

Understanding Ghana's Debt-to-GDP Ratio

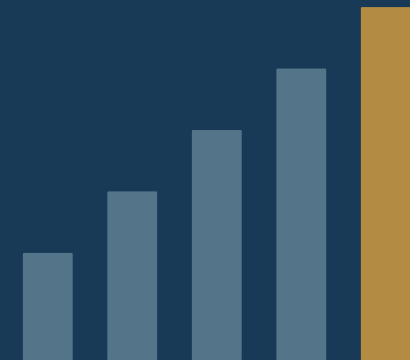
Repayment, Restructuring and Valuation

Borrowing. Repayment. Currency valuation. GDP. Cash service.

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DSA projections: 2026–2031

About this publication

Independent research • transparent evidence • reproducible calculations

TITLE AND SERIES

Understanding Ghana's Debt-to-GDP Ratio:
Repayment, Restructuring and Valuation

IDER's Ghana Macroeconomic Policy and Business Intelligence Briefings

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Instrument validation: end-2025 register.

RESPONSIBILITY AND INTERPRETATION

The analysis and interpretations are those of the author and IDER. This is not a World Bank or IMF publication. Exact accounting does not identify causal policy effects; source projections and illustrative scenarios remain separate.

DATA, CODE AND ENQUIRIES

The companion archive includes source-labelled inputs, calculation code, exhibit data, model documentation and verification records. Research and corrections: info@iderafrica.com.

Contents

Page numbers match the printed folios and PDF pages; entries link to their destinations.

READING AND DECISION USE		ANALYSIS		SCENARIOS AND TECHNICAL REFERENCE	
About this publication	2	1 Measurement and annual evidence	15	8 Debt and primary-balance stress	88
Reading guide	4	2 Exact ratio and FX decomposition	23	9 Treasury cash and rollover timing	92
Infographic abstract	5	3 Borrowing, repayment and residuals	35	10 Business and policy applications	97
Two-page decision brief	6	4 Restructuring: claims and payments	62	11 Identification and precision	99
Abbreviations and reading terms	8	5 Debt service and financing needs	71	12 SMART implementation	102
How to interpret the evidence	9	6 IMF coverage and projections	78	13 Model and equation catalogue	105
Figure, table and model indexes	10	7 Quarterly denominator monitoring	85	14 Sources and reproducibility	123

EMPIRICAL VALIDATION Instrument, creditor and source checks: pp. 42–61

NAVIGATION Click a running header for Contents. Source identifiers link to References; equation identifiers return to the model index.

Read the debt stock, the GDP denominator and the payment calendar together

A lower ratio is not a receipt of cash, a principal repayment or a guarantee of refinancing.

01 WHAT IS OWED?

Match nominal principal, currency, creditor and institutional coverage. Separate new borrowing, principal paid, capitalised interest, claim reduction and other changes.

02 WHY DID THE RATIO MOVE?

Use one GDP vintage. Separate real output from GDP prices, and currency translation from changes in native liabilities. State the allocation of interaction terms.

03 WHAT MUST BE FUNDED?

Map coupons, principal, rollover and arrears to actual dates. A smaller stock ratio does not provide Treasury cash or ensure access to refinancing.

[Exact decomposition | p. 23](#)

[Debt service | p. 71](#)

[Scenarios | p. 88](#)

[Model catalogue | p. 105](#)

Separate debt reduction from valuation and denominator growth

Research question: why did the ratio move, and what changed in the obligations that must be financed?

RESEARCH QUESTION Lower debt ratio— but lower cash obligations? Debt, GDP and scheduled payments are different measurements.	01 SOURCE Match official stocks and GDP with 90 bill records and 12 DDEP bond quotes; preserve dates, units and source differences.	02 DECOMPOSE Average all six update orders for debt, real growth and GDP prices; reconstruct FX and stock— flow bridges.	03 TEST Test maturity concentration, price-versus-face values, creditor residuals and input rounding. Keep payment status unobserved where absent.
	MATCHED 2025 RATIO CHANGE −16.90 pp Debt stock −6.74 pp; real growth −3.08 pp; GDP prices −7.08 pp under the declared Shapley allocation.	REPORTED DOMESTIC DEBT SERVICE +30.34% Reported 2025 domestic debt service increased despite the ratio decline. Principal rollover and interest are separate.	
WHAT THIS MEANS	The report explains the arithmetic of the ratio and the financing record. It does not attribute the improvement to a causal policy treatment or certify future payment capacity.		

A lower debt ratio did not mean lower reported debt service

The 2025 ratio decline, borrowing record and debt-service requirements answer different questions.

01 RATIO

MATCHED MoF STOCK / GDP

61.60% → 44.70%

2024 to 2025

Not all repayment

Nominal debt fell 12.01%; nominal GDP grew 21.25%. Currency valuation and denominator growth both matter.

02 DEBT SERVICE

SOURCE-REPORTED ANNUAL FLOW

GHS 310.70 bn

2025 domestic service

Up 30.34%

Principal refinancing dominates the reported flow. The source cash/PIK crosswalk is incomplete; this is not a verified cash-only total.

03 FORWARD PRESSURE

IMF BASELINE PROJECTION

95.9%

2028 debt service / revenue

Projection, not outturn

Nominal debt/GDP can decline while debt service remains high. Use actual instruments and due dates before making funding decisions.

DECISION RULE

Require a matched debt/GDP bridge, a currency-specific service calendar and a financing plan. None can replace the other two.

A 90-day route to an auditable debt-and-cash explanation

Proposed after authorised access; responsibilities and acceptance tests are not achieved national coverage.

DAYS 0–30

Debt office + data owners

MATCH

Freeze the debt perimeter, currency fields, GDP vintage and instrument IDs. Preserve unallocated changes and source discrepancies.

Every known material item linked; unknown coverage disclosed.

DAYS 31–60

Treasury + statistics + BoG

RECONCILE

Build the stock–flow bridge and 13-week cash ladder. Separate PIK, repayments, restructuring dates and valuation.

No double-counted claim; every residual and payment status visible.

DAYS 61–90

IDER + reviewer + partners

REPRODUCE & RELEASE

Recalculate all figures; review source exceptions; publish the ratio explanation alongside debt-service and funding tests.

Outputs replay; assumptions and causal limits travel with the findings.

READING THE TARGETS

Proposed control targets, not agreed institutional mandates or achieved national coverage. Confidential instrument data require authorised access.

Abbreviations and reading terms

Definitions support the analysis; source-specific coverage and payment conventions remain controlling.

APDR / ISIN	Annual Public Debt Report / International Securities Identification Number.	OCC	Official Creditor Committee; treatment scope is source-specific.
BoG / MoF	Bank of Ghana / Ministry of Finance, Ghana.	PDI	Post-default interest; distinguish it from original principal.
DDEP	Domestic Debt Exchange Programme.	PIK / PIC	Payment-in-kind / payment-in-cash interest.
DSA	Debt sustainability analysis; specify scope and baseline.	PPG / SOE	Public and publicly guaranteed / state-owned enterprise.
DS / GFN	Debt service / gross financing needs; different cash measures.	PV	Present value of contractual payments at a stated rate.
GDP	Gross domestic product; nominal and real measures differ.	Shapley	Average marginal accounting contribution across update orders.
GDP deflator	Output-price measure; not the consumer price index.	Residual	Unallocated difference; not an identified economic cause.
FX / GHS	Foreign exchange / Ghana cedi; specify the rate direction.	USD / EUR	US dollar / euro; native currency differs from equivalents.
IDER	Institute of Development and Economic Research.	pp / %	Percentage points / percent; not interchangeable.
IMF	International Monetary Fund.	m / bn	Million / billion; one billion equals 1,000 million.

How to interpret the evidence

Distinguish observed records, exact accounting attribution, source projections and conditional scenarios.

SOURCE-REPORTED / DATED

MoF stock, GDP and cash-flow figures retain their vintage and provisional/revised status. The IMF perimeter and source projections remain separate.

EXECUTED ACCOUNTING

Ratios, residuals, symmetric bridges and Shapley allocations are recalculated from named inputs. Their precision does not identify policy causality.

ILLUSTRATIVE / CONDITIONAL

Debt, refinancing and contract scenarios impose rates, growth, prices and timing. No shock probability, default frequency or optimum portfolio is estimated.

PROSPECTIVE / NOT ESTIMATED

P01 formalises a possible policy-effect design. No new instrumental-variable, panel or experimental coefficient is reported.

UNITS AND SIGNS

A higher GHS/FX quote denotes cedi depreciation. Money stocks and cash flows retain native units; principal, interest and GDP have different periods.

REPAYMENT AND RESTRUCTURING

A recognised claim reduction differs from cash amortisation, coupon relief, PIK or rescheduling. Never count the same obligation twice.

RANGES AND MISSINGNESS

Allocation ranges and rounding envelopes are not confidence intervals. An unallocated residual is not zero and is not assigned to debt relief.

SOURCE AND MODEL IDENTIFIERS

S01–S04 identify primary official publications; S05 records IDER methods. E01–E30 are executed; P01 is prospective. Source exceptions remain visible.

List of figures — 1 of 2

Short navigation labels; full captions, units, sources and interpretation limits accompany each figure.

01	Matched annual debt-to-GDP history	19
02	Debt and nominal-GDP index paths	20
03	Three-factor ratio-decline decomposition	23
04	Alternative exact allocation conventions	25
05	Annual debt, growth and price contributions	26
06	Reported nominal debt-stock bridge	27
07	Valuation and domestic-debt contribution to ratio	28
08	Opening, closing and symmetric FX valuation	30
09	External-debt currency mix	32

10	Domestic debt in dollars: stock versus conversion	34
11	Domestic debt stock–flow bridge	36
12	External disbursement, repayment and residual	37
13	Bill maturity-quarter concentrations	44
14	Cumulative captured bill maturity distribution	45
15	DDEP nominal versus price-weighted value	49
16	DDEP final-maturity year concentrations	50
17	DDEP price-change reconstruction	51
18	Creditor-specific unallocated changes	55

List of figures — 2 of 2

Short navigation labels; full captions, units, sources and interpretation limits accompany each figure.

19	Domestic service-growth attribution	56
20	Synthetic annual debt-service profiles	67
21	Present-value sensitivity to discount rates	68
22	Domestic principal, interest and total service	71
23	Domestic service and interest relative to revenue	73
24	External service and early-payment timing	74
25	Gross financing needs and funding composition	76
26	Headline versus broader debt coverage	78
27	Published IMF debt-dynamics contributions	80

28	Projected debt-service amounts by component	82
29	Projected service-to-revenue burden	83
30	Implicit annual-GDP denominator ranges	86
31	Debt ratio under FX and GDP-price scenarios	88
32	Net-borrowing and currency sensitivity	89
33	Conditional debt-stabilising primary balances	90
34	Within-week full-rollover cash path	93
35	Cash path with delayed refinancing	94

List of tables — 1 of 2

Short navigation labels; complete definitions and notes accompany each numbered table.

01	Research questions and evidence boundaries	15	14	DDEP cash, PIK and issuance treatment	41
02	Debt concepts and statistical perimeter	16	15	Added instrument records and research boundaries	42
03	Sources, dates and analytical roles	17	16	Treasury-bill row-to-stock reconciliation	43
04	Headline stock and GDP input table	21	17	Five largest bill maturity dates	46
05	Debt growth, real growth and implied deflator	22	18	Stock snapshot versus annual turnover	47
06	Meaning of the exact ratio contributions	24	19	DDEP weighting and source-precision check	48
07	Exchange-rate conventions and debt valuation	29	20	Past-dated positive outstanding entries	52
08	Reconstruction of the reported external-FX effect	31	21	External stock–flow bridge by creditor	54
09	Domestic USD-bond valuation	33	22	Gross issuance and identified non-cash components	57
10	Gross issuance, maturities and net issuance	35	23	Shapley input-rounding corner sensitivity	58
11	External-principal subtotal reconciliation	38	24	Implemented selection and endogeneity safeguards	59
12	Detailed domestic flow and valuation contributions	39	25	Validation computation and interpretation controls	60
13	Detailed external flow and valuation contributions	40	26	Eurobond exchange: date, claims and scope	62

List of tables — 2 of 2

Short navigation labels; complete definitions and notes accompany each numbered table.

27	2025 restructuring coverage and recognition stages	63	40	Parliamentary and fiscal-accountability checklist	97
28	Different restructuring relief measures	64	41	Audience-specific business and investment interpretation	98
29	Eurobond stock and principal-payment identity	65	42	Endogeneity and coverage safeguards	99
30	Synthetic restructuring contract assumptions	66	43	Prospective policy-effect design and release gates	100
31	Face value, discounted value and cash relief	69	44	Conditional debt-ratio rounding bounds	101
32	Treasury-bill rollover and service concentration	72	45	90-day workplan and verifiable deliverables	102
33	Why source financing measures differ	77	46	Debt and liquidity monitoring indicators	103
34	Broader DSA coverage and omitted headline risks	79	47	Shared assumptions and calculation boundaries	105
35	Projected debt, PV and debt-service ratios	81	48	Worked ratios, principal and PV calculations	122
36	2026 debt monitoring and fixed-denominator comparison	85	49	Source exceptions and release limits (1/3)	123
37	Scenario assumptions and excluded responses	91	50	Source exceptions and release limits (2/3)	124
38	Synthetic treasury ledger assumptions	92	51	Source exceptions and release limits (3/3)	125
39	Cash minimum and required bridging finance	95	52	Source-to-output reproducibility map	126

Model and equation index

Stable identifiers distinguish executed accounting and scenario models from prospective causal research.

E01–E10 STOCKS AND TRANSACTIONS			E11–E20 VALUES AND SCENARIOS			E21–E30 CASH AND VALIDATION		
E01	Debt ratio and stock growth	106	E11	Nominal claims and present value	111	E21	Ordered Treasury cash path	116
E02	Real growth and implied GDP prices	106	E12	Debt-service amounts and burdens	111	E22	Minimum financing bridge	116
E03	Debt stock–flow identity	107	E13	Gross financing need and resources	112	E23	External principal and residual audit	117
E04	Symmetric stock–GDP attribution	107	E14	Common-denominator scope comparison	112	E24	Early payment and calendar effect	117
E05	Three-factor Shapley allocation	108	E15	Published DSA attribution	113	E25	Captured maturity-cohort distribution	118
E06	Nested stock-component attribution	108	E16	Quarterly denominator diagnostic	113	E26	Indicative price and nominal amount	118
E07	External currency-conversion bridge	109	E17	Ratio display-rounding envelope	114	E27	Creditor-level stock–flow residual	119
E08	Domestic debt in dollar equivalents	109	E18	Joint debt-ratio stress	114	E28	Domestic service-growth contribution	119
E09	Gross issuance and principal maturity	110	E19	Debt-stabilising primary surplus	115	E29	Shapley input-rounding corners	120
E10	Cash coupons and capitalised interest	110	E20	Restructured contract cash	115	E30	Instrument scope and reconciliation	120
P01 PROSPECTIVE ONLY			Policy-effect design — not estimated			121		

E01–E30 are executed accounting or conditional methods. E25–E30 add instrument validation; P01 has no fitted coefficient.

Four debt questions require four different records

The report treats an accounting identity as an identity—not as an estimated causal relationship.

Table 1. Four debt questions require four different records

Question	Required record	What it does not establish
How much is owed?	Instrument-level nominal principal, accrued amounts and debt perimeter at one date.	Current cash availability, market price or creditor present value.
Why did the ratio change?	Matched debt stocks, nominal GDP, real growth, flows and valuation adjustments.	The counterfactual effect of government policy on growth or the cedi.
What must be paid?	Currency-specific interest and principal at actual due dates; already-paid flags.	The annual ratio does not identify this payment calendar.
What must be raised?	Debt service, primary financing balance, other financing uses and usable buffers.	New borrowing is not identical to the gross debt-stock increase.

Sources: IDER calculations [\[S05\]](#).

Note: The analytical focus is exact measurement and financing diagnosis; no policy-effect regression is fitted.

Debt-market location, currency and creditor residency are different classifications

MoF headline debt and the IMF public-debt assessment are not interchangeable samples.

Table 2. Debt-market location, currency and creditor residency are different classifications

Concept	Meaning in this report	Measurement safeguard
Headline nominal debt	MoF central-government and government-guaranteed obligations.	Keep nominal principal and the stated institutional perimeter.
Domestic versus external	Source debt-market classification; the IMF DSA uses its own residency framework.	A domestic USD bond still carries exchange-rate exposure.
Nominal versus present value	Face/nominal stock versus discounted contractual payments.	Coupon and maturity relief can lower PV without reducing face value.
Debt service versus GFN	Principal plus interest versus broader financing requirements.	Repeated bill refinancing may inflate gross annual payments relative to year-end stock.

Sources: MoF APDR 2025 [\[S01\]](#); IMF CR 26/212 [\[S03\]](#); IDER calculations [\[S05\]](#).

Note: A creditor’s residence, the issuance market and the contract currency must be stored as separate fields.

Use a fixed annual vintage and a separately dated monitoring update

All debt and cash statistics retain their source-specific units and status.

Table 3. Use a fixed annual vintage and a separately dated monitoring update

Source	Observation window	Use and boundary
MoF APDR 2025	2021–2025; 2025 provisional, earlier years revised.	Matched headline stocks and GDP; issuance, service, restructuring and source audits.
MoF APDR 2024	Exchange completed in October 2024; bilateral terms as reported.	Date principal relief correctly; keep face and service relief distinct.
IMF CR 26/212	2024–2025 records; 2026–2031 projections.	Broader scope, published DSA contributions and future payment pressures.
MoF Q2 bulletin	Quarter-end observations through June 2026.	Monitor stocks and annual-denominator changes; not actual full-year 2026 GDP.

Sources: MoF APDR 2025 [\[S01\]](#); MoF APDR 2024 [\[S02\]](#); IMF CR 26/212 [\[S03\]](#); MoF Q2 2026 [\[S04\]](#).

Note: Information cut-off: 26 September 2026. A later linked July debt-data file was not successfully authenticated.

The same debt can have different valid monetary presentations

Specify which value, currency and date are being compared.

CEDI STOCK	DOLLAR EQUIVALENT	RATIO DENOMINATOR
The source debt stock fell from GHS 728.63 bn to GHS 641.11 bn in 2025. This includes valuation and other changes; it is not a statement that GHS 87.52 bn of principal was repaid.	The same source reports USD 49.51 bn rising to USD 61.32 bn. Translating cedi obligations into dollars creates an exchange-rate effect without creating additional foreign-currency principal.	Nominal GDP rose from GHS 1,182.8 bn to GHS 1,434.1 bn in the matched publication. A larger denominator lowers debt/GDP even when some liabilities or payments increase.

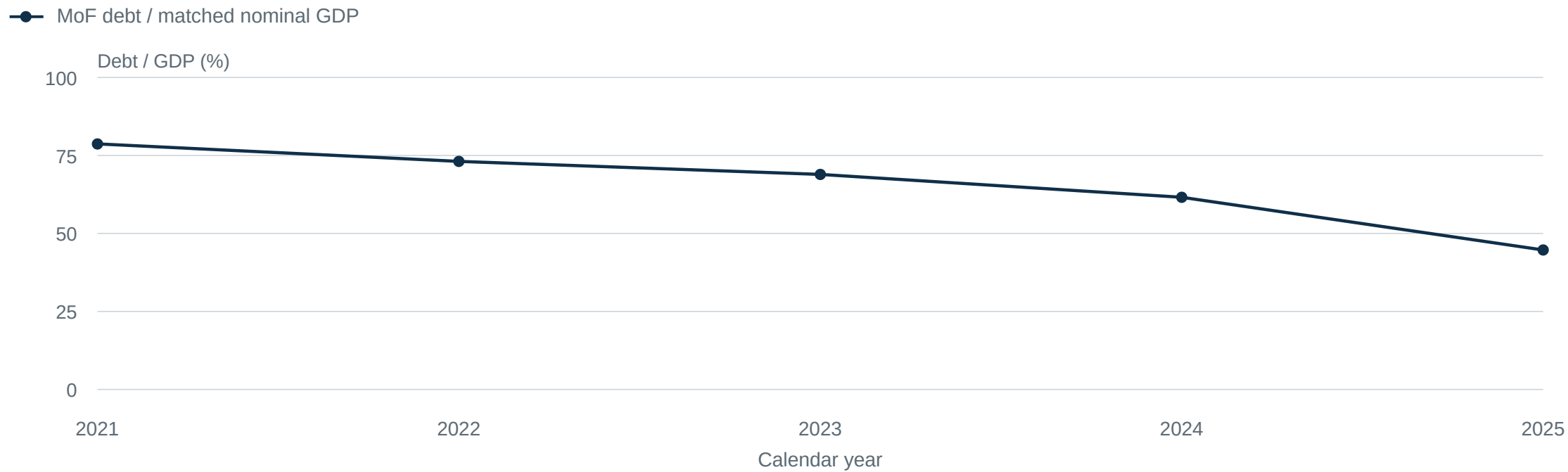
Sources: MoF APDR 2025 [\[S01\]](#); IDER calculations [\[S05\]](#).

Note: Stocks are dated; GDP is a period flow. Currency equivalents are not amounts all payable in that currency.

The ratio declined throughout the retrieved vintage, but the stock did not

Five annual observations, 2021–2025; headline debt/GDP calculated from the matched source stocks.

Figure 1. The ratio declined throughout the retrieved vintage, but the stock did not



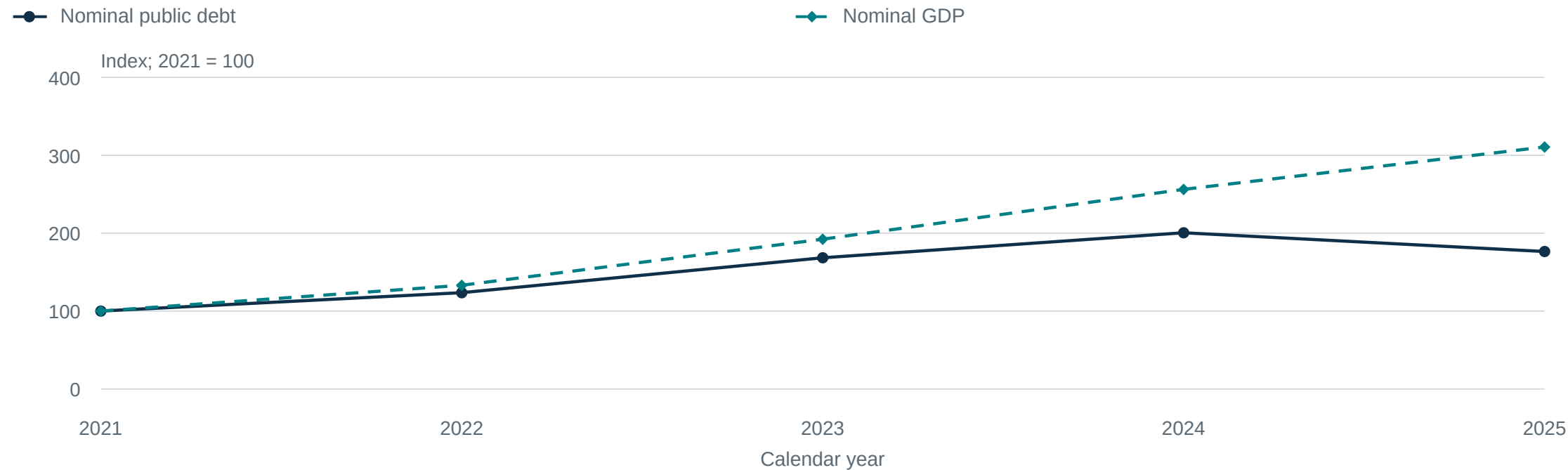
Sources: MoF APDR 2025 [\[S01\]](#); IDER calculations [\[S05\]](#).

