

Economic Performance Before Valuation

From Adam Smith to the Closed-Loop Architecture of Economic Performance, Corporate Finance, and Valuation

A Historical, Structural, Formal, and Computational Reconstruction of Capital, Return, Income, Cash Flow, Financing Claims, Risk, Time, Terminal Value, and Corporate Value

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Citation: Badr, H, H. (2026). Economic Performance Before Valuation from Adam Smith to the Closed-Loop Architecture of Economic Performance, Corporate Finance, and Valuation, *Econ Dev Glob Mark*, 2(2), 01-35.

Abstract

Corporate valuation has developed through a long sequence of intellectual advances: productive capital and profit in classical political economy; the capital-income distinction and present value; required return and asset pricing; capital-structure and tax-shield theory; shareholder-value analysis; economic profit and EVA; free-cash-flow valuation; clean-surplus and residual-income models; and formal equivalence among multiple valuation representations. This history makes one conclusion clear: the individual ingredients of modern valuation are mature. A remaining implementation problem is that the literature does not generally supply one mandatory governance architecture for determining when different formulas are economically comparable, when they should converge, and what a residual difference means when they do not. This paper develops and tests such an architecture under the principle Economic Performance Before Valuation. The claim is deliberately bounded. It does not assert priority for present value, FCFE-FCFF identities, EVA, residual income, WACC, tax-shield valuation, or model equivalence. Instead, it reconstructs the firm as a sequence of auditable economic states in which capital employment generates performance; performance generates after-tax operating income; reinvestment converts performance into cash; financing transforms the operating claim into claimant-specific cash flows; and the ending state becomes the opening state of the next period. Valuation is therefore downstream and conditionally admissible. The proposed Closed-Loop architecture formalizes nine controls: performance precedence, state continuity, claimant congruence, financing-bridge reversibility, temporal congruence, terminal-state legitimacy, multilateral convergence, visible structural refusal, and an explicit evidence hierarchy. A route-admissibility vector is introduced to distinguish true convergence tests from comparisons of non-equivalent claims or time conventions. Model C - a 28-worksheet, approximately 8,425-formula linked workbook covering 2005-2009 plus continuing value - provides the computational proof environment. In

the fixed-WACC regime, five FCFE routes reconcile annually; FCFE reverses to FCFF with zero residual; the terminal financing bridge closes exactly; and the principal FCFF/DCF and EVA routes converge at 335.0839028 per share. In the broken-date floating-WACC regime, apparently small divergences are decomposed rather than suppressed: one residual is traced exactly to a one-unit 2008 FCFF mismatch, while the larger DCF-EVA residual is traced to inconsistent rate-time recursion. Two controlled replications restore exact closure under different internally consistent timing architectures, showing that closure and value level are distinct questions. The resulting contribution is best understood as valuation governance rather than another valuation method: value is not admitted merely because a formula produces a number; it is admitted only when the economic state, claimant boundary, time map, financing bridge, and terminal state reconcile.

Keywords: Economic Performance, Closed-Loop Valuation, Capital Continuity, Economic State, ROIC, NOPLAT, EVA, Residual Income, DCF, FCFF, FCFE, WACC, WACE, Claimant Congruence, Financing Bridge, Terminal Value, Tax Shield, Multilateral Convergence, Structural Refusal, Model C

JEL Classification: B12; B13; D24; D46; G12; G31; G32; M41.

Introduction: From Valuation Methods to Valuation Architecture

Modern finance offers a large menu of valuation representations. A firm can be valued through dividends, FCFE, FCFF, capital cash flow, adjusted present value, residual income, economic profit/EVA, or accounting-based formulations. A superficial reading of this diversity suggests that analysts must choose among competing methods. The deeper literature says otherwise: when methods are implemented under identical economic assumptions, many are transformations of the same underlying present-value logic. The intellectual problem is therefore no longer simply to prove another equivalence.

The practical problem is governance. A spreadsheet can contain individually correct formulas and still produce economically inconsistent outputs because the claim being valued changes, the capital base resets silently, financing flows are mixed with operating flows, a discount rate is matched to the wrong cash flow, a fractional first period is treated differently across routes, or a terminal value is used as a plug. The formula may be correct while the model is not. This distinction between theoretical identity and implemented admissibility motivates the Closed-Loop research programme.

The central proposition of this paper is that economic performance should be treated as a state-generating process rather than as one explanatory variable among many. Capital is employed; capital earns a return; the return generates operating income; operating income and reinvestment determine operating cash flow; financing transforms the operating claim into claimant-specific flows; and only then does valuation convert those flows and residual economic states to a present representation. In this causal order, valuation is downstream of performance.

This formulation does not imply that classical economists or modern valuation scholars ignored performance. On the contrary, the historical record contains many antecedents. Smith's productive employment of stock, Marshall's profit after the charge for capital, Fisher's

distinction between capital stock and income flow, Rappaport's value-driver logic, Stewart's economic profit, and McKinsey's ROIC-growth framework all place economic performance upstream of value in important ways. The novelty question must therefore be more demanding: does the Closed-Loop architecture add a distinct system of continuity, boundary control, reversibility, temporal discipline, terminal legitimacy, and multilateral reconciliation beyond those established contributions?

The paper answers that question through a claim-by-claim historical review and a computational audit. The historical review is not decorative; it is the mechanism that limits overclaiming. Every proposed contribution is tested against the strongest prior art that appears to anticipate it. The computational section then asks whether the remaining contribution can be operationalized in Model C without balancing manipulation.

Research Design, Questions, and Claim Discipline

- RQ1. How did economic thought evolve from productive capital and profit to formal corporate valuation, and where does the idea of performance preceding valuation already appear?
- RQ2. Which equivalences among dividends, cash flow, residual income, economic profit, firm value, and equity value are already established in the literature?
- RQ3. Which financing and tax-shield literatures already govern the transition from operating cash flow to claimant-specific value?
- RQ4. What implementation problems remain when theoretically equivalent methods are carried across changing capital structures, claimant boundaries, fractional periods, and terminal states?
- RQ5. Can the Closed-Loop framework be stated as a falsifiable architecture rather than a descriptive metaphor?
- RQ6. After confronting the closest prior art - especially unified valuation frameworks, DCF-residual-income equivalence, capital-cash-flow approaches, and debt-policy-specific tax-shield models - what residual contribution remains both distinctive and defensible?
- RQ7. Can Model C provide evidence of exact closure, diagnostic near-closure, and visible failure without inserting balancing values?

Method of historical comparison and claim audit

The literature review is organized by claim rather than by prestige or chronology alone. Each proposed Closed-Loop feature is tested against the strongest known antecedent: productive capital against Smith and Ricardo; capital charge against Marshall and residual-income traditions; intertemporal value against Fisher and Williams; required return against Gordon-Shapiro and Sharpe; financing boundaries against M&M, Myers, Miles-Ezzell, Harris-Pringle, Ruback, and Fernandez; accounting-state valuation against Preinreich, Peasnell, Ohlson, Feltham-Ohlson, Penman, and Gode-Ohlson; and contemporary claimant matching against Damodaran and CFA practice. A contribution is retained only if the comparison leaves a meaningful residual after these antecedents are credited.

The evidentiary standard is deliberately asymmetric. Prior literature is credited at the strongest level supported by its published result, while the Closed-Loop programme is credited only at the strongest level demonstrated by the audited model. Formula equality, numerical

convergence, economic interpretation, historical originality, and empirical external validity are therefore kept separate throughout the paper.

Contribution boundary. The paper does not claim priority for present value, residual income, EVA, FCFE, FCFF, WACC, CAPM, APV, capital cash flow, clean-surplus accounting, or the general statement that operating performance affects value. It also does not claim that the acronym WACE is new; prior public uses exist. The claim tested is architectural: whether these established components can be governed by a mandatory set of state, claim, time, financing, and terminal conditions so that valuation becomes an auditable consequence of economic performance rather than a free-standing estimate.

Historical Genealogy I: Productive Capital, Profit, and Economic Performance

Adam Smith (1776): productive employment of stock

Smith's analysis of the accumulation and employment of stock predates corporate valuation theory, but it establishes a causal logic central to the present paper: capital employed productively enables output and accumulation. The Closed-Loop framework does not inherit a valuation formula from Smith; it inherits the insistence that the economic use of capital must precede any interpretation of the wealth that follows from it.

David Ricardo (1817): profits, interest, and distribution

Ricardo's treatment of wages, profits, rent, and interest situates the return to capital inside the production-and-distribution process. That lineage matters because it reminds valuation theory that profit is first an economic result of capital allocation before it becomes a forecast input or a capitalization base.

Alfred Marshall (1890): profit after the charge for capital

Marshall's distinction between interest on capital and the residual reward to undertaking and management is an important antecedent of residual-income logic. The conceptual move is decisive: accounting surplus is not sufficient if the employed capital has not earned its required charge. Later residual-income and EVA systems formalize this idea more explicitly.

The performance lineage before formal valuation

The classical lineage does not yield a modern DCF model, but it establishes three ideas that remain visible throughout later finance: capital is an economic stock, return is generated through productive use, and the distributable surplus must be interpreted relative to the cost or opportunity cost of the capital committed. Closed-Loop analysis treats these as the pre-valuation layer of the firm.

Historical Genealogy II: Capital, Income, Present Value, and Required Return

Irving Fisher (1906, 1930): capital as stock, income as flow

Fisher's capital-income distinction and intertemporal theory provide a foundation for treating valuation as a temporal mapping of future economic outcomes. Closed-Loop analysis accepts present value but adds a conservation requirement: if capital is a state variable, the closing state of one period cannot be silently replaced by an unrelated opening state in the next.

