

Foreign-Currency Exposure

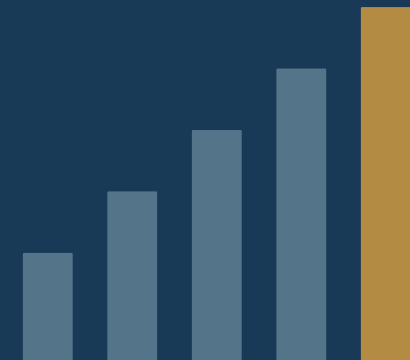
Ghanaian Businesses: A Balance-Sheet Assessment

Currency mismatches. Debt service. Capital expenditure. Cash.

Commissioning institution: Institute of Development and Economic Research (IDER)

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INFORMATION CUT-OFF
25 SEPTEMBER 2026

Issuer records: 2023–2025
Scenario horizons: annual / 13 weeks

About this publication

Independent research • transparent evidence • reproducible calculations

TITLE AND SERIES

Foreign-Currency Exposure in Ghanaian Businesses: A Balance-Sheet Assessment

IDER's Ghana Macroeconomic Policy and Business Intelligence
Briefings

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The validated analytical data vintage is preserved.

RESPONSIBILITY AND INTERPRETATION

The analysis and interpretations are those of the author and IDER. This is not a World Bank or IMF publication; source citation does not imply endorsement. The five purposive issuer cases are not a national sample. Scenarios are conditional, not forecasts or causal estimates.

DATA, CODE AND ENQUIRIES

The companion evidence package contains source-labelled inputs, calculation code, figure data, model documentation and verification records. Research and corrections: info@iderafrica.com.

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Page numbers match the printed folios and the PDF page count; all entries are clickable.

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EMPIRICAL VALIDATION Source-based analysis: pp. 49–65.

Evidence conventions | p. 9

NAVIGATION Click a running header to return here. Source IDs link to references; equation IDs link to the model index.

Read the currency, the legal entity and the payment date together

Three connected analytical pillars; a balance-sheet stock is not a dated cash budget.

01 WHAT IS RECORDED?

Identify the currency and legal entity of monetary assets, debt, suppliers and related-party positions. Verify scale, signs, valuation rates, tax treatment and year-end scope.

02 WHAT MUST BE FUNDED?

Connect revenues, debt service, suppliers and capital expenditure to their currencies and payment dates. Keep operating earnings, revaluation and financing cash flows separate.

03 WHAT CAN BE CONCLUDED?

Use issuer cases for documented exposure and conditional sensitivity. Use scenarios for cash-planning tests. Do not convert these records into a national loss estimate or causal effect.

Issuer cases | p. 22

Annual scenarios | p. 66

Dated cash tests | p. 83

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A matched balance sheet is only the start of a liquidity assessment

Research question: which currency mismatches change net worth, funding needs and payment capacity?

RESEARCH QUESTION	01 SOURCE	02 RECONCILE	03 TEST
Which currency mismatches threaten payment capacity? A recorded net position does not reveal when usable cash will arrive. DATA WINDOW Issuer records: 2023–2025 Cut-off: 25 September 2026	Check primary statements and ageing schedules; retain dates, currency units, scope and source differences. 93.6% Unilever 2025: cancellation of absolute currency-net positions in the algebraic total. Not an executed hedge.	Reconcile currency components, maturity, cash definitions and dividend classifications. Separate source ambiguity. GHS 37.2k Synthetic early-depreciation case: bridge funding needed despite positive closing cash. Not an issuer loss.	Run fixed and adaptive annual cases and dated cash tests. No scenario probabilities are assigned.
WHAT THIS MEANS	Five selected issuer cases, six assumed annual profiles and one synthetic cash ledger support reproducible diagnosis—not national exposure totals, forecasts or causal treatment effects.		

Net currency exposure can conceal gross and dated funding pressures

Read the stock, contractual cash calendar and capital expenditure commitments as separate tests.

01 NET VERSUS GROSS

OBSERVED STOCK / CONDITIONAL SHOCK

GHS 1.38m

Unilever 2025 algebraic net assets

GHS 2.14m

Loss under the adverse 10% currency box

Opposite currency positions cancel in the sum.
The adverse box is a mathematical scenario, not a joint forecast.

02 CAPITAL CASH

SOURCE CASH FLOW / UNKNOWN FX SHARE

GHS 5.37bn

MTN 2025 cash PPE + intangibles

Not disclosed

Invoice-currency mix in retrieved release

Test imported capex as an explicit fraction. Do not treat cash capex and non-cash lease additions as identical.

03 DATED FUNDING

SYNTHETIC 13-WEEK LEDGER

GHS 348.8k

Closing cash in early +20% FX case

–GHS 37.2k

Lowest payment-date balance

A positive closing balance can coexist with a deficit. A 28-day receipt delay raises the same model's bridge need to GHS 239.2k.

ONE CONTROL RECORD

Match currency + entity + amount + value date; reconcile revenues, debt, suppliers, capex and hedges before judging funding resilience.

A 90-day route to source-linked enterprise FX intelligence

Proposed sequence starts after authorised access; targets are research controls, not achieved national coverage.

DAYS 0–30

Finance lead + data steward

MAP & RECONCILE

Link all known material monetary balances and committed invoices. Record native currency, scale, legal entity, due date and already-paid status.

Target: all known material items have unique IDs; the unknown reporting universe is disclosed.

DAYS 31–60

Treasury + operations

BUILD & TEST

Create a 13-week cash ladder by currency. Test FX, interest, suppliers, capex, collection delays and hedges without counting principal or assets twice.

Target: every material currency tested; no known duplicate settlement; assumptions and limits explicit.

DAYS 61–90

Management + IDER + reviewer

REPRODUCE & USE

Replay the numerical outputs, review unresolved conventions and approve a dated dashboard. Keep sensitive dealing positions and counterparties confidential.

Target: zero undocumented changes; all unresolved material gaps visible before release.

HOW TO READ THE TARGETS

Proposed implementation controls, not achieved Ghana-wide coverage or legal minimums. Treasury actions require each firm's authorised mandate, contracts and risk limits.

Abbreviations and reading terms

Definitions support the analysis; source-specific measurement rules remain controlling.

AP / AR	Accounts payable / accounts receivable.	IDER	Institute of Development and Economic Research.
BoG	Bank of Ghana.	IFRS / IAS	International Financial Reporting Standards / Accounting Standards.
Capex	Capital expenditure; distinguish cash payments and non-cash additions.	IMF / MoF	International Monetary Fund / Ministry of Finance, Ghana.
CFO / CFI / CFF	Operating / investing / financing cash flows; retain the source classification.	NWC	Net working-capital proxy; not cash immediately available.
DSCR	Debt-service coverage ratio; the report's proxy is not a covenant.	PPE / ROU	Property, plant and equipment / right-of-use assets.
DSO / DIO / DPO	Receivable / inventory / payable days in the working-capital proxy.	USD / EUR	US dollar / euro; other source currencies remain identified.
ECL / OD	Expected credit loss / overdraft; keep allowances and cash definitions distinct.	GBP / NGN	Pound sterling / Nigerian naira.
FX	Foreign exchange; record the currency of each contract.	ZAR / CHF	South African rand / Swiss franc. CFA follows the issuer label.
GHS	Ghana cedi; GHS/FX rises when the cedi depreciates.	k / m / bn	Thousand / million / billion. One billion equals 1,000 million.

How to interpret the evidence

Read the evidence status, measurement boundary and assumptions before interpreting a number.

SOURCE-REPORTED / HISTORICAL

Issuer balances retain their date, units, company/group scope and disclosure status. A prior-year monetary position is not current operational cash.

DERIVED ACCOUNTING

Positions, ratios and symmetric decompositions are calculated from named inputs. Arithmetic attribution is not an identified causal effect.

ILLUSTRATIVE / CONDITIONAL

FX, repricing, interest, capex, collection and hedge settings define scenarios. Six business profiles and the cash ledger are not observed firms.

PROSPECTIVE / NOT ESTIMATED

P01 documents a possible firm-panel design. No causal coefficient, empirical standard error, experimental result or national weighting is reported.

UNITS AND ROUNDING

Keep input precision; calculate before rounding. Currency thousands and GHS thousands differ. Small displayed components may not sum exactly.

SIGNS AND DATES

Assets are positive and liabilities negative. Higher GHS per FX means depreciation. Interest/principal cash and stock revaluation are separate.

RANGES AND MISSINGNESS

Scenario boxes and parameter envelopes are not confidence intervals. Missing positions are not zero. No default or shock probabilities are assigned.

SOURCES AND EQUATIONS

S01–S11 identify evidence and methods. E01–E30 cover executed accounting and scenarios; P01 is prospective. Source conflicts remain visible.

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E01–E30 are executed accounting diagnostics or conditional scenarios. E25–E30 extend validation. P01 remains prospective and has not been estimated.

Four questions require four different measurement records

The study links published statements to transparent sensitivity tests; it does not reconstruct a national firm census.

Table 1. Four questions require four different measurement records

Question	Measurement record	Interpretation boundary
What is exposed?	Monetary assets and liabilities by legal entity and currency	A reported position is a stock at one date.
What could change?	Fixed-position revaluation under a stated FX shock	Mechanical effect, not an estimated policy treatment effect.
What must be funded?	Suppliers, debt service and capex at their payment dates	Annual cash generation can conceal an earlier deficit.
What remains uncertain?	Missing currencies, collections, hedges, timing and coverage	Missing exposure is not zero; selected cases are not Ghana-wide.

Sources: IFRS Foundation: IAS 21 [\[S07\]](#); IFRS Foundation: IFRS 7 [\[S08\]](#); Shrestha et al. / IMF (2012) [\[S09\]](#); IDER calculations [\[S10\]](#).

Note: The evidence is descriptive and conditional. No investment recommendation or issuer credit rating is assigned.

Five issuer cases illuminate different parts of the exposure problem

Purposive availability-based selection of public nonfinancial disclosures; no sector population weights.

Table 2. Five issuer cases illuminate different parts of the exposure problem

Issuer / scope	Retrieved evidence	Year-end / main use
Unilever Ghana company	Currency balances, rates and sensitivity; financial position	2025 / 2024: gross versus net currency mismatch.
Kasapreko company	FX positions, debt, origin of sales, cash flow	2025 / 2024: supplier/debt currencies and rate–quantity bridge.
Fan Milk company	Historical FX aggregate; newer cash and liquidity records	2024 / 2023 FX; 2025 liquidity: collection and vintage.
TotalEnergies Ghana group / company	Notional exposure table and published sensitivities	2025 / 2024: consolidation and measurement-basis diagnosis.
MTN Ghana group	Condensed financial statements and cash capex	2025: capex amount observed; invoice-currency mix unknown.

Sources: Unilever (2025) [\[S01\]](#); Kasapreko (2025) [\[S02\]](#); Fan Milk (2024) [\[S03\]](#); Fan Milk (2025) [\[S04\]](#); TotalEnergies (2025) [\[S05\]](#); MTN Ghana (2025) [\[S06\]](#).

Note: The cases are not a random sample of listed firms, manufacturers, MSMEs or all Ghanaian businesses.

Foreign currency is defined against the entity’s functional currency

The invoicing currency, the customer’s country and the reporting currency are separate attributes.

FUNCTIONAL CURRENCY

Identify the currency of the primary economic environment. A presentation in Ghana cedis does not itself prove that every subsidiary has a GHS functional currency.

CONTRACT CURRENCY

Record the enforceable payment denomination of each invoice, loan and capital order. A local supplier can invoice in FX; an export can be paid in cedis.

ECONOMIC EXPOSURE

Local prices can respond to imported costs or competing products. These future price and volume channels are not fully captured by a monetary-position note.

Sources: IFRS Foundation: IAS 21 [\[S07\]](#); IFRS Foundation: IFRS 7 [\[S08\]](#); IDER calculations [\[S10\]](#).

Note: IAS 21’s functional-currency concept is used; this report does not issue entity-specific accounting judgements.

A number must pass the unit, sign, tax and perimeter checks

Source records are retained alongside every conversion or standardisation.

Table 3. A number must pass the unit, sign, tax and perimeter checks

Dimension	Control	Why it matters
Units and scale	Keep native units, thousands and GHS equivalents separate	Multiplying an already converted GHS value by FX again exaggerates exposure.
Sign convention	Assets positive; liabilities negative; higher GHS/FX = depreciation	Published strengthening/weakening labels can differ from arithmetic direction.
Tax basis	Separate pre-tax mechanical effects and reported post-tax sensitivities	A 25% diagnostic tax factor is not a forecast of marginal cash tax.
Legal entity	Do not add the parent company to its consolidated group	Intercompany balances and subsidiaries can change the external position.
Measurement date	Keep 2023, 2024 and 2025 observations explicitly dated	A prior-year FX balance is not a current operational cash estimate.

Sources: Unilever (2025) [\[S01\]](#); Kasapreko (2025) [\[S02\]](#); Fan Milk (2024) [\[S03\]](#); TotalEnergies (2025) [\[S05\]](#); IDER calculations [\[S10\]](#).

Note: No source inconsistency is silently reconciled by averaging conflicting conventions.

An FX loss and the settlement of principal must not be counted twice

A monetary revaluation changes carrying value; cash settlement extinguishes the same obligation.

OPENING STOCK

A USD 10 loan at GHS 10/USD has a GHS 100 carrying equivalent. At GHS 12/USD the fixed principal is GHS 120: a GHS 20 mechanical translation increase.

DATED CASH PAYMENT

Repaying that USD 10 requires GHS 120 at the new rate. The payment is not GHS 120 plus another GHS 20: the stock increase is not a second bill.

RECONCILIATION

Track a single liability ID through opening principal, interest accrual, new drawdowns, revaluation and repayment. Model future capex commitments separately from assets already paid.

Sources: Shrestha et al. / IMF (2012) [\[S09\]](#); IDER calculations [\[S10\]](#).

Note: Illustration uses an unchanged foreign principal and excludes interest, taxes and transaction costs.

The quotation convention determines the percentage effect

The report uses e = Ghana cedis per unit of foreign currency; every scenario rate stays positive.

Table 4. The quotation convention determines the percentage effect

Scenario in GHS/FX	Value of cedi in FX	Fixed foreign invoice
+10%	−9.09%	Cedi settlement cost rises 10%.
+20%	−16.67%	Cedi settlement cost rises 20%.
−10%	+11.11%	Cedi settlement cost falls 10%.
−20%	+25.00%	Cedi settlement cost falls 20%.

Sources: IDER calculations [\[S10\]](#).

Note: Simple percentage changes are not reciprocal; log changes are not used as exact substitutes in large shocks.

Accounting precision does not eliminate economic endogeneity

The analysis measures disclosed exposures and imposed shocks, rather than estimating a currency-policy effect.

REVERSE CAUSALITY

Borrowing, FX cash holdings and supplier terms may respond to expected currency movements. A year-to-year reduction in net debt does not identify why management changed it.

SELECTION AND COVERAGE

Available issuer statements overrepresent formal, larger and surviving firms. Disclosed risk tables may omit future capex or denomination details. Statistical reweighting needs a defined frame.

RELEASE STANDARD

Use exact arithmetic for fixed-position questions. Reserve causal language for designs with defensible assignment, pre-shock exposure, controls and a credible comparison population.

Sources: IFRS Foundation: IFRS 7 [\[S08\]](#); Shrestha et al. / IMF (2012) [\[S09\]](#); IDER calculations [\[S10\]](#).

Note: No instrumental-variable, panel or experimental estimator is fitted to these few disclosure cases.

Positive dollar balances coexist with euro and rand liabilities

Foreign-denominated balances, thousands of each currency; 31 December 2025.

Table 5. Positive dollar balances coexist with euro and rand liabilities

Component	USD	EUR	GBP	ZAR
Bank balances	2,209	442	35	1,866
Related-party receivables	253	0	4	0
Trade payables	-136	-55	-5	0
Related-party payables	-1,281	-744	0	-10,825
Reported net	1,045	-357	34	-8,959

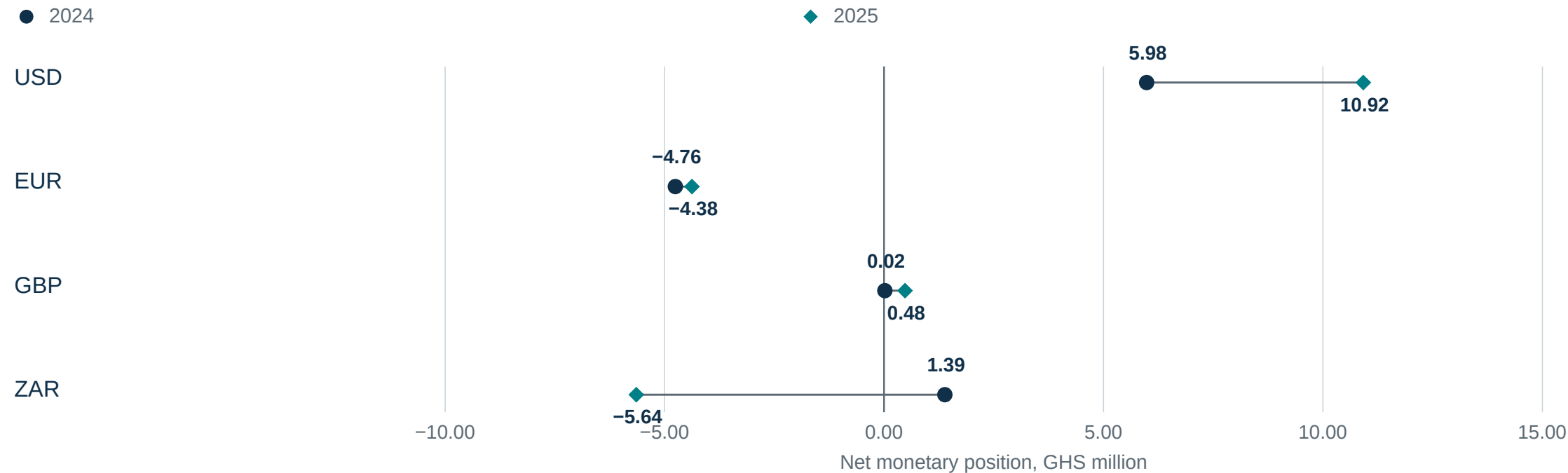
Sources: Unilever (2025) [\[S01\]](#).

Note: Scale is supported by the source rounding convention and sensitivity magnitudes. Different native currencies must not be directly added.

The direction of the rand position changed between year ends

Reported currency positions translated at each year’s source reporting rate; GHS million.

Figure 1. The direction of the rand position changed between year ends



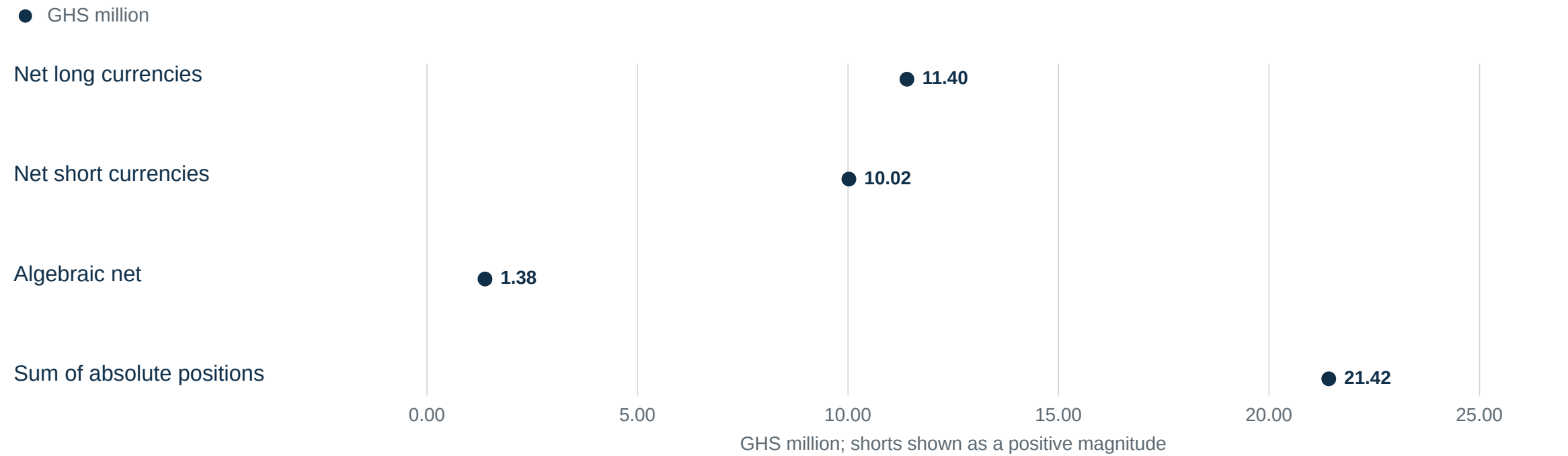
Sources: Unilever (2025) [S01]; IDER calculations [S10].

Note: Translation at dated rates is not a cash transaction. Comparative changes do not identify management policy effects.

The aggregate net balance conceals much larger opposing positions

Same 2025 native balances and source reporting rates; no cash pooling or conversion is assumed.

Figure 2. The aggregate net balance conceals much larger opposing positions



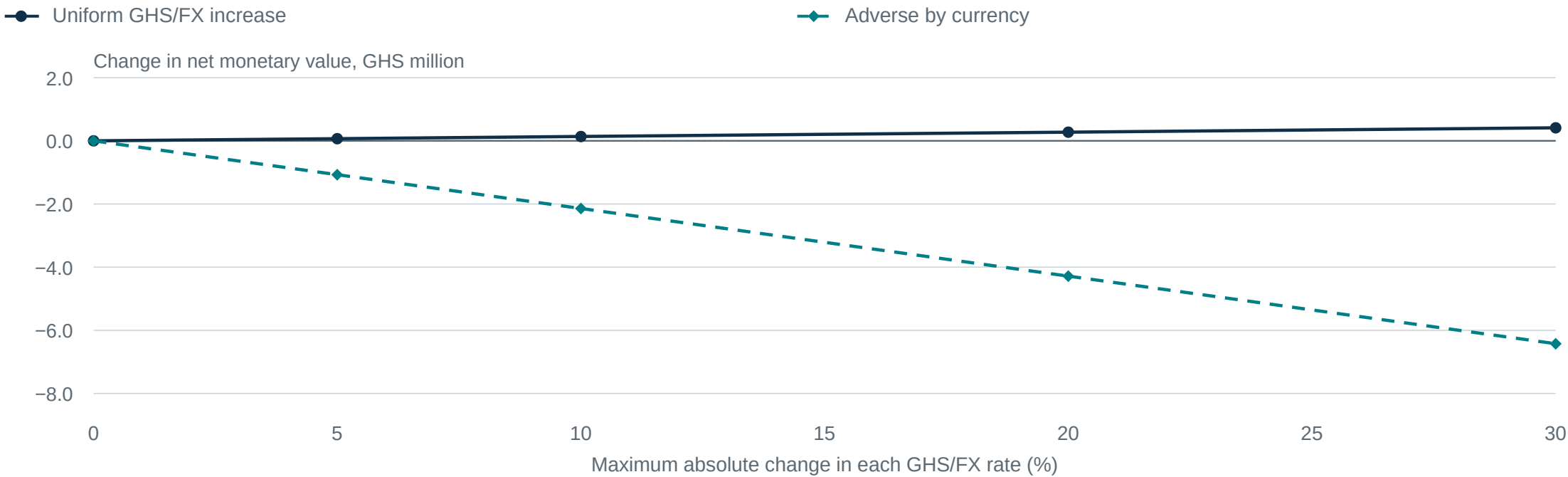
Sources: Unilever (2025) [\[S01\]](#); IDER calculations [\[S10\]](#).

Note: Cross-currency netting cancels 93.6% of gross absolute exposure in the scalar net. That is not a hedge-effectiveness estimate.

A uniform cedi shock is not the same as a currency-specific stress

Hold all 2025 foreign monetary balances fixed; pre-tax mechanical changes only.

Figure 3. A uniform cedi shock is not the same as a currency-specific stress



Sources: Unilever (2025) [\[S01\]](#); IDER calculations [\[S10\]](#).

Note: The adverse box lowers rates on net assets and raises rates on net liabilities. It is not an estimated joint shock distribution.

Small net exposure does not establish same-currency cash coverage

2025 currency assets and liabilities are measured on the same source basis; maturity is not available by currency.

Table 6. Small net exposure does not establish same-currency cash coverage

Currency	Asset / liability cover	Cash / liability cover	2025 net, GHS m
USD	1.74×	1.56×	10.92
EUR	0.55×	0.55×	−4.38
GBP	7.80×	7.00×	0.48
ZAR	0.17×	0.17×	−5.64

Sources: Unilever (2025) [\[S01\]](#); IDER calculations [\[S10\]](#).

Note: Asset coverage includes receivables. Neither ratio verifies collectible cash before a particular payment date.

Magnitude checks and direction checks must be performed separately

The reported weakening column is preserved; the diagnostic defines weakening as an increase in GHS per currency unit.

Table 7. Magnitude checks and direction checks must be performed separately

Currency / source shock	Source weakening effect	Mechanical effect	Diagnostic finding
USD / 6.90%	-754.0	753.5	Magnitude broadly matches; direction differs.
EUR / 5.70%	250.0	-249.5	Magnitude broadly matches; direction differs.
GBP / 5.31%	-26.0	25.4	Magnitude broadly matches; direction differs.
ZAR / 2.31%	130.0	-130.4	Magnitude broadly matches; direction differs.

Sources: Unilever (2025) [\[S01\]](#); IDER calculations [\[S10\]](#).

Note: GHS thousands, before tax. The report does not amend the issuer’s accounts; the sign convention requires issuer clarification.

A positive current ratio is not a foreign-currency cash guarantee

Year-end financial position and contractual maturity disclosures answer related but different questions.

ALL-CURRENCY STOCK	CONTRACTUAL TIMING	BORROWER ASSESSMENT
Current assets / current liabilities = 1.59×. Cash / current liabilities = 0.84×. These ratios do not identify the currency of each payable.	GHS 242.18 million of reported contractual financial payments fall within six months. Their dated currency split is not reconstructed from the annual note.	A 10% adverse-by-currency mechanical value loss is GHS 2.14 million, or 0.77% of source equity. This is not a default probability or cash shortfall.

Sources: Unilever (2025) [\[S01\]](#); IDER calculations [\[S10\]](#).
Note: Covenant definitions, taxes, hedging contracts and actual settlement dates are outside this stock sensitivity.

Supplier balances and borrowing generate different currency pressures

Amounts expressed in millions of each native currency; 31 December 2025.

Table 8. Supplier balances and borrowing generate different currency pressures

Currency	Monetary assets	Monetary liabilities	Reported net	Reporting rate
USD	11.752	14.257	−2.505	11.7667
EUR	3.194	8.840	−5.646	13.9533
GBP	0.000	0.022	−0.021	15.9833
NGN	2,275.294	0.000	2,275.294	0.0077

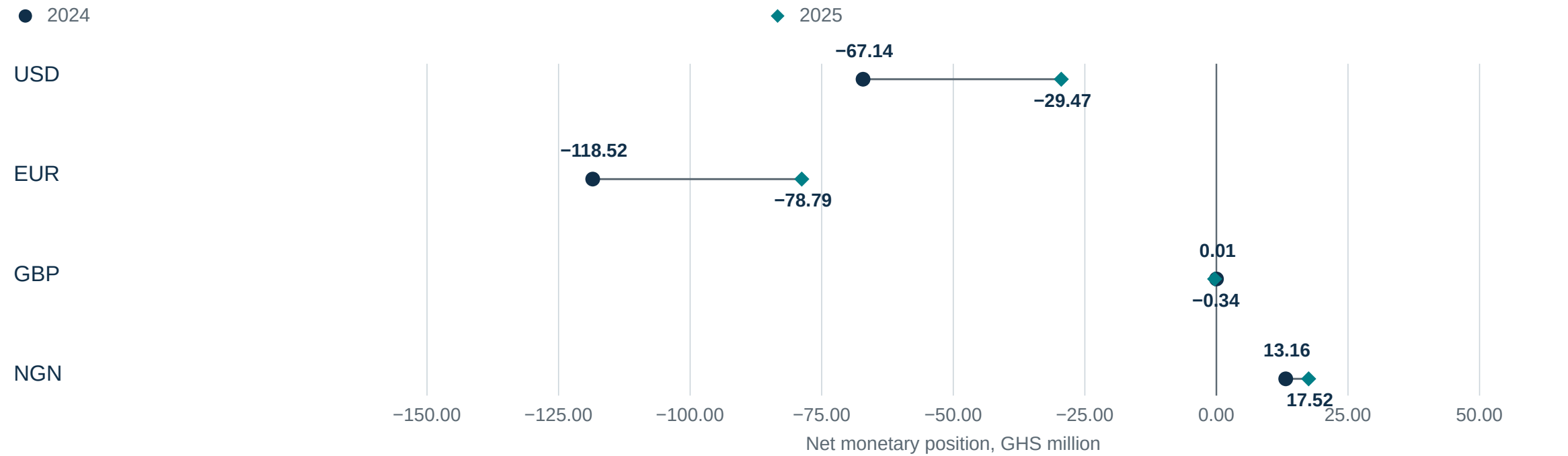
Sources: Kasapreko (2025) [\[S02\]](#); IDER calculations [\[S10\]](#).

Note: Conversion follows the table column labelled Reporting Rate; its labels are not swapped with the source Average Rate column.

A naira asset does not remove the euro funding requirement

Net currency positions, source reporting-rate conversion; GHS million.

Figure 4. A naira asset does not remove the euro funding requirement



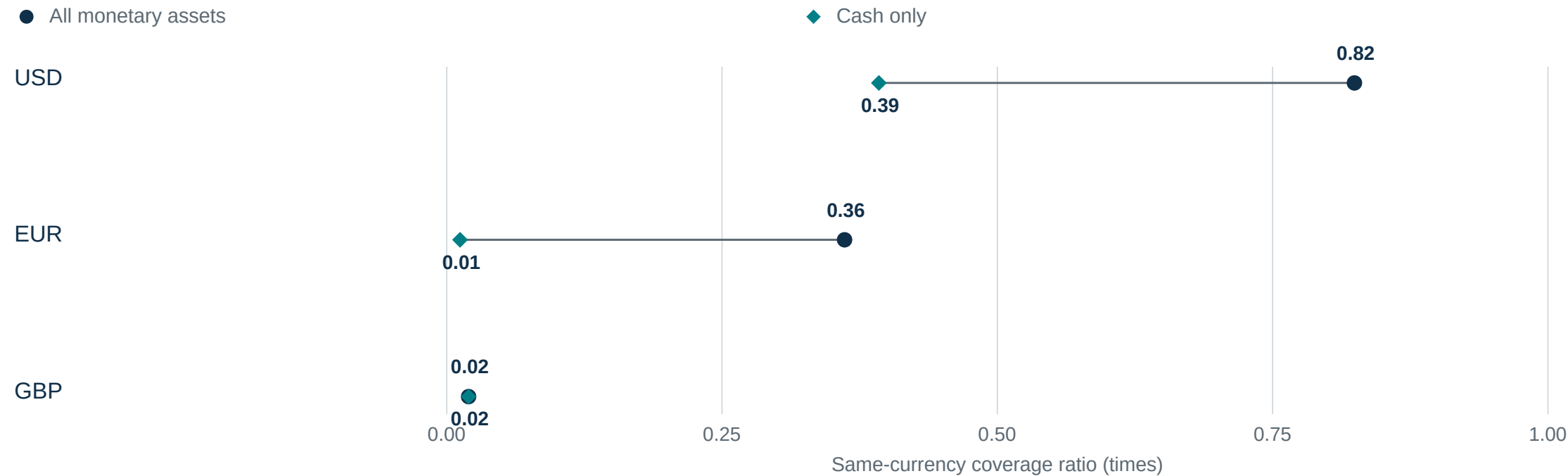
Sources: Kasapreko (2025) [\[S02\]](#); IDER calculations [\[S10\]](#).

Note: The positive naira position includes related-party receivables; legal transferability and collection dates are not demonstrated.

Receivables and cash provide different degrees of balance coverage

2025 assets and cash divided by same-currency monetary liabilities; naira has no disclosed liability denominator.

Figure 5. Receivables and cash provide different degrees of balance coverage



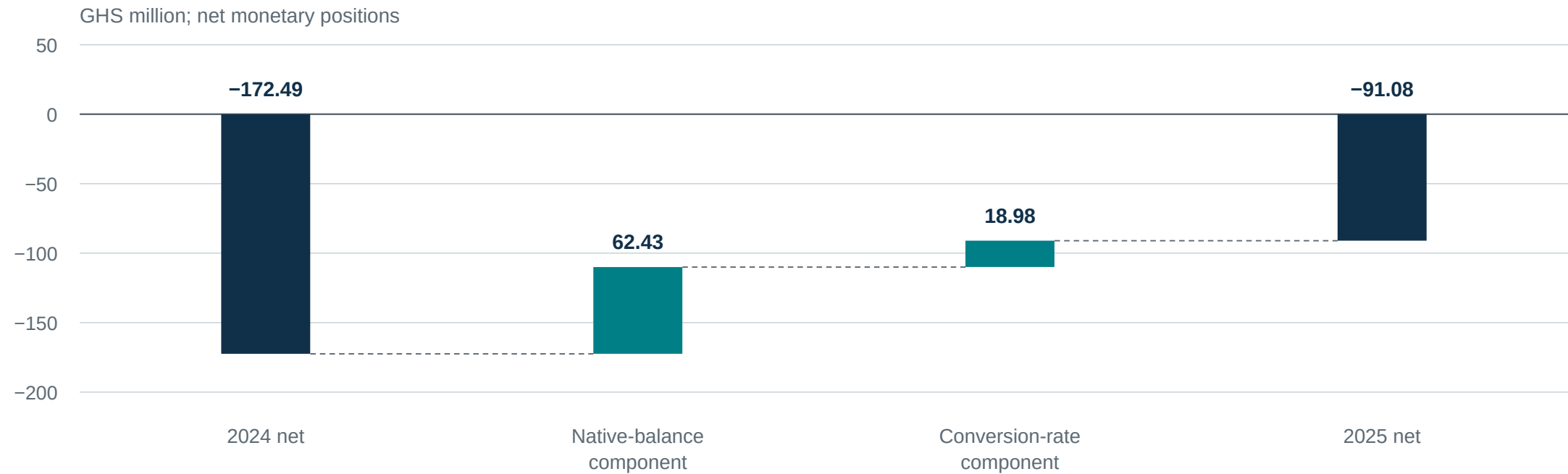
Sources: Kasapreko (2025) [S02]; IDER calculations [S10].

Note: Ratios are not maturity-adjusted. Undefined naira coverage is omitted rather than displayed as zero or infinity.

Both native balances and conversion rates affect the cedi total

Symmetric two-factor decomposition; interaction is shared equally and components reconcile exactly.

Figure 6. Both native balances and conversion rates affect the cedi total



Sources: Kasapreko (2025) [\[S02\]](#); IDER calculations [\[S10\]](#).

Note: The native-balance component combines transactions and other changes. Neither component is a causal effect of treasury decisions.

The fixed-position loss depends on which currencies move

Use the same source reporting-rate basis for all calculations; no extra transactions or policy response.

Table 9. The fixed-position loss depends on which currencies move

Shock family	10% magnitude	20% magnitude	What is held fixed
Uniform GHS/FX increase	−9.11	−18.22	All native monetary balances.
Adverse by currency	−12.61	−25.22	Net assets face lower conversion; liabilities face higher.
Uniform GHS/FX decrease	9.11	18.22	Symmetric rate change, not reciprocal cedi-value shock.

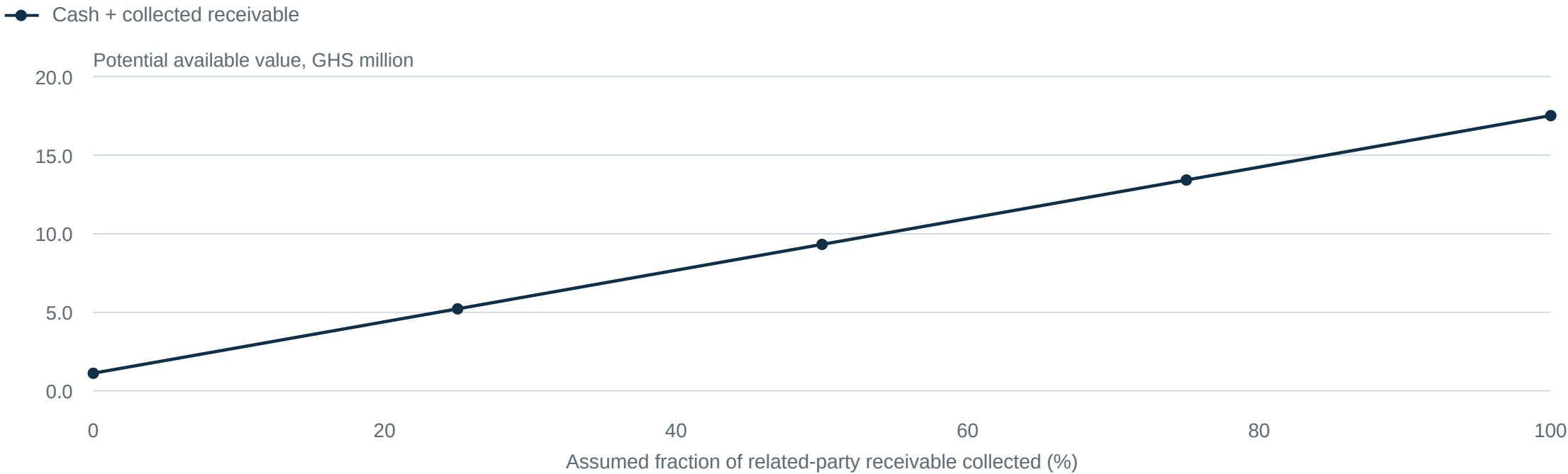
Sources: Kasapreko (2025) [\[S02\]](#); IDER calculations [\[S10\]](#).

Note: Amounts are pre-tax changes in GHS million. No claim is made about current exposure or the probability of any scenario.

The positive naira position is dominated by a receivable

Source 2025 naira cash and related-party receivable, converted at the source reporting rate.

Figure 7. The positive naira position is dominated by a receivable



Sources: Kasapreko (2025) [\[S02\]](#); IDER calculations [\[S10\]](#).

Note: A collection fraction is imposed, not estimated. Convertibility, withholding, transfer fees and payment dates may further restrict usability.

Customer geography does not identify the denomination of receipts

Observed revenue split by customer location; amounts in GHS million.

Table 10. Customer geography does not identify the denomination of receipts

Year	Within Ghana	Outside Ghana	Outside / total
2024	2,072.67	648.49	23.83%
2025	2,811.55	689.34	19.69%

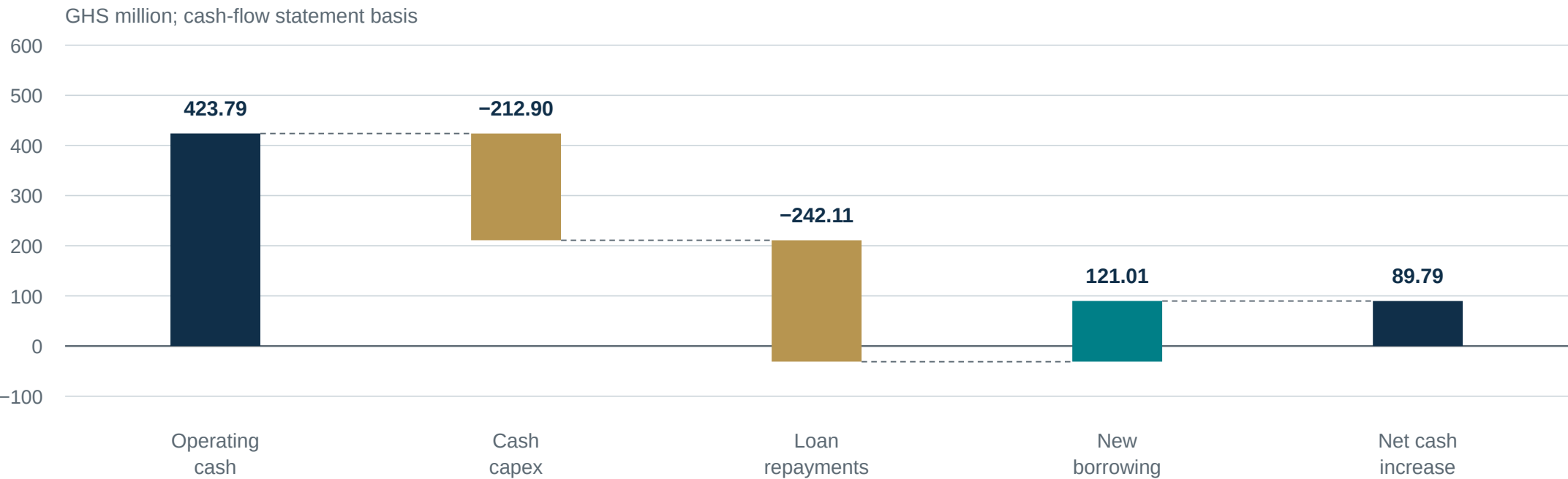
Sources: Kasapreko (2025) [\[S02\]](#); IDER calculations [\[S10\]](#).

Note: The geographic export share must not be used as an estimated FX-revenue share or natural-hedge ratio.

Capital spending and repayment can absorb positive operating cash

Observed 2025 cash-flow lines; interest and tax already included in reported operating cash.

Figure 8. Capital spending and repayment can absorb positive operating cash



Sources: Kasapreko (2025) [\[S02\]](#); IDER calculations [\[S10\]](#).

Note: Do not deduct interest or tax again. Financing amounts include the company and related-party loan cash lines.

Reported inconsistencies remain visible in the evidence register

Authentication of the printed table does not resolve differences between its accounting conventions.

Table 11. Reported inconsistencies remain visible in the evidence register

Source issue	Observed record	Treatment
Kasapreko equity	GHS 700.435416m in financial position; GHS 700.760254m in risk note	Use financial-position equity for the denominator; retain GHS 0.324838m difference.
Kasapreko EUR sensitivity	2025 amount printed as “2,954,48”; directional wording differs from liability sign	No missing digit is inferred; use an explicitly separate mechanical diagnostic.
Kasapreko rates / currency text	Reporting Rate and Average Rate columns; NGN paragraph also mentions CFA	Retain reporting-rate label and NGN table; seek issuer clarification.
Unilever sensitivity direction	Magnitudes approximately reconcile, weakening-column directions differ	Retain source signs and label mechanical GHS/FX convention separately.

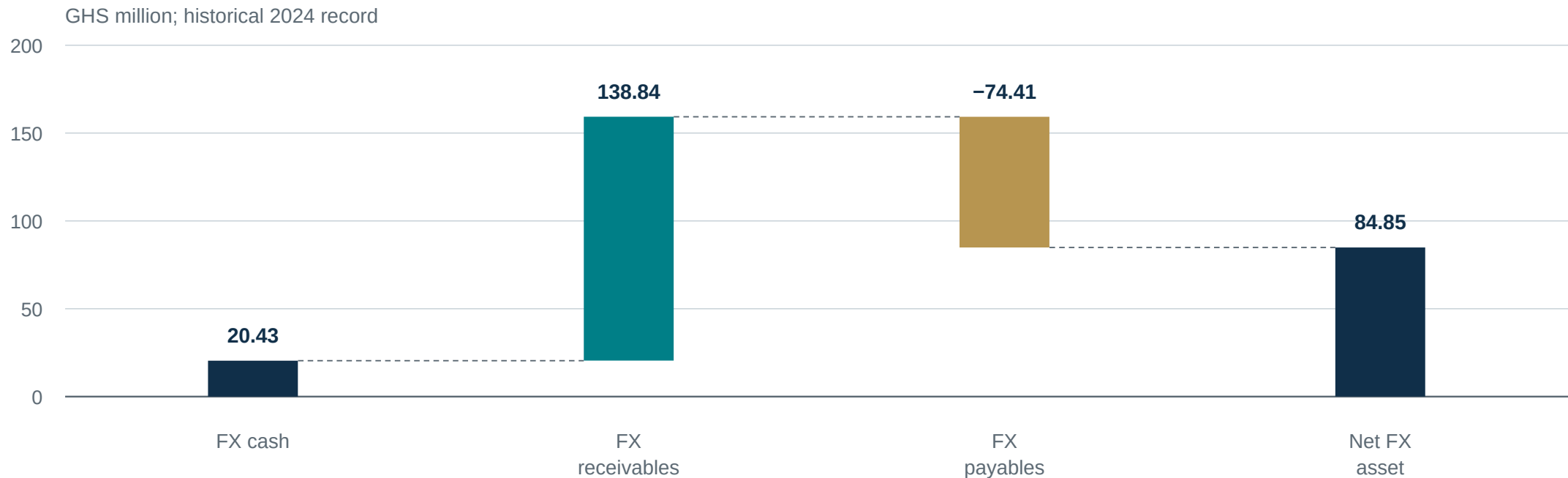
Sources: Unilever (2025) [\[S01\]](#); Kasapreko (2025) [\[S02\]](#); IDER calculations [\[S10\]](#).