Note: No trend forecast or regression is fitted to five observations. 2021–2024 are revised; 2025 is provisional.

Nominal GDP expanded faster than the debt stock after 2022

Indices normalised to 2021 = 100; both use the same source vintage.

Figure 2. Nominal GDP expanded faster than the debt stock after 2022



Sources: MoF APDR 2025 [\[S01\]](#); IDER calculations [\[S05\]](#).

Note: An index comparison is not a real debt-service measure or evidence that inflation is costless.

All headline stock and GDP inputs remain visible

Debt and nominal GDP in GHS billion; the printed ratio retains source rounding.

Table 4. All headline stock and GDP inputs remain visible

Year	Domestic debt	External debt	Total debt	Nominal GDP	Printed ratio
2021	193.583	169.774	363.357	461.7	78.7%
2022	206.187	242.862	449.048	614.3	73.1%
2023	257.299	354.521	611.821	887.7	68.9%
2024	309.845	418.782	728.626	1,182.8	61.6%
2025	333.756	307.355	641.111	1,434.1	44.7%

Sources: MoF APDR 2025 [\[S01\]](#).

Note: Original source amounts are preserved in millions in the CSV; displayed conversions are not new observations.

The GDP price denominator is not year-end consumer inflation

Implied deflator growth = nominal GDP growth divided by real-growth factor, less one.

Table 5. The GDP price denominator is not year-end consumer inflation

Year	Debt growth	Nominal GDP growth	Real GDP growth	Implied GDP-price growth
2022	23.58%	33.05%	3.8%	28.18%
2023	36.25%	44.51%	3.1%	40.16%
2024	19.09%	33.24%	5.8%	25.94%
2025	-12.01%	21.25%	6.0%	14.38%

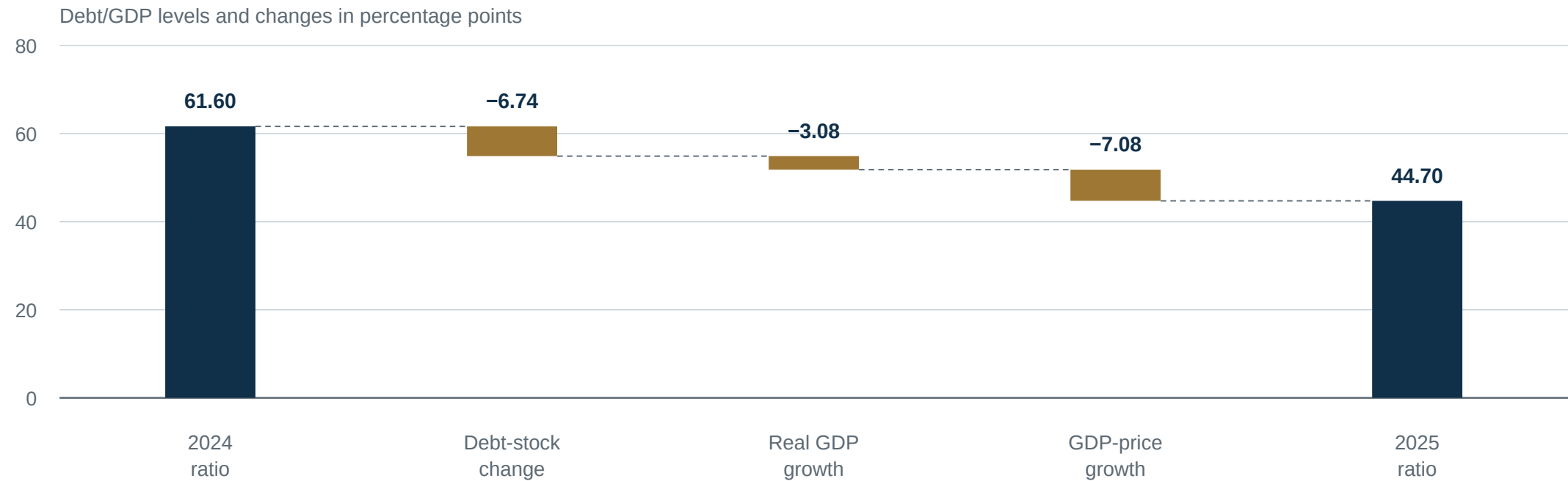
Sources: MoF APDR 2025 [\[S01\]](#); IDER calculations [\[S05\]](#).

Note: The 2025 implied value is 14.38%; source end-year CPI is 5.4%. The implied series inherits rounded GDP and real-growth inputs.

The 16.90-point decline splits into debt, real-output and price effects

Three-factor Shapley allocation averages all six update orders; matched 2024–2025 MoF records.

Figure 3. The 16.90-point decline splits into debt, real-output and price effects



Sources: MoF APDR 2025 [\[S01\]](#); IDER calculations [\[S05\]](#).

Note: Accounting attribution, not causal policy shares. The price component is based on the implied GDP deflator, not CPI.

The price contribution is larger than the real-growth contribution in this allocation

Debt/GDP changes are calculated before display rounding.

Table 6. The price contribution is larger than the real-growth contribution in this allocation

Factor	Contribution, pp	What the calculation means
Debt stock	−6.742	The lower GHS numerator reduces the ratio; its own change includes currency valuation and transactions.
Real output	−3.076	The 6.0% real-growth factor enlarges the denominator. Its policy cause is not identified.
GDP prices	−7.079	Implied 14.38% GDP-price growth enlarges nominal output; it does not cancel principal.
Total	−16.897	Components reconcile exactly to the matched ratio change at full precision.

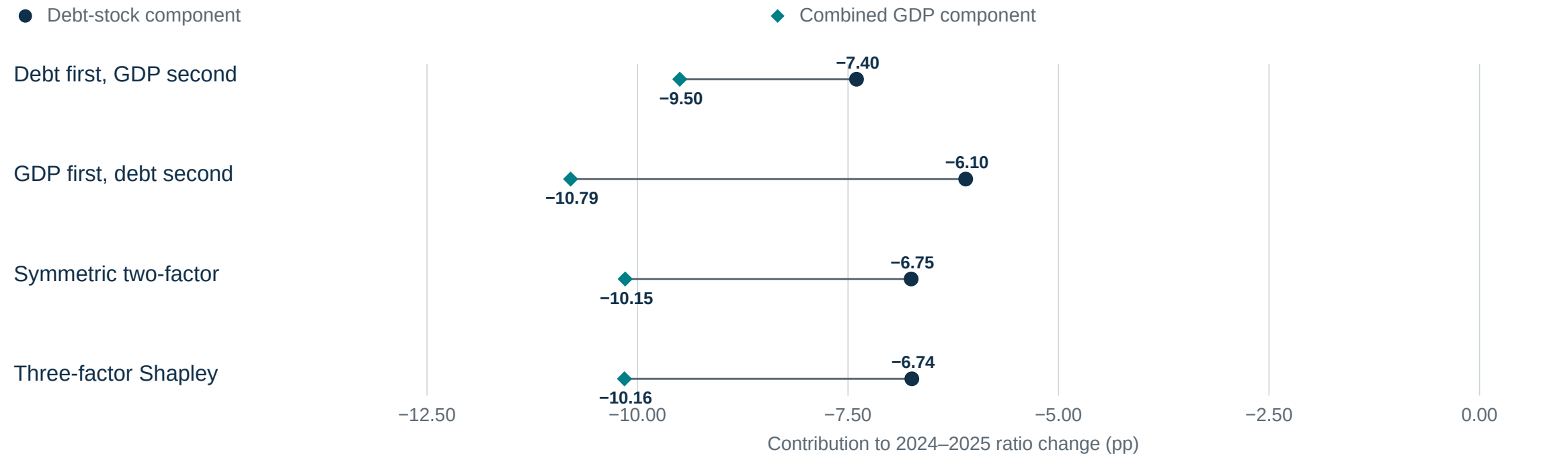
Sources: MoF APDR 2025 [\[S01\]](#); IDER calculations [\[S05\]](#).

Note: No component is interpreted as a share of welfare gains, repayment effort or government-policy effectiveness.

The stock–GDP split depends modestly on how interactions are allocated

All four conventions reproduce the same total ratio decline.

Figure 4. The stock–GDP split depends modestly on how interactions are allocated



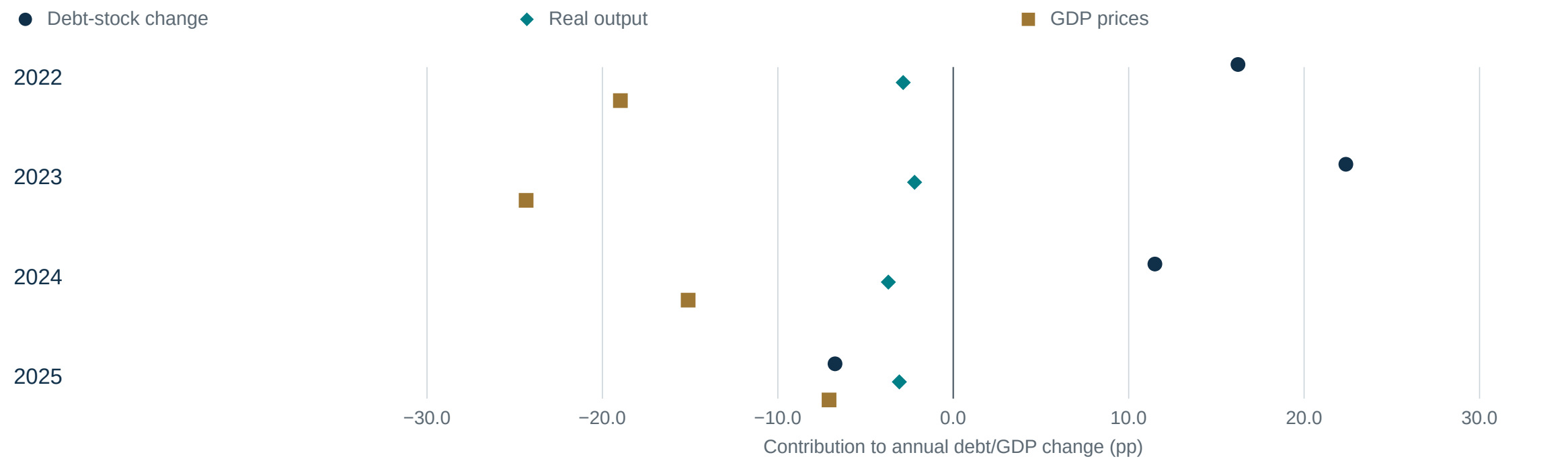
Sources: MoF APDR 2025 [\[S01\]](#); IDER calculations [\[S05\]](#).

Note: Differences across allocations are not standard errors. Three-factor Shapley additionally separates real output and GDP prices.

Earlier ratio declines occurred even while nominal debt was rising

Same three-factor allocation for each available annual transition.

Figure 5. Earlier ratio declines occurred even while nominal debt was rising



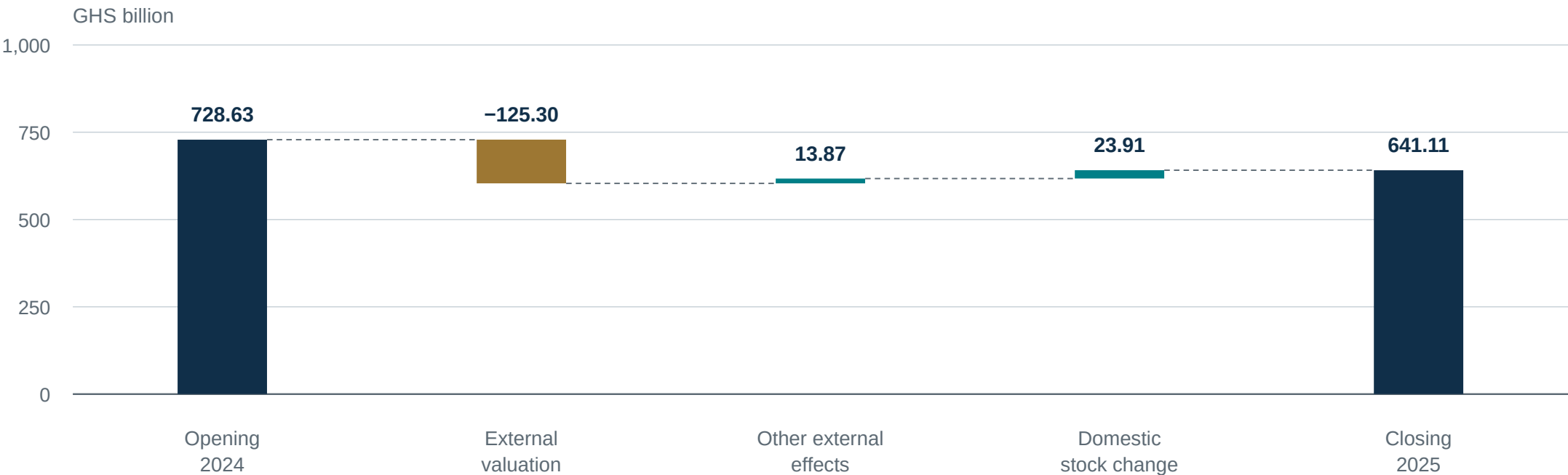
Sources: MoF APDR 2025 [\[S01\]](#); IDER calculations [\[S05\]](#).

Note: The 2024–2025 result is not imposed on earlier episodes. Every annual decomposition uses its own matched endpoints.

Currency valuation outweighed the increase in domestic debt in the source bridge

MoF 2025 reported external valuation and other effects; GHS billion.

Figure 6. Currency valuation outweighed the increase in domestic debt in the source bridge



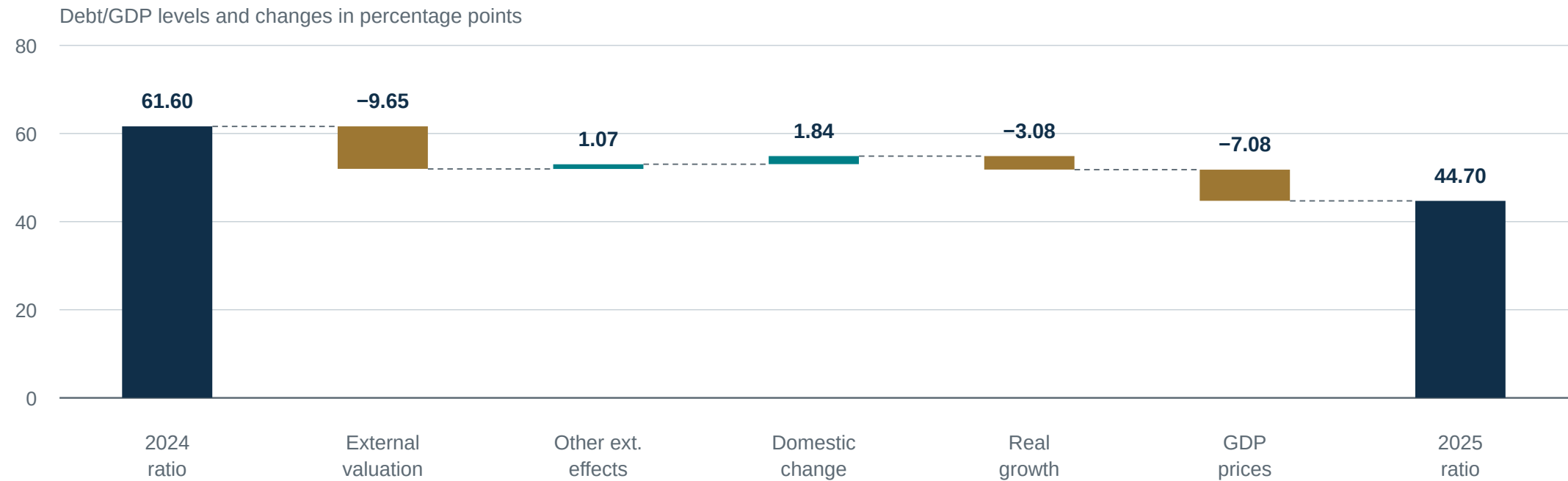
Sources: MoF APDR 2025 [\[S01\]](#); IDER calculations [\[S05\]](#).

Note: “Other external effects” preserves the source attribution; it is not verified net new borrowing. Source components close exactly.

The source valuation component can be mapped into the ratio bridge

Debt-factor contribution is allocated linearly across the closed source stock bridge.

Figure 7. The source valuation component can be mapped into the ratio bridge



Sources: MoF APDR 2025 [\[S01\]](#); IDER calculations [\[S05\]](#).

Note: This hierarchical allocation is declared; it is not a seven-factor causal decomposition or a measure of debt forgiveness.

A 40.77% cedi-value gain corresponds to a 28.96% fall in GHS per dollar

The source numerical rates are GHS per USD even though its table heading reverses the quotation.

Table 7. A 40.77% cedi-value gain corresponds to a 28.96% fall in GHS per dollar

Comparison	Computed value	Use in the debt calculation
GHS per USD	14.7174 → 10.4552	Multiply USD-equivalent debt by this rate to obtain its GHS equivalent.
Change in GHS/USD	−28.96%	This is the proportional reduction in unchanged dollar principal’s GHS carrying value.
Reciprocal cedi-value change	40.77%	A valid reciprocal quotation; not the percentage to subtract from the GHS stock.
Incorrect shortcut	Do not deduct 40.77% of external GHS debt	Use the correct quote factor and the explicit opening/closing balance convention.

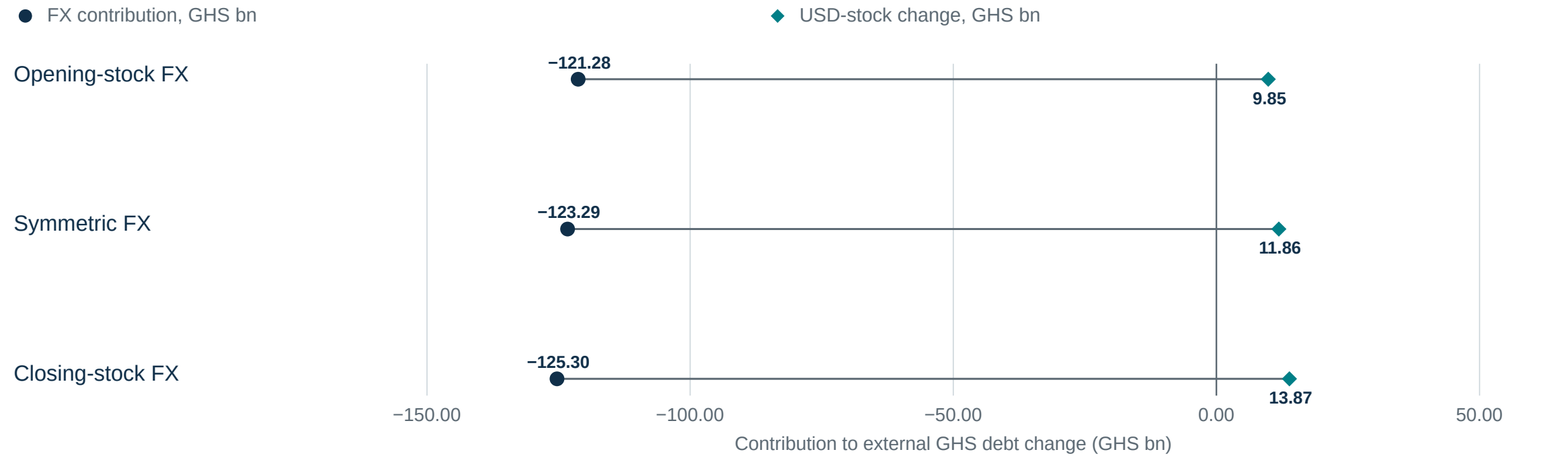
Sources: MoF APDR 2025 [\[S01\]](#); IDER calculations [\[S05\]](#).

Note: These percentage changes use identical endpoints but different denominators; they are not contradictory exchange-rate estimates.

The external valuation allocation changes when the reference stock changes

External debt is expressed in USD equivalents; all three conventions are exact before source rounding.

Figure 8. The external valuation allocation changes when the reference stock changes



Sources: MoF APDR 2025 [\[S01\]](#); IDER calculations [\[S05\]](#).

Note: The USD-stock change includes cross-currency and other adjustments. It cannot be renamed net borrowing without loan-level reconciliation.

The reported GHS 125.30 bn effect is reproduced by the closing-USD-stock convention

An accounting diagnostic, not independent authentication of the original instrument ledger.

Table 8. The reported GHS 125.30 bn effect is reproduced by the closing-USD-stock convention

Term	Calculation	GHS billion
FX on closing USD-equivalent debt	$29,397.4 \text{ m} \times (10.4552 - 14.7174) / 1,000$	-125.297598
Other USD-stock movement at opening rate	$(29,397.4 - 28,454.9) \text{ m} \times 14.7174 / 1,000$	13.871149
Conversion/source residual	Actual external stock change less the two calculated terms	0.000149
Actual external-stock change	$307.3553 - 418.7816$	-111.426300

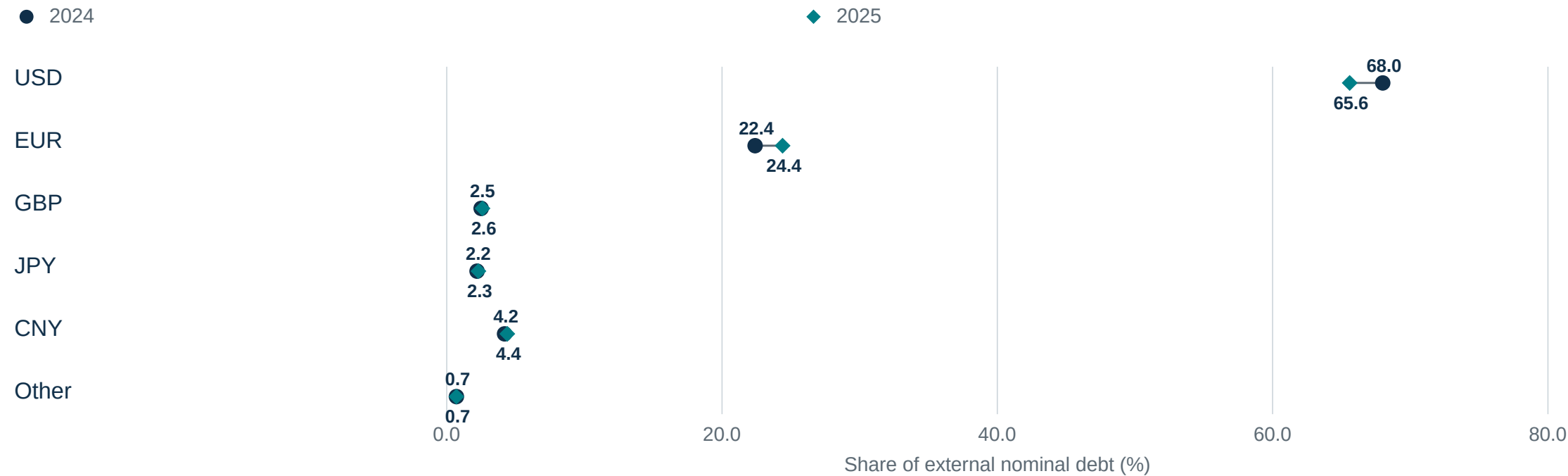
Sources: MoF APDR 2025 [\[S01\]](#); IDER calculations [\[S05\]](#).