John Burr Williams (1938): investment value as discounted future distributions

Williams helped establish intrinsic value as the present worth of future distributions. The Closed-Loop framework does not challenge this logic. It challenges the sufficiency of a present-value calculation when the underlying claim, state, timing, and terminal assumptions are not reconciled with the economic path that generates the distributions.

Preinreich (1936-1938): fair value, yield, goodwill, depreciation, and the accounting-value bridge

Preinreich is a critical antecedent because he worked directly on the relationships among fair value, yield, goodwill, depreciation, income, and accounting value well before modern residual-income formulations. His 1936 paper on the fair value and yield of common stock, his 1937 paper on valuation and amortization, and his 1938 *Econometrica* survey of depreciation show that the accounting-value bridge has deeper roots than later EVA or clean-surplus terminology. The implication for this paper is important: the Closed-Loop programme cannot claim priority for linking income measurement and value. Its residual question is operational - whether capital, income, cash flow, financing claims, time, and terminal states can be forced to reconcile simultaneously in an implemented system.

Gordon and Shapiro (1956): required rate of profit

Gordon and Shapiro formalized a required-rate framework for capital-equipment analysis during the postwar rise of systematic capital budgeting. Their work represents a bridge from present-value theory to managerial investment analysis, reinforcing that an operating opportunity is judged relative to a required return.

Markowitz (1952): portfolio risk enters the valuation lineage

Markowitz shifted finance from evaluating risky assets in isolation toward a portfolio framework in which variance and covariance determine the economic meaning of risk. The paper is not a corporate-valuation model, but it is a necessary antecedent to the required-return layer that later enters CAPM, cost of equity, and WACC. For Closed-Loop analysis, this distinction is important: operating performance and risk are different dimensions. Performance generates the economic cash and successor state; risk helps determine the rate at which a claimant-specific representation is capitalized. The architecture therefore treats risk pricing as prior art while refusing to let the discount rate substitute for a missing operating-performance path.

Sharpe (1964), Lintner (1965), and Mossin (1966): equilibrium pricing of risk

The Sharpe-Lintner-Mossin asset-pricing lineage formalized the relationship between systematic risk and expected return in equilibrium. These results are prior art for the required-return layer used in modern equity valuation. The Closed-Loop programme therefore does not claim novelty for K_e , CAPM, beta, or risk premia. Its question begins one layer later: once a required return has been estimated, does the leverage-to-risk-to- K_e -to-WACC chain remain consistent with the claimant being valued, the cash-flow definition, the valuation date, and the rate-time path used by every competing route?

Robichek-Myers (1966) and Arditti (1973): discount-rate discipline

The literature on risk-adjusted discount rates and the meaning of WACC already warns that discount rates cannot be used mechanically. These papers strengthen, rather than weaken, the Closed-Loop thesis: the rate is part of a claim-and-time architecture and should not be detached from the cash flow it discounts.

Historical Genealogy III: Capital Structure, Financing Claims, and Tax Shields Modigliani-Miller (1958, 1963)

The M&M propositions transformed modern corporate finance by separating operating economics from financing under explicit assumptions and then incorporating corporate taxes. Closed-Loop claimant boundaries are best understood as an implementation discipline built on this separation, not as an alternative capital-structure theory.

Miller-Modigliani (1961): payout, growth, and valuation

Their dividend-policy analysis directly confronted what investors capitalize and how growth, investment, and payout interact. The lesson for Closed-Loop work is that value cannot be interpreted from one flow in isolation without specifying the economic and financing environment that produces it.

Hamada (1972): leverage, systematic risk, and the equity-claim burden

Hamada empirically and theoretically connected capital structure to the systematic risk of common equity. This is especially close prior art to Model C's leverage-to-beta-to-required-return chain. The Closed-Loop programme therefore does not treat relevering beta as an innovation. Its additional test is sequential: the financing structure must map into equity risk and required return, that required return must be attached to the correct equity claim, and any movement back to the operating claim must remain reversible through the financing bridge. The contribution is the governed chain, not the leverage-beta relation itself.

Myers (1974): adjusted present value and financing-investment interaction

Myers made financing effects explicit by separating unlevered investment value from financing side effects. This is close prior art to any claim that operating and financing layers should be traced separately. The Closed-Loop extension is an implementation requirement that the transformation from operating to financing claims be reversible in each period and at the terminal boundary.

Jensen-Meckling (1976): debt and equity claims as governance objects

Jensen and Meckling do not provide a valuation-closure theorem, but their agency framework makes debt and outside equity economically consequential claims rather than passive labels. This matters for Closed-Loop claimant congruence: financing claims affect incentives, control, and the distribution of cash-flow rights, so an enterprise-value route and an equity-value route cannot be treated as the same object until the financing boundary is made explicit. The Closed-Loop contribution is not agency theory; it is the use of claimant boundaries as a mandatory reconciliation control inside valuation implementation.

Miller (1977): debt, taxes, and the limits of a mechanical tax-shield story

Miller's debt-and-taxes analysis is a reminder that the tax consequences of financing cannot be reduced to a context-free additive benefit. The value of debt-related tax effects depends on the surrounding equilibrium and financing assumptions. This matters directly for Closed-Loop terminal analysis: the model-defined Terminal Tax Shield can be accepted as a bridge component only within the workbook's declared financing boundary. It is not automatically an independently valued APV tax shield merely because a label contains the words 'tax shield'.

Miles-Ezzell (1980), Harris-Pringle (1985), and debt-policy assumptions

These streams show that valuation of tax shields and the correct discounting approach depend on financing policy and the risk properties of debt and shields. Accordingly, no Closed-Loop proof can treat a tax-shield label as self-validating. The model must state the financing policy, identify the claim being bridged, and distinguish annual financing charges from the model-defined Terminal Tax Shield.

Inselbag-Kaufold (1997) and Ruback (2002)

Inselbag and Kaufold contrast WACC and APV under alternative financing strategies. Ruback's capital-cash-flow method incorporates interest tax shields in the cash flow and demonstrates equivalence with WACC valuation under consistent assumptions, including changing debt levels. These are especially close antecedents to the Closed-Loop financing bridge and therefore sharply limit any claim that such equivalence is new.

Fernandez (2003/2008): equivalence of ten valuation methods

Fernandez presents perhaps the strongest direct prior-art challenge to any broad claim of unification: ten discounted-cash-flow approaches, including WACC, equity cash flow, capital cash flow, APV, residual income, and EVA, produce the same value under identical assumptions. The Closed-Loop contribution must therefore be defined beyond 'many methods give one value.' It must reside in state continuity, explicit implementation constraints, reversible bridges, local/global closure, and diagnostic failure.

Historical Genealogy IV: Residual Income, Economic Profit, Accounting States, and Value

Peasnell (1982): formal connections among economic values, yields, and accounting numbers

Peasnell demonstrates mathematically that different accounting-profit representations can connect to present value under appropriate constructions. This is foundational prior art for the proposition that representation can change while underlying value remains invariant. Earlier accounting-income theory, including Edwards and Bell (1961), also deepened the distinction between measured business income and the economic changes in capital that underlie it.

Rappaport (1981, 1986): strategy, performance, and shareholder value

Rappaport moves valuation into managerial strategy and value drivers. The Closed-Loop framework agrees with the causal direction but imposes a stricter audit trail: strategy must pass through operating capital, return, reinvestment, cash release, financing transformation, and claim-consistent valuation before value is accepted.

Stewart (1991): EVA as a performance discipline

EVA operationalizes a full capital charge against after-tax operating profit. It is one of the closest antecedents to 'performance before valuation.' However, EVA is treated in Closed-Loop analysis as one representation within a wider system, not as a privileged replacement for cash-flow valuation. The broader capital-charge lineage also includes Anthony (1973), who argued for explicit recognition of the cost of equity, and later value-based-management treatments such as Young and O'Byrne (2001).

Biddle, Bowen, and Wallace (1997): empirical caution on EVA superiority

The empirical literature does not support sweeping claims that EVA dominates earnings in explaining returns or firm value. This evidence is important because the Closed-Loop programme should not claim superiority of a single metric. Its proposition is structural: the metrics must reconcile to the same economic system under stated conditions.

Ohlson (1990, 1995) and Feltham-Ohlson (1995)

Ohlson's 1990 synthesis is especially important because it makes intertemporal consistency explicit and clarifies the theoretical roles of dividends, cash flows, earnings, and no-arbitrage valuation. The 1995 model then links market value to book value and expected abnormal earnings under clean-surplus accounting, while Feltham and Ohlson separate operating and financial activities and develop accounting dynamics for valuation. These papers come close to a state-based interpretation of the firm. The Closed-Loop residual contribution cannot therefore be 'state variables matter.' It must be the stronger governance rule that accounting states, operating cash generation, financing transformations, claimant boundaries, discount-time conventions, and terminal claims must remain jointly traceable across multiple valuation families.

Penman (1998) and Penman-Sougiannis (1998)

Penman synthesizes dividend, discounted-cash-flow, and residual-income models and shows how terminal-value calculations connect apparently different formulations. Penman-Sougiannis show how finite forecast horizons and implementation choices affect valuation error. Closed-Loop terminal closure must therefore go beyond stating that terminal value matters; it must specify a continuing economic state and show how claim conservation survives the forecast boundary.

