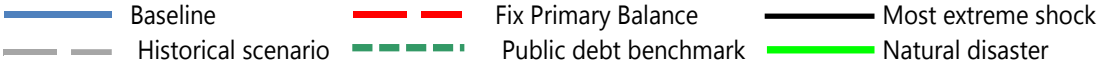
Box 2. Debt Dynamics and Natural Disasters

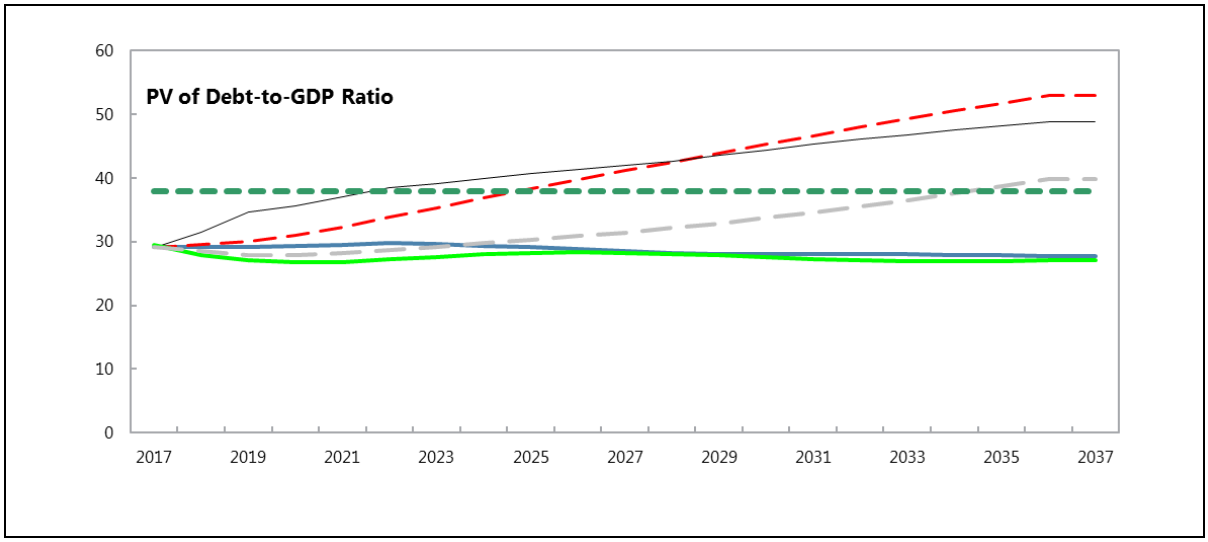
Madagascar's history of natural disasters suggests that the effects of these events that are not already incorporated in the baseline scenario would be manageable. The potential effect of natural disasters on debt dynamics are investigated using an event study of the tropical cyclones in 2004 as an example; it was the most destructive year since 1980 (the greater damage by cyclones in the seventies reflected a different economic and social structure). Among standard macro-variables, the effects were most pronounced for inflation and the exchange rate, but modest overall.

Natural disasters are a recurring phenomenon in Madagascar, so their occurrence is incorporated into baseline assumptions. Since 2000, Madagascar has been affected by 30 natural disasters, including droughts, storms, floods, epidemics and insect infestation. Since they are recurring, natural disasters are included into the medium-term macroeconomic forecasts. The starting point for these forecasts are historical averages, which already incorporate the medium-term impact of these recurrent disasters and are then adjusted for the impact of planned policy measures. Nevertheless, the possible occurrence of a more severe event raises the question of its macro-economic implications and its risk to debt dynamics.

The most violent storms in recent history suggest that the macro-economic effects of natural disasters tend to be surprisingly contained. In 2004, Madagascar was hit by two tropical cyclones that caused 400 deaths, nearly 1,000 injured and estimated economic damage equivalent to 5.7 percent of GDP. Macro-economic variables were less affected than usual volatility, including from political crises. *Primary expenditure* by the government increased from 17 percent of GDP in the previous year to 22 percent in 2004. However, general government revenues also rose; with 3 of the 5 percentage points of GDP increase coming from additional grant support. Both expenditure and revenues declined again the following year. The *primary fiscal deficit* thus increased by only 0.3 percent of GDP, from 1.7 to 2 percent of GDP in 2004. In 2005, the primary fiscal accounts were roughly in balance. Despite the disaster, GDP growth was above 5 percent (which was a slowdown from the exceptional 10 percent in the previous year but close to the long-run average). (In early 2017, the country was hit by the biggest tropical cyclone for 13 years, which is also projected to have a very small net impact on growth in that year.) Of greater importance, the cyclone may have contributed to above average inflation reported at 14 percent in 2004 and 18 percent in the following year, compared to an average 8 percent over the previous 5 years. Related to the higher inflation, the currency depreciated in nominal terms by 34 percent in 2004.

A customized debt scenario confirms the robustness of the fiscal debt dynamics. We thus include a 35 percent depreciation of the exchange rate and 10 percent faster inflation in 2018. Consistent with the experience in 2004, the fiscal variables and GDP growth rates for the year of the shock are left unchanged. The effects of the depreciation and the higher inflation roughly offset one another in the case of the PV of Debt-to-GDP ratio. For the other measures in the fiscal scenario, indicators actually improve.





13. **Under the baseline projection, all PPG external debt indicators remain below the policy-dependent debt burden thresholds** (Figure 2). The present value (PV) of external debt is projected to increase from 15½ percent of GDP in 2016 to 21 percent of GDP by 2022 and then to decline to 16 percent by 2037. This projection is somewhat more favorable than the medium-term DSA forecast at the time of the ECF request.

14. **Private external debt is projected to decline slowly, as the loans related to a major mining project are repaid.** Given the exceptional nature of this project, the DSA does not forecast substantial new external borrowing from the private sector. Furthermore, this debt is not assessed to pose a significant threat to external sustainability, as the ultimate liability for these loans is held by the multinational shareholders, rather than resident entities (such as domestic banks or the government).

Alternative scenarios

15. **The two standard DSA alternative scenarios are applied to the baseline external PPG debt projections.** First, the standard bound tests apply pre-defined shocks to the key macroeconomic variables that drive external debt (summarized in Footnote 1 of Figure 2). Second, a historical scenario where macroeconomic variables are set equal to their average over 2007-16 is imposed on the baseline projection. These shocks are detailed in Table 4.

16. **For the standard bound tests, at least one scenario causes a significant breach of the threshold for one or more indicators**. A simultaneous slowdown in GDP, decline in exports, a depreciation, and reduction of non-debt creating flows (all a one-half standard deviation; see Table 4) would cause the PV of debt-to-revenue ratio to peak at 243 percent in 2017, above the threshold implied by Madagascar's CPIA rating. The same shock would also just barely exceed the threshold for the PV of debt-to-GDP ratio. Additionally, a one standard deviation decline in exports would result in the PV of debt-to-exports to increase to 108 percent, above its threshold of 100. The first stress test in particular is sufficient to classify Madagascar as standing at moderate risk of external debt distress.

17. **The historical scenario[10] projects a rapid increase in all debt metrics and causes a breach for four of the five external debt thresholds.** These scenarios cause a substantial breach in three thresholds, especially for the PV of debt-to-GDP and the PV of debt-to-revenue ratios. However, there are good reasons to place less weight on the historical scenario. The large current account deficits in 2008 and 2009 (over 20 percent of GDP) were driven by imports associated with large mining projects, which were principally financed through non-debt creating FDI flows. Thus, these deficits did not lead to a build-up of PPG external debt and this period is not representative of the normal economic environment in Madagascar.

PUBLIC DSA

Baseline scenario

18. **Domestic PPG debt is projected to decline as a proportion of GDP over the next decade**, with authorities replacing domestic financing by concessional external borrowing, given the projected continued improvement in donor relations. The importance of domestic PPG debt is then expected to grow again over the long term, as domestic markets deepen and savings become more abundant. The PV of total PPG debt is projected to remain less than 30 percent of GDP throughout the forecast horizon—well-below the threshold of 38 percent (Figure 3 and Table 5).

Alternative scenarios

19. **Two of the three alternative scenarios used to stress test the baseline for total PPG debt breach the risk threshold** (Figure 3 and Table 6). The most extreme shock—a one standard deviation reduction in GDP growth in 2018-2019—would lead to a rapid and persistent breach of the threshold starting in 2022. Assuming that the primary deficit remains unchanged as a proportion to GDP throughout the forecast horizon also results in a breach in the PV of debt-to-GDP ratio in the outer years. Reducing the current gap between revenue and spending is a clear priority.

CONCLUSION

20. **Breaches of debt thresholds only under stress scenarios result in a moderate risk rating.** While the authorities are expected to be able to service current and future debt obligations, the debt sustainability is vulnerable to shocks, poor revenue collection, and contingent liabilities related to state-owned enterprises. The authorities have initiated measures that can help address these vulnerabilities including enhanced revenue collections and budgetary execution, strengthened debt monitoring capacity, and improved policy and institutional performance. If successful, these measures should help to maintain favorable financing

[10] Key macroeconomic variables (non-interest current account, growth, GDP deflator, growth of exports, current official transfers, and net FDI) remain fixed at the average of the 2007-16 period.

conditions and increase Madagascar potential economic growth. It is also important to strengthen the monitoring and management of state-owned enterprises, including by publishing their audited financial statements.

21. **The DSA was discussed with the authorities during the March 2017 Article IV mission.** Staff used the results to illustrate the need for prudence and continued reform of public financial management when increasing external borrowing to maintain debt sustainability. Reforms should focus on (i) increasing tax revenues to safeguard the capacity of the state to service debt; (ii) ensuring that debt continues to be financed on the most concessional terms possible; (iii) ensuring that investments are carefully prioritized to enhance growth and human capital accumulation; and (iv) improving debt monitoring capacity, especially the control of debt guarantees and potential contingent liabilities. The authorities agreed with the overall assessment as well as the policy implications. They expressed their firm commitment to tackle any risks that could push them beyond a moderate risk rating.

Table 3. Madagascar: External Debt Sustainability Framework, Baseline Scenario, 2014-37[1]

(In percent of GDP; unless otherwise indicated)

	Actual			Historical Average [6/]	Standard Deviation [6/]	Projections									
	2014	2015	2016			2017	2018	2019	2020	2021	2022	2017-2022 Average	2027	2037	2023-2037 Average
External debt (nominal) 1/	**45.0**	**48.6**	**45.4**	**43.0**	**7.8**	**45.3**	**45.6**	**45.7**	**44.9**	**44.0**	**43.1**	**44.8**	**34.7**	**29.7**	**32.6**
of which: public and publicly guaranteed (PPG)	24.4	28.4	27.0	25.0	1.7	29.6	31.9	33.9	34.8	35.4	35.8	33.6	32.1	25.3	29.8
Change in external debt	1.2	3.7	-3.2	2.0	3.4	-0.1	0.2	0.1	-0.8	-0.9	-0.9	-0.4	-1.5	0.9	-0.9
Identified net debt-creating flows	-2.9	1.7	-6.5			-1.6	-1.4	-1.9	-2.9	-3.1	-3.2		-3.1	0.9	
Non-interest current account deficit	**0.1**	**1.6**	**-1.0**	**8.2**	**7.7**	**4.4**	**4.9**	**4.6**	**3.8**	**3.7**	**3.5**	**4.2**	**3.9**	**7.6**	**5.1**
Deficit in balance of goods and services	4.4	3.5	2.1	11.7	7.8	7.5	8.1	7.6	6.4	6.2	6.1	7.0	6.7	11.0	8.0
Exports	32.8	32.1	33.5			33.2	32.4	33.1	34.6	35.3	35.7		36.5	37.7	36.9
Imports	37.2	35.5	35.6			40.7	40.5	40.7	41.0	41.5	41.8		43.2	48.8	44.8
Net current transfers (negative = inflow)	-6.9	-5.4	-6.9	-5.4	1.1	-6.8	-6.9	-6.6	-6.1	-6.1	-6.1	-6.4	-6.1	-6.1	-6.1
of which: official	-0.8	-1.5	-3.4	-1.5	1.6	-3.5	-3.6	-3.3	-2.3	-2.3	-2.2	-2.9	-2.0	-1.8	-2.0
Other current account flows (negative = net inflow)	2.5	3.6	3.8	1.9	1.4	3.7	3.7	3.6	3.5	3.6	3.5	3.6	3.3	2.6	3.2
Net FDI (negative = inflow)	**-2.9**	**-4.5**	**-4.5**	**-5.6**	**1.9**	**-4.4**	**-4.4**	**-4.4**	**-4.8**	**-5.1**	**-5.1**	**-4.7**	**-5.1**	**-5.1**	**-5.1**
Endogenous debt dynamics 2/	**0.0**	**4.6**	**-1.0**	**-1.2**	**3.5**	**-1.6**	**-1.9**	**-2.1**	**-1.9**	**-1.7**	**-1.6**	**-1.8**	**-1.9**	**-1.6**	**-1.8**
Contribution from nominal interest rate	0.3	0.3	0.3	0.3	0.0	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.4
Contribution from real GDP growth	-1.4	-1.5	-2.0	-0.9	1.0	-1.9	-2.3	-2.5	-2.3	-2.2	-2.1	-2.2	-1.7	-1.3	-1.6
Contribution from price and exchange rate changes	1.1	5.8	0.7			...	...	...	...	...	...		...	...	
Residual (3-4) 3/	**4.1**	**1.9**	**3.3**	**0.4**	**5.1**	**1.5**	**1.7**	**2.0**	**2.2**	**2.3**	**2.3**	**2.0**	**1.6**	**0.0**	**0.9**
of which: exceptional financing	0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
PV of external debt 4/	...	...	33.9			33.2	32.5	31.7	30.6	29.6	28.6		22.5	20.6	
In percent of exports	...	...	101.2			99.8	100.3	95.9	88.6	83.9	80.2		61.7	54.5	
PV of PPG external debt	**...**	**...**	**15.5**			**17.4**	**18.8**	**20.0**	**20.5**	**21.0**	**21.3**		**19.9**	**16.2**	
In percent of exports	**...**	**...**	**46.2**			**52.4**	**58.1**	**60.4**	**59.4**	**59.4**	**59.7**		**54.5**	**43.0**	
In percent of government revenues	**...**	**...**	**138**			**150**	**160**	**163**	**162**	**160**	**158**		**130**	**100**	
Debt service-to-exports ratio (in percent)	**2.3**	**2.1**	**2.9**			**3.4**	**3.0**	**2.7**	**3.2**	**3.3**	**3.4**		**3.6**	**3.8**	
PPG debt service-to-exports ratio (in percent)	**2.3**	**2.1**	**2.9**			**3.4**	**3.0**	**2.7**	**3.2**	**3.3**	**3.4**		**3.6**	**3.8**	
PPG debt service-to-revenue ratio (in percent)	**7.4**	**6.5**	**8.6**			**9.7**	**8.3**	**7.4**	**8.8**	**8.8**	**9.1**		**8.6**	**8.9**	
Total gross financing need (Millions of U.S. dollars)	-227.5	-212.8	-458.4			114.5	165.1	132.9	13.1	-35.7	-49.9		27.3	1587.6	
Non-interest current account deficit that stabilizes debt ratio	-1.1	-2.0	2.2			4.5	4.7	4.5	4.6	4.6	4.5		5.5	6.6	
Key macroeconomic assumptions															
Real GDP growth (in percent)	3.3	3.1	4.2	2.7	3.3	4.3	5.3	5.9	5.5	5.2	5.0	5.2	5.0	5.0	5.0
GDP deflator in US dollar terms (change in percent)	-2.6	-11.5	-1.5	4.0	11.5	1.2	0.4	1.6	1.8	2.0	1.6	1.4	1.8	2.1	1.9
Effective interest rate (percent) 5/	0.6	0.6	0.6	0.9	0.4	0.7	0.9	0.9	1.0	1.0	1.0	0.9	1.1	1.3	1.2
Growth of exports of G&S (US dollar terms, in percent)	9.8	-10.7	7.3	8.6	16.5	4.6	3.2	9.7	12.3	9.4	8.0	7.9	7.4	7.5	7.4
Growth of imports of G&S (US dollar terms, in percent)	-3.4	-12.7	2.8	6.4	22.4	20.7	5.3	8.0	8.2	8.6	7.5	9.7	7.9	8.6	8.1
Grant element of new public sector borrowing (in percent)	...	...	...	...	...	36.2	43.1	47.8	45.0	45.3	43.7	43.5	40.4	37.0	39.1
Government revenues (excluding grants, in percent of GDP)	10.1	10.4	11.2	10.6	1.0	11.6	11.8	12.2	12.7	13.1	13.5	12.5	15.3	16.4	15.5
Aid flows (in Millions of US dollars) 7/	246	144	343			658	759	858	713	751	751		820	1575	
of which: Grants	246	144	343			367	404	406	305	316	330		419	741	
of which: Concessional loans	0.0	0.0	0.0			290.3	354.7	452.3	407.5	434.6	420.6		400.4	834.2	
Grant-equivalent financing (in percent of GDP) 8/	...	...	...			5.3	5.7	5.7	4.2	3.9	3.7	4.7	2.9	2.8	2.9
Grant-equivalent financing (in percent of external financing) 8/	...	...	...			62.7	67.4	69.1	65.4	66.6	66.2	66.2	69.1	62.9	67.3
Memorandum items:															
Nominal GDP (Millions of US dollars)	10674	9744	10001			10557	11161	12009	12896	13841	14761		20480	40629	
Nominal dollar GDP growth	0.7	-8.7	2.6			5.6	5.7	7.6	7.4	7.3	6.6	6.7	6.8	7.2	7.0
PV of PPG external debt (in Millions of US dollars)			1469.0			1762.0	2048.7	2350.0	2608.7	2852.7	3094.2		4016.7	6500.7	
(PVt-PVt-1)/GDPt-1 (in percent)						2.9	2.7	2.7	2.2	1.9	1.7	2.4	1.0	1.0	0.9
Gross workers' remittances (Millions of US dollars)	...	...	...			...	...	...	...	...	...		...	...	
PV of PPG external debt (in percent of GDP + remittances)	...	...	15.5			17.4	18.8	20.0	20.5	21.0	21.3		19.9	16.2	
PV of PPG external debt (in percent of exports + remittances)	...	...	46.2			52.4	58.1	60.4	59.4	59.4	59.7		54.5	43.0	
Debt service of PPG external debt (in percent of exports + remittances)	...	...	2.9			3.4	3.0	2.7	3.2	3.3	3.4		3.6	3.8	

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

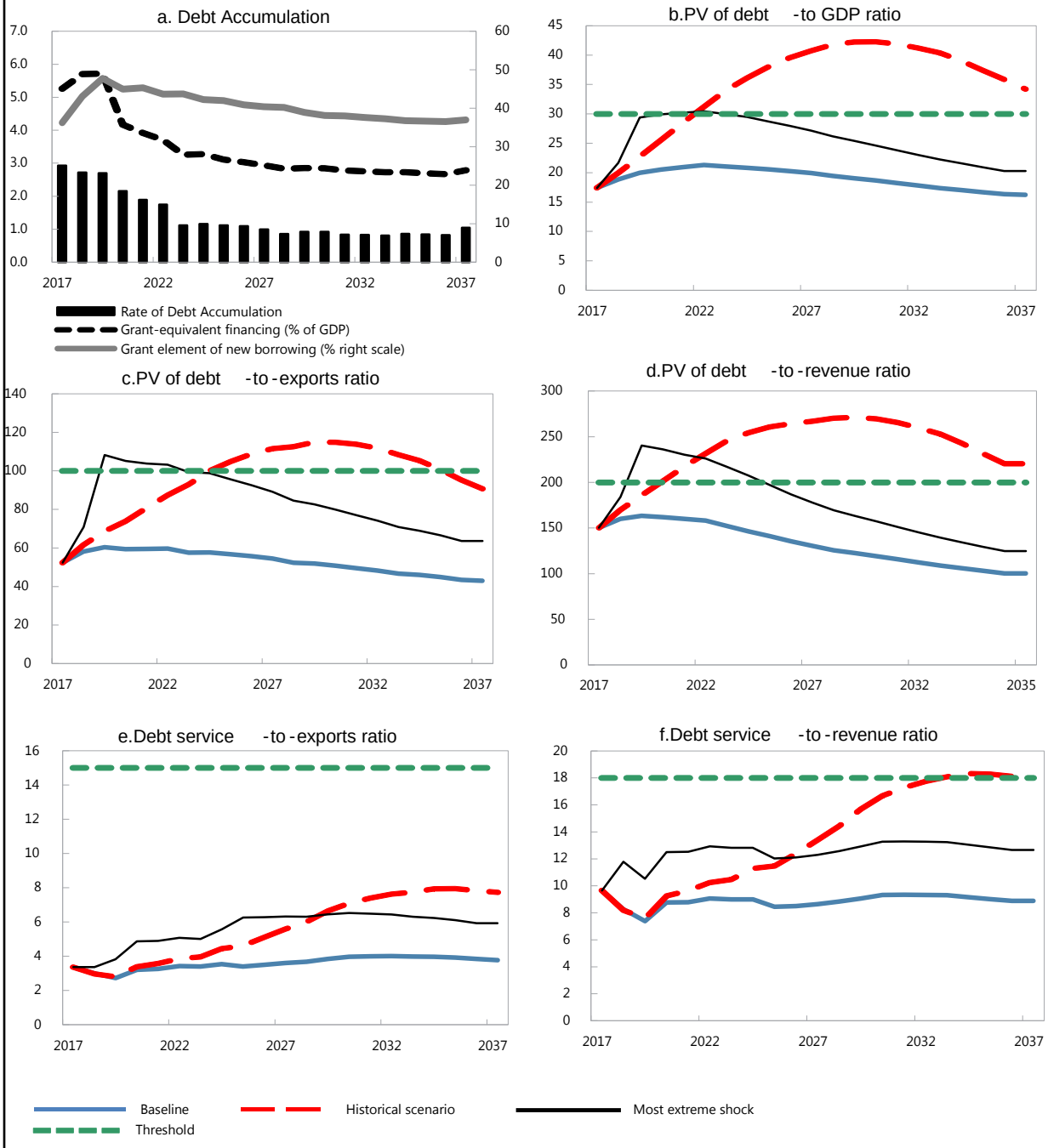
5/ Current-year interest payments divided by previous period debt stock.

6/ Historical averages and standard deviations are generally derived over the past 10 years, subject to data availability.

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

8/ 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).

Figure 2. Madagascar: Indicators of Public and Publicly Guaranteed External Debt Under Alternatives Scenarios, 2017-2037 1/



Sources: Country authorities; and staff estimates and projections.

1/ The most extreme stress test is the test that yields the highest ratio on or before 2027. In figure b. it corresponds to a Natural disaster shock; in c. to a Exports shock; in d. to a Combination shock; in e. to a Exports shock and in figure f. to a One-time depreciation shock

Table 4. Madagascar: Sensitivity Analysis for Key Indicators of Public and Publicly Guaranteed External Debt, 2017-37

(In percent)

	Projections																				
	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	**2027**	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
PV of debt-to GDP ratio																					
Baseline	17	19	20	21	21	21	21	21	21	20	**20**	19	19	19	18	18	17	17	17	16	16
A. Alternative Scenarios																					
A1. Key variables at their historical averages in 2017-2037 1/	17	20	23	26	28	31	34	36	38	40	**41**	42	42	42	42	41	40	39	37	36	34
A2. New public sector loans on less favorable terms in 2017-2037 2	17	20	23	24	26	27	27	27	27	27	**27**	27	27	27	27	26	26	26	26	26	26
B. Bound Tests																					
B1. Real GDP growth at historical average minus one standard deviation in 2018-2019	17	19	22	23	23	24	23	23	23	23	**22**	22	21	21	20	20	19	19	19	18	18
B2. Export value growth at historical average minus one standard deviation in 2018-2019 3/	17	21	27	27	27	28	27	27	26	25	**24**	24	23	22	21	20	20	19	19	18	18
B3. US dollar GDP deflator at historical average minus one standard deviation in 2018-2019	17	20	23	24	25	25	25	24	24	24	**23**	23	22	22	21	21	20	20	20	19	19
B4. Net non-debt creating flows at historical average minus one standard deviation in 2018-2019 4/	17	20	23	24	24	24	24	24	23	23	**22**	21	21	20	20	19	18	18	17	17	17
B5. Combination of B1-B4 using one-half standard deviation shocks	17	22	29	30	30	30	30	29	29	28	**27**	26	25	25	24	23	22	22	21	20	20
B6. One-time 30 percent nominal depreciation relative to the baseline in 2018 5/	17	26	28	29	29	30	29	29	29	28	**28**	27	27	26	26	25	24	24	23	23	23
PV of debt-to-exports ratio																					
Baseline	52	58	60	59	59	60	58	58	57	56	**55**	52	52	51	50	48	47	46	45	43	43
A. Alternative Scenarios																					
A1. Key variables at their historical averages in 2017-2037 1/	52	62	69	74	81	87	93	100	105	109	**112**	113	115	115	114	112	108	105	101	95	91
A2. New public sector loans on less favorable terms in 2017-2037 2	52	62	69	71	73	75	74	75	75	75	**75**	73	73	73	72	72	71	71	70	69	69
B. Bound Tests																					
B1. Real GDP growth at historical average minus one standard deviation in 2018-2019	52	57	59	58	58	59	57	57	56	55	**54**	51	51	50	49	48	46	45	44	43	42
B2. Export value growth at historical average minus one standard deviation in 2018-2019 3/	52	71	108	105	104	103	99	99	96	93	**89**	85	83	80	77	74	71	69	67	64	62
B3. US dollar GDP deflator at historical average minus one standard deviation in 2018-2019	52	57	59	58	58	59	57	57	56	55	**54**	51	51	50	49	48	46	45	44	43	42
B4. Net non-debt creating flows at historical average minus one standard deviation in 2018-2019 4/	52	63	70	69	68	68	66	66	64	62	**60**	58	57	55	53	52	50	48	47	45	44
B5. Combination of B1-B4 using one-half standard deviation shocks	52	65	87	84	83	83	80	80	77	75	**72**	69	67	65	63	61	58	57	55	53	51
B6. One-time 30 percent nominal depreciation relative to the baseline in 2018 5/	52	57	59	58	58	59	57	57	56	55	**54**	51	51	50	49	48	46	45	44	43	42
PV of debt-to-revenue ratio																					
Baseline	150	160	163	162	160	158	152	146	141	135	**130**	126	122	119	116	112	109	106	103	100	100
A. Alternative Scenarios																					
A1. Key variables at their historical averages in 2017-2037 1/	150	170	186	201	217	232	246	254	261	264	**267**	270	271	270	266	260	253	243	231	220	209
A2. New public sector loans on less favorable terms in 2017-2037 2	150	171	187	192	196	198	195	191	187	182	**178**	175	173	171	169	167	165	163	161	159	159
B. Bound Tests																					
B1. Real GDP growth at historical average minus one standard deviation in 2018-2019	150	165	181	180	178	176	169	163	157	151	**145**	140	136	133	129	125	121	118	115	112	110
B2. Export value growth at historical average minus one standard deviation in 2018-2019 3/	150	174	219	215	209	205	197	188	178	168	**160**	152	146	140	135	129	124	119	114	110	107
B3. US dollar GDP deflator at historical average minus one standard deviation in 2018-2019	150	169	191	190	187	185	178	172	165	159	**153**	147	143	140	136	132	128	124	121	118	116
B4. Net non-debt creating flows at historical average minus one standard deviation in 2018-2019 4/	150	173	191	188	184	181	174	166	159	151	**144**	138	133	129	124	120	116	112	108	105	102
B5. Combination of B1-B4 using one-half standard deviation shocks	150	184	240	236	230	226	217	207	197	187	**178**	169	163	157	151	145	139	134	129	125	122
B6. One-time 30 percent nominal depreciation relative to the baseline in 2018 5/	150	222	228	227	224	222	213	205	198	190	**183**	176	172	167	162	157	153	149	145	141	139

Table 4. Madagascar: Sensitivity Analysis for Key Indicators of Public and Publicly Guaranteed External Debt, 2017-37 (concluded)

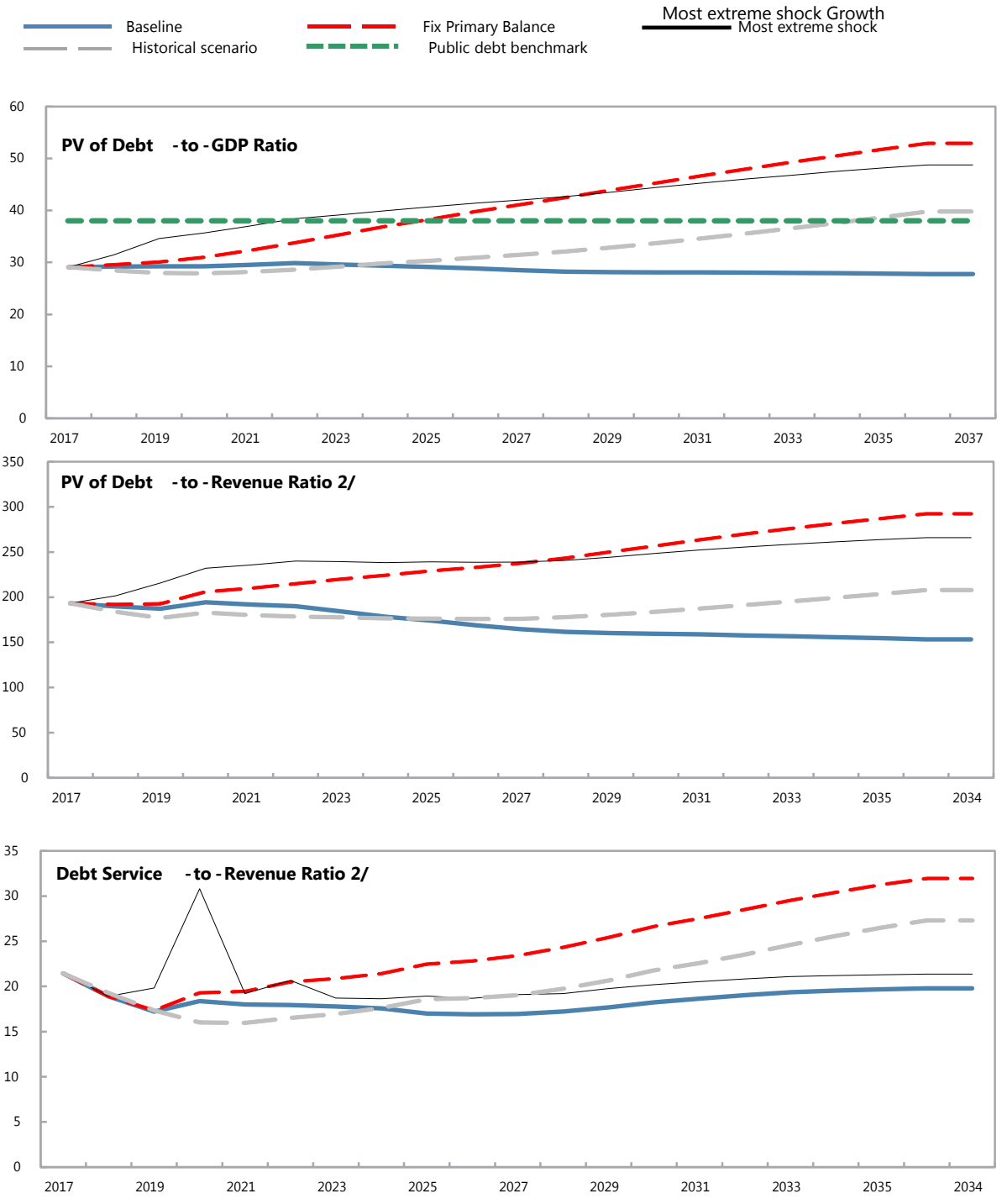
(In percent)

	Projections																				
	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	**2027**	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Debt service-to-exports ratio																					
Baseline	3	3	3	3	3	3	3	4	3	3	**4**	4	4	4	4	4	4	4	4	4	4
A. Alternative Scenarios																					
A1. Key variables at their historical averages in 2017-2037 1/	3	3	3	3	4	4	4	4	5	5	**6**	6	7	7	7	8	8	8	8	8	8
A2. New public sector loans on less favorable terms in 2017-2037 2	3	3	3	3	3	4	4	4	5	5	**5**	5	5	5	5	5	5	5	6	5	6
B. Bound Tests																					
B1. Real GDP growth at historical average minus one standard deviation in 2018-2019	3	3	3	3	3	3	3	4	3	3	**4**	4	4	4	4	4	4	4	4	4	4
B2. Export value growth at historical average minus one standard deviation in 2018-2019 3/	3	3	4	5	5	5	5	6	6	6	**6**	6	6	7	6	6	6	6	6	6	6
B3. US dollar GDP deflator at historical average minus one standard deviation in 2018-2019	3	3	3	3	3	3	3	4	3	3	**4**	4	4	4	4	4	4	4	4	4	4
B4. Net non-debt creating flows at historical average minus one standard deviation in 2018-2019 4/	3	3	3	3	3	4	4	4	4	4	**4**	4	4	4	4	4	4	4	4	4	4
B5. Combination of B1-B4 using one-half standard deviation shocks	3	3	3	4	4	4	4	5	5	5	**5**	5	5	5	5	5	5	5	5	5	5
B6. One-time 30 percent nominal depreciation relative to the baseline in 2018 5/	3	3	3	3	3	3	3	4	3	3	**4**	4	4	4	4	4	4	4	4	4	4
Debt service-to-revenue ratio																					
Baseline	10	8	7	9	9	9	9	9	8	8	**9**	9	9	9	9	9	9	9	9	9	9
A. Alternative Scenarios																					
A1. Key variables at their historical averages in 2017-2037 1/	10	8	8	9	10	10	10	11	11	12	**13**	14	16	17	17	18	18	18	18	18	18
A2. New public sector loans on less favorable terms in 2017-2037 2	10	8	7	8	9	10	10	11	12	11	**12**	12	12	12	13	13	13	13	13	13	13
B. Bound Tests																					
B1. Real GDP growth at historical average minus one standard deviation in 2018-2019	10	9	8	10	10	10	10	10	10	10	**10**	10	10	11	11	11	10	10	10	10	10
B2. Export value growth at historical average minus one standard deviation in 2018-2019 3/	10	8	8	10	10	10	10	11	12	11	**11**	11	11	11	11	11	11	11	11	10	10
B3. US dollar GDP deflator at historical average minus one standard deviation in 2018-2019	10	9	9	10	10	11	11	11	10	10	**10**	11	11	11	11	11	11	11	11	11	10
B4. Net non-debt creating flows at historical average minus one standard deviation in 2018-2019 4/	10	8	8	9	9	10	9	10	10	10	**10**	10	10	10	10	10	10	10	10	10	9
B5. Combination of B1-B4 using one-half standard deviation shocks	10	9	9	11	11	11	11	12	13	13	**13**	13	13	13	13	13	12	12	12	12	11
B6. One-time 30 percent nominal depreciation relative to the baseline in 2018 5/	10	12	11	12	13	13	13	13	12	12	**12**	13	13	13	13	13	13	13	13	13	12
Memorandum item:																					
Grant element assumed on residual financing (i.e., financing required above baseline) 6/	38	38	38	38	38	38	38	38	38	38	**38**	38	38	38	38	38	38	38	38	38	38

Sources: Country authorities; and staff estimates and projections.

1/ Variables include real GDP growth, growth of GDP deflator (in U.S. dollar terms), non-interest current account in percent of GDP, and non-debt creating flows.
2/ Assumes that the interest rate on new borrowing is by 2 percentage points higher than in the baseline., while grace and maturity periods are the same as in the baseline.
3/ Exports values are assumed to remain permanently at the lower level, but the current account as a share of GDP is assumed to return to its baseline level after the shock (implicitly assuming an offsetting adjustment in import levels).
4/ Includes official and private transfers and FDI.
5/ Depreciation is defined as percentage decline in dollar/local currency rate, such that it never exceeds 100 percent.
6/ Applies to all stress scenarios except for A2 (less favorable financing) in which the terms on all new financing are as specified in footnote 2.

Figure 3. Madagascar: Indicators of Public Debt Under Alternative Scenarios, 2017-2037



Sources: Country authorities; and staff estimates and projections.
1/ The most extreme stress test is the test that yields the highest ratio on or before 2027.
2/ Revenues are defined inclusive of grants.

Table 5. Madagascar: Public Sector Debt Sustainability Framework, Baseline Scenario, 2017-37

(In percent of GDP; unless otherwise indicated)

	Actual					Projections									
	2014	2015	2016	Average 5/	Standard Deviation 5/	2017	2018	2019	2020	2021	2022	2017-22 Average	2027	2037	2023-37 Average
Public sector debt 1/	35.8	41.3	38.7	34.4	3.2	41.3	42.2	43.2	43.5	43.9	44.3	43.1	40.7	37.1	39.5
of which: foreign-currency denominated	24.4	28.4	27.0	24.8	1.7	29.6	31.9	33.9	34.8	35.4	35.8	33.6	32.1	25.3	29.8
Change in public sector debt	1.9	5.5	-2.5			2.5	1.0	0.9	0.3	0.4	0.4		-0.8	0.1	
Identified debt-creating flows	1.8	4.4	-2.8			1.5	0.8	0.6	0.1	0.3	0.3		-0.9	-1.0	
Primary deficit	1.7	2.4	0.4	1.5	0.9	4.2	3.6	3.4	2.8	2.5	2.4	3.2	1.0	0.7	1.0
Revenue and grants	12.4	11.8	14.7	12.9	2.0	15.1	15.4	15.6	15.1	15.4	15.7	15.4	17.3	18.2	17.5
of which: grants	2.3	1.5	3.4	2.3	1.1	3.5	3.6	3.4	2.4	2.3	2.2	2.9	2.0	1.8	2.0
Primary (noninterest) expenditure	14.1	14.3	15.1	14.4	1.6	19.2	19.0	19.1	17.8	17.9	18.1	18.5	18.3	18.9	18.5
Automatic debt dynamics	0.9	2.5	-2.0			-2.1	-2.3	-2.6	-2.4	-2.2	-2.1		-2.0	-1.7	
Contribution from interest rate/growth differential	-1.5	-1.3	-1.9			-2.0	-2.4	-2.5	-2.4	-2.4	-2.4		-2.2	-1.8	
of which: contribution from average real interest rate	-0.4	-0.2	-0.2			-0.4	-0.3	-0.2	-0.1	-0.3	-0.3		-0.2	0.0	
of which: contribution from real GDP growth	-1.1	-1.1	-1.7			-1.6	-2.1	-2.3	-2.2	-2.1	-2.1		-2.0	-1.8	
Contribution from real exchange rate depreciation	2.4	3.8	-0.1			-0.1	0.0	-0.1	-0.1	0.2	0.3		...	...	
Other identified debt-creating flows	-0.7	-0.5	-1.2			-0.7	-0.5	-0.2	-0.2	0.0	0.0		0.0	0.0	
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 implicit or contingent liabilities	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			0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Reduction of domestic arrears	-0.7	-0.5	-1.2			-0.7	-0.5	-0.2	-0.2	0.0	0.0		0.0	0.0	
Residual, including asset changes	0.1	1.1	0.3	-0.5	1.3	1.1	0.2	0.3	0.2	0.1	0.1	0.3	0.1	1.2	0.4
Other Sustainability Indicators															
PV of public sector debt	...	...	27.2			29.1	29.2	29.2	29.2	29.5	29.9		28.5	28.0	
of which: foreign-currency denominated	...	...	15.5			17.4	18.8	20.0	20.5	21.0	21.3		19.9	16.2	
of which: external	...	...	15.5			17.4	18.8	20.0	20.5	21.0	21.3		19.9	16.2	
Gross financing need 2/	9.3	10.5	9.3	8.2	1.5	12.6	11.8	10.7	9.7	9.2	9.1	10.5	7.9	9.5	8.6
PV of public sector debt-to-revenue and grants ratio (in percent)	...	...	185.3			193.3	189.8	187.3	194.2	191.8	190.1		164.6	153.7	
PV of public sector debt-to-revenue ratio (in percent)	...	...	241.9			251.4	248.2	239.1	230.5	225.2	221.7		186.6	170.8	
of which: external 3/	...	...	137.6			150.3	160.1	163.3	161.9	160.0	158.2		130.5	99.1	
Debt service-to-revenue and grants ratio (in percent) 4/	20.5	24.5	21.1	19.5	3.5	21.4	18.9	17.2	18.4	18.0	17.9	18.6	16.9	19.9	18.4
Debt service-to-revenue ratio (in percent) 4/	25.2	28.0	27.6	23.5	3.6	27.9	24.7	22.0	21.8	21.1	20.9	23.1	19.2	22.1	20.7
Primary deficit that stabilizes the debt-to-GDP ratio	-0.2	-3.1	2.9	-0.1	3.0	1.7	2.7	2.5	2.5	2.1	2.0	2.2	1.9	0.5	1.5
Key macroeconomic and fiscal assumptions															
Real GDP growth (in percent)	3.3	3.1	4.2	2.7	3.3	4.3	5.3	5.9	5.5	5.2	5.0	5.2	5.0	5.0	5.0
Average nominal interest rate on forex debt (in percent)	1.1	1.1	1.1	1.3	0.2	1.2	1.3	1.4	1.3	1.3	1.3	1.3	1.3	1.4	1.3
Average real interest rate on domestic debt (in percent)	-2.7	-1.5	-0.8	-0.1	1.5	-1.5	-0.6	0.2	1.3	1.6	1.7	0.5	1.9	1.9	1.9
Real exchange rate depreciation (in percent, + indicates depreciation	10.8	16.1	-0.3	2.8	8.6	-0.2	...	...	...	...	...	...	...	...	...
Inflation rate (GDP deflator, in percent)	6.6	7.6	6.7	7.6	1.6	7.8	6.8	6.5	5.5	5.4	5.0	6.1	5.0	5.0	5.0
Growth of real primary spending (deflated by GDP deflator, in percer	3.2	4.3	10.1	1.7	3.3	33.2	4.2	6.0	-1.4	5.8	5.8	8.9	5.9	4.9	5.3
Grant element of new external borrowing (in percent)	...	...	...	...	...	36.2	43.1	47.8	45.0	45.3	43.7	43.5	40.4	37.0	39.1

Sources: Country authorities; and staff estimates and projections.

1/ General government gross debt

2/ 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.

3/ Revenues excluding grants.

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

5/ Historical averages and standard deviations are generally derived over the past 10 years, subject to data availability.

Table 6. Madagascar: Sensitivity Analysis for Key Indicators of Public Debt 2017-37

	Projections																				
	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
PV of Debt-to-GDP Ratio																					
Baseline	29	29	29	29	30	30	30	29	29	29	28	28	28	28	28	28	28	28	28	28	28
A. Alternative scenarios																					
A1. Real GDP growth and primary balance are at historical averages	29	28	28	28	28	29	29	30	30	31	31	32	33	34	35	36	37	38	39	40	41
A2. Primary balance is unchanged from 2017	29	30	30	31	32	34	35	37	38	40	41	43	44	45	47	48	49	51	52	53	54
A3. Permanently lower GDP growth 1/	29	29	30	30	31	32	32	33	33	33	34	35	35	37	38	39	40	41	42	44	45
B. Bound tests																					
B1. Real GDP growth is at historical average minus one standard deviations in 2018-2019	29	31	35	36	37	38	39	40	41	41	42	43	44	44	45	46	47	48	48	49	50
B2. Primary balance is at historical average minus one standard deviations in 2018-2019	29	28	28	28	28	29	28	28	28	28	27	27	27	27	27	27	27	27	27	27	27
B3. Combination of B1-B2 using one half standard deviation shocks	29	29	29	30	32	33	33	34	35	35	36	36	37	37	38	39	39	40	41	41	42
B4. One-time 30 percent real depreciation in 2018	29	36	35	34	34	34	33	33	32	32	32	31	31	31	31	31	31	31	31	30	31
B5. 10 percent of GDP increase in other debt-creating flows in 2018	29	36	36	35	35	36	35	35	34	34	33	33	32	32	32	32	31	31	31	31	31
PV of Debt-to-Revenue Ratio 2/																					
Baseline	193	190	187	194	192	190	184	178	174	169	165	162	160	159	159	158	157	156	155	153	154
A. Alternative scenarios																					
A1. Real GDP growth and primary balance are at historical averages	193	184	177	183	180	179	178	177	176	176	176	178	181	184	188	191	195	199	204	208	215
A2. Primary balance is unchanged from 2017	193	192	193	206	210	215	220	224	229	233	238	243	250	257	264	270	276	282	287	292	299
A3. Permanently lower GDP growth 1/	193	191	190	200	200	201	199	196	196	195	194	196	200	205	210	215	221	226	232	238	245
B. Bound tests																					
B1. Real GDP growth is at historical average minus one standard deviations in 2018-2019	193	202	216	232	236	240	239	238	239	239	239	241	244	248	252	256	259	261	264	266	270
B2. Primary balance is at historical average minus one standard deviations in 2018-2019	193	185	178	185	183	182	177	171	167	162	158	156	155	154	154	153	152	151	150	149	150
B3. Combination of B1-B2 using one half standard deviation shocks	193	188	185	199	203	207	206	204	204	203	203	204	207	210	214	216	219	221	223	225	228
B4. One-time 30 percent real depreciation in 2018	193	234	223	226	218	213	206	199	193	187	182	179	177	176	175	174	172	171	170	168	168
B5. 10 percent of GDP increase in other debt-creating flows in 2018	193	235	231	235	230	226	219	211	205	198	192	187	184	182	180	178	176	174	172	170	169
Debt Service-to-Revenue Ratio 2/																					
Baseline	21	19	17	18	18	18	18	18	17	17	17	17	18	18	19	19	19	20	20	20	20
A. Alternative scenarios																					
A1. Real GDP growth and primary balance are at historical averages	21	19	17	16	16	17	17	18	19	19	19	20	21	22	23	24	25	26	27	27	28
A2. Primary balance is unchanged from 2017	21	19	17	19	19	20	21	21	22	23	23	24	25	27	28	29	30	30	31	32	33
A3. Permanently lower GDP growth 1/	21	19	17	19	19	19	19	19	19	19	20	20	21	23	24	25	25	26	27	28	29
B. Bound tests																					
B1. Real GDP growth is at historical average minus one standard deviations in 2018-2019	21	20	19	22	23	23	23	23	23	23	24	24	25	26	27	28	29	29	30	30	31
B2. Primary balance is at historical average minus one standard deviations in 2018-2019	21	19	17	16	16	17	17	17	17	16	16	17	17	18	18	19	19	19	19	19	20
B3. Combination of B1-B2 using one half standard deviation shocks	21	20	18	17	17	20	20	21	20	20	20	21	22	23	24	24	25	26	26	26	27
B4. One-time 30 percent real depreciation in 2018	21	20	20	22	22	22	22	22	22	22	22	22	23	24	25	25	26	26	26	26	26
B5. 10 percent of GDP increase in other debt-creating flows in 2018	21	19	20	31	19	21	19	19	19	19	19	19	20	20	21	21	21	21	21	21	21

Sources: Country authorities; and staff estimates and projections.
1/ Assumes that real GDP growth is at baseline minus one standard deviation divided by the square root of the length of the projection period.
2/ Revenues are defined inclusive of grants.