Note: The approximately GHS 0.149 m residual reflects displayed precision; USD-equivalent balances are not a full currency-by-instrument valuation record.

External debt is not entirely denominated in US dollars

Source currency shares are rounded percentages, not independently reconstructed instrument amounts.

Figure 9. External debt is not entirely denominated in US dollars



Sources: MoF APDR 2025 [\[S01\]](#).

Note: A change in EUR/USD alters the USD-equivalent balance even if the euro principal is unchanged; cross-currency effects remain in the residual.

Domestic issuance does not eliminate foreign-currency valuation risk

The disclosed domestic USD bond is USD 791.8 m at both year ends.

Table 9. Domestic issuance does not eliminate foreign-currency valuation risk

Record	2024	2025	Change
Native principal, USD m	791.8	791.8	0.0
Source GHS/USD rate	14.7174	10.4552	-4.2622
Translated value, GHS m	11,653.237	8,278.427	-3,374.810

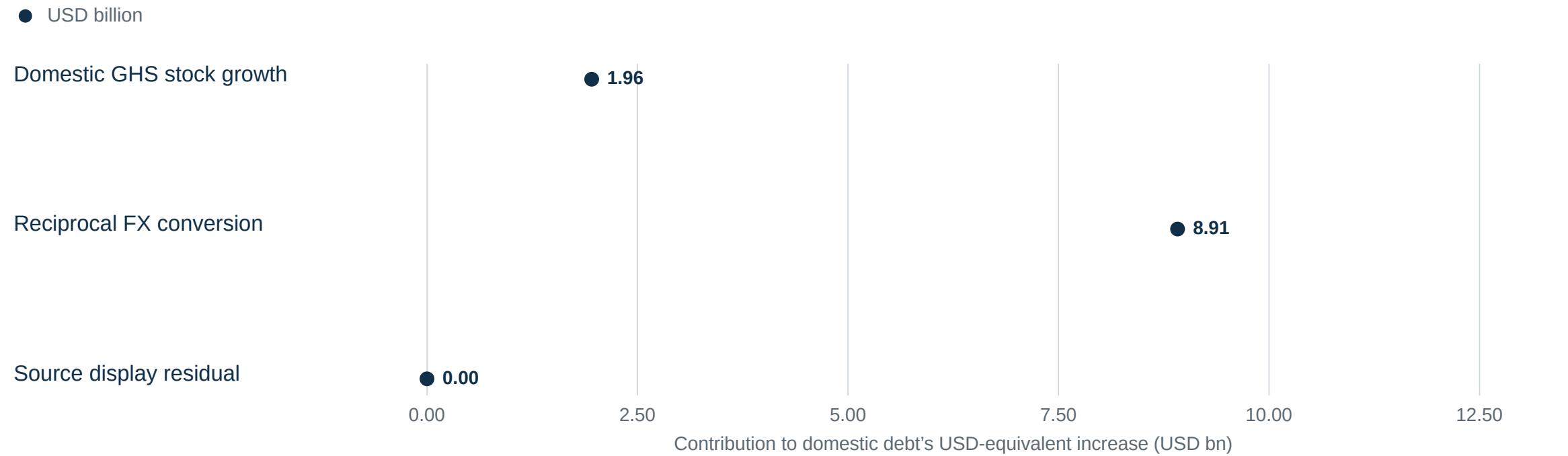
Sources: MoF APDR 2025 [\[S01\]](#); IDER calculations [\[S05\]](#).

Note: Fixed-principal sensitivity: -GHS 3.375 bn. It is already inside domestic stock changes and must not be deducted again from the total.

Most of the domestic debt’s dollar-equivalent increase is a conversion effect

Symmetric decomposition of the domestic cedi stock divided by GHS/USD.

Figure 10. Most of the domestic debt’s dollar-equivalent increase is a conversion effect



Sources: MoF APDR 2025 [\[S01\]](#); IDER calculations [\[S05\]](#).

Note: The positive FX term does not mean the government issued that amount of new dollar-denominated domestic debt.

Gross issuance, principal maturities and net issuance must be separated

MoF marketable issuance table; GHS billion.

Table 10. Gross issuance, principal maturities and net issuance must be separated

Year	Gross issuance	Principal maturities	Net issuance	Gross / net
2024	243.045	197.193	45.852	5.30×
2025	298.057	267.916	30.141	9.89×

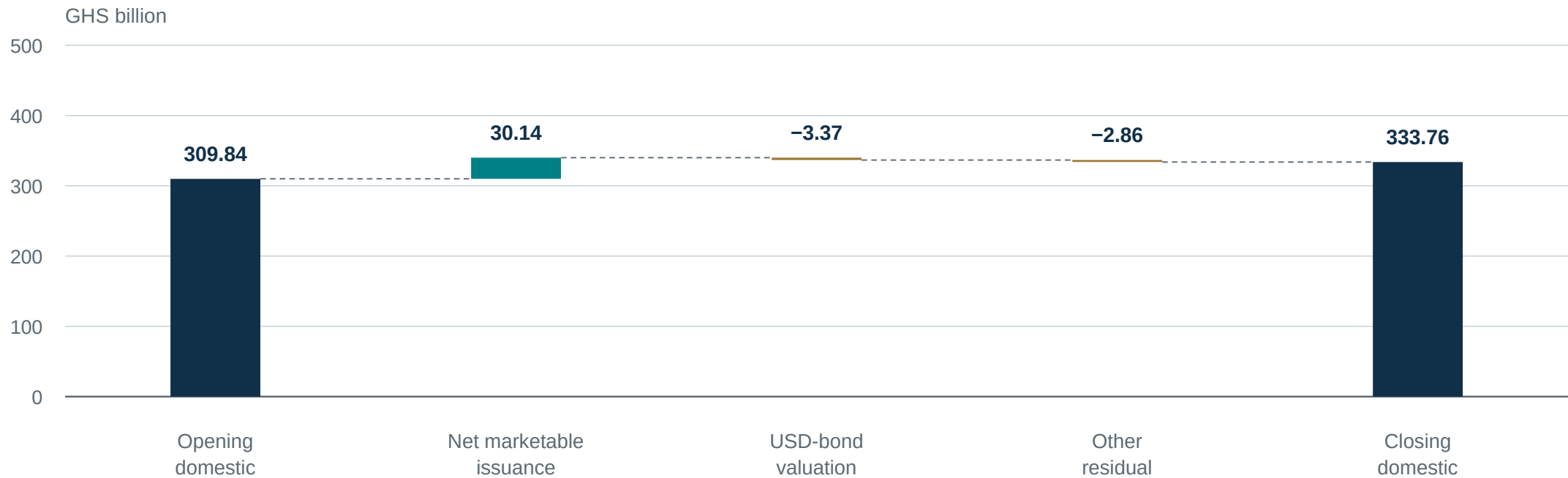
Sources: MoF APDR 2025 [\[S01\]](#); IDER calculations [\[S05\]](#).

Note: 2025 gross issuance includes PIK and recap instruments. This table is not a pure cash financing statement.

Net marketable issuance exceeds the change in the domestic stock

GHS billion; the known domestic USD-bond valuation is identified separately.

Figure 11. Net marketable issuance exceeds the change in the domestic stock



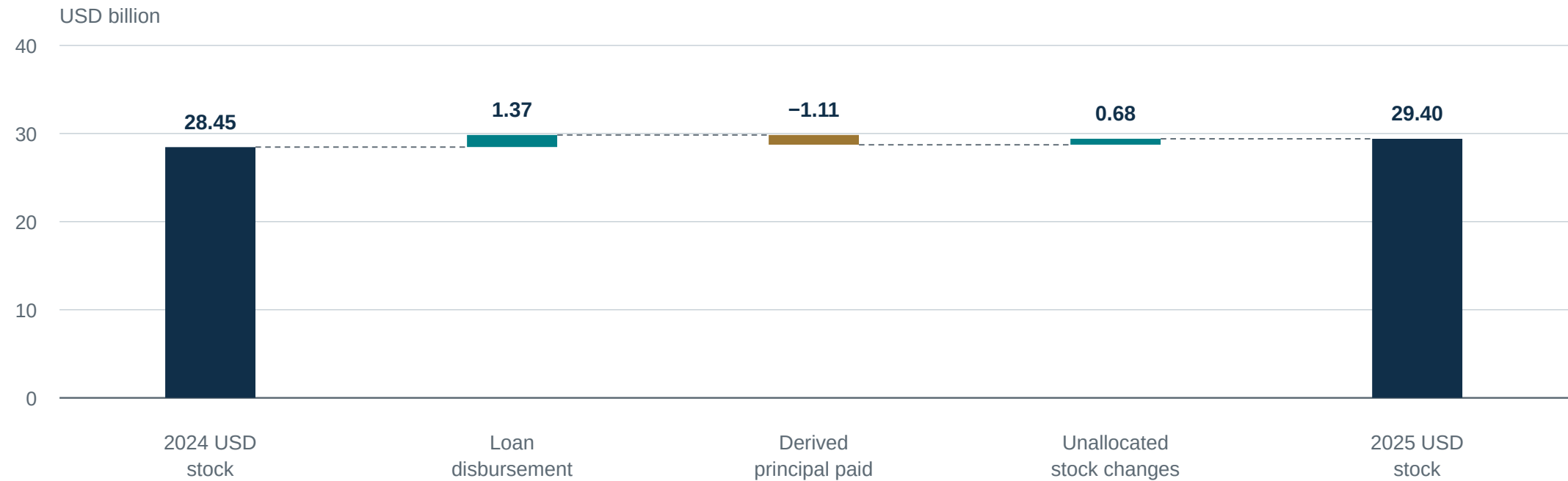
Sources: MoF APDR 2025 [\[S01\]](#); IDER calculations [\[S05\]](#).

Note: The remaining -GHS 2.855 bn is unallocated. Discounts, other instruments and accounting changes are not inferred without the ledger.

External loan cash flows do not fully explain the USD-equivalent stock change

Use the separately derived principal subtotal from total service less interest.

Figure 12. External loan cash flows do not fully explain the USD-equivalent stock change



Sources: MoF APDR 2025 [\[S01\]](#); IDER calculations [\[S05\]](#).

Note: The USD 679.7 m residual may contain cross-currency valuation, capitalisation, restructuring or scope changes; its cause is not identified.

One printed repayment subtotal is inconsistent with its own components

External debt service, USD million; no source figure is silently overwritten.

Table 11. One printed repayment subtotal is inconsistent with its own components

2025 source entry	USD m	Interpretation
Printed principal subtotal: Table 8.7	356.8	Does not match its creditor components or total less interest.
Principal: source paragraph 119	1,109.3	Independent narrative presentation; 0.1 m differs from component arithmetic.
Creditor-component sum	1,109.2	232.9 multilateral +11.3 bilateral +8.3 commercial +856.7 Eurobond.
Total service less interest	1,109.2	1,799.4 less 690.2; agrees with the component sum.

Sources: MoF APDR 2025 [\[S01\]](#); IDER calculations [\[S05\]](#).

Note: The bridge uses “derived principal 1,109.2”, with all three printed conventions retained in the source-exception register.

A detailed stock bridge separates recorded flows from unallocated changes

Domestic components, GHS billion; ratio contributions use the debt-factor coefficient of the three-factor Shapley allocation.

Table 12. A detailed stock bridge separates recorded flows from unallocated changes

Component	Stock effect, GHS bn	Ratio effect, pp	Basis
Domestic gross issuance	298.057	22.962	Includes PIK and recap instruments; not all cash
Domestic maturities: Table 6.1	−267.916	−20.640	Gross principal flow; not interest
Known domestic USD-bond valuation	−3.375	−0.260	Fixed USD 791.8 m; endpoint FX sensitivity
Domestic other stock–flow residual	−2.855	−0.220	Unallocated; not assigned to restructuring

Sources: MoF APDR 2025 [\[S01\]](#); IDER calculations [\[S05\]](#).

Note: Gross issuance and maturities largely offset; both remain explicit. These are accounting effects, not treatment effects.

Dollar cash flows are converted at one fixed reference rate for this bridge

External components, GHS billion; the opening rate 14.7174 is a decomposition convention, not the actual settlement rate.

Table 13. Dollar cash flows are converted at one fixed reference rate for this bridge

Component	Stock effect, GHS bn	Ratio effect, pp
External loan disbursement at opening FX	20.192	1.556
External principal at opening FX	-16.325	-1.258
Other external USD-stock changes at opening FX	10.003	0.771
External FX on closing USD-equivalent stock	-125.298	-9.653
External conversion/source residual	0.000149	0.000011

Sources: MoF APDR 2025 [\[S01\]](#); IDER calculations [\[S05\]](#).

Note: These five terms plus the four domestic terms reproduce the debt-stock change. A restructuring amount is not invented inside either residual.

Payment-in-kind interest lowers current cash payment—not the debt obligation

DDEP 2025 source coupon amounts, GHS billion.

Table 14. Payment-in-kind interest lowers current cash payment—not the debt obligation

Source coupon record	Amount	Treatment
Cash coupons	16.5554	Current cash-service component, using the source classification.
PIK coupons	3.7474	Interest converted into debt; already included in the issuance record.
Combined coupons	20.3028	Cash plus PIK; PIK share is 18.46%.
Recapitalisation securities within issuance	2.0760	A separate stock-creating transaction; not automatically cash available to Treasury.

Sources: MoF APDR 2025 [\[S01\]](#); IDER calculations [\[S05\]](#).

Note: Do not add PIK to gross issuance a second time. Cash interest, accrued interest and new principal must be reconciled by instrument.

Instrument records make the refinancing question more specific

The extension adds disclosed instruments and exact reconciliations—not additional independent sovereign observations.

Table 15. Instrument records make the refinancing question more specific

Evidence block	Source and captured unit	Analysis / exclusion
90 Treasury bills	S01 Appendix 3, PDF pp. 89–91; unique ISINs, issue and maturity dates, outstanding amounts.	Date concentrations and remaining days at 31 December 2025. Not a current unpaid-debt list.
12 DDEP bond records	S01 Table 8.10, PDF p. 48; outstanding amounts, coupons, closing prices and yields.	Price-times-face diagnostics and final-maturity cohorts. Not a verified instalment-level cash schedule.
Four external-creditor categories	S01 Appendix 1B p. 67; Tables 8.6–8.7, pp. 43–44.	Stock, disbursement, principal and residual by matched category; rounding shown.
Source-eligibility and date checks	S01 Appendix 3, pp. 91–92; Table 8.10 p. 48.	Past-dated positive entries, repeated serials, excluded interest-only references and conflicting dates retained.

Sources: MoF APDR 2025 [\[S01\]](#); IDER calculations [\[S05\]](#).

Note: More rows improve measurement detail; they do not create a random sample, an exogenous policy shock or a causal standard error.

The security rows reconcile within the headline display precision

Amounts in GHS million. Row totals are independently summed; Appendix 1A totals retain source rounding.

Table 16. The security rows reconcile within the headline display precision

Tenor	Securities	Appendix 3 row sum	Appendix 1A	Row sum less total
91 days	13	47,921.486257	47,921.5	-0.013743
182 days	26	36,073.545559	36,073.5	0.045559
364 days	51	43,031.477953	43,031.5	-0.022047
Total	90	127,026.509769	127,026.5	0.009769

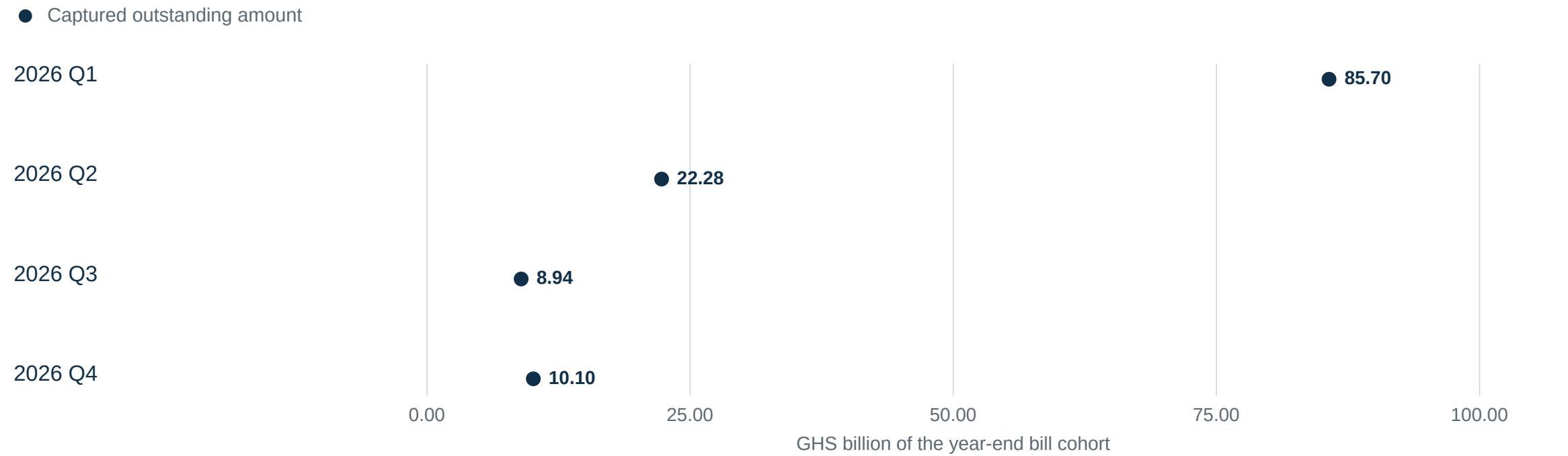
Sources: MoF APDR 2025 [\[S01\]](#); IDER calculations [\[S05\]](#).

Note: All three tenor sums round to Appendix 1A at GHS 0.1 m precision. The unrounded total differs by GHS 9,769; date metrics use the original whole-cedi security amounts.

Two-thirds of the captured bill stock has first-quarter maturity dates

Outstanding at 31 December 2025, grouped by the source maturity quarter in 2026.

Figure 13. Two-thirds of the captured bill stock has first-quarter maturity dates



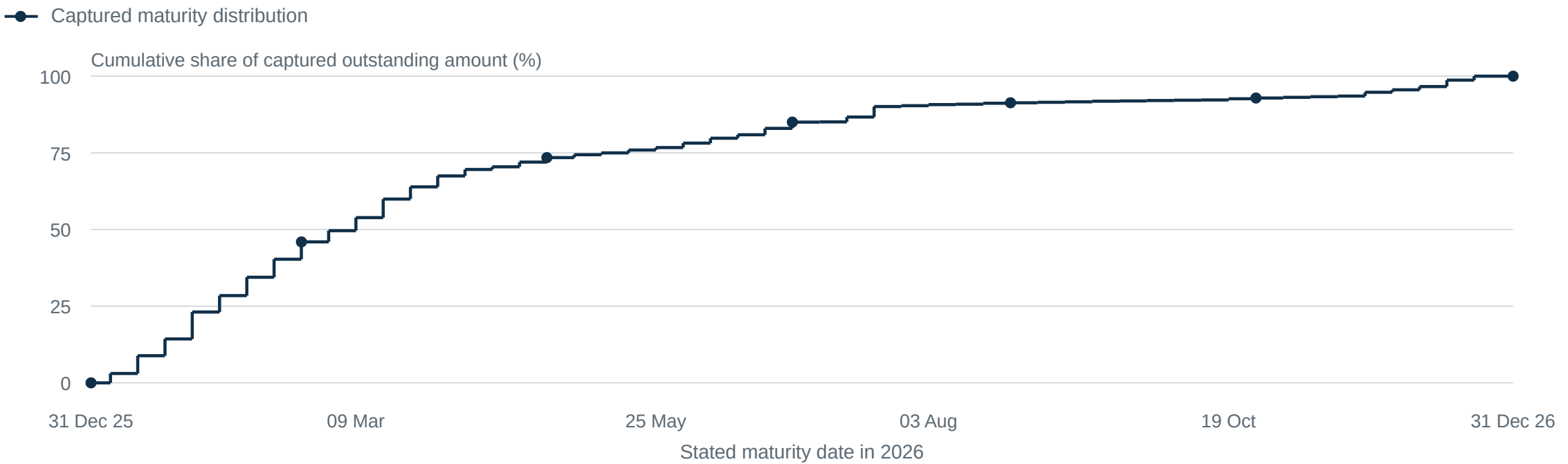
Sources: MoF APDR 2025 [\[S01\]](#); IDER calculations [\[S05\]](#).

Note: Q1 contains 67.47% of the captured GHS 127.027 bn. Later issuance, refinancing, interest and actual payment status are not included.

The year-end bill cohort is concentrated in the first half of 2026

Cumulative share of disclosed outstanding amounts by stated maturity date; no new issuance is added.

Figure 14. The year-end bill cohort is concentrated in the first half of 2026



Sources: MoF APDR 2025 [\[S01\]](#); IDER calculations [\[S05\]](#).

Note: By 30 June: 85.01%. Amount-weighted remaining time at the snapshot is 96.1 days. Neither statistic measures September 2026 arrears.

Five dates account for almost one-third of the captured maturity amount

Ranked by outstanding amount at the end-2025 snapshot; GHS billion, with unique-security counts.

Table 17. Five dates account for almost one-third of the captured maturity amount

Stated maturity date	Securities	Captured amount	Share of captured stock
26 January 2026	3	11.138	8.77%
16 March 2026	3	7.693	6.06%
09 February 2026	3	7.594	5.98%
16 February 2026	3	7.477	5.89%
12 January 2026	3	7.359	5.79%

Sources: MoF APDR 2025 [\[S01\]](#); IDER calculations [\[S05\]](#).

Note: The five shares sum to 32.48%. This is a concentration diagnostic; actual funding requires redemption prices, settlement status and subsequent issues.

A maturity snapshot and annual principal turnover have different denominators

The register describes the stock outstanding at one date; the service record counts payments over a year.

Table 18. A maturity snapshot and annual principal turnover have different denominators

Record	Amount / period	Supported use
Bill register, Appendix 3	GHS 127.027 bn at end-2025	Group the captured stock by maturity; retain the small display-rounding difference.
Short-term stock, Appendix 1A	GHS 127.0265 bn at end-2025	The rounded official aggregate matches the captured row sum at its stated GHS 0.1 m precision.
Treasury-bill principal service	GHS 266.0559 bn during 2025	Repeated refinancing within the year can exceed the closing stock. Not an additional end-year liability.
September 2026 unpaid obligations	Not reconstructed	Later auctions, redemptions, cancellations and settlement flags are absent from the end-2025 register.

Sources: MoF APDR 2025 [\[S01\]](#); IDER calculations [\[S05\]](#).

Note: The report does not roll the December 2025 register forward by assuming that every due instrument was repaid or that none was repaid.

The DDEP summary can be reconstructed from its twelve displayed rows

Weights are the displayed end-2025 outstanding amounts; the calculated sum is GHS 180,179.44 m.

Table 19. The DDEP summary can be reconstructed from its twelve displayed rows

Diagnostic	Recomputed	Source weighted row
Amount-weighted coupon (%)	9.1139	9.11
Amount-weighted quoted yield (%)	15.2507	15.25
Amount-weighted price per 100	79.5364	79.54
Amount-weighted reported price change (%)	62.1861	62.19
Amount-weighted yield change (bp)	-1,151.5142	-1,152.00

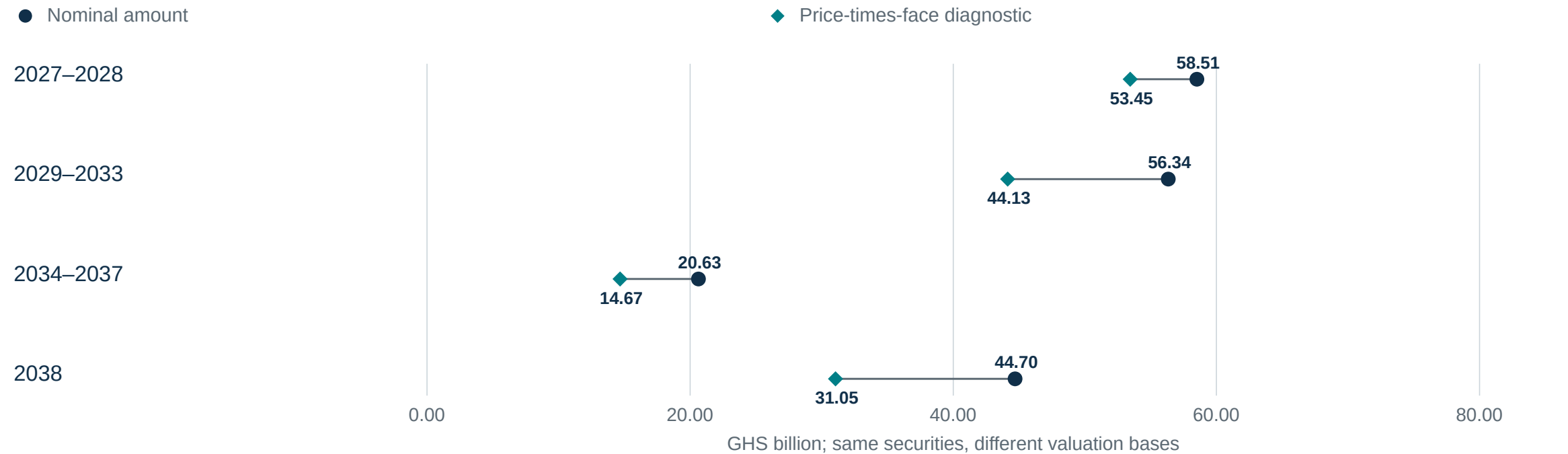
Sources: MoF APDR 2025 [\[S01\]](#); IDER calculations [\[S05\]](#).

Note: Source total is GHS 180,179.43 m: the GHS 0.01 m difference is retained. An amount-weighted quoted yield is not the portfolio’s yield-to-maturity or an expected return.

Lower quoted prices do not extinguish the government’s nominal claims

Four final-maturity cohorts of the same twelve DDEP records; source prices multiplied by nominal amounts.

Figure 15. Lower quoted prices do not extinguish the government’s nominal claims



Sources: MoF APDR 2025 [\[S01\]](#); IDER calculations [\[S05\]](#).

Note: Total nominal amount 180.179 bn versus diagnostic 143.308 bn. Accrued interest, execution prices and holder-specific valuation are not reconstructed.

The 2027 and 2028 instruments represent 32.48% of this bond subset

Displayed outstanding amount by stated final-maturity year; not an assumed bullet-redemption schedule.

Figure 16. The 2027 and 2028 instruments represent 32.48% of this bond subset



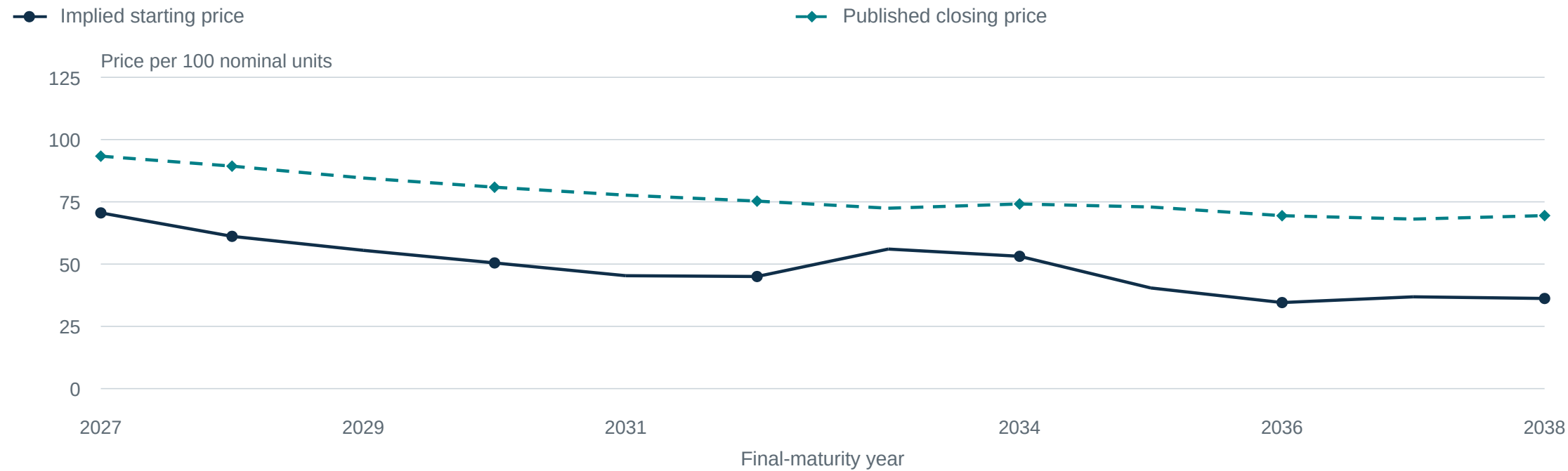
Sources: MoF APDR 2025 [\[S01\]](#); IDER calculations [\[S05\]](#).

Note: The two cohorts contain GHS 58.514 bn. Interim amortisation and coupons require contractual schedules; the 2027 date conflict is documented separately.

Higher reported bond prices are not a reduction in nominal debt

Source closing price versus the start-price value implied by the source’s reported year-to-date price change.

Figure 17. Higher reported bond prices are not a reduction in nominal debt



Sources: MoF APDR 2025 [\[S01\]](#); IDER calculations [\[S05\]](#).

Note: The earlier price is algebraically reconstructed, not a new quote. This is not a total return: coupons, accrued interest, reinvestment, turnover and transaction costs are omitted.

Four positive outstanding entries carry dates before the snapshot

Selected reconciliation exceptions in the domestic register; no paid, unpaid or arrears status is inferred.

Table 20. Four positive outstanding entries carry dates before the snapshot

Source identifier	Printed maturity	Outstanding, GHS m	Verification needed
GHGGOG069873	17 Mar 2025	3,038.320	Confirm extension, settlement status or source date.
GHGGOG069899	23 Jun 2025	227.102	Confirm extension, settlement status or source date.
GHGGOG069907	27 Jan 2025	227.102	Confirm extension, settlement status or source date.
2020503	22 Aug 2025	38.566	Confirm extension, settlement status or source date.

Sources: MoF APDR 2025 [\[S01\]](#); IDER calculations [\[S05\]](#).

Note: These four entries total GHS 3.531 bn. They are not automatically arrears and are not silently removed from the source record.

A conflicting 2027 date changes the half-year bucket, not the known claim

The amount is consistent to table precision; the stated dates differ between Table 8.10 and Appendix 3.

TABLE 8.10	APPENDIX 3	RELEASE CONDITION
The 8.35% instrument has a stated maturity of 16 February 2027 and GHS 29,380.92 m outstanding. Its annual 2027 cohort is identifiable.	ISIN GHGGOG069915 reports 16 August 2027 and GHS 29,380,917,382 outstanding. This shifts the same-sized item from the first to second half of 2027.	Retain both dates. Do not publish one as an authenticated payment date or infer that the liability was extended. Request the contractual schedule and instrument-level confirmation.

Sources: MoF APDR 2025 [\[S01\]](#); IDER calculations [\[S05\]](#).

Note: The register also contains GHS 30.987 bn of interest-only reference amounts explicitly excluded from stock. Those notionals are not added to nominal principal.

Creditor-level bridges locate the residual without naming its cause

2025 external USD-equivalent changes; cash flows and stocks retain their own source definitions.

Table 21. Creditor-level bridges locate the residual without naming its cause

Creditor category	Stock change	Disbursement	Principal paid	Unallocated change
Multilateral	1,226.4	1,307.2	232.9	152.1
Bilateral	467.7	64.7	11.3	414.3
Commercial excluding Eurobonds	105.1	0.0	8.3	113.4
Eurobonds	-856.7	0.0	856.7	0.0

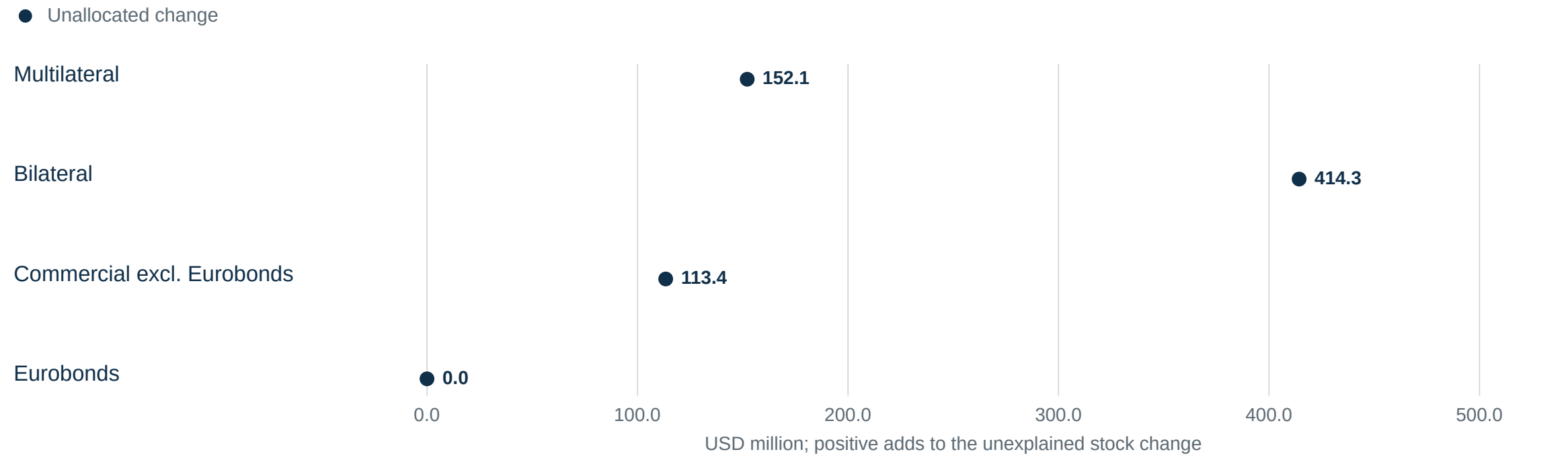
Sources: MoF APDR 2025 [\[S01\]](#); IDER calculations [\[S05\]](#).

Note: USD million. Residual = stock change – disbursements + principal. Category residuals sum to 679.8 versus the headline bridge’s 679.7 because disbursement subtotals differ by 0.1.

The bilateral residual is not evidence of new borrowing or forgiveness

Unallocated USD-equivalent stock changes after displayed disbursement and principal flows.

Figure 18. The bilateral residual is not evidence of new borrowing or forgiveness



Sources: MoF APDR 2025 [\[S01\]](#); IDER calculations [\[S05\]](#).

Note: The Eurobond residual is zero; this does not rule out offsetting adjustments. Other residuals may combine valuation, capitalisation, scope and restructuring; no causal allocation is inferred.

Treasury-bill principal explains 97.46% of the reported service increase

2024–2025 change in domestic debt service; principal turnover is kept distinct from interest.

Figure 19. Treasury-bill principal explains 97.46% of the reported service increase



Sources: MoF APDR 2025 [\[S01\]](#); IDER calculations [\[S05\]](#).

Note: Rounding term: -GHS 0.1 m. These are accounting shares, not causal effects. The source cash/PIK crosswalk is incomplete; principal turnover differs from interest burden.

At least the identified PIK and recapitalisation entries require separate treatment

Gross issuance is GHS 298,057.2 m; the two identified components sum to GHS 5,823.4 m.

Table 22. At least the identified PIK and recapitalisation entries require separate treatment

Component	GHS million	Measurement implication
PIK coupons	3,747.4	Capitalised interest; already inside gross issuance, not a second cash receipt.
Recapitalisation instruments	2,076.0	Stock-creating securities; issuance does not establish freely usable Treasury cash.
Remaining gross issuance	292,233.8	Residual gross category, not an independently reconciled net cash-proceeds total.
PIK plus recapitalisation / gross	1.954%	Do not subtract twice in debt, fiscal and bank-balance-sheet reconciliations.

Sources: MoF APDR 2025 [\[S01\]](#); IDER calculations [\[S05\]](#).

Note: The report does not infer that every remaining issue is cash-settled at face value. Discounts, proceeds, maturity and security exchanges require a transaction-level cash crosswalk.

The three-factor conclusion survives the evaluated rounding corners

All 32 corners for two debt stocks, two GDP levels and one real-growth input; GDP prices are recomputed jointly.

Table 23. The three-factor conclusion survives the evaluated rounding corners

Contribution	Central, pp	Minimum evaluated	Maximum evaluated
Debt-stock change	−6.74195	−6.74226	−6.74164
Real GDP growth	−3.07581	−3.10077	−3.05085
Implied GDP prices	−7.07930	−7.10820	−7.05040

Sources: MoF APDR 2025 [\[S01\]](#); IDER calculations [\[S05\]](#).

Note: Corners use ±0.05 m debt, ±0.05 bn nominal GDP and ±0.05 percentage points real growth. These are evaluated sensitivity ranges, not statistical confidence intervals or a claim of global interior extrema.

The validation separates measurement problems from policy identification

Specific threats and the treatment implemented in this edition; no synthetic instruments are counted as observed records.

Table 24. The validation separates measurement problems from policy identification

Threat	Implemented treatment	What remains unidentified
End-year survival and issuance selection	Include all 90 disclosed bill rows; use no invented issuance or population weights.	Effects on failed auctions, instruments already redeemed in 2025 or later refinancing.
Yield and policy simultaneity	Treat DDEP price/yield changes as source observations and arithmetic reconstructions.	A causal monetary, restructuring or debt-management treatment effect.
Scope and cash-status uncertainty	Check stock-rounding closure; retain past maturity dates and interest-only exclusions.	An audited full debt inventory and a current unpaid cash schedule.
Nonlinear ratio allocation	Recompute six-order attribution and all 32 input corners; preserve GDP vintage.	Which policy caused real growth, prices or exchange-rate changes.

Sources: MoF APDR 2025 [\[S01\]](#); IDER calculations [\[S05\]](#).

Note: Robust standard errors cannot identify missing assignment or correct misclassified principal. P01 remains prospective; instrument counts are not independent country observations.

Four independent controls support the additional quantitative findings

The new source records and outputs are supplied separately from the incoming frozen inputs.

Table 25. Four independent controls support the additional quantitative findings

Control	Executed check	Boundary
Bill register	Unique ISINs, issue/maturity day differences, positive amounts, all date and tenor totals.	Source transcription checks do not verify actual redemptions.
DDEP price and amount	Independent amount-weighted price/yield calculations and price-times-face sums.	No executable bid, accounting impairment or total-return inference.
Credit and service bridges	Category residuals, source rounding, principal/interest change shares.	Unallocated differences are not renamed restructuring effects.
Ratio precision	Independent subset-form Shapley verification at all 32 rounding corners.	No sampling precision, model probability or causal confidence claim.

Sources: MoF APDR 2025 [\[S01\]](#); IDER calculations [\[S05\]](#).

Note: The verification archive records the tests actually run. A successful replay is not a separate empirical study or an audit of the original public-debt system.

Debt-ratio interpretation should travel with an instrument and funding record

The extension changes the evidence available for scrutiny—not the source’s recorded debt or contractual terms.

PARLIAMENT AND MoF	BANKS AND INSTITUTIONAL INVESTORS	RESEARCH AND PUBLIC COMMUNICATION
The captured bill schedule places GHS 107.98 bn by June 2026 at the end-2025 snapshot. Require the redemption and rollover crosswalk before treating any part as a current requirement.	DDEP face amounts of GHS 180.18 bn correspond to GHS 143.31 bn under the source price-times-face calculation. Neither is an immediate liquidation guarantee.	Keep the 16.90-point ratio decline separate from principal turnover, creditor residuals and market valuation. Publish the source date conflict and captured-stock reconciliation with the finding.

Sources: MoF APDR 2025 [\[S01\]](#); IDER calculations [\[S05\]](#).

Note: The first-half schedule is historical cohort evidence, not a claim that those amounts remain unpaid at the report’s 26 September 2026 cut-off.

A stock reduction must be assigned to the date the liability was extinguished

Ghana’s Eurobond exchange was completed in October 2024; the 2025 stock already starts after that exchange.

Table 26. A stock reduction must be assigned to the date the liability was extinguished

Event / record	Reported amount or date	What may be concluded
Eurobond exchange completion	10 October 2024	Date the exchanged legacy bonds were cancelled and new instruments delivered.
Legacy principal / recognised PDI	USD 13,103.9 m / USD 1,166.6 m	Principal and post-default interest are different components of eligible claims.
Reported nominal claim reduction	USD 4,866.0 m, including PDI	A source restructuring measure; not 37% of all Ghana public debt.
Participation / discount option	98.6% participation; 37% reduction except Long-Term Par	Participation and haircut denominators differ; preserve the option-specific qualification.

Sources: MoF APDR 2024 [\[S02\]](#).

Note: Do not apply the 2024 exchange reduction again to the already restructured opening stock in a 2025 decomposition.

Covered or renegotiated debt is not the amount of debt forgiven

The 2025 report describes agreements at different stages; coverage figures are not principal-cancellation entries.

Table 27. Covered or renegotiated debt is not the amount of debt forgiven

Record	Source amount or date	Measurement safeguard
Official bilateral treatment	USD 5,303.1 m covered	Reported coverage relates to the restructuring process; not a new end-2025 write-off of this amount.
OCC memorandum and indicative terms	28 January 2025; 24 June 2025 approval	Distinguish memorandum, Parliamentary approval, signed bilateral agreement and accounting recognition.
Non-bonded commercial treatment	USD 2,721.3 m; end-2022 outstanding basis	Ten lender agreements in principle by end-2025; remaining negotiations described separately.
Stock-bridge requirement	Recognition date + instrument amount	Only verified cancellation, capitalisation and exchange entries belong in a realised restructuring component.

Sources: MoF APDR 2025 [\[S01\]](#).

Note: Paragraph 37 uses broad restructuring wording; paragraphs 38–48 distinguish memoranda, definitive agreements and AIPs. Do not treat all covered claims as cancelled.

Nominal claim reduction and programme-period payment relief are not additive

Reported Ghana restructuring figures have different time horizons and measurement bases.

Table 28. Nominal claim reduction and programme-period payment relief are not additive

Source measure	Reported value	Interpretation boundary
Eurobond nominal claims reduction	USD 4,866.0 m	Includes recognised post-default interest; not the same as cumulative cash saving.
Eurobond programme-period service relief	USD 4,325.0 m	Payments avoided or deferred over the named programme period; do not add to the claims reduction.
OCC covered debt: 2024-report scope	USD 5,173.9 m	Covered official bilateral obligations; not a verified principal write-off of this amount.
OCC programme-period service relief	USD 2,845.0 m	Cash-timing relief; a postponement can leave nominal principal intact.

Sources: MoF APDR 2024 [\[S02\]](#).

Note: The report does not infer a single total haircut by pooling different restructuring perimeters, periods and relief concepts.

The Eurobond stock reduction matches its reported principal repayment

USD million; this is a specific instrument-category reconciliation.

Table 29. The Eurobond stock reduction matches its reported principal repayment

Record	Amount	Calculation or status
End-2024 Eurobond principal	9,236.1	Opening source stock after the October 2024 exchange.
2025 principal payment	856.7	Creditor component in Table 8.7.
End-2025 Eurobond principal	8,379.4	9,236.1 less 856.7.
Remaining external categories	Separate reconciliation required	This exact category match does not close the entire external-debt ledger.

Sources: MoF APDR 2025 [\[S01\]](#); IDER calculations [\[S05\]](#).

Note: No new 2025 haircut is inferred from this amortisation identity; interest and early-payment timing remain separate.

Four synthetic contracts isolate face-value, coupon, maturity and PIK effects

Normalised principal 100; annual end-year payments. These are not Ghana’s actual new-bond terms.

Table 30. Four synthetic contracts isolate face-value, coupon, maturity and PIK effects

Contract	Opening face	Coupon / maturity	Cash treatment
Legacy comparison	100	8%; principal at year 3	Coupon paid annually through year 3.
Rescheduled / lower coupon	100	3%; principal at year 8	Face unchanged; payment profile and PV change.
Face reduction plus rescheduling	70	3%; principal at year 8	30% face reduction, separately identifiable from timing relief.
PIK first two years	100	3%; principal at year 8	Years 1–2 interest capitalised; later coupon accrues on the larger balance.

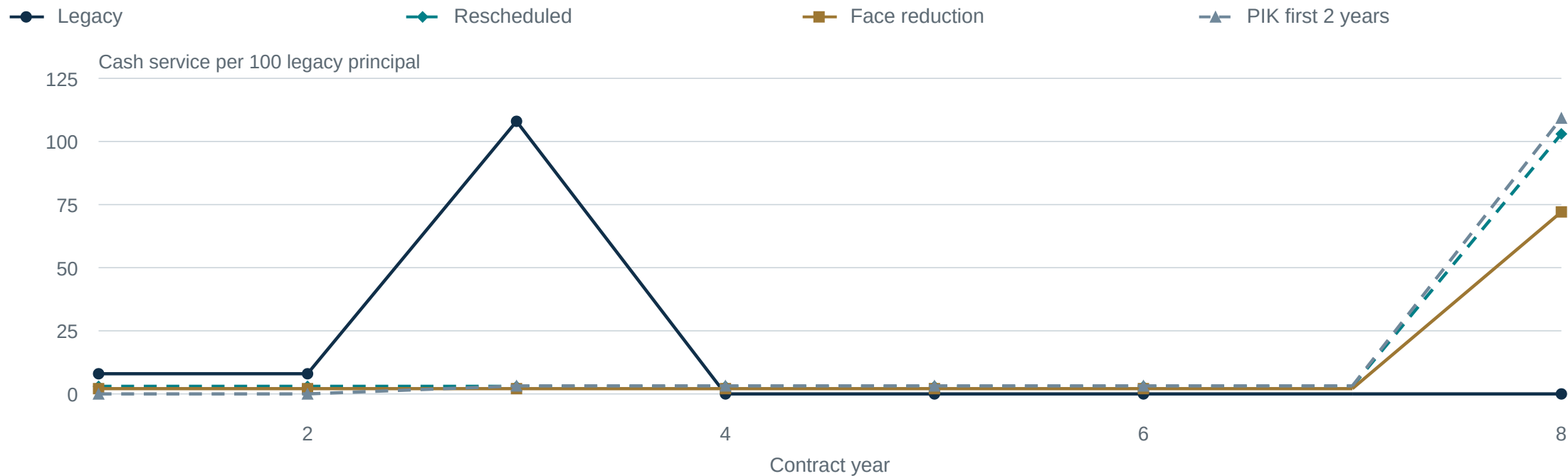
Sources: IDER calculations [\[S05\]](#).

