

VAT Design, Business Cash Flow and

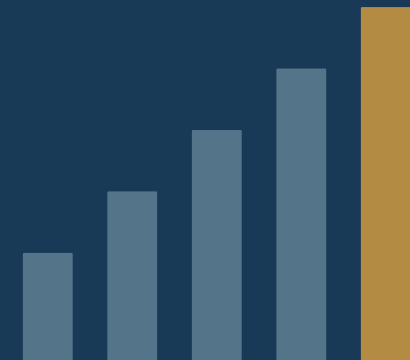
Consumer Prices in Ghana

Input-tax recovery. Refund timing. Prices. Margins. Distribution.

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

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INFORMATION CUT-OFF
27 SEPTEMBER 2026

January 2026 VAT reform
Observed, modelled and conditional evidence

About this publication

Independent research • transparent evidence • reproducible calculations

TITLE AND SERIES

VAT Design, Business Cash Flow and Consumer Prices in Ghana

IDER's Ghana Macroeconomic Policy and Business Intelligence Briefings

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EDITION AND EVIDENCE DATES

Final publication edition: 27 September 2026.
Information cut-off: 27 September 2026.
January 2026 framework; historical source dates retained.
Final design refinements preserve the validated analysis.

RESPONSIBILITY AND INTERPRETATION

This is an independent IDER publication. Citation does not imply endorsement. Statutory calculations and scenarios do not establish Ghana's realised price pass-through or current refund delays. It is not transaction-specific tax advice.

DATA, CODE AND ENQUIRIES

The package contains source transcriptions, assumptions, calculation code, editable exhibits and verification records. Original source PDFs are not bundled. Research and corrections: info@iderafrica.com.

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Report pages and slide numbers match. Entries link to their destinations.

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NAVIGATION Click the running header for Contents. Source IDs link to References. Each exhibit has an editable data record.

Follow the tax from the invoice to cash, prices and households

Three connected reading pathways; invoice rules, business cash flow and incidence remain distinct.

01 INVOICE AND ENTITLEMENT

Which rate, tax base, registration rule and input-credit condition applies? Separate ordinary taxable, exempt, zero-rated and specialist transactions.

02 BUSINESS AND CUSTOMER

When is cash paid, credited, offset or refunded? Then separate the consumer price from net revenue, input cost, unit margin and sales volume.

03 EVIDENCE AND INCIDENCE

Distinguish historical source estimates from new arithmetic. A national causal share requires matched prices, costs and a defensible comparison—not the headline CPI.

Sources: IDER calculations [\[S99\]](#).

Note: The numerical cases concern ordinary standard-rated transactions; gold-to-BoG treatment is outside their scope.

Separate fiscal evidence, business-credit associations and price scenarios

Research question: how do VAT design and recovery timing affect business cash, consumer prices and the distribution of burdens?

PRE-REFORM FISCAL EVIDENCE

GHS 39.155 bn

2025 domestic-plus-import VAT collections, GHS 3.830 bn below the annual target. The calculation does not measure a 2026 reform effect.

HISTORICAL ECONOMETRIC EVIDENCE

+5.90 pp

Source-fitted association of withholding credits with a credit position, May 2018–December 2020. Selection and causal interpretation remain limited.

CONDITIONAL PRICE BENCHMARK

–1.56%

GHS 121.90 becomes GHS 120.00 at an unchanged GHS 100 net price. Input-credit and funding channels are analysed separately.

Sources: GRA reform notice [\[S01\]](#); MoF/IFS VAT review [\[S06\]](#); MoF 2025 annual revenue report [\[S17\]](#); IDER calculations [\[S99\]](#).

Note: No national realised price–margin split or current refund-duration estimate is reported. The empirical extension is in Chapters 11–12.

Separate legal change, realised recovery and commercial pricing

The same reform can affect cash, cost and gross prices at different times.

CONSUMER PRICE

GHS 1.90

Full direct invoice saving per old GHS 121.90 purchase in the fixed-net-price benchmark. Basket exposure determines household-level relief.

BUSINESS UNIT MARGIN

GHS 1.583

Gain if the same gross price stays unchanged and resource costs do not move. This is per-unit pre-income-tax margin, not total profit.

LEGAL REGISTRATION

GHS 750 k

Goods threshold under the verified January framework. The taxable-services rule is distinct; the goods threshold is not a general exemption.

Sources: GRA reform notice [\[S01\]](#); Act 1151 [\[S02\]](#); IDER calculations [\[S99\]](#).

Note: For an actual business, replace scenario inputs with verified invoices, product costs and settlement dates before making a forecast.

A staged evidence programme makes the incidence question testable

Proposed milestones begin after data-access, confidentiality and institutional approval.

DAYS 0–30 | DEFINE

GRA, MoF and IDER data leads: freeze legal versions, goods/service classifications, invoice fields and refund event definitions. Acceptance: every included row has an identifiable source and status.

DAYS 31–90 | LINK

Match unchanged products, suppliers and credit events; retain exits and unpaid claims. Acceptance: publish linkage losses, coverage and an approved pre-analysis plan before estimating effects.

DAYS 91–180 | VALIDATE

Estimate only supported comparisons; release uncertainty, sensitivity and a reproducible decision brief. Acceptance: independent replay and unresolved exceptions accompany every material result.

Sources: IDER calculations [\[S99\]](#).

Note: Proposed research responsibilities and timelines are not institutional commitments or directions on tax-policy choices.

Abbreviations and reading terms

The meaning of “VAT” changes when levies, timing or tax bases are silently combined.

VAT	Value added tax.	B2C	Business-to-consumer transactions.
NHIL	National Health Insurance Levy.	VFRS / E-VAT	VAT Flat Rate Scheme / electronic VAT invoicing.
GETFund	Ghana Education Trust Fund levy.	Credit / offset / refund	Entitlement on a tax ledger / application against liability / cash repayment.
GRA	Ghana Revenue Authority.	Pass-through / incidence	Price response relative to a tax change / economic distribution of the burden.
MoF	Ministry of Finance.	pp / %; k / m / bn	Percentage points / percent; thousand / million / billion.
BoG	Bank of Ghana.	DiD / RD	Difference-in-differences / regression discontinuity.
CPI	Consumer price index; not a matched business-margin series.	FE / SE / CI	Fixed effects / standard error / confidence interval.
PPI	Producer price index; not a matched business-margin series.	ATT / DR DiD	Average treatment effect on the treated / doubly robust difference-in-differences.
B2B	Business-to-business transactions.	MAR / MNAR	Missing at random / missing not at random; assumptions about unobserved outcomes.

How to interpret the evidence

Read the status label before using a number in a financial model or public statement.

VERIFIED LEGAL BASELINE	January 2026 ordinary standard-rate rules. Specialist later amendments require separate primary confirmation.
HISTORICAL SOURCE MODEL	VAT-gap and household-incidence results belong to their original periods and modelling assumptions.
ORIGINAL IDER CALCULATION	Tax arithmetic, accounting closure and conditional sensitivity computed from disclosed inputs.
CONDITIONAL SCENARIO	Price pass-through, financing rates and delays are imposed. Scenario ranges are not confidence intervals.
CAUSAL RESEARCH DESIGN	Proposed, not fitted: linked prices, costs, assignment and outcomes are not yet available.
UNVERIFIED OR EXCLUDED	Missing refunds, legal commencement, survey detail and unmatched source perimeters are not filled with invented values.

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The research question has four distinct estimands

A tax-rate comparison cannot, by itself, answer the commercial-incidence question.

Table 1. The research question has four distinct estimands

Question	Measure required	What is available here
Input recovery	Eligible credits recognised, denied, offset and repaid by origin period.	Verified entitlement rules; illustrative ledgers.
Refund timing	Credit age and admissible-application-to-payment duration.	Legal clocks; historical limitations; conditional financing costs.
Consumer versus firm incidence	Matched gross price, net unit cost and pre-income-tax margin.	Exact scenario allocation; no observed national coefficient.
Household distribution	Survey-weighted direct and embedded taxes, by consumption rank.	Historical source-model results; new basket-exposure sensitivities.

Sources: IDER calculations [\[S99\]](#).

Note: Each estimand needs its own denominator, population, timing and identification strategy.

The January reform changes rates, creditability and registration together

Ordinary standard-rated supplies; implementation date 1 January 2026.

Table 2. The January reform changes rates, creditability and registration together

Feature	Before January 2026	Verified January framework
Combined invoice wedge	21.9% on the underlying base: levies plus VAT on the levy-inclusive base.	20%: VAT 15%, NHIL 2.5%, GETFund 2.5% on one base.
Levy treatment	NHIL, GETFund and COVID levy create non-creditable input costs in the ordinary standard-rate comparison.	COVID levy removed; eligible NHIL and GETFund input deductions restored.
Goods registration	GHS 200,000 threshold.	GHS 750,000, with statutory actual/forward and related-person rules.
Flat-rate scheme	Separate VFRS treatment.	VFRS abolished; do not apply the old standard-rate benchmark to every former flat-rate trader.

Sources: GRA reform notice [\[S01\]](#); GRA VAT guidelines [\[S03\]](#); MoF 2026 Budget [\[S04\]](#).

Note: Scope-specific treatment is required for exempt, zero-rated, relief and specialist transactions.

A 1.9-percentage-point wedge reduction is a 1.56% gross-price reduction

Worked invoice: unchanged underlying selling price of GHS 100.

Table 3. A 1.9-percentage-point wedge reduction is a 1.56% gross-price reduction

E01

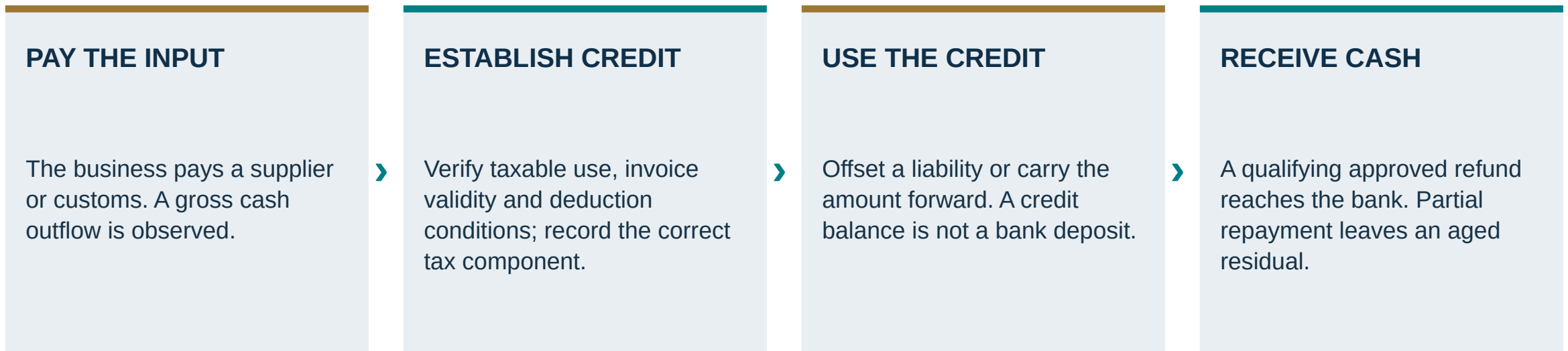
Component	Pre-reform standard case	January 2026 case
Underlying price	100.00	100.00
NHIL + GETFund + COVID levy	6.00	5.00
VAT amount	15.90 = 15% × 106.00	15.00 = 15% × 100.00
Total customer invoice	121.90	120.00
Gross-price change	—	−1.56% = (120 / 121.90 − 1) × 100

Sources: GRA reform notice [\[S01\]](#); GRA VAT guidelines [\[S03\]](#); MoF 2026 Budget [\[S04\]](#); IDER calculations [\[S99\]](#).

Note: Fixed-net-price accounting only. The GHS 1.90 reduction is not 1.90% of the old gross price.

An entitlement becomes cash only after a sequence of distinct events

Track the tax ledger and cash ledger separately.



Sources: Act 1151 [\[S02\]](#); GRA VAT guidelines [\[S03\]](#); IDER calculations [\[S99\]](#).

Note: Denied entitlement is an economic tax cost; delayed valid recovery is primarily a financing exposure.

The recoverable amount is not automatically all tax on purchases

Apply documentation and taxable-use conditions before modelling the benefit.

Table 4. The recoverable amount is not automatically all tax on purchases

Control	Required distinction	Cash-flow implication
Invoice and timing	Valid tax invoice or import documentation; observe the statutory deduction window.	An unmatched invoice cannot be assumed to generate immediate usable credit.
Business use	Taxable versus exempt/private use; directly attribute inputs first.	Common-input recovery may be partial rather than 100%.
Restricted inputs	Vehicle, entertainment and other restrictions have specified exceptions.	Do not classify all capital expenditure as deductible or blocked.
Mixed financial activity	Act 1151 has a specific direct-attribution rule for banks and financial institutions.	The ordinary manufacturer case cannot be transferred unchanged to a bank.

Sources: Act 1151 [\[S02\]](#); GRA VAT guidelines [\[S03\]](#).

Note: The model's full-recovery cases presume valid, eligible taxable inputs. Transaction-specific tax review remains necessary.

Exemption and zero-rating have different input-cost consequences

Classification is at the supply level, not inferred from a company’s broad sector name.

Table 5. Exemption and zero-rating have different input-cost consequences

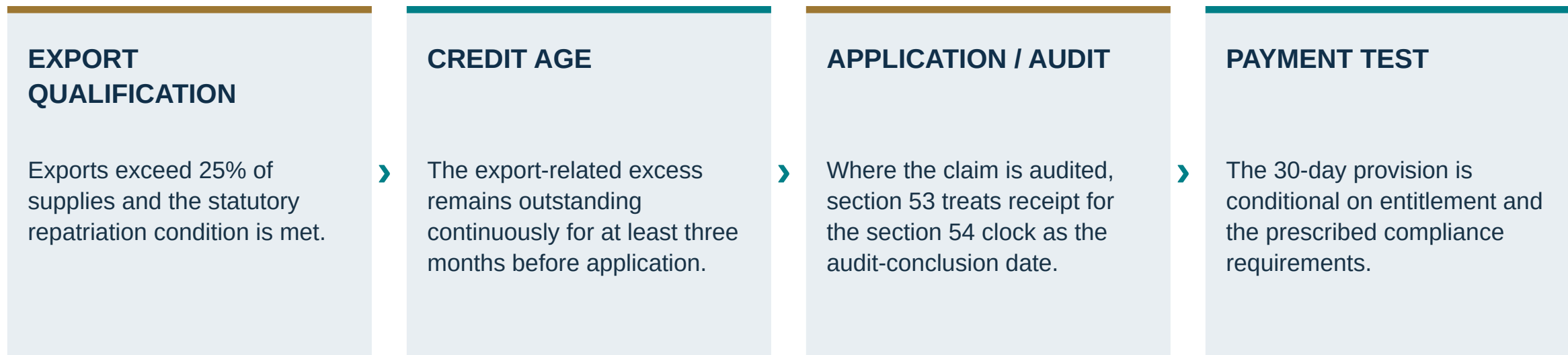
Supply status	Output treatment	Eligible input recovery	Analytical treatment
Ordinary standard rate	VAT and associated levies on the stated base.	Subject to entitlement and evidence.	Separate gross price from net revenue.
Zero-rated	Output tax rate of zero.	Potential credits; cash refund has further conditions.	Model recurring credits and recovery timing.
Exempt	No output tax charged on the exempt supply.	Inputs attributable to exempt supplies generally not deductible.	Embedded tax may remain in production costs.
Approved relief	Depends on beneficiary, commodity and legal conditions.	Do not assume the ordinary import cash payment occurs.	Separate approved relief cases from standard imports.

Sources: Act 1151 [\[S02\]](#); GRA import VAT guidance [\[S13\]](#).

Note: Exports, medicines, education, financial services and manufacturing relief require exact statutory scope, not blanket sector labels.

The export-credit route has gates before the 30-day payment clock

Act 1151 sections 53–54; the economic financing period can begin earlier.



Sources: Act 1151 [\[S02\]](#).

Note: Thirty days is not a promise of repayment 30 days after an exporter buys an input. Other refund routes have their own conditions.

The report does not treat a January statute as a complete September legal clearance

The current ordinary-rate guidance is verified; specialist later changes are separately flagged.

Table 6. The report does not treat a January statute as a complete September legal clearance

Record	Verification status	Treatment in this publication
Act 1151 and January GRA notice	Primary statute and official implementation guidance inspected.	Control the ordinary standard-rate and procedural analysis.
September GRA E-VAT page	Official page continues to specify the 20% combined structure.	Corroborates in-scope ordinary invoice rates.
Reported August gold amendment	A secondary September update was found; operative gazette and commencement were not recovered.	Gold-to-BoG supplies are excluded from numerical and legal conclusions.
Business-specific transactions	No product ruling, taxpayer file or individual entitlement decision supplied.	Not a legal clearance for a particular invoice, claim or registration decision.

Sources: GRA reform notice [\[S01\]](#); Act 1151 [\[S02\]](#); GRA E-VAT guidance [\[S11\]](#); ENS legal-update lead [\[S14\]](#).

Note: The update lead is disclosed, not promoted into verified primary law.

The 2026 VAT-gap study measures an earlier tax base—not the reform’s outcome

Published MoF/IFS model estimates for 2024; retain their modelling and coverage assumptions.

COMPLIANCE GAP

≈ GHS 69 bn

Approximately 5.9% of GDP and nearly 70% of potential VAT under the then-current policy system.

EXEMPTION / RELIEF GAP

≈ GHS 48 bn

Approximately 4.1% of GDP: the expenditure-gap component, excluding the source’s hard-to-tax activity component.

WHAT IT IS NOT

Not a cash pot

A modelled gap is not verified collectible arrears, an immediate spending resource or a measured 2026 revenue effect.

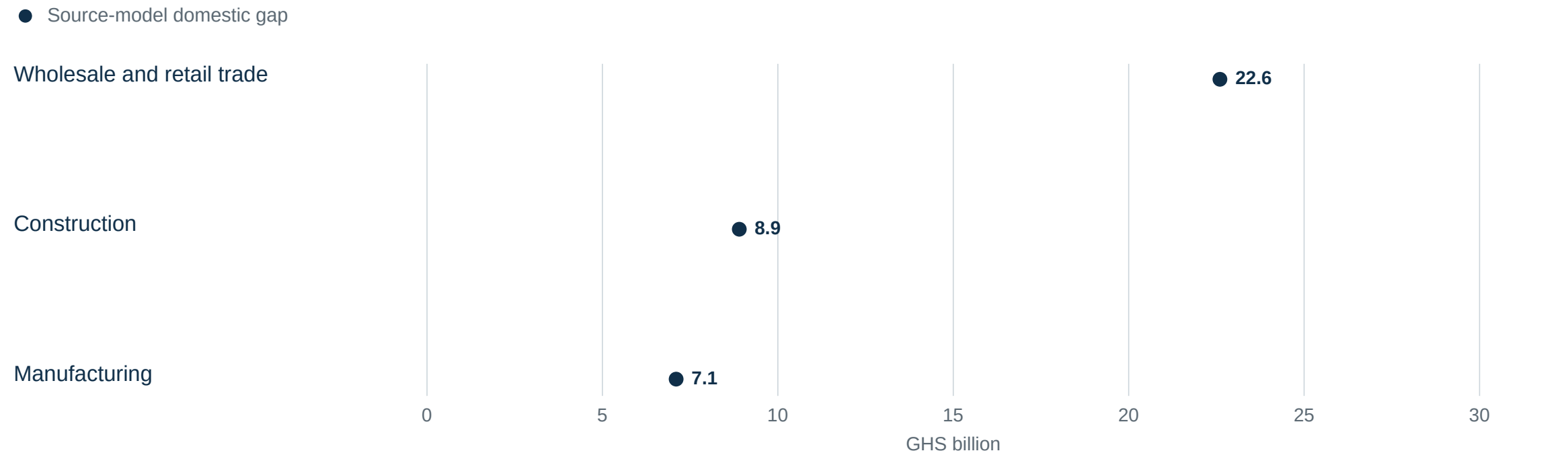
Sources: MoF/IFS VAT-gap study [\[S05\]](#).

Note: The full policy gap also includes a non-taxable component. These modelled amounts are not a stock of immediately recoverable tax debt.

Selected sectors account for substantial modelled domestic VAT gaps

GHS billion; positive sector estimates for 2024, as published.

Figure 1. Selected sectors account for substantial modelled domestic VAT gaps



Sources: MoF/IFS VAT-gap study [\[S05\]](#).

Note: Selected sectors only. Other sectors include negative estimated gaps; this is not a complete additive sector ranking.

The expenditure gap is a component of the broader policy gap

Source-model decomposition for 2024; rounded amounts have distinct benchmark meanings.

Table 7. The expenditure gap is a component of the broader policy gap

Concept	GHS billion	Interpretation
Compliance gap	≈ 69	Difference between actual and potential receipts under the tax policy then in force.
Expenditure gap	≈ 48	Exemptions and reliefs, excluding the registration-threshold / hard-to-tax component.
Non-taxable component	≈ 21	Source-defined hard-to-tax activities within the broader policy gap.
Full policy gap	≈ 69	Approximately 48 + 21; a different benchmark from the separately estimated compliance gap.

Sources: MoF/IFS VAT-gap study [\[S05\]](#); IDER calculations [\[S99\]](#).

Note: The two rounded 69 billion figures refer to different concepts. Do not count the 48 billion expenditure component twice or treat modelled potential as collectible arrears.

Credits and cash refunds are not interchangeable stocks and flows

The 2024 review reports historical amounts with unmatched coverage.

ACCUMULATED CREDITS

GHS 3.4 bn

Selected positive-credit TRIPS records for 2016–2019; not a verified universe of currently payable refund claims.

AGGREGATE REFUNDS

GHS 2.6 bn

Refunds over 2016–2019 in the source; not necessarily settlement of the same credit cohort.

INVALID SUBTRACTION

Not GHS 0.8 bn

Subtracting the two does not identify arrears. Credits can be offset, ineligible, disputed or outside the refund cohort.

Sources: MoF/IFS VAT review [\[S06\]](#).

Note: The historical review’s missing timeliness linkage does not establish that the same administrative condition persists in 2026.

A within-year audit identity can hold while the cross-year series breaks

Counts of post-payment tax-refund audits in the historical source—not refund applications.

Table 8. A within-year audit identity can hold while the cross-year series breaks E02

Year	Brought forward	Initiated	Completed	Carried forward
2016	3	26	23	6
2017	6	161	139	28
2018	28	70	66	32
2019	32	28	19	41
2020	25	37	41	21
2021	2	44	37	9

Sources: MoF/IFS VAT review [\[S06\]](#); IDER calculations [\[S99\]](#).

Note: All six within-year balances close. Opening counts differ from prior closing counts by –16 in 2020 and –19 in 2021; no unsupported adjustment is inserted.

Provisional collections and refund lines need matching definitions

Q1–Q3 2025, GHS billion; source published with the 2026 Budget in November 2025.

Table 9. Provisional collections and refund lines need matching definitions E03

Fiscal line	Programme	Provisional	Difference
VAT	30.910	29.987	−0.924
NHIL	6.124	7.142	1.019
GETFund	6.136	7.115	0.980
COVID levy	2.793	2.001	−0.792
All-tax refunds	−5.304	−7.540	−2.236

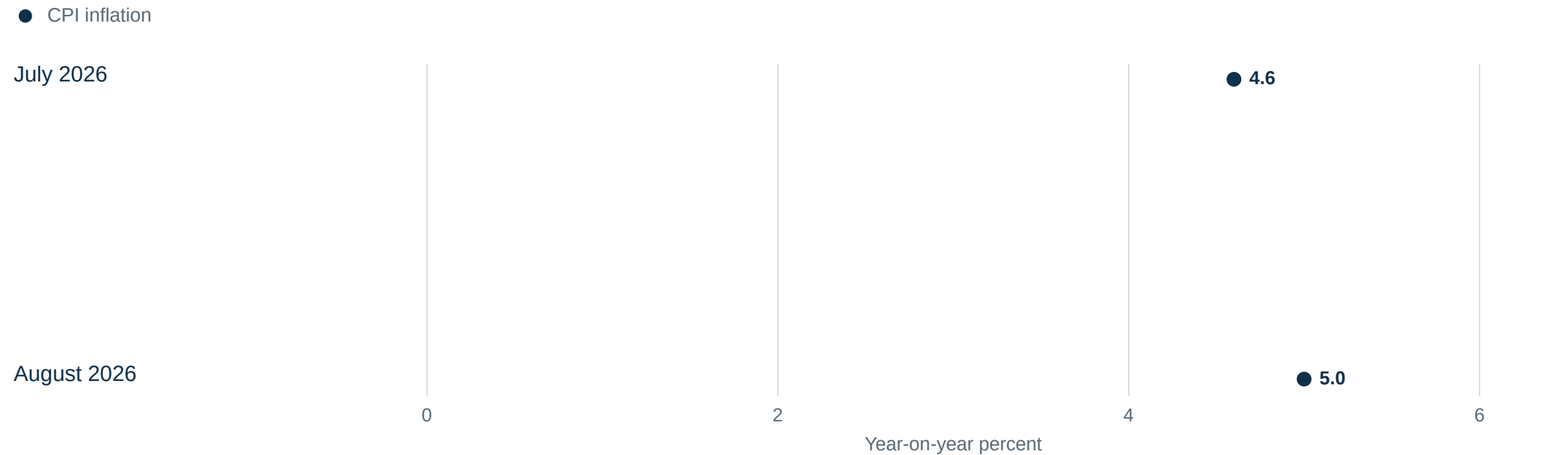
Sources: MoF 2026 Budget [\[S04\]](#); IDER calculations [\[S99\]](#).

Note: Refunds are reported as deductions. “All-tax refunds” cannot be used as the VAT-only payment numerator, or as evidence of 2026 settlement speed.

The latest headline CPI reading does not isolate the VAT reform

Official August 2026 headline and July comparison; inflation is year-on-year.

Figure 2. The latest headline CPI reading does not isolate the VAT reform



Sources: GSS CPI headline [\[S10\]](#).

Note: July is reconstructed as 5.0 – 0.4 percentage points from the official headline. No missing months are interpolated.

A CPI movement and a VAT price effect are different statistical objects

A tax reform can reduce prices relative to a counterfactual even while the observed price level rises.

YEAR-ON-YEAR INFLATION

The headline compares the current index with the same month a year earlier. Base effects and the entire consumption basket affect the result.

REFORM PASS-THROUGH

The relevant comparison is a matched product's price with and without the tax change, net of other relevant influences—not merely before versus after.

MARGINS REQUIRE COSTS

Retail CPI minus aggregate PPI is not a firm margin. Product mix, imported content, inventory valuation and measurement stages differ.

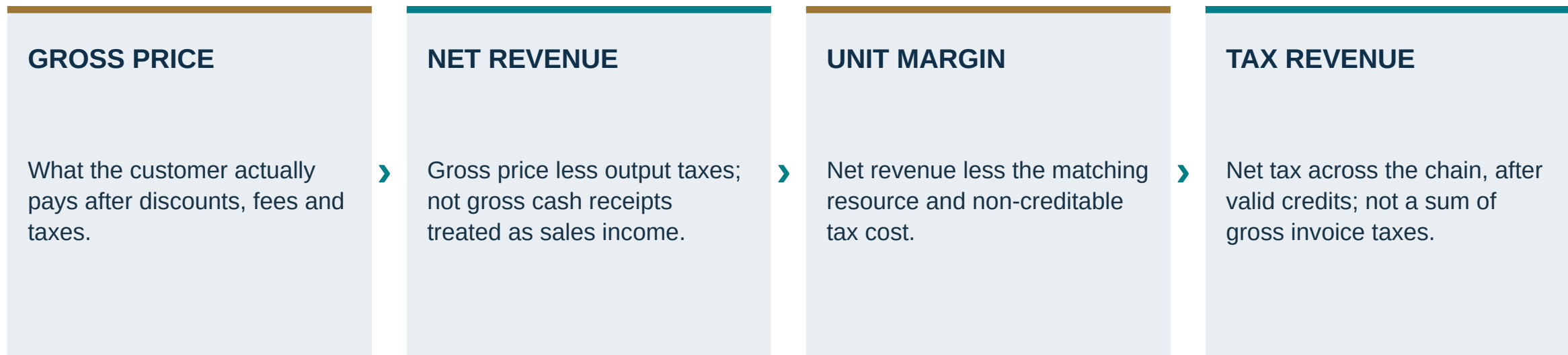
Sources: GSS CPI headline [\[S10\]](#); IDER calculations [\[S99\]](#).

Note: Exchange rates, food supply, fuel and other costs are potential confounders; this report does not attribute the observed CPI change to any one of them.

Trace each cedi across the customer, firm and government

Fixed quantity and resource costs first; demand and supply responses require additional evidence.

E04



Sources: IDER calculations [\[S99\]](#).

Note: The calculations exclude corporate income tax, changing quantities and wage or upstream price responses.

Partial pass-through allocates the direct tax change between price and margin

GHS per unit; old gross price 121.90 and old net price 100.00; unchanged resource costs.

Table 10. Partial pass-through allocates the direct tax change between price and margin E05

Assumed price pass-through	New gross price	Consumer saving	Unit-margin gain	Tax-revenue reduction
0%	121.90	0.000	1.583	1.583
25%	121.43	0.475	1.188	1.663
50%	120.95	0.950	0.792	1.742
75%	120.48	1.425	0.396	1.821
100%	120.00	1.900	0.000	1.900

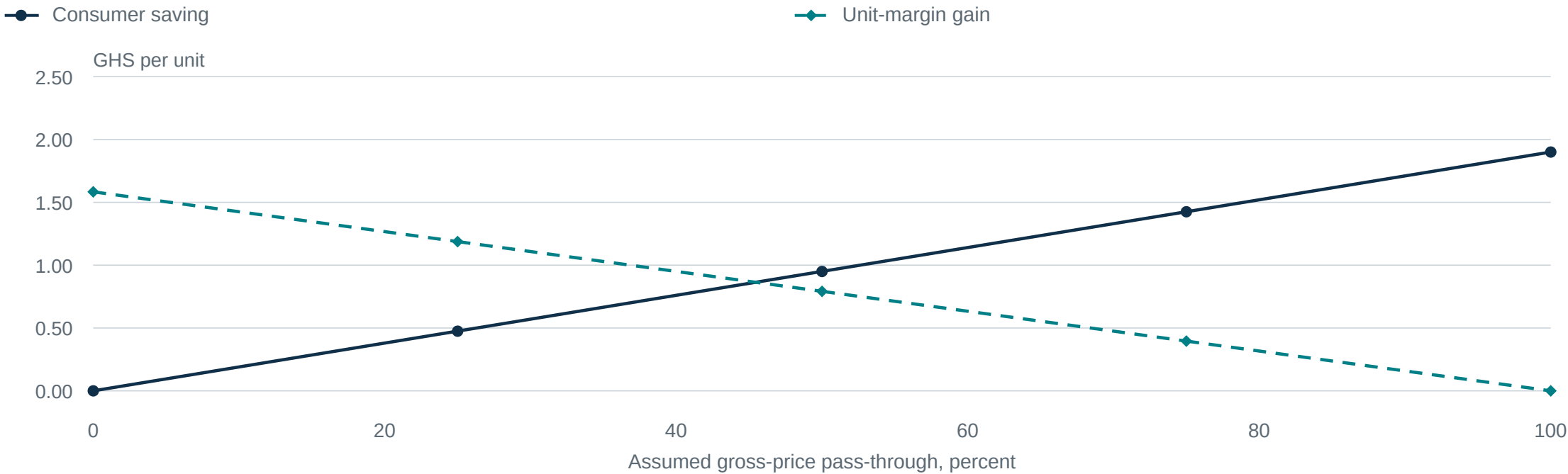
Sources: IDER calculations [\[S99\]](#).

Note: Rows are scenarios, not estimated business behaviour. Consumer saving plus margin gain equals tax-revenue reduction at fixed quantity.

Consumer savings rise as firms pass more of the invoice reduction through

Deterministic division of the direct change; GHS per unit.

Figure 3. Consumer savings rise as firms pass more of the invoice reduction through



Sources: IDER calculations [\[S99\]](#).

Note: At zero pass-through the gross price is unchanged, but net revenue increases. No current Ghana coefficient is implied.

“Half passed through” is not the same as half of the fiscal benefit

Direct reform case with assumed 50% gross-price pass-through.

CONSUMER SAVING GHS 0.950 Half of the GHS 1.90 fixed-net-price benchmark reduction.	UNIT-MARGIN GAIN GHS 0.792 Residual gross receipts are divided by 1.20 to obtain net revenue, before costs.	CONSUMER FISCAL SHARE 54.55% 0.950 divided by the total GHS 1.742 reduction in tax revenue. The price-response and fiscal-share denominators differ.
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Sources: IDER calculations [\[S99\]](#).

Note: Rounded displayed amounts may not sum exactly; full precision is retained in the calculations.

Recoverable levies change the cost base as well as the invoice wedge

One-stage input example: GHS 60 taxable input; other resource cost GHS 20; no quantity change.

Table 11. Recoverable levies change the cost base as well as the invoice wedge E06

Per-unit component	Old standard case	New full-recovery case
Underlying resource cost	80.00	80.00
Non-creditable input levies	3.60 = 6% × 60	0.00
Baseline unit margin preserved	16.40	16.40
Required tax-exclusive selling price	100.00	96.40
Customer price	121.90	115.68

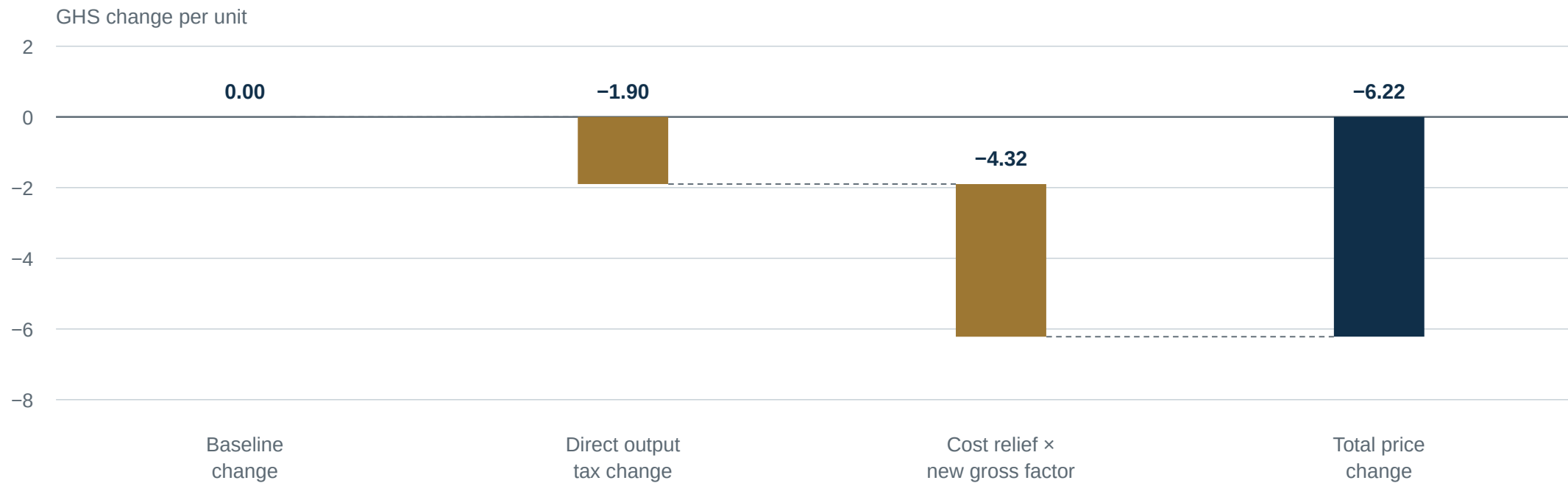
Sources: GRA reform notice [\[S01\]](#); GRA VAT guidelines [\[S03\]](#); IDER calculations [\[S99\]](#).

Note: This is a fully eligible, fully recovered credit case. The GHS 3.60 cost relief is not added twice as a separate profit gain.

Input-credit recovery creates additional conditional room for lower prices

GHS change per unit, relative to 121.90; new price 115.68 preserves the GHS 16.40 baseline unit margin.

Figure 4. Input-credit recovery creates additional conditional room for lower prices



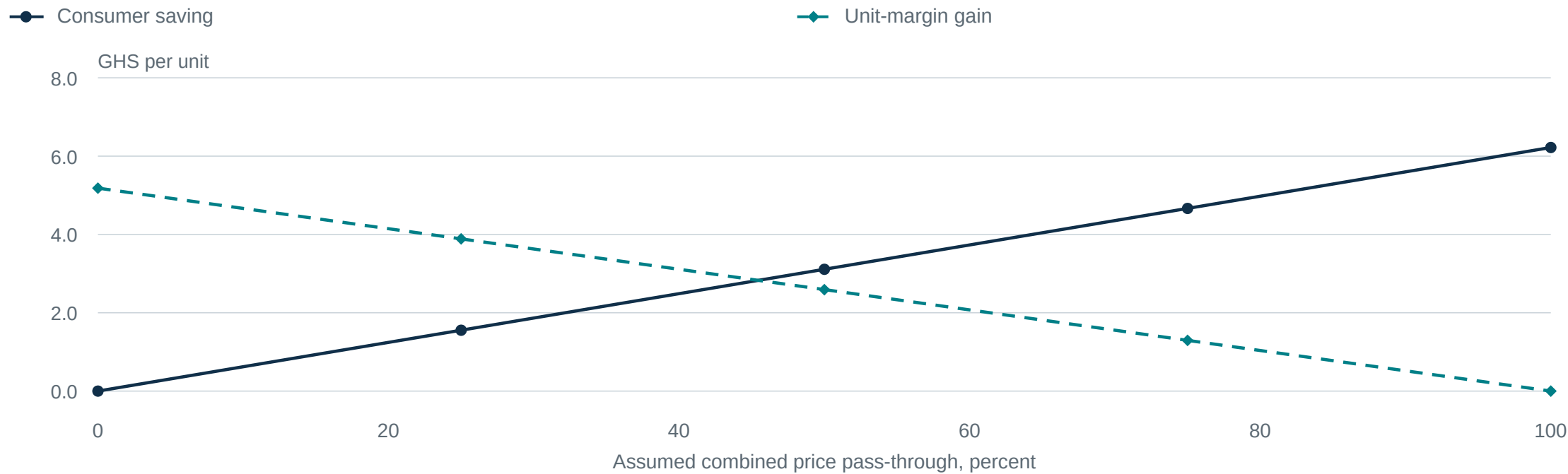
Sources: IDER calculations [\[S99\]](#).

Note: -4.32 equals -3.60×1.20 . The total -5.10% is a modelled endpoint, not a forecast or an observed Ghana average.

With input recovery, the same pass-through share applies to a larger price range

GHS 60 input base; resource costs held at GHS 80; all eligible credits eventually recovered.

Figure 5. With input recovery, the same pass-through share applies to a larger price range



Sources: IDER calculations [\[S99\]](#).

Note: At unchanged gross prices the conditional unit-margin gain is GHS 5.183. Financing costs, sales volumes and input-price responses are additional channels.

The potential gross-price change varies with the taxable input base

Twenty deterministic cases; underlying resource cost fixed at GHS 80 per unit.

Figure 6. The potential gross-price change varies with the taxable input base

	0% passed	25% passed	50% passed	75% passed	100% passed
Input base GHS 20	0.00	-0.68	-1.37	-2.05	-2.74
Input base GHS 40	0.00	-0.98	-1.96	-2.94	-3.92
Input base GHS 60	0.00	-1.28	-2.55	-3.83	-5.10
Input base GHS 80	0.00	-1.57	-3.14	-4.71	-6.28

Gross-price change, percent of old GHS 121.90 invoice

Sources: IDER calculations [\[S99\]](#).

Note: Input base plus other resource costs equals 80. Zero on the left means no consumer price relief, not no business benefit.

A tax saving need not increase margin when non-tax input costs rise

GHS 60 taxable-input case; prices follow the same stated pass-through rule.

Figure 7. A tax saving need not increase margin when non-tax input costs rise

E07

	0% passed	25% passed	50% passed	75% passed	100% passed
Resource cost +0%	5.18	3.89	2.59	1.30	0.00
Resource cost +5%	1.18	-0.11	-1.41	-2.70	-4.00
Resource cost +10%	-2.82	-4.11	-5.41	-6.70	-8.00

Change in unit margin, GHS; relative to baseline margin 16.40

Sources: IDER calculations [\[S99\]](#).

Note: An independent 10% increase in GHS 80 resource costs adds GHS 8 per unit. These are sensitivities, not cost or exchange-rate forecasts.

Unit margin, margin percentage and total profit must be kept separate

A pricing decision can change all three in different directions.

PER-UNIT ACCOUNT

Measure revenue and inputs for the same product and period. Separate supplier discounts, quality changes, shrinkflation, fees and inventory accounting from the tax effect.

TOTAL PROFIT

Multiply contribution per unit by quantity, then subtract fixed costs and financing. The report does not infer sales elasticity or firm profitability from a unit-price calculation.

TIME AND CONTRACTS

Existing inventory, fixed-price contracts and reimbursement terms can delay adjustment. Estimate short- and longer-horizon responses rather than force one immediate coefficient.

Sources: IDER calculations [\[S99\]](#).

Note: Wages, employment and investment returns are possible subsequent outcomes, not estimated effects in this presentation.

International pass-through evidence supports heterogeneity—not a Ghana coefficient

Original IMF study: 17 euro-area countries over 1999–2013.

PUBLISHED PATTERN

The study finds approximately full pass-through for standard-rate changes, around 30% for reduced-rate changes and little for reclassifications.

TRANSFER LIMIT

These results concern different markets, periods and reforms. Ghana's simultaneous levy-credit and registration changes alter the treatment; no external coefficient is mechanically imported.

DESIGN IMPLICATION

Estimate effects by baseline tax exposure, input structure, customer type and horizon. The scenario shares in this report span possibilities rather than assign probabilities.

Sources: IMF WP 15/214 [\[S09\]](#); IDER calculations [\[S99\]](#).

Note: Source estimates are attributed external evidence. The Ghana scenario grid is not calibrated to them.

Measure two clocks: financing exposure and legal processing time

The starting dates are different and should remain visible in the dashboard.



Sources: Act 1151 [\[S02\]](#); IDER calculations [\[S99\]](#).

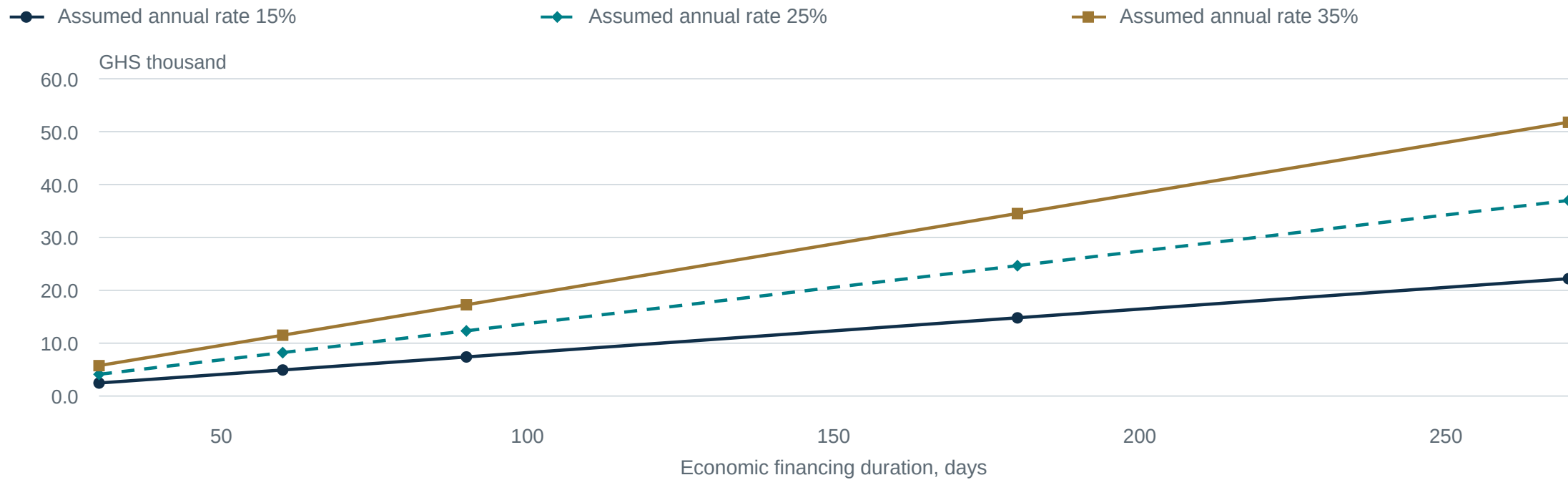
Note: A legally on-time payment can still follow a long economic financing period; a credit balance alone does not reveal either duration.

Longer recovery periods increase the cost of financing the same credit

GHS 200,000 balance; simple interest; rates are explicitly assumed.

Figure 8. Longer recovery periods increase the cost of financing the same credit

E08



Sources: IDER calculations [\[S99\]](#).

Note: No current Ghana median refund delay, business lending quote or statutory interest entitlement is estimated.

Reducing a financing period from 90 to 30 days saves GHS 8,219 in this case

Assumed 25% annual simple rate; eligible credit balance GHS 200,000.

Table 12. Reducing a financing period from 90 to 30 days saves GHS 8,219 in this case

Economic duration	Finance cost, GHS	Cost as % of credit
30 days	4,109.59	2.05%
60 days	8,219.18	4.11%
90 days	12,328.77	6.16%
180 days	24,657.53	12.33%
270 days	36,986.30	18.49%

Sources: IDER calculations [\[S99\]](#).

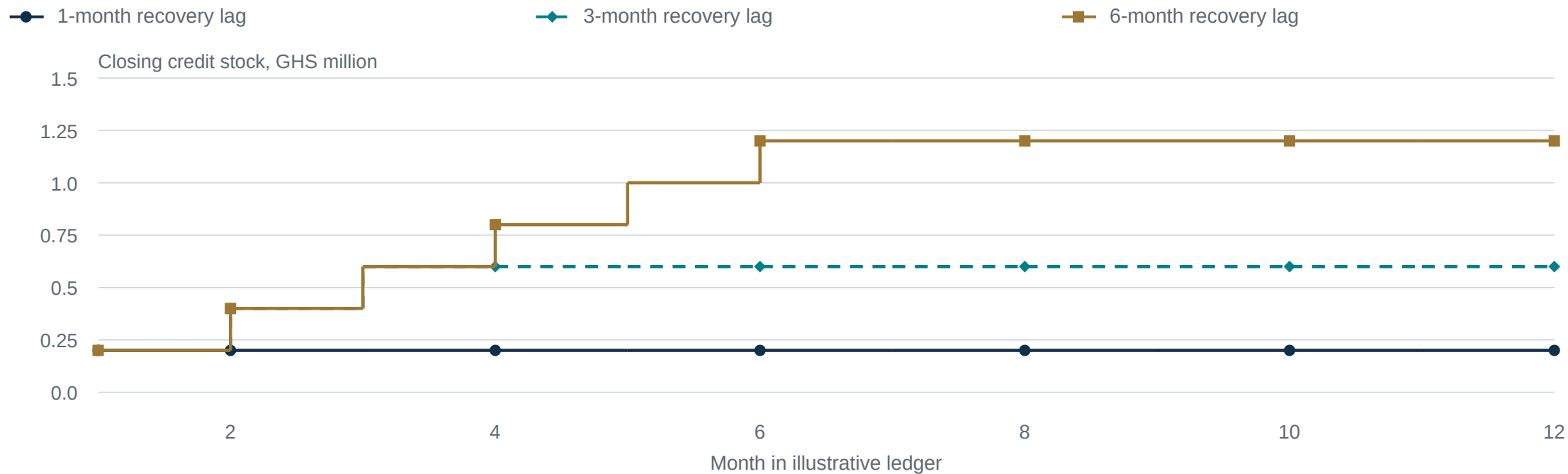
Note: The saving is an accounting sensitivity, not a measured reform effect. The 30-day economic case is not the full statutory export-refund process.

Recurring credits can create a financing stock much larger than one claim

GHS 200,000 created each month; equal full recovery after the stated economic lag.

Figure 9. Recurring credits can create a financing stock much larger than one claim

E09



Sources: IDER calculations [\[S99\]](#).

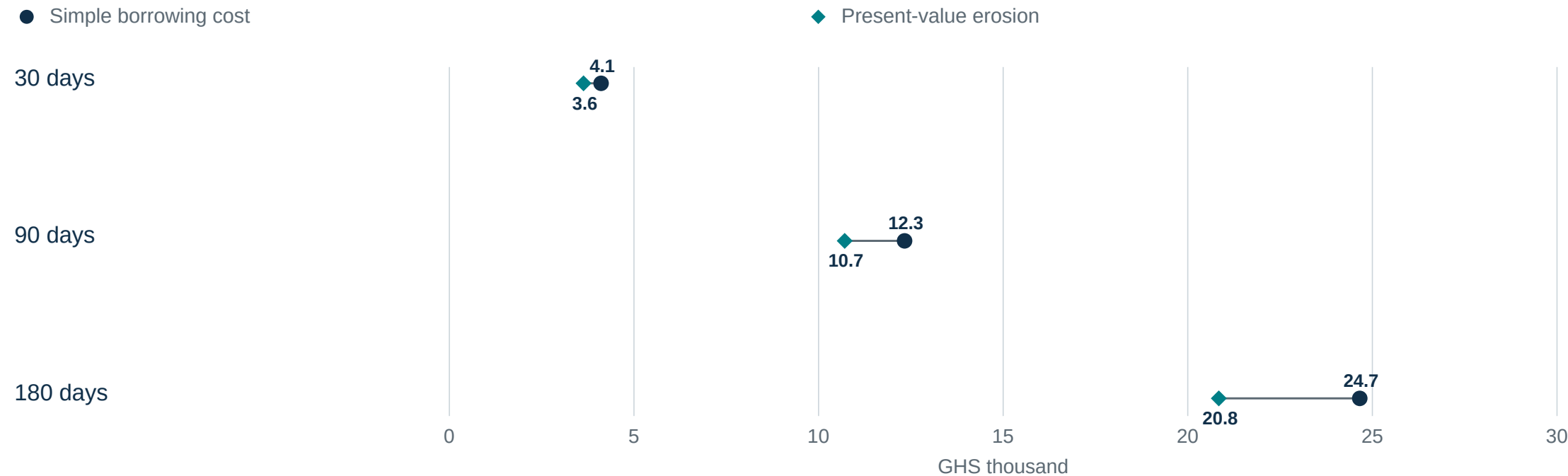
Note: The one-month case can represent an offset or post-eligibility settlement assumption, not automatic export refund eligibility. No denials or partial payments imposed.

Financing expense and present-value erosion answer different questions

One GHS 200,000 credit; assumed 25% annual rate.

Figure 10. Financing expense and present-value erosion answer different questions

E10



Sources: IDER calculations [\[S99\]](#).

Note: Borrowing cost uses simple interest; present value uses annual effective discounting. Do not add them as two independent losses.

Withholding can create a VAT credit while levy payments remain due

Illustrative GHS 1 million net sale and GHS 800,000 eligible net purchases.

Table 13. Withholding can create a VAT credit while levy payments remain due E11

VAT component ledger	GHS	Separate cash or levy entry
Output VAT less input VAT	30,000	150,000 – 120,000
7% withholding certificate	70,000	Customer pays 1,130,000 after withholding.
VAT credit carried	40,000	70,000 credit less 30,000 VAT liability.
NHIL and GETFund net payables	10,000	5,000 on each levy ledger.
Cash contribution after supplier and levies	160,000	1,130,000 – 960,000 – 10,000; accrual margin is 200,000.

Sources: Act 1151 [\[S02\]](#); IDER calculations [\[S99\]](#).

Note: Certificate posting to the VAT ledger is shown separately; no automatic cross-component cash set-off is assumed. Confirm actual administration for the taxpayer.

Recoverable border tax can still absorb working capital

Illustrative import without approved relief; assumed 10% customs duty is not an HS-code determination.

Table 14. Recoverable border tax can still absorb working capital E12

Component	GHS	Treatment in the example
Customs value	1,000,000	Scenario input.
Assumed duty	100,000	10% of customs value; a distinct landed-cost item.
VAT / NHIL / GETFund	165,000 / 27,500 / 27,500	20% combined on an assumed 1,100,000 taxable base.
Recoverable-tax cash exposure	220,000	Eligible components remain separately recorded.
90-day financing at assumed 25%	13,561.64	Simple financing cost of 220,000; duty financing is excluded.

Sources: Act 1151 [\[S02\]](#); GRA import VAT guidance [\[S13\]](#); IDER calculations [\[S99\]](#).

Note: Other border charges, exchange movements, storage and clearance costs are excluded. Approved manufacturer relief requires a separate case.

Invoice timing can separate tax liability from customer settlement

Assess time of supply, payment dates and invoice evidence together.

GOVERNMENT SUPPLIER

A certified invoice and tax point may precede customer payment. Record contract milestone, invoice date, statutory tax payment and actual bank credit separately.

CONTRACTOR OR EXPORTER

Retention, foreign-currency receipts and disputed certification can extend financing needs. Do not label all of the receivable as VAT or all of the delay as a tax-administration delay.

BANK OR FINANCE TEAM

A refund receivable is not immediately available cash collateral. Underwriting requires eligibility, claim status, recovery history and legal enforceability—not only its face value.

Sources: Act 1151 [\[S02\]](#); IDER calculations [\[S99\]](#).

Note: These are case-assessment requirements, not evidence of default, a credit recommendation or a claim that invoices can be delayed to avoid tax.

Goods and taxable services do not share one general GHS 750,000 exemption

Act 1151 section 6; ordinary registration rules and their scope.

Table 15. Goods and taxable services do not share one general GHS 750,000 exemption

Rule	Verified baseline	Analytical consequence
Taxable goods	Actual turnover above GHS 750,000 in 12 months or less, or the relevant expected-turnover test.	Record sales history and expectations; year-end realised turnover alone is insufficient.
Shorter-period test	GHS 187,500 in three months plus the stated forward nine-month expectation.	The threshold is not a single static annual cut-off for every firm.
Taxable services	Registration within 30 days of commencing taxable activity, unless otherwise directed by the Commissioner-General.	Do not apply the goods threshold to an ordinary taxable professional-service firm.
Connected persons / cancellation	Related-person and cancellation provisions affect treatment.	Do not assume splitting activity or falling below the threshold automatically removes registration.

Sources: Act 1151 [\[S02\]](#).

Note: Voluntary registration, exemptions, existing registrants and specialist circumstances require their own assessment.

A larger threshold changes the coverage boundary—not every firm’s optimal status

The goods threshold increases from GHS 200,000 to GHS 750,000.

E13

NOMINAL INCREASE

GHS 550 k

An increase of 275% relative to the earlier threshold; this is not an estimate of firms leaving VAT.

THRESHOLD MULTIPLE

3.75×

The new nominal threshold is 3.75 times the earlier amount. Real growth and inflation affect the firms around it.

FIRM COUNT

Not estimated

A registry with activity, actual and expected turnover, related persons and current registration is needed to estimate coverage changes.

Sources: GRA reform notice [\[S01\]](#); Act 1151 [\[S02\]](#); IDER calculations [\[S99\]](#).

Note: A national estimate of compliance-cost savings cannot be obtained by multiplying the threshold change by a representative firm.

Customer type can reverse the apparent price advantage of non-registration

Illustrative same resource inputs and GHS 20 target margin; both cases assumed legally permissible.

Table 16. Customer type can reverse the apparent price advantage of non-registration

E14

Per-unit item	Unregistered supplier	Registered supplier
Resource input / tax paid	60 / 12	60 / 12
Recovered input tax	0	12
Other cost / target margin	20 / 20	20 / 20
Customer invoice	112	120
Registered buyer's net cost	112	100, after eligible 20 credit

Sources: IDER calculations [\[S99\]](#).

Note: Consumer buyers compare 112 with 120; fully credit-eligible business buyers compare 112 with 100. Compliance costs and equilibrium responses are excluded.

The end of the flat-rate scheme is a separate treatment from a standard-rate cut

A valid evaluation must preserve firms’ actual pre-reform tax regimes.

FORMER STANDARD-RATE FIRM

The 121.90-to-120 benchmark applies to the stated ordinary standard-rate case. It is not a universal before-and-after price formula.

FORMER FLAT-RATE FIRM

Reconstruct old invoice taxes, input-credit restrictions and new registration status from its records. The net change can differ with margins and purchase structure.

SELECTED REGISTRANTS

Voluntary registration, customer demands and reporting capacity affect which firms remain visible. Comparing registered and unregistered firms without addressing selection is not causal.

Sources: GRA reform notice [\[S01\]](#); IDER calculations [\[S99\]](#).

Note: No old flat-rate invoice is imputed and no assumed transition saving is assigned to all MSMEs.

A threshold effect can appear in turnover, organisation and reporting

The direction and size of these responses are empirical questions.

REAL ACTIVITY

Output, entry, exit, investment and customer composition can change. Firm survival and activity need a roster independent of filed VAT returns.

REPORTED ACTIVITY

Invoice issuance and sales reporting may change without the same movement in physical output. Reconcile quantities and third-party purchases where lawful.

IDENTIFICATION

Bunching near a threshold does not identify one mechanism. Test manipulation, connected entities and forward-turnover eligibility before using a discontinuity design.

Sources: IDER calculations [\[S99\]](#).

Note: The presentation does not advise artificial fragmentation, suppressed turnover or non-compliance.

The household burden has a direct tax component and an embedded-cost component

Consumption rank, cash burden and welfare effects are different concepts.

DIRECT PURCHASE TAX

The observed invoice tax depends on the purchased product, outlet and registration status. Home production and exempt items have different treatment.

EMBEDDED INPUT TAX

Tax on inputs that cannot be recovered can remain in the price of an exempt or informal sale. “No VAT shown” does not guarantee a tax-free supply chain.

NET WELFARE

Price changes, producer income, employment, transfers and public spending interact. A static consumption-tax calculation is not a complete fiscal-incidence assessment.

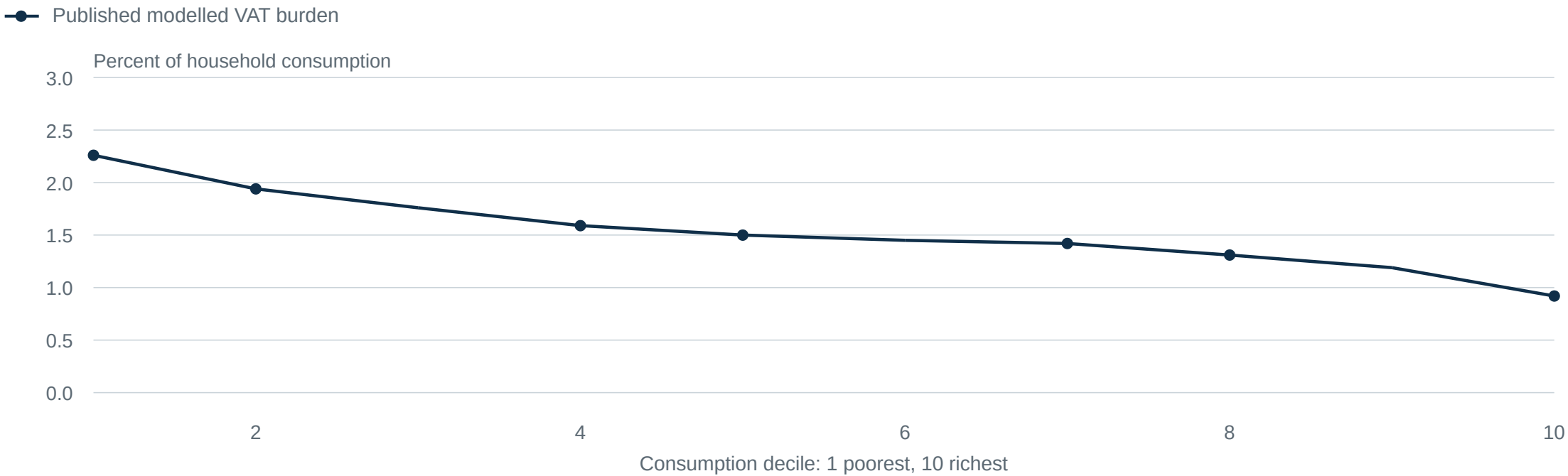
Sources: MoF/IFS GHATAx study [\[S07\]](#); AERC Research Paper 443 [\[S08\]](#); IDER calculations [\[S99\]](#).

Note: No current decile burden is inferred from historical surveys without an explicit uprating, behavioural and tax-classification model.

One historical AERC simulation reports a declining burden across deciles

Published 17.5% regime column using GLSS 7; these are not 2026 estimates.

Figure 11. One historical AERC simulation reports a declining burden across deciles



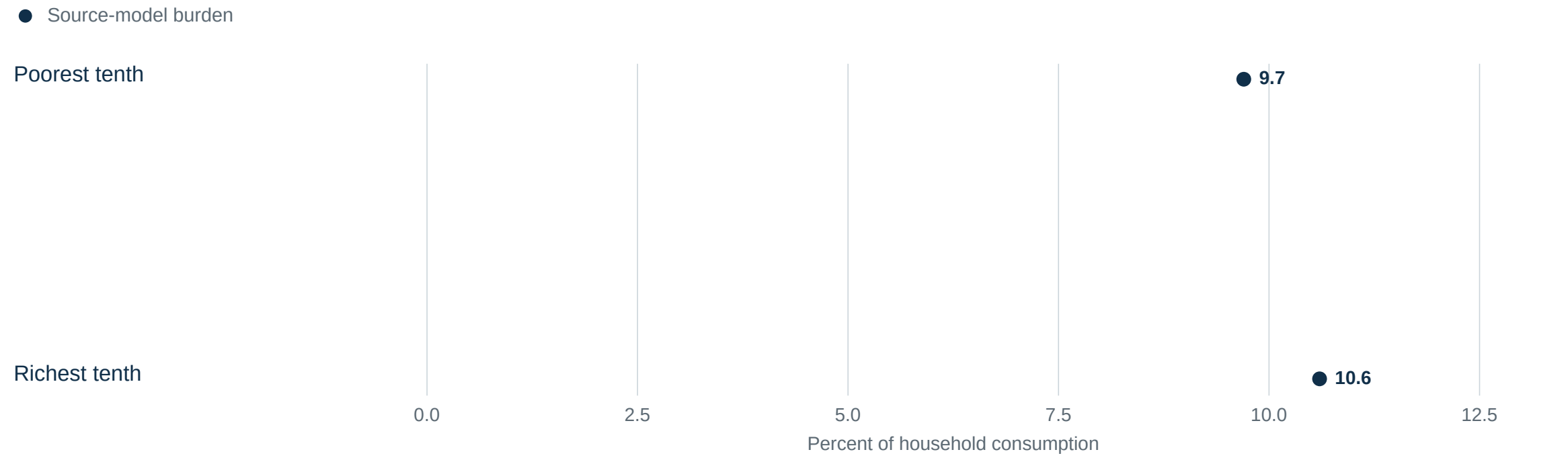
Sources: AERC Research Paper 443 [\[S08\]](#).

Note: Reproduced from Table A1. Source-model inputs and assumptions are retained; the series is not rescaled to the 2026 statutory rate.

GHATAX reports a different historical burden under a different tax perimeter

December 2022 VAT-plus-levies simulation; original model, survey uprating and embedded-tax treatment.

Figure 12. GHATAX reports a different historical burden under a different tax perimeter



Sources: MoF/IFS GHATAX study [\[S07\]](#).

Note: These are historical simulated endpoints, not observed 2026 burdens. They should not be pooled with the AERC series.

Different historical models are not alternative estimates of one 2026 effect

The discrepancy is disclosed rather than resolved by choosing the more convenient result.

Table 17. Different historical models are not alternative estimates of one 2026 effect

Dimension	AERC historical column	MoF/IFS GHATAX
Tax-policy frame	Published 17.5% regime comparison.	December 2022 VAT and associated levies.
Microdata and production structure	Older GLSS waves and input-output modelling; displayed column uses GLSS 7.	GLSS 7 and social accounting structure, uprated to the policy year.
Displayed burden endpoints	2.26% poorest; 0.92% richest.	9.7% poorest; 10.6% richest.
Required before a common comparison	Reproduce tax perimeter, embedded costs, informality, denominators and assumptions.	Same harmonisation; no arithmetic averaging of incompatible outputs.

Sources: MoF/IFS GHATAX study [\[S07\]](#); AERC Research Paper 443 [\[S08\]](#); IDER calculations [\[S99\]](#).

Note: The exact contribution of each modelling difference has not been separately replicated here.

Basket exposure determines how a direct tax saving affects the household budget

Fixed quantities; direct standard-rated purchases only; no embedded-cost or income response.

Figure 13. Basket exposure determines how a direct tax saving affects the household budget E15

	0% passed	25% passed	50% passed	75% passed	100% passed
20% of budget exposed	0.000	0.078	0.156	0.234	0.312
40% of budget exposed	0.000	0.156	0.312	0.468	0.623
60% of budget exposed	0.000	0.234	0.468	0.701	0.935
80% of budget exposed	0.000	0.312	0.623	0.935	1.247

Static saving as percent of the original household consumption budget

Sources: IDER calculations [\[S99\]](#).

Note: Shares are illustrative, not Ghana decile estimates. A 40%-exposed basket with full direct pass-through saves 0.623% of its original budget.

A GHS 5,000 budget does not receive a uniform 1.56% saving

Illustrative fixed consumption basket: 40% initially spent on affected standard-rated purchases.

FULL DIRECT PASS-THROUGH GHS 31.17 0.40 × 5,000 × (1 – 120 / 121.90). This is an expenditure saving at fixed quantities.	HALF DIRECT PASS-THROUGH GHS 15.59 Half of that direct saving, before changes in income, exempt-item prices and embedded input costs.	FIXED-INCOME EXPOSURE Basket-specific For retirees or other fixed-income households, actual products and purchase channels matter; no pension benefit or investment return is estimated.
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Sources: IDER calculations [\[S99\]](#).

Note: This is a transparent consumer-budget illustration, not personalised advice or a representative Ghana household.

A nationally weighted analysis must preserve household and market heterogeneity

Specify subgroup questions before seeing the estimated effects.

HOUSEHOLD GROUPS

Report consumption deciles, locality and household composition using survey weights. Avoid assigning the same formal-market exposure to every income group without testing it.

DIRECT AND INDIRECT

Map expenditure items to legal tax classes and input-output exposure. Keep producer-income and public-spending effects separate from the static consumer-price channel.

UNCERTAINTY

Propagate sampling uncertainty and plausible pass-through, informality and embedded-tax assumptions. Label model sensitivity separately from survey confidence intervals.

Sources: MoF/IFS GHATAx study [\[S07\]](#); AERC Research Paper 443 [\[S08\]](#); IDER calculations [\[S99\]](#).

Note: No poverty, inequality, gender or regional treatment effect is fabricated from the aggregate CPI or a historical decile chart.

The realised Ghana price–margin split is not identified by the recovered data

A valid estimate requires a linked counterfactual—not simply more aggregate time-series observations.

Table 18. The realised Ghana price–margin split is not identified by the recovered data

Required object	Available evidence	Missing identification component
Matched consumer prices	Two current headline CPI snapshots; no item–outlet micro-panel.	Same products, quality, quantities and treatment exposure.
Matched input costs and margins	Illustrative cost and invoice ledgers.	Firm invoices, inventory valuation, unit costs and quantities.
Refund outcomes	Historical review, credit-position regression and legal clocks.	Current inception-cohort applications, audits, offsets and payments.
Tax assignment and comparison	Common January reform date; different statutory exposures.	Defensible exposure variation and a credible no-reform trend.

Sources: IDER calculations [\[S99\]](#).

Note: Adding forecasts or assigning identical national treatment values to many firms would not supply an independent source of identifying variation.

Use pre-reform exposure and matched products to separate the channels

Prospective design: not estimated in this publication.

P01

DEFINE THE EXPOSURE

Before the announcement, record output-tax regime, taxable-input levy intensity, customer type and registration status. Freeze definitions to avoid using post-treatment choices as baseline treatment.

DEFINE THE COMPARISON

Follow the same item–outlet combinations over time. Contrast credible differences in exposure, with explicit anticipation, seasonality and competing cost-shock assessments.

DEFINE THE ESTIMAND

Estimate gross-price response and net unit-margin response separately. Exposure-specific effects do not automatically identify the economy-wide effect of a common national reform.

Sources: Callaway et al., continuous DiD [\[S15\]](#); IDER calculations [\[S99\]](#).

Note: A linear exposure-by-post coefficient needs additional interpretation assumptions under heterogeneous continuous treatment.

The identification threats are specific to this reform

Controls do not replace a valid treatment-assignment argument.

Table 19. The identification threats are specific to this reform

Threat	Why it matters	Required design response
Simultaneous cost movements	Import prices, currency, fuel and seasonality may covary with baseline VAT exposure.	Pre-specified cost-exposure controls and credible comparison trends; test alternatives.
Mediation versus confounding	Input-credit recovery is part of the reform mechanism.	Do not control away post-reform recovery when estimating the total effect.
Anticipation and contracts	Prices may change after announcement or only at renegotiation.	Separate announcement, implementation and contract horizons.
Tax status is selected	Voluntary registration and exit respond to costs and customers.	Baseline roster, treatment histories and explicit selection analysis.

Sources: Callaway et al., continuous DiD [\[S15\]](#); Callaway–Sant’Anna [\[S16\]](#); IDER calculations [\[S99\]](#).

Note: Fixed effects, instrumental variables or an ARDL label do not by themselves solve these threats.

Release a causal result only with a defensible design and its diagnostics

No coefficients or confidence bands are drawn here because no model was fitted.

DESIGN CHECKS

Show pre-treatment trends, anticipation tests and placebo dates or outcomes. Examine common support and composition shifts; a non-significant pre-trend test is not proof of validity.

UNCERTAINTY

Cluster at the relevant assignment or shared-shock level. Small-cluster inference requires appropriate methods and stated assumptions, not automatic conventional standard errors.

ROBUSTNESS

Compare matched-sample, weighting and alternative cost specifications; report item entry/exit and influential firms. Pre-specify outcomes and horizons to limit selective reporting.

Sources: Callaway et al., continuous DiD [\[S15\]](#); Callaway–Sant’Anna [\[S16\]](#); IDER calculations [\[S99\]](#).

Note: Simultaneous uncertainty across horizons differs from pointwise intervals. Additional evidence may support association but not a causal interpretation.

A simple before–after comparison around GHS 750,000 is insufficient

Prospective goods-registration design; the legal assignment rule must be reconstructed first.

P02

RUNNING VARIABLE

Use independently supported pre-treatment turnover, related-person links and forward-turnover evidence. Exclude service activities wrongly classified under the goods threshold.

LOCAL VALIDITY

Test sorting, measurement error and discontinuities in baseline covariates. Explore bandwidth and donut sensitivity only where the underlying assignment is valid.

INTERPRETATION

Actual registration may not switch sharply at one observed annual value. A fuzzy design needs a valid first stage and exclusion argument; it estimates a local effect, not all MSMEs.

Sources: Act 1151 [\[S02\]](#); IDER calculations [\[S99\]](#).

Note: This is a proposed identification protocol; no regression-discontinuity estimate or number of deregistered firms is reported.

Unpaid claims must remain in the refund sample

Design the dataset from claim inception, not from the list of paid refunds.

P03

EVENT HISTORY

Retain original claim, revisions, audits, admissible-clock start, partial payment, offset, rejection and bank value date. Do not reset old claims as new applications.

DURATION ESTIMATION

Use survival analysis only with defensible censoring assumptions. Refund, offset and rejection are distinct competing outcomes; an unpaid claim is not a zero-day refund.

STATISTICAL OUTPUT

Report claim-weighted and amount-weighted aging, paid share and tail exposure. A median time to payment is undefined if the estimated paid proportion never reaches one half.

Sources: IDER calculations [\[S99\]](#).

Note: The public legal deadline and the economic recovery duration must be reported as separate clocks.

The starting roster must include firms and claims that disappear

Missing data can correlate with the cash-flow stress being studied.

Table 20. The starting roster must include firms and claims that disappear

Selection channel	Minimum record	Sensitivity or interpretation
Non-filers and exits	Eligible baseline firms, closed outlets and nonresponse reasons.	Report attrition by exposure and size, not only surviving reporters.
Paid-claim selection	All submitted claims, including disputed and unpaid balances.	Use inception cohorts and competing outcomes.
Invoice linkage loss	Original record count and value; unmatched supplier/buyer reasons.	Audit duplicates and report value coverage as well as row coverage.
Correction assumptions	Predictors measured before treatment and overlap diagnostics.	Weighting requires stated missing-at-random/positivity assumptions; add non-random missingness sensitivity.

Sources: IDER calculations [\[S99\]](#).

Note: No selection weights are fabricated from the published aggregate tables. Results must retain any unresolvable population limitation.

Translate the mechanism into the institution’s own exposure

These applications require entity-level evidence; they are not investment recommendations.

Table 21. Translate the mechanism into the institution’s own exposure

Audience	Relevant exposure	Evidence needed before a decision
Manufacturers / importers / exporters	Input eligibility, landed tax cash, recovery lag and foreign-currency timing.	Verified purchase and import records; separate relief and ordinary-tax cases.
Banks / DFIs / private equity	Borrower tax receivables, liquidity conversion and margin sensitivity.	Aged credit ledger, adjudication status, funding cost and business forecasts.
Pensions / insurers / asset managers	Counterparty cash timing and consumer-price exposure.	Holdings, liability structure and issuer-specific accounts; no VAT-only return forecast.
MSMEs / accountants / suppliers	Goods/service classification, customer type and withholding certificates.	Tax status, turnover evidence, valid invoices and payment milestones.

Sources: IDER calculations [\[S99\]](#).

Note: Diaspora investors and corporate executives face the same need for transaction-specific legal and financial verification.

Different public questions require different evidence products

A published revenue or CPI aggregate is not a substitute for the underlying incidence measure.

Table 22. Different public questions require different evidence products

Audience	Question supported	Decision-grade evidence product
MoF / GRA / Treasury	How do collections, lawful credits and refunds reconcile?	Component-ledger cash bridge, legal-clock compliance and cohort aging.
BoG / researchers / think tanks	What part of price change is attributable to tax design?	Matched-product study with stated identification and uncertainty.
Parliament / sector ministries	Who bears the burden, and what is the fiscal interaction?	Weighted household and producer incidence, with separate spending assumptions.
Consumers / media / development partners	Which findings are observed and which are conditional?	Plain-language brief with gross/net distinctions, vintages and reproducible source links.

Sources: IDER calculations [\[S99\]](#).

Note: No preferred tax-policy option, allocation or political judgement is inferred from these measurement requirements.

A management dashboard needs balances, dates and exceptions —not one refund ratio

Proposed operating controls for authorised internal use.

DAILY / WEEKLY

Track taxes paid, credit generated, withholding certificates and expected cash settlements by tax component. Match bank value dates rather than assuming ledger recognition is cash.

MONTHLY

Reconcile opening balance + valid additions – offsets – payments – denials = closing balance. Assign unresolved differences to a documented exception register.

QUARTERLY

Compare product margins and gross prices with the pre-specified baseline. Refresh financing sensitivities and tax classifications; keep scenario changes separate from observed outcomes.

Sources: IDER calculations [\[S99\]](#).

Note: Working-capital forecasts should include payable taxes and customer receivables, not VAT credits in isolation.

A 180-day programme can turn the unmeasured split into a testable research output

Proposed windows after authorised access; milestones are project targets, not claimed achievements.