Lundholm-O'Keefe (2001) and Plenborg (2002)

Lundholm and O'Keefe make the equivalence point explicit: properly implemented DCF and residual-income models yield identical values. Plenborg shows how simplifying assumptions can introduce bias despite theoretical equivalence. The Closed-Loop architecture adopts this logic and generalizes it from pairwise model equivalence to a system-wide implementation protocol.

Ohlson (2005), Gode-Ohlson (2006), and Ohlson-Gao (2006)

Later accounting-based valuation research further unifies dividends, free cash flows, residual income, earnings, and earnings growth. Consequently, the phrase 'unified valuation framework' cannot itself support originality. Closed-Loop novelty, if sustained, must be located

in governance rules that determine when a valuation representation is admissible and how a failure is localized.

Kaplan-Ruback (1995) and Fama-French (1999): from valuation theory to empirical economic returns

Kaplan and Ruback compared discounted cash-flow forecasts with transaction values in highly leveraged transactions and found that DCF valuations were, on average, reasonably close to observed transaction values (Kaplan & Ruback, 1995). Fama and French later estimated both the corporate cost of capital and realized returns on corporate investment over a long historical sample (Fama & French, 1999). These studies matter for the present paper because they separate two questions that Closed-Loop analysis also keeps distinct: whether a valuation architecture is internally coherent and whether its forecasts are externally accurate. Model C can establish the first within its declared conventions; only market and cross-firm evidence can establish the second.

Contemporary practice in 2025-2026: performance remains upstream of value

Contemporary practice reinforces the historical direction of causality. The eighth edition of Koller, Goedhart, and Wessels continues to organize valuation around operating performance, invested capital, cash flow, and the cost of capital (Koller, Goedhart, & Wessels, 2025). McKinsey's 2026 valuation explainer states that revenue growth and return on capital drive cash flow and, ultimately, company value (McKinsey & Company, 2026). CFA Institute's 2026 curriculum likewise treats FCFF, FCFE, residual income, continuing value, and claimant-consistent discounting as standard valuation tools (CFA Institute, 2026). This contemporary evidence supports the phrase Economic Performance Before Valuation as a disciplined ordering rule, but it also prevents an overbroad novelty claim: the general proposition that performance drives value is well established. The residual contribution must remain the Closed-Loop governance architecture.

What the Literature Has Already Established

- Productive capital and operating performance are economically prior to distributable surplus.
- Profit must be interpreted relative to a required return or capital charge if it is to represent economic profit.
- Present value provides the fundamental intertemporal valuation operator.
- Risk and required return are linked; cash flows and discount rates must be matched to the relevant claim.
- Operating and financing effects can be separated through APV-type or related approaches.
- Tax-shield value depends on financing policy, debt risk, and the discounting convention.
- FCFE, FCFF, capital cash flow, APV, residual income, EVA, and related methods can be equivalent under aligned assumptions.
- Residual-income and DCF valuation are not rival theories when implemented consistently.
- Terminal value is structurally important in finite-horizon valuation and can absorb model inconsistencies if constructed carelessly.
- Operating and financial activities can be separated inside accounting-based valuation frameworks.

- ROIC, growth, reinvestment, and cost of capital are established drivers of enterprise value in modern practice.

This list is intentionally extensive. The intellectual credibility of the Closed-Loop programme depends on conceding prior art wherever it exists. The paper's thesis survives only if a meaningful residual contribution remains after those concessions.

The conclusion from this literature is stronger than a generic acknowledgement of prior art. The historical record already contains: present-value valuation; claimant-specific discounting; operating versus financing decomposition; residual-income and economic-profit valuation; clean-surplus state variables; DCF-RI equivalence; multi-method cash-flow equivalence; terminal-value theory; and debt-policy-dependent tax-shield valuation. Any paper that merely recombines those elements without adding a governing rule would be incremental at best. The Closed-Loop claim must therefore survive comparison with the strongest synthesis papers, not merely with textbook presentations.

Internal coherence and external valuation accuracy are different research questions; historical theory and empirical work support both, but neither substitutes for the other.

Table 1. Historical Map: From Economic Performance to Closed-Loop Valuation Governance

Period	Representative literature	Established contribution	Relation to paper
1776	Adam Smith	Productive stock and accumulation	Performance / capital employment
1817	Ricardo	Profits, interest, distribution	Return to capital
1890	Marshall	Profit after capital charge	Economic profit antecedent
1906/1930	Fisher	Capital stock, income flow, interest	Intertemporal foundation
1938	Williams	Present value of future distributions	Intrinsic valuation
1938	Preinreich	Economic value, depreciation, income	Accounting-value lineage
1952	Markowitz	Portfolio risk and covariance	Risk foundation for required return
1956	Gordon-Shapiro	Required rate of profit	Capital budgeting
1958-1963	M&M	Cost of capital, taxes, financing	Claim structure
1964	Sharpe	CAPM required return	Risk pricing
1965-1966	Lintner; Mossin	Equilibrium pricing of risky assets	Required-return lineage

Period	Representative literature	Established contribution	Relation to paper
1966-1985	Robichek-Myers; Arditti; Miles-Ezzell; Harris-Pringle	Risk-adjusted rates, WACC, debt policy	Rate/financing discipline
1972	Hamada	Capital structure and systematic equity risk	Leverage-beta-Ke chain
1974	Myers	APV and financing side effects	Operating-financing separation
1976	Jensen-Meckling	Debt/equity agency relationships	Governance of claims
1977	Miller	Debt and taxes	Financing-tax context
1981-1986	Rappaport	Shareholder value and value drivers	Strategy-performance-value
1982	Peasnell	Accounting/economic value connections	Representation equivalence
1991	Stewart	EVA	Capital-charge performance
1995	Ohlson; Feltham-Ohlson	Clean surplus; operating/financial activities	Accounting-state valuation
1995	Kaplan-Ruback	DCF forecasts versus transaction values	External valuation evidence
1997-1998	Penman; Penman-Sougiannis	Valuation synthesis; terminal value	Finite-horizon discipline
1997	Biddle-Bowen-Wallace	EVA empirical comparison	Caution on metric superiority
1999	Fama-French	Corporate cost of capital and returns on investment	Performance versus required return
2001-2002	Lundholm-O'Keefe; Plenborg	DCF-RI equivalence; implementation bias	Pairwise closure / simplifying assumptions
2002	Ruback	Capital cash flow	Changing debt / tax-shield cash flow
2003-2008	Fernandez	Ten-method equivalence	Broad DCF equivalence
2005-2006	Ohlson; Gode-Ohlson; Ohlson-Gao	Accounting-based and unified valuation	Unified representations

Period	Representative literature	Established contribution	Relation to paper
2025-2026	Koller-Goedhart-Wessels; McKinsey; CFA	ROIC/growth/cash flow; FCFF/FCFE/RI practice	Current performance-to-value practice
2026	Closed-Loop programme	State continuity, reversibility, terminal closure, structural refusal	Proposed governance architecture

The Remaining Gap: From Equivalence Theorems to Valuation Governance

An equivalence theorem is not an implementation architecture. It can show that two formulas must agree under common assumptions without telling the analyst how to detect which assumption has been violated when an actual workbook does not agree. Likewise, a unified theoretical framework can relate valuation metrics without imposing a period-by-period state transition, an explicit claimant boundary, or a terminal claim-conservation test.

The Closed-Loop proposal begins at this gap. It asks not merely whether methods are theoretically equivalent but whether a model can demonstrate the conditions of equivalence, preserve them across periods, expose their failure, and identify the source of the residual without inserting a balancing plug. This changes the primary question from 'Which valuation method is correct?' to 'Under what economic and computational conditions is a valuation output admissible?'

The distinction is similar to the difference between an accounting identity and an audited accounting system. The identity may be universally true; the audit architecture determines whether an implemented record actually preserves it. Closed-Loop valuation is proposed as this second-order layer: not a replacement for the identities, but a governance system for their implementation.

Closed-Loop Ontology: The Firm as a Sequence of Economic States

Let the firm's economically relevant state at the end of period t be represented by a state vector S_t . The exact contents can vary by application, but the minimum Closed-Loop state separates operating capital, operating equity, financing claims, non-operating items, and the variables required to explain the next transition.

$$S_t = \{OC_t, OE_t, Debt_t, NOA_t, Claim_t, Time_t, Policy_t\}$$

$$S_{\{t+1\}} = T(S_t, Performance_{\{t+1\}}, Reinvestment_{\{t+1\}}, Financing_{\{t+1\}}, Distribution_{\{t+1\}})$$

The transition operator T is not presented as a stochastic structural model of the entire corporation. It is an audit ontology: every forecasted state must be explainable from the prior state and explicitly declared flows. This is the formal content of capital-state continuity.

Performance enters before valuation because the operating state generates the period's economic output. A simplified operating chain is:

$$NOPLAT_t = ROIC_t \times OC_{\{t-1\}}$$

$$FCFF_t = NOPLAT_t - \Delta OC_t \text{ (under the declared operating – capital convention)}$$

$$EVA_t = NOPLAT_t - k_t \times OC_{\{t-1\}}$$

In the author's Model C, a parallel equity-side mapping relates operating equity, ROE, and net income. The specific WACE construction is treated as an author-defined structural layer; originality is not claimed for the acronym or generic phrase 'weighted average cost of equity.'

Three linked ledgers: operating state, financing claims, and valuation representation

The architecture separates three ledgers that conventional models often compress. The operating-state ledger records capital employed, operating return, NOPLAT, reinvestment, and successor operating capital. The financing-claim ledger records debt movement, financing charges, tax effects, equity cash flow, and claimant transitions. The valuation-representation ledger discounts economically admissible flows or residual-income measures to a common valuation date. A route is not accepted merely because one ledger balances internally; the ledgers must map into one another without unexplained residuals.

In compact form, the causal order is: $S_t \rightarrow \text{Performance}_{\{t+1\}} \rightarrow \text{Income}_{\{t+1\}} \rightarrow \text{Reinvestment}_{\{t+1\}} \rightarrow \text{Cash}_{\{t+1\}} \rightarrow \text{FinancingClaims}_{\{t+1\}} \rightarrow S_{\{t+1\}}$; valuation operators are applied only after the underlying route has been defined. This is the precise meaning of performance before valuation. It is an ordering rule, not a claim that market prices are determined mechanically by one accounting ratio.

Formal Admissibility Conditions

Route-admissibility vector and comparability criterion

For valuation route r , define an admissibility vector:

$$\Omega_{ar} = (\text{Claim}_r, \text{Date}_r, \text{CapitalBoundary}_r, \text{CashFlowDefinition}_r, \text{FinancingTaxConvention}_r, \text{RatePath}_r, \text{TimeMap}_r, \text{TerminalRule}_r)$$

Two numerical outputs are legitimate convergence candidates only when the economically relevant dimensions of their admissibility vectors are congruent. Congruence does not require textual identity of model labels; it requires economic equivalence of claim, date, capital boundary, cash-flow definition, financing and tax convention, rate path, time map, and terminal rule. If the routes are not economically congruent, $V_i - V_j$ is not evidence of model failure; it may simply measure different claims, dates, or conventions. If the routes are economically congruent and the residual remains non-zero beyond a declared numerical tolerance, the residual becomes diagnostic evidence requiring explanation.

This criterion is intentionally stricter than the statement that two methods are theoretically equivalent. Theoretical equivalence supplies the expectation of equality under common assumptions; the admissibility vector identifies whether those common assumptions actually exist in an implemented model.

Admissibility-Convergence Proposition

This proposition is an audit rule, not a new universal asset-pricing theorem. It formalizes what an implemented model must demonstrate before an observed equality can be interpreted as evidence and before an observed inequality can be interpreted as a contradiction. Its novelty claim is therefore methodological: equivalence becomes conditional on documented admissibility rather than assumed from the names of the formulas being used.

A non-zero residual is therefore not interpreted immediately as a failure of valuation theory. It is classified against a diagnostic set of possible sources: source/provenance, state continuity, claimant boundary, financing transformation, time mapping, rate path, terminal construction, and numerical rounding. In controlled perturbations, an attributable component can be

quantified exactly, as Model C demonstrates for the one-unit FCFF mismatch; in general, however, these categories are not assumed to be orthogonal or mechanically additive. A route may differ legitimately because it values a different claim or date; it may differ computationally because of a hard-coded input or sign error; or it may differ structurally because the time map, financing convention, or terminal state is inconsistent.

For two valuation routes i and j that are theoretically equivalent, define the valuation residual as $\epsilon_{ij} = V_i - V_j$. The Closed-Loop proposition is conditional rather than universal: if Ω_i and Ω_j are congruent on the economically relevant dimensions, both routes are generated from the same underlying state transition, the financing transformation is reversible, and the terminal rule is common, then ϵ_{ij} should converge to zero within a declared numerical tolerance.

A1 - Performance precedence

A valuation route is admissible only if its cash flows or residual-income measures are traceable to an explicit economic performance path rather than introduced as free-standing forecast numbers.

A2 - State continuity

Absent an explicit economic transaction, the closing state of period t must map to the opening state of period $t+1$ under declared transition rules.

A3 - Claimant congruence

Numerical equality is required only between routes that value the same claim. Enterprise, debt, preferred, non-operating assets, and common equity must not be mixed implicitly.

A4 - Financing-bridge reversibility

A transformation between firm cash flow and equity cash flow must be reversible under the same sign, tax, and debt conventions. Reversal failure is evidence of an omitted or misclassified financing item.

A5 - Temporal congruence

Cash-flow dates, discount factors, capital-charge periods, and terminal dates must be governed by one coherent time axis. Broken dates and floating rates are permitted but must propagate consistently.

A6 - Terminal-state legitimacy

Continuing value must represent a coherent successor state in which growth, reinvestment, financing claims, tax effects, and discounting are mutually compatible. Terminal value cannot be an unexplained balancing residual.

A7 - Multilateral convergence

When independent valuation routes represent the same economic object under congruent assumptions, they must converge within a declared numerical tolerance.

A8 - Structural refusal

If convergence fails after claim and time alignment, the residual must remain visible until an economic or computational cause is identified. A balancing plug is not a proof.

A9 - Evidence hierarchy

Formula identity, numerical reconciliation, and economic interpretation are distinct evidentiary levels. Equality proves arithmetic consistency; it does not automatically validate economic assumptions.

Formal Closure Results

Residual taxonomy

Let $\epsilon_{ij} = V_i - V_j$. Closed-Loop analysis classifies ϵ before interpreting it: (i) identity residual - a formula or sign mismatch; (ii) claimant residual - non-equivalent claims; (iii) timing residual - non-congruent dates or discount recursion; (iv) state residual - discontinuity in capital or balance-sheet transition; (v) terminal residual - inconsistent continuing-state assumptions; or (vi) unexplained structural residual. Only the last category remains after admissibility alignment and therefore justifies structural refusal.

Operationally, the residual ledger is classified before interpretation rather than forced into an assumed additive decomposition. Each non-zero difference is investigated against the source, state, claim, financing, time, rate, terminal, and rounding categories, and any quantitatively attributable component is documented separately. A residual is not 'fixed' by changing a terminal value or a discount rate until its cause has been identified. This is the computational expression of structural refusal.

FCFE route closure

$$FCFE_{\{r,t\}} = FCFE_t, \quad r = 1, \dots, 5; \quad t = 2005, \dots, 2009$$

Five separately formulated FCFE derivation/check routes in Scenario C reproduce the same annual series. This is an internal redundancy test: multiple formula paths land on the same equity cash flow before valuation begins.

Financing-boundary closure

$$\epsilon_{bridge,t} = FCFE_{reported,t} - [FCFE_t + DM_t + FC_t] = 0$$

DM_t denotes the workbook debt-movement row and FC_t the workbook financing-charge row. The equation is deliberately workbook-specific and is not relabeled as the textbook after-tax-interest identity. Its evidentiary meaning is exact reversal of the model's own financing boundary.

General discount-factor closure condition

$$\begin{aligned} D_0 &= 1, & D_t &> 0 \\ k_t * &= D_{\{t-1\}}/D_t - 1 \\ D_{\{t-1\}} &= (1 + k_t *)D_t \end{aligned}$$

If $FCFF_t = NOPLAT_t - (IC_t - IC_{\{t-1\}})$ and $EVA_t = NOPLAT_t - k_t IC_{\{t-1\}}$, then using the period capital-charge rate implied by adjacent discount factors causes the invested-capital terms to telescope. With terminal FCFE value TV_n and terminal residual-income value $TV_n - IC_n$, the finite-horizon identity becomes:

$$IC_0 + \sum D_t EVA_t + D_n(TV_n - IC_n) = \sum D_t FCFF_t + D_n TV_n$$

This identity is not claimed as a new valuation theorem. Its role is to convert temporal consistency into an explicit audit condition that can be compared directly with the workbook's floating-rate implementation.

Proof sketch and interpretation

Substitute $EVA_t = NOPLAT_t - k_t IC_{t-1}$ and $k_t = D_{t-1}/D_t - 1$. Because $D_t k_t = D_{t-1} - D_t$, the discounted capital-charge term becomes $(D_{t-1} - D_t) IC_{t-1}$. Combining this term with discounted NOPLAT and using $FCFF_t = NOPLAT_t - (IC_t - IC_{t-1})$ causes the capital terms to telescope across the forecast horizon. The remaining terminal adjustment is exactly $D_n(TV_n - IC_n)$ on the EVA side versus $D_n TV_n$ on the FCFF side. The identity therefore demonstrates why rate-time recursion, not merely the label WACC, governs DCF-EVA closure.

Terminal financing closure

$$\begin{aligned}FCFF_{TV} &= FCFE_{TV} + DM_{TV} + TS_{TV} \\TS_{TV} &= FCFF_{TV} - (FCFE_{TV} + DM_{TV})\end{aligned}$$

TS_{TV} is the model-defined Terminal Tax Shield component. The terminology is kept terminal-specific. The paper does not generalize this label to annual financing charges, and it does not equate the workbook component with an independently valued APV tax shield unless the relevant debt and discounting assumptions are separately established.

The Closest Prior Art and the Exact Residual Contribution

Fernandez: ten-method equivalence is already known

Fernandez demonstrates that ten discounted-cash-flow valuation methods can produce the same company value when identical assumptions are used, including WACC, equity cash flow, capital cash flow, APV, residual income, and EVA. This is extremely close prior art to any broad claim that the Closed-Loop programme "unifies valuation methods." That claim is therefore rejected. The residual Closed-Loop contribution must begin where Fernandez stops: not whether methods can be algebraically equivalent, but how an implemented model proves that claim, date, financing, time, capital state, and terminal assumptions are actually aligned before equivalence is demanded.

Lundholm-O'Keefe and Plenborg: DCF-RI convergence is already known

Lundholm and O'Keefe argue that properly implemented DCF and residual-income models yield identical valuations; differences arise from inconsistent implementation. Plenborg likewise compares DCF and residual income under their theoretical equivalence and shows how simplifying assumptions can introduce bias. These papers sharply limit novelty claims for DCF-EVA or DCF-RI convergence. Closed-Loop adds value only if it turns this insight into a broader operational hierarchy that diagnoses the source of inconsistency across more than one pair of models.

Penman, Gode-Ohlson, and the unified-framework challenge

Penman synthesizes dividend, discounted-cash-flow, and residual-income approaches and makes terminal value central to finite-horizon implementation. Gode and Ohlson provide a unified theoretical framework for dividends, free cash flows, residual income, and earnings-growth models. Accordingly, "unified valuation framework" is not a defensible novelty label by itself. The residual claim is governance: route admissibility, state continuity, financing

reversibility, temporal congruence, terminal-state conservation, and visible refusal when implementation violates those conditions.

Ohlson and Feltham-Ohlson: state variables and operating-financing separation already exist

Ohlson's 1990 synthesis emphasizes intertemporal consistency; Ohlson (1995) and Feltham-Ohlson (1995) make book value, abnormal earnings, and operating-financial separation explicit in valuation. Closed-Loop therefore cannot claim that using states or separating operating and financing activities is new. Its residual contribution is the simultaneous enforcement of accounting-state continuity with claimant-specific cash-flow bridges, rate-time recursion, and terminal closure in a computational audit environment.

Miles-Ezzell, Harris-Pringle, Ruback, and the financing-policy challenge

The financing literature already shows that tax-shield value and appropriate discount rates depend on financing policy. Miles-Ezzell analyze WACC under leverage policy; Harris-Pringle examine risk-adjusted discount rates; Ruback's capital-cash-flow approach incorporates interest tax shields directly in the cash flow to all capital providers. The Closed-Loop framework therefore does not claim discovery of tax shields or financing-policy dependence. Its distinct test is whether financing effects can be traced and reversed across the firm/equity boundary annually and at continuing value without hidden plugs.

Damodaran and CFA: claimant matching is established practice

Modern valuation practice explicitly distinguishes equity cash flows discounted at cost of equity from firm cash flows discounted at WACC, and warns against mixing cash flows and discount rates. CFA materials likewise present direct FCFE valuation and indirect FCFF-to-equity valuation as coherent alternatives. Claimant matching is therefore established. Closed-Loop adds a formal admissibility test that asks whether the implemented routes truly share the same claim, date, capital boundary, financing convention, rate path, time map, and terminal rule.

The residual contribution after the strongest prior art is credited

After these antecedents are fully credited, the defensible residual is narrower but more substantial: a higher-order audit architecture that makes theoretical equivalence conditional on an explicit admissibility vector, treats ending capital as a successor-state constraint, requires financing bridges to be reversible rather than merely formulable, separates closure from value level, extends reconciliation into terminal claims, classifies residuals diagnostically, and permits the model to refuse valuation closure when the economic history cannot be reconciled. The contribution is therefore architectural and methodological rather than elemental.

Closest prior art	What it already establishes	What cannot be claimed	Residual Closed-Loop contribution
Fernandez (2003/2008)	Equivalence of ten DCF-based valuation methods under identical assumptions	General multi-method equivalence	Implementation admissibility + diagnostic residual classification

Closest prior art	What it already establishes	What cannot be claimed	Residual Closed-Loop contribution
Lundholm & O'Keefe (2001); Plenborg (2002)	DCF and residual-income equivalence; implementation inconsistency explains differences	DCF-RI convergence	System-wide closure hierarchy beyond a single pair
Penman (1997/1998); Gode & Ohlson (2006)	Synthesis/unification of dividend, FCF, RI and earnings-based models; terminal-value theory	"Unified valuation" as such	Governed state/claim/time/terminal architecture
Ohlson (1990, 1995); Feltham & Ohlson (1995)	Intertemporal consistency; book-value/abnormal-earnings states; operating-financial separation	State-based valuation or operating/financing split	Joint enforcement with cash-flow reversibility and terminal claim conservation
Miles & Ezzell (1980); Harris & Pringle (1985); Ruback (2002)	Financing-policy-dependent discounting and tax-shield treatment; capital cash flow	Tax-shield valuation or financing-policy sensitivity	Reversible financing bridge tested annually and at CV
Damodaran; CFA (2026)	Cash-flow/discount-rate claimant matching; FCFF/FCFE relation	Claimant matching	Formal route-admissibility vector + refusal when congruent routes do not close
Model C evidence	Not prior art - author's implementation	No claim of external empirical superiority	Visible, reproducible audit of closure and failure modes

Literature / School	Established contribution	Residual gap for this paper	Closed-Loop response
Smith / Ricardo / Marshall	Capital, profit, distribution, capital charge	No corporate multi-method audit architecture	State-generating performance sequence
Fisher / Williams	Capital-income distinction; present value	PV does not itself police implemented state continuity	PV becomes downstream representation
M&M / Myers / Miles-Ezzell / Harris-Pringle	Capital structure, APV, WACC, tax-shield assumptions	Multiple financing conventions remain possible	Explicit claimant boundary and reversible financing bridge
Sharpe / risk-adjusted discount literature	Required return and risk pricing	Rate can still be misapplied to wrong claim/date	Claim-rate-time congruence test

Literature / School	Established contribution	Residual gap for this paper	Closed-Loop response
Peasnell / Ohlson / Feltham-Ohlson	Accounting states, abnormal earnings, valuation links	Strong theoretical state models but narrower cash/claim bridge	Broader operating-financing-terminal closure
Rappaport / Stewart	Performance-value drivers; EVA	Managerial systems do not require multi-route numerical closure	Performance-first plus admissibility tests
Penman / Penman-Sougiannis	Model synthesis; terminal-value discipline	Primarily model/finite-horizon equivalence	Terminal state as claim-conserving successor state
Lundholm-O'Keefe / Plenborg	DCF-RI equivalence and implementation bias	Pairwise comparison	Multilateral closure with residual decomposition
Ruback / Fernandez	CCF/WACC/APV and ten-method equivalence	Equivalence under identical assumptions	Operational mechanism for detecting which assumption is not identical
Closed-Loop proposal	No claim to replace prior theory	Higher-order audit layer	Continuity, congruence, reversibility, terminal legitimacy, structural refusal

From component truth to system truth: the precise historical advance

The strongest formulation of the historical advance is cumulative rather than adversarial. The foundational economists and finance scholars reviewed here solved indispensable parts of the problem: productive capital, profit and distribution, present value, risk pricing, cost of capital, financing side effects, residual income, operating-versus-financial separation, terminal value, and multi-method equivalence. Closed-Loop analysis does not supersede those results. It changes the unit of proof.

Earlier results are often component truths or pairwise equivalence results. The Closed-Loop architecture asks whether those truths survive simultaneously inside one implemented economic history. The advance claimed here has four dimensions: from representation to state transition; from pairwise equivalence to multilateral closure; from a valuation output to an admissibility test; and from unexplained non-convergence to a classified diagnostic residual. In this sense the programme advances the implementation frontier rather than claiming a replacement theory of value.

The paper therefore uses a deliberately demanding originality test: after the strongest prior art is credited, does any reviewed antecedent jointly require performance precedence, capital-state continuity, claimant congruence, financing reversibility, temporal congruence, terminal-state legitimacy, multilateral convergence, visible structural refusal, and an explicit evidence hierarchy inside one computational audit? The present review does not establish an absolute

'first ever' claim, but it does identify this joint governance architecture as the defensible residual contribution to be tested and replicated.

Model C as a Computational Proof Environment

Model C consists of 28 principal linked worksheets and approximately 8,425 stored formulas. The relevant forecast window is 2005-2009 plus continuing value. The model is used here not because spreadsheet complexity is itself evidence, but because a linked environment allows the proposed architecture to fail visibly. The proof standard is therefore cell-level traceability, not visual repetition of a headline value.

The audit distinguishes three evidentiary levels. Level I is formula identity: do linked rows and cells reconcile? Level II is valuation closure: do independent routes representing the same claim produce the same value? Level III is economic interpretation: are the assumptions that generate the closure economically defensible? The paper never treats Level I equality as sufficient proof of Level III validity.

Two regimes are especially informative. Scenario C uses a 5%-higher-sales operating path, full-year timing, and a fixed workbook WACC of 17.6753653%. Scenario A uses baseline operations, a floating leverage-to-beta-to-Ke-to-WACC path, and a deliberately broken first interval of 108/365 of a year. Because the regimes differ in operating assumptions as well as discount architecture, their headline values are not interpreted as a causal fixed-versus-floating WACC experiment. The valid evidence is within-regime closure and controlled replication.

Source precedence and anti-circularity rules

The computational audit follows four source-precedence rules: active workbook formulas and linked cells govern over captions or legacy labels; an equality is called exact only when the governing cells or an independently recomputed bridge close numerically; repeated displays of one linked result are cross-checks rather than automatically independent valuation methods; and no adjustment defined from the target value is accepted as independent convergence evidence. These rules are essential because a closed-loop proof can become circular if a balancing amount is itself derived from the value it is supposed to verify.

This anti-circularity rule is why the direct FCFE block that reaches 335.0839028 only after adding a target-derived difference is not treated as an independent proof, even though the underlying annual FCFE series remains strong reconciliation evidence. The paper therefore deliberately gives less credit to a visually impressive equality when its construction is endogenous to the target.

Scenario C: Exact Local and Global Closure Five FCFE routes

Route	2005	2006	2007	2008	2009
Operating cash less debt/financing rows	2,790.59	1,158.75	5,541.71	8,568.63	11,890.31
NOPLAT - net investment - financing bridge	2,790.59	1,158.75	5,541.71	8,568.63	11,890.31

Route	2005	2006	2007	2008	2009
Financing-flow aggregation	2,790.59	1,158.75	5,541.71	8,568.63	11,890.31
Net-income / balance-sheet reconciliation	2,790.59	1,158.75	5,541.71	8,568.63	11,890.31
Net income + noncash - reinvestment + financing	2,790.59	1,158.75	5,541.71	8,568.63	11,890.31

This table demonstrates route closure before discounting. It is stronger than one repeated output because the routes arise from different formula organizations. It is still an internal-model result, not external empirical validation.

Exact annual FCFE-to-FCFF reversal

Year	FCFE	Debt movement	Financing charge	Reconstructed FCFF	Reported FCFF	Residual
2005	2,790.59	(57.00)	519.00	3,252.59	3,252.59	0.00
2006	1,158.75	3,055.00	409.00	4,622.75	4,622.75	0.00
2007	5,541.71	1,445.00	298.00	7,284.71	7,284.71	0.00
2008	8,568.63	978.00	171.00	9,717.63	9,717.63	0.00
2009	11,890.31	0.00	111.00	12,001.31	12,001.31	0.00

The residual is zero in every forecast year. The result establishes exact cash-flow conservation across the workbook's financing boundary under its stated row definitions. It does not require the annual financing-charge row to be relabeled as an interest tax shield.

DCF/EVA global closure

Under Scenario C, the principal FCFF/DCF and EVA/economic-profit routes produce identical equity value per share:

$$\begin{aligned}\frac{V_{FCFF}}{DCF}, C &= 335.0839028 \\ V_{EVA}, C &= 335.0839028 \\ \varepsilon_C &= 0\end{aligned}$$

The fixed discount-factor sequence also satisfies the adjacent-factor recursion exactly, so the equality is not merely observed; it is explained by a rate-time architecture consistent with the EVA capital charge.

Terminal claim conservation

Component	Value	Role
FCFE continuing value	108,791.1362	Equity claim
Debt movement	2,121.0000	Financing bridge
Terminal Tax Shield	9,377.9090	Model-defined terminal financing component

Component	Value	Role
FCFF continuing value	120,290.0452	Firm cash-flow claim

$$108,791.1362 + 2,121.0000 + 9,377.9090 = 120,290.0452$$

$$\varepsilon_{TV} = 0$$

This is a terminal bridge proof inside the model. A separate APV-style present value of tax shields would be a different exercise and is not inferred from the label alone.

Scenario A: Why Non-Convergence Is More Informative Than Cosmetic Equality

Scenario A produces 320.9936089 per share on the DCF sheet, 320.9962697 on the integrated FCFF route, and 321.7155488 on the EVA/economic-value route. A weak analysis would describe these as 'close enough.' Closed-Loop analysis decomposes them because each residual has a different cause.

Route	Value/share	Difference DCF	vs	Relative difference
DCF / FCFF	320.9936089	—		—
Integrated FCFF	320.9962697	+0.0026609		+0.000829%
EVA / Economic Value	321.7155488	+0.7219400		+0.224908%

Residual 1: one-unit cash-flow mismatch

The integrated route uses FCFF of 8,300 in 2008 while the DCF route uses 8,299. Discounting the one-unit difference at the 2008 factor 0.5853884991 and converting through the model's share scale explains exactly 0.0026609 per share. The first residual is therefore a legacy hard-coded-versus-linked operating-capital inconsistency, not a failure of valuation theory.

Residual 2: rate-time inconsistency

The larger DCF/EVA residual arises because the workbook's DCF factors and EVA capital charges do not obey one common recursion. The first EVA charge uses simple prorating for a 108-day interval while the DCF factor embeds an effective compounded rate; later periods also combine maturity-specific factors with period capital charges that are not the adjacent-factor rates implied by those factors.

Controlled Replications: Closure Versus Value Level

Replication R1 - preserve the DCF schedule

R1 preserves Scenario A's DCF discount factors and operating cash-flow path, then derives the one-period capital-charge sequence $k_t * = D_{\{t-1\}}/D_t - 1$. The implied rates are 4.4314%, 17.1379%, 18.0405%, 18.3032%, and 17.8469%. With those rates, DCF and EVA operating values both equal 71,168.593948 exactly. Applying the same non-operating adjustments returns the DCF value of 320.9936089 per share.

Replication R2 - preserve the displayed floating-WACC path

R2 preserves the displayed floating-WACC path but rebuilds the discount factors sequentially. The 15.7822% annual first-period rate is converted to its 108-day effective rate of 4.4314%, after which later annual rates are compounded sequentially. Under this second internally consistent architecture, DCF and EVA operating values both equal 72,165.379330, corresponding to 325.5244515 per share after the same non-operating adjustments.

The two replications establish a key methodological distinction: exact closure does not determine a unique value level. Closure tests internal consistency; value level still depends on the economically selected rate-time convention. This prevents the paper from confusing mathematical coherence with market truth.

Counterfactual Failure Architecture

Claimant mismatch

Discount FCFF at K_e or FCFE at WACC without a valid claim transformation. Expected result: numerical divergence that should be classified as a claimant-boundary violation, not 'model uncertainty.'

Silent capital reset

Alter an opening operating-capital balance without an explicit transaction. Expected result: FCFF and EVA paths can no longer telescope correctly because the economic state history has been broken.

Financing omission

Remove or mis-sign a debt-movement or financing-charge component. Expected result: the FCFE-to-FCFF reversal develops a period-specific residual, localizing the defect before valuation.

Broken-date inconsistency

Use a simple-prorated EVA charge while discounting the same period at an effective compounded factor. Observed in Scenario A: DCF/EVA near-closure rather than exact closure until the rate-time recursion is normalized.

Terminal plug

Insert an unexplained terminal adjustment to force a target value. Expected result: the model may display global equality while failing terminal-state legitimacy. Closed-Loop governance rejects the equality because the bridge is not independently generated.

Legacy input mismatch

Use two operating-capital paths that differ by one unit. Observed in Scenario A: the exact valuation impact is traceable to the discounted one-unit FCFF difference.

Direct-FCFE balancing adjustment

Scenario C contains a direct FCFE valuation block of 253.7461845 per share plus a displayed adjustment of 81.3377183 to reach 335.0839028. Because the adjustment is defined from the benchmark, the sum is a reconciliation display rather than independent valuation proof. The architecture explicitly refuses to count it as independent convergence.

Seeded disturbance	Violated condition	Expected symptom	Closed-Loop diagnosis
Value enterprise cash flow at K_e	Claim/rate congruence	Systematic valuation bias	Claimant mismatch
Reset operating capital between years	State continuity	Cash flow can appear plausible while history breaks	State residual
Omit debt movement or financing charge	Financing reversibility	FCFE cannot reconstruct FCFF	Financing-boundary residual
Prorate one rate but compound another	Temporal congruence	DCF and EVA diverge despite same operations	Timing residual
Insert terminal value as balancing plug	Terminal legitimacy	Headline value closes without successor-state proof	Terminal residual / circularity
Use hard-coded legacy input in one route	Source consistency	Small unexplained gap	Implementation residual
Add target-derived adjustment to FCFE value	Evidence independence	Apparent equality by construction	Circular reconciliation - not proof

WACE: What Can and Cannot Be Claimed

The phrase 'Weighted Average Cost of Equity' and the acronym WACE have prior public uses, including academic use before the author's 2026 programme. Accordingly, this paper does not claim invention of the name. The potentially distinctive contribution is narrower: the author's endogenous structural use of WACE as a bridge between operating-capital performance and operating-equity return inside the Closed-Loop architecture.

A defensible WACE research question is therefore: does the author's derivation create a distinct mapping between operating capital, ROIC, NOPLAT, operating equity, ROE, and equity burden that is not captured by the conventional use of WACE as a weighted average of equity components or as a generic cost-of-equity estimate? That question requires a dedicated prior-art review and should not be resolved by nomenclature alone.

For this paper, WACE is therefore treated as a secondary structural proposition, not as the main originality claim. The central paper remains valid even if future prior-art review finds additional uses of the same term. What matters here is whether the model's operating-capital-to-operating-equity mapping adds explanatory structure to the closed-loop state transition.

That question is preserved for separate formal treatment rather than used as a rhetorical novelty device.

Local Closure, Global Closure, and Diagnostic Hierarchy

Level	Test	Question	What it proves
Level 0	Input provenance	Are source cells, dates, and definitions known?	Traceability only
Level I	Formula identity	Do linked formulas reconcile?	Arithmetic consistency
Level II	Local closure	Does a bridge close within each period/boundary?	Boundary integrity
Level III	Global closure	Do independent routes reach the same value?	System coherence
Level IV	Economic admissibility	Are claim, timing, risk, tax, financing, and terminal assumptions defensible?	Economic interpretation
Level V	External validity	Does the architecture generalize across firms, industries, and market settings?	Empirical research question

This hierarchy prevents a common error in valuation research: treating numerical equality as sufficient evidence of economic truth. Closed-Loop closure is a necessary audit property under stated assumptions, not a substitute for market estimation or empirical validation.

Why "Economic Performance Before Valuation" Is More Than a Slogan

The phrase is not defensible as an assertion that no earlier scholar placed performance before value. The genealogy in this paper shows the opposite. Its defensible meaning is architectural: the valuation layer is prohibited from creating economic performance retrospectively. Capital, return, income, reinvestment, cash release, and financing transformation must exist as a coherent prior path.

This ordering changes the analyst's workflow. Instead of starting from a target multiple, terminal growth rate, or discount-rate convention and working backward to a value, the Closed-Loop analyst begins with the economic state and asks whether the valuation representation preserves it. The difference is subtle but consequential: valuation becomes an audit of an economic history rather than a numerical endpoint detached from that history.

The motto 'Economic performance is the enduring reality; valuation is its ever-changing reflection' should therefore be interpreted as a methodological hierarchy, not an ontological claim that market value is irrelevant. Market value remains important; the point is that a credible intrinsic valuation must remain accountable to the performance-and-claim system that generates it.

Implications for Corporate Governance, Credit, Investment, and Capital Allocation Boards and governance

A board can ask not only for a valuation but for a closure map: which routes agree, which claimant bridges are used, which assumptions drive the terminal state, and where residuals

remain. This shifts governance from accepting a single valuation number to reviewing the integrity of the economic architecture behind it.

Credit analysis

Lenders can separate operating capacity from financing transformation and observe how debt movement, financing charges, and cash generation interact through time. A model that exposes rather than hides claimant transitions can improve covenant and refinancing analysis.

Investment appraisal

Project and production-line decisions can be tested for performance before being capitalized into value. The approach is especially relevant when leverage or discount rates change through time, because the rate-time path becomes part of the audit rather than a silent assumption.

Capital allocation

ROIC, reinvestment, and capital continuity become central governance variables. The framework discourages value claims that arise from terminal-value mechanics without an economically sustainable successor state.

Model risk

Structural refusal is a model-risk control. A spreadsheet that refuses to reconcile is more informative than one that is forced to match through hidden plugs. Residuals become diagnostic signals to investigate rather than nuisances to eliminate.

What the Closed-Loop Framework Does Not Claim

- It does not claim that Adam Smith, Marshall, Fisher, Williams, M&M, Rappaport, Stewart, Ohlson, Penman, Damodaran, or later valuation literature failed to connect performance and value.
- It does not claim that FCFE-FCFF reconciliation is new.
- It does not claim that DCF-EVA or DCF-residual-income equivalence is new.
- It does not claim that WACC, CAPM, APV, capital cash flow, tax-shield valuation, or terminal-value analysis is new.
- It does not claim that every repeated 335.0839028 workbook display is an independent valuation method.
- It does not treat the direct FCFE block plus a target-derived adjustment as independent proof.
- It does not claim that exact spreadsheet closure proves that a chosen discount rate is the unique economically correct market rate.
- It does not claim empirical external validity from one workbook.

What the Closed-Loop Framework Does Claim to Add

- A performance-first state-transition architecture in which valuation is downstream of an auditable economic path.
- A mandatory continuity rule linking closing and opening economic states across periods.
- A claimant-boundary rule that determines when numerical equality is required and when divergence is legitimate until claims are bridged.
- A reversible financing bridge tested annually and at continuing value.

- A rate-time recursion that makes broken dates and floating discount rates auditable rather than ad hoc.
- A terminal-state test that rejects continuing value as an unexplained balancing plug.
- A distinction between local closure, global closure, and economic admissibility.
- Multilateral convergence across firm, equity, and economic-profit routes rather than reliance on a single pairwise identity.
- Structural refusal: the principle that unexplained non-convergence should remain visible until its cause is located.
- A computational proof environment in which the architecture can be reproduced and falsified.

Falsifiability and Research Agenda

A framework that cannot fail is not scientifically useful. The Closed-Loop architecture is falsifiable at several levels. State continuity can be broken; claimant bridges can leave residuals; discount-rate recursions can fail; terminal claims can fail to conserve; independent valuation routes can diverge after alignment. Each failure creates an observable residual that can be inspected.

The next empirical stage should move beyond Model C. Candidate designs include multi-firm archival replications, controlled spreadsheet experiments, practitioner-model audits, and synthetic simulations with known ground truth. External validity would be materially strengthened if the same closure hierarchy detects seeded errors across different firms, leverage policies, accounting systems, and terminal assumptions.

A dedicated WACE paper should separately test the structural derivation against prior uses of weighted average cost of equity. A dedicated terminal-value study should compare the Closed-Loop terminal-state rule with constant-growth DCF, residual-income terminal value, APV tax-shield treatment, and capital-cash-flow approaches.

A four-stage external validation programme

Stage 1 should use synthetic financial statements with known ground truth and deliberately seeded errors, allowing sensitivity and specificity of the diagnostic rules to be measured. Stage 2 should audit practitioner-built valuation models from multiple industries to test whether the admissibility vector identifies real implementation inconsistencies. Stage 3 should perform cross-firm archival reconstruction using standardized operating-capital, FCFF, FCFE, and residual-income definitions. Stage 4 should test whether closure diagnostics improve governance outcomes - for example, whether boards, lenders, or investment committees identify model risk earlier when residuals are classified rather than smoothed away.

The empirical programme should also distinguish two questions that the current paper separates conceptually: whether a model is internally admissible and whether its economic assumptions are externally accurate. Closed-Loop closure is designed to answer the first. Market calibration, forecasting quality, and realized investment outcomes answer the second. Conflating these questions would recreate the very ambiguity the architecture is intended to remove.

Limitations

- Model C is a single, author-developed workbook and cannot establish population-level empirical superiority.
- The fixed and floating scenarios are not a one-factor experiment because operating assumptions differ; headline value differences cannot be causally attributed to WACC alone.
- Some workbook labels reflect a long development history and may be stronger than the derivation they describe; the paper therefore gives formulas and numerical roles precedence over labels.
- The Terminal Tax Shield is proven as a model-defined bridge component, not as an externally estimated APV tax-shield present value.
- The derived k_t^* sequence in Replication R1 is schedule-implied; it is not independently estimated market WACC.
- The literature review is broad and deliberately claim-focused, but it is neither exhaustive nor a legal or patent-style priority search. Absolute historical claims such as "first ever" are therefore avoided; originality is framed as a defensible residual after comparison with identified prior art.

Conclusion

The historical record does not support a claim that corporate finance lacked theories of value before the Closed-Loop programme. It supports the opposite conclusion. Smith and Ricardo placed capital and profit inside the productive process; Marshall anticipated capital-charge reasoning; Fisher and Williams established intertemporal value; Markowitz, Gordon-Shapiro, Sharpe, Lintner, and Mossin formalized risk and required return; M&M, Hamada, Myers, Miller, Miles-Ezzell, and Harris-Pringle transformed capital structure, leverage, taxes, and financing policy into valuation theory; Rappaport connected strategy to shareholder value; Stewart operationalized economic profit; Preinreich, Peasnell, Ohlson, Feltham-Ohlson, and Penman connected accounting states, income, and value; Lundholm-O'Keefe and Plenborg clarified DCF-residual-income equivalence; Fernandez demonstrated broad multi-method equivalence; and contemporary practice represented by Damodaran, McKinsey, and CFA codifies claimant-specific cash flows and discount rates. A credible Closed-Loop paper must begin by conceding this intellectual inheritance in full.

Once that inheritance is credited, however, a meaningful residual remains. The literature contains many correct components and several powerful equivalence theorems, yet implementation can still fragment the firm into incompatible claims, dates, capital bases, financing conventions, discount paths, and terminal assumptions. The contribution developed here is a governance architecture for that implementation problem. It introduces an admissibility vector that determines when two routes are genuinely comparable; treats capital as a state that must transition rather than reset silently; requires the financing boundary to be reversible; separates time-path consistency from rate labels; extends reconciliation into the terminal state; distinguishes local closure from global closure and from economic validity; classifies residuals by cause; and allows unexplained non-convergence to remain visible as structural refusal.

Model C supplies a demanding computational environment for testing these rules. Under Scenario C, five independently organized FCFE routes produce the same annual series, the model-specific financing bridge reconstructs FCFF exactly in every forecast year, the terminal bridge $FCFF_{TV} = FCFE_{TV} + DM_{TV} + TS_{TV}$ closes with zero residual, and the principal FCFF/DCF and EVA routes converge at 335.0839028 per share. These results are not presented as discoveries of the underlying identities. Their evidentiary importance lies in simultaneous, cell-traceable closure across a linked system.

Scenario A is more revealing because it does not close automatically. The 0.0026609 per-share DCF/integrated-FCFF difference is traced exactly to a one-unit 2008 FCFF mismatch. The larger DCF/EVA gap is traced to a rate-time inconsistency between the displayed DCF factors and EVA capital charges. Replication R1 preserves the DCF schedule and derives the adjacent-period capital-charge sequence required by that schedule, restoring exact DCF/EVA operating value of 71,168.593948. Replication R2 preserves the displayed floating-WACC path, rebuilds the discount factors sequentially, and again restores exact closure at 72,165.379330. The two replications prove a crucial distinction: closure is a property of internal consistency; value level remains a function of the economically selected assumptions. A model can therefore be coherent without being uniquely correct about market value, and it can be incoherent even when its headline number appears plausible.

This distinction is the deepest meaning of Economic Performance Before Valuation. Performance is not claimed as a newly discovered value driver. It is elevated into a sequencing rule. Capital must be employed before return can be interpreted; return must generate income before reinvestment and cash release can be traced; financing claims must be bridged before equity and enterprise values can be compared; and the successor economic state must exist before a continuing value can be accepted. Valuation is thus treated as a conditional representation of an auditable economic history rather than as an autonomous numerical endpoint.

The strongest defensible claim is therefore architectural, not elemental. The Closed-Loop framework does not ask finance to abandon DCF, EVA, residual income, FCFF, FCFE, WACC, APV, or clean-surplus analysis. It asks those representations to become mutually accountable. Where the admissibility conditions are satisfied, convergence is evidence. Where they are not satisfied, divergence may be legitimate. Where they are satisfied and unexplained divergence remains, the model must refuse closure until the cause is located. That principle converts non-convergence from embarrassment into information and converts valuation from a menu of methods into an auditable system of economic claims.

The programme remains to be tested beyond Model C. External validation across firms, industries, practitioner models, and synthetic error-seeding experiments is necessary before broader claims of empirical superiority can be made. But as a theoretical and computational positioning result, the paper establishes a precise research agenda: the next frontier is not another valuation formula. It is the governance of equivalence itself [1-58].

Appendix A. Proof Ledger for Model C

Test	Numerical evidence	Result	Classification
FCFE route closure	Five routes, 2005-2009	Exact same annual series	Level I / II
Annual financing bridge	FCFE + debt movement + financing charge = FCFF	Zero residual each year	Level II
Scenario C DCF/EVA	335.0839028 = 335.0839028	Exact	Level III
Scenario A DCF vs integrated FCFF	0.0026609/share gap	Explained by one-unit 2008 FCFF mismatch	Diagnostic
Scenario A DCF vs EVA	0.7219400/share gap	Explained by rate-time inconsistency	Diagnostic
Replication R1	71,168.593948 = 71,168.593948	Exact schedule-preserving closure	Controlled replication
Replication R2	72,165.379330 = 72,165.379330	Exact rate-path-preserving closure	Controlled replication
Terminal bridge	108,791.1362 + 2,121 + 9,377.9090 = 120,290.0452	Zero residual	Terminal closure
Direct FCFE block	253.7461845 + target-derived 81.3377183	Not independent proof	Structural refusal

Appendix B. Originality Claim Language

Status	Language	Reason
Avoid	"The Closed-Loop model is the first system to show that performance drives value."	Too broad; deep prior art from classical economics through value-based management.
Use	"The contribution is not the proposition that performance drives value, but the formalization of performance-before-valuation as a governed closure architecture."	Narrow, defensible, architecture-specific.
Avoid	"The model discovered FCFE-FCFF equivalence."	Established finance identity.
Use	"The model subjects the financing boundary to annual and terminal reversibility tests and treats residuals as diagnostics."	Implementation contribution.
Avoid	"WACE was invented here."	Term/acronym has prior uses.

Status	Language	Reason
Use	"The programme develops an author-defined structural WACE role between operating performance and equity return."	Separates nomenclature from structural contribution.
Avoid	"All valuation methods always give the same answer."	False without congruent assumptions and claim definitions.
Use	"Independent routes converge when they value the same economic object under congruent state, claim, time, rate, tax, and terminal conditions."	Conditional, falsifiable claim.

Appendix C. Closed-Loop Audit Algorithm

Step 1 - Freeze provenance. Identify the governing source cells, valuation date, explicit forecast horizon, and any legacy or hard-coded ranges. Do not allow labels or duplicated displays to override active formulas.

Step 2 - Classify the economic object. State whether each route values the operating enterprise, total firm, debt, common equity, or another claimant. Record the route-admissibility vector Ω_r .

Step 3 - Reconcile the operating state. Trace opening operating capital, ROIC, NOPLAT, reinvestment, FCFF, and closing operating capital. Verify that the successor state is generated rather than silently reset.

Step 4 - Reconcile the financing boundary. Trace debt movement, financing charges, tax effects, and FCFE. Reverse the bridge back to FCFF under the same sign and tax convention and require period-by-period closure.

Step 5 - Normalize time and rate paths. Map each cash-flow date to the discount factor and each capital-charge period to the same time axis. For floating rates or broken dates, verify the adjacent-period recursion implied by the discount schedule.

Step 6 - Prove the terminal state. Reconcile continuing operating capital, growth, reinvestment, financing claims, debt movement, Terminal Tax Shield where applicable, and continuing value. Reject target-derived terminal plugs.

Step 7 - Compare admissible routes and classify residuals. If Ω_i is congruent with Ω_j , compute ϵ_{ij} and classify any non-zero difference as source, state, claim, financing, time, rate, terminal, or rounding residual. Do not force closure before the cause is documented.

Decision rule. Output one of three statuses: (A) admissible closure - economically congruent routes reconcile within tolerance; (B) legitimate divergence - routes are not economically comparable because one or more admissibility dimensions are not congruent; or (C) structural refusal - economically comparable routes fail to reconcile and the residual remains unexplained.

Source and Reproducibility Note

Historical and theoretical claims were checked against primary or authoritative bibliographic sources where available, including original journal and publisher records, JSTOR/Wiley/Springer/Cambridge metadata, public-domain editions of classical texts, NYU Stern valuation materials, CFA Institute 2026 curriculum summaries, McKinsey/Wiley

contemporary valuation materials, and the author's governing Model C / author-verified WACC audit files. The paper distinguishes source-derived facts from interpretive inference. Model C numerical claims are confined to the audited workbook conventions and are not presented as external market truths. Absolute historical priority is not claimed.

References

1. Anthony, R. N. (1973). Accounting for the Cost of Equity. *Harvard Business Review*, 51, 88-102.
2. Arditti, F. D. (1973). The Weighted Average Cost of Capital: Some Questions on Its Definition, Interpretation, and Use. *Journal of Finance*, 28(4), 1001-1007. <https://doi.org/10.1111/j.1540-6261.1973.tb01422.x>
3. Badr, H. H. (2026). From ROIC to Equity Burden: A Closed-Loop Structural Derivation of the Weighted Average Cost of Equity (WACE). SSRN 6132991. <https://doi.org/10.2139/ssrn.6132991>
4. Badr, H. H. (2026). From Required Return on Equity to WACC, FCFE, FCFF, and EVA: A Closed-Loop Audit of Exact Fixed-WACC Closure, Broken-Date Floating-WACC Diagnostics, and Schedule-Consistent Replication. Author-verified manuscript, 28 September 2026.
5. Biddle, G. C., Bowen, R. M., & Wallace, J. S. (1997). Does EVA Beat Earnings? Evidence on Associations with Stock Returns and Firm Values. *Journal of Accounting and Economics*, 24(3), 301-336. [https://doi.org/10.1016/S0165-4101\(98\)00010-X](https://doi.org/10.1016/S0165-4101(98)00010-X)
6. CFA Institute. (2026). Free Cash Flow Valuation. CFA Program Level II, Equity Valuation.
7. CFA Institute. (2026). Residual Income Valuation. CFA Program Level II, Equity Valuation.
8. Damodaran, A. (2012). *Investment Valuation: Tools and Techniques for Determining the Value of Any Asset* (3rd ed.). Wiley.
9. Damodaran, A. (2014). *Applied Corporate Finance* (4th ed.). Wiley.
10. Edwards, E. O., & Bell, P. W. (1961). *The Theory and Measurement of Business Income*. University of California Press.
11. Fama, E. F., & French, K. R. (1999). The Corporate Cost of Capital and the Return on Corporate Investment. *Journal of Finance*, 54(6), 1939-1967. <https://doi.org/10.1111/0022-1082.00178>
12. Feltham, G. A., & Ohlson, J. A. (1995). Valuation and Clean Surplus Accounting for Operating and Financial Activities. *Contemporary Accounting Research*, 11(2), 689-731. <https://doi.org/10.1111/j.1911-3846.1995.tb00462.x>
13. Fernandez, P. (2003; rev. 2008). Equivalence of Ten Different Methods for Valuing Companies by Cash Flow Discounting. SSRN 367161. <https://doi.org/10.2139/ssrn.367161>
14. Fernandez, P. (2007; rev. 2008). Equivalence of the Different Discounted Cash Flow Valuation Methods. SSRN 182308. <https://doi.org/10.2139/ssrn.182308>
15. Fisher, I. (1906). *The Nature of Capital and Income*. Macmillan.
16. Fisher, I. (1930). *The Theory of Interest*. Macmillan.
17. Gode, D. K., & Ohlson, J. A. (2006). A Unified Valuation Framework for Dividends, Free Cash Flows, Residual Income, and Earnings Growth Based Models. SSRN 884310.
18. Gordon, M. J., & Shapiro, E. (1956). Capital Equipment Analysis: The Required Rate of Profit. *Management Science*, 3(1), 102-110. <https://doi.org/10.1287/mnsc.3.1.102>

19. Hamada, R. S. (1972). The Effect of the Firm's Capital Structure on the Systematic Risk of Common Stocks. *Journal of Finance*, 27(2), 435-452. <https://doi.org/10.1111/j.1540-6261.1972.tb00971.x>
20. Harris, R. S., & Pringle, J. J. (1985). Risk-Adjusted Discount Rates-Extensions from the Average-Risk Case. *Journal of Financial Research*, 8(3), 237-244. <https://doi.org/10.1111/j.1475-6803.1985.tb00406.x>
21. Inselbag, I., & Kaufold, H. (1997). Two DCF Approaches for Valuing Companies under Alternative Financing Strategies. *Journal of Applied Corporate Finance*, 10(1), 114-122. <https://doi.org/10.1111/j.1745-6622.1997.tb00132.x>
22. Jensen, M. C., & Meckling, W. H. (1976). Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure. *Journal of Financial Economics*, 3(4), 305-360. [https://doi.org/10.1016/0304-405X\(76\)90026-X](https://doi.org/10.1016/0304-405X(76)90026-X)
23. Kaplan, S. N., & Ruback, