INTERNATIONAL MONETARY FUND

MALI

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STAFF REPORT FOR THE 2015 ARTICLE IV CONSULTATION, FOURTH REVIEW UNDER THE EXTENDED CREDIT FACILITY ARRANGEMENT, AND REQUEST FOR MODIFICATION OF A PERFORMANCE CRITERION—DEBT SUSTAINABILITY ANALYSIS

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Prepared jointly by staffs of the International Monetary Fund and the International Development Association

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

Mali's risk of debt distress continues to be assessed as moderate—unchanged from the previous Debt Sustainability Analysis (DSA). Debt sustainability is highly sensitive to a tightening of financial terms, limiting the room for non-concessional borrowing. It is also vulnerable to a reduction in transfers and foreign direct investment and an export shock stemming from the concentration of exports in gold.

BACKGROUND

A. Recent Developments in Public External Debt

1. As a result of the enhanced Highly Indebted Poor Countries (HIPC) Initiative and the Multilateral Debt Relief Initiative (MDRI), Mali's stock of external debt declined significantly in the early to mid-2000s. Mali's stock of public and publicly guaranteed external debt declined from 89 percent of GDP in 2001 to 19 percent in 2006 owing to enhanced HIPC debt relief in 2002 and MDRI debt relief in 2006 (Text Table 1). At end-2014, it had increased to 25 percent of GDP owing mainly to new loans granted by the International Development Association (IDA), the African Development Bank (ADB), the Islamic Development Bank (IsDB), and the IMF (mainly through an allocation of SDR 74 million in 2009). The bulk of Mali's stock of external public debt is owed to multilateral creditors, mainly IDA, ADB and IsDB. There are no official estimates of Mali's total private external debt stock but a rough proxy suggests this is likely to be small, at around 8 percent of GDP at end-2014.[1]

Text Table 1: Mali: External Debt Stock at Year-End, 2001–14

(billions of CFAF)

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Total	1,969	1,156	1,169	1,185	1,474	606	643	811	958	1,134	1,229	1,382	1,407	1,485
(percent of GDP)	89.0	52.0	47.7	45.0	50.9	18.9	18.8	20.7	22.6	24.3	24.4	25.9	25.6	24.8
Multilateral	1,506	824	741	878	1,199	357	448	616	767	896	1,006	1,105	1,160	1,202
IMF [1]	110	100	94	79	66	4	6	19	68	72	101	101	83	94
World Bank/IDA	343	106	176	268	384	84	216	263	313	414	494	578	586	597
African Development Bank	329	116	239	289	380	121	134	112	136	158	257	247	229	245
Islamic Development Bank	45	40	36	55	64	31	57	96	112	114	124	118	111	92
Others	678	462	195	187	306	117	34	126	138	139	30	62	151	174
Official Bilateral	456	327	423	302	270	247	193	192	188	236	222	276	284	282
Paris Club official debt	127	31	8	17	18	13	16	4	4	10	13	13	10	8
Non-Paris Club official debt	328	297	416	285	252	234	178	188	184	226	209	263	275	273
Other Creditors	7	4	4	4	6	2	3	3	3	3	2	2	1	1

Sources: Malian authorities, staff estimates.

[1] Includes August 2009 SDR allocation.

B. Recent Developments in Public Domestic Debt

2. Mali's domestic public debt is low but has increased rapidly over the past few years. At end 2014, domestic public debt was 7.4 percent of GDP, compared to 2.3 percent of GDP in 2009 (Text Table 2). The outstanding stock consists mainly of treasury bills and bonds issued on the regional market of the

[1] Calculated as the gross external liabilities of commercial banks resident in Mali from the monetary survey and the gross external liabilities of the Malian non-bank sector vis-à-vis banks that report to the Bank of International Settlements (BIS). The latter may also include any debt of the public sector to BIS-reporting banks.

West African Economic and Monetary Union (WAEMU), but it also includes some arrears owed to domestic suppliers that have been validated through audits and recognized as debt by the authorities. The sharp increase in the stock of domestic debt between 2009 and 2014 resulted mainly from new issuances of treasury bills and bonds. The increase also reflects the inclusion of debt previously unreported in the official statistics, following an inventory of all loans contracted or guaranteed by the government that the authorities have been conducting as part of their plan to strengthen debt management.

Text Table 2: Mali: Public Domestic Debt Stock at Year-End, 2009–14

(billions of CFAF)

	2009	2010	2011	2012	2013	2014
Total	97	203	238	231	318	445
Nominal GDP	4233	4667	5038	5328	5490	5987
(percent of GDP)	2.3	4.4	4.7	4.3	5.8	7.4
Central bank (ex IMF)	8	6	3	1	0	0
Commercial banks	82	94	114	112	172	329
Other [1]	6	104	120	119	146	116

Sources: Malian authorities, staff estimates.

[1] Includes debt owed to non-banks and banks resident in WAEMU countries outside of Mali.

C. Debt Burden Thresholds under the Debt Sustainability Framework

3. Mali is a medium policy performer for the purpose of determining the debt burden thresholds under the Debt Sustainability Framework (DSF). Mali's rating on the World Bank's Country Policy and Institutional Assessment (CPIA) averaged 3.38 (on a scale of 1 to 6) during 2012–14, making it a medium policy performer. The corresponding external public debt burden thresholds are shown in Text Table 3.

Text Table 3. External Public Debt Thresholds for "Medium Policy Performers" under the Debt Sustainability Framework

	Without remittances	With remittances
Present value of external debt in percent of:		
GDP	40	36
Exports	150	120
Revenue	250	250
External debt service in percent of:		
Exports	20	16
Revenue	20	20

UNDERLYING ASSUMPTIONS

A. Baseline Scenario

4. In the short run, the economy is expected to grow slightly above trend as the recovery following the political and security crisis of 2012 takes hold. The baseline scenario remains broadly in line with that of the December 2014 DSA[2] and assumes a stable political environment, the implementation of sound macroeconomic and structural policies, and the resumption of aid and foreign direct investment (FDI). Notable revisions compared to the December 2014 DSA include (Text Table 4):

- Real GDP growth is expected to be slightly weaker in the near term (2015) on the back of unusually strong agricultural production during the previous year. In the long run, growth is assumed to revert toward the historical average of 4.5 percent
- Oil prices are around 20 percent lower over the projection period, expected to result in a modest boost to the trade balance in the medium term from lower oil imports.
- Gold prices are around 7 percent lower over the projection period, although the impact on the value of export receipts is offset in the near term by upward revisions to the projected volume of production from existing mines and production from new mines expected to come on stream during the next five years. From 2019, however, the volume of gold production is expected to decline by around 2 percent per annum.
- The medium-term current account deficit (excluding grants) is expected to be higher than in the previous DSA in the medium term, due to staffs' updated assumption of the likely duration of international military assistance and associated military services imports.[3]
- The medium-term current account deficit (including grants) is expected to be lower than in the previous DSA in the medium term, due to the beneficial impact of lower oil prices on imports.
- The overall fiscal deficit (excluding grants) is projected to be slightly lower than in the previous DSA in 2015 due to under-executed capital spending, but broadly similar further out.
- All new external borrowing is projected to be on similar terms as in the recent past. The main change with respect to the previous DSA is a projected increase in the share of Mali's external loans provided by Chinese development banks.

[2] See Joint IDA/IMF Debt Sustainability Analysis in the IMF Country Report No. 14/337.

[3] International military assistance is registered in the balance of payments as imports of security services financed by grants and includes the United Nations MINUSMA mission and the French Barkhane operation. Although MINUSMA's mandate is renewed on an annual basis there are no indications it will be wound down soon, while to Staff's knowledge, there is no published end-date for Barkhane.

Text Table 4. Mali: Evolution of Selected Macroeconomic Indicators

	2014	2015	2016	2017	2018	Long term [1]
	Est	Projections				
Real GDP growth						
Current DSA	7.2	4.9	5.4	5.1	4.5	4.5
Previous DSA	7.2	5.0	5.5	5.6	5.7	5.0
Overall fiscal deficit (excluding grants, percent of GDP)						
Current DSA	-6.1	-6.0	-5.5	-5.6	-5.2	-5.4
Previous DSA	-6.2	-7.7	-5.7	-5.8	-5.8	-5.9
Current account deficit [2] (excluding grants, percent of GDP)						
Current DSA	-16.4	-12.9	-13.2	-13.9	-15.1	-8.3
Previous DSA	-18.1	-16.4	-10.0	-10.6	-10.2	-16.8
Current account deficit (including grants, percent of GDP)						
Current DSA	-5.5	-2.5	-3.2	-4.4	-6.1	-6.1
Previous DSA	-7.0	-5.3	-5.5	-6.1	-6.4	-6.4
Official aid [3] (percent of GDP)						
Current DSA	4.6	6.0	5.0	5.4	5.5	6.0
Previous DSA	4.6	8.3	6.3	6.4	6.4	6.6
Gold prices (US$/fine ounce London fix)						
Current DSA	1266	1175	1158	1171	1188	1234
Previous DSA	1290	1286	1295	1320	1351	1394
Gold exports (percent of GDP)						
Current DSA	15.3	15.5	14.1	13.1	10.8	5.8
Previous DSA	14.7	13.9	13.3	12.2	11.5	6.2
Oil prices (US$/barrel)[4]						
Current DSA	96	52	50	55	60	63
Previous DSA	99	85	86	86	85	85

[1] Defined as the last 15 years of the projection period. For the current DSA, the long term covers the 2021-35 period. For the previous DSA, it covered 2020-34.

[2] The large current account (excluding grants) deficit in 2014-18 reflects the international military assistance, which is assumed to continue into the medium term. It is registered as imports of security services financed by grants, which average 6% of GDP per annum.

[3] Defined as the sum of concessional grants and loans.

[4] Simple average of three spot prices; Dated Brent, West Texas Intermediate, and the Dubai Fateh.

5. The central feature of Mali's medium- and long-term external sector outlook is the steady decline of annual gold production expected to be compensated only in part by other exports. The baseline long-term scenario assumes trend GDP growth of 4.5 percent—in line with the historical average—as strong growth in the secondary and tertiary sectors offsets the steady decline of gold production (Box 1). Inflation is expected to remain moderate as prudent fiscal policies are implemented with no recourse to domestic borrowing on a net basis, and the monetary policy stance stays consistent with the objectives of the regional central bank. The current account deficit is expected to remain stable (8–9 percent of GDP excluding grants, 6 percent including grants) as the decline in gold exports is compensated by an increase of other exports including agricultural products and other minerals, and a deceleration in import growth. The deceleration of import growth stems from the decline in gold exports that are particularly import intensive relative to other exports.

Box 1. Mali: Macroeconomic Assumptions Underlying the Baseline Scenario, 2015–35

- **Real GDP growth.** It is expected to remain robust as Mali's recovery from the recent political and security challenges takes hold. Near term growth in 2015 is projected to remain strong at 5 percent, while long-term growth is expected to average 4.5 percent per year. This is moderately higher than the trend observed during the past 10 years which included the 2012 crisis (4.3 percent) but broadly in line with average growth over the past 30 years. Gold output is projected to decline by around 2 percent annually starting in 2019 but strong growth in the secondary and tertiary sectors, aided by political stability and supported by structural reforms, is expected to offset this decline over time. With a projected rapid population growth, the baseline scenario thus assumes low per capita income growth and therefore continuous access to concessional financing linked to low income status.
- **Consumer price inflation.** It is projected to remain below the WAEMU convergence criterion of 3 percent, reflecting low global inflation and normal domestic weather conditions.
- **Fiscal policy.** Owing to pressing public spending needs related to implementation of the peace agreement[1], the overall fiscal deficit (excluding grants) is expected to remain close to 6 percent of GDP in 2015. The 2015 deficit is expected to be financed by higher disbursements of grants and loans pledged by the international community to help with the country's recovery from the 2012–13 crisis, some of which represent undisbursed support from 2014. Thereafter, the overall fiscal deficit (excluding grants) is projected to come down to and average around 5.4 percent of GDP in 2021–35, and to be financed in equal proportion by grants and external loans. The basic fiscal balance (revenue plus budgetary grants minus domestically financed expenditure) is expected to remain at zero from 2018 onwards and the overall fiscal balance at 3 percent of GDP, in line with the convergence criterion of the WAEMU, of which Mali is a member. Tax revenue, as a percent of GDP, is expected to increase by about 5.0 percentage points over the projection period, finance the increase of domestically financed expenditure, and compensate the reduction of aid after the post-crisis surge in 2013–15. Therefore, there is no recourse to additional domestic borrowing to finance the budget, except for rolling over current stock of domestic debt at market rates.
- **The non-interest current account deficit (including transfers)**. It is projected to average 6.1 percent of GDP over 2021–35, slightly above the historic average (6.8 percent of GDP). It is expected to decline from 5.5 percent of GDP in 2014 to 2.5 percent of GDP in 2015, mainly resulting from a decline in the value of oil imports due to lower oil prices. The improvement in the current account (including grants), in turn, is expected to lead to a small accumulation of reserves at the BCEAO. Gold export volumes are expected to decline steadily over time, with the share of gold in total exports projected to fall from 67 percent in 2014 to about 31 percent in 2035.[2] This decline is projected to be compensated in part by a gradual increase in other exports (including food, cotton, tourism and other minerals such as cement, phosphate, uranium, bauxite, iron ore, copper, nickel, oil) and in part by a deceleration of import growth. Remittances are projected to remain at their current level of 7 percent of GDP.

[1/] See paragraph 1 of Staff Report.
[2/] New mining projected to come on stream from 2018 is, however, expected to provide some support to gold exports in the medium term.

B. External DSA

6. Under the baseline assumptions, all external debt and debt-service ratios remain below the policy-dependent thresholds throughout the projection period (Figure 1a). The present value (PV) of external debt, calculated using a 5 percent discount rate, is expected to remain broadly constant throughout the projection period, between 15 and 19 percent of GDP (Table 1a). As production from

existing and planned new gold mines declines starting in 2019 and growth of other exports only partly compensate for that decline, the PV of the external debt-to-exports ratio is projected to increase from 52 percent in 2014 to 143 percent in 2035, only slightly below the threshold of 150 percent (Figure 1a, Table 1a). With a 5 percentage point increase in tax revenue to GDP during the projection period, the PV of the external debt-to-revenue ratio is expected to remain broadly stable between 70% - 80% percent of GDP, significantly below the threshold of 250 percent (Figure 1a, Table 1a).

7. Under the alternative probability approach, all external debt and debt-service ratios also remain below the policy-dependent thresholds throughout the projection period (Figure 1b). Since Mali's debt-to-export ratio lies within 10 percent of the threshold in the baseline case (and is hence considered borderline), the use of the "probability approach" is recommended. The "probability approach" is an alternative and complementary methodology for assessing external debt sustainability, based on the evolution of the probability of debt distress over time, rather than on the evolution of debt burden indicators. Under the probability approach, the projected probability of debt distress (expressed as a percent) associated with each debt burden indicator is compared to a threshold level, which in contrast to the baseline approach, is country specific; in this case, the thresholds incorporate Mali's individual CPIA score and average GDP growth rate. Application of the probability approach in Mali's case yields a similar conclusion as the standard approach, except that there are now no breaches under any of the shocks (Figure 1b).

8. Mali's external debt sustainability is most sensitive to a tightening of financial terms while also being vulnerable to a reduction in transfers and FDI and an export shock. Under a bound test where financial terms are tightened by 2 percentage points over the projection period, the PV of debt-to-exports ratio would breach the threshold in 2024 and continue to increase until the end of the projection period to reach about 270 percent in 2035 (Figure 1a, Table 1b, Scenario A2). Under a bound test that reduces FDI and official and private transfers in 2016–17 by 5 percent of GDP, the PV of the debt-to-exports ratio would exceed the threshold from 2019 until the end of the projection period (Table 1b, Scenario B4). And under a bound test that reduces export *growth* temporarily in 2016–17 with the effect of reducing exports *levels* permanently by 15 percent, the PV of the debt-to-exports ratio would breach the threshold in 2030 (Table 1b, Scenario B2). Under the probability approach, stress tests do not result in breaches of thresholds, though the margin relative to the threshold for the debt-to-export ratio is very small. Under this approach, external debt is most sensitive to a shock to non-debt flows for all debt level and debt service indicators (Figure 1b).

9. Mali's external debt sustainability assessment remains similar when remittances are accounted for.[4] Workers' remittances represent a reliable source of foreign exchange in Mali, averaging 7 percent of GDP during the past three years. Under the baseline assumptions, all external debt and debt-service ratios remain below the policy-dependent thresholds throughout the projection period (Figure 2, Table 3). Over 2015–35, the PV of debt-to-GDP plus remittances remains broadly constant, between 14 and 18 percent, and the PV of debt-to-exports plus remittances increases from 47 percent to 96 percent. Under

[4] Note that the risk of external debt distress is based on the without-remittances assessment.

a bound test that tightens financial terms, the PV of debt-to-exports plus remittances ratio would breach the threshold in 2022, and remain above it for the entire projection period through 2032 (Figure 2, Table 3).

C. Public DSA

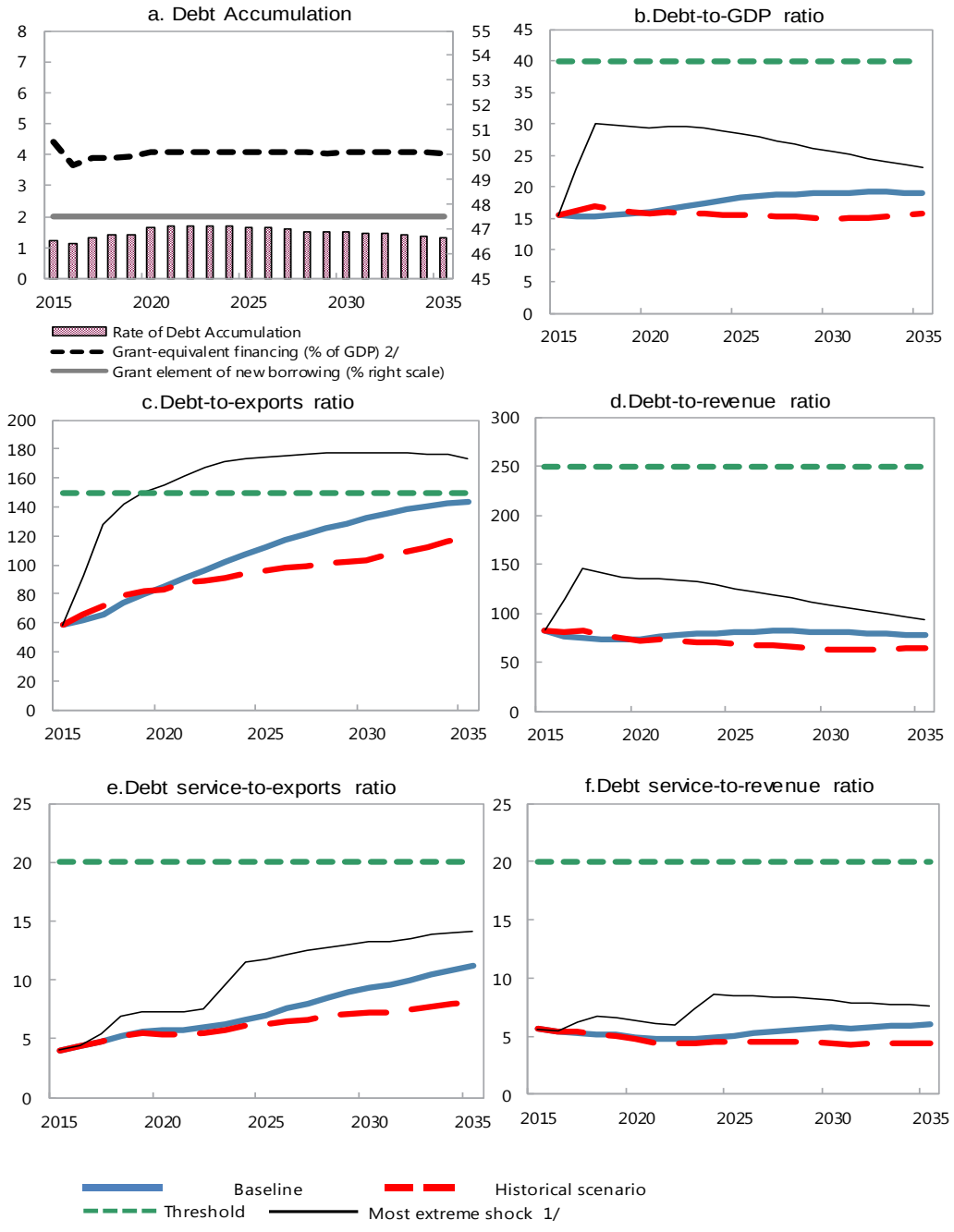
10. The inclusion of domestic debt does not alter the assessment of Mali's debt sustainability. Given the small size of Mali's domestic debt and the absence of recourse to additional domestic borrowing in the baseline scenario, the public debt sustainability analysis closely mirrors the external debt sustainability analysis (Figure 3 and Table 2a). The PV of public sector debt-to-GDP ratio stays between 23 and 28 percent of GDP during the whole projection period. However, in light of the recent rapid growth in the stock of domestic debt (¶2), new domestic borrowing should be closely monitored.

11. The Malian authorities broadly agreed with the conclusions of the DSA. Staffs stressed the importance of continuing to meet their financing needs with grants and concessional loans with a minimum grant element of 35 percent, where possible. The authorities indicated they found some of the DSA assumptions, notably on long-run economic growth (4.5 percent), conservative, but shared the staff's overall assessment. In accordance with the Fund's new debt limits policy, which will be applicable to Mali under its Extended Credit Facility (ECF) arrangement following the current 4th review, the authorities agreed a borrowing plan for 2015 and 2016 with IMF staff. Based on this, a ceiling for the nominal value of new external borrowing contracted during these years was included in the ECF-supported program.

D. Conclusion

12. The DSA indicates that Mali remains at moderate risk of debt distress based on the external debt burden indicators. Although none of the debt burden thresholds are breached over the 20–year projection period under the baseline scenario—unchanged from the last DSA—the alternative scenario shows a sustained breach of the debt-to-exports limit under the most extreme shock. Contrary to this finding, the probability approach does not show breaches of the thresholds under stress tests, which could be consistent with a low risk of debt distress. However, the debt-to-export threshold is almost breached by stress tests on this approach, and given Mali's undiversified export base and significant uncertainties surrounding both gold export prices and volumes, vulnerabilities on this front merit retaining a moderate risk of debt distress rating. Debt sustainability is highly sensitive to a tightening of financing terms, underscoring the importance for the Malian government of continuing to meet its external financing needs with grants and concessional loans, wherever possible, and where loans are contracted on less concessional terms, ensuring that the underlying projects deliver a high return on investment. In addition to a financing shock, Mali's debt sustainability is also vulnerable to a reduction in transfers and FDI, and an export shock owing to the export concentration in gold. Given the expected decline in gold exports in the medium term, and the uncertain prospects for export diversification, improving export performance in other sectors to compensate for the expected decline in gold exports will also be critical to maintaining external debt sustainability.

Figure 1a. Mali: Indicators of Public and Publicly Guaranteed External Debt under Alternative Scenarios, 2015–35 1/

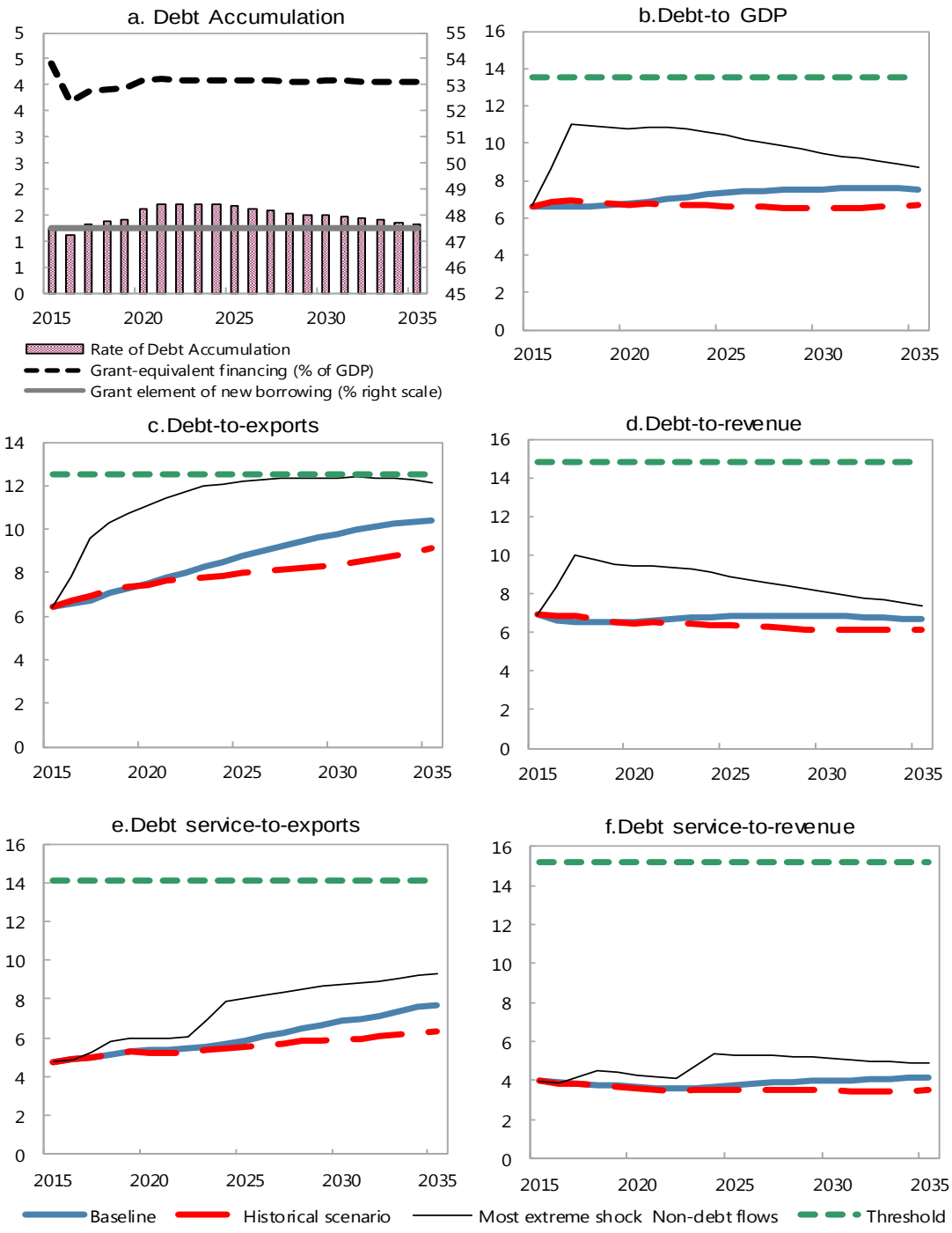


Sources: Country authorities; and staff estimates and projections.

1/ The most extreme stress test is the test that yields the highest ratio on or before 2025. In figure b. it corresponds to a Non-debt flows shock; in c. to a Non-debt flows shock; in d. to a Non-debt flows shock; in e. to a Non-debt flows shock and in figure f. to a Non-debt flows shock

2/ The decline in grant-equivalent financing in 2016 reflects the return to more normal levels of concessional aid following the exceptionally high level of assistance related to the 2011-2012 crisis.

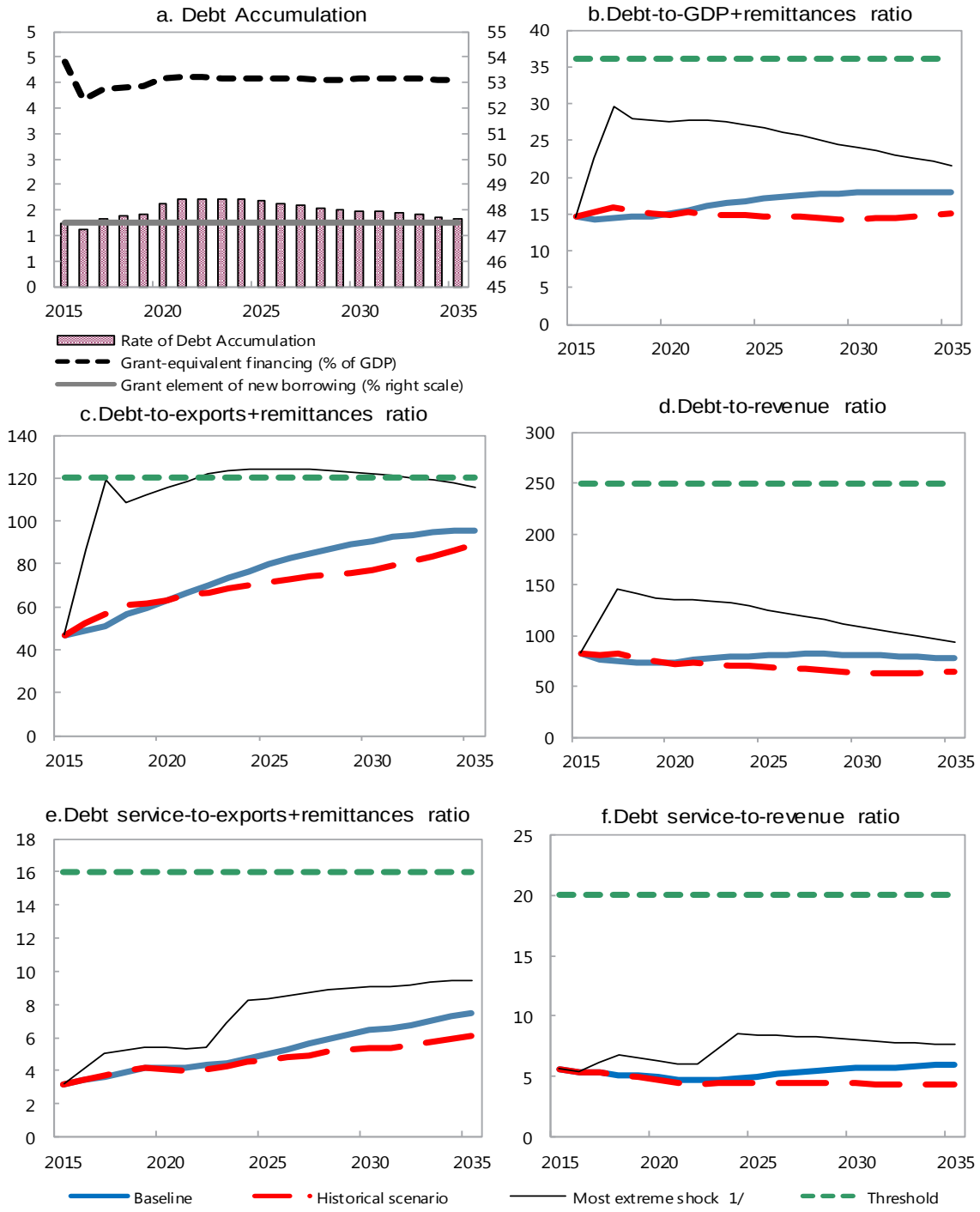
Figure 1b. Mali: Probability of Debt Distress of Public and Publicly Guaranteed External Debt under Alternative Scenarios, 2015–35 1/



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 2025. In figure b. it corresponds to a Non-debt flows shock; in c. to a Non-debt flows shock; in d. to a Non-debt flows shock; in e. to a Non-debt flows shock and in figure f. to a Non-debt flows shock

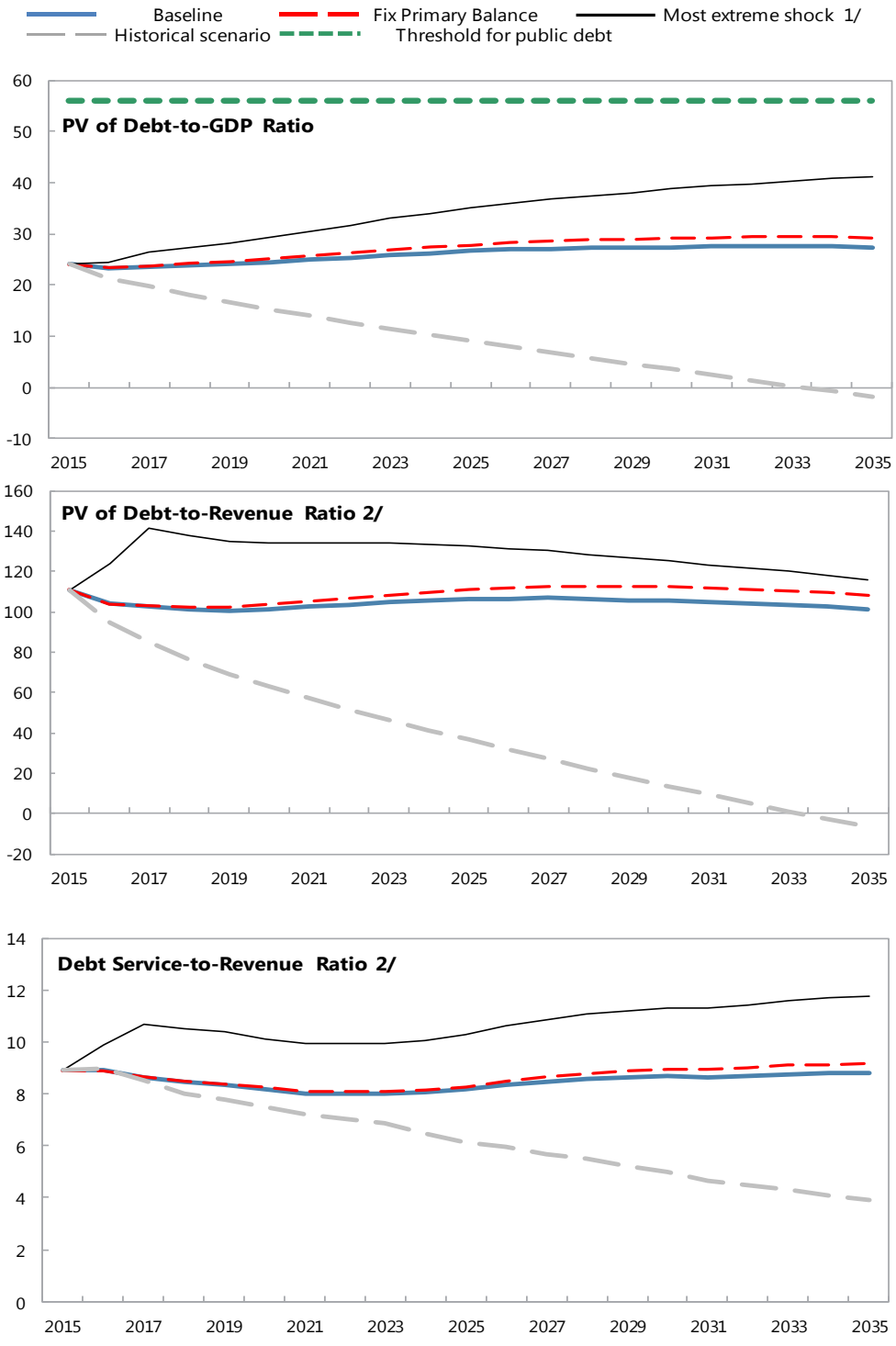
Figure 2. Mali: Indicators of Debt Distress of Public and Publicly Guaranteed External Debt Including Remittances under Alternative Scenarios, 2015–35 1/



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 2025. In figure b. it corresponds to a Non-debt flows shock; in c. to a Non-debt flows shock; in d. to a Non-debt flows shock; in e. to a Non-debt flows shock and in figure f. to a Non-debt flows shock

Figure 3. Mali: Indicators of Public Debt Under Alternative Scenarios, 2015–35 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 2025.
2/ Revenues are defined inclusive of grants.

Table 1a. Mali: External Debt Sustainability Framework, Baseline Scenario, 2014–34 1/

(In percent of GDP, unless otherwise indicated)

	Actual			Historical 6/ Average	Standard Deviation 6/	Projections									
	2012	2013	2014			2015	2016	2017	2018	2019	2020	2015-2020 Average	2025	2035	2021-2035 Average
External debt (nominal) 1/	**25.9**	**25.6**	**25.0**			**28.0**	**27.5**	**27.7**	**28.2**	**28.5**	**29.2**		**32.9**	**35.1**	
of which: public and publicly guaranteed (PPG)	25.9	25.6	25.0			28.0	27.5	27.7	28.2	28.5	29.2		32.9	35.1	
Change in external debt	1.5	-0.3	-0.7			3.0	-0.5	0.1	0.5	0.3	0.7		0.6	0.0	
Identified net debt-creating flows	-0.5	-0.9	1.8			-0.4	0.3	1.2	3.0	3.1	3.1		2.8	1.7	
Non-interest current account deficit	**2.3**	**3.1**	**5.2**	**6.6**	**3.5**	**2.2**	**3.0**	**4.2**	**5.8**	**6.3**	**6.3**		**6.0**	**5.0**	5.7
Deficit in balance of goods and services	5.8	17.9	19.4			15.3	15.9	16.9	18.7	18.9	18.7		13.1	12.8	
Exports	32.1	29.7	26.6			26.5	24.7	23.5	21.0	19.7	18.9		16.3	13.3	
Imports	37.9	47.6	46.1			41.8	40.6	40.4	39.7	38.6	37.6		29.3	26.1	
Net current transfers (negative = inflow)	-7.6	-18.3	-17.4	-9.2	4.7	-17.1	-16.6	-16.1	-15.6	-15.2	-14.7		-8.8	-8.7	-8.7
of which: official	-0.5	-11.4	-10.8			-10.4	-10.0	-9.5	-9.0	-8.6	-8.1		-2.2	-2.1	
Other current account flows (negative = net inflow)	4.1	3.6	3.3			4.0	3.7	3.3	2.7	2.5	2.3		1.7	0.9	
Net FDI (negative = inflow)	**-3.7**	**-2.7**	**-1.6**	**-3.2**	**2.2**	**-1.6**	**-1.6**	**-1.9**	**-1.9**	**-2.2**	**-2.2**		**-2.2**	**-2.2**	-2.2
Endogenous debt dynamics 2/	**0.9**	**-1.2**	**-1.9**			**-1.1**	**-1.1**	**-1.0**	**-0.9**	**-1.0**	**-1.0**		**-1.0**	**-1.1**	
Contribution from nominal interest rate	0.4	0.3	0.3			0.3	0.3	0.3	0.3	0.3	0.3		0.4	0.4	
Contribution from real GDP growth	0.0	-0.4	-1.7			-1.3	-1.4	-1.3	-1.1	-1.3	-1.3		-1.4	-1.5	
Contribution from price and exchange rate changes	0.6	-1.2	-0.4			...	...	...	...	...	...		...	...	
Residual (3-4) 3/	**2.0**	**0.6**	**-2.5**			**3.4**	**-0.7**	**-1.1**	**-2.5**	**-2.8**	**-2.4**		**-2.3**	**-1.8**	
of which: exceptional financing	-0.5	-0.2	0.0			-0.3	-0.3	-0.2	-0.2	-0.2	-0.1		0.0	0.0	
PV of external debt 4/	...	...	13.8			15.5	15.3	15.3	15.6	15.7	16.1		18.2	19.0	
In percent of exports	...	...	51.9			58.5	61.8	65.2	74.2	79.8	84.9		112.0	143.4	
PV of PPG external debt	**...**	**...**	**13.8**			**15.5**	**15.3**	**15.3**	**15.6**	**15.7**	**16.1**		**18.2**	**19.0**	
In percent of exports	**...**	**...**	**51.9**			**58.5**	**61.8**	**65.2**	**74.2**	**79.8**	**84.9**		**112.0**	**143.4**	
In percent of government revenues	**...**	**...**	**78.2**			**82.4**	**76.0**	**74.1**	**73.3**	**72.7**	**73.8**		**80.5**	**77.1**	
Debt service-to-exports ratio (in percent)	**3.4**	**3.8**	**4.3**			**4.0**	**4.4**	**4.7**	**5.2**	**5.6**	**5.7**		**7.0**	**11.2**	
PPG debt service-to-exports ratio (in percent)	**3.4**	**3.8**	**4.3**			**4.0**	**4.4**	**4.7**	**5.2**	**5.6**	**5.7**		**7.0**	**11.2**	
PPG debt service-to-revenue ratio (in percent)	**6.3**	**6.4**	**6.5**			**5.6**	**5.4**	**5.3**	**5.1**	**5.1**	**4.9**		**5.0**	**6.0**	
Total gross financing need (Billions of U.S. dollars)	0.0	0.2	0.6			0.2	0.3	0.4	0.7	0.8	0.8		1.1	2.0	
Non-interest current account deficit that stabilizes debt ratio	0.7	3.4	5.9			-0.8	3.4	4.0	5.3	6.0	5.6		5.4	5.0	
Key macroeconomic assumptions															
Real GDP growth (in percent)	0.0	1.7	7.2	4.3	2.2	4.9	5.4	5.1	4.5	5.0	5.1	5.0	4.5	4.5	4.5
GDP deflator in US dollar terms (change in percent)	-2.3	4.7	1.8	5.0	6.4	-13.6	2.9	3.1	2.9	2.7	2.5	0.1	2.6	2.7	2.7
Effective interest rate (percent) 5/	1.4	1.3	1.2	1.5	0.3	1.0	1.0	1.1	1.1	1.2	1.2	1.1	1.3	1.3	1.3
Growth of exports of G&S (US dollar terms, in percent)	19.4	-1.3	-2.2	11.1	13.8	-9.8	1.1	2.9	-3.9	1.1	3.7	-0.8	4.3	6.3	4.8
Growth of imports of G&S (US dollar terms, in percent)	2.6	33.7	5.6	13.9	17.9	-17.8	5.4	7.8	5.6	5.0	4.9	1.8	5.9	6.3	4.8
Grant element of new public sector borrowing (in percent)	...	...	...	...	...	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5
Government revenues (excluding grants, in percent of GDP)	17.1	17.3	17.7			18.8	20.1	20.7	21.2	21.6	21.8		22.6	24.7	23.2
Aid flows (in Billions of US dollars) 7/	0.1	0.6	0.6			0.5	0.5	0.5	0.6	0.6	0.7		1.0	2.1	
of which: Grants	0.0	0.4	0.3			0.3	0.3	0.3	0.3	0.4	0.4		0.5	1.1	
of which: Concessional loans	0.0	0.3	0.2			0.2	0.2	0.2	0.3	0.3	0.3		0.5	1.0	
Grant-equivalent financing (in percent of GDP) 8/	...	...	...			4.4	3.7	3.9	3.9	3.9	4.1		4.1	4.0	4.1
Grant-equivalent financing (in percent of external financing) 8/	...	...	...			72.4	72.4	70.5	70.1	69.9	68.8		68.8	69.1	68.8
Memorandum items:															
Nominal GDP (Billions of US dollars)	10.4	11.1	12.1			11.0	11.9	12.9	13.9	15.0	16.1		22.8	46.2	
Nominal dollar GDP growth	-2.3	6.5	9.1			-9.4	8.4	8.4	7.5	7.9	7.7	5.1	7.3	7.4	7.3
PV of PPG external debt (in Billions of US dollars)			1.6			1.7	1.8	2.0	2.2	2.4	2.6		4.2	8.8	
(PVt-PVt-1)/GDPt-1 (in percent)						1.2	1.1	1.3	1.4	1.4	1.6	1.4	1.7	1.3	1.6
Gross workers' remittances (Billions of US dollars)	0.7	0.8	0.8			0.7	0.8	0.9	0.9	1.0	1.1		1.5	3.1	
PV of PPG external debt (in percent of GDP + remittances)	...	...	13.0			14.5	14.3	14.4	14.6	14.7	15.1		17.1	17.8	
PV of PPG external debt (in percent of exports + remittances)	...	...	41.6			46.9	48.7	50.9	56.4	59.7	63.0		79.7	95.8	
Debt service of PPG external debt (in percent of exports + remittances)	...	...	3.5			3.2	3.5	3.7	3.9	4.2	4.2		5.0	7.5	

Sources: Country authorities; and staff estimates and projections.

1/ Public sector external debt only.
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); project grants, changes in gross foreign assets; and valuation adjustments. For projections also includes contribution from price and exchange rate changes. The calculation of the residual assumes the capital account is a debt-creating flow, which is inappropriate in Mali's case since the capital account consists primarily of project grants (around 2% of GDP).

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).

Table 1b. Mali: Sensitivity Analysis for Key Indicators of Public and Publicly Guaranteed External Debt, 2014–2034

(In percent)

	Projections											
	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2035
Debt-to-GDP ratio												
Baseline	16	15	15	16	16	16	17	17	17	18	18	19
A. Alternative Scenarios												
A1. Key variables at their historical averages in 2015-2035 1/	16	16	17	17	16	16	16	16	16	16	16	16
A2. New public sector loans on less favorable terms in 2015-2035 2	16	16	17	18	19	21	22	24	25	26	28	36
B. Bound Tests												
B1. Real GDP growth at historical average minus one standard deviation in 2016-2017	16	16	16	17	17	17	18	18	19	19	20	20
B2. Export value growth at historical average minus one standard deviation in 2016-2017 3/	16	16	17	17	17	18	18	19	19	19	20	20
B3. US dollar GDP deflator at historical average minus one standard deviation in 2016-2017	16	16	17	17	17	18	18	19	19	20	20	21
B4. Net non-debt creating flows at historical average minus one standard deviation in 2016-2017 4/	16	23	30	30	30	29	30	30	29	29	28	23
B5. Combination of B1-B4 using one-half standard deviation shocks	16	21	27	27	27	27	27	27	27	27	27	23
B6. One-time 30 percent nominal depreciation relative to the baseline in 2016 5/	16	22	22	22	22	23	24	24	25	25	26	27
Debt-to-exports ratio												
Baseline	59	62	65	74	80	85	90	96	102	107	112	143
A. Alternative Scenarios												
A1. Key variables at their historical averages in 2015-2035 1/	59	66	72	79	81	83	88	89	91	93	96	119
A2. New public sector loans on less favorable terms in 2015-2035 2	59	65	73	87	99	110	122	134	146	158	170	269
B. Bound Tests												
B1. Real GDP growth at historical average minus one standard deviation in 2016-2017	59	62	66	74	80	85	91	97	102	108	113	145
B2. Export value growth at historical average minus one standard deviation in 2016-2017 3/	59	67	81	91	98	103	110	116	122	127	132	163
B3. US dollar GDP deflator at historical average minus one standard deviation in 2016-2017	59	62	66	74	80	85	91	97	102	108	113	145
B4. Net non-debt creating flows at historical average minus one standard deviation in 2016-2017 4/	59	93	128	142	150	155	161	167	171	173	174	173
B5. Combination of B1-B4 using one-half standard deviation shocks	59	81	104	116	123	128	134	139	143	146	149	158
B6. One-time 30 percent nominal depreciation relative to the baseline in 2016 5/	59	62	66	74	80	85	91	97	102	108	113	145
Debt-to-revenue ratio												
Baseline	82	76	74	73	73	74	75	77	78	80	81	77
A. Alternative Scenarios												
A1. Key variables at their historical averages in 2015-2035 1/	82	81	82	78	74	72	73	71	71	70	69	64
A2. New public sector loans on less favorable terms in 2015-2035 2	82	80	83	86	90	96	102	107	113	118	122	144
B. Bound Tests												
B1. Real GDP growth at historical average minus one standard deviation in 2016-2017	82	79	79	78	78	79	81	82	84	85	86	83
B2. Export value growth at historical average minus one standard deviation in 2016-2017 3/	82	79	83	82	81	82	83	84	86	86	87	80
B3. US dollar GDP deflator at historical average minus one standard deviation in 2016-2017	82	80	81	80	80	81	83	84	86	87	88	85
B4. Net non-debt creating flows at historical average minus one standard deviation in 2016-2017 4/	82	114	146	141	137	135	135	134	132	129	125	93
B5. Combination of B1-B4 using one-half standard deviation shocks	82	106	131	127	124	124	124	124	123	121	119	94
B6. One-time 30 percent nominal depreciation relative to the baseline in 2016 5/	82	108	105	104	103	105	107	109	111	113	114	110

Table 1b. Mali: Sensitivity Analysis for Key Indicators of Public and Publicly Guaranteed External Debt, 2015–35 (concluded)

(In percent)

	Projections											
	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2035
Debt service-to-exports ratio												
Baseline	4	4	5	5	6	6	6	6	6	7	7	11
A. Alternative Scenarios												
A1. Key variables at their historical averages in 2015-2035 1/	4	4	5	5	5	5	5	5	6	6	6	8
A2. New public sector loans on less favorable terms in 2015-2035 2	4	4	4	5	6	6	6	7	8	8	9	17
B. Bound Tests												
B1. Real GDP growth at historical average minus one standard deviation in 2016-2017	4	4	5	5	6	6	6	6	6	7	7	11
B2. Export value growth at historical average minus one standard deviation in 2016-2017 3/	4	5	5	6	6	6	6	7	7	8	8	13
B3. US dollar GDP deflator at historical average minus one standard deviation in 2016-2017	4	4	5	5	6	6	6	6	6	7	7	11
B4. Net non-debt creating flows at historical average minus one standard deviation in 2016-2017 4/	4	4	5	7	7	7	7	7	9	12	12	14
B5. Combination of B1-B4 using one-half standard deviation shocks	4	4	5	6	6	7	7	7	8	10	10	13
B6. One-time 30 percent nominal depreciation relative to the baseline in 2016 5/	4	4	5	5	6	6	6	6	6	7	7	11
Debt service-to-revenue ratio												
Baseline	6	5	5	5	5	5	5	5	5	5	5	6
A. Alternative Scenarios												
A1. Key variables at their historical averages in 2015-2035 1/	6	5	5	5	5	5	4	4	4	4	4	4
A2. New public sector loans on less favorable terms in 2015-2035 2	6	5	5	5	5	5	5	5	6	6	7	9
B. Bound Tests												
B1. Real GDP growth at historical average minus one standard deviation in 2016-2017	6	6	6	5	5	5	5	5	5	5	5	6
B2. Export value growth at historical average minus one standard deviation in 2016-2017 3/	6	5	5	5	5	5	5	5	5	5	5	6
B3. US dollar GDP deflator at historical average minus one standard deviation in 2016-2017	6	6	6	6	6	5	5	5	5	5	5	7
B4. Net non-debt creating flows at historical average minus one standard deviation in 2016-2017 4/	6	5	6	7	7	6	6	6	7	9	8	8
B5. Combination of B1-B4 using one-half standard deviation shocks	6	6	6	7	7	6	6	6	7	8	8	8
B6. One-time 30 percent nominal depreciation relative to the baseline in 2016 5/	6	8	8	7	7	7	7	7	7	7	7	8
Memorandum item:												
Grant element assumed on residual financing (i.e., financing required above baseline) 6/	40	40	40	40	40	40	40	40	40	40	40	40

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.

Table 2a. Mali: Public Sector Debt Sustainability Framework, Baseline Scenario, 2015–2035

(In percent of GDP, unless otherwise indicated)

	Actual					Estimate	Projections								
	2012	2013	2014	Average 5/	Standard Deviation 5/	2015	2016	2017	2018	2019	2020	2015-20 Average	2025	2035	2021-35 Average
Public sector debt 1/	30.3	31.4	32.4			36.5	35.6	36.0	36.5	36.8	37.6		41.3	43.5	
of which: foreign-currency denominated	25.9	25.6	25.0			28.0	27.5	27.7	28.2	28.5	29.2		32.9	35.1	
Change in public sector debt	1.1	1.2	1.0			4.1	-1.0	0.4	0.5	0.3	0.7		0.6	0.0	
Identified debt-creating flows	-0.5	-0.6	3.2			3.1	0.1	0.3	0.2	0.0	0.2		0.2	0.2	
Primary deficit	0.5	2.2	2.7	2.5	10.9	2.4	2.4	2.5	2.1	2.2	2.1	2.3	2.2	2.3	2.2
Revenue and grants	17.4	20.7	20.3			21.7	22.5	23.1	23.6	24.0	24.2		25.0	27.1	
of which: grants	0.2	3.4	2.6			2.9	2.4	2.4	2.4	2.4	2.4		2.4	2.4	
Primary (noninterest) expenditure	17.9	23.0	23.0			24.2	24.9	25.5	25.7	26.2	26.3		27.2	29.4	
Automatic debt dynamics	-0.9	-1.4	0.7			0.7	-2.3	-2.0	-1.7	-2.0	-1.9		-2.0	-2.1	
Contribution from interest rate/growth differential	-0.1	-0.3	-1.9			-1.5	-1.9	-1.7	-1.5	-1.7	-1.8		-1.8	-1.9	
of which: contribution from average real interest rate	-0.1	0.2	0.2			0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
of which: contribution from real GDP growth	0.0	-0.5	-2.1			-1.5	-1.9	-1.7	-1.5	-1.7	-1.8		-1.8	-1.9	
Contribution from real exchange rate depreciation	-0.8	-1.0	2.6			2.2	-0.4	-0.3	-0.1	-0.3	-0.1		...	...	
Other identified debt-creating flows	-0.1	-1.5	-0.2			-0.1	0.0	-0.2	-0.2	-0.2	0.0		0.0	0.0	
Privatization receipts (negative)	0.0	-1.0	0.0			0.2	0.3	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)	-0.1	-0.5	-0.2			-0.3	-0.3	-0.2	-0.2	-0.2	0.0		0.0	0.0	
Other (specify, 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	
Residual, including asset changes	1.6	1.8	-2.2			1.0	-1.1	0.2	0.3	0.3	0.5		0.4	-0.2	
Other Sustainability Indicators															
PV of public sector debt	...	...	21.3			24.1	23.3	23.7	23.9	24.1	24.4		26.6	27.4	
of which: foreign-currency denominated	...	...	13.8			15.5	15.3	15.3	15.6	15.7	16.1		18.2	19.0	
of which: external	...	...	13.8			15.5	15.3	15.3	15.6	15.7	16.1		18.2	19.0	
PV of contingent liabilities (not included in public sector debt)	...	...	...			...	...	...	...	...	...		...	...	
Gross financing need 2/	4.7	6.5	7.6			9.6	8.6	8.1	8.0	8.1	7.9		8.1	8.6	
PV of public sector debt-to-revenue and grants ratio (in percent)	...	...	104.7			110.8	103.7	102.6	101.2	100.3	101.0		106.2	101.2	
PV of public sector debt-to-revenue ratio (in percent)	...	...	120.3			127.8	116.1	114.6	112.7	111.5	112.2		117.5	111.0	
of which: external 3/	...	...	78.2			82.4	76.0	74.1	73.3	72.7	73.8		80.5	77.1	
Debt service-to-revenue and grants ratio (in percent) 4/	10.9	7.9	8.8			8.9	8.9	8.6	8.5	8.4	8.2		8.2	8.8	
Debt service-to-revenue ratio (in percent) 4/	11.1	9.4	10.1			10.3	10.0	9.6	9.4	9.3	9.1		9.0	9.7	
Primary deficit that stabilizes the debt-to-GDP ratio	-0.6	1.1	1.7			-1.7	3.3	2.0	1.6	1.9	1.4		1.6	2.3	
Key macroeconomic and fiscal assumptions															
Real GDP growth (in percent)	0.0	1.7	7.2	4.3	2.2	4.9	5.4	5.1	4.5	5.0	5.1	5.0	4.5	4.5	4.5
Average nominal interest rate on forex debt (in percent)	1.4	1.3	1.2	1.5	0.3	1.0	1.0	1.1	1.1	1.2	1.2	1.1	1.3	1.3	1.3
Average real interest rate on domestic debt (in percent)	0.5	4.7	5.9	1.6	3.8	3.1	2.8	3.5	3.4	3.3	2.8	3.1	2.6	2.5	2.6
Real exchange rate depreciation (in percent, + indicates depreciation)	-3.3	-4.1	11.1	-0.9	8.7	9.4	...	...	...	...	...	...	...	...	...
Inflation rate (GDP deflator, in percent)	5.7	1.3	1.7	4.2	2.2	3.2	2.4	1.9	1.8	1.9	2.5	2.3	2.6	2.7	2.7
Growth of real primary spending (deflated by GDP deflator, in percent)	-26.3	30.4	7.5	1.2	13.6	10.1	8.4	8.0	5.1	6.9	5.6	7.4	5.1	5.4	5.3
Grant element of new external borrowing (in percent)	...	...	...	...	...	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5

Sources: Country authorities; and staff estimates and projections.

1/ Gross debt of central government

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. The historical average for the primary deficit, however, excludes 2006 (the year of MDRI debt relief and hence an unusually large primary surplus).

Table 2b. Mali: Sensitivity Analysis for Key Indicators of Public Debt, 2015–35

	Projections							
	2015	2016	2017	2018	2019	2020	2025	2035
PV of Debt-to-GDP Ratio								
Baseline	24	23	24	24	24	24	27	27
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	24	21	20	18	16	15	9	-2
A2. Primary balance is unchanged from 2015	24	23	24	24	24	25	28	29
A3. Permanently lower GDP growth 1/	24	23	24	25	25	26	31	41
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviations in 2016-2017	24	24	26	27	28	29	35	41
B2. Primary balance is at historical average minus one standard deviations in 2016-2017	24	28	33	33	32	32	33	31
B3. Combination of B1-B2 using one half standard deviation shocks	24	25	27	28	28	29	33	37
B4. One-time 30 percent real depreciation in 2016	24	29	28	28	27	27	26	24
B5. 10 percent of GDP increase in other debt-creating flows in 2016	24	29	29	29	29	29	31	30
PV of Debt-to-Revenue Ratio 2/								
Baseline	111	104	103	101	100	101	106	101
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	111	95	85	76	69	63	36	-7
A2. Primary balance is unchanged from 2015	111	104	103	102	102	103	111	108
A3. Permanently lower GDP growth 1/	111	104	104	104	104	107	123	151
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviations in 2016-2017	111	108	113	115	117	120	139	151
B2. Primary balance is at historical average minus one standard deviations in 2016-2017	111	124	141	138	135	134	133	116
B3. Combination of B1-B2 using one half standard deviation shocks	111	111	116	116	117	119	132	136
B4. One-time 30 percent real depreciation in 2016	111	129	123	118	113	111	104	87
B5. 10 percent of GDP increase in other debt-creating flows in 2016	111	130	127	124	122	122	123	110
Debt Service-to-Revenue Ratio 2/								
Baseline	9	9	9	8	8	8	8	9
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	9	9	9	8	8	8	6	4
A2. Primary balance is unchanged from 2015	9	9	9	8	8	8	8	9
A3. Permanently lower GDP growth 1/	9	9	9	9	9	8	9	11
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviations in 2016-2017	9	9	9	9	9	9	9	11
B2. Primary balance is at historical average minus one standard deviations in 2016-2017	9	9	9	10	9	9	10	10
B3. Combination of B1-B2 using one half standard deviation shocks	9	9	9	9	9	9	9	11
B4. One-time 30 percent real depreciation in 2016	9	10	11	10	10	10	10	12
B5. 10 percent of GDP increase in other debt-creating flows in 2016	9	9	9	9	9	9	9	10

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.

Table 3. Mali: Sensitivity Analysis for Key Indicators of Public and Publicly Guaranteed External Debt, including remittances, 2015–35

(In percent)

	Projections							
	2015	2016	2017	2018	2019	2020	2025	2035
Debt-to-GDP+remittances ratio								
Baseline	15	14	14	15	15	15	17	18
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2015-2035 1/	15	15	16	16	15	15	15	15
A2. New public sector loans on less favorable terms in 2015-2035 2	15	15	16	17	18	20	26	33
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2016-2017	15	15	15	16	16	16	18	19
B2. Export value growth at historical average minus one standard deviation in 2016-2017 3/	15	15	16	16	16	17	18	18
B3. US dollar GDP deflator at historical average minus one standard deviation in 2016-2017	15	15	16	16	16	16	19	19
B4. Net non-debt creating flows at historical average minus one standard deviation in 2016-2017 4/	15	22	30	28	28	28	27	22
B5. Combination of B1-B4 using one-half standard deviation shocks	15	21	26	25	25	25	25	22
B6. One-time 30 percent nominal depreciation relative to the baseline in 2016 5/	15	20	20	20	20	21	24	25
Debt-to-exports+remittances ratio								
Baseline	47	49	51	56	60	63	80	96
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2015-2035 1/	47	52	56	60	62	63	71	89
A2. New public sector loans on less favorable terms in 2015-2035 2	47	52	57	67	74	82	121	179
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2016-2017	47	49	51	57	60	63	80	96
B2. Export value growth at historical average minus one standard deviation in 2016-2017 3/	47	52	62	68	71	75	92	105
B3. US dollar GDP deflator at historical average minus one standard deviation in 2016-2017	47	49	51	57	60	63	80	96
B4. Net non-debt creating flows at historical average minus one standard deviation in 2016-2017 4/	47	86	119	108	112	115	124	116
B5. Combination of B1-B4 using one-half standard deviation shocks	47	73	93	88	92	95	105	105
B6. One-time 30 percent nominal depreciation relative to the baseline in 2016 5/	47	49	51	57	60	63	80	96
Debt-to-revenue ratio								
Baseline	82	76	74	73	73	74	81	77
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2015-2035 1/	82	81	82	78	74	72	69	64
A2. New public sector loans on less favorable terms in 2015-2035 2	82	80	83	86	90	96	122	144
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2016-2017	82	79	79	78	78	79	86	83
B2. Export value growth at historical average minus one standard deviation in 2016-2017 3/	82	79	83	82	81	82	87	80
B3. US dollar GDP deflator at historical average minus one standard deviation in 2016-2017	82	80	81	80	80	81	88	85
B4. Net non-debt creating flows at historical average minus one standard deviation in 2016-2017 4/	82	114	146	141	137	135	125	93
B5. Combination of B1-B4 using one-half standard deviation shocks	82	106	131	127	124	124	119	94
B6. One-time 30 percent nominal depreciation relative to the baseline in 2016 5/	82	108	105	104	103	105	114	110

Table 3. Mali: Sensitivity Analysis for Key Indicators of Public and Publicly Guaranteed External Debt, Including Remittances, 2015–35 (concluded)

(In percent)

	Projections							
	2015	2016	2017	2018	2019	2020	2025	2035
Debt service-to-exports+remittances ratio								
Baseline	3	3	4	4	4	4	5	7
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2015-2035 1/	3	3	4	4	4	4	5	6
A2. New public sector loans on less favorable terms in 2015-2035 2	3	3	4	4	4	4	7	12
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2016-2017	3	3	4	4	4	4	5	7
B2. Export value growth at historical average minus one standard deviation in 2016-2017 3/	3	4	4	4	5	5	6	8
B3. US dollar GDP deflator at historical average minus one standard deviation in 2016-2017	3	3	4	4	4	4	5	7
B4. Net non-debt creating flows at historical average minus one standard deviation in 2016-2017 4/	3	4	5	5	5	5	8	9
B5. Combination of B1-B4 using one-half standard deviation shocks	3	4	4	5	5	5	7	8
B6. One-time 30 percent nominal depreciation relative to the baseline in 2016 5/	3	3	4	4	4	4	5	7
Debt service-to-revenue ratio								
Baseline	6	5	5	5	5	5	5	6
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2015-2035 1/	6	5	5	5	5	5	4	4
A2. New public sector loans on less favorable terms in 2015-2035 2	6	5	5	5	5	5	7	9
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2016-2017	6	6	6	5	5	5	5	6
B2. Export value growth at historical average minus one standard deviation in 2016-2017 3/	6	5	5	5	5	5	5	6
B3. US dollar GDP deflator at historical average minus one standard deviation in 2016-2017	6	6	6	6	6	5	5	7
B4. Net non-debt creating flows at historical average minus one standard deviation in 2016-2017 4/	6	5	6	7	7	6	8	8
B5. Combination of B1-B4 using one-half standard deviation shocks	6	6	6	7	7	6	8	8
B6. One-time 30 percent nominal depreciation relative to the baseline in 2016 5/	6	8	8	7	7	7	7	8
Memorandum item:								
Grant element assumed on residual financing (i.e., financing required above baseline) 6/	40	40	40	40	40	40	40	40

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.