Table 23. A 180-day programme can turn the unmeasured split into a testable research output

Window / proposed lead	Deliverable	Measurable acceptance condition
Days 0–30 GRA, MoF, IDER	Legal/source register, tax-class map and secure linkage specification.	Every included variable has unit, event date, source, tax component and status.
Days 31–60 Data custodians + research team	Pilot invoice, refund and business panel with linkage diagnostics.	No unresolved duplicate keys; row and value coverage reported by exposure group.
Days 61–90 IDER + independent methods reviewer	Frozen sample, power assessment and preregistered design.	Feasibility decision documents counterfactual, attrition, cluster structure and precision.
Days 91–180 Research team + reviewers	Conditional analysis or identified estimates, replication and stakeholder brief.	Independent reproduction; uncertainty and limitations accompany each central finding.

Sources: IDER calculations [\[S99\]](#).

Note: If identification fails, publish transparent descriptive and conditional evidence rather than a falsely causal coefficient.

Set targets only after the baseline is measured

Suggested definitions and frequencies; this report does not invent achieved performance.

Table 24. Set targets only after the baseline is measured

Indicator	Definition	Frequency / data owner
Economic credit age	Cash-origin-to-offset/payment duration, with remaining balances.	Monthly / taxpayer and GRA ledgers.
Legal-clock compliance	Share and value settled within applicable statutory clock, among eligible cases.	Monthly / GRA claim events.
Input-credit loss	Denied or expired eligible-claim candidates, by documented reason.	Monthly / finance and tax teams.
Matched price / margin response	Constant-quality gross price and net unit margin by baseline exposure.	Weekly/monthly / authorised business panel.
Coverage and attrition	Linked value, nonreporting firms, exits and outstanding claims.	Each release / independent quality lead.

Sources: IDER calculations [\[S99\]](#).

Note: A paid-claims-only median or a falling credit stock can conceal rejection, offset or sample exit.

Rate design, credit recovery and registration affect different margins

This framework supports comparison without selecting a tax-policy choice.

RATE OR BASE CHANGE

Compare household exposure, revenue under alternative compliance assumptions and effects on exempt chains. A static price benefit is not the full fiscal welfare effect.

REFUND ADMINISTRATION

Compare cash-release timing and legitimate-credit verification, including fraud, dispute and audit costs. Faster settlement and weak control are not equivalent concepts.

REGISTRATION BOUNDARY

Compare compliance burden, input-credit chain continuity, customer mix and reporting incentives. Effects on goods traders need not match taxable service providers.

Sources: Act 1151 [\[S02\]](#); IDER calculations [\[S99\]](#).

Note: Tradeoffs require explicit objectives and empirical evidence; the report does not rank or endorse policy alternatives.

Price and margin methods are explicit accounting—not fitted regressions

All amounts refer to one unchanged unit unless stated otherwise.

Table 25. Price and margin methods are explicit accounting—not fitted regressions

Method	Calculation	Interpretation
E01 / E05 Direct wedge	Old price = $100 \times 1.06 \times 1.15 = 121.90$; new price = $100 \times 1.20 = 120.00$.	Full direct price change = -1.55865% .
E04 Fiscal identity	Consumer saving + firm unit-margin gain = reduction in chain tax revenue.	Holds here at fixed quantities and resource costs; includes input levies in the old chain.
E06 Input recovery	Old cost = $80 + 0.06 \times \text{input base}$; margin-preserving new net price = $100 - 0.06 \times \text{input base}$.	At input base 60, new gross price 115.68; combined change -5.10254% .
E07 Cost sensitivity	New margin = new gross price / 1.20 – $80 \times (1 + \text{resource-cost shock})$.	Cost changes are imposed independently; no input-cost elasticity is estimated.

Sources: IDER calculations [\[S99\]](#).

Note: Pass-through values from 0 to 100% are selected scenarios, not theoretical bounds; negative or over-shifting responses are not ruled out.

Timing, population and threshold denominators remain explicit

Worked substitutions support independent checking of the results.

Table 26. Timing, population and threshold denominators remain explicit

Method	Calculation	Status
E08 Credit finance	$200,000 \times 0.25 \times 90 / 365 = \text{GHS } 12,328.77.$	Assumed rate and duration; simple interest.
E09 Credit stock	Closing = opening + new valid credits – actual recovery; $200,000 \times 6 = 1,200,000$ at steady six-month lag.	Synthetic monthly ledger; no observed business claim.
E10 Present value	$\text{Loss} = \text{balance} \times [1 - (1 + \text{annual discount rate})^{-(\text{days}/365)}].$	Alternative timing valuation; not added to simple finance cost.
E15 Household budget	$\text{Exposed budget share} \times \text{price pass-through} \times (1 - 120/121.90).$	Fixed-quantity direct-price saving; not total welfare.
E13 Threshold	$750,000 / 200,000 = 3.75; \text{increase} = 275\%.$	Nominal statutory comparison; not a firm-count estimate.

Sources: IDER calculations [\[S99\]](#).

Note: No probability, confidence interval or representative household is inferred from the parameter grid.

Four linked datasets are needed for the next empirical stage

The package includes headers-only templates—not fabricated records.

Table 27. Four linked datasets are needed for the next empirical stage

Dataset / grain	Minimum key fields	Protection and quality rule
Firm–item–outlet–week	Constant unit size, quantity, gross price, tax components, unit input cost, baseline tax status.	Pseudonymise firms; preserve nonresponse and product exits.
Refund claim–event	Tax ledger, cash origin, application, audit, legal-clock start, approval, offset, payment, rejection.	Keep partial settlements and immutable claim lineage.
Goods firm–registration history	Audited and expected turnover, related persons, activity, registration and cancellation.	Do not mix taxable services with goods-threshold assignments.
Household–item expenditure	Survey weight, strata, clusters, consumption, home production, outlet and tax class.	Secure microdata access; disclose uprating and classification uncertainty.

Sources: IDER calculations [\[S99\]](#).

Note: The report does not claim access to GRA confidential microdata, business ledgers or current household consumption records.

The package separates source truth, model assumptions and exhibit output

Checks are executable; source agreement is not the same as causal validity.

Table 28. The package separates source truth, model assumptions and exhibit output

Layer	Executed check	Remaining boundary
Source transcriptions	Historical table rows and stated units retained with locators; material source images inspected.	Not an audit of the originating tax or survey systems.
Accounting calculations	All direct and combined price cases satisfy the customer–firm–government identity.	Fixed quantity, resource costs and eligible recovery are maintained assumptions.
Historical continuity	Six within-year audit counts close; two cross-year carry differences remain disclosed.	No unexplained bridge is treated as actual applications or payments.
Publication integrity	Editable exhibits, source notes, navigation, render review and machine checks supplied.	No external institutional or accessibility certification is claimed.

Sources: IDER calculations [\[S99\]](#).

Note: Successful reproduction proves what the supplied model computes; it does not verify an unobserved behavioural parameter.

The most consequential unresolved questions are visible

These limitations accompany the decision brief rather than being confined to code comments.

Table 29. The most consequential unresolved questions are visible

Unresolved item	Why it matters	Treatment
Realised national pass-through	Item prices and matching costs are unavailable.	No national causal consumer/margin share reported.
Current refund delays	A complete 2026 claim-to-bank event history is unavailable.	Only legal clocks and conditional duration costs shown.
Specialist later legal changes	Primary gold-amendment commencement not verified.	Gold-to-BoG treatment excluded pending legal clearance.
Distribution model harmonisation	Historical studies have distinct perimeters and assumptions.	Do not average or relabel their outputs as 2026 estimates.
Original PDF binaries	Runtime source downloads failed despite accessible web text/images.	Source URLs, locators, transcriptions and access exceptions retained.

Sources: IDER calculations [\[S99\]](#).

Note: The analysis remains useful for verified legal distinctions and transparent financial sensitivities within the stated scope.

The validation adds historical evidence—not an invented 2026 effect

Three evidence levels: source-reported collections, historical fitted associations and new conditional calculations.

2025 VAT COLLECTIONS

GHS 39.155 bn

Domestic plus import VAT, compared with a GHS 42.985 bn annual target. This predates the January 2026 reform.

HISTORICAL CREDIT ASSOCIATION

+5.90 pp

A source-fitted within-firm association between withholding credits and a credit position, using 2018–2020 returns. It is not a causal refund effect.

2026 NATIONAL PRICE SPLIT

Not identified

The supplied price, cost, registration and refund microdata templates still contain no observations. Scenarios cannot fill that gap.

Sources: MoF/IFS VAT review [\[S06\]](#); MoF 2025 annual revenue report [\[S17\]](#); IDER calculations [\[S99\]](#).

Note: New results retain source periods, estimator limitations and rounding. The review does not certify the underlying taxpayer accounts.

The 2025 VAT shortfall is GHS 3.830 billion on a matched annual basis

GHS billion; recomputed from the Ministry of Finance’s Appendix Table 1, shown in GHS million.

Table 30. The 2025 VAT shortfall is GHS 3.830 billion on a matched annual basis E16

VAT component	Actual	Annual target	Actual – target	Target achieved
Domestic VAT	20.898	22.708	–1.810	92.03%
Import VAT	18.257	20.277	–2.020	90.04%
Total	39.155	42.985	–3.830	91.09%

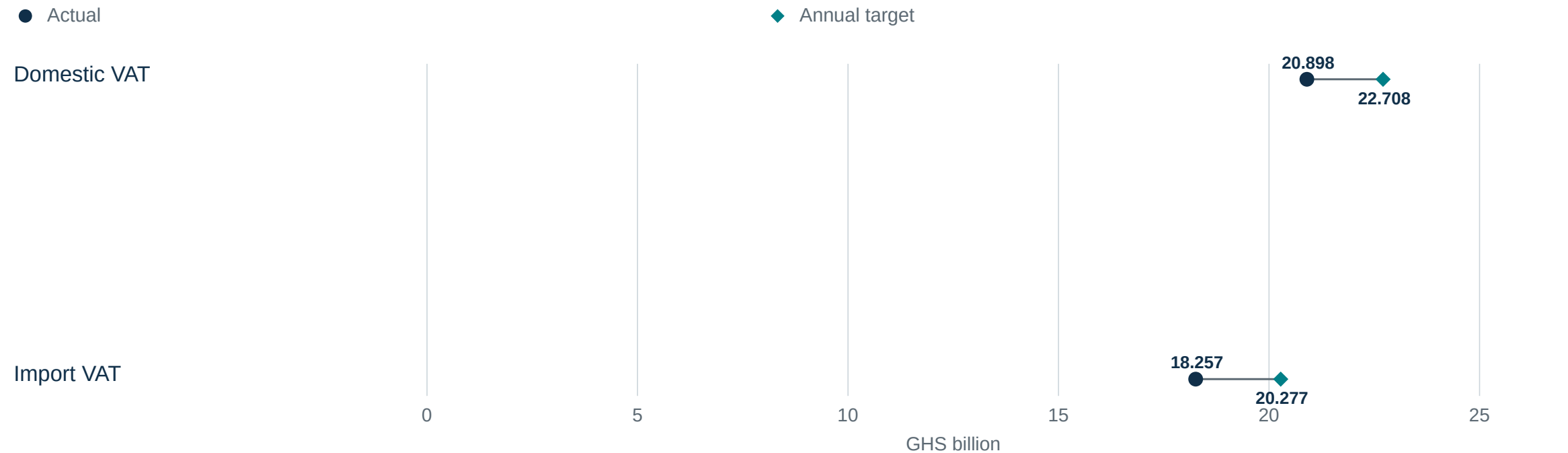
Sources: MoF 2025 annual revenue report [\[S17\]](#); IDER calculations [\[S99\]](#).

Note: This is a target comparison, not a causal loss or a VAT-refund payment estimate. Do not subtract the earlier Q1–Q3 vintage to manufacture Q4.

Import VAT accounts for 52.74% of the combined target shortfall

Annual 2025 source amounts; domestic and import VAT remain separate collection lines.

Figure 14. Import VAT accounts for 52.74% of the combined target shortfall



Sources: MoF 2025 annual revenue report [S17]; IDER calculations [S99].
Note: The remaining 47.26% is domestic VAT. A share of a target shortfall is not a sectoral non-compliance rate or an incidence estimate.

Domestic-VAT growth is compatible once source rounding is retained

2024 rounded narrative amounts versus 2025 Appendix Table 1; nominal change, not a real-growth estimate.

Table 31. Domestic-VAT growth is compatible once source rounding is retained

Component	2024, GHS bn	2025, GHS bn	Source growth	Recomputed
Domestic VAT	17.140	20.898	22.0%	21.93%
Import VAT	16.080	18.257	13.5%	13.54%
Total VAT	33.220	39.155	17.9%	17.87%

Sources: MoF 2025 annual revenue report [\[S17\]](#); IDER calculations [\[S99\]](#).

Note: Domestic rounding envelope: 21.89%–21.96%, not a confidence interval. The source’s 22.0% rounds an underlying rate in 21.95%–22.05%; the intervals overlap. This does not establish a source error.

Withholding credits are associated with a higher probability of a credit position

MoF/IFS Table A.1; standard VAT, May 2018–December 2020; firm and year-month fixed effects.

Table 32. Withholding credits are associated with a higher probability of a credit position E17

Source specification	Coefficient	Robust SE	Observations	Sample restriction
Any withholding credit (0/1)	0.059	0.005	155,686	Monthly non-nil returns.
Log withholding credit amount	0.032	0.005	5,992	Positive withholding credits only.

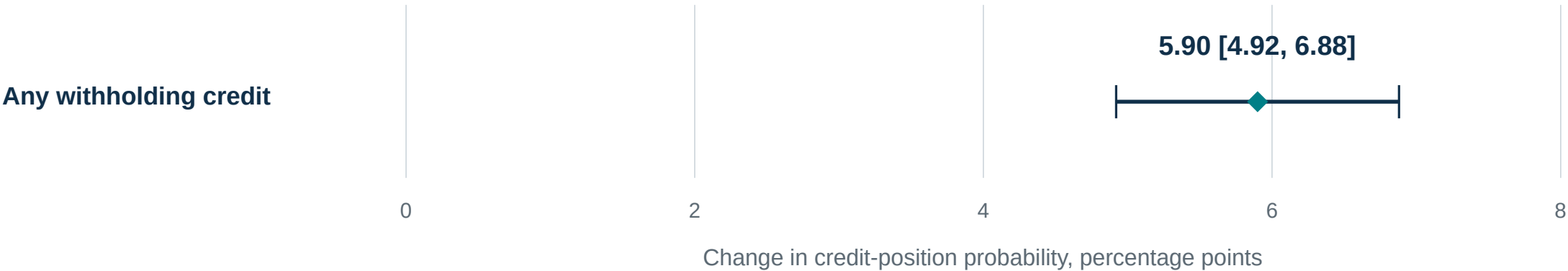
Sources: MoF/IFS VAT review [\[S06\]](#); IDER calculations [\[S99\]](#).

Note: Outcome is a credit-position indicator, not cash refund receipt. NHIL/GETFund excluded. A 10% amount increase corresponds to 0.305 pp in the second linear-probability specification.

The reported association is 5.90 percentage points; causality remains unproven

Approximate 95% normal interval reconstructed from the published coefficient and rounded robust standard error.

Figure 15. The reported association is 5.90 percentage points; causality remains unproven



155,686 firm-month records | Firm and year-month fixed effects | Historical association, not a 2026 effect

Sources: MoF/IFS VAT review [\[S06\]](#); IDER calculations [\[S99\]](#).

Note: Interval = $100 \times [0.059 \pm 1.96 \times 0.005]$. Original microdata and covariance matrix were not supplied; no re-estimation or re-clustering is claimed.

Fixed effects do not remove selected withholding or omitted changing costs

Use the historical regression to motivate a mechanism—not to calibrate today’s price or refund response.

ENDOGENEITY

Firm effects remove time-invariant differences. They do not remove changing contracts, taxable sales, input purchases or other factors correlated with withholding credits.

SELECTION

Non-nil filing and positive withholding restrict the samples. The 5,992-record specification does not estimate the same population quantity as the 155,686-record specification.

INFERENCE

The source reports robust standard errors. Firm-clustered or multiway uncertainty cannot be reconstructed from one coefficient and its standard error; no such correction is claimed.

Sources: MoF/IFS VAT review [\[S06\]](#); IDER calculations [\[S99\]](#).

Note: Credit position, approved refund, final offset and bank payment are different outcomes. None of the historical coefficients identifies national 2026 pass-through.

Sector VAT-gap estimates retain negative values — 1 of 2

Source-model compliance gap as percent of potential sector revenue; changes are percentage points.

Table 33. Sector VAT-gap estimates retain negative values — 1 of 2

Sector	2017	2024	Change, pp
Agriculture, forestry and fishing	97%	96%	−1
Mining and quarrying	−30%	−57%	−27
Petroleum and gas	−134%	−219%	−85
Manufacturing	71%	61%	−10
Electricity, gas, steam and air conditioning	42%	−43%	−85
Water, sewage and waste management	80%	81%	1
Construction	98%	97%	−1
Wholesale and retail trade*	77%	92%	15
Transport and storage	85%	85%	0

Sources: MoF/IFS VAT-gap study [\[S05\]](#); IDER calculations [\[S99\]](#).

Note: Negative estimates are retained, not clipped to zero. *The source warns that the 2017 trade estimate is biased upwards by VFRS; no causal trend is inferred.

Sector VAT-gap estimates retain negative values — 2 of 2

Source-model compliance gap as percent of potential sector revenue; changes are percentage points.

Table 34. Sector VAT-gap estimates retain negative values — 2 of 2 E18

Sector	2017	2024	Change, pp
Accommodation and food services	93%	85%	−8
Information and communication	49%	58%	9
Financial and insurance services	17%	−148%	−165
Real-estate activities	45%	27%	−18
Professional, scientific and support services	28%	−6%	−34
Public administration and defence	43%	−116%	−159
Education	92%	70%	−22
Human health and social care	−50%	−28%	22
Arts, recreation, social work and other services	−16%	−533%	−517

Sources: MoF/IFS VAT-gap study [\[S05\]](#); IDER calculations [\[S99\]](#).

Note: Negative estimates are retained, not clipped to zero. *The source warns that the 2017 trade estimate is biased upwards by VFRS; no causal trend is inferred.

Eight negative sector estimates are a measurement warning—not a tax dividend

All 18 source sectors are retained. Percentage gaps cannot be added or averaged into a national money total.

SOURCE DENOMINATORS

A sector percentage uses modelled potential revenue, not sector turnover. Negative estimates can reflect modelling, refund and classification differences; they are not automatic evidence of excess tax payments.

SOURCE COMPARABILITY

The 2013 series lacks sector refund data and is biased towards zero in the source. Its values remain in the evidence file, not in an unqualified trend graph.

BUSINESS USE

A modelled national or sector gap is not a forecast of assessments against a particular firm. Borrower exposure requires its own invoices, tax positions and disputes.

Sources: MoF/IFS VAT-gap study [\[S05\]](#); IDER calculations [\[S99\]](#).

Note: The 2017–2024 differences describe published model estimates, not changes caused by a registration, enforcement or rate intervention.

Output-tax and input-cost relief need not be passed through at the same rate

25 independent-channel cases: GHS 60 taxable inputs; full eventual recovery; resource costs and quantities fixed.

Figure 16. Output-tax and input-cost relief need not be passed through at the same rate

E19

	Output: 0%	Output: 25%	Output: 50%	Output: 75%	Output: 100%
Input relief passed: 0%	0.00	0.39	0.78	1.17	1.56
Input relief passed: 25%	0.89	1.28	1.67	2.05	2.44
Input relief passed: 50%	1.77	2.16	2.55	2.94	3.33
Input relief passed: 75%	2.66	3.05	3.44	3.83	4.22
Input relief passed: 100%	3.54	3.93	4.32	4.71	5.10

Consumer price reduction, percent of old GHS 121.90 invoice

Sources: IDER calculations [\[S99\]](#).

Note: Selected transmission settings are assumptions, not estimates or bounds. Negative pass-through and over-shifting remain possible outside this grid.

The same price change can come from different commercial decisions

New gross price = 121.90 – 1.90 × output pass-through – 4.32 × input pass-through.

OUTPUT CHANNEL ONLY

Passing the full direct invoice change but no input relief gives a GHS 120.00 price and a GHS 3.60 unit-margin gain in the fully recovered input case.

INPUT CHANNEL ONLY

Passing the full input relief but no direct invoice change gives a GHS 117.58 price and a GHS 1.583 unit-margin gain.

BOTH CHANNELS

Full pass-through of both components gives GHS 115.68 and preserves the GHS 16.40 baseline unit margin. One aggregate price cannot reveal both transmission parameters.

Sources: IDER calculations [\[S99\]](#).

Note: These are partial-equilibrium accounting cases. Funding costs, supplier responses and sales volume must be measured separately.

Financing cost must follow the remaining balance—not the original face value

Assumed GHS 200,000 credit; 25% annual simple financing; recovery at days 30, 90 and 180.

Table 35. Financing cost must follow the remaining balance—not the original face value

E20

Interval, days	Opening credit	Recovery at end	Closing credit	Interval finance cost
0–30	200,000	50,000	150,000	4,109.59
30–90	150,000	50,000	100,000	6,164.38
90–180	100,000	100,000	0	6,164.38
Total	—	200,000	0	16,438.36

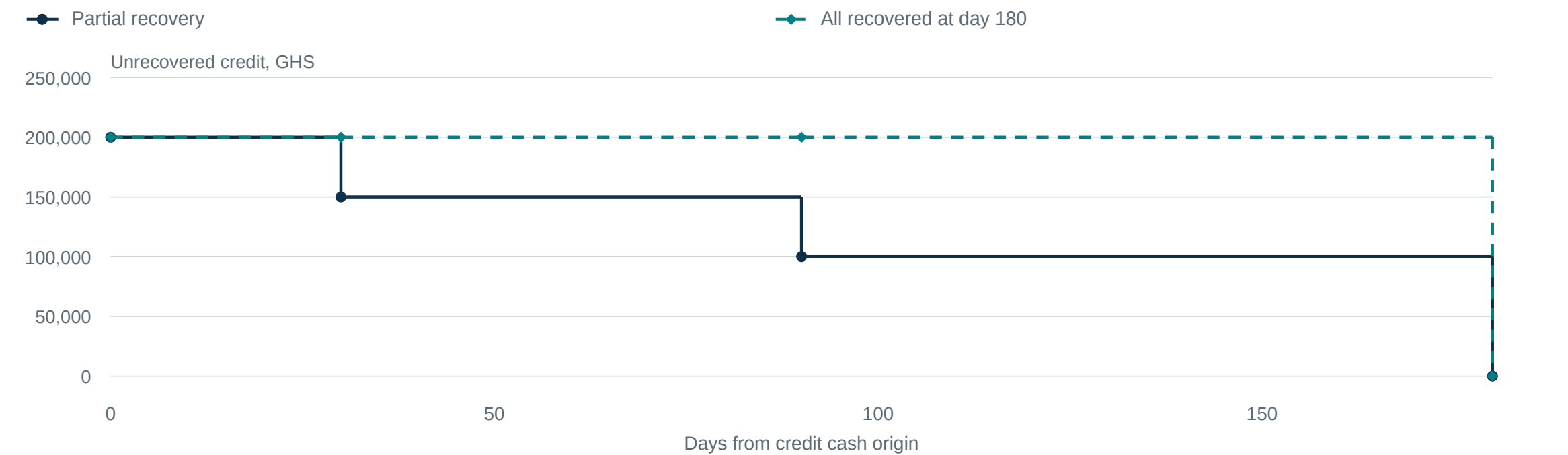
Sources: IDER calculations [\[S99\]](#).

Note: Amounts in GHS. The amount-weighted economic duration is 120 days. These are assumed settlements, not a measured Ghana refund cohort.

Partial payments reduce finance cost by GHS 8,219 in this 180-day case

Same GHS 200,000 original credit and 25% annual simple financing rate.

Figure 17. Partial payments reduce finance cost by GHS 8,219 in this 180-day case



Sources: IDER calculations [\[S99\]](#).

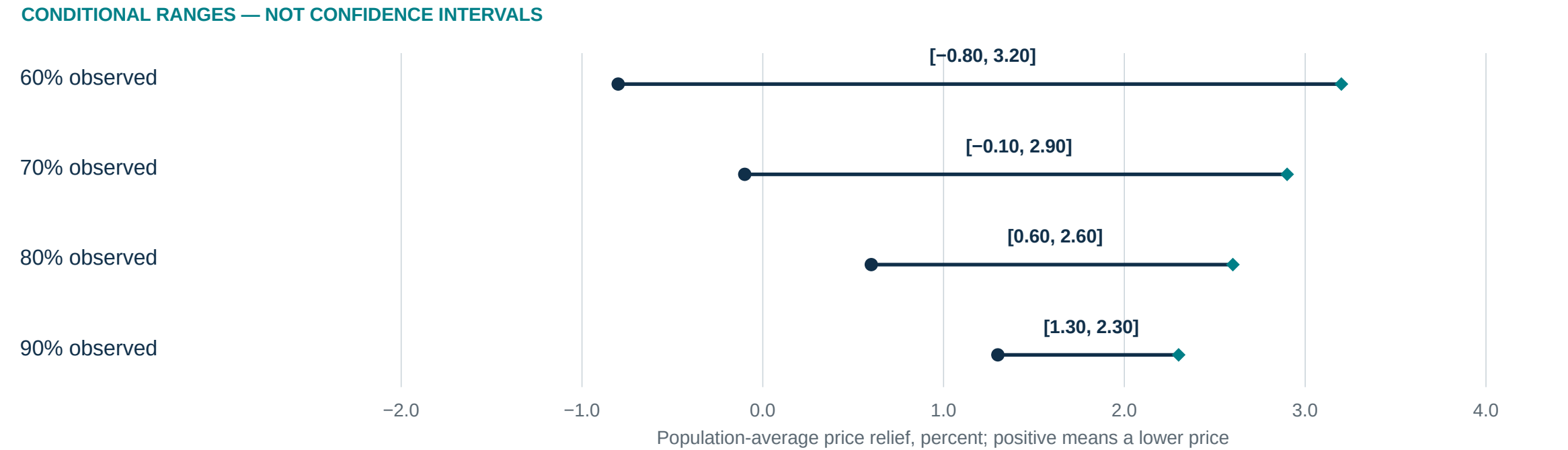
Note: Step changes occur on the payment date. Finance cost is the area under each balance path $\times 25\% / 365$; no present-value loss is added.

A positive observed saving may not survive missing-firm sensitivity

Assumed observed mean price relief: 2%. Missing firms are assumed to lie between -5% and +5%.

Figure 18. A positive observed saving may not survive missing-firm sensitivity

E21



Sources: IDER calculations [\[S99\]](#).

Note: These are arithmetic bounds under stated outcome limits, not measured Ghana attrition, confidence intervals or Lee trimming bounds.

Common reform timing cannot identify a national effect on its own

Prospective specifications; no estimates are fitted to the scenario grid or to duplicated national observations.

P01a | EXPOSURE-SPECIFIC PRICE RESPONSE

$$\log P_{it} = \alpha_i + \lambda_t + \beta_o (x_i \times \text{Post}_t) + \beta_i (z_i \times \text{Post}_t) + u_{it}$$

Firm–item–outlet effects and time effects are explicit. Freeze direct-tax and input-levy exposure before announcement; avoid controlling for post-reform recovery when estimating total effects.

P01b | COMMON-EXPOSURE RANK DIAGNOSTIC

[1, Post_t, 0.019 × Post_t] has rank 2, not 3

For identical direct exposure, the tax regressor is collinear with the post-period effect. The code verifies this algebraic example; it does not fabricate observed firms or provide an instrument.

Sources: Callaway et al., continuous DiD [\[S15\]](#); Sant’Anna–Zhao [\[S18\]](#); Rambachan–Roth [\[S19\]](#); IDER calculations [\[S99\]](#).

Note: P is a constant-quality gross unit price; x and z are pre-reform exposures. Full column rank is necessary, not sufficient, for causal identification.

Use an estimator only after establishing the comparison it requires

The estimand and selection mechanism determine the method—not a preference for a more complicated regression.

Table 36. Use an estimator only after establishing the comparison it requires

Empirical setting	Defensible method, conditional on assumptions	What the method does not fix
Binary comparison with baseline data	Doubly robust DiD under conditional parallel trends, overlap and valid nuisance models.	Not a cure for invalid trends, simultaneous confounding or no comparison group.
Continuous VAT exposure	Exposure-specific effects with an explicit dose-response estimand and support checks.	Not an automatic national average; linear coefficients can mix heterogeneous responses.
Dynamic response	Pre-specified event horizons, clustered inference and parallel-trend sensitivity.	A non-significant pre-trend test does not validate the counterfactual.
Goods registration discontinuity	Reconstruct the actual legal assignment; assess first stage, sorting and covariate continuity.	Baseline turnover alone is not necessarily the statutory running variable.

Sources: Act 1151 [\[S02\]](#); Callaway et al., continuous DiD [\[S15\]](#); Sant’Anna–Zhao [\[S18\]](#); Rambachan–Roth [\[S19\]](#).

Note: No additional regressions, instrumental-variable estimates or selection-corrected coefficients are claimed in this edition.

A complete eligible roster must come before weighting or trimming

Separate causal assignment from the probability that a firm, outlet or claim remains observed.

Table 37. A complete eligible roster must come before weighting or trimming

Risk	Required empirical response	Release condition
Non-filers, closures and product exits	Track the pre-reform roster; report row, value and sales-share attrition by exposure.	Disclose the excluded population, not only the retained sample size.
Missing at random is plausible	Estimate observation probabilities using pre-treatment predictors; inspect overlap and weight tails.	Publish predictors, effective sample size and sensitivity to weight handling.
Missingness may depend on outcomes	Report bounded-outcome or pattern-mixture sensitivity, with explicit assumptions.	Do not rename a sensitivity range a confidence interval.
Monotone selection is argued	Lee-type trimming may be informative only under the design’s selection restrictions.	Do not presume monotonicity when reform can induce both exit and entry.

Sources: Lee selection bounds [\[S20\]](#); IDER calculations [\[S99\]](#).

Note: No missingness probabilities, excluded-firm outcomes or selection weights have been invented from aggregate source tables.

Payment, offset and rejection must not be collapsed into one refund date

Prospective competing-event analysis, supported by an amount-level cash ledger.

KEEP UNPAID CLAIMS

Start from every eligible inception cohort. Preserve application, audit, partial settlement and bank dates. Administrative censoring and loss to follow-up require separate treatment.

DEFINE THE EVENT

For full-resolution outcomes, use competing-event probabilities, not one minus a Kaplan–Meier curve that censors competing resolutions. Partial payments need states and remaining balances.

REPORT BOTH CLOCKS

Show statutory-clock compliance separately from cash-origin duration and amount-weighted age. If fewer than half reach payment, do not invent an overall median time to payment.

Sources: Act 1151 [\[S02\]](#); survival competing-risk methods [\[S21\]](#); IDER calculations [\[S99\]](#).

Note: No Aalen–Johansen curve or current refund-duration estimate is plotted without a dated inception-cohort dataset.

No fitted 2026 result is released from an empty data template

All four supplied administrative/survey templates are headers-only; the gate records zero observed rows.

Table 38. No fitted 2026 result is released from an empty data template

Requested result	Missing observed object	Status after validation
National consumer–margin split	Matched prices, tax components, costs, quantities and credible exposure comparison.	Not estimated. Historical association and scenario calculations are separate.
Current refund median or causal delay effect	Full claim inception, eligibility, audit, offset and bank-payment events.	Not estimated; partial-payment examples remain assumptions.
Registration effect on firms	Legal assignment, turnover history, connected entities and non-filer roster.	Prospective only; no fabricated discontinuity.
Current household distribution	Survey-weighted consumption, outlet/formality and tax classification.	Historical source models retained; no new 2026 decile burden.

Sources: IDER calculations [\[S99\]](#).

Note: The causal-data gate and numeric tests are executable. Structural lack of identification is not corrected by robust standard errors.

Source reconciliation and historical uncertainty have explicit formulas

These definitions connect each added result to its actual evidence and statistical interpretation.

Table 39. Source reconciliation and historical uncertainty have explicit formulas

Method	Reproducible expression	Required qualification
E16 Annual fiscal comparison	$A = \text{sum}(\text{actual}); T = \text{sum}(\text{target}); \text{shortfall} = 100 \times (1 - A / T).$	Same year, component and source vintage; rounded source values.
E17 Published coefficient	$\text{Effect in pp} = 100 \times \text{beta}; \text{approximate interval} = 100 \times (\text{beta} \pm 1.96 \times \text{SE}).$	Source-fitted historical association; rounded SE and normal reference.
E18 Signed sector difference	$\text{Change in gap} = \text{gap}_{2024} - \text{gap}_{2017}.$	Percentage points, not a percent change or national revenue amount.

Sources: MoF/IFS VAT review [\[S06\]](#); MoF 2025 annual revenue report [\[S17\]](#); IDER calculations [\[S99\]](#).

Note: The source covariance matrix, individual returns and survey records were not supplied. Reproduction is not re-estimation.

Cash timing and selection bounds are calculated without invented observations

The parameter values are declared assumptions; their outputs are not estimates of realised 2026 behaviour.

Table 40. Cash timing and selection bounds are calculated without invented observations

Method	Reproducible expression	Required qualification
E19 Two-channel price	$P = 121.90 - 1.90 \times \text{lambda_output} - 4.32 \times \text{lambda_input}.$	GHS 60 taxable inputs; full eventual recovery; fixed quantities and resource costs.
E20 Partial-settlement finance	$\text{Finance cost} = \text{sum}(\text{balance_before} \times \text{days} \times \text{rate} / 365).$	Use remaining balance between events; economic dates, not assumed legal deadlines.
E21 Missing-outcome range	Population mean belongs to $c \times \text{observed_mean} + (1 - c) \times [L, U].$	c is assumed observed coverage; [L, U] are imposed limits for missing outcomes.

Sources: IDER calculations [\[S99\]](#).

Note: A scenario range or selection bound is not a sampling confidence interval. No MAR, monotonicity or causal assignment is established by these identities.

A smaller tax charge does not mean every household receives the same saving

Conclusion for consumers, retirees, journalists, diaspora organisations and consumer associations.

DIRECT PRICE BENCHMARK

GHS 1.90

On the stated old GHS 121.90 invoice, full direct pass-through lowers the price to GHS 120.00. It is a benchmark, not a measured national discount.

HOUSEHOLD EXAMPLE

GHS 31.17

A GHS 5,000 fixed basket with 40% exposure saves this amount at full direct pass-through. Exempt purchases, quantities and income are held unchanged.

NEXT 30 DAYS

Compare like for like

Consumer associations and media can publish paired receipts with unchanged pack size, outlet, date and tax class. Label any unobserved cost or quality change.

Sources: GRA reform notice [\[S01\]](#); IDER calculations [\[S99\]](#).

Note: A household price saving is not the full welfare effect; no pension return, poverty reduction or universal business price response is inferred.

A recoverable tax credit can still leave a business short of cash

Conclusion for manufacturers, importers, exporters, suppliers, contractors, banks and investors.

UNIT-COST CHANNEL

Firm-specific

The GHS 115.68 price case requires GHS 60 taxable inputs, full recovery and a preserved GHS 16.40 margin. It is not a price instruction for all firms.

FINANCING EXPOSURE

GHS 12,329

Financing a GHS 200,000 credit for 90 days at an assumed 25% costs this amount. Cash arrival and legal entitlement are different records.

NEXT 30 DAYS

Reconcile the ledger

CFOs and accountants can identify each credit's origin, component, lawful status and cash date. Funders can then test the actual borrower's exposure—not a national average.

Sources: Act 1151 [\[S02\]](#); IDER calculations [\[S99\]](#).

Note: Do not add tax-cost relief, a refund receivable and cash recovery as three independent gains. No security or lending recommendation is supplied.

Revenue performance, refund delivery and price incidence answer different questions

Conclusion for MoF, GRA, Treasury, BoG, Parliament, sector ministries and development partners.

PRE-REFORM COLLECTIONS

GHS 3.830 bn

The 2025 domestic-plus-import VAT shortfall against target is a fiscal comparison. It does not measure revenue lost because of the 2026 reform.

HISTORICAL CREDIT EVIDENCE

Not a cash refund

The historical +5.90 pp association concerns being in a credit position. It does not establish current unpaid claims or an effect on consumer prices.

NEXT 90 DAYS

Publish three accounts

A pilot can report collections by component, claim-cohort cash recovery and matched product prices separately, with dates, denominators and unresolved differences.

Sources: MoF/IFS VAT review [\[S06\]](#); MoF 2025 annual revenue report [\[S17\]](#); IDER calculations [\[S99\]](#).

Note: The evidence supports these measurement distinctions; it does not identify an optimal VAT rate, base, refund budget or registration threshold.

Make VAT rules and component balances traceable within 60 days

For the Ghana Revenue Authority, Ministry of Finance, Treasury and taxpayer-service teams.

A01 Create one dated VAT classification and eligibility matrix

PROPOSED OWNER

GRA legal + taxpayer services

TIME

Day 30 after approved access

ACTION / DELIVERABLE

Document goods/service rules, exemptions, input-credit eligibility and legal refund-clock definitions in one dated matrix.
Give unresolved cases a named referral route.

MEASURABLE ACCEPTANCE TEST

100% of included transaction classes have a legal provision, effective date and exception route. Record unresolved classifications; do not infer eligibility from turnover alone.

A02 Reconcile collections, credits and settlements by tax component

PROPOSED OWNER

GRA finance + MoF revenue team

TIME

Day 60
refresh monthly

ACTION / DELIVERABLE

Present domestic and import collections separately. Reconcile valid credits, offsets, refunds and denials on component ledgers without treating gross collections as net cash available.

MEASURABLE ACCEPTANCE TEST

Each credit balance reconciles as opening plus additions less settlements and denials equals closing. Record the amount and reason for every unresolved difference.

Sources: [\[S02\]](#); [\[S99\]](#). IDER action framework; see the source register.

Note: Proposed actions and owners; timelines start after authorised access and institutional approval. Targets concern the agreed scope, not achieved national coverage. No tax-rate, lending or investment decision is prescribed.

Track every refund stage before publishing a payment-time statistic

For GRA refund operations, Treasury, tax accountants and authorised data custodians.

A03 Build a claim-inception register that retains unpaid balances

PROPOSED OWNER

GRA refund operations + Treasury

TIME

Day 90 first cohort register update monthly

ACTION / DELIVERABLE

Link each in-scope credit to cash origin, application, audit, legal-clock start, offset and bank payment. Keep original claim identifiers, unpaid balances and partial settlements.

MEASURABLE ACCEPTANCE TEST

Report count and value coverage. Every captured claim has a recorded stage or missing flag; partial payments reduce the outstanding balance rather than restart claim age.

A04 Release a disclosure-safe dashboard with both recovery clocks

PROPOSED OWNER

GRA reporting + Treasury data-protection leads

TIME

Day 90 first summary refresh monthly

ACTION / DELIVERABLE

Publish an anonymised summary of claim-cohort recovery, outstanding value and legal processing time. Keep purchase-to-recovery duration separate from the applicable legal clock.

MEASURABLE ACCEPTANCE TEST

Show the reporting period, denominator and unpaid share beside each statistic. No paid-claims-only median represents all claims; no confidential taxpayer details are disclosed.

Sources: [\[S02\]](#); [\[S99\]](#). IDER action framework; see the source register.

Note: Proposed actions and owners; timelines start after authorised access and institutional approval. Targets concern the agreed scope, not achieved national coverage. No tax-rate, lending or investment decision is prescribed.

Turn invoice taxes and recoverable credits into a verified cash-flow bridge

For CFOs, accountants, manufacturers, importers, exporters, government suppliers and contractors.

A05 Reconcile gross price, input recovery and margin for each product		
PROPOSED OWNER Enterprise CFO + tax accountant	ACTION / DELIVERABLE For selected products, match gross selling price to output tax, documented input costs, eligible credits and unit margin. Identify old inventory separately and retain quantity and quality.	MEASURABLE ACCEPTANCE TEST 100% of included products have a matched unit, tax class, input record and costing date. Separate observed margins from scenarios; do not count one input credit twice.
TIME Day 30 first product bridge review monthly		

A06 Maintain a rolling 13-week cash schedule with recovery scenarios		
PROPOSED OWNER Enterprise treasury + finance team	ACTION / DELIVERABLE Map customer receipts, tax payments and expected credit recovery to bank dates. Run delayed and partial-settlement cases with the business's own operating costs and funding assumptions.	MEASURABLE ACCEPTANCE TEST Opening cash plus receipts less payments equals closing cash in every case. Credits remain receivables until recovered; label each timing and financing assumption.
TIME Day 30 update weekly		

Sources: [\[S02\]](#); [\[S99\]](#). IDER action framework; see the source register.

Note: Proposed actions and owners; timelines start after authorised access and institutional approval. Targets concern the agreed scope, not achieved national coverage. No tax-rate, lending or investment decision is prescribed.

Verify registration status and tax-credit evidence at the firm level

For MSMEs, business and SME associations, accountants, banks and development finance institutions.

A07 Run a documented goods-versus-services registration clinic

PROPOSED OWNER

MSME association + qualified tax advisers

TIME

Day 45 first clinic

ACTION / DELIVERABLE

Assess each participating firm’s activity, turnover tests, existing registration and unresolved eligibility. Separate goods and taxable services; refer transaction-specific questions for advice.

MEASURABLE ACCEPTANCE TEST

Every assessed case has a dated record of activity, turnover evidence, current status and referral. Do not assume automatic deregistration or advise artificial business splitting.

A08 Match each material tax receivable to a dated recovery record

PROPOSED OWNER

Credit + investment analysts

TIME

Day 30
before each material review

ACTION / DELIVERABLE

Obtain a tax-credit aging schedule for each material exposure under review. Match it to the counterparty’s financial statements, claim evidence, offsets and actual bank receipts.

MEASURABLE ACCEPTANCE TEST

Separate face value, eligible amount, disputed sums and offset potential. Document unmatched amounts; do not classify an unreceived refund as unrestricted cash.

Sources: [\[S02\]](#); [\[S99\]](#). IDER action framework; see the source register.

Note: Proposed actions and owners; timelines start after authorised access and institutional approval. Targets concern the agreed scope, not achieved national coverage. No tax-rate, lending or investment decision is prescribed.

Test recovery timing before treating tax receivables as usable liquidity

For banks, DFIs, private equity, pension funds, insurers, fund managers and asset managers.

A09 Stress delayed and partial recovery in counterparty cash forecasts

PROPOSED OWNER

Risk + corporate finance teams

TIME

Day 60 first stress review
refresh with material changes

ACTION / DELIVERABLE

Compare base, delayed and partial recovery in each reviewed issuer or borrower forecast. Show funding costs and the link from recovery timing to cash and scheduled debt service.

MEASURABLE ACCEPTANCE TEST

Each scenario has a reconciled cash and debt-service bridge with disclosed assumptions. Keep hypothetical shortfalls distinct from observed arrears and default probabilities.

A10 Report portfolio recovery exposure without hiding missing accounts

PROPOSED OWNER

Portfolio oversight +
investment operations

TIME

First quarterly review
then quarterly

ACTION / DELIVERABLE

Aggregate disclosed tax-recovery exposure across reviewed counterparties. Show concentrations and recovery status separately from cash holdings, with the same reporting date and scope.

MEASURABLE ACCEPTANCE TEST

Report coverage by count and value. Retain missing counterparties as unknown, not zero; distinguish receivables from unrestricted cash and document scope changes.

Sources: [\[S99\]](#). IDER action framework; see the source register.

Note: Proposed actions and owners; timelines start after authorised access and institutional approval. Targets concern the agreed scope, not achieved national coverage. No tax-rate, lending or investment decision is prescribed.

Freeze the evidence and identification plan before estimating price effects

For BoG, GSS, IDER, authorised data custodians, researchers and independent methods reviewers.

A11 Build a matched product-and-cost panel with a visible coverage record

PROPOSED OWNER

Data custodians + IDER

TIME

Day 60 linked-data pilot

ACTION / DELIVERABLE

Link item–outlet prices, input invoices, pre-reform tax exposure and quantity/quality records. Keep product exits, missing costs and failed matches in a separate coverage record.

MEASURABLE ACCEPTANCE TEST

Report row and value linkage coverage by exposure group. Identify duplicate keys and exclusions; retain a baseline roster rather than analysing only surviving reporters.

A12 Register the estimands, comparison and sensitivity tests

PROPOSED OWNER

IDER + independent methods reviewer

TIME

Day 90 design review before estimation

ACTION / DELIVERABLE

Specify outcomes, horizons, comparison groups, exposure support, clustering and attrition sensitivity. Document the counterfactual and power assessment before fitting the model.

MEASURABLE ACCEPTANCE TEST

Release a dated identification and coverage checklist. Designs that fail stay descriptive or bounded; no significance target or synthetic observations substitute for evidence.

Sources: [\[S15\]](#); [\[S18\]](#); [\[S19\]](#); [\[S99\]](#). IDER action framework; see the source register.

Note: Proposed actions and owners; timelines start after authorised access and institutional approval. Targets concern the agreed scope, not achieved national coverage. No tax-rate, lending or investment decision is prescribed.

Release reproducible findings with population limits and an independent review

For IDER, GSS, research teams, development agencies, development partners and think tanks.

A13 Publish supported price, margin and household-distribution results

PROPOSED OWNER

Research team + GSS / partners

TIME

Day 180 evidence release

ACTION / DELIVERABLE

Estimate only responses supported by the approved design. Where survey data permit, report weighted household distribution; release code, inputs and a non-technical explanation.

MEASURABLE ACCEPTANCE TEST

An independent analyst reproduces each central result. Report uncertainty, multiple-testing treatment, trend sensitivity and population limits; label scenarios separately.

A14 Close the pilot review with a documented evidence-gap register

PROPOSED OWNER

Development partners + think-tank reviewers

TIME

Day 60 access review
Day 180 evidence review

ACTION / DELIVERABLE

Review authorised access, confidentiality, source conflicts and population coverage alongside the pilot. Record uncovered groups and legal questions that still require clarification.

MEASURABLE ACCEPTANCE TEST

The public summary identifies every material unresolved issue, its owner and next step. Keep decisions requiring institutional authority separate from research findings.

Sources: [\[S15\]](#); [\[S18\]](#); [\[S19\]](#); [\[S99\]](#). IDER action framework; see the source register.

Note: Proposed actions and owners; timelines start after authorised access and institutional approval. Targets concern the agreed scope, not achieved national coverage. No tax-rate, lending or investment decision is prescribed.

Attach a dated evidence test to every public VAT headline

For Parliament, sector ministries, media, consumer bodies, retiree groups and diaspora organisations.

A15 Request four separate accounts at the next scrutiny briefing

PROPOSED OWNER

Parliamentary technical staff + sector ministry teams

TIME

Next scheduled briefing
refresh for each hearing

ACTION / DELIVERABLE

Request separate evidence on gross collections, eligible claims, legal timeliness and household incidence. Keep administrative payment results distinct from modelled price effects.

MEASURABLE ACCEPTANCE TEST

100% of briefing headlines identify period, population, tax component and observed or modelled status. Unresolved evidence gaps remain visible beside the conclusion.

A16 Use like-for-like receipts and explicit baselines in consumer briefings

PROPOSED OWNER

Media editors + consumer bodies

TIME

Day 30 first briefing
every subsequent release

ACTION / DELIVERABLE

Use same-item receipts to explain gross and net prices, unchanged pack size and the difference between percent and percentage points. Name the outlet, comparison dates and tax class.

MEASURABLE ACCEPTANCE TEST

Each comparison states its baseline and evidence. Flag unobserved cost or quality changes; do not label an unexplained before–after price movement a causal VAT effect.

Sources: [\[S99\]](#). IDER action framework; see the source register.

Note: Proposed actions and owners; timelines start after authorised access and institutional approval. Targets concern the agreed scope, not achieved national coverage. No tax-rate, lending or investment decision is prescribed.

The mechanism is quantified; the realised national split remains an empirical question

Use the results at their demonstrated level of support.

INVOICE –1.56% Direct full-pass-through benchmark. Input-credit restoration can add conditional cost relief; the amount depends on the business input chain.	CASH Separate clocks Measure credit origin, eligibility, audit, offset and bank payment. A legal credit and a tax receivable do not imply immediate cash availability.	INCIDENCE Matched evidence Recover prices, costs, quantities and household exposure. Keep causal estimates, historical models and imposed scenarios visibly separate.
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Sources: GRA reform notice [\[S01\]](#); Act 1151 [\[S02\]](#); IDER calculations [\[S99\]](#).

Note: Independent IDER research; no national price-effect coefficient, current refund median or investment recommendation is claimed.

Catalogue of models, equations and identifying assumptions

A separate technical reference: what was calculated, what was assumed and what has not been estimated.

E01–E15

ACCOUNTING AND CONDITIONAL MODELS

Invoice taxes; price and margin incidence; input credits; financing; registration; household exposure.

pp. 115–122

E16–E21

SOURCE EVIDENCE AND ROBUSTNESS

Annual-source precision; historical fitted associations; sector gaps; two-channel incidence; partial recovery; missing outcomes.

pp. 122–125

P01–P03

PROSPECTIVE RESEARCH ONLY

Matched-product exposure; registration thresholds; refund competing events and the empirical release conditions.

pp. 126–127

IMPORTANT DISTINCTION

E01–E21 formalise calculations and source evidence already used in this report. E17 preserves the historical source-model status; it is not re-estimated. P01–P03 remain prospective. No national 2026 price–margin effect or refund median is claimed.

Common assumptions, notation and interpretation limits

Each catalogue entry inherits the relevant A1–A6 conditions; additional identification requirements are stated separately.

A1 Match the measurement

Use the same physical unit, period, currency, tax component and institutional scope. Retain distinctions between actuals, targets, historical source estimates and imposed scenarios.

A3 Distinguish arithmetic from inference

Calculate at full precision, then round for display. Rounding envelopes and conditional outcome bounds are not confidence intervals. Published coefficient intervals retain their source limitations.

A5 Require identification before causality

Source-fitted fixed-effects associations are not new causal estimates. A prospective causal design needs credible assignment, comparison trends, support, timing and dependence-aware inference.

A2 Reconcile without double counting

Separate net sales, output tax, eligible input credits, non-creditable levies and cash settlements. Count tax across the chain once. Retain unresolved source and ledger differences.

A4 State every scenario assumption

Pass-through, input intensity, resource costs, financing rates and recovery dates are imposed where labelled. Fixed quantities and full eligible recovery are maintained only in the specified cases.

A6 Preserve the reporting universe

Include unpaid claims, non-filers and firm or product exits. Weighting, trimming and missing-outcome bounds require explicit assumptions. Empty templates do not support estimation.

NOTATION

P = gross price; B = net price; R = resource cost; m = unit margin; λ = assumed pass-through; Δ = change; Σ = sum; $E[\cdot]$ = expectation. A hat marks a statistical estimate. Each card defines its local symbols and units.

Statutory invoices and historical audit reconciliation

E01: results pp. 16, 31 | E02: results p. 26

E01 Statutory invoice and gross-price benchmark

EXECUTED STATUTORY ACCOUNTING

$$P_0 = B(1 + \ell_0)(1 + v_0) = 121.90 \quad (\text{E01.1})$$

$$P_1^* = B(1 + t_1) = 120.00 \quad (\text{E01.2})$$

$$g_P = 100(P_1^*/P_0 - 1) = -1.55865\% \quad (\text{E01.3})$$

B = GHS 100 net selling price; old levies $\ell_0 = 0.06$; old VAT $v_0 = 0.15$; new combined charge $t_1 = 0.20$. P is the gross price.

ASSUMPTIONS / AXIOMS

A1–A3. Ordinary standard-rated supplies, unchanged net price and quantity. The 1.9 percentage-point wedge change is not a 1.9% gross-price fall.

A benchmark, not observed Ghanaian price pass-through.

E02 Historical audit closure and continuity

EXECUTED SOURCE RECONCILIATION

$$O_t = B_t + I_t, \quad C_t = O_t - D_t \quad (\text{E02.1})$$

$$\rho_t = B_t - C_{t-1} \quad (\text{E02.2})$$

B: audits brought forward; I: initiated; O: outstanding; D: completed; C: carried forward. ρ is the cross-year opening difference.

ASSUMPTIONS / AXIOMS

A1–A3. These are counts of historical post-payment audits, not refund applications. All six within-year identities close; cross-year differences remain.

The –16 and –19 carry differences are not imputed payments.

Fiscal comparison and customer–firm–government accounting

E03: results p. 27 | E04: results pp. 30, 31, 34, 89

E03 Matched fiscal collection comparisons

EXECUTED DATED SOURCE COMPARISON

$$\Delta V_j = V_j^{\text{prov}} - V_j^{\text{prog}} \tag{E03.1}$$

$$a_j = 100 V_j^{\text{prov}} / V_j^{\text{prog}} \tag{E03.2}$$

V: the same fiscal component and period; prov/prog: provisional outturn/programme. ΔV uses GHS; a is a percentage.

ASSUMPTIONS / AXIOMS

A1–A3. Compare Q1–Q3 2025 within its source vintage; convert millions/billions consistently. Preserve negative refund-deduction signs.

An all-tax refund line is not VAT-only cash recovery.

E04 Customer–firm–government accounting

EXECUTED FIXED-QUANTITY IDENTITY

$$S = P_0 - P_1, \quad \Delta m = m_1 - m_0 \tag{E04.1}$$

$$T_j = P_j - R - m_j \quad (j = 0, 1) \tag{E04.2}$$

$$T_0 - T_1 = S + \Delta m \tag{E04.3}$$

S: consumer saving; m: unit margin before income tax; R: unchanged resource cost; T: net tax across the matched supply chain.

ASSUMPTIONS / AXIOMS

A1–A4. Same physical unit and resource cost in both cases. Include old non-creditable input levies once; do not add gross taxes at each stage.

Not a welfare identity once quantities or resource costs change.

Direct price transmission and input-credit recovery

E05: results pp. 31, 32, 33 | E06: results pp. 34, 35, 36, 37

E05 Direct output-tax incidence scenarios

EXECUTED CONDITIONAL PRICE MODEL

$$D_o = P_0 - (1 + t_1)B = 1.90 \quad (\text{E05.1})$$

$$P_1 = P_0 - \lambda D_o, \quad S = \lambda D_o \quad (\text{E05.2})$$

$$\Delta m = \frac{(1 - \lambda)D_o}{1 + t_1} \quad (\text{E05.3})$$

λ : assumed direct gross-price pass-through; D_o : full direct price room. $P_0 = 121.90$, $B = 100$ and $t_1 = 0.20$; amounts are GHS/unit.

ASSUMPTIONS / AXIOMS

A1–A4. The direct case holds the cost base fixed. A 50% price response gives $S = 0.950$ and $\Delta m \approx 0.792$, not an equal cash split.

Selected 0–100% cases are neither estimates nor general bounds.

E06 Input-levy recovery and preserved margin

EXECUTED CONDITIONAL COST MODEL

$$c_0 = R + \ell_0 k, \quad m_0 = B - c_0 \quad (\text{E06.1})$$

$$P_1^* = (1 + t_1)(B - \ell_0 k) \quad (\text{E06.2})$$

$$D = P_0 - P_1^* = 1.90 + 0.072k \quad (\text{E06.3})$$

k : taxable resource-input base; $R = 80$: total resource cost; $\ell_0 = 0.06$. Other resource cost is $R - k$. Baseline margin m_0 is preserved.

ASSUMPTIONS / AXIOMS

A1–A4. Full eligible recovery, unchanged upstream prices and quantity. At $k = 60$, old cost is 83.60, margin 16.40 and new gross price 115.68.

Input relief is not counted twice as both profit and price saving.

Resource-cost sensitivity and credit-financing expense

E07: results pp. 38, 39 | E08: results pp. 42, 43

E07 Non-tax resource-cost sensitivity

EXECUTED CONDITIONAL MARGIN MODEL

$$P_1 = P_0 - \lambda(1.90 + 0.072k) \tag{E07.1}$$

$$m_1 = P_1/(1 + t_1) - R(1 + z) \tag{E07.2}$$

$$\Delta m = m_1 - m_0 \tag{E07.3}$$

z: imposed resource-cost increase; R = 80, k = 60, m₀ = 16.40 and t₁ = 0.20.
λ determines the combined price response.

ASSUMPTIONS / AXIOMS

A1–A4. z is varied independently of pricing in the reported sensitivity. A 10% cost increase adds GHS 8/unit; no cost elasticity is fitted.

Unit margin is not margin percentage or total business profit.

E08 Financing an eligible tax credit

EXECUTED SIMPLE-INTEREST SCENARIO

$$F = B_c r d/365 \tag{E08.1}$$

$$\Delta F = B_c r(d_1 - d_0)/365 \tag{E08.2}$$

B_c: unrecovered credit held constant; r: assumed annual simple rate; d: economic financing days. F is a financing expense in GHS.

ASSUMPTIONS / AXIOMS

A1–A4. ACT/365 convention, no fees or compounding. B_c = 200,000, r = 0.25 and d = 90 give F = 12,328.77.

Economic financing duration is not the statutory processing clock.

Recurring-credit balances and present-value effects

E09: results p. 44 | E10: results p. 45

E09 Recurring-credit cash ledger

EXECUTED MONTHLY COHORT ACCOUNTING

$$C_m = C_{m-1} + q_m - u_m \tag{E09.1}$$

$$u_m = q_{m-L} \mathbf{1}\{m > L\} \tag{E09.2}$$

$$C_m = q \min(m, L) \text{ if } q_m = q \tag{E09.3}$$

C: closing outstanding credit; q: new valid monthly credit; u: recovery; L: assumed recovery lag in whole months. Opening $C_0 = 0$.

ASSUMPTIONS / AXIOMS

A1–A4. All cohorts recover fully after L months, with no denial or partial settlement. At $q = 200,000$ and $L = 6$, steady stock is 1.2 million.

This ledger does not establish legal eligibility for a one-month refund.

E10 Present value of delayed recovery

EXECUTED ALTERNATIVE TIMING VALUATION

$$PV = \frac{B_c}{(1+r)^{d/365}} \tag{E10.1}$$

$$L_{PV} = B_c - PV \tag{E10.2}$$

PV: discounted value of full recovery; L_PV: present-value erosion; r: assumed annual effective discount rate; d: days to recovery.

ASSUMPTIONS / AXIOMS

A1–A4. Same face amount and recovery date as the financing comparison. Discounting uses an effective rate; E08 uses simple borrowing interest.

Do not add E08 expense and E10 erosion as independent losses.

Withholding ledgers and taxable-import cash requirements

E11: results p. 46 | E12: results p. 47

E11 VAT withholding and separate levy ledgers

EXECUTED COMPONENT-LEDGER EXAMPLE

$$W = wS, \quad C_V = \max\{W - v(S - X), 0\} \quad (\text{E11.1})$$

$$L_N + L_G = (n + g)(S - X) \quad (\text{E11.2})$$

$$K = (1 + t_1 - w)S - (1 + t_1)X - L_N - L_G \quad (\text{E11.3})$$

S/X: net sale/purchases; W: withholding certificate; C_V: VAT credit; n = g = 0.025, v = 0.15, w = 0.07; K: cash contribution.

ASSUMPTIONS / AXIOMS

A1–A4. S = 1 million and X = 800,000; keep VAT and levy balances separate. C_V = 40,000 and K = 160,000; no automatic cross-ledger set-off.

K + C_V = GHS 200,000 accrual margin in this example only.

E12 Taxable-import working capital

EXECUTED CONDITIONAL BORDER-TAX CASE

$$Z = V(1 + a), \quad B_c = t_1 Z \quad (\text{E12.1})$$

$$F_c = B_c r d / 365 \quad (\text{E12.2})$$

V: customs value; a: assumed duty rate; Z: taxable import base; B_c: combined recoverable VAT and levies. r and d are financing assumptions.

ASSUMPTIONS / AXIOMS

A1–A4. V = 1 million, a = 0.10 and t₁ = 0.20 give B_c = 220,000. At 25% for 90 days, F_c = 13,561.64; other border charges are excluded.

The duty assumption is not an HS-code ruling or a relief decision.

Registration thresholds and customer-type comparisons

E13: results pp. 49, 50 | E14: results p. 51

E13 Threshold arithmetic and legal coverage

EXECUTED NOMINAL COMPARISON

$$H_1/H_0 = 750,000/200,000 = 3.75 \tag{E13.1}$$

$$100(H_1/H_0 - 1) = 275\% \tag{E13.2}$$

$$H_1/4 = 187,500 \tag{E13.3}$$

H_0/H_1 : earlier/new goods-registration thresholds in GHS. The three-month amount belongs to a rule that also uses forward expectations.

ASSUMPTIONS / AXIOMS

A1–A3. Reconstruct taxable activity, related persons, actual/expected turnover and cancellation status. Taxable services follow a distinct rule.

The threshold multiple is not a count of firms leaving registration.

E14 Customer type and registration

EXECUTED B2B–B2C COMPARISON

$$P_U = (1 + t_1)k + c + m^* = 112 \tag{E14.1}$$

$$P_R = (1 + t_1)(k + c + m^*) = 120 \tag{E14.2}$$

$$K_U^{B2B} = 112, \quad K_R^{B2B} = 120/1.20 = 100 \tag{E14.3}$$

U/R: unregistered/registered supplier; $k = 60$ inputs, $c = 20$ other cost and $m^* = 20$ target margin. K_B2B is an eligible buyer’s net cost.

ASSUMPTIONS / AXIOMS

A1–A4. Both supplier cases are assumed legally permissible; the registered buyer can recover the full input charge. No compliance cost is imposed.

A consumer compares gross invoices; an eligible business compares net cost.

Household exposure and annual-source precision

E15: results pp. 58, 59 | E16: results pp. 80, 81, 82

E15 Household direct-tax exposure

EXECUTED STATIC BASKET SENSITIVITY

$$s_H = w_H \lambda (1 - 120/121.90) \tag{E15.1}$$

$$\text{Saving}_{GHS} = H s_H \tag{E15.2}$$

w_H: initial budget share exposed to affected standard-rated purchases; λ: assumed direct pass-through; H: initial household budget.

ASSUMPTIONS / AXIOMS

A1–A4. Fixed quantities, direct price channel only. With H = 5,000, w_H = 0.40 and λ = 1, saving is GHS 31.17.

Not a survey-weighted decile estimate or a complete welfare effect.

E16 Annual fiscal and rounding diagnostics

EXECUTED SOURCE / PRECISION CALCULATIONS

$$A = \sum_j A_j, \quad T = \sum_j T_j, \quad h = 100(1 - A/T) \tag{E16.1}$$

$$g_L = 100 \left[\frac{a - h_a}{b + h_b} - 1 \right] \tag{E16.2}$$

$$g_U = 100 \left[\frac{a + h_a}{b - h_b} - 1 \right] \tag{E16.3}$$

A/T: summed annual actual/target VAT; h: shortfall %. For growth, a/b are new/base amounts and h_a/h_b their rounding half-widths.

ASSUMPTIONS / AXIOMS

A1–A3. Same-year component totals. Compare the growth envelope with the reported rate's own rounding interval; do not treat 22.0% as exact.

A rounding envelope is not a statistical confidence interval.

Historical econometric evidence and interval reconstruction

E17: results pp. 83, 84, 85 | E17: results pp. 83, 84, 85

E17 Coefficient units and approximate interval

EXECUTED TRANSFORMATION OF SOURCE ESTIMATES

$$\hat{\beta}_{pp} = 100\hat{\beta} \tag{E17.1}$$

$$CI_{95}^{\text{approx}} = 100[\hat{\beta} \pm 1.96 SE(\hat{\beta})] \tag{E17.2}$$

$$\Delta p_{pp}(q) = 100\hat{\theta}\ln(1 + q) \tag{E17.3}$$

$\beta = 0.059$ and rounded $SE = 0.005$ give 5.90 pp and [4.92, 6.88]. $\theta = 0.032$ converts a 10% credit-amount increase to about 0.305 pp.

ASSUMPTIONS / AXIOMS

A1–A3, A5. The interval uses a normal reference and published rounded SE. Source microdata/covariance were not supplied; no re-clustering is claimed.

Historical association; not a newly estimated 2026 treatment effect.

E17 Historical source-model specifications

SOURCE-REPORTED FIT • NOT RE-ESTIMATED

$$Y_{it} = \alpha_i + \delta_t + \beta D_{it} + u_{it} \tag{E17.4}$$

$$Y_{it} = \mu_i + \eta_t + \theta \ln W_{it} + v_{it} \tag{E17.5}$$

Y: credit-position indicator; D: any withholding credit; W: positive withholding amount. i: firm; t: year-month. These are two separate specifications.

ASSUMPTIONS / AXIOMS

A1, A3, A5. Schematic of the documented firm/time fixed-effects models: 155,686 non-nil firm-months versus 5,992 positive-credit records, 2018–2020.

The source regression code and covariance matrix are not reconstructed.

Sector-gap diagnostics and two-channel incidence

E18: results pp. 86, 87, 88 | E19: results pp. 89, 90

E18 Signed sector-gap comparisons

EXECUTED SOURCE-MODEL DIAGNOSTICS

$$\Delta g_s = g_{s, 2024} - g_{s, 2017} \tag{E18.1}$$

$$N_- = \sum_{s=1}^{18} \mathbf{1}\{g_{s, 2024} < 0\} = 8 \tag{E18.2}$$

g: published sector gap as percent of modelled potential sector revenue; Δg: percentage-point difference. All 18 source sectors are retained.

ASSUMPTIONS / AXIOMS

A1–A3. Keep negative values and the source’s 2017 trade/VFRS warning. The 2013 series has a separate refund-coverage limitation.

Sector gap percentages cannot be summed into a national cash amount.

E19 Independent output and input transmission

EXECUTED TWO-CHANNEL SCENARIOS

$$P_1 = 121.90 - 1.90\lambda_o - 4.32\lambda_i \tag{E19.1}$$

$$S = 121.90 - P_1, \quad \Delta m = P_1/1.20 - 96.40 \tag{E19.2}$$

$$\Delta T = 25.50 - P_1/6 = S + \Delta m \tag{E19.3}$$

λ_o/λ_i: independent assumed output-tax/input-relief pass-through. k = 60; resource cost 80; old margin 16.40. All amounts are GHS/unit.

ASSUMPTIONS / AXIOMS

A1–A4. Full eventual credit recovery, fixed resource costs and quantities. The 25 parameter combinations are not observed firms.

One gross-price change cannot reveal both transmission parameters.

Partial settlement and missing-outcome sensitivity

E20: results pp. 91, 92 | E21: results pp. 93, 96

E20 Event-date financing and credit duration

EXECUTED PARTIAL-SETTLEMENT LEDGER

$$B_j = B_{j-1} - q_j \tag{E20.1}$$

$$F = \frac{r}{365} \sum_j B_{j-1} (t_j - t_{j-1}) \tag{E20.2}$$

$$\bar{d} = \frac{\sum_j q_j t_j}{B_0} = \frac{\sum_j B_{j-1} \Delta t_j}{B_0} \tag{E20.3}$$

q_j : recovery at day t_j ; B_j : remaining balance; r : annual simple rate. With full settlement, $\bar{d}$ is the amount-weighted economic duration.

ASSUMPTIONS / AXIOMS

A1–A4. Credit 200,000; recover 50,000/50,000/100,000 on days 30/90/180. $\bar{d} = 120$ days and $F = 16,438.36$ at 25%.

Charge financing only on the balance still outstanding between events.

E21 Bounded missing-outcome arithmetic

EXECUTED CONDITIONAL SELECTION SENSITIVITY

$$\mu_L = c \bar{y}_{obs} + (1 - c)L \tag{E21.1}$$

$$\mu_U = c \bar{y}_{obs} + (1 - c)U \tag{E21.2}$$

$$\mu \in [\mu_L, \mu_U] \tag{E21.3}$$

c : assumed observed coverage; $\bar{y}_{obs}$: observed mean in the illustration; $[L, U]$: imposed limits for missing-firm outcomes, in the same units.

ASSUMPTIONS / AXIOMS

A1, A3–A6. The report imposes $\bar{y}_{obs} = 2\%$ and $[L, U] = [-5\%, 5\%]$. At $c = 0.60$, the population-mean range is $[-0.80\%, 3.20\%]$.

Neither a sampling confidence interval nor a Lee trimming bound.

Prospective price-response and registration designs

P01: results pp. 62, 63, 64, 94, 95 | P02: results pp. 65, 95

P01 Matched-product exposure response

PROSPECTIVE ONLY • NOT ESTIMATED

$$\ln P_{it} = \alpha_i + \delta_t + Z_i' \beta Post_t + u_{it} \tag{P01.1}$$

$$Z_i = (x_i, z_i)', \quad \beta = (\beta_o, \beta_i)' \tag{P01.2}$$

$$\text{rank}[1, Post_t, 0.019 Post_t] = 2 < 3 \tag{P01.3}$$

P: constant-quality gross price; i: matched firm–item–outlet; x/z: frozen pre-reform direct/input exposure. β separates the two exposure responses.

ASSUMPTIONS / AXIOMS

A1, A5–A6. Requires credible comparison trends, support and no correlated unmeasured shocks. Full rank is necessary, not sufficient; common exposure is absorbed.

No scenario-grid regression or national causal coefficient was fitted.

P02 Registration-threshold estimand

PROSPECTIVE ONLY • NOT ESTIMATED

$$\tau_{FRD} = \frac{\Delta_c E[Y|s]}{\Delta_c E[D|s]} \tag{P02.1}$$

$$\Delta_c f = \lim_{h \downarrow 0} [f(c+h) - f(c-h)] \tag{P02.2}$$

s/c: valid running variable/cut-off after reconstructing legal assignment; D: actual registration treatment; Y: prespecified business outcome.

ASSUMPTIONS / AXIOMS

A1, A5–A6. Requires continuity, a non-zero first stage, exclusion and monotonicity. Sorting, expectations, related persons and services must be addressed.

A local fuzzy-RD estimand is not an effect for all Ghanaian MSMEs.

Prospective refund analysis and empirical release status

P03: results pp. 66, 97 | Linked-data release conditions: pp. 76, 97–98

P03 Refund competing-event probabilities

PROSPECTIVE ONLY • NOT ESTIMATED

$$\widehat{F}_k(t) = \sum_{u \leq t} \widehat{S}(u -) \frac{dN_k(u)}{Y(u)} \tag{P03.1}$$

$$\widehat{S}(t) = \prod_{u \leq t} \left[1 - \frac{\sum_k dN_k(u)}{Y(u)} \right] \tag{P03.2}$$

k: mutually exclusive full-resolution event, such as payment, offset or rejection; N_k: event count; Y: risk set. S is survival without any resolution.

ASSUMPTIONS / AXIOMS

A1, A5–A6. Requires an inception cohort and defensible censoring. Partial recoveries need additional states and amount-level records, not final-payment relabelling.

No current refund curve or median was estimated from empty templates.

Empirical release status

NO CURRENT REFUND-DURATION FIT

No fitted 2026 effect

Price, refund-event, goods-registration and household templates contain headers only. The publication does not manufacture records, paid-claim samples or missing outcomes.

REQUIRED BEFORE ESTIMATION

Validated inception cohorts; dated eligibility, audit and recovery events; unpaid balances; a defensible censoring process; and independently reproducible analysis.

P01–P03 do not produce any of the numerical scenario results.

References and source links — 1 of 8

Titles open the source; dated locators and verification boundaries are retained in the package.

S01 Ghana Revenue Authority

Notice to All VAT Registered Taxpayers | 2026

Reform notice; effective implementation 1 January 2026

S02 Republic of Ghana

Value Added Tax Act, 2025 (Act 1151) | 2025

Sections 6, 13, 20, 39, 49–54, 56–60, 68; schedules. PDF pp. 8–9 and 41–43 image-checked.

S03 Ghana Revenue Authority

Guidelines for VAT Act 1151 | January 2026

PDF p. 3: rate structure; relevant implementation guidance.

References and source links — 2 of 8

Titles open the source; dated locators and verification boundaries are retained in the package.

S04 Ministry of Finance, Ghana

2026 Budget Statement and Economic Policy | 13 November 2025

Paragraph 790, PDF p. 122; Appendix 2A, printed p. 154 / PDF p. 170: Q1–Q3 2025 programme and provisional outturn.

S05 Abdul Malik Iddrisu et al.

Estimating the VAT Gap in Ghana | June 2026; online September 2026

Executive summary; pp. 26–27 policy-gap decomposition; Figure 3.5, printed p. 30 / PDF p. 31. Table 3.1, printed p. 29 / PDF p. 30: all 18 sectors, image-checked.

S06 Ross Warwick et al.

A Review of Ghana's Value-Added Tax System | March 2024

Refund discussion pp. 108–116; Table 4.1, printed p. 116 / PDF p. 117. Table A.1: printed p. 174 / PDF p. 175; sample/SE notes on PDF p. 176, image-checked.

References and source links — 3 of 8

Titles open the source; dated locators and verification boundaries are retained in the package.

S07 Edward Abrokwah et al.

Distributional Analysis of Ghana's Tax System, IFS Report R285 | 2023

Method and VAT discussion; PDF p. 23 (index 22).

S08 Francis Kwaw Andoh

Distributional Effects of Ghana's Value Added Tax Regime, Research Paper 443 | 2021

Table A1, printed p. 25 / PDF p. 36 (index 35).

S09 Dóra Benedek et al.

Estimating VAT Pass Through, IMF Working Paper 15/214 | 2015

Abstract and empirical design.

References and source links — 4 of 8

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S10 Ghana Statistical Service

Ghana at a Glance: CPI Inflation | Accessed 27 September 2026

Headline panel: August 2026 CPI 5.0% year-on-year, +0.4 percentage points versus July.

S11 Ghana Revenue Authority

Electronic VAT System (E-VAT) | Accessed 27 September 2026

E-VAT definition, receipt fields and installation options.

S12 Ghana Revenue Authority

Implementation of Electronic Invoicing of VAT — Phase Two | 4 September 2024

Notice of phased rollout.

References and source links — 5 of 8

Titles open the source; dated locators and verification boundaries are retained in the package.

S13 Ghana Revenue Authority

VAT on Imports and Exports | Accessed 27 September 2026

Import valuation and input-tax treatment.

S14 ENS

Africa Tax in Brief | 13 September 2026

Ghana tax-amendment item.

S15 Brantly Callaway et al.

Difference-in-Differences with a Continuous Treatment | 2021 working paper; current author version

Identification and treatment-intensity interpretation.

References and source links — 6 of 8

Titles open the source; dated locators and verification boundaries are retained in the package.

S16 Brantly Callaway et al.

Difference-in-Differences with Multiple Time Periods | 2021 journal paper; 2018 working paper

Group-time effects, conditional parallel trends and inference.

S17 Ministry of Finance, Ghana

Annual Tax Revenue Performance Report: 2025 | May 2026

PDF pp. 30–31 VAT narrative; PDF p. 49 Appendix Table 1, visually checked.

S18 Pedro H. C. Sant’Anna et al.

Doubly Robust Difference-in-Differences Estimators | Journal of Econometrics, 2020

Two-group/two-period ATT framework; identification and nuisance-model robustness.

References and source links — 7 of 8

Titles open the source; dated locators and verification boundaries are retained in the package.

S19 Ashesh Rambachan et al.

A More Credible Approach to Parallel Trends | Review of Economic Studies, 2023

Introduction and sections on bounded violations of parallel trends.

S20 David S. Lee

Training, Wages, and Sample Selection: Estimating Sharp Bounds on Treatment Effects | Review of Economic Studies, 2009

Author manuscript: selection assumptions and trimming bounds.

S21 Terry M. Therneau et al.

Multi-state models and competing risks | survival package vignette; accessed 2026

Aalen–Johansen probabilities and competing-event interpretation.

References and source links — 8 of 8

Titles open the source; dated locators and verification boundaries are retained in the package.

S99 Institute of Development and Economic Research

VAT Design, Cash Flow and Incidence: Analytical Protocol and Reproducible Calculations | 27 September 2026

This package: inputs/, code/analyse.py, outputs/, docs/ and verification/.

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