Note: No exchange offer, investment recommendation, probability or legal enforceability conclusion is implied.

Extending maturity moves a payment peak rather than abolishing principal

Synthetic annual service on the four declared contracts.

Figure 20. Extending maturity moves a payment peak rather than abolishing principal



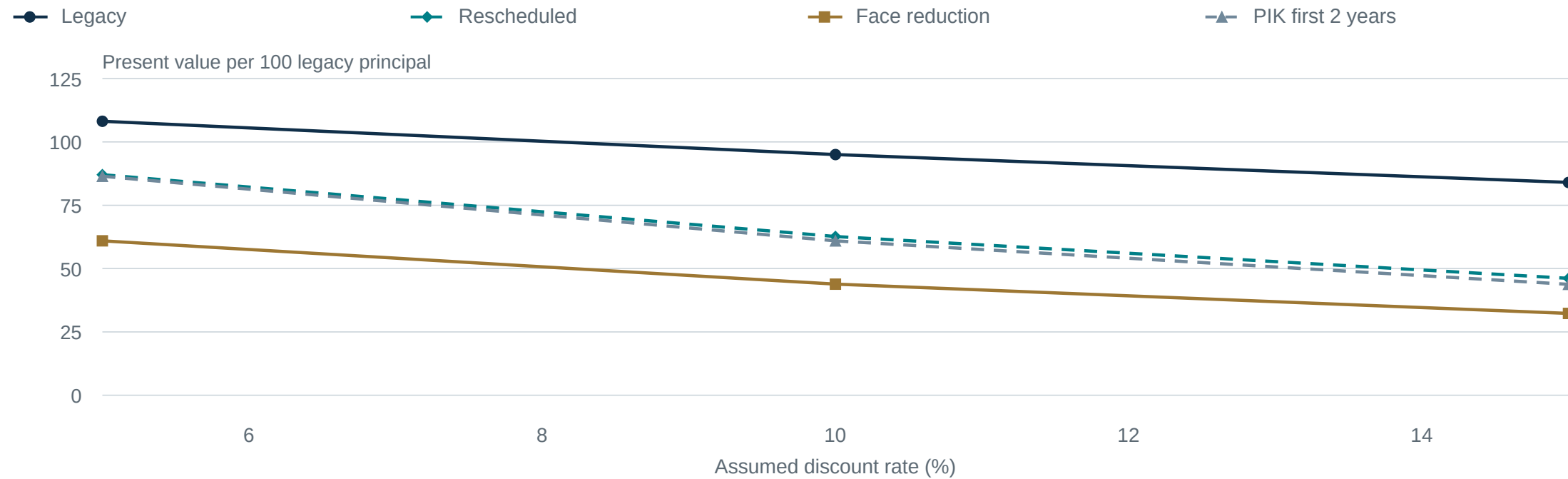
Sources: IDER calculations [\[S05\]](#).

Note: Later service includes the outstanding principal. Timing relief is not the same as debt cancellation.

The measured PV relief depends on the common discount rate

Discount both old and new contractual cash flows at the same illustrative rate.

Figure 21. The measured PV relief depends on the common discount rate



Sources: IDER calculations [\[S05\]](#).

Note: These are deterministic contract values, not market prices. The chosen 5%, 10% and 15% rates are not an official Ghana DSA rule.

A rescheduling can preserve total nominal payments and still lower present value

All four examples use the same 10% illustrative discount rate.

Table 31. A rescheduling can preserve total nominal payments and still lower present value

Contract	Face at inception	PV at 10%	First 3-year cash	Lifetime cash
Legacy	100.00	95.03	124.00	124.00
Rescheduled	100.00	62.66	9.00	124.00
Face reduction	70.00	43.86	6.30	86.80
PIK first 2 years	100.00	60.95	3.18	125.19

Sources: IDER calculations [\[S05\]](#).

Note: Legacy and rescheduled contracts each pay 124 nominal units, but their timing and coupon profiles produce different PVs.

Debt relief can redistribute losses and funding pressures across institutions

A sovereign cash saving is not automatically a gain for every domestic investor.

GOVERNMENT	BANKS AND FUNDS	PENSIONS AND INSURERS
Separate the reduction in face claims, coupon savings and maturity extensions. Then include recapitalisation, arrears clearance and guarantees rather than netting them against an unexplained residual.	Measure modified cash receipts, market values, capital effects and liquidity separately. A bond exchange can reduce government cash outgo while changing the holder’s income and duration exposure.	Test revised asset cash dates against benefit and claim payments. Lower debt/GDP does not restore the original coupon schedule or guarantee that assets can be liquidated at book value.

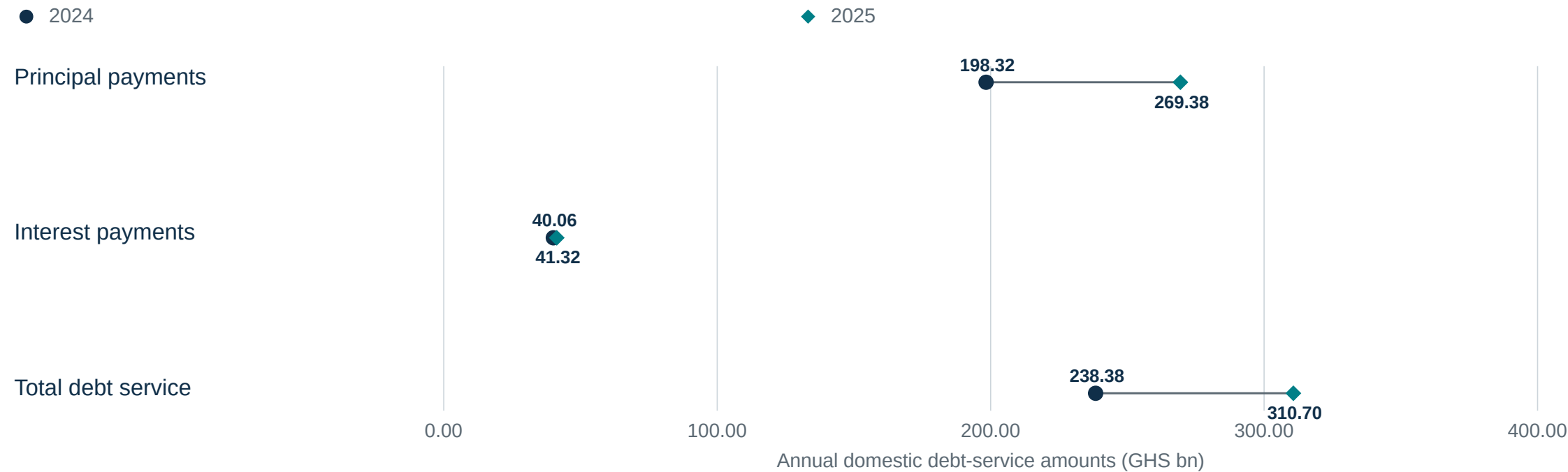
Sources: MoF APDR 2025 [\[S01\]](#); MoF APDR 2024 [\[S02\]](#); IMF CR 26/212 [\[S03\]](#); IDER calculations [\[S05\]](#).

Note: The report does not calculate institution-specific impairments, solvency ratios, investment suitability or actuarial funding gaps.

Domestic debt service rose while headline debt/GDP fell

MoF reported annual domestic service; GHS billion.

Figure 22. Domestic debt service rose while headline debt/GDP fell



Sources: MoF APDR 2025 [\[S01\]](#); IDER calculations [\[S05\]](#).

Note: Reported service rose 30.34%. Cash/PIK treatment is not fully reconciled across source tables; this is not a verified cash-only series.

Treasury-bill turnover dominates the reported domestic payment flow

Source-reported debt-service classification; GHS billion.

Table 32. Treasury-bill turnover dominates the reported domestic payment flow

Indicator	2024	2025	Interpretation
Treasury-bill principal	195.570	266.056	A short instrument can mature and be refinanced more than once within a calendar year.
Treasury-bill interest	19.320	19.075	This component declined slightly while principal turnover increased.
Treasury-bill total service	214.890	285.131	Reported flow, not the closing stock; retain the source payment basis.
Share of domestic service	90.15%	91.77%	Not a share of the year-end debt stock or revenue.

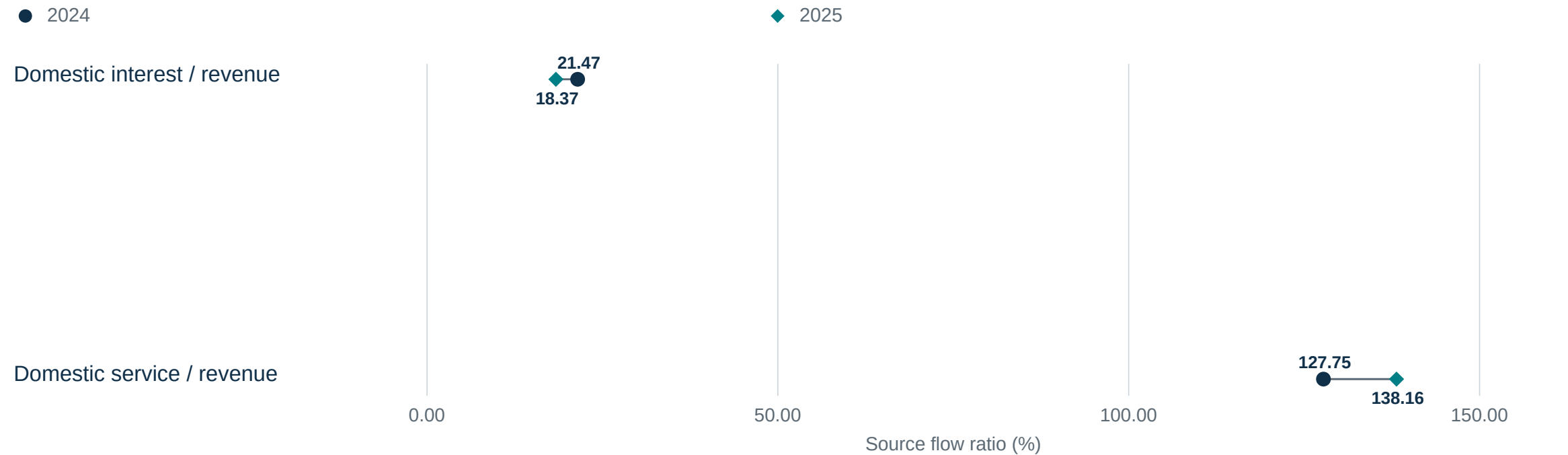
Sources: MoF APDR 2025 [\[S01\]](#); IDER calculations [\[S05\]](#).

Note: A decline in short-term rates does not by itself remove the requirement to roll over maturing principal.

Interest grew in cedis but fell relative to revenue and grants

Domestic interest / source revenue and grants; no external cash amount converted at a year-end rate.

Figure 23. Interest grew in cedis but fell relative to revenue and grants



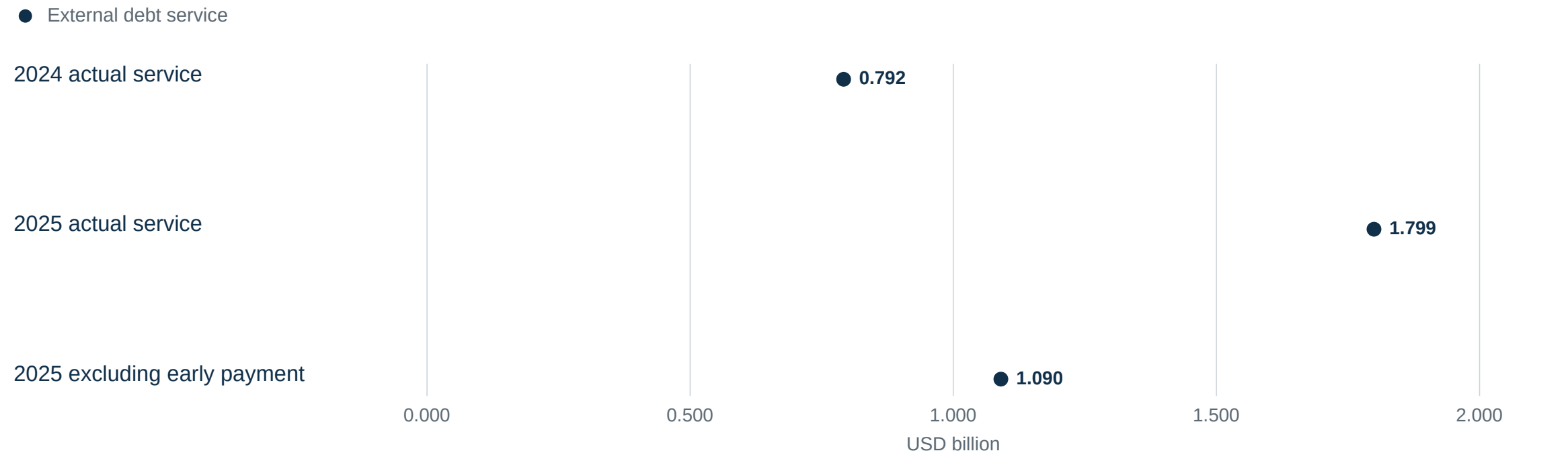
Sources: MoF APDR 2025 [\[S01\]](#); IDER calculations [\[S05\]](#).

Note: Interest affordability and rollover intensity can move differently. Revenue is not identical to GDP or cash available on every payment date.

The early Eurobond payment explains much of the annual cash-service increase

USD billion; source total versus a separately labelled timing illustration.

Figure 24. The early Eurobond payment explains much of the annual cash-service increase



Sources: MoF APDR 2025 [\[S01\]](#); IDER calculations [\[S05\]](#).

Note: USD 709 m paid 30 December 2025 for 3 January 2026 accounts for 70.35% of the increase. Excluding it is not an official correction.

An early payment changes the year of cash service, not a second liability

The same instrument ID must link the stock, the payment and its contractual due date.

2025 CASH RECORD	2026 PAYMENT LADDER	ANALYTICAL COMPARISON
The USD 709 m payment is already in 2025 reported external service. The year-end stock should reflect extinguished obligations according to the source’s recognition rules.	An obligation settled in December must not be counted again as unpaid on its January due date. Contractual schedules require a settled flag, not just the original maturity date.	Keep actual cash paid and scheduled service distinct. A timing-adjusted comparison may explain a calendar spike without changing what Treasury actually paid.

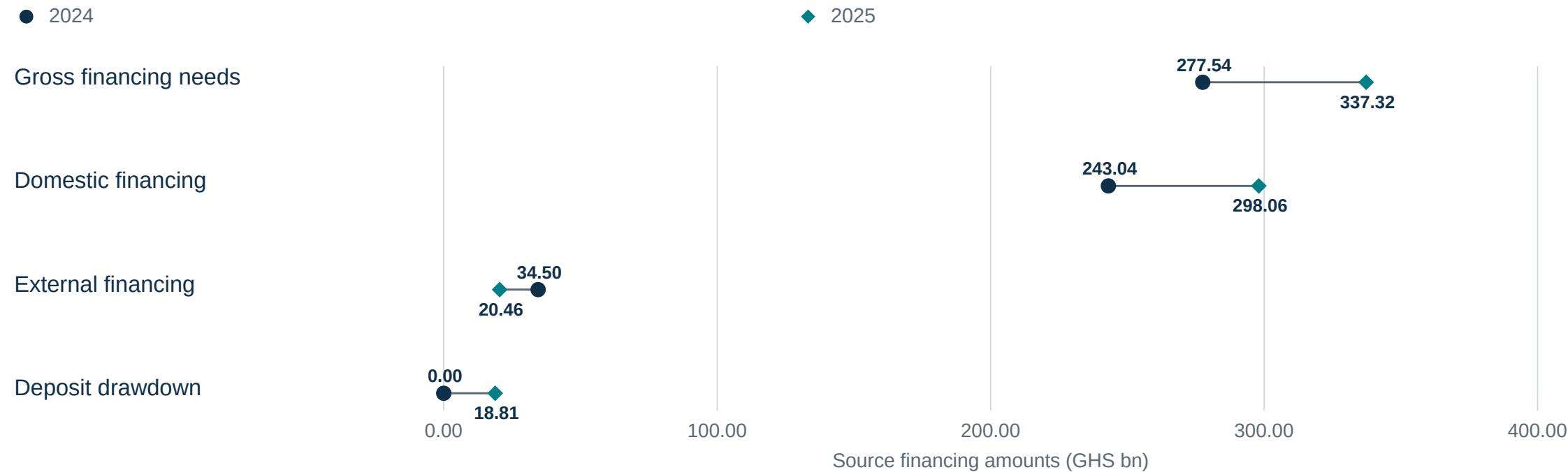
Sources: MoF APDR 2025 [\[S01\]](#); IDER calculations [\[S05\]](#).

Note: No inference is made about the breakdown of this specific early payment beyond what the source discloses.

Reported gross financing needs increased despite nearly unchanged GFN/GDP

MoF source outturn; GHS billion, with actual reported financing components.

Figure 25. Reported gross financing needs increased despite nearly unchanged GFN/GDP



Sources: MoF APDR 2025 [\[S01\]](#); IDER calculations [\[S05\]](#).

Note: GFN grew 21.54%. Both years round to 23.5% of matched GDP; the unchanged ratio does not imply an unchanged financing volume.

MoF and IMF financing amounts must not be spliced into one cash series

2025 measures in GHS billion unless stated otherwise.

Table 33. MoF and IMF financing amounts must not be spliced into one cash series

Measure	MoF APDR	IMF staff / DSA	Use restriction
Gross financing needs	337.324	160.6: staff Table 3c	Different coverage and rollover conventions; no full reconciliation obtained.
Domestic debt service	310.701	145.6: staff Table 3c	Do not subtract the difference as evidence of unpaid service or hidden debt.
GFN / GDP	23.5% rounded	12.1%: DSA Table 2	The staff cash-financing table and DSA ratio also have different bases.
Debt coverage	Headline central + guaranteed	Broader public sector, arrears and specified SOEs	Maintain source-specific numerator, denominator and status.

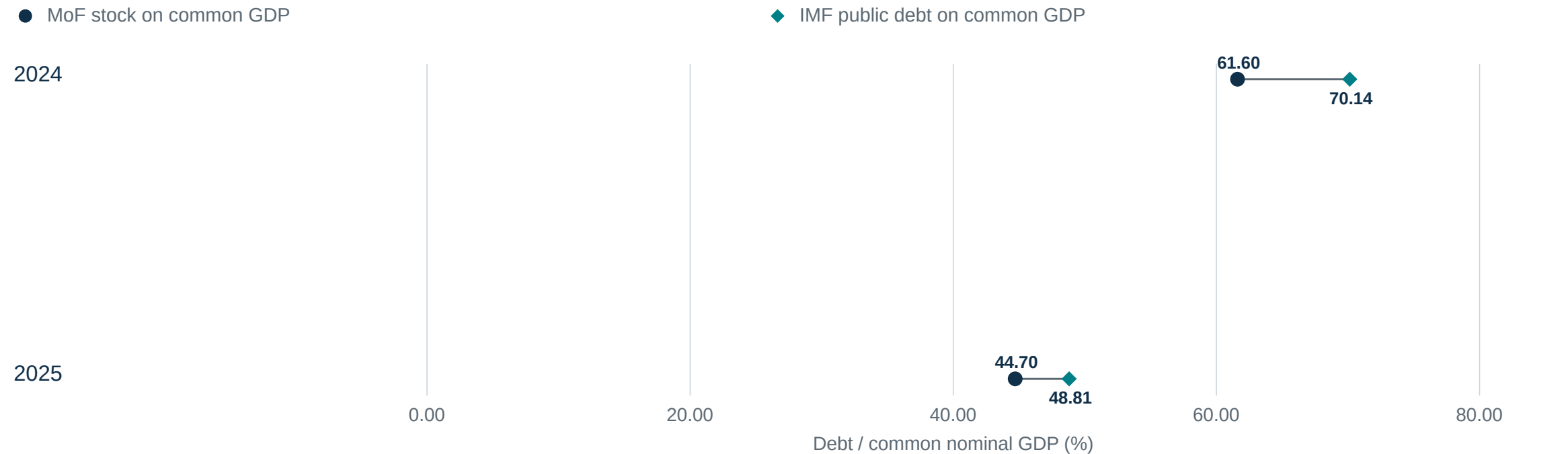
Sources: MoF APDR 2025 [\[S01\]](#); IMF CR 26/212 [\[S03\]](#).

Note: Intra-year short-term refinancing and scope can change gross measures. This report does not claim a quantitatively closed cross-source GFN bridge.

The broader IMF public-debt ratio remains above the MoF headline

Each pair uses the same IMF nominal-GDP denominator to isolate the reported stock gap.

Figure 26. The broader IMF public-debt ratio remains above the MoF headline



Sources: MoF APDR 2025 [\[S01\]](#); IMF CR 26/212 [\[S03\]](#); IDER calculations [\[S05\]](#).

Note: The 2025 stock gap is GHS 58.874 bn, or 4.105 pp. This is a scope/measurement difference, not a newly discovered debt item.

The broad debt perimeter includes obligations outside the headline stock

IMF July 2026 DSA coverage statement; amounts and treatment remain tied to that vintage.

Table 34. The broad debt perimeter includes obligations outside the headline stock

Coverage item	Source treatment	Analytical consequence
Central and guaranteed obligations	Public and publicly guaranteed central-government debt.	Avoid adding a guarantee again when the underlying loan is already included.
Specified implicit SOE obligations	Sinohydro-related debt and gross Cocobod debt as defined by the DSA.	State institutional scope before comparing domestic/external totals.
Domestic arrears	Estimated 3.7% of GDP at end 2025, with source recognition rules.	Recognising arrears can raise reported debt without new borrowing on that date.
Financial and energy-sector risks	Baseline recapitalisation and fiscal-support assumptions; historic buybacks treated by vintage.	Future funding needs are not eliminated by a lower current headline ratio.

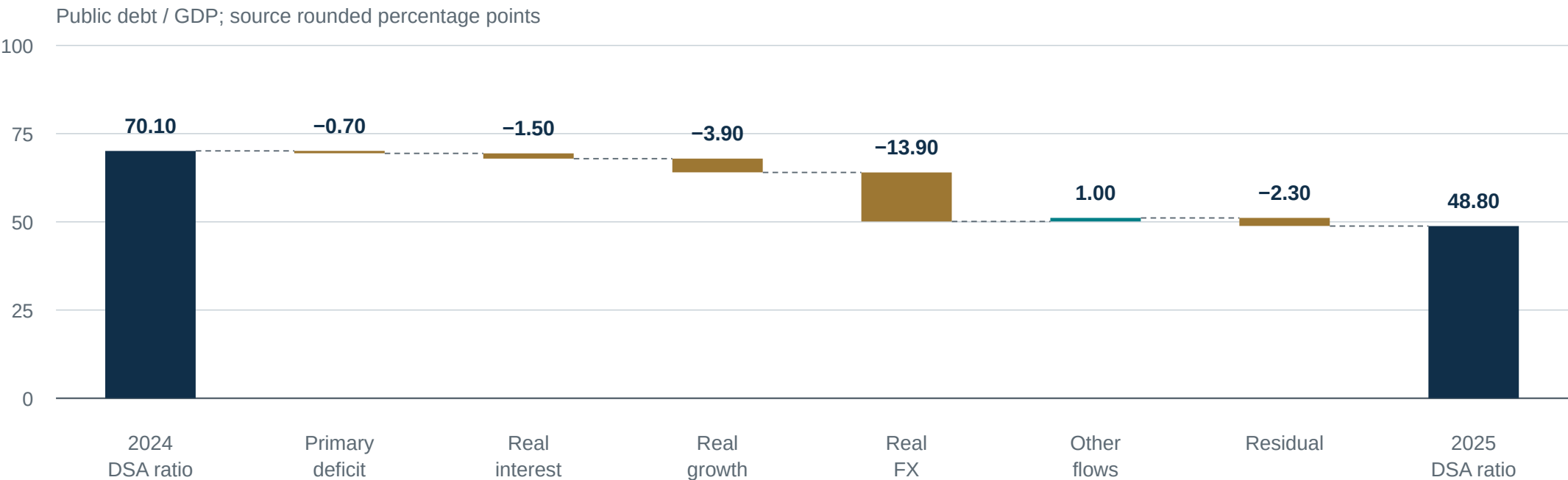
Sources: IMF CR 26/212 [\[S03\]](#).

Note: The report does not allocate the entire MoF–IMF gap to a single SOE or arrears category; that bridge requires matched instruments.

The IMF’s broader-perimeter decomposition answers a different accounting question

Published 2025 contributions, rounded percentage points; no new causal regression.

Figure 27. The IMF’s broader-perimeter decomposition answers a different accounting question



Sources: IMF CR 26/212 [\[S03\]](#).

Note: The real-FX term already incorporates price effects. Do not add the report’s separate GDP-price contribution to these DSA terms.

The baseline debt ratio rises in 2026 before declining in later years

IMF July 2026 DSA; 2025 preliminary, later years projections under full restructuring.

Table 35. The baseline debt ratio rises in 2026 before declining in later years

Year	Nominal debt / GDP	PV debt / GDP	Debt service / revenue	DSA GFN / GDP
2025	48.8%	44.8%	74.6%	12.1%
2026	52.6%	48.3%	77.4%	13.0%
2027	51.7%	47.7%	89.4%	15.0%
2028	50.6%	47.0%	95.9%	16.3%
2029	49.9%	46.7%	82.9%	14.4%
2030	48.9%	46.2%	77.5%	13.3%
2031	48.0%	45.6%	78.0%	13.4%

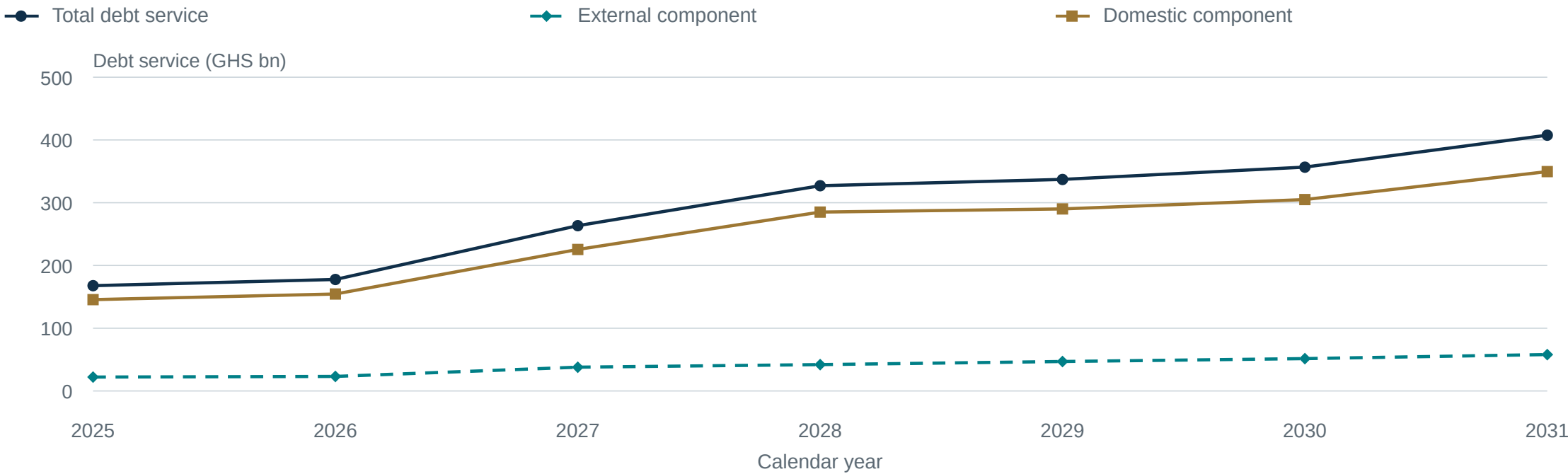
Sources: IMF CR 26/212 [\[S03\]](#).

Note: These are source projections, not verified future payments. The nominal ratio and PV ratio use different debt valuations.

Projected cash service rises as the later debt ratio declines

IMF staff Table 3c; GHS billion; 2025 is preliminary, 2026 onward projected.

Figure 28. Projected cash service rises as the later debt ratio declines



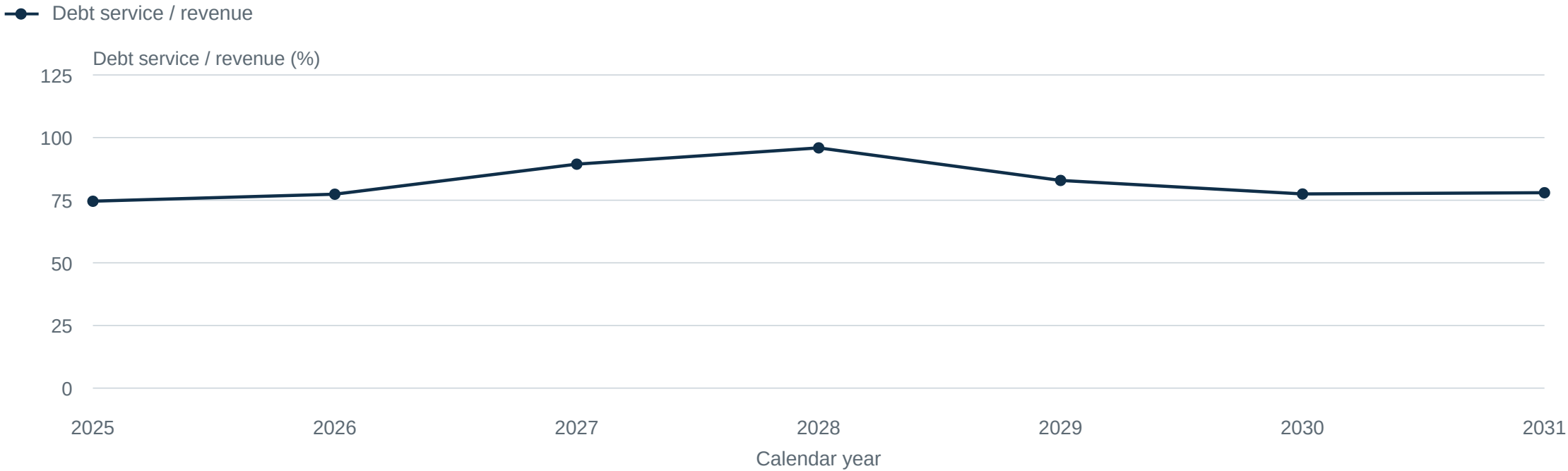
Sources: IMF CR 26/212 [\[S03\]](#).

Note: Table 3c and DSA financing measures remain separate. By 2028 the staff table projects GHS 327.1 bn in service, versus GHS 167.8 bn in 2025.

The debt-service-to-revenue ratio peaks later than the 2025 stock improvement

Source DSA path,2025–2031; revenue and service both depend on baseline assumptions.

Figure 29. The debt-service-to-revenue ratio peaks later than the 2025 stock improvement



Sources: IMF CR 26/212 [\[S03\]](#).

Note: The 2028 projected ratio is 95.9%. This is not a current default probability, a legal ceiling or a statement that every payment must use tax revenue.

Lower debt/GDP does not by itself identify a safer security or cheaper business credit

The ratio is one input to due diligence, not an investment recommendation.

SOVEREIGN INSTRUMENT	BANK AND ENTERPRISE	PORTFOLIO CASH
Compare the actual coupon, maturity, currency, market price and recovery terms. A lower face ratio can coexist with a near-term redemption peak or higher duration risk.	Trace government-payment arrears, bank security holdings and credit conditions separately. A fiscal ratio does not identify lending-rate pass-through or payment timeliness to suppliers.	Map coupon and redemption receipts against fund withdrawals, insurance claims or pension payments. Book-value recovery and liquid cash available at a date are not the same test.

Sources: MoF APDR 2025 [\[S01\]](#); IMF CR 26/212 [\[S03\]](#); IDER calculations [\[S05\]](#).

Note: No issuer rating, bond-price forecast, currency allocation or personalised suitability judgement is produced.

A lower quarterly ratio can coexist with a rising debt stock

MoF bulletin appendix; quarter-end stock and source-published ratio.

Table 36. A lower quarterly ratio can coexist with a rising debt stock

Observation	Debt, GHS bn	Published ratio	At fixed 2025 GDP
2025 Q2	614.10	42.8%	42.82%
2025 Q4	641.11	44.7%	44.70%
2026 Q1	686.10	42.9%	47.84%
2026 Q2	719.52	45.0%	50.17%

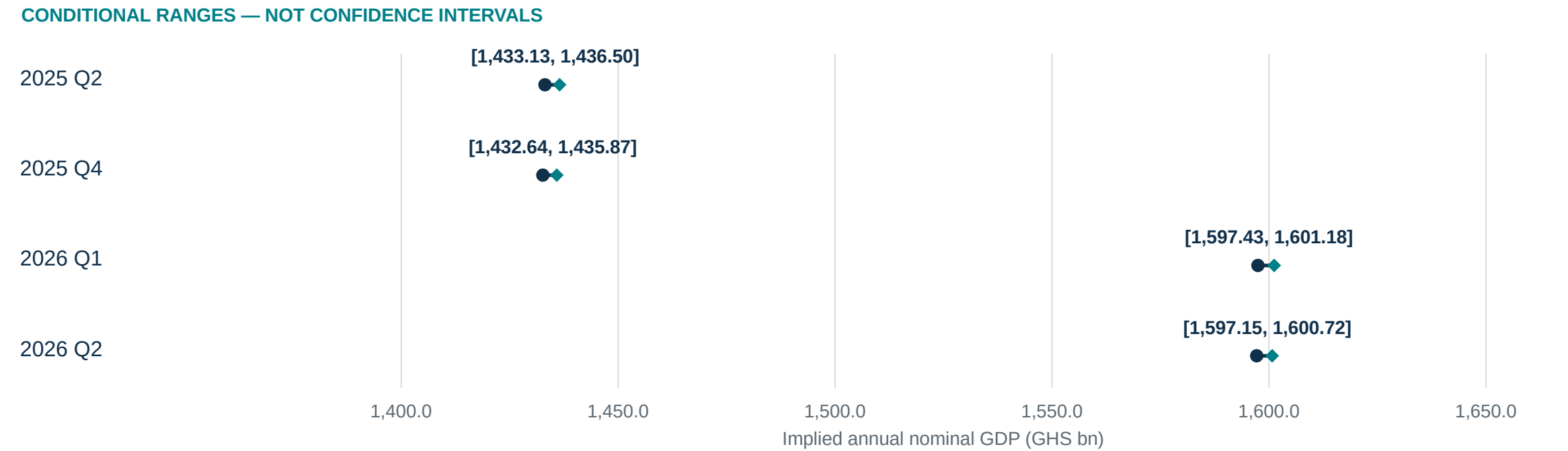
Sources: MoF Q2 2026 [\[S04\]](#); IDER calculations [\[S05\]](#).

Note: 2026 ratios use a different annual denominator. Fixed 2025 GDP comparisons are diagnostic, not replacement official ratios.

The annual denominator changes between end 2025 and 2026 Q1

Implied GDP = 100 × debt / published ratio; intervals assume rounding to 0.01 bn and 0.1 pp.

Figure 30. The annual denominator changes between end 2025 and 2026 Q1



Sources: MoF Q2 2026 [\[S04\]](#); IDER calculations [\[S05\]](#).

Note: These are conditional rounding envelopes, not GDP forecast intervals. The implied 2026 denominator is not realised quarterly output.

Growth, price changes and statistical revisions must not be conflated

A revised GDP benchmark changes a ratio without extinguishing a liability.

ECONOMIC GROWTH	GDP PRICES	STATISTICAL REVISIONS
Real output growth changes the volume of production. The report separates it from the price component using the same annual source vintage.	The GDP deflator values domestic output; it is not the year-end CPI. Higher nominal output may improve a ratio while coupon resets, wages and import costs also change.	A new base year, coverage correction or forecast revision may change the measured denominator. Keep old/new vintages side by side; no new 2026 rebasing event is asserted here.

Sources: MoF APDR 2025 [\[S01\]](#); MoF Q2 2026 [\[S04\]](#); IDER calculations [\[S05\]](#).

Note: A pure 10% upward GDP revision mechanically divides debt/GDP by 1.10 and leaves the scheduled nominal payment unchanged.

Currency and GDP-price changes affect different sides of the ratio

2025 MoF starting stock; 3% real growth; no net additional debt. Known FX-sensitive proxy includes domestic USD bonds.

Figure 31. Currency and GDP-price changes affect different sides of the ratio

	FX -20%	FX -10%	FX +0%	FX +10%	FX +20%	FX +30%
GDP prices 0%	39.13	41.27	43.40	45.54	47.68	49.81
GDP prices 5%	37.27	39.30	41.34	43.37	45.41	47.44
GDP prices 10%	35.57	37.51	39.46	41.40	43.34	45.28
GDP prices 15%	34.03	35.88	37.74	39.60	41.46	43.32

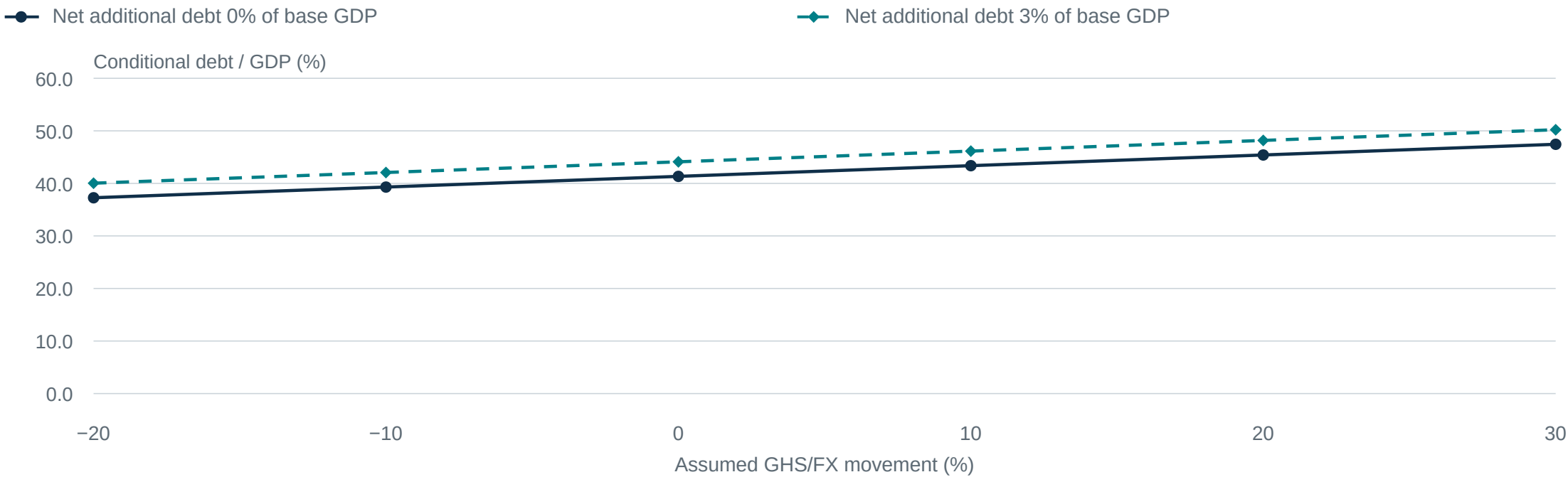
Conditional debt/GDP (%)
Sources: MoF APDR 2025 [\[S01\]](#); IDER calculations [\[S05\]](#).

Note: All shocks are assumptions. The known FX proxy is GHS 315.634 bn; omitted domestic currency exposures or indexed instruments would change the result.

Net new debt raises the entire conditional ratio schedule

Real growth 3%; GDP-price growth 5%; new debt measured against baseline GDP, with the same currency proxy.

Figure 32. Net new debt raises the entire conditional ratio schedule



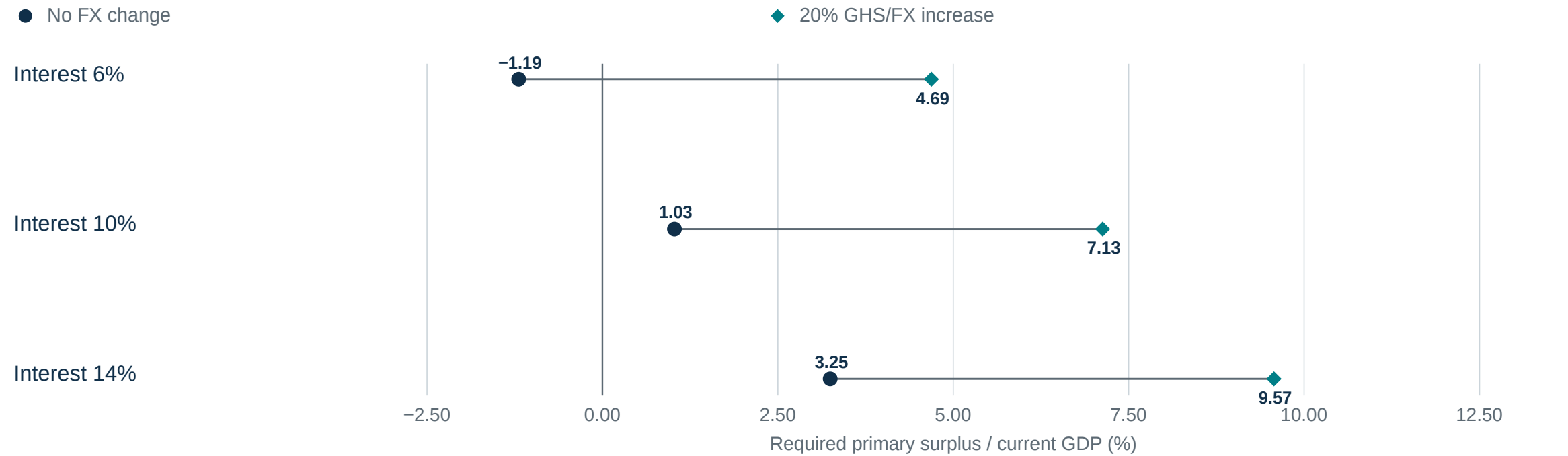
Sources: MoF APDR 2025 [\[S01\]](#); IDER calculations [\[S05\]](#).

Note: No new issuance mix, endogenous interest or policy response is fitted. A net debt increment is not gross auction turnover.

The primary balance needed for stability depends on prices, rates and currency exposure

Synthetic opening debt 60% of GDP, FX share 50%; 3% real growth and 5% GDP-price growth.

Figure 33. The primary balance needed for stability depends on prices, rates and currency exposure



Sources: IDER calculations [\[S05\]](#).

Note: Negative values permit a deficit in this one-period model. This is not Ghana’s fiscal target; stock–flow adjustments are set to zero only for the illustration.

Sensitivity ranges are conditional on the declared debt and GDP model

The entire parameter grid contains 144 deterministic combinations.

Table 37. Sensitivity ranges are conditional on the declared debt and GDP model

Parameter	Values or treatment	Boundary
Exchange-rate change	−20%, −10%, 0%, +10%, +20%, +30%	All foreign rates move together; cross-rate risk is not estimated.
Real GDP growth / GDP-price growth	0%, 3%, 6% / 0%, 5%, 10%, 15%	No estimated probability or covariance between growth, prices and FX.
Net additional debt	0% or 3% of baseline GDP	No separate financing currency is assigned to the increment.
FX-sensitive debt proxy	External stock + domestic USD 791.8 m bond	Other domestic instruments treated as GHS; not a complete audited currency inventory.

Sources: MoF APDR 2025 [\[S01\]](#); IDER calculations [\[S05\]](#).

Note: The grid contains 6×3×4×2 = 144 points. No fiscal stress frequency or default probability is inferred.

Rollover risk requires an event schedule—not just a stock ratio

Synthetic 13-week ledger; GHS million; no current Ghana Treasury calendar is reconstructed.

Table 38. Rollover risk requires an event schedule—not just a stock ratio

Record	Declared assumption	Control
Opening cash / weekly revenues	20 opening cash; 8 revenue each week	Revenue arrives before other same-week events in this illustration.
Primary spending / interest	8 primary spending weekly; 6 interest in weeks 3,6,9,13	Interest is separate from principal and counted once.
Maturities	20,25,20,30 in weeks 2,5,8,12	Each maturity has a linked auction-refinancing event.
Financing variants	100% same-week; 75% same-week; 100% one week late	Maturity is paid before auction proceeds within the week; no unrecorded facility.

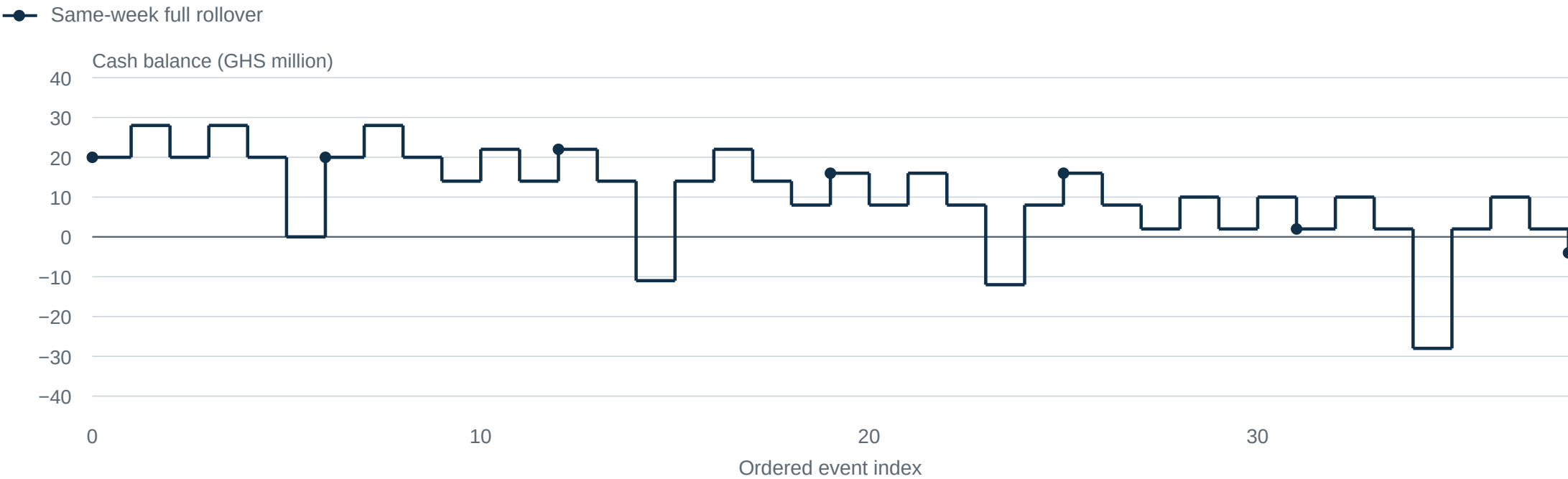
Sources: IDER calculations [\[S05\]](#).

Note: The ending deficit and temporary intraperiod deficit are both retained; facility interest and approval conditions are outside the model.

Full same-week rollover can still require a temporary cash bridge

Synthetic cash after each ordered event; revenue first, then spending, interest, principal and auction proceeds.

Figure 34. Full same-week rollover can still require a temporary cash bridge



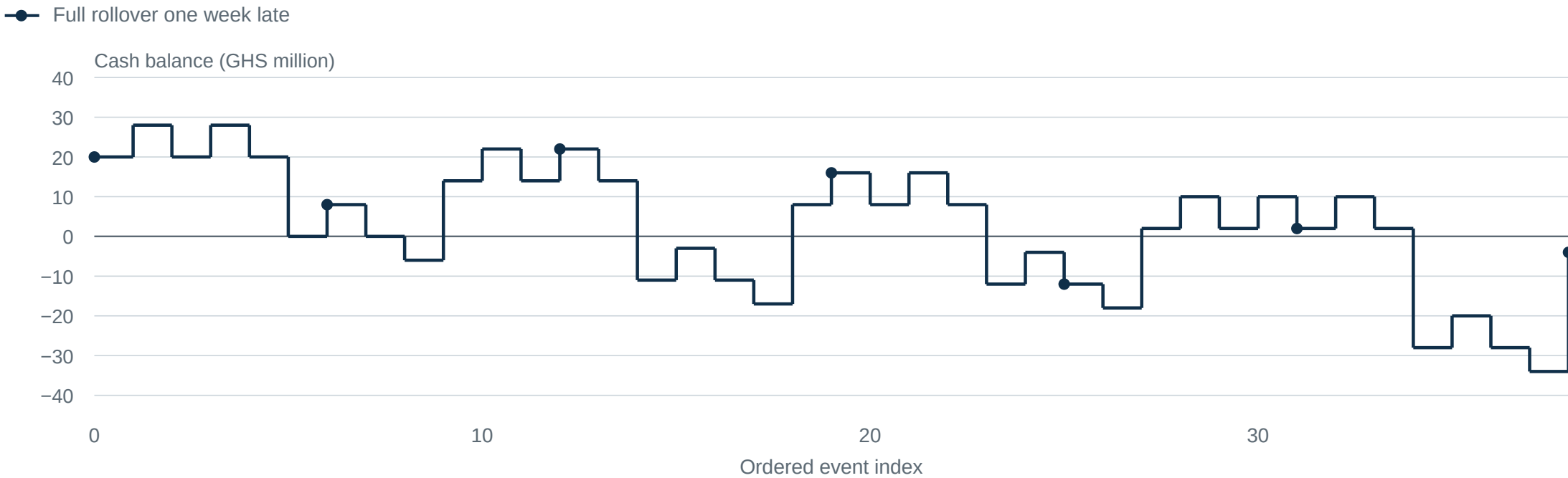
Sources: IDER calculations [\[S05\]](#).

Note: The horizontal coordinate is the event sequence, not elapsed days. Negative balances denote an unmet funding requirement, not authorised borrowing.

A one-week auction delay increases the interim financing requirement

Synthetic cash after each ordered event; revenue first, then spending, interest, principal and auction proceeds.

Figure 35. A one-week auction delay increases the interim financing requirement



Sources: IDER calculations [\[S05\]](#).

Note: The horizontal coordinate is the event sequence, not elapsed days. Negative balances denote an unmet funding requirement, not authorised borrowing.

A financing facility must cover the minimum balance, not only the closing deficit

Exact calculations from the synthetic treasury event ledger.

Table 39. A financing facility must cover the minimum balance, not only the closing deficit

Scenario	Minimum cash	Closing cash	Required bridge
Same-week full rollover	-28.00	-4.00	28.00
Same-week 75% rollover	-44.25	-27.75	44.25
Full rollover one week late	-34.00	-4.00	34.00

Sources: IDER calculations [\[S05\]](#).

Note: Amounts are GHS million. A positive facility requirement is not a measured Ghana shortfall, credit approval or recommended buffer.

Repayment financed by a cash drawdown differs from repayment financed by new borrowing

The debt stock and the asset stock should be reconciled together.

CASH-FINANCED REPAYMENT	REFINANCED MATURITY	ARREARS OR PIK
Paying principal from existing deposits reduces gross debt and cash together. A lower gross ratio can therefore coincide with a smaller liquid buffer; net debt may change much less.	Issuing a new bond to repay an old one can leave gross principal broadly unchanged. The relevant change may be maturity, coupon, currency and rollover concentration.	Unpaid obligations and capitalised interest alter the timing or form of debt; they are not extinguished merely because current cash service is low. Record recognition and settlement separately.

Sources: MoF APDR 2025 [\[S01\]](#); IMF CR 26/212 [\[S03\]](#); IDER calculations [\[S05\]](#).

Note: This is accounting logic, not an assertion about the source of funds behind an unidentified Ghana payment.

A debt-ratio statement should be accompanied by a five-part reconciliation

Proposed disclosure test for a budget hearing or debt-management review.

Table 40. A debt-ratio statement should be accompanied by a five-part reconciliation

Question to require	Evidence to request	Unsupported shortcut to reject
Which numerator and denominator?	Named debt perimeter, units, GDP vintage and annual/quarterly observation date.	Comparing 44.7% headline with 48.8% broad DSA as if one must be an error.
What reduced the debt stock?	Gross disbursement, principal settlement, restructuring recognition, FX and other changes.	Calling the entire GHS 87.52 bn decline repayment.
What changed the denominator?	Real-output factor, GDP deflator and benchmark revisions separately.	Using year-end CPI in place of the annual GDP-price factor.
What is due next?	Currency-specific maturity calendar and settled flags.	Assuming a lower stock ratio removes the 2027–2028 payment concentration.
What will finance it?	Usable cash, issuance plan, committed credit and stress-tested rollover.	Treating borrowing authorisation or gross issuance as settled cash.

Sources: MoF APDR 2025 [\[S01\]](#); IMF CR 26/212 [\[S03\]](#); MoF Q2 2026 [\[S04\]](#); IDER calculations [\[S05\]](#).

Note: These are proposed evidence requests; they do not certify statutory compliance or assign responsibilities without an institutional mandate.

The same ratio movement has different implications across balance sheets

Translate sovereign debt evidence into entity-specific cash and risk questions.

Table 41. The same ratio movement has different implications across balance sheets

Audience	Decision-relevant test	Data still required
Banks and fund managers	Revised coupons, redemption concentration, mark-to-market and collateral liquidity.	Security holdings, accounting basis, funding maturities and stress limits.
Businesses and manufacturers	Government receivable timing, payment arrears, credit availability and FX costs.	Invoices, due dates, bank terms and contract-currency exposure.
Pensions, insurers and retirees	Match investment cash receipts to benefit, claim and withdrawal dates.	Liability horizon, liquidity facilities and instrument-specific terms.
DFIs, private equity and diaspora investors	Project funding under currency, public-payment and refinancing shocks.	Project cash model, counterparties, covenants and transfer constraints.

Sources: MoF APDR 2025 [\[S01\]](#); IMF CR 26/212 [\[S03\]](#); IDER calculations [\[S05\]](#).

Note: No security recommendation, expected return or firm-level causal credit effect is derived from the aggregate debt ratio.

Exact accounting does not establish which policy caused the improvement

The regressors in an accounting identity are not independent policy treatments.

Table 42. Exact accounting does not establish which policy caused the improvement

Threat	What is done in this report	What causal research would need
Debt, FX and output are jointly determined	State exact valuation and denominator effects; no causal regression of ratio on its components.	A prespecified policy shock and a defensible counterfactual, not the accounting identity itself.
Restructuring is selected in distress	Date the actual exchange and distinguish cash relief from claim reduction.	Credible comparison instruments/countries, event confounders and treatment-selection design.
Debt coverage changes with reporting	Keep MoF and IMF perimeters separate; preserve residuals and absent liabilities.	A full instrument roster with entry, exit, arrears and guarantee recognition.
Source uncertainty and rounded inputs	Run source arithmetic, alternative allocations and display-rounding envelopes.	Original debt ledger, transaction rates and revised GDP metadata.

Sources: MoF APDR 2025 [\[S01\]](#); MoF APDR 2024 [\[S02\]](#); IMF CR 26/212 [\[S03\]](#); IDER calculations [\[S05\]](#).

Note: No instrument, randomised assignment or causal elasticity is claimed. Lagged variables or robust errors would not solve these issues alone.

A policy evaluation must define an outcome beyond the ratio identity

P01 is prospective only; no coefficient is estimated from these aggregate records.

Table 43. A policy evaluation must define an outcome beyond the ratio identity

Design element	Proposed approach	Release gate
Treatment and outcome	A named refinancing or restructuring intervention; yields, payment reliability or financing access.	Predefine the treatment date, outcome horizon and policy question.
Exposure and comparison	Predetermined instrument/creditor exposure and credible untreated or differently treated comparisons.	Do not assume initial exposure is exogenous; test institutional assignment and concurrent policies.
Uncertainty and selection	Retain cancelled issues, failed auctions, nonparticipants and changes in coverage.	Assignment-level dependence and missingness require design-specific treatment.
Interpretation	Separate accounting valuation, realised cash flows and behavioural response.	Release an association as such when exclusion or counterfactual assumptions are unsupported.

Sources: IDER calculations [\[S05\]](#).

Note: The debt and GDP endpoints support exact identities, not a newly estimated welfare, investment or debt-restructuring treatment effect.

Display-rounding uncertainty is small relative to the observed ratio change

Debt source rounded to 0.1 million; GDP to 0.1 billion. Bounds condition on nearest-unit rounding.

Table 44. Display-rounding uncertainty is small relative to the observed ratio change

Year	Calculated ratio	Lower endpoint	Upper endpoint
2024	61.601826	61.599218	61.604435
2025	44.704770	44.703207	44.706332

Sources: MoF APDR 2025 [\[S01\]](#); IDER calculations [\[S05\]](#).

Note: Units are percent of GDP. These are arithmetic envelopes, not confidence intervals; source revisions, coverage errors and forecast uncertainty are excluded.

A 90-day programme should close the measurement bridge before assigning policy credit

Proposed roles after data-access approval; targets refer to the obtained reporting universe.

Table 45. A 90-day programme should close the measurement bridge before assigning policy credit

Timing / proposed owner	Deliverable	Acceptance criterion
Days 0–30 MoF debt/statistics teams	Instrument registry, GDP-vintage file and source-definition crosswalk.	All known material instruments have currency, principal, creditor, guarantee and source IDs; unknown coverage listed.
Days 31–60 debt office, Treasury, BoG	Stock–flow bridge and 13-week currency-specific payment/financing ladder.	Every bridge closes with a disclosed residual; no double PIK, principal or already-paid obligation.
Days 61–90 IDER, reviewer and data owners	Reproducible ratio dashboard, cash-service scenarios and public explanatory brief.	Every output replays; source conflicts and remaining coverage gaps are visible; no unsupported causal ranking.

Sources: IDER calculations [\[S05\]](#).

Note: Proposed quality controls, not a statement that named institutions have accepted assignments or met these targets.

Monitor the stock ratio and payment execution on different schedules

Indicator definitions must remain stable across releases.

Table 46. Monitor the stock ratio and payment execution on different schedules

Indicator	Definition	Frequency / proposed owner
Matched debt/GDP	Named nominal debt divided by same-vintage annual GDP.	Quarterly debt statistics + national accounts liaison
Reconciled stock change	Opening stock + transactions + valuation + other changes.	Monthly / quarterly debt office
Cash debt-service calendar	Unique interest/principal due, currency, payment status and funding source.	Weekly 13-week update Treasury
Rollover concentration	Principal by remaining maturity; auction completion against cash need.	Each auction / monthly debt management
Residual and coverage register	Unmatched flows, missing liabilities, source revisions and unsettled conventions.	Every release quality reviewer

Sources: IDER calculations [\[S05\]](#).

Note: A threshold breach is a review trigger, not an estimated probability of default or an automatic investment signal.

The strongest conclusion is a combination—not a single headline

The 2025 improvement is real within the chosen source perimeter, but its interpretation requires three records.

RATIO EXPLANATION	CASH CONSEQUENCE	RESEARCH STANDARD
The matched ratio falls 16.90 pp. The declared Shapley split assigns 6.74 pp to the stock change, 3.08 pp to real growth and 7.08 pp to GDP prices.	Domestic service rises 30.34% in the MoF annual record. External payments also rise, partly because of early settlement. The later IMF baseline still contains substantial service and refinancing needs.	Borrowing, repayment and restructuring are separately recorded where the source permits. Unallocated stock–flow differences remain unallocated. No lower ratio is treated as proof of a lower every-date cash requirement.

Sources: MoF APDR 2025 [\[S01\]](#); IMF CR 26/212 [\[S03\]](#); IDER calculations [\[S05\]](#).

Note: Source windows, projection status and scope differences must accompany any excerpt used in policy or investment communication.

The assumptions are part of the calculation—not an optional footnote

Each model family records its variables, restrictions and reproducible output.

Table 47. The assumptions are part of the calculation—not an optional footnote

Principle	Maintained condition	Interpretation limit
A 1 Same measurement	Match currency, valuation, debt perimeter, dates and GDP vintage.	A source dollar equivalent is not an all-dollar debt obligation.
A 2 No duplication	Link issuance, PIK, principal, interest, restructuring and settlement IDs.	Do not add capitalised interest twice or repay the same early-paid claim again.
A 3 Closed arithmetic	Report all identified components and retain residuals at source precision.	An unexplained residual is not a policy mechanism.
A 4 Explicit allocation	State update order, symmetric convention or Shapley hierarchy.	Accounting attribution does not identify policy causality.
A 5 Conditional stress	Keep scenarios, source projections and observed payments separate.	No probabilities, current default risk or investment return is estimated.

Sources: IDER calculations [\[S05\]](#).

Note: E01–E30 are executed definitions, source diagnostics or conditional models. P01 is unestimated research design.

Debt, growth and GDP prices

Equations, variables and restrictions accompany every numerical method.

E01 Debt ratio and stock growth

EXECUTED SOURCE ACCOUNTING

$$d_t = 100 D_t/Y_t \tag{E01a}$$

$$g^D_t = 100(D_t/D_{t-1} - 1) \tag{E01b}$$

D is nominal gross debt; Y is nominal annual GDP in the same currency. d is percent; gD is the percentage stock change.

ASSUMPTIONS / INTERPRETATION

Match source perimeter and vintage. A stock decline includes valuation and other changes; it is not automatically repayment.

Sources: IDER calculations [\[S05\]](#).

Note: Exact accounting and hypothetical sensitivities are not fitted causal models. All monetary units follow the corresponding source or scenario.

E02 Real growth and implied GDP prices

EXECUTED DENOMINATOR IDENTITY

$$Y_1/Y_0 = (1 + g)(1 + \pi) \tag{E02a}$$

$$\pi = (Y_1/Y_0)/(1 + g) - 1 \tag{E02b}$$

g is reported real GDP growth as a fraction; π is the GDP-price factor implied by matched nominal GDP, not end-year CPI.

ASSUMPTIONS / INTERPRETATION

Positive GDP and factors. Rounded GDP and real-growth inputs imply a conditional deflator; benchmark revisions need separate treatment.

Stock–flow reconciliation and ratio allocation

Equations, variables and restrictions accompany every numerical method.

E03 Debt stock–flow identity

EXECUTED RECONCILIATION

$$D_1 - D_0 = B - A + K - H + V + O \tag{E03a}$$

$$O = \Delta D - (B - A + K - H + V) \tag{E03b}$$

B is new principal, A repayment, K capitalised interest, H recognised claim reduction, V valuation and O other/unallocated changes.

ASSUMPTIONS / INTERPRETATION

Each entry counted once. K is not added again when included in issuance B. Unobserved restructuring effects remain unallocated, not set to zero.

Sources: IDER calculations [\[S05\]](#).

Note: Exact accounting and hypothetical sensitivities are not fitted causal models. All monetary units follow the corresponding source or scenario.

E04 Symmetric stock–GDP attribution

EXECUTED EXACT ACCOUNTING

$$\Delta d = 100[\text{mean}(1/Y)\Delta D + D\Delta(1/Y)] \tag{E04a}$$

$$D = (D_0 + D_1)/2 \tag{E04b}$$

The first term is the stock contribution; the second is the combined GDP-denominator contribution. Means are endpoint averages.

ASSUMPTIONS / INTERPRETATION

Same matched numerator and denominator. The symmetric split averages two update orders; it is not a causal mechanism estimate.

Order-independent and nested attribution

Equations, variables and restrictions accompany every numerical method.

E05 Three-factor Shapley allocation

EXECUTED EXACT ACCOUNTING

$$f(D,a,b) = 100D/(Y_{0ab}) \tag{E05a}$$

$$\varphi_j = \text{mean}_{6 \text{ orders}} [f(\text{after } j) - f(\text{before } j)] \tag{E05b}$$

Initial factors $a=b= 1$; final $a= 1+g$ and $b= 1+\pi$. Average each factor’s marginal change across all six permutations.

ASSUMPTIONS / INTERPRETATION

All six orders use the same endpoints. The allocation is order-independent by convention, not an identified counterfactual effect.

Sources: IDER calculations [\[S05\]](#).

Note: Exact accounting and hypothetical sensitivities are not fitted causal models. All monetary units follow the corresponding source or scenario.

E06 Nested stock-component attribution

EXECUTED HIERARCHICAL ACCOUNTING

$$c_j = \varphi_D \Delta D_j/\Delta D \tag{E06a}$$

$$\sum_j c_j = \varphi_D \tag{E06b}$$

ΔD_j are components of a closed debt-stock bridge. φ_D is its debt-factor Shapley contribution. c_j is in percentage points.

ASSUMPTIONS / INTERPRETATION

Requires nonzero ΔD and a closed component bridge. This hierarchy is declared; it is not a fresh many-factor Shapley model.

Currency conversion and dollar presentation

Equations, variables and restrictions accompany every numerical method.

E07 External currency-conversion bridge

EXECUTED ENDPOINT ACCOUNTING

$$\Delta(eF) = F_1\Delta e + e_0\Delta F \tag{E07a}$$

$$\Delta(eF) = F\Delta e + \bar{e}\Delta F \tag{E07b}$$

e is GHS/USD; F is external debt in USD equivalents. Closing-stock and symmetric FX terms are both shown; rounding residual is separate.

ASSUMPTIONS / INTERPRETATION

F contains cross-currency conversion. ΔF is not net borrowing without transactions, capitalisation and restructuring records.

Sources: IDER calculations [\[S05\]](#).

Note: Exact accounting and hypothetical sensitivities are not fitted causal models. All monetary units follow the corresponding source or scenario.

E08 Domestic debt in dollar equivalents

EXECUTED SYMMETRIC ACCOUNTING

$$U = D^{\text{dom}}/e \tag{E08a}$$

$$\Delta U = \text{mean}(1/e)\Delta D^{\text{dom}} + D^{\text{dom}}\Delta(1/e) \tag{E08b}$$

U is a USD-equivalent presentation of domestic cedi debt; e is the same source GHS/USD rate.

ASSUMPTIONS / INTERPRETATION

Dollar translation is not dollar denomination. The exchange contribution does not create an equal amount of new foreign principal.

Issuance, maturities and payment-in-kind

Equations, variables and restrictions accompany every numerical method.

E09 Gross issuance and principal maturity

EXECUTED SOURCE RECONCILIATION

$$\text{NetIssue} = \text{GrossIssue} - \text{Maturities} \tag{E09a}$$

$$\text{Residual}_{\text{dom}} = \Delta D^{\text{dom}} - \text{NetIssue} \tag{E09b}$$

Use MoF Table 6.1 within its own marketable-instrument scope. Domestic total debt includes other instruments and valuation.

ASSUMPTIONS / INTERPRETATION

Do not substitute a differing maturity line from Table 8.11. Gross issuance includes PIK and recap instruments; not all cash.

Sources: IDER calculations [\[S05\]](#).

Note: Exact accounting and hypothetical sensitivities are not fitted causal models. All monetary units follow the corresponding source or scenario.

E10 Cash coupons and capitalised interest

EXECUTED ACCOUNTING / ILLUSTRATION

$$\text{AccruedCoupon} = \text{CashCoupon} + \text{PIK} \tag{E10a}$$

$$D_{\text{close}} = D_{\text{open}} + \text{PIK} - \text{PrincipalPaid} \tag{E10b}$$

PIK means payment in kind: recognised interest added to the obligation instead of paid immediately in cash.

ASSUMPTIONS / INTERPRETATION

No additional drawdown or valuation in E10b. The Ghana issuance record already contains its PIK amount; the synthetic contract makes timing explicit.

Present value and annual debt service

Equations, variables and restrictions accompany every numerical method.

E11 Nominal claims and present value

EXECUTED CONDITIONAL CONTRACT MODEL

$$PV(r) = \sum_{t=1}^T Service_t / (1 + r)^t \tag{E11a}$$

$$PVRelief(r) = 1 - PV_{new}(r) / PV_{old}(r) \tag{E11b}$$

Service includes coupon and principal. Discount rates 5%, 10%, 15% are illustrative, common to the compared schedules.

ASSUMPTIONS / INTERPRETATION

No probabilities, market price or legal haircut is estimated. Nominal reduction, PV reduction and cash deferral are not additive measures.

Sources: IDER calculations [\[S05\]](#).

Note: Exact accounting and hypothetical sensitivities are not fitted causal models. All monetary units follow the corresponding source or scenario.

E12 Debt-service amounts and burdens

EXECUTED SOURCE RATIOS

$$Service = Principal + Interest \tag{E12a}$$

$$Burden = 100 Service / Revenue \tag{E12b}$$

Principal and interest retain the source service classification. Revenue includes grants in the MoF comparison.

ASSUMPTIONS / INTERPRETATION

Maintain currency and source scope. Repeated bill maturities can exceed year-end stock; a service burden is not a default probability.

Financing needs and debt perimeter

Equations, variables and restrictions accompany every numerical method.

E13 Gross financing need and resources

EXECUTED SOURCE FINANCING CHECK

$$\text{GFN} = \text{GrossDomestic} + \text{GrossExternal} + \text{DepositUse} \tag{E13a}$$

$$\text{GFNratio} = 100 \text{ GFN}/Y \tag{E13b}$$

E13a reproduces the MoF 2025 source financing composition. Deposit use is an asset drawdown, not additional debt issuance.

ASSUMPTIONS / INTERPRETATION

This is the source outturn identity, not a universal definition. IMF staff and DSA financing measures differ and are not spliced.

Sources: IDER calculations [\[S05\]](#).

Note: Exact accounting and hypothetical sensitivities are not fitted causal models. All monetary units follow the corresponding source or scenario.

E14 Common-denominator scope comparison

EXECUTED SOURCE DIAGNOSTIC

$$\text{Gap}^D = D^{\text{IMF}} - D^{\text{MoF}} \tag{E14a}$$

$$\text{Gap}^{\text{pp}} = 100 \text{ Gap}^D/Y^{\text{common}} \tag{E14b}$$

The common denominator is IMF nominal GDP for each year; the two reported debt perimeters remain distinct.

ASSUMPTIONS / INTERPRETATION

The gap is not automatically one SOE, a hidden liability or an error. Source classifications and arrears recognition need a bridge.

Published DSA and quarterly denominator

Equations, variables and restrictions accompany every numerical method.

E15 Published DSA attribution

REPRODUCED SOURCE CONTRIBUTIONS

$$\Delta d = \text{Primary} + \text{Interest} + \text{Growth} + \text{RealFX} + \text{Other} + \text{Residual} \tag{E15a}$$

$$2025: -21.3 = -0.7 - 1.5 - 3.9 - 13.9 + 1.0 - 2.3 \tag{E15b}$$

Contributions are the rounded IMF DSA Table 2 entries, in percentage points; they use the broader debt perimeter.

ASSUMPTIONS / INTERPRETATION

The real-FX component incorporates price effects. Do not add a separate nominal-GDP inflation term from a different decomposition.

Sources: IDER calculations [\[S05\]](#).

Note: Exact accounting and hypothetical sensitivities are not fitted causal models. All monetary units follow the corresponding source or scenario.

E16 Quarterly denominator diagnostic

EXECUTED CONDITIONAL RECONSTRUCTION

$$Y^{\text{implied}}_q = 100D_q/d^{\text{reported}}_q \tag{E16a}$$

$$d^{\text{fixed}}_q = 100D_q/Y_{2025} \tag{E16b}$$

Quarter-end debt is divided by an annual GDP denominator. The fixed 2025 comparison isolates the change of denominator convention.

ASSUMPTIONS / INTERPRETATION

Published ratios are rounded and annual 2026 GDP is not realised quarterly output. No new GDP rebasing event is inferred.

Rounding precision and debt stress

Equations, variables and restrictions accompany every numerical method.

E17 Ratio display-rounding envelope

EXECUTED ENDPOINT PROPAGATION

$$d_L = 100(D - h_D)/(Y + h_Y) \tag{E17a}$$

$$d_U = 100(D + h_D)/(Y - h_Y) \tag{E17b}$$

For annual GHS-bn displays, $h_D = 0.00005$ and $h_Y = 0.05$. Ratios use positive lower denominators.

ASSUMPTIONS / INTERPRETATION

Conditional on nearest-unit rounding. Bounds exclude data revisions, misclassification, unreported debt and GDP forecast uncertainty.

Sources: IDER calculations [\[S05\]](#).

Note: Exact accounting and hypothetical sensitivities are not fitted causal models. All monetary units follow the corresponding source or scenario.

E18 Joint debt-ratio stress

EXECUTED CONDITIONAL SCENARIO

$$D_1 = D_{\text{local}} + D_{\text{FX}}(1 + \varepsilon) + \text{NewDebt} \tag{E18a}$$

$$d_1 = 100D_1/[Y_0(1 + g)(1 + \pi)] \tag{E18b}$$

The FX proxy is external debt plus the disclosed domestic USD bond; other domestic debt is fixed in GHS for this illustration.

ASSUMPTIONS / INTERPRETATION

No interest feedback, indexed debt, cross-rate model, probability or additional hidden financing. Net debt increments use baseline GDP.

Primary balances and contractual service

Equations, variables and restrictions accompany every numerical method.

E19 Debt-stabilising primary surplus

EXECUTED ONE-PERIOD ILLUSTRATION

$$d_1 = d_0(1 + i)(1 + \alpha\varepsilon)/[(1 + g)(1 + \pi)] - pb + sfa \tag{E19a}$$

$$pb^* = d_0\{(1 + i)(1 + \alpha\varepsilon)/[(1 + g)(1 + \pi)] - 1\} + sfa \tag{E19b}$$

Here d is a fraction, α is FX share, i the effective rate, pb surplus/current GDP, sfa other debt-creating flow/current GDP.

ASSUMPTIONS / INTERPRETATION

Uniform full-period interest and FX timing; no amortisation feedback. Synthetic $d_0=0.60$ and $\alpha=0.50$; not Ghana's fiscal target.

Sources: IDER calculations [\[S05\]](#).

Note: Exact accounting and hypothetical sensitivities are not fitted causal models. All monetary units follow the corresponding source or scenario.

E20 Restructured contract cash

EXECUTED SYNTHETIC CONTRACT

$$\text{Coupon}_t = iD_{t-1} - \text{PIK}_t \tag{E20a}$$

$$\text{Service}_t = \text{Coupon}_t + \text{Principal}_t \tag{E20b}$$

Synthetic legacy, rescheduled, face-reduction and PIK contracts pay annually; principal is paid at the stated maturity.

ASSUMPTIONS / INTERPRETATION

Interest can be capitalised in years 1–2 in the PIK case. No Ghana contractual cash schedule or market pricing is fabricated.

Treasury cash paths and bridge funding

Equations, variables and restrictions accompany every numerical method.

E21 Ordered Treasury cash path

EXECUTED SYNTHETIC LEDGER

$$\text{Cash}_k = \text{Cash}_0 + \sum_{j \leq k} (\text{Receipts}_j - \text{Payments}_j) \tag{E21a}$$

$$\text{Auction}_{t+\ell} = \rho \text{PrincipalDue}_t \tag{E21b}$$

k is the ordered event index; t is the maturity week; ρ is the rollover fraction and ℓ the delay in weeks. PrincipalDue is positive. Events have unique IDs.

ASSUMPTIONS / INTERPRETATION

Revenue precedes spending; debt payments precede auction proceeds within a week. This ordering is imposed, not observed Treasury practice.

Sources: IDER calculations [\[S05\]](#).

Note: Exact accounting and hypothetical sensitivities are not fitted causal models. All monetary units follow the corresponding source or scenario.

E22 Minimum financing bridge

EXECUTED CONDITIONAL CASH TEST

$$\text{Cash}_{\min} = \min_k \text{Cash}_k \tag{E22a}$$

$$\text{Bridge} = \max(0, -\text{Cash}_{\min}) \tag{E22b}$$

The bridge measures the largest model cash deficit before any additional facility. Closing cash is reported separately.

ASSUMPTIONS / INTERPRETATION

No credit approval, facility costs, collateral or drawdown restrictions are assumed. A model deficit is not an observed Ghana payment failure.

Principal reconciliation and payment timing

Equations, variables and restrictions accompany every numerical method.

E23 External principal and residual audit

EXECUTED SOURCE CONSISTENCY TEST

$$A^{\text{derived}} = \text{TotalService} - \text{Interest} \tag{E23a}$$

$$U = \Delta F - (\text{Disbursement} - A^{\text{derived}}) \tag{E23b}$$

USD-million external flows and USD-equivalent stocks. For 2025, principal 1109.2 also equals the creditor-component sum.

ASSUMPTIONS / INTERPRETATION

The printed principal subtotal differs. U remains unallocated; it is not called restructuring relief, new borrowing or exchange-rate gain.

Sources: IDER calculations [\[S05\]](#).

Note: Exact accounting and hypothetical sensitivities are not fitted causal models. All monetary units follow the corresponding source or scenario.

E24 Early payment and calendar effect

EXECUTED TIMING DIAGNOSTIC

$$\text{Service}^{\text{exearly}}_{2025} = \text{Service}_{2025} - \text{EarlyPayment} \tag{E24a}$$

$$\text{Share} = 100 \text{ EarlyPayment} / (\text{Service}_{2025} - \text{Service}_{2024}) \tag{E24b}$$

The identified USD 709 m payment was made 30 December 2025 for an obligation due 3 January 2026.

ASSUMPTIONS / INTERPRETATION

Excluding it is a timing illustration, not a correction of actual service. Mark it settled in the next-year due-date ledger.

Maturity cohorts and indicative bond values

Equations, variables and restrictions accompany every numerical method.

E25 Captured maturity-cohort distribution

EXECUTED INSTRUMENT DESCRIPTION

$$M(t) = \sum_{i:\tau(i)\leq t} A_i \tag{E25a}$$

$$\text{Share}(t) = 100M(t)/\sum_i A_i \tag{E25b}$$

A is disclosed outstanding GHS for security i at 31 December 2025; $\tau(i)$ is its printed maturity date. All 90 bill rows have unique ISINs.

ASSUMPTIONS / INTERPRETATION

Cohort shares use the unrounded security sum; headline stocks retain their display precision. No later issuance, interest or actual settlement status is inferred.

Sources: IDER calculations [\[S05\]](#).

Note: Exact accounting and hypothetical sensitivities are not fitted causal models. All monetary units follow the corresponding source or scenario.

E26 Indicative price and nominal amount

EXECUTED SOURCE DIAGNOSTIC

$$V_q = \sum_i A_i p_i/100 \tag{E26a}$$

$$\bar{p} = \sum_i A_i p_i/\sum_i A_i \tag{E26b}$$

A is the displayed nominal amount of DDEP bond i and p its closing price per 100. Same end-2025 weights are used throughout.

ASSUMPTIONS / INTERPRETATION

Price-times-face is not principal cancelled, an executable bid or an audited portfolio value. Accrued interest and trading costs are not reconstructed.

Creditor reconciliation and service attribution

Equations, variables and restrictions accompany every numerical method.

E27 Creditor-level stock–flow residual

EXECUTED SOURCE RECONCILIATION

$$U_c = F_{c,1} - F_{c,0} - B_c + A_c \tag{E27a}$$

$$\rho = U_{\text{total}} - \sum_c U_c \tag{E27b}$$

F is the USD-equivalent stock; B is disbursement and A principal paid, in USD million. c identifies four non-overlapping creditor categories.

ASSUMPTIONS / INTERPRETATION

Amounts retain source dates and classification. ρ preserves aggregation rounding; U cannot be identified as restructuring or borrowing without instrument records.

Sources: IDER calculations [\[S05\]](#).

Note: Exact accounting and hypothetical sensitivities are not fitted causal models. All monetary units follow the corresponding source or scenario.

E28 Domestic service-growth contribution

EXECUTED ACCOUNTING ATTRIBUTION

$$\Delta DS = \sum_j \Delta DS_j + \rho \tag{E28a}$$

$$\text{Contribution}_j = 100 \Delta DS_j / \Delta DS \tag{E28b}$$

j distinguishes T-bill and other principal from T-bill and other interest. ρ is the difference between displayed components and reported total.

ASSUMPTIONS / INTERPRETATION

This is a share of the reported service increase, not a causal effect or a share of debt stock. Aggregate cash and PIK classifications remain unresolved.

Precision and eligibility controls

Equations, variables and restrictions accompany every numerical method.

E29 Shapley input-rounding corners

EXECUTED NUMERICAL SENSITIVITY

$$X = \{x_0 + s \odot h : s \in \{-1, 1\}^5\} \tag{E29a}$$

$$\text{Range}_j = [\min_{x \in X} \varphi_j(x), \max_{x \in X} \varphi_j(x)] \tag{E29b}$$

$x=(D0, D1, Y0, Y1, g)$; $h=(0.00005, 0.00005, 0.05, 0.05, 0.0005)$. Money is GHS bn; growth is fractional. $\odot$ means element-wise multiplication. Recompute GDP prices at all 32 corners.

ASSUMPTIONS / INTERPRETATION

Ranges are evaluated corner sensitivities only, not statistical intervals or a proof of global interior extrema. They exclude source revisions and omitted liabilities.

Sources: IDER calculations [\[S05\]](#).

Note: Exact accounting and hypothetical sensitivities are not fitted causal models. All monetary units follow the corresponding source or scenario.

E30 Instrument scope and reconciliation

EXECUTED ELIGIBILITY CHECK

$$S_{\text{selected}} = \sum_i w_i A_i \tag{E30a}$$

$$\text{Gap} = S_{\text{selected}} - S_{\text{reference}} \tag{E30b}$$

Each unique instrument is counted once. w is an explicit inclusion flag for instrument i : interest-only reference notionals are excluded from nominal stock.

ASSUMPTIONS / INTERPRETATION

A passed maturity date is not proof of repayment or default. Repeated printed serial numbers do not justify dropping distinct ISINs; retain unresolved date and stock gaps.

Prospective causal policy research

Equations, variables and restrictions accompany every numerical method.

P01 Prospective policy-effect design

PROSPECTIVE ONLY — NOT ESTIMATED

$$Y_{it} = \alpha_i + \lambda_t + \beta(\text{Exposure}_{i,0} \times \text{PolicyShock}_t) + u_{it} \tag{P01a}$$

Y = yield, financing access or payment performance (P01b)

A prespecified outcome and justified policy variation are required. Exposure is measured before the intervention.

ASSUMPTIONS / INTERPRETATION

No panel or credible exogenous assignment was obtained. Exposure selection, spillovers, anticipation and failed issues need design-specific treatment.

Sources: IDER calculations [\[S05\]](#).

Note: Exact accounting and hypothetical sensitivities are not fitted causal models. All monetary units follow the corresponding source or scenario.

CAUSAL IDENTIFICATION IS NOT CLAIMED

A regression of debt/GDP on its arithmetic components would not establish which policy caused those components to change. This report’s contribution is a reproducible measurement and cash-financing assessment.

A future evaluation needs a defensible comparison, a stated policy shock and observations on economic outcomes beyond the ratio identity.

Four worked checks connect the equations to the report’s core findings

The values come from source records or the explicitly labelled synthetic schedules.

Table 48. Four worked checks connect the equations to the report’s core findings

Calculation	Substitution	Interpretation
Debt ratio, E01	$100 \times 641.1111 / 1,434.1 = 44.70477\%$	Calculated headline ratio; source display rounds to 44.7%.
Implied GDP prices, E02	$(1,434.1/1,182.8)/1.06 - 1 = 14.3832\%$	GDP-price growth consistent with the matched real/nominal figures; not CPI.
External principal, E23	$1,799.4 - 690.2 = 1,109.2$ USD m	Same as creditor-component sum; printed subtotal inconsistency remains visible.
No-haircut rescheduling, E11	PV at 10%: 95.03 → 62.66 per 100 legacy face	Face remains 100; lower coupon and later principal lower discounted value.

Sources: MoF APDR 2025 [\[S01\]](#); IDER calculations [\[S05\]](#).

Note: These checks do not convert source arithmetic into an audit opinion, a probability of default or a causal policy effect.

Material source exceptions — 1 of 3

The raw source record is kept alongside the analytical treatment.

Table 49. Material source exceptions — 1 of 3

Source / issue	Observed record	Treatment
S01 Table 8.1 rate convention and 2021 closure	Printed US\$/GHS; numerical convention GHS/USD. 2021 conversion differs by GHS 229.3982 m	Preserve source stocks and rate; detailed FX bridge uses 2024–2025 only. Do not silently repair 2021
S01 Table 8.7 principal 2025	Printed 356.8; narrative 1109.3; creditor sum and total less interest 1109.2 USD m	Use separately labelled derived 1109.2 for diagnostics; preserve all source entries
S01 Domestic maturity totals	Table 6.1 267916.1 versus Table 8.11 267696.0 GHS m	Retain 220.1 m discrepancy; no forced stock/cash reconciliation
S01 Domestic 2025 stock	Table 8.1 333755.8 versus paragraph 121 333755.9 GHS m	Use Table 8.1 consistent component stock; retain 0.1 m display difference
S01 Domestic service rounding and cash basis	Principal+interest 310701.4 versus total 310701.3 GHS m; cash/PIK crosswalk incomplete	Use source-reported total and disclose rounding. Do not claim an independently reconciled cash-only service total

Sources: MoF APDR 2025 [\[S01\]](#); IMF CR 26/212 [\[S03\]](#); MoF Q2 2026 [\[S04\]](#); IDER calculations [\[S05\]](#).

Note: Residuals, rounded totals and inconsistent source labels are not silently repaired or assigned a preferred explanation.

Material source exceptions — 2 of 3

The raw source record is kept alongside the analytical treatment.

Table 50. Material source exceptions — 2 of 3

Source / issue	Observed record	Treatment
S01 Gross issuance composition	Includes 3747.4 m PIK and 2076.0 m recap instruments	Do not equate every issue to cash or add PIK twice
S03 Debt/GDP 2024	Table 70.1%; narrative 70.3%	Use table debt 829564 and GDP 1182799; no silent mixing
S03 DSA identified flows	Displayed components sum–19.0 pp; identified row–19.1 pp	Source precision limitation; components plus residual close displayed–21.3 pp
S01 / S03 GFN and debt service	MoF 2025 GFN 337.324 bn; IMF Table 3c 160.6 bn; DSA 12.1% GDP	Scope, timing and intra-year rollover differ; complete bridge unavailable
S04 Quarter prose	One narrative sentence labels 45.0% as Q1; appendix labels Q2	Use appendix dated stock/ratio; do not treat annual GDP as realised quarterly output

Sources: MoF APDR 2025 [\[S01\]](#); IMF CR 26/212 [\[S03\]](#); MoF Q2 2026 [\[S04\]](#); IDER calculations [\[S05\]](#).

Note: Residuals, rounded totals and inconsistent source labels are not silently repaired or assigned a preferred explanation.

Material source exceptions — 3 of 3

The raw source record is kept alongside the analytical treatment.

Table 51. Material source exceptions — 3 of 3

Source / issue	Observed record	Treatment
S04 GDP denominator	Different implied annual GDP at 2025 Q4 and 2026 Q1	Report denominator diagnostic and rounding interval; no GDP rebasing claimed
S01 External stock–flow residual	679.7 USD m after disbursement and derived principal	Unallocated cross-currency, capitalisation, restructuring or scope; not net borrowing
S01 Domestic stock–flow residual	-6230.1 GHS m versus net issuance	Identify known USD-bond sensitivity separately; remainder not named debt relief
Access Latest July 2026 debt data	Linked monthly file not successfully authenticated	June 2026 is latest separate monitoring observation used
Access Source PDF binaries	Runtime network copies failed; web table images inspected	URLs, locators, frozen transcriptions provided; no primary PDF binaries bundled

Sources: MoF APDR 2025 [\[S01\]](#); IMF CR 26/212 [\[S03\]](#); MoF Q2 2026 [\[S04\]](#); IDER calculations [\[S05\]](#).

Note: Residuals, rounded totals and inconsistent source labels are not silently repaired or assigned a preferred explanation.

Trace each result from source transcription to editable exhibit

The package separates frozen evidence, deterministic scenarios and publication styling.

Table 52. Trace each result from source transcription to editable exhibit

Analytical layer	Input and code	Output and check
Annual debt and GDP	mof_annual_vintage2025.csv; analyse.py	annual_history; six-order Shapley; ratio-rounding checks.
Debt transactions and service	mof_cash_and_issuance.csv; source_additional_values.json	Stock-flow residuals; principal audit; service and financing diagnostics.
Scope and monitoring	IMF tables; MoF Q2 appendix; source-specific CSVs	Common-GDP scope gap; denominator-reconstruction envelopes.
Contracts and cash scenarios	scenario_assumptions.json; synthetic_treasury_ledger.csv	PV, debt-ratio sensitivities, primary balances and every-event cash.
Instrument validation	inputs/validation; code/validate_extend.py	90 bill rows; 12 DDEP price records; creditor/service bridges; maturity and source precision diagnostics.
Publication	build_report.py; refine_final_design.py; finalise.py	Editable chart marks and equations; data tables; indexes; links and render review.

Sources: IDER calculations [\[S05\]](#).

Note: Original source PDF binaries are not bundled. URLs, exact locators and transcribed inputs are supplied; no audit of original public-debt systems is claimed.

References and source links — 1 of 3

Titles link to primary publications; precise table locations and coverage are retained in the evidence package.

S01 Ministry of Finance, Ghana | 2026 publication; 2021–2025 observations

Annual Public Debt Report for the 2025 Financial Year

PDF pp. 15, 18, 20, 29, 37, 39, 41, 43–44, 47–49; Tables 2.1, 6.1, 8.1–8.3, 8.5–8.7, 8.9–8.11; paragraphs 35–48, 71–76, 103, 119, 129–130; validation: Table 8.10 PDF p. 48; Appendix 1A p. 65; Appendix 1B p. 67; Appendix 3 pp. 89–92. All 90 bill rows and 12 DDEP quote rows transcribed with source locators.

S02 Ministry of Finance, Ghana | 2025 publication; restructuring through 2024 / early 2025

Annual Public Debt Report for the 2024 Financial Year

PDF pp. 20–22; official bilateral treatment and Eurobond exchange; especially paragraph 35 and footnote 2.

References and source links — 2 of 3

Titles link to primary publications; precise table locations and coverage are retained in the evidence package.

S03 International Monetary Fund / World Bank staff and Ghanaian authorities | Staff report 10 July 2026; Board 27 July 2026

Ghana: 2026 Article IV Consultation and Sixth ECF Review; Country Report 26/212, including Debt Sustainability Analysis

PDF pp. 53–54 (Tables 3b–3 c); p. 141 (DSA coverage); p. 168 (DSA Table 2). Source projections, preliminary results and DSA definitions retained.

S04 Ministry of Finance, Ghana | 2026 Q2

Quarterly Public Debt Statistical Bulletin: April–June 2026

PDF p. 13 (Appendix Tables 1–2); PDF p. 7 source narrative has an inconsistent quarter label. Appendix period labels control this report.

References and source links — 3 of 3

Titles link to primary publications; precise table locations and coverage are retained in the evidence package.

S05 Institute of Development and Economic Research | 2026

Debt-to-GDP: Reconciliation, Decomposition and Cash-Service Protocol

This archive: frozen inputs; code/analyse.py; code/validate_extend.py; code/build_report.py; code/refine_final_design.py; model and exhibit registers; numerical and publication verification records.

A lower debt ratio is progress—but it is not a complete cash verdict

Three records should travel together in every public, business or investment interpretation.

MATCHED RATIO	LIABILITY AND PAYMENT	FINANCING CAPACITY
The MoF 2025 ratio decline is arithmetically reproducible. The numerator reduction, real growth and GDP-price effect all matter; the allocation convention is disclosed.	Borrowing and repayment continue alongside restructuring and valuation. Face relief, PIK, coupon changes, principal maturity and early settlement affect different records.	Domestic service and gross funding needs can rise despite a lower ratio. Test actual payment dates, currency availability, rollover and fiscal resources before inferring affordability.

Sources: MoF APDR 2025 [\[S01\]](#); MoF APDR 2024 [\[S02\]](#); IMF CR 26/212 [\[S03\]](#); MoF Q2 2026 [\[S04\]](#); IDER calculations [\[S05\]](#).

Note: No national causal policy estimate, investment return, hidden-debt allegation, debt-service guarantee or current credit rating is implied.

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For research enquiries, supporting data, methodological documentation or corrections to this report, contact the Institute of Development and Economic Research.

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