Note: These are document-level reconciliation issues, not allegations about reporting motives or an audit opinion.

A net foreign monetary asset is not all available cash

Fan Milk 2024 historical aggregate; GHS million as disclosed, not the 2025 currency position.

Figure 9. A net foreign monetary asset is not all available cash



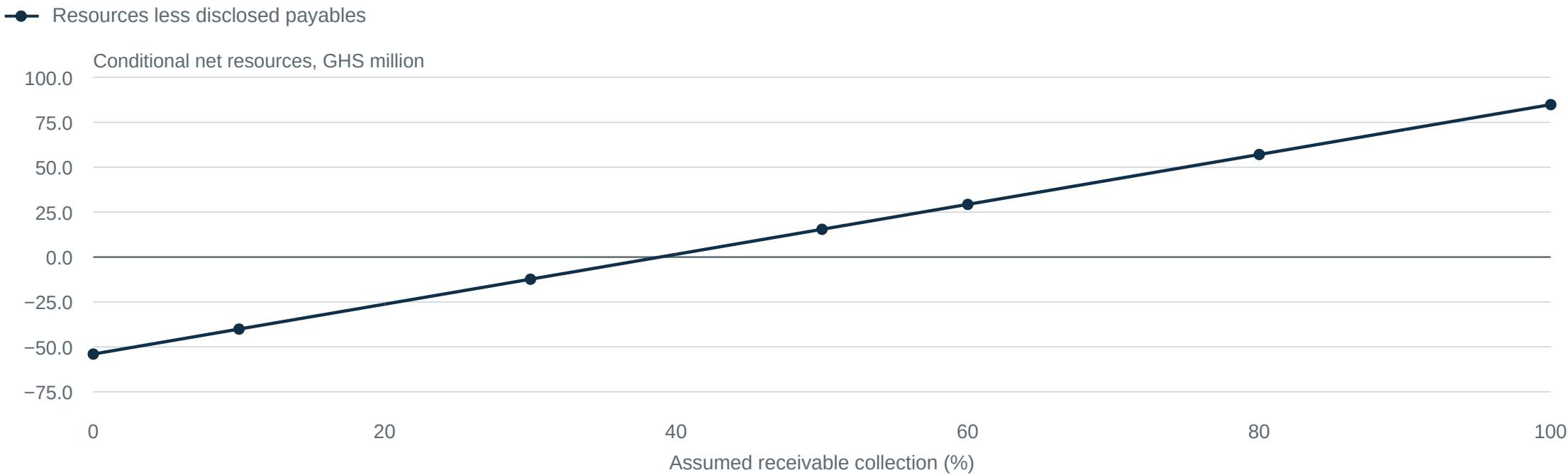
Sources: Fan Milk (2024) [\[S03\]](#); IDER calculations [\[S10\]](#).

Note: The source does not provide the complete currency-by-date allocation required to test actual payment feasibility.

About two-fifths of the receivable is needed in the aggregate test

Assume all disclosed 2024 FX payables are due and the aggregate currency value can be used without friction.

Figure 10. About two-fifths of the receivable is needed in the aggregate test



Sources: Fan Milk (2024) [\[S03\]](#); IDER calculations [\[S10\]](#).

Note: Break-even collection is 38.88%. This is a constructed threshold, not actual collection performance or same-currency settlement proof.

Newer liquidity records cannot be substituted for an absent FX split

All-currency financial information, 2025; GHS million unless stated otherwise.

Table 12. Newer liquidity records cannot be substituted for an absent FX split

Indicator	Observed value	Limit
Cash and equivalents	231.613	Denomination and restrictions not identified here.
Trade and other receivables	141.719	Not all is foreign, not all is immediately collectible.
Cash capital expenditure	34.610	PPE plus intangible cash purchases; currency mix absent.
Net operating cash	168.850	Annual cash outturn, not an opening buffer.
Lease maturity split	1.997 current in position; 0.263 within year in risk note	Split is inconsistent across tables; do not silently swap it.

Sources: Fan Milk (2025) [\[S04\]](#).

Note: The 2024 foreign-exposure aggregate is not carried forward as an estimate of the 2025 FX position.

Tax and coverage assumptions change the reconciliation

Combined reported post-tax USD and EUR sensitivity to the stated 10% movement; GHS thousands.

Table 13. Tax and coverage assumptions change the reconciliation

Year	Reported combined	Net ×10% ×75%	Unreconciled difference
2024	6,363.903	6,363.900	0.003
2023	7,655.216	4,787.025	2,868.191

Sources: Fan Milk (2024) [\[S03\]](#); IDER calculations [\[S10\]](#).

Note: The 25% tax deduction is only a diagnostic. The 2023 difference is not resolved by inventing a currency balance or tax adjustment.

Consolidated and company-only exposures must remain separate

2025 figures retain the printed notional-table scale, before deciding whether further currency conversion is appropriate.

Table 14. Consolidated and company-only exposures must remain separate

Currency	Group net	Company net	Group minus company
EUR	-14,313	-14,313	0
USD	-9,997	-73	-9,924
CFA	-2,629	-2,629	0
CHF	-118	-118	0

Sources: TotalEnergies (2025) [\[S05\]](#); IDER calculations [\[S10\]](#).

Note: The group includes the company; adding them double counts. Their difference is not automatically a stand-alone subsidiary risk balance.

The published sensitivity follows the direct-table arithmetic

Absolute 2025 group sensitivity; the alternative native-rate reading is a diagnostic, not a corrected disclosure.

Table 15. The published sensitivity follows the direct-table arithmetic

Currency	Source effect, GHS 000	Table × shock	Table × rate × shock
EUR	3,578.0	3,578.2	45,150.7
USD	2,299.0	2,299.3	24,487.7
CFA	684.0	683.5	13.1
CHF	31.0	30.7	412.8

Sources: TotalEnergies (2025) [\[S05\]](#); IDER calculations [\[S10\]](#).

Note: The table says notional amounts while the page heading says GHS thousands. No unconditional cross-issuer GHS net is computed from this table.

Group netting is an accounting operation—not guaranteed cash access

Country, currency and legal-entity boundaries can make consolidated resources unavailable to a specific payer.

INTERCOMPANY BALANCES Match receivables to the related entity’s payable. Eliminate them for group exposure only when the consolidation perimeter requires it; retain the legal-entity settlement obligation.	TRANSFERABILITY A subsidiary’s currency surplus may be subject to approvals, documentation, exchangeability limits, covenants or ring-fencing. A group-level value cannot establish cash at the parent’s bank.	RELEASE RULE Present both legal-entity and consolidated tests. Do not add them together. Name assumptions about cash pooling and conversion instead of treating intra-group claims as unrestricted cash.
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Sources: TotalEnergies (2025) [\[S05\]](#); IFRS Foundation: IAS 21 [\[S07\]](#); Shrestha et al. / IMF (2012) [\[S09\]](#); IDER calculations [\[S10\]](#).

Note: The report does not determine the legal enforceability of any issuer’s cash pooling or netting arrangements.

Recognised investment and cash capital expenditure are different

2025 group amounts; source-rounded right-of-use additions are separated from cash purchases.

Figure 11. Recognised investment and cash capital expenditure are different



Sources: MTN Ghana (2025) [\[S06\]](#); IDER calculations [\[S10\]](#).

Note: The cash capex base used for scenarios is GHS 5,373.751m. Do not add right-of-use additions as another cash purchase.

An unknown imported-capex share produces a range—not a point estimate

Hypothetical repetition of the historical cash-capex amount; only the foreign-priced share is shocked.

Figure 12. An unknown imported-capex share produces a range—not a point estimate

	FX -20%	FX +0%	FX +20%	FX +30%
FX share 0%	0.0	0.0	0.0	0.0
FX share 25%	-268.7	0.0	268.7	403.0
FX share 50%	-537.4	0.0	537.4	806.1
FX share 75%	-806.1	0.0	806.1	1,209.1
FX share 100%	-1,074.8	0.0	1,074.8	1,612.1

Incremental capital outlay, GHS million

Sources: MTN Ghana (2025) [\[S06\]](#); IDER calculations [\[S10\]](#).

Note: No 2025 cash payment is retroactively changed. The currency mix of a future programme is assumed, not disclosed.

Operating cash is not directly comparable without its classification

Selected 2025 source cash-flow amounts; GHS million. This is not an issuer performance ranking.

Table 16. Operating cash is not directly comparable without its classification

Issuer / statement scope	Operating cash	PPE + intangible cash	Interpretation
Kasapreko company	423.791	212.900	Interest and taxes already deducted in operating cash.
Fan Milk company	168.850	34.610	Interest and tax included; dividends in financing.
MTN Ghana group	7,611.114	5,373.751	Operating cash already includes GHS 4,235.576m dividend payment.

Sources: Kasapreko (2025) [\[S02\]](#); Fan Milk (2025) [\[S04\]](#); MTN Ghana (2025) [\[S06\]](#); IDER calculations [\[S10\]](#).

Note: The cash-capex currency split is not inferred from the size of the cash-flow total.

The disclosures establish exposure channels—not national prevalence

The quantitative diagnosis is reproducible at the source-record level; it remains conditional on the stated measurement basis.

WHAT IS OBSERVED

Different currency signs, foreign supplier and borrowing balances, receivable-heavy asset offsets, company–group differences and large capital cash purchases are visible in selected statements.

WHAT IS CALCULATED

Net and gross positions, common-shock effects, coverage ratios, source sensitivity diagnostics, two-factor bridges and collection thresholds follow explicit identities.

WHAT IS NOT IDENTIFIED

The population distribution of Ghanaian business exposure; a 2026 national cash shortfall; a causal FX effect on investment; current hedge coverage; or optimal portfolio currency allocations.

Sources: Unilever (2025) [\[S01\]](#); Kasapreko (2025) [\[S02\]](#); Fan Milk (2024) [\[S03\]](#); Fan Milk (2025) [\[S04\]](#); TotalEnergies (2025) [\[S05\]](#); MTN Ghana (2025) [\[S06\]](#); IDER calculations [\[S10\]](#).

Note: Source differences, missing denominations and purposive selection preclude a national exposure total.

The extension adds disclosed records—not invented firm observations

Additional source transcriptions remain separate from the original frozen inputs and illustrative business profiles.

Table 17. The extension adds disclosed records—not invented firm observations

Evidence added	Primary location	New calculation / boundary
Kasapreko: two annual cash and maturity records	S02: PDF pp.24,58–59	Gross/net cash; maturity concentration. Contractual totals include all currencies.
Fan Milk: five receivable-ageing buckets	S04: PDF/printed p.49	Gross carrying values and loss allowances; these are amounts, not five sampled firms.
MTN group: comparative cash-flow lines	S06: PDF p.16	Dividends already in CFO and closing-cash reconciliation; no invoice-currency share inferred.
Existing currency-component schedules	S01: PDF pp.63–64; S02: pp.59–60	Component bridges, rate-basis sensitivity and common-shock normalisation.
TotalEnergies: within-currency coverage	S05: PDF pp.68–70	Ratios invariant to a common unit scale; ambiguous cross-currency totals remain excluded.

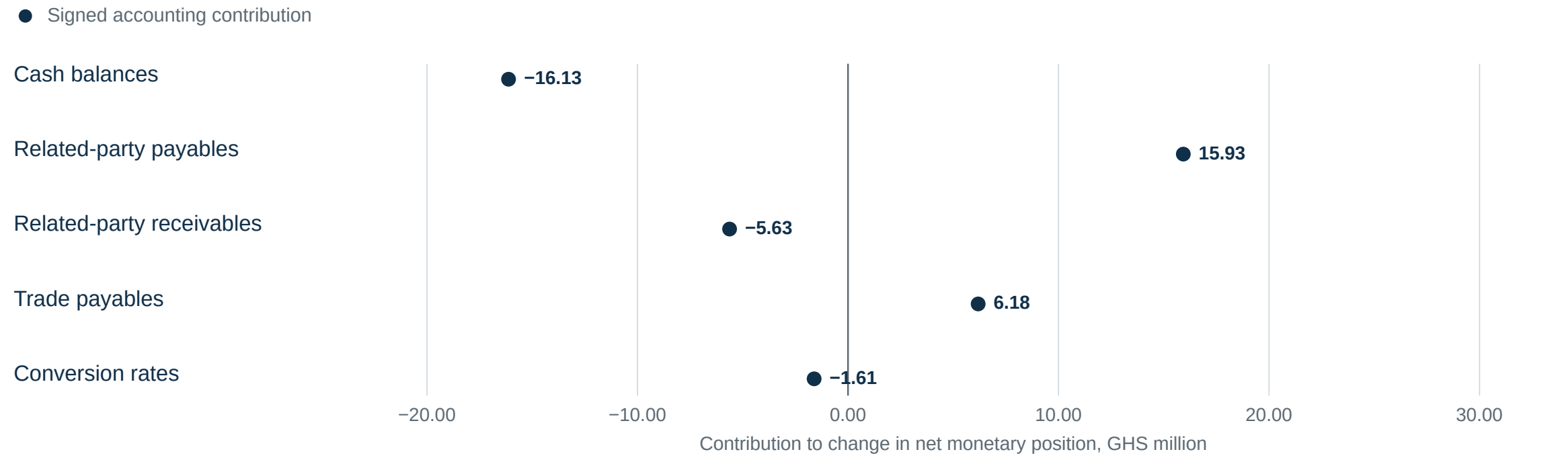
Sources: Unilever (2025) [\[S01\]](#); Kasapreko (2025) [\[S02\]](#); Fan Milk (2025) [\[S04\]](#); TotalEnergies (2025) [\[S05\]](#); MTN Ghana (2025) [\[S06\]](#); IDER calculations [\[S10\]](#).

Note: Five issuers remain purposively selected. More disclosed rows do not create an independent enterprise sample.

Offsetting changes explain why the net position moved only slightly

2024–2025 GHS-equivalent change; native changes converted at mean endpoint rates.

Figure 13. Offsetting changes explain why the net position moved only slightly



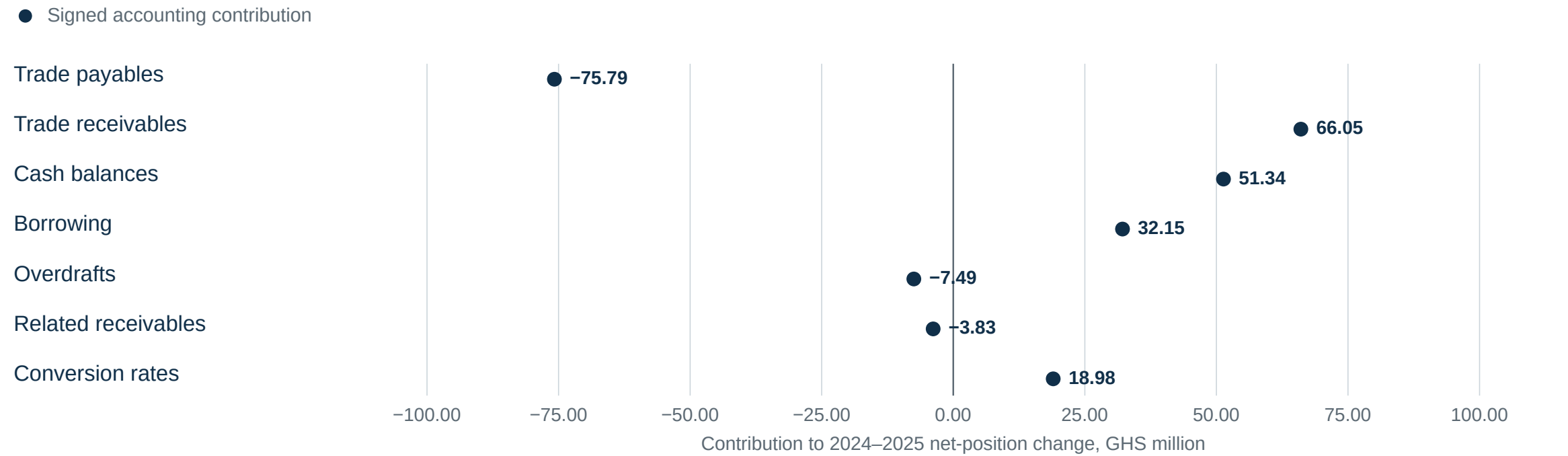
Sources: Unilever (2025) [\[S01\]](#); IDER calculations [\[S10\]](#).

Note: Components sum to –GHS 1.254m. A cash-component change is not an identified cash receipt or treasury-policy effect.

Reduced borrowing did not remove the supplier-payable channel

All disclosed native component changes at mean reporting rates, plus the conversion-rate component.

Figure 14. Reduced borrowing did not remove the supplier-payable channel



Sources: Kasapreko (2025) [\[S02\]](#); IDER calculations [\[S10\]](#).

Note: Contributions sum to +GHS 81.409m. Larger supplier liabilities offset part of the cash, receivable and borrowing changes; no behavioural cause is assigned.

A lower loss-to-equity ratio can reflect a larger equity denominator

Fixed 10% adverse-by-currency box. Both years use their own disclosed positions, rates and book equity.

Table 18. A lower loss-to-equity ratio can reflect a larger equity denominator

Issuer	2024 loss / equity	2025 loss / equity	Position contribution	Equity contribution
Unilever	0.537%	0.768%	0.372 pp	−0.141 pp
Kasapreko	5.743%	1.801%	−1.569 pp	−2.373 pp

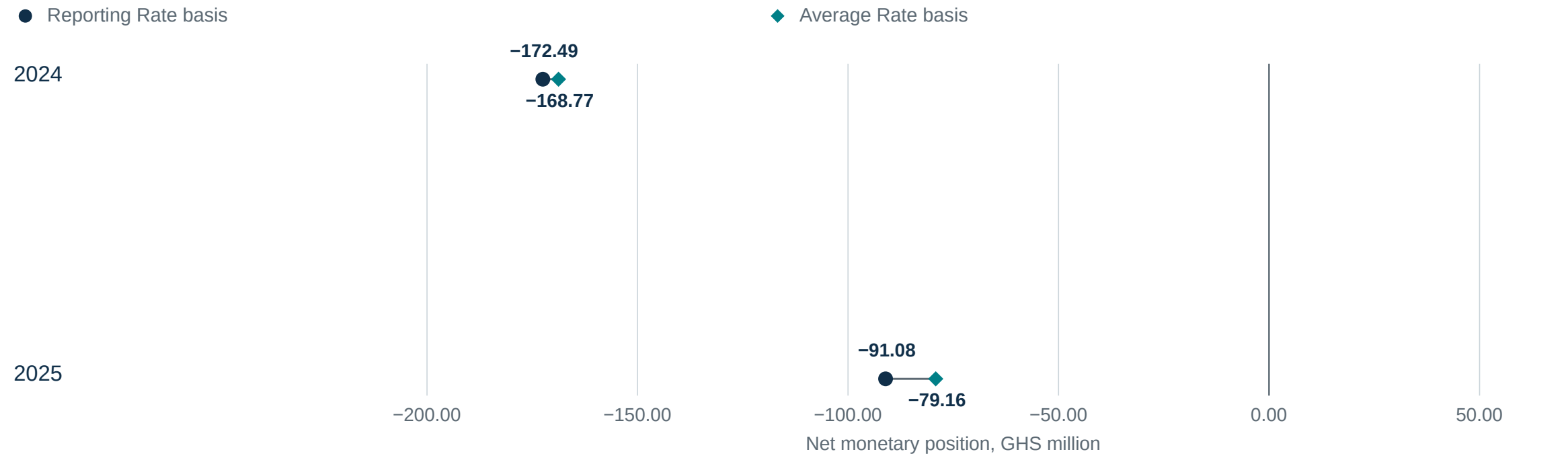
Sources: Unilever (2025) [\[S01\]](#); Kasapreko (2025) [\[S02\]](#); IDER calculations [\[S10\]](#).

Note: Symmetric two-factor allocation is exact. Book-equity growth is not assumed to be new cash, and the ratio is not a regulatory capital or credit-risk score.

Kasapreko’s labelled rate columns give different conversion totals

The alternative preserves the source’s Average Rate label; the primary result continues to use Reporting Rate.

Figure 15. Kasapreko’s labelled rate columns give different conversion totals



Sources: Kasapreko (2025) [S02]; IDER calculations [S10].

Note: The 2025 totals differ by GHS 11.918m. This is a basis diagnostic, not a confidence interval or permission to choose the less adverse number.

Full collection may still leave same-currency liabilities uncovered

Constructed stock test: assume every disclosed liability is due, no new inflows and no currency conversion.

Table 19. Full collection may still leave same-currency liabilities uncovered

Currency	Cash cover	Required collection	Gap after full collection	Interpretation
USD	0.392×	140.7%	−29.47m GHS	A threshold above 100% is infeasible using only the disclosed receivable.
EUR	0.012×	282.9%	−78.79m GHS	A threshold above 100% is infeasible using only the disclosed receivable.

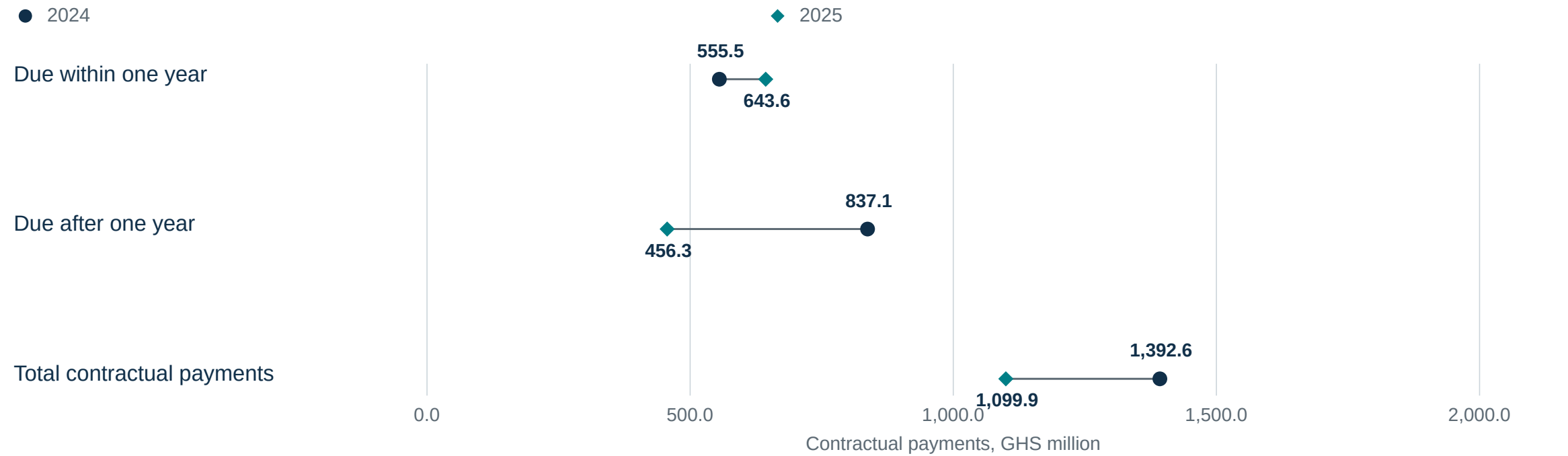
Sources: Kasapreko (2025) [\[S02\]](#); IDER calculations [\[S10\]](#).

Note: USD: 140.7%; EUR: 282.9%. These all-due thresholds do not estimate a dated funding failure: liability maturities and collection dates are not matched.

Near-term contractual payments rose while the total declined

Year-end undiscounted contractual financial payments, all currencies, GHS million.

Figure 16. Near-term contractual payments rose while the total declined



Sources: Kasapreko (2025) [\[S02\]](#); IDER calculations [\[S10\]](#).

Note: Within-year payments rose GHS 88.137m; total payments fell GHS 292.654m. The within-year share increased from 39.9% to 58.5%; currency-specific timing remains unavailable.

GHS 243.00m of gross cash is not the GHS 172.73m cash-flow closing balance

Source financial-position cash, overdrafts and statement-of-cash-flows cash equivalents; GHS million.

Table 20. GHS 243.00m of gross cash is not the GHS 172.73m cash-flow closing balance

Year	Gross cash	Less overdrafts	Cash-flow closing	Calculated less reported
2024	162.94	78.92	84.02	0 GHS
2025	243.00	70.27	172.73	1 GHS

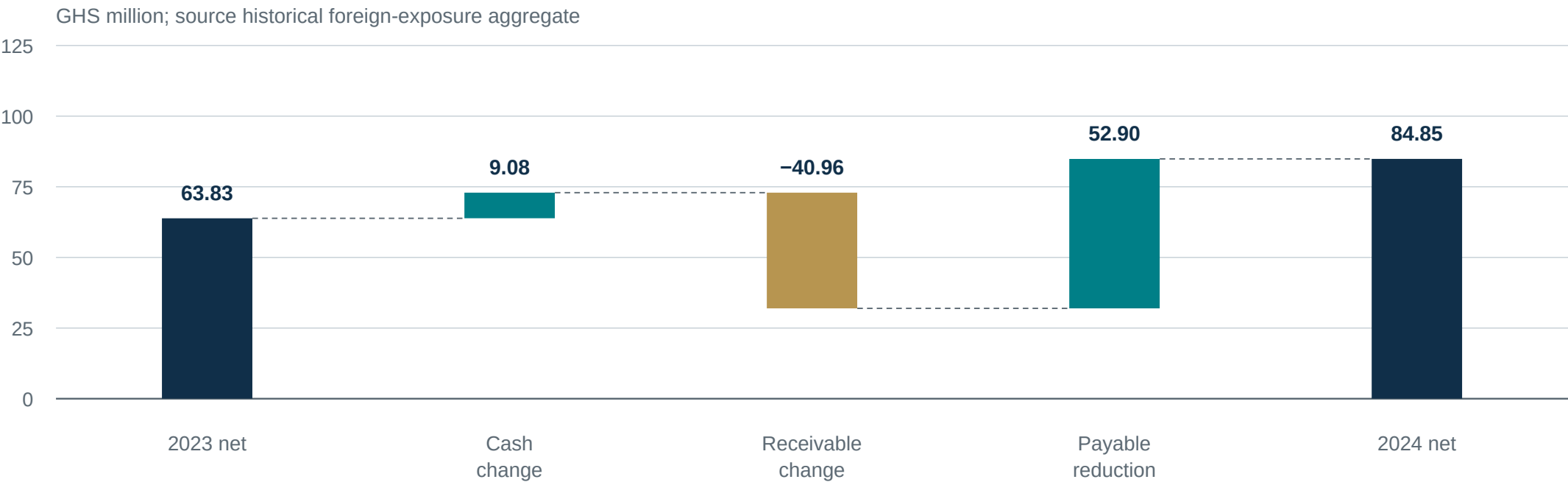
Sources: Kasapreko (2025) [\[S02\]](#); IFRS Foundation: IAS 7 [\[S11\]](#); IDER calculations [\[S10\]](#).

Note: Gross cash is retained for the earlier financial-position ratio. The cash-flow statement uses its own net basis; the 2025 GHS 1 residual is disclosed.

The historical net FX asset rose mainly through lower payables

2023–2024 aggregate GHS-equivalent FX record; no 2025 denomination is inferred.

Figure 17. The historical net FX asset rose mainly through lower payables



Sources: Fan Milk (2024) [\[S03\]](#); IDER calculations [\[S10\]](#).

Note: The +GHS 21.025m net change is not an FX revaluation gain. Transactions, settlements, valuation and other balance changes are not separately identified.

A small overdue balance accounts for most of the disclosed allowance

2025 third-party trade receivables, all currencies: share of gross amount versus share of expected-credit-loss allowance.

Figure 18. A small overdue balance accounts for most of the disclosed allowance



Sources: Fan Milk (2025) [\[S04\]](#); IDER calculations [\[S10\]](#).

Note: Above-90-day balances are 7.03% of gross receivables and 90.34% of the allowance. The allowance is a source estimate—not realised defaults or an FX-only exposure.

Net trade receivables reconcile to gross amounts less the allowance

2025 third-party balances, GHS thousands. The disclosed currency allocation is not available.

Table 21. Net trade receivables reconcile to gross amounts less the allowance

Age bucket	Gross amount	Loss allowance	Net amount	Source loss rate
Not yet due	24,813	181	24,632	0.73%
0–30 days	894	8	886	0.85%
31–60 days	588	5	583	0.84%
61–90 days	32	19	13	60.00%
Above 90 days	1,992	1,992	0	100.00%
Total	28,319	2,205	26,114	Not a default frequency

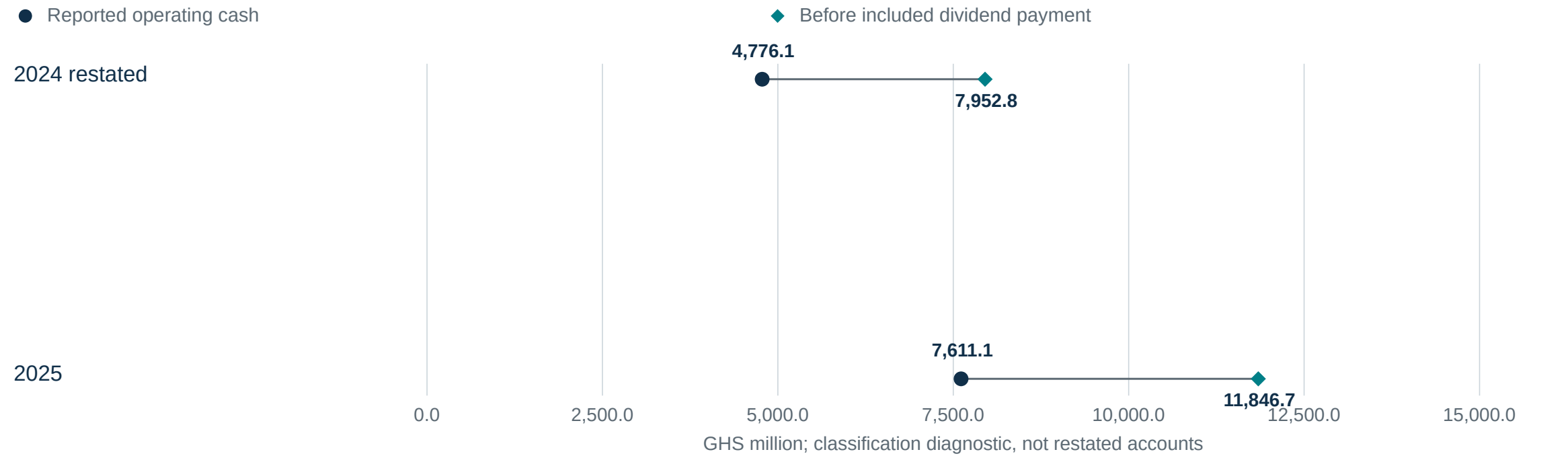
Sources: Fan Milk (2025) [\[S04\]](#); IDER calculations [\[S10\]](#).

Note: The net GHS 26.114m equals the credit-risk table’s third-party receivable. Rounded amount ratios need not reproduce each printed loss rate exactly.

The dividend line explains a large difference between cash subtotals

Group CFO as reported versus CFO before the dividend payment already included by the issuer; GHS million.

Figure 19. The dividend line explains a large difference between cash subtotals



Sources: MTN Ghana (2025) [\[S06\]](#); IFRS Foundation: IAS 7 [\[S11\]](#); IDER calculations [\[S10\]](#).

Note: Add back only the disclosed dividend for this comparison: 2025 CFO before dividends is GHS 11,846.690m. Interest, tax and levies remain as reported.

Cash growth, investment and FX effects reconcile on one statement basis

Group GHS million; positive amounts add cash, negative amounts use cash.

Table 22. Cash growth, investment and FX effects reconcile on one statement basis

Cash-flow line	2024 restated	2025
Opening cash	2,946.133	3,284.768
Operating cash (dividends already included)	4,776.124	7,611.114
Net investing cash flow	-3,732.877	-6,050.485
Net financing cash flow	-684.723	-658.727
FX effect on cash	-19.889	111.807
Closing cash	3,284.768	4,298.477

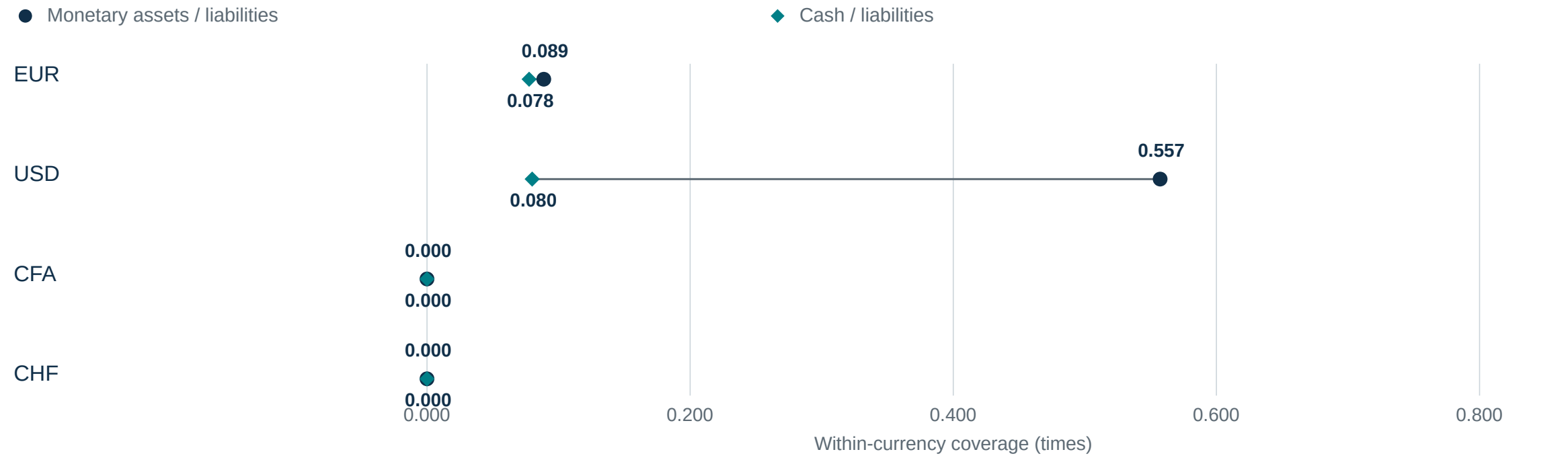
Sources: MTN Ghana (2025) [\[S06\]](#); IFRS Foundation: IAS 7 [\[S11\]](#); IDER calculations [\[S10\]](#).

Note: 2025 reconciles exactly. The 2024 displayed components leave a GHS 1,000 source-rounding residual; no additional receipt is fabricated.

Within-currency coverage ratios survive a common unit-scale change

2025 group notional-table rows; ratios cancel a shared positive conversion factor within each currency.

Figure 20. Within-currency coverage ratios survive a common unit-scale change



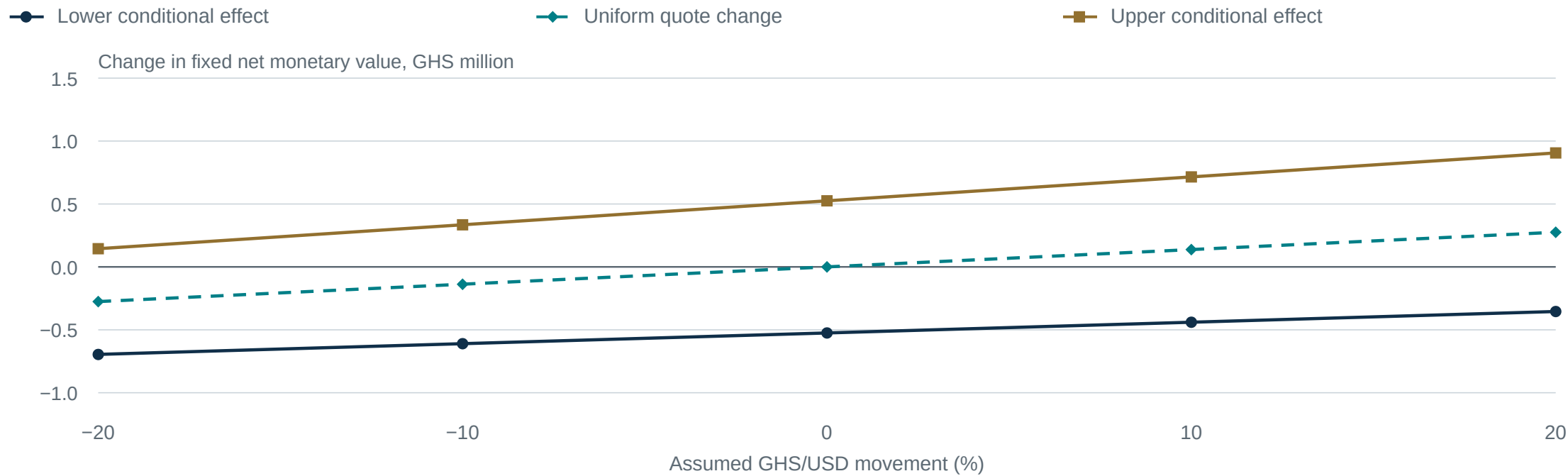
Sources: TotalEnergies (2025) [S05]; IDER calculations [S10].

Note: USD cash coverage is 0.080× versus asset coverage 0.557×. No maturity test is inferred; the ambiguous cross-currency aggregate is still not published.

Unilever: the dollar anchor and cross-currency moves matter separately

Each GHS/FX quote equals GHS/USD multiplied by USD/FX. Non-dollar cross-rate changes are constrained to $\pm 5\%$.

Figure 21. Unilever: the dollar anchor and cross-currency moves matter separately



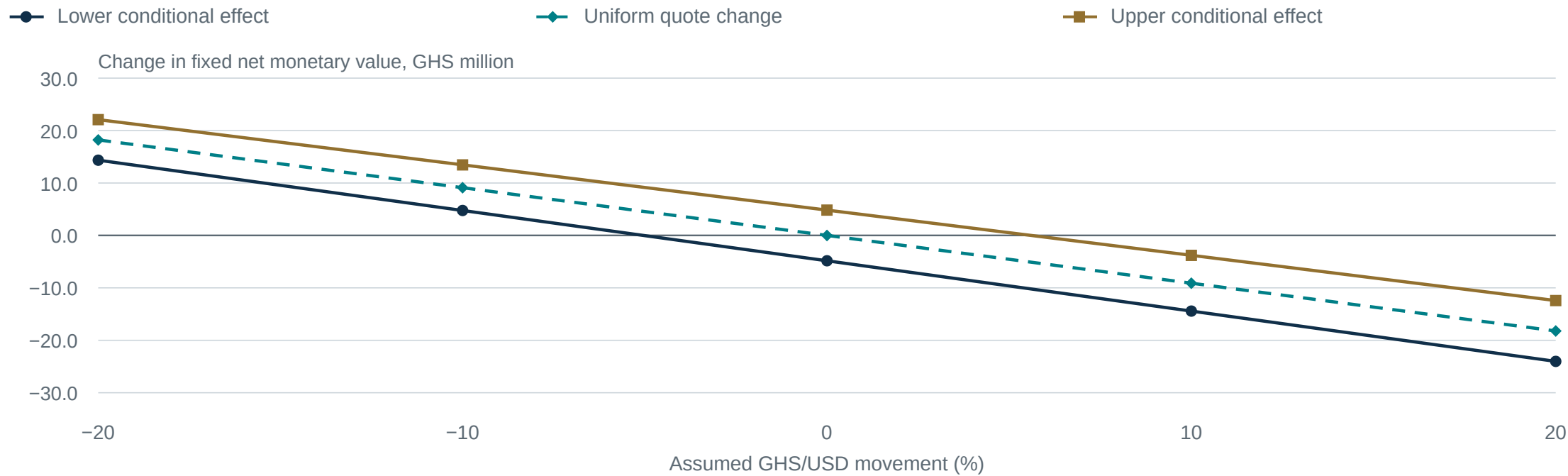
Sources: Unilever (2025) [S01]; IDER calculations [S10].

Note: The original broad box is retained. These deterministic bounds add $\pm 5\%$ non-dollar cross-rate limits; they are not confidence bands or estimated joint probabilities.

Kasapreko: the dollar anchor and cross-currency moves matter separately

Each GHS/FX quote equals GHS/USD multiplied by USD/FX. Non-dollar cross-rate changes are constrained to $\pm 5\%$.

Figure 22. Kasapreko: the dollar anchor and cross-currency moves matter separately



Sources: Kasapreko (2025) [\[S02\]](#); IDER calculations [\[S10\]](#).

Note: The original broad box is retained. These deterministic bounds add $\pm 5\%$ non-dollar cross-rate limits; they are not confidence bands or estimated joint probabilities.

Rounding uncertainty is distinct from missing balances or causal uncertainty

Unilever 2025 net native positions rounded to thousands; reporting rates assumed rounded to 0.01 GHS/FX.

Table 23. Rounding uncertainty is distinct from missing balances or causal uncertainty

Currency	Central GHS m	Lower endpoint GHS m	Upper endpoint GHS m
USD	10.9202	10.9098	10.9307
EUR	−4.3768	−4.3847	−4.3689
GBP	0.4780	0.4708	0.4852
ZAR	−5.6442	−5.6893	−5.5991

Sources: Unilever (2025) [\[S01\]](#); IDER calculations [\[S10\]](#).

Note: Endpoints propagate only the declared display-rounding assumptions. They are not confidence intervals and exclude source errors, omitted positions and common-rate restrictions.

Separate opening monetary stocks from future operating cash flows

Six assumed annual business profiles use GHS 100 of baseline revenue; none is fitted to an issuer or a national survey.

STOCK REVALUATION

Apply the FX change once to opening monetary assets less liabilities. Keep foreign debt stock distinct from the portion contractually due during the year.

FLOW SENSITIVITY

Convert foreign sales, inputs, interest, principal and capex at the scenario rate. Model repricing, demand and working-capital changes only where the assumptions explicitly allow them.

PAYMENT FEASIBILITY

A closing cash proxy includes assumed opening liquid cash, but it does not prove every-date feasibility. A separate 13-week event ledger tests timing and currency availability.

Sources: IDER calculations [\[S10\]](#).

Note: There is no tax, depreciation, dividend or endogenous refinancing model. Exclusion from a proxy does not mean zero in reality.

The operating profiles differ in net FX flow—not only sector labels

GHS per 100 baseline annual revenue. FX flows are baseline GHS equivalents at normalised spot 1.

Table 24. The operating profiles differ in net FX flow—not only sector labels

Profile	FX sales	FX operating cost	Local operating cost	Baseline operating profit
A Import distributor	0	70	18	12
B Import-intensive manufacturer	20	50	28	22
C Net exporter	80	25	48	27
D Domestic-service FX borrower	5	10	60	30
E Capex expansion project	10	25	40	35
F Matched trading business	60	50	30	20

Sources: IDER calculations [\[S10\]](#).

Note: Six analytical archetypes; no population shares or cost elasticities are estimated from these assumed values.

A low imported-input bill can coexist with a large FX debt stock

Same normalised annual profiles; opening stock balances are not added again as annual operating cash expenses.

Table 25. A low imported-input bill can coexist with a large FX debt stock

Profile	GHS cash	FX cash	FX receivable	FX payable	FX debt
A	10	2	8	3	20
B	8	4	12	5	35
C	12	6	15	8	40
D	8	2	8	4	80
E	12	3	10	5	60
F	10	6	12	5	20

Sources: IDER calculations [\[S10\]](#).

Note: Opening receivables are not treated as available cash; collection timing is tested separately. No full statutory balance sheet is reconstructed.

Foreign-currency capex creates exposure outside a debt-stock note

Baseline annual amounts; principal due is a subset of the debt stock, not an additional stock.

Table 26. Foreign-currency capex creates exposure outside a debt-stock note

Profile	FX interest rate	FX principal due	Total capex	FX capex	Opening liquid cash
A	10.0%	5.0	8.0	3.0	12.0
B	8.0%	7.0	15.0	11.0	12.0
C	8.0%	8.0	12.0	9.0	18.0
D	10.0%	12.0	18.0	14.0	10.0
E	8.0%	8.0	40.0	30.0	15.0
F	8.0%	4.0	6.0	3.0	16.0

Sources: IDER calculations [\[S10\]](#).

Note: The capex-expansion profile has a baseline financing need; no unreported loan is inserted to make it appear funded.

Behavioural parameters are assumptions—not fitted pass-through rates

Fixed-price and adaptive cases answer different questions; neither is a forecast.

Table 27. Behavioural parameters are assumptions—not fitted pass-through rates

Assumption	Fixed case	Adaptive / additional tests
Domestic output price and quantity	Both unchanged	Price $=1+0.35d$; domestic quantity = $\text{price}^{(-0.6)}$. Export quantity unchanged.
Local operating cost	Unchanged	Local cost factor $=1+0.10d$, multiplied by output basket.
Turnover-day funding	Profile DSO / DIO / DPO	Additional receivable delay:0,7,14,30 days.
Joint foreign-price / interest shock	Zero	Foreign input/capex prices +15%; loan rate +2 or +4 percentage points.
Forward / liquidity floor	No hedge in central case	Forward premium 2%; hedge share0%, 50%, 100%; hypothetical management cash floors.

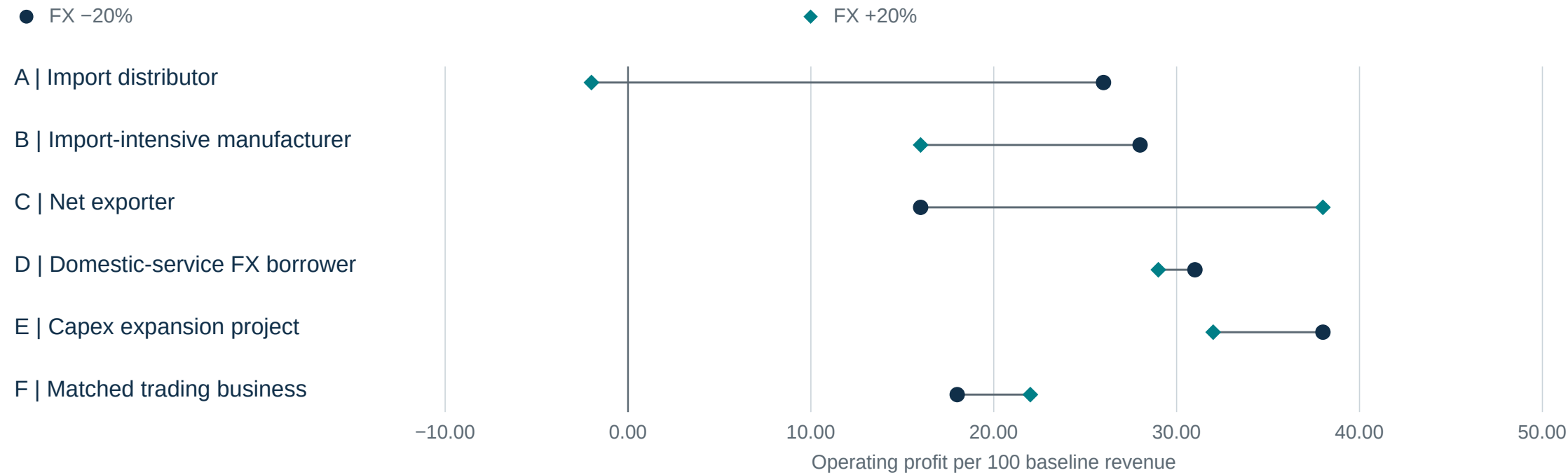
Sources: IDER calculations [\[S10\]](#).

Note: d is the proportional increase in GHS/FX. Working-capital proxy and full model assumptions are in the catalogue and CSVs.

Depreciation can benefit net FX sales while hurting net FX purchasers

Fixed prices, quantities and local costs; operating profit before financing and capital expenditure.

Figure 23. Depreciation can benefit net FX sales while hurting net FX purchasers



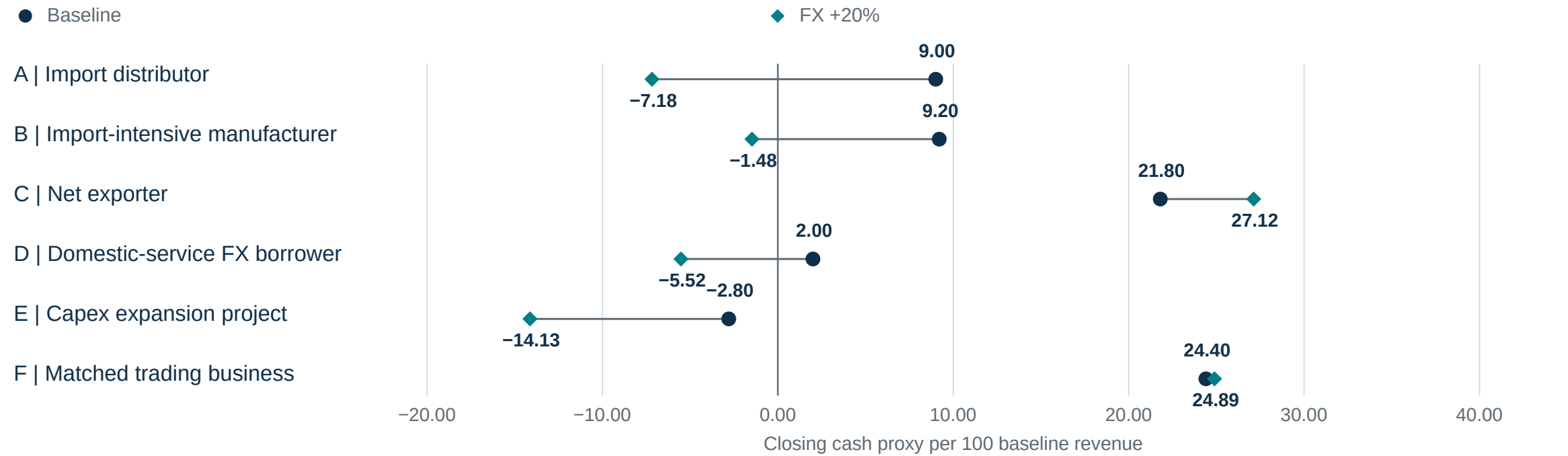
Sources: IDER calculations [\[S10\]](#).

Note: The effects are mechanical responses of the assumed cash operating structure, not observed profits of Ghanaian firms.

Positive operating profit can coexist with negative closing cash

Opening cash plus annual operating cash proxy, less debt service, capex and incremental working capital.

Figure 24. Positive operating profit can coexist with negative closing cash



Sources: IDER calculations [\[S10\]](#).

Note: Taxes, dividends and new financing are excluded. A negative amount is a model funding requirement, not a measured default.

The same exchange-rate scenario changes the six cash buffers differently

Fixed operating behaviour; capex, debt service and turnover-based working capital are included.

Figure 25. The same exchange-rate scenario changes the six cash buffers differently

	-30%	-20%	-10%	+0%	+10%	+20%	+30%
A	33.3	25.2	17.1	9.0	0.9	-7.2	-15.3
B	25.2	19.9	14.5	9.2	3.9	-1.5	-6.8
C	13.8	16.5	19.1	21.8	24.5	27.1	29.8
D	13.3	9.5	5.8	2.0	-1.8	-5.5	-9.3
E	14.2	8.5	2.9	-2.8	-8.5	-14.1	-19.8
F	23.7	23.9	24.2	24.4	24.6	24.9	25.1

Closing cash proxy; GHS per 100 baseline annual revenue

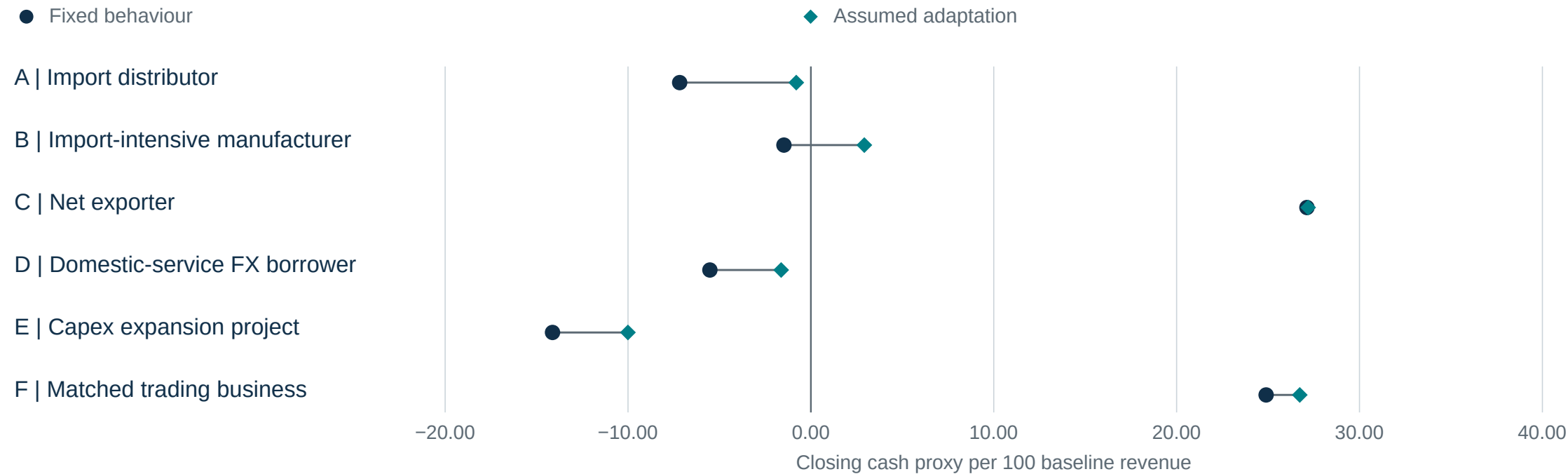
Sources: IDER calculations [\[S10\]](#).

Note: Scenario cells are not probabilities. Baseline shortfalls are retained rather than filled with assumed financing.

Repricing changes the cash result but does not guarantee sufficient funding

Both cases use +20% GHS/FX; only the declared domestic price, demand and local-cost response differs.

Figure 26. Repricing changes the cash result but does not guarantee sufficient funding



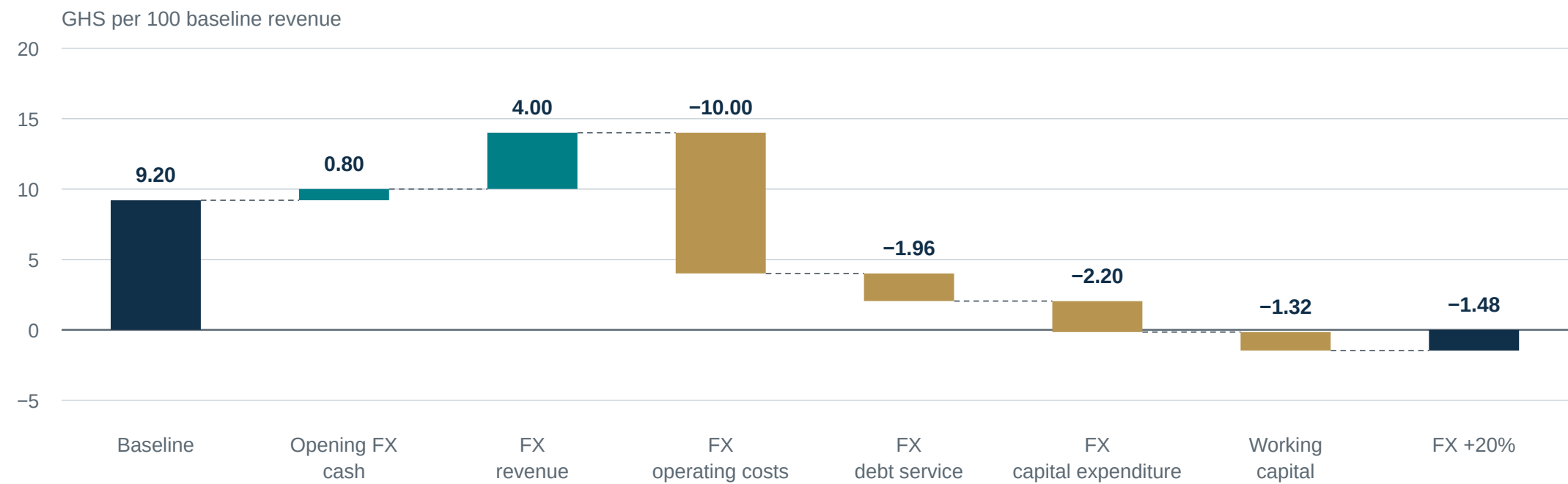
Sources: IDER calculations [\[S10\]](#).

Note: A response coefficient is imposed here; the report does not infer customer acceptance, spare capacity or actual collection performance.

The manufacturer's closing cash change is traced to six channels

Fixed +20% FX case for profile B; the decomposition is exact within the declared model.

Figure 27. The manufacturer's closing cash change is traced to six channels



Sources: IDER calculations [\[S10\]](#).

Note: The bridge includes opening FX cash translation once and does not add debt-stock translation to principal service.

An export-revenue ratio can miss imports, capex and debt payments

Profile-level annual FX need before hedging; matched payment dates are not assumed.

Table 28. An export-revenue ratio can miss imports, capex and debt payments

Profile	FX receipts	FX operating + service + capex	Net FX need	Interpretation
A	0.0	80.0	80.0	Positive = purchaser; negative = seller.
B	20.0	70.8	50.8	Positive = purchaser; negative = seller.
C	80.0	45.2	−34.8	Positive = purchaser; negative = seller.
D	5.0	44.0	39.0	Positive = purchaser; negative = seller.
E	10.0	67.8	57.8	Positive = purchaser; negative = seller.
F	60.0	58.6	−1.4	Positive = purchaser; negative = seller.

Sources: IDER calculations [\[S10\]](#).

Note: Annual netting is not a settlement hedge. A later receipt does not fund an earlier invoice without a facility or prior cash.

The foreign debt stock is not the amount of annual cash service

Domestic-service borrower D; fixed amounts except for the exchange-rate conversion.

Table 29. The foreign debt stock is not the amount of annual cash service

Metric	FX -20%	Baseline	FX +20%
Operating profit	31.00	30.00	29.00
Translated debt stock	64.00	80.00	96.00
Interest	6.40	8.00	9.60
Principal due	9.60	12.00	14.40
Capex	15.20	18.00	20.80
Closing cash proxy	9.52	2.00	-5.52

Sources: IDER calculations [\[S10\]](#).

Note: The full translated debt balance is not deducted from annual cash; only interest and due principal are deducted.

A rate increase and depreciation jointly raise foreign debt service

Borrower D: operating cash proxy after incremental working capital, divided by interest plus due principal.

Figure 28. A rate increase and depreciation jointly raise foreign debt service

	FX -20%	FX +0%	FX +20%	FX +30%
Rate +0 pp	1.95	1.50	1.20	1.09
Rate +2 pp	1.80	1.39	1.11	1.01
Rate +4 pp	1.68	1.29	1.04	0.94

Coverage proxy (times), before taxes and capex

Sources: IDER calculations [\[S10\]](#).

Note: This is not an issuer covenant DSCR. Contract rate resets and amortisation must be supplied for an actual loan assessment.

Currency sensitivity should be assessed with prices, rates and collections

Adaptive +20% FX; additional assumptions are cumulative along the columns.

Figure 29. Currency sensitivity should be assessed with prices, rates and collections

	FX only	+Foreign prices	+Interest rates	+14-day delay
A	-0.8	-13.9	-14.4	-18.4
B	2.9	-8.5	-9.3	-13.4
C	27.2	20.9	20.0	15.5
D	-1.6	-5.9	-7.8	-11.8
E	-10.0	-19.9	-21.4	-25.4
F	26.7	17.3	16.9	12.5

Closing cash proxy per 100 baseline revenue

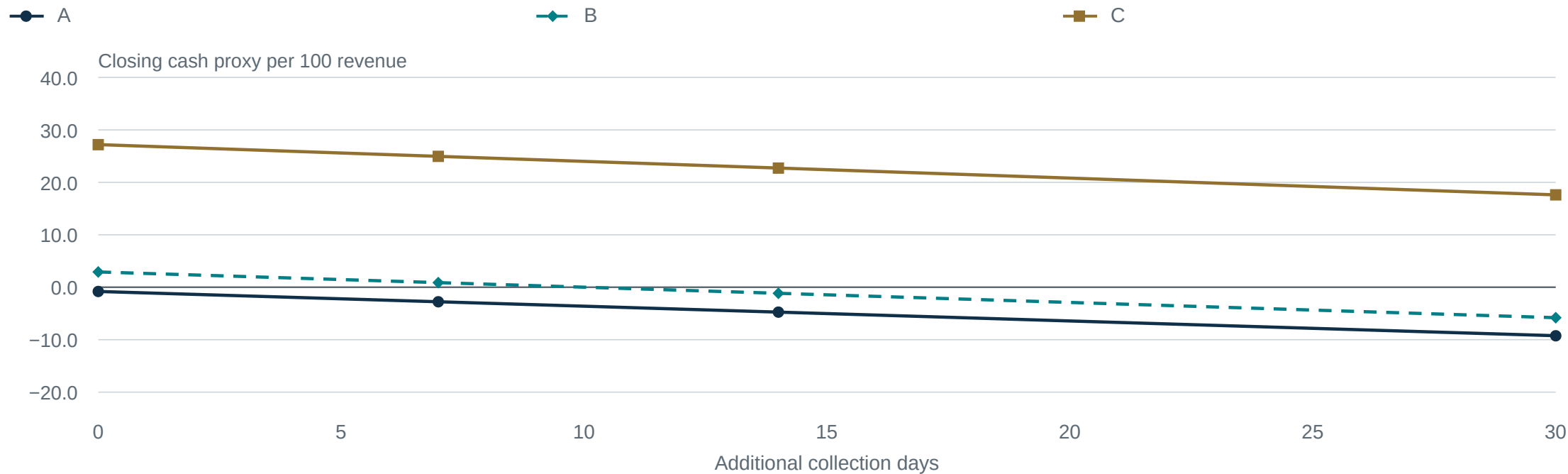
Sources: IDER calculations [\[S10\]](#).

Note: Joint shocks are imposed, not causally attributed to FX; no likelihood or frequency is assigned.

Slower collections can absorb a repricing benefit

Adaptive +20% FX; add receivable days without changing invoice revenue recognition.

Figure 30. Slower collections can absorb a repricing benefit



Sources: IDER calculations [\[S10\]](#).

Note: Turnover-day calculations approximate a transition funding need. They are not a substitute for dated receivables.

A liquidity-floor crossing is conditional on the business model

Solve the fixed-behaviour cash proxy for the exchange-rate change that reaches the assumed management floor.

Table 30. A liquidity-floor crossing is conditional on the business model

Profile	Assumed floor	Baseline margin	FX move to floor	Inside ±30%?
A	8.0	1.00	1.24%	Yes
B	10.0	−0.80	−1.50%	Yes
C	12.0	9.80	−36.81%	No
D	10.0	−8.00	−21.27%	Yes
E	15.0	−17.80	−31.42%	No
F	8.0	16.40	No root in search	No

Sources: IDER calculations [\[S10\]](#).

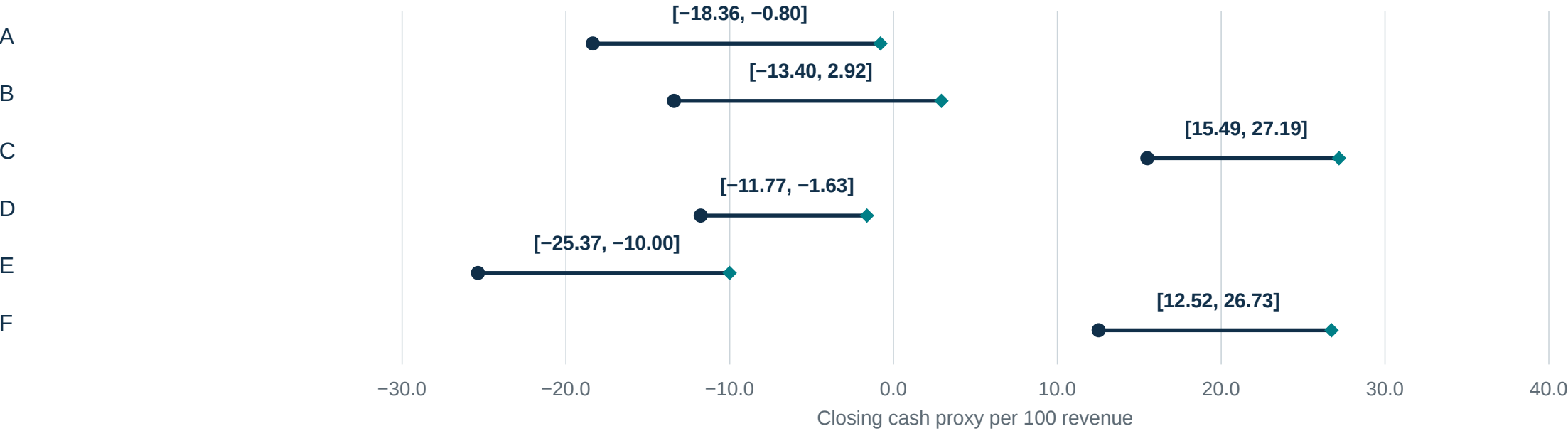
Note: Negative baseline margins already breach the imposed floor. A threshold is not a forecast, legal minimum or probability.

Changing plausible assumptions changes the conditional cash range

All 16 combinations of two input-price, capex-price, rate and collection-delay settings per profile.

Figure 31. Changing plausible assumptions changes the conditional cash range

CONDITIONAL RANGES — NOT CONFIDENCE INTERVALS



Sources: IDER calculations [\[S10\]](#).

Note: Grid values are declared stress choices, not statistical support bounds. Minimum and maximum are not confidence limits.

A hedge must match the currency, the notional and the settlement date

Financial hedging and operational matching are different controls; both depend on contract details.

NATURAL MATCHING

Net only receipts and payments in the same currency that are contractually available in the relevant time bucket. Verify collection, restrictions and conversion access.

FINANCIAL HEDGE

Link a forward or other instrument to a documented exposure ID, amount and value date. Show the agreed price, fees, collateral conditions and counterparty separately.

RESIDUAL EXPOSURE

Forecast quantities may be cancelled; foreign prices and interest may change. A hedge sized to baseline annual net flows does not automatically cover these changes.

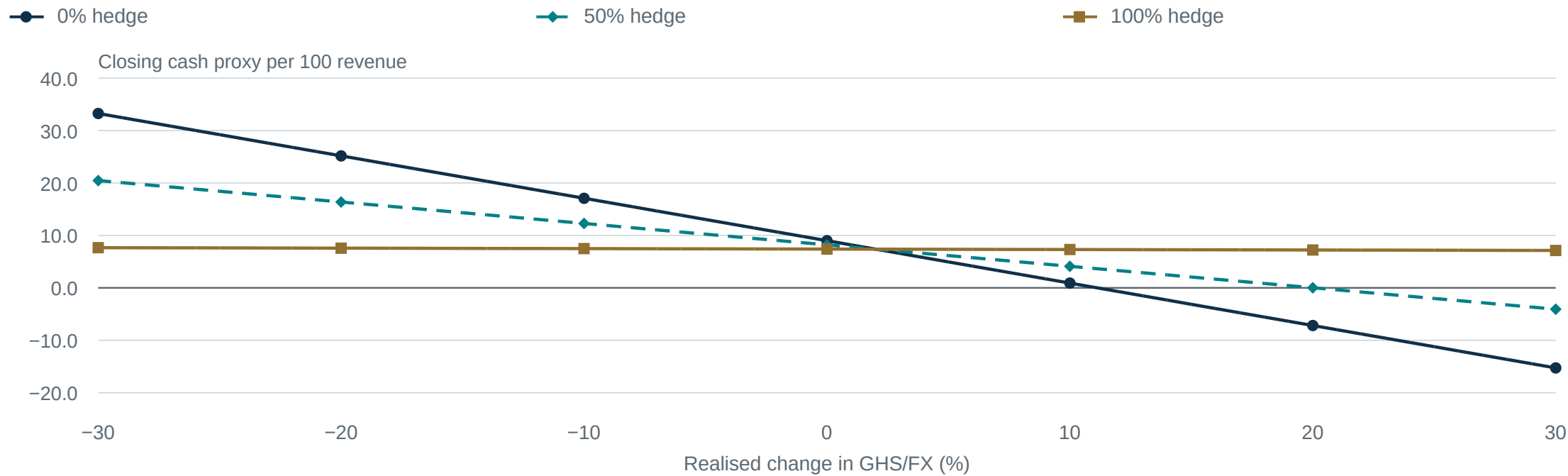
Sources: IFRS Foundation: IFRS 7 [\[S08\]](#); IDER calculations [\[S10\]](#).

Note: No market forward quote, optimal hedge ratio or personalised treasury recommendation is supplied.

A forward reduces one FX sensitivity but introduces a contracted price

ProfileA fixed behaviour; hedge the declared baseline annual net foreign-currency need.

Figure 32. A forward reduces one FX sensitivity but introduces a contracted price



Sources: IDER calculations [\[S10\]](#).

Note: Forward premium 2% is assumed. Working-capital and opening-FX-cash sensitivities remain; collateral and fees are separate.

An order cancellation can leave a forward loss without an import benefit

Illustration: USD 20,000 order; fully hedged at GHS 10.20/USD; realised spot GHS 8/USD.

Table 31. An order cancellation can leave a forward loss without an import benefit

Order retained	Actual USD 000 purchase	Forward payoff, GHS 000	Net cash outlay, GHS 000
0%	0.0	-44.0	44.0
50%	10.0	-44.0	124.0
100%	20.0	-44.0	204.0

Sources: IDER calculations [\[S10\]](#).

Note: A negative hedge payoff is a cash cost. No cancellation right, netting exemption or zero-cost contract is assumed.

Risk reduction can still require cash before the protected payment

Operational checks for the actual treasury agreement; no issuer-specific contractual terms are inferred.

Table 32. Risk reduction can still require cash before the protected payment

Exposure	Cash-flow question	Ledger treatment
Forward / swap	When is margin posted, called and released?	Separate collateral cash from the final settlement payoff.
Letter of credit	Is cash cover required before shipment?	Record opening or top-up date, currency and fee.
Guarantee / covenant	Which documented trigger accelerates payment?	Include a separately labelled contingent drain.
Committed facility	Are conditions precedent, currency and tenor satisfied?	Treat undrawn access as conditional support, not cash.
Related-party claim	Can the payer collect or transfer the balance on time?	Do not treat every group receivable as immediate liquidity.

Sources: IFRS Foundation: IFRS 7 [\[S08\]](#); IDER calculations [\[S10\]](#).

Note: Legal enforceability and hedge-accounting qualification require the authorised advisers and contract documentation.

Synthetic cash schedule — 1 of 2

Every scheduled receipt and payment has a unique identifier, currency, amount and date.

Table 33. Synthetic cash schedule — 1 of 2

Day	Transaction	Currency	Amount
0	Opening	GHS	180.0
0	Opening	USD	5.0
0	Opening	EUR	2.0
7	Supplier	USD	−20.0
14	Sales	GHS	150.0
21	Capex	EUR	−15.0
28	Export	USD	30.0

Sources: IDER calculations [\[S10\]](#).

Note: Amounts are currency thousands. Opening USD 5, EUR 2 and GHS 180; base GHS/FX rates 10 and 12. Not an actual company ledger.

Synthetic cash schedule — 2 of 2

Every scheduled receipt and payment has a unique identifier, currency, amount and date.

Table 34. Synthetic cash schedule — 2 of 2

Day	Transaction	Currency	Amount
35	Operating	GHS	-70.0
42	Debt Interest	USD	-1.0
42	Debt Principal	USD	-10.0
56	Export	EUR	20.0
63	Supplier	USD	-10.0
70	Sales	GHS	100.0
84	Operating	GHS	-40.0

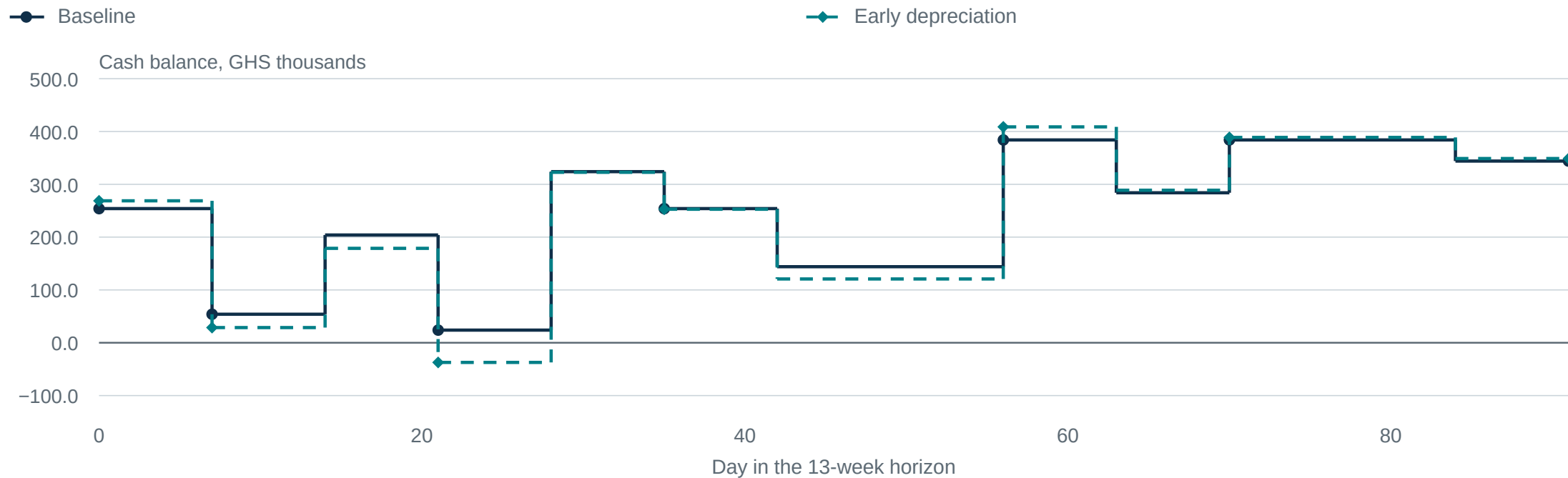
Sources: IDER calculations [\[S10\]](#).

Note: Amounts are currency thousands. Opening USD 5, EUR 2 and GHS 180; base GHS/FX rates 10 and 12. Not an actual company ledger.

A higher closing balance can coexist with an earlier funding gap

All receipts converted and payments funded at the stated event-date rates; no overdraft or undisclosed financing.

Figure 33. A higher closing balance can coexist with an earlier funding gap



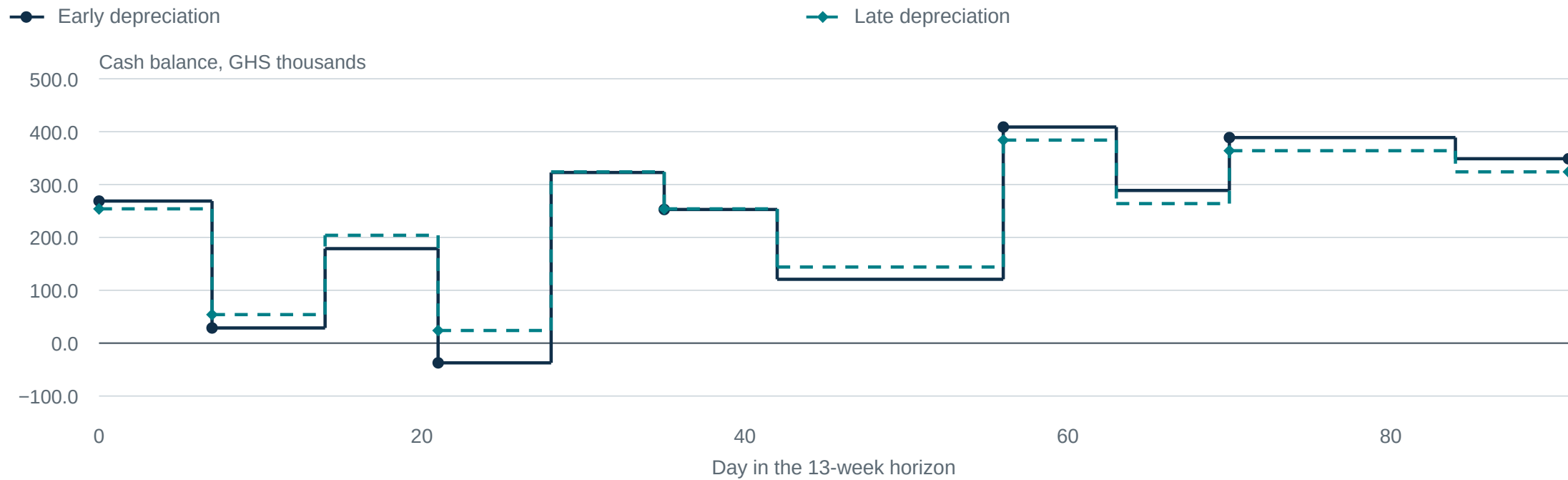
Sources: IDER calculations [\[S10\]](#).

Note: The +20% early FX case closes at 348.8 but reaches -37.2 on day 21. Negative balances denote unmet funding.

The same terminal FX rate produces different cash paths

Both scenarios end 20% above the baseline GHS/FX rates; the jump occurs at day 0 or day 60.

Figure 34. The same terminal FX rate produces different cash paths



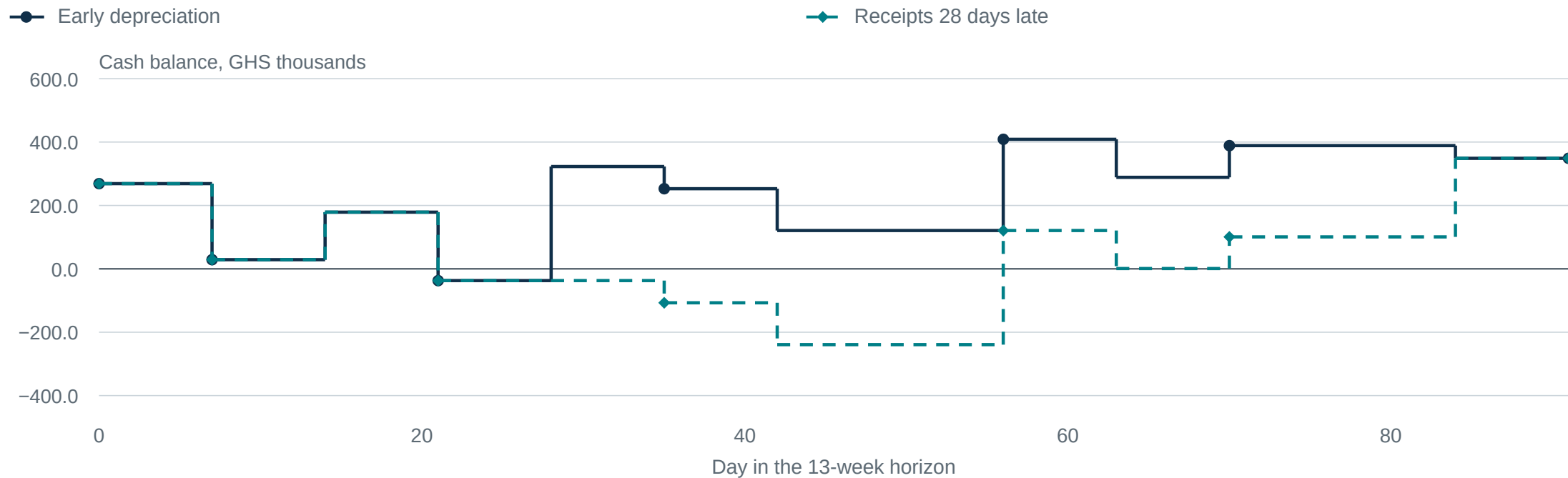
Sources: IDER calculations [\[S10\]](#).

Note: Opening FX cash is converted at the opening scenario rate. Receipts and payments are converted at their own dates.

A collection delay can multiply the bridging-finance need

The same foreign amounts are collected 28 days later; no invoice is written off and both receipts arrive within the horizon.

Figure 35. A collection delay can multiply the bridging-finance need



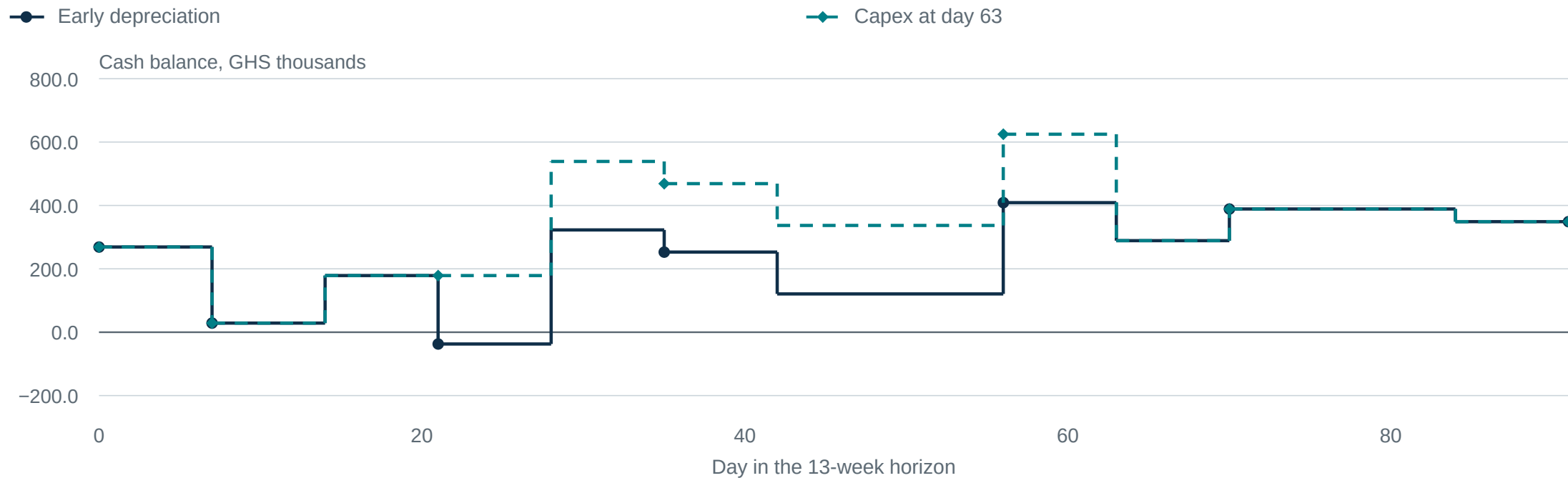
Sources: IDER calculations [\[S10\]](#).

Note: The closing balance is unchanged, but the required bridging facility rises from 37.2 to 239.2 in this illustration.

Deferring a capital payment changes funding timing—not project profitability

Move the EUR 15,000 capex payment from day 21 to day 63, holding its amount and all other cash flows fixed.

Figure 36. Deferring a capital payment changes funding timing—not project profitability



Sources: IDER calculations [\[S10\]](#).

Note: This illustration excludes penalties, lost production and supplier consent. It is not a recommendation to delay actual contracted payments.

The minimum dated balance determines the illustrated bridging requirement

Required facility=max(0,−minimum balance); currency conversion is assumed feasible in this integrated version.

Table 35. The minimum dated balance determines the illustrated bridging requirement

Scenario	Minimum cash	Closing cash	Required facility
Baseline	24.0	344.0	0.0
Early depreciation	−37.2	348.8	37.2
Late depreciation	24.0	324.0	0.0
Receipts 28 days late	−239.2	348.8	239.2
Capex at day 63	28.8	348.8	0.0
Capex foreign price +15%	−69.6	316.4	69.6
Appreciation	79.2	339.2	0.0

Sources: IDER calculations [\[S10\]](#).

Note: GHS thousands. Facility costs, collateral, committed availability and limit sizing buffers are not modelled.

An aggregate cedi value does not settle a segregated dollar obligation

Same ledger, but no conversion, pooling or borrowing between currency accounts is assumed.

Table 36. An aggregate cedi value does not settle a segregated dollar obligation

Currency	Minimum native balance	Closing native balance	Interpretation
EUR	-13.0	7.0	Negative balance is an unmet same-currency obligation.
GHS	180.0	320.0	Cedi surplus is not automatically converted to another currency.
USD	-15.0	-6.0	Negative balance is an unmet same-currency obligation.

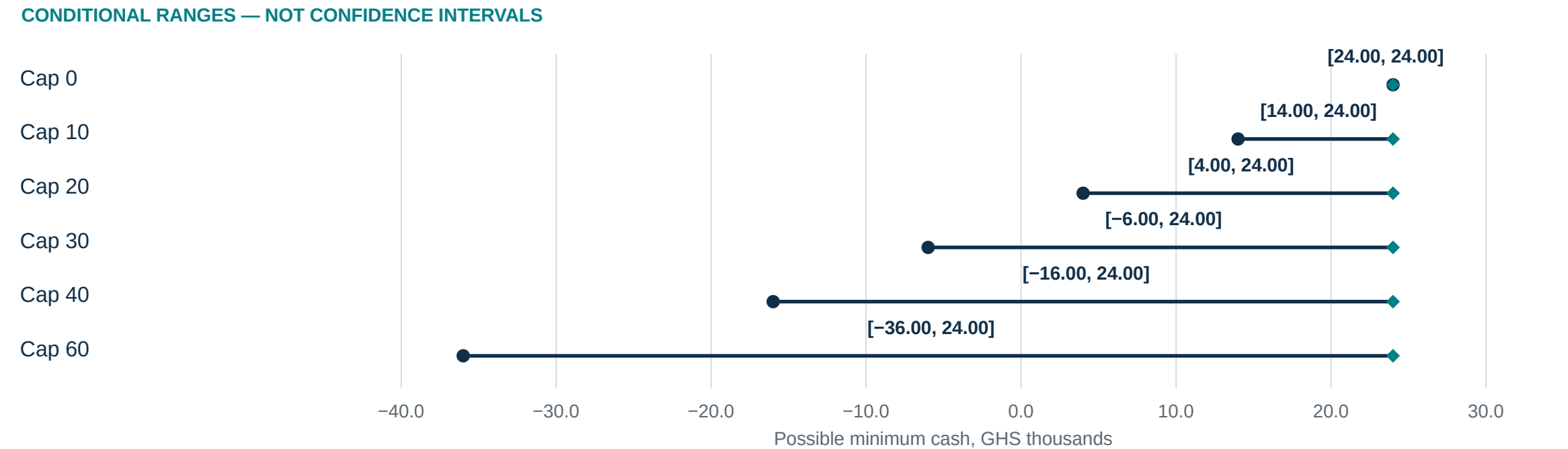
Sources: IDER calculations [\[S10\]](#).

Note: Values are native currency thousands. Do not add these currency balances without conversion assumptions.

Unreported adverse commitments can overturn a positive cash buffer

Bound the cumulative omitted net adverse drain between zero and the stated cap at every relevant payment date.

Figure 37. Unreported adverse commitments can overturn a positive cash buffer



Sources: IDER calculations [\[S10\]](#).

Note: The baseline 24 buffer is synthetic. E24 requires a horizon-wide cap, including any newly identified payment dates; no issuer or national cap is estimated.

Cash availability depends on more than the terminal spot rate

The deterministic results make the assumptions inspectable; they do not assign likelihoods.

MODEL RISK

Demand, capacity, taxes, dividends, inflation, default, conversion restrictions and endogenous refinancing can change the result. The model keeps excluded channels visible rather than setting them to zero in reality.

DATA RISK

Missing invoices and selected reporting can dominate arithmetic precision. Reconcile balances to source systems and preserve failed, disputed and delayed settlements in the reporting universe.

DECISION USE

Test margin, equity translation, annual funding and every-date cash separately. Use sensitivity to identify the missing record that matters most —not to claim a currency forecast.

Sources: IDER calculations [\[S10\]](#).

Note: Deterministic stress ranges are not value-at-risk, default probabilities or statistically estimated uncertainty bands.

Due diligence needs a currency-by-date funding bridge

Use issuer disclosures as the starting record, then verify contracts, cash restrictions and commitments.

Table 37. Due diligence needs a currency-by-date funding bridge

Decision	Evidence to request	Analytical test
Borrowing currency	Sales and collections by invoice currency; repayment schedule	Compare net collectible currency cash with due interest and principal.
Investment / capex	Supplier quote currency, milestone dates, VAT/duties, payment terms	Separate committed and optional capex; joint FX and unit-price stress.
Enterprise valuation	Operating cash, working capital, net monetary stock, hedges	Do not add translation loss again after cash settlement; avoid double-counting risk.
Acquisition / consolidation	Legal-entity debt, guarantees, intercompany balances, cash access	Show stand-alone and consolidated exposures without adding them.
Refinancing / covenant	Documented covenant definition, rate reset and headroom	Use the actual contract; model thresholds are not covenant conclusions.

Sources: IFRS Foundation: IFRS 7 [\[S08\]](#); IDER calculations [\[S10\]](#).

Note: No issuer rating, value target, expected equity return or acquisition recommendation is produced.

Financing capacity and currency exposure must be evaluated jointly

Different institutions need different horizons and denominators; no common optimal currency position is inferred.

Table 38. Financing capacity and currency exposure must be evaluated jointly

User	Relevant exposure record	Risk of a headline interpretation
Banks and trade financiers	Customer invoice currencies, maturity, bank facilities, collateral	Gross export sales do not guarantee due-date debt-service currency.
DFIs and project investors	Construction-stage capex, grace periods, revenue ramp and funding	An operating natural hedge may not exist before production begins.
Fund / asset managers	Issuer net and gross positions, reporting basis and cash controls	A favourable FX sensitivity does not establish investment return.
Pension funds and insurers	Asset liquidation currency, benefit/claim cash dates and concentration	A currency asset gain may not match liability timing or purchasing power.
Private equity / corporate executives	Integration cash, debt service, distribution constraints and capex	Consolidated net assets do not equal deployable cash in every subsidiary.

Sources: IFRS Foundation: IFRS 7 [\[S08\]](#); Shrestha et al. / IMF (2012) [\[S09\]](#); IDER calculations [\[S10\]](#).

Note: Portfolio suitability, prudential compliance and current product pricing are outside this assessment.

A small enterprise needs a complete ledger before a complex forecast

Extend the approach with a simpler record, without extrapolating formal issuer balances to informal businesses.

MINIMUM ENTERPRISE RECORD

Track invoice ID, currency, amount, due date, paid status, expected collection and bank quote. Record the next replacement order separately from stock already paid.

ASSOCIATION DATA

Define the participating-firm universe, activity, size and geography. Preserve non-response, exits and failed settlements. Membership or survival alone does not produce a representative sample.

PRACTICAL OUTPUT

Provide a 13-week cash schedule and a short sensitivity table showing operating input costs, debt service and committed capex. Keep assumptions legible and exceptions visible.

Sources: IDER calculations [\[S10\]](#).

Note: No national MSME exposure prevalence, informal-firm cost share or small-business treatment effect is estimated.

A shared measurement framework can inform several policy questions

Diagnostic options for MoF, BoG, regulators and development partners; no policy ranking or effectiveness score.

Table 39. A shared measurement framework can inform several policy questions

Research option	Information it would provide	Trade-off / evidence requirement
Linked enterprise currency records	Joint revenue, debt, suppliers and capex exposure by entity	Reporting burden, confidentiality, harmonised units and permission.
Bank–borrower matching	Transmission of borrower FX stress to lenders and facilities	Avoid counting both the loan asset and liability as two independent risks.
Dated trade and investment payments	Timing of FX demand and delayed receipts	Cash dates differ from customs and accrual dates.
Coverage of smaller and informal firms	Exposure distribution beyond public issuers	A separate sampling frame and design-based inference are needed.
Disclosure reconciliation	Comparable sensitivity conventions and source exceptions	Operational confidentiality and entity-specific contract interpretation remain.

Sources: IFRS Foundation: IFRS 7 [\[S08\]](#); Shrestha et al. / IMF (2012) [\[S09\]](#); IDER calculations [\[S10\]](#).

Note: The report’s case results cannot be aggregated into national welfare, bank losses or a policy treatment effect.

The scientific boundary is the question that the data can identify

Fixed-balance sensitivity is identified arithmetically; behavioural and causal effects require additional evidence.

SUPPORTED NOW

Reconcile reported stocks, translate at stated rates, compare counterparty and currency patterns, and compute conditional cash-flow effects. No fitted regression is required for an accounting identity.

UNSUPPORTED WITHOUT DESIGN

The effect of changing financing currency on investment, productivity or survival. Firms select debt currency and hedges; expectations and credit access can influence both exposure and outcomes.

REQUIRED NEXT

Linked firm panels, pre-shock exposure, contract and event timing, a complete reporting roster and an identification strategy. Standard errors or lagged exposure alone do not solve selection.

Sources: Shrestha et al. / IMF (2012) [\[S09\]](#); IDER calculations [\[S10\]](#).

Note: The report does not claim to have eliminated unobserved endogeneity or non-random disclosure.

Define the estimand before selecting an econometric estimator

P01 is a research specification, not an estimated coefficient or a completed evaluation.

Table 40. Define the estimand before selecting an econometric estimator

Design element	Proposed specification	Release gate
Outcome	Capex execution, settlement delay, employment or cash shortfall	Define currency, horizon, unit and eligible population in advance.
Exposure	Pre-shock net currency position and due-date mismatch	Do not use post-shock financing choices as if predetermined.
Comparison	Firm and time effects with differential pre-shock exposure	Credible counterfactual trends; exposure can remain endogenous.
Instrument / assignment	Use only documented exogenous variation with defensible exclusion	No valid external instrument or randomised assignment established here.
Missingness / inference	Report coverage, exits, failed payments and assignment-level dependence	Weighting and imputation need a defined frame, overlap and missingness assumptions.

Sources: IDER calculations [\[S10\]](#).

Note: Significant associations would not by themselves prove a currency-policy effect. No synthetic firms are passed off as observed data.

Different uncertainties should not be collapsed into one error bar

The current report contains exact calculations and conditional ranges—not regression confidence bands.

Table 41. Different uncertainties should not be collapsed into one error bar

Uncertainty	Treatment in this report	What remains unresolved
Source precision	Keep original units; show component closure and rounding residuals	Underlying ledger errors and undisclosed adjustments.
Measurement convention	Show native/GHS, sign, tax and scope alternatives separately	Issuer confirmation of inconsistent conventions.
Scenario parameters	Transparent grid, reverse thresholds and sensitivity paths	Probability distribution and endogenous business responses.
Coverage / selection	Name the purposive cases and absent reporting universe	A national exposure distribution and representative means.
Causal identification	Do not estimate a treatment effect from few annual statements	Counterfactual assignment, confounding and selective exits.

Sources: IDER calculations [\[S10\]](#).

Note: A scenario envelope is not a confidence interval; a repeatable calculation is not an independent empirical replication.

Each inference risk has a specific treatment and an unresolved boundary

The report estimates accounting quantities from records; it does not estimate a causal business response from two year ends.

Table 42. Each inference risk has a specific treatment and an unresolved boundary

Threat	Treatment implemented in this edition	What cannot be claimed
Endogenous borrowing and FX cash	Separate source balances, component changes and rate conversion; hold native quantities fixed in stress.	A balance reduction was caused by an exchange-rate or treasury policy.
Availability and survivorship selection	Keep five issuer cases named; do not pool totals or construct unsupported population weights.	The sample describes Ghanaian firms, informal enterprises or MSMEs generally.
Non-random missing denominations	Publish cash-capex share grids and scale-invariant ratios; do not fill missing currencies with zero.	Missing FX capex or hedge coverage has been recovered by imputation.
Thin time dimension / repeated rows	Treat currency rows and year-end comparatives as linked records, not independent firm observations.	A t-test, regression or bootstrap on these rows identifies a national effect.
Post-shock mediators	Prospective design distinguishes baseline exposure from later refinancing, pricing and collection changes.	Conditioning on realised borrowing automatically removes confounding.

Sources: Unilever (2025) [\[S01\]](#); Kasapreko (2025) [\[S02\]](#); Fan Milk (2025) [\[S04\]](#); TotalEnergies (2025) [\[S05\]](#); MTN Ghana (2025) [\[S06\]](#); IDER calculations [\[S10\]](#).

Note: No valid instrument, exchange-rate assignment mechanism or representative firm panel has been established. More precise arithmetic does not supply them.

A valid cash lower bound requires a cap over the entire payment path

The earlier minimum-date wording is tightened: the omitted cumulative net drain must be bounded at every relevant event date.

THE REQUIRED CONDITION

Write the undisclosed cumulative drain as $U(t)$. Require $0 \leq U(t) \leq U_{\max}$ at every date, including newly identified payment dates. Missing receipts and omitted contingent calls cannot be assumed to cancel.

THE VALID CONCLUSION

The true minimum of $B(t) - U(t)$ lies between $B_{\min} - U_{\max}$ and $B_{\min}$. The old minimum date may move after additional obligations are included; test the whole path again.

THE EMPIRICAL LIMIT

No firm or Ghana-wide $U_{\max}$ is estimated. The executed finite-grid checks confirm the conditional inequality; they do not estimate the missing obligations or certify their absence.

Sources: IDER calculations [\[S10\]](#).

Note: E24 is clarified without changing its previously calculated illustrative endpoints. The condition is stronger than a cap only at the original minimum date.

Specify the owner, deliverable and acceptance criterion

Proposed 90-day pilot for consenting enterprises; the baseline is measured at inception.

Table 43. Specify the owner, deliverable and acceptance criterion

Period / owner	Deliverable	Proposed acceptance criterion
Days 0–30 Finance lead + data steward	Source-linked balance sheet and currency-by-date commitments	100% of known material items assigned an ID; unknown reporting coverage listed.
Days 31–60 treasury + operations	13-week ledger, scenario results, capex and hedge register	All material currency buckets tested; no known duplicate stock/settlement deduction.
Days 61–90 management + reviewer	Reproducible dashboard and documented exception review	Every change versioned; all unresolved material differences disclosed; cash paths rerun.

Sources: IDER calculations [\[S10\]](#).

Note: These are proposed project controls, not achieved national coverage, regulatory minima or a commitment by named public institutions.

Track currencies, commitments, adjustments and execution

Thresholds should be agreed by the authorised management team for the specific firm and funding arrangement.

Table 44. Track currencies, commitments, adjustments and execution

Indicator	Definition	Cadence / owner
Net monetary position	Monetary assets minus liabilities by currency and legal entity	Monthly finance
Committed currency gap	Collectible contracted receipts minus unique due payments	Weekly 13-week horizon treasury
Capital-order exposure	Unpaid committed capex by currency, value date and quote validity	Weekly during build procurement
Hedge alignment	Matched notional / committed exposure; forecast hedges separate	Each booking and payment treasury
Minimum available cash	Minimum balance by currency, after approved conversion constraints	Weekly / scenario rerun risk
Data exceptions	Missing, disputed, unmatched, duplicated and outdated records	Every release independent checker

Sources: IDER calculations [\[S10\]](#).

Note: A threshold breach prompts review; it is not an estimated default event or an automatic policy-intervention instruction.

Reproducibility and confidentiality should be designed together

Use authorised access and limited publication of sensitive dealing and counterparty positions.

CONTROL THE INPUT

Freeze the source vintage and unit definitions. Keep unmodified raw records, pseudonymised IDs, change logs and a named data steward. Store linkage keys separately from analysis files.

VERIFY THE OUTPUT

Reconcile accounting totals and duplicate IDs; independently recalculate key scenarios. Confirm that a published chart uses the tested dataset and preserves its units, dates and limitations.

RELEASE RESPONSIBLY

Publish aggregates only after disclosure review. Keep source conflicts and non-response visible. Avoid turning a conditional firm case into a national estimate or a marketing claim of investment certainty.

Sources: IFRS Foundation: IFRS 7 [\[S08\]](#); IDER calculations [\[S10\]](#).

Note: Public disclosure of a company report does not imply permission to publish private transaction records or personal data.

Common assumptions and controls apply before any model is interpreted

Every family below states its additional restrictions, measurement units and executable output.

Table 45. Common assumptions and controls apply before any model is interpreted

Principle	Maintained condition	Interpretation
A1 Measurement alignment	Same date, legal entity, currency, unit scale and source basis	A source-labelled notional is not automatically a native-currency amount.
A2 Stock and flow separation	Unique asset, invoice, loan and settlement identifiers	Do not count a carrying-value change and principal payment twice.
A3 Precision and provenance	Calculate before display rounding; preserve unresolved source differences	Arithmetic closure does not authenticate undisclosed accounting records.
A4 Conditional behaviour	Scenario prices, volumes, collection, financing and FX shocks are imposed	No model parameter is represented as an estimated Ghana elasticity.
A5 Date and currency feasibility	Test each event date and currency; state conversion and support assumptions	Closing cash and aggregate currency netting can conceal interim deficits.
A6 Coverage and identification	Five purposive issuer cases; no probability weights or causal assignment	No representative national exposure or causal business effect is identified.

Sources: IFRS Foundation: IAS 21 [\[S07\]](#); IFRS Foundation: IFRS 7 [\[S08\]](#); Shrestha et al. / IMF (2012) [\[S09\]](#); IDER calculations [\[S10\]](#).

Note: E01–E30 document executed calculations; P01 formalises a prospective design that has not been estimated.

Positions, conversion and exposure

Executed calculations are conditional on their stated inputs; prospective specifications are not fitted.

E01 Monetary position by currency

EXECUTED ACCOUNTING

$$N_{c,t} = A_{c,t} - L_{c,t} \tag{E01a}$$

$$A_{c,t} = \text{Cash}_{c,t} + \text{Receivables}_{c,t} \tag{E01b}$$

A and L are monetary assets and liabilities in native currency units; c identifies the currency, t the reporting date. Only disclosed categories are included.

ASSUMPTIONS / INTERPRETATION

Match entity, date, units and instrument scope. Retain displayed rounding differences; the position is not a cash-availability measure.

E02 Conversion and uniform sensitivity

EXECUTED FIXED-POSITION SENSITIVITY

$$V_t = \sum_c e_{c,t} N_{c,t} \tag{E02a}$$

$$\Delta V(d) = d \sum_c e_{c,0} N_{c,0} \tag{E02b}$$

e is GHS per currency unit; V is the GHS equivalent. d is a proportional change in every GHS/FX rate. Positive d denotes cedi depreciation.

ASSUMPTIONS / INTERPRETATION

Hold native positions fixed; no trading, tax or operational adjustment. Do not reconvert amounts already expressed in GHS. Sign conventions are explicit.

Sources: IDER calculations [\[S10\]](#).

Note: Each family links to an output or design record. Variables retain the source units or the declared scenario normalisation.

Adverse currency shocks and gross offsets

Executed calculations are conditional on their stated inputs; prospective specifications are not fitted.

E03 Currency-specific adverse box

EXECUTED CONDITIONAL BOUND

$$\Delta V = \sum_c e_{c,0} N_{c,0} d_c \tag{E03a}$$

$$\min \Delta V = -\varepsilon \sum_c |e_{c,0} N_{c,0}| \tag{E03b}$$

Each currency shock is constrained independently by $-\varepsilon \leq d_c \leq \varepsilon$. Net asset rates fall and net liability rates rise in the mathematical adverse case.

ASSUMPTIONS / INTERPRETATION

An unconstrained rectangular scenario set, not a joint shock distribution. Cross-rate feasibility, probabilities and behavioural responses are not estimated.

E04 Gross and net offset diagnostic

EXECUTED ACCOUNTING

$$G = \sum_c |e_c N_c|; \quad V = \sum_c e_c N_c \tag{E04a}$$

$$\text{Offset} = 1 - |V| / G \tag{E04b}$$

G sums absolute currency-specific net positions; V is their algebraic GHS sum. Offset is a fraction and requires $G > 0$.

ASSUMPTIONS / INTERPRETATION

This is cross-currency cancellation in an aggregate—not gross balance-sheet assets plus liabilities or an executable natural hedge.

Sources: IDER calculations [\[S10\]](#).

Note: Each family links to an output or design record. Variables retain the source units or the declared scenario normalisation.

Coverage ratios and the position bridge

Executed calculations are conditional on their stated inputs; prospective specifications are not fitted.

E05 Currency-specific asset coverage

EXECUTED RATIO

$$AC_c = A_c / L_c \tag{E05a}$$

$$CC_c = \text{Cash}_c / L_c \tag{E05b}$$

AC includes cash and the disclosed receivables. CC includes only disclosed cash. Native units cancel within each currency; L must be positive.

ASSUMPTIONS / INTERPRETATION

Collection, restrictions and maturities are not observed by currency. A ratio above one is not proof of payment-date liquidity.

E06 Position and conversion-rate bridge

EXECUTED SYMMETRIC ACCOUNTING

$$\Delta(eN) = \bar{e} \Delta N + \bar{N} \Delta e \tag{E06a}$$

$$\bar{e} = (e_0 + e_1)/2; \bar{N} = (N_0 + N_1)/2 \tag{E06b}$$

Bars are endpoint averages. The two components allocate the interaction symmetrically; signed net positions can be negative.

ASSUMPTIONS / INTERPRETATION

Same currency and perimeter at both endpoints. Changes in N are not attributed to causal financing decisions; source rate labels remain unchanged.

Sources: IDER calculations [\[S10\]](#).

Note: Each family links to an output or design record. Variables retain the source units or the declared scenario normalisation.

Source checks and receivable collection

Executed calculations are conditional on their stated inputs; prospective specifications are not fitted.

E07 Published sensitivity reconciliation

EXECUTED DISCLOSURE DIAGNOSTIC

$$S_c^{native} = N_c e_c d_c \tag{E07a}$$

$$S_c^{GHS} = N_c^{GHS} d_c \tag{E07b}$$

The first expression treats the displayed position as native units. The second treats it as already converted GHS. Source sensitivity is retained separately.

ASSUMPTIONS / INTERPRETATION

Apply only the matching measurement basis; do not select the interpretation that gives a preferred answer. Tax and sign differences are separate tests.

E08 Receivable collection threshold

EXECUTED CONDITIONAL ACCOUNTING

$$\text{Gap}(q) = \text{Cash} + q \text{ AR} - \text{AP} \tag{E08a}$$

$$q^* = (\text{AP} - \text{Cash}) / \text{AR} \tag{E08b}$$

q is the collectible fraction of receivables AR; AP denotes payables assumed due. q* is the zero-gap boundary when AR > 0.

ASSUMPTIONS / INTERPRETATION

The Fan Milk illustration uses an aggregate GHS equivalent, full payables due and no additional inflows. It does not establish same-currency timing.

Sources: IDER calculations [\[S10\]](#).

Note: Each family links to an output or design record. Variables retain the source units or the declared scenario normalisation.

Financial ratios and capital cash flows

Executed calculations are conditional on their stated inputs; prospective specifications are not fitted.

E09 Financial ratios and materiality

EXECUTED SOURCE-BASED RATIOS

$CR = \text{CurrentAssets} / \text{CurrentLiabilities}$ (E09a)

$\text{Materiality} = 100 \Delta V / \text{Equity}$ (E09b)

CR is the current ratio. Materiality scales a stated pre-tax mechanical FX effect by reported book equity. Positive denominators are required.

ASSUMPTIONS / INTERPRETATION

Retain financial-position scope and dates. Neither ratio is a credit rating, regulatory capital ratio, default probability or cash-flow coverage covenant.

E10 Cash capex and financing bridge

EXECUTED ACCOUNTING

$\text{CashCapex} = \text{CashPPE} + \text{CashIntangibles}$ (E10a)

$\Delta \text{Cash} = \text{CFO} - \text{CashCapex} + \text{OtherCashFlows}$ (E10b)

CFO is the cash-flow statement subtotal as classified by the issuer. OtherCashFlows includes the named financing or investing items and any cash FX effect.

ASSUMPTIONS / INTERPRETATION

Do not deduct interest, tax or dividends twice if already included in CFO. Non-cash right-of-use additions are not a second cash-capex payment.

Sources: IDER calculations [\[S10\]](#).

Note: Each family links to an output or design record. Variables retain the source units or the declared scenario normalisation.

Capital currency and revenue behaviour

Executed calculations are conditional on their stated inputs; prospective specifications are not fitted.

E11 Unknown capex-currency fraction

EXECUTED CONDITIONAL SENSITIVITY

$$\Delta K = K_0 f [(1+d)(1+u) - 1] \tag{E11a}$$

$$K_1 = K_0 + \Delta K \tag{E11b}$$

K0 is a hypothetical repeat of the recorded cash-capex amount; f is the assumed FX share; d is the rate change and u the foreign supplier-price change.

ASSUMPTIONS / INTERPRETATION

f is not disclosed in the retrieved MTN record. Local-currency capex stays fixed. This is not revaluation of historical payments or a forecast capex budget.

E12 Scenario prices, quantities and sales

EXECUTED CONDITIONAL MODEL

$$p = 1+0.35d; \quad q = p^{-0.6} \tag{E12a}$$

$$Q = (1-x)q + x; \quad e = 1+d \tag{E12b}$$

$$R = (100-R_{FX,0})pq + R_{FX,0}e \tag{E12c}$$

x = baseline FX revenue / 100; baseline annual revenue is 100. Export quantities and FX unit prices are fixed. p = q = Q = 1 in the fixed case.

ASSUMPTIONS / INTERPRETATION

Repricing and demand parameters are assumptions. Require p > 0 and e > 0. No market equilibrium, capacity constraint or national elasticity is estimated.

Sources: IDER calculations [\[S10\]](#).

Note: Each family links to an output or design record. Variables retain the source units or the declared scenario normalisation.

Operating costs and debt obligations

Executed calculations are conditional on their stated inputs; prospective specifications are not fitted.

E13 Operating costs and cash earnings

EXECUTED CONDITIONAL MODEL

$$M = M_0 e^{(1+u)Q} \tag{E13a}$$

$$L = L_0 (1+0.10d)Q; \quad \Pi = R - M - L \tag{E13b}$$

M is FX operating cost and L is cedi operating cost. Adaptive local costs use the stated feedback; fixed-case local costs and quantities do not respond.

ASSUMPTIONS / INTERPRETATION

Operating costs are treated as cash costs. Depreciation, tax, capex, interest and principal are excluded from Π ; supplier-price shock u is imposed.

E14 Debt service versus debt stock

EXECUTED CONDITIONAL ACCOUNTING

$$D_{GHS} = eD_0; \quad I = eD_0(r+\Delta r) \tag{E14a}$$

$$\text{PrincipalDue} = eP_0 \tag{E14b}$$

D_0 is fixed FX principal outstanding, r its annual rate and P_0 the portion due. Δr is an assumed reset in percentage-point units expressed as a fraction.

ASSUMPTIONS / INTERPRETATION

No amortisation within the interest-accrual calculation or refinancing is assumed. Translate the stock separately; deduct only interest and due principal as cash.

Sources: IDER calculations [\[S10\]](#).

Note: Each family links to an output or design record. Variables retain the source units or the declared scenario normalisation.

Working capital and annual cash

Executed calculations are conditional on their stated inputs; prospective specifications are not fitted.

E15 Working-capital proxy

EXECUTED CONDITIONAL ACCOUNTING

$$W = [R \cdot DSO + (M+L) \cdot DIO - M \cdot DPO] / 365 \tag{E15a}$$

$$\Delta W = W_1 - W_0 \tag{E15b}$$

DSO, DIO and DPO are receivable, inventory and import-payable days. A collection-delay scenario increases DSO before recomputing W.

ASSUMPTIONS / INTERPRETATION

Annual flow approximation; only import payables offset funding. The proxy is not an invoice-level ledger or a complete statutory working-capital statement.

E16 Annual cash proxy and coverage

EXECUTED CONDITIONAL ACCOUNTING

$$C_{open} = C_{GHS,0} + eC_{FX,0} \tag{E16a}$$

$$C_1 = C_{open} + \Pi - I - eP_0 - K - \Delta W + H \tag{E16b}$$

$$DSCR^{proxy} = (\Pi - \Delta W) / (I + eP_0) \tag{E16c}$$

Copen is the translated opening liquid cash. C1 is closing cash proxy; K is scenario cash capex and H the hedge payoff.

ASSUMPTIONS / INTERPRETATION

Tax, distributions, new credit and other omitted cash items are outside the proxy. DSCR excludes capex and is not a lender-defined covenant ratio.

Sources: IDER calculations [\[S10\]](#).

Note: Each family links to an output or design record. Variables retain the source units or the declared scenario normalisation.

Hedge commitments and reverse stress

Executed calculations are conditional on their stated inputs; prospective specifications are not fitted.

E17 Fixed-notional annual FX hedge

EXECUTED CONDITIONAL ACCOUNTING

$$F = M_0 + I_0 + P_0 + K_{FX,0} - R_{FX,0} \tag{E17a}$$

$$H = hF [e^{-1.02}] \tag{E17b}$$

F is baseline net annual FX need. A positive F buys FX forward; a negative F sells the surplus. h is an imposed coverage fraction.

ASSUMPTIONS / INTERPRETATION

Assumed forward rate 1.02 and baseline spot 1; no market quote or optimal hedge ratio. Counterparty, collateral, taxes and basis risks are excluded.

E18 Reverse cash and liquidity thresholds

EXECUTED REVERSE STRESS

$$\text{Margin}(d) = C_1(d) - C_{\text{floor}} \tag{E18a}$$

$$\text{Find } d^*: \text{Margin}(d^*) = 0 \tag{E18b}$$

C_{floor} is the profile's assumed minimum liquidity. Numerical roots are searched over the declared shock range; a baseline deficit is separately reported.

ASSUMPTIONS / INTERPRETATION

A root is conditional on all other parameters. It is not a forecast, probability of default or a feasible solution when credit or liquidity is already deficient.

Sources: IDER calculations [\[S10\]](#).

Note: Each family links to an output or design record. Variables retain the source units or the declared scenario normalisation.

Parameter ranges and dated ledgers

Executed calculations are conditional on their stated inputs; prospective specifications are not fitted.

E19 Finite parameter-grid ranges

EXECUTED CONDITIONAL ENVELOPE

$$L_i = \min_{\theta \in \Theta} C_i(\theta) \tag{E19a}$$

$$U_i = \max_{\theta \in \Theta} C_i(\theta) \tag{E19b}$$

Θ contains 16 declared combinations of supplier price, capex price, FX rate-reset and collection-delay settings at the +20% adaptive FX case.

ASSUMPTIONS / INTERPRETATION

A finite deterministic grid is not a sample or probability distribution. Endpoints cover only the tested combinations, not every possible adverse outcome.

E20 Dated cash by currency

EXECUTED SYNTHETIC LEDGER

$$B_c(t) = B_c(0) + \sum_{\tau \leq t} [In_c(\tau) - Out_c(\tau)] \tag{E20a}$$

$$B^{GHS}(t) = B^{GHS}(0) + \sum_c \sum_{\tau \leq t} e_c(\tau) F_c(\tau) \tag{E20b}$$

The first equation forbids automatic cross-currency conversion. The second tracks converted event flows F , with opening FX cash separately translated.

ASSUMPTIONS / INTERPRETATION

Use unique cash IDs and actual event rates. Same-day outflows precede receipts. The integrated example assumes immediate conversion and no dealing costs.

Sources: IDER calculations [\[S10\]](#).

Note: Each family links to an output or design record. Variables retain the source units or the declared scenario normalisation.

Minimum funding and timing shifts

Executed calculations are conditional on their stated inputs; prospective specifications are not fitted.

E21 Minimum bridge funding

EXECUTED SYNTHETIC CASH TEST

$$B_{\min} = \min_t B(t) \tag{E21a}$$

$$\text{FacilityNeeded} = \max(0, -B_{\min}) \tag{E21b}$$

Bmin is the lowest balance across the event dates. The facility amount is a zero-floor bridge need in the no-overdraft demonstration.

ASSUMPTIONS / INTERPRETATION

This does not establish credit approval, drawdown availability or covenant compliance. A positive end-horizon balance does not remove an earlier funding gap.

E22 Receipt and exchange-rate timing

EXECUTED CONDITIONAL TIMING TEST

$$t_{\text{new}}^{\text{receipt}} = t_{\text{old}}^{\text{receipt}} + \ell \tag{E22a}$$

$$e_c(t) = e_{c,0} [1 + d \cdot 1(t \geq t_{\text{shock}})] \tag{E22b}$$

ℓ is a receipt delay; t_{shock} is the date of the permanent assumed rate change. Amounts are retained unless a separate price shock is specified.

ASSUMPTIONS / INTERPRETATION

No source business is assigned this ledger. Early and late shocks share a terminal rate but can change both the cash minimum and the closing balance.

Sources: IDER calculations [\[S10\]](#).

Note: Each family links to an output or design record. Variables retain the source units or the declared scenario normalisation.

Residual hedges and omitted exposure

Executed calculations are conditional on their stated inputs; prospective specifications are not fitted.

E23 Cancelled order and residual hedge

EXECUTED CONDITIONAL ACCOUNTING

$$H = Q_{FX}(e_{spot} - e_{forward}) \tag{E23a}$$

$$\text{HedgeCashCost} = -H, \text{ if the order is cancelled} \tag{E23b}$$

The illustration contracts USD 20,000 at GHS 10.20/USD. The order can be cancelled while the forward notional remains outstanding.

ASSUMPTIONS / INTERPRETATION

Cash-settled payoff illustration only; no close-out fees or collateral. A forecast purchase is not a committed payable and a remaining hedge can create risk.

E24 Omitted adverse-exposure bound

EXECUTED CONDITIONAL BOUND

$$0 \leq U(t) \leq U_{max}, \text{ for every } t \tag{E24a}$$

$$B_{min}^{true} \in [B_{min}^{model} - U_{max}, B_{min}^{model}] \tag{E24b}$$

$U(t)$ is the cumulative omitted net adverse drain, bounded at every relevant event date, including newly identified dates. U_{max} is an imposed horizon-wide cap.

ASSUMPTIONS / INTERPRETATION

The minimum can move to another date. The inequality requires the cap over the entire path; no national or issuer cap is estimated. Existing illustrative endpoints are unchanged.

Sources: IDER calculations [\[S10\]](#).

Note: Each family links to an output or design record. Variables retain the source units or the declared scenario normalisation.

Component attribution and equity normalisation

Executed calculations are conditional on their stated inputs; prospective specifications are not fitted.

E25 Component-level exposure bridge

EXECUTED SOURCE ACCOUNTING

$$\text{Contribution}_j = \sum_c \bar{e}_c \Delta N_{j,c} \tag{E25a}$$

$$\Delta V = \sum_j \text{Contribution}_j + \sum_c \bar{N}_c \Delta e_c + \rho \tag{E25b}$$

j identifies a cash, receivable or liability component; c is currency. Bars are two-year endpoint means. ρ retains source component-to-total rounding residuals.

ASSUMPTIONS / INTERPRETATION

Use matched source categories and rates. Component changes contain transactions and other changes; the identity does not identify a treasury-policy cause.

E26 Exposure-to-equity attribution

EXECUTED SYMMETRIC ACCOUNTING

$$b_t = 100 \, \varepsilon \, G_t / Q_t \tag{E26a}$$

$$\Delta b = 100\varepsilon[\text{mean}(1/Q)\Delta G + \bar{G} \, \Delta(1/Q)] \tag{E26b}$$

G is the sum of absolute currency-net GHS positions; Q is source book equity. ε=0.10 is an imposed adverse-box magnitude. b is expressed in percent.

ASSUMPTIONS / INTERPRETATION

Equity must be positive. Numerator and denominator contributions are accounting effects; equity growth is not assumed to be cash funding or a capital-policy treatment.

Sources: IDER calculations [\[S10\]](#).

Note: Each family links to an output or design record. Variables retain the source units or the declared scenario normalisation.

Cash definitions and payout classification

Executed calculations are conditional on their stated inputs; prospective specifications are not fitted.

E27 Cash definition and closing bridge

EXECUTED SOURCE RECONCILIATION

$$C_{\text{net}} = C_{\text{gross}} - \text{OD} + \rho \tag{E27a}$$

$$C_1 = C_0 + \text{CFO} + \text{CFI} + \text{CFF} + \text{FX}_{\text{cash}} + \rho \tag{E27b}$$

OD is the issuer’s included overdraft; CFO/CFI/CFF are source operating, investing and financing cash flows. FXcash is the separate currency effect; ρ preserves rounding.

ASSUMPTIONS / INTERPRETATION

Cash-definition adjustments apply only to the source perimeter, not every bank loan. Interest, dividends and tax must not be deducted again if already in a subtotal.

E28 Cash-flow classification diagnostic

EXECUTED SOURCE-BASED RECONCILIATION

$$\text{CFO}_{\text{before payout}} = \text{CFO}_{\text{reported}} + \text{Div}_{\text{in CFO}} \tag{E28a}$$

$$\text{Cover} = \text{CFO}_{\text{chosen basis}} / \text{CashCapex} \tag{E28b}$$

DivinCFO is only the source dividend already deducted in reported CFO. The adjusted subtotal is an analytical comparison; all other source classifications stay unchanged.

ASSUMPTIONS / INTERPRETATION

Do not call the comparison a correction of audited accounts. Payout-neutral cash is not unrestricted free cash; capex mix and payment dates remain separate.

Sources: IDER calculations [\[S10\]](#).

Note: Each family links to an output or design record. Variables retain the source units or the declared scenario normalisation.

Cross-rate consistency and rounding limits

Executed calculations are conditional on their stated inputs; prospective specifications are not fitted.

E29 Dollar-anchored currency stress

EXECUTED COHERENT SCENARIO

$$e_{c,1}/e_{c,0} = (1+z)(1+q_c); q_{USD}=0 \tag{E29a}$$

$$\Delta V = zV_0 + (1+z)\sum_c V_{c,0}q_c \tag{E29b}$$

z is the assumed common GHS/USD change; qc changes USD per other currency. Non-dollar qc lies in ±5%; every pairwise cross-rate follows from the same prices.

ASSUMPTIONS / INTERPRETATION

Positive quotes and fixed native positions. Conditional extrema are not joint confidence bands; no cross-rate distribution or probability is fitted.

E30 Conditional display-rounding bounds

EXECUTED ENDPOINT PROPAGATION

$$L_c = \min[(N_c \pm h_N)(e_c \pm h_e)] \tag{E30a}$$

$$U_c = \max[(N_c \pm h_N)(e_c \pm h_e)] \tag{E30b}$$

Evaluate all four endpoint combinations. Unilever 2025 uses hN=500 native units and he=0.005 GHS/FX, conditional on rounding to the displayed precision.

ASSUMPTIONS / INTERPRETATION

These limits cover only the imposed rounding mechanism. They exclude source errors, missing balances, common pricing constraints and statistical sampling uncertainty.

Sources: IDER calculations [\[S10\]](#).

Note: Each family links to an output or design record. Variables retain the source units or the declared scenario normalisation.

Prospective empirical identification

Executed calculations are conditional on their stated inputs; prospective specifications are not fitted.

P01 Pre-shock firm-exposure design

PROSPECTIVE ONLY — NOT ESTIMATED

$$y_{i,t} = \alpha_i + \lambda_t + \beta(X_{i,0} \times \Delta \ln e_t)$$

(P01a)

$$+ \Gamma W_{i,t} + u_{i,t}$$

(P01b)

y is a prespecified firm outcome; X_i,0 is measured pre-shock exposure. Firm and time effects absorb persistent firm differences and common time shocks.

ASSUMPTIONS / INTERPRETATION

No panel or valid assignment was obtained. Differential counterfactual trends, endogenous exposure, missing firms and spillovers need design-specific treatment.

NO EMPIRICAL COEFFICIENT IS REPORTED

A future study needs a defined business population, matched invoices and contracts, a pre-shock exposure measure, sufficient time variation and defensible identification.

Firm and time effects do not by themselves make exposure exogenous. Missing firms, anticipation, funding selection and spillovers must be addressed before causal interpretation.

Sources: IDER calculations [\[S10\]](#).

Note: Each family links to an output or design record. Variables retain the source units or the declared scenario normalisation.

Four calculations demonstrate the difference between stocks and cash

Values are taken directly from the recorded issuer data or the explicitly synthetic ledger.

Table 46. Four calculations demonstrate the difference between stocks and cash

Model / interpretation	Substitution	Result
E02 Unilever uniform +10%	$1,377,300 \times 0.10$	GHS +137,730 before tax.
E03 Unilever adverse currency box	$-21,419,280 \times 0.10$	GHS -2,141,928 before tax.
E08 Fan Milk 2024 collection threshold	$(74,414 - 20,429) \div 138,837$	38.88% under the assumed aggregate due-payables test.
E21 Synthetic early depreciation	$\max(0, -[-37.2])$	GHS 37.2 thousand bridge need despite a positive closing balance.

Sources: Unilever (2025) [\[S01\]](#); Fan Milk (2024) [\[S03\]](#); IDER calculations [\[S10\]](#).

Note: Issuer positions are dated observations. The collection threshold and cash-ledger deficit are conditional scenarios, not actual payment failures.

Trace each analytical layer from source to output

The evidence archive separates source transcriptions, imposed parameters, numerical results and publication files.

Table 47. Trace each analytical layer from source to output

Layer	Inputs / implementation	Output and interpretation
Issuer positions	issuer_fx_components.csv; rates and totals; code/analyse.py	Native balances, GHS conversions, coverage, source audits and scenarios.
Financial statement diagnostics	issuer_financials.csv; other_source_values.json	Financial ratios, financing bridge and capex sensitivity.
Annual business profiles	scenario_profiles.csv; scenario_assumptions.json	Scenario cash proxies, joint stress, hedging and reverse thresholds.
Event cash ledger	illustrative_cash_ledger.csv; event-time calculation	Dated cash paths, minimum facilities and segregated currencies.
Validation extension	validation_source_values.json; code/validate_extend.py	Source-based maturity, ageing, classification and component outputs in outputs/validation.
Publication / quality	code/build_report.py; polish_publication.py; finalise_publication.py	Native editable charts/tables; indexes, equations, sources and verification records.

Sources: IDER calculations [\[S10\]](#).

Note: Primary source page images were inspected online; original current source PDF binaries are not bundled. The source register records URLs and exact page locators.

Maintain a visible register of unresolved conventions

An internally consistent calculation does not make contradictory source disclosures disappear.

Table 48. Maintain a visible register of unresolved conventions

Source	Unresolved item	Treatment retained
Unilever 2025	Weakening-column direction differs from GHS/FX mechanical sign	Preserve the source; show the sign-defined diagnostic separately.
Kasapreko 2025	Reporting/average-rate labels; malformed EUR sensitivity; conflicting equity totals	Use labelled reporting rates; exclude malformed sensitivity; use position-statement equity.
Fan Milk 2025 / 2024	No retrieved 2025 currency split; lease maturity classification differs	Keep 2024 FX historical; show 2025 all-currency records only.
TotalEnergies 2025	Notional/native/GHS measurement basis not unambiguously resolved	Show direct versus rate-converted sensitivity diagnosis; do not pool its net with other firms.
MTN Ghana 2025	Condensed release lacks retrieved invoice-currency capex breakdown	Treat the FX-capex fraction as an assumption, not an observed exposure.

Sources: Unilever (2025) [\[S01\]](#); Kasapreko (2025) [\[S02\]](#); Fan Milk (2024) [\[S03\]](#); Fan Milk (2025) [\[S04\]](#); TotalEnergies (2025) [\[S05\]](#); MTN Ghana (2025) [\[S06\]](#).

Note: These are disclosure reconciliation issues, not allegations about intent or an amendment to any issuer’s audited statements.

Verify computation without overstating what the evidence establishes

The supplied scripts generate the results from the frozen source-labelled inputs and declared assumptions.

Table 49. Verify computation without overstating what the evidence establishes

Verification layer	Recorded control	Interpretation boundary
Transcription / units	192 currency-component values; dates, scales and source locators retained	Selected pages checked, not a fresh audit of accounting systems.
Numerical closure	Component sums; symmetric bridges; scenario and cash identities	Checks apply to supplied inputs and assumptions.
Independent checks	Separate high-precision recalculation and isolated output replay	Repeatability is not a second empirical study or causal validation.
Document integrity	Figure/table datasets, equation IDs, internal destinations and QR	Publication checks do not certify full accessibility or institutional approval.
Release boundary	No pooled national total, fitted causal effect or scenario probability	The evidence supports due diligence and conditional risk measurement.

Sources: IDER calculations [\[S10\]](#).

Note: The final evidence archive contains the executed verification results, environment record and file-integrity manifest.

References and source links — 1 of 4

Titles link to source publications; the companion register preserves locations, units and retrieval limitations.

S01 Unilever Ghana PLC | 2025; comparative 2024

2025 annual report

PDF pp.20,23,63–64,68: financial position, currency balances, rates, sensitivity, scale policy and maturity. Native currency thousands; source signs and scope retained.

S02 Kasapreko PLC | 2025; comparative 2024

Annual report and financial statements 2025

PDF pp.21,24,55,58–61: position, cash flow, revenue and risk notes. Native currency units; labelled Reporting Rate retained. Equity, rate and sensitivity exceptions remain.

S03 Fan Milk PLC | 2024; comparative 2023

Annual report and financial statements 2024

PDF p.58 (printed p.55), note 28. Historical GHS-thousand FX aggregate and separate post-tax currency sensitivities. No 2025 currency split is inferred.

References and source links — 2 of 4

Titles link to source publications; the companion register preserves locations, units and retrieval limitations.

S04 Fan Milk PLC | 2025; comparative 2024

Annual financial statements 2025

PDF/printed pp.19,21,48–50: cash, leases, third-party receivable ageing and expected-loss allowances. The newer all-currency records do not reveal a 2025 FX split.

S05 TotalEnergies Marketing Ghana PLC | 2025; comparative 2024

Consolidated and separate financial statements 2025

PDF pp.68–70 (printed pp.67–69), note 29. Group and company remain separate. Notional measurement basis is unresolved; direct versus converted sensitivities are diagnostic.

S06 Scancom PLC (MTN Ghana) | 2025; restated 2024

Performance for the year ended 31 December 2025

PDF pp.2,12–16; group cash flow on PDF p.16 (printed p.15). 2025 and restated 2024 classifications retained. Cash capex is observed; invoice-currency mix is not.

References and source links — 3 of 4

Titles link to source publications; the companion register preserves locations, units and retrieval limitations.

[S07 IFRS Foundation | Accessed 25 September 2026](#)

IAS 21: The Effects of Changes in Foreign Exchange Rates

Official standard overview and history. Used for functional/foreign/presentation-currency distinction. Not a legal or entity-specific accounting opinion.

[S08 IFRS Foundation | Accessed 25 September 2026](#)

IFRS 7: Financial Instruments—Disclosures

Official standard overview and history. Used for qualitative and quantitative risk-disclosure principles. Not an IFRS compliance audit.

[S09 Shrestha, Manik; Reimund Mink; Segismundo Fassler / IMF | 2012](#)

An Integrated Framework for Financial Positions and Flows on a From-Whom-to-Whom Basis: Concepts, Status, and Prospects

IMF Working Paper 12/57; paragraphs 18–26,46–49. Framework for stocks, transactions, revaluation, currency and maturity. No foreign-country result is imposed as Ghana evidence.

References and source links — 4 of 4

Titles link to source publications; the companion register preserves locations, units and retrieval limitations.

S10 [Institute of Development and Economic Research | 2026](#)

Foreign-Currency Exposure: Evidence and Scenario Protocol

Supplied archive: source-labelled inputs, calculation and validation code, final publication workflow, numerical outputs, model registers and verification. All firm profiles and dated-ledger cases are hypothetical.

S11 [IFRS Foundation | Accessed 25 September 2026](#)

IAS 7: Statement of Cash Flows

Official overview; components and reconciliation of cash and cash equivalents; operating/investing/financing classifications. Framework for the cash-definition and classification diagnostics. The issuer classifications are preserved, not retrospectively restated.

Assess the currency position, its funding path and its evidential boundary

A balance-sheet assessment is most useful when the stocks, commitments and cash dates can be reconciled.

WHAT THE ISSUER CASES SHOW

Small algebraic net positions can coexist with material offsetting currency exposures. Receivables differ from cash, group differs from parent, and source conventions can alter reported sensitivities.

WHAT THE SCENARIOS SHOW

Debt service, capex, working capital, hedge commitments and collection delays can dominate operating profit. A positive closing cash proxy does not rule out an earlier payment-date deficit.

WHAT TO DO WITH THE EVIDENCE

Use the documented framework to request source-linked currency and payment records. Keep assumptions, unresolved disclosures and coverage limits visible in credit, investment and management decisions.

Sources: Unilever (2025) [\[S01\]](#); Kasapreko (2025) [\[S02\]](#); Fan Milk (2024) [\[S03\]](#); Fan Milk (2025) [\[S04\]](#); TotalEnergies (2025) [\[S05\]](#); MTN Ghana (2025) [\[S06\]](#); IDER calculations [\[S10\]](#).

Note: No national loss estimate, issuer rating, optimal hedge ratio, currency forecast or causal policy verdict is supplied.

Institute of Development and Economic Research

EVIDENCE FOR YOUR NEXT DECISION

Evidence for informed decisions.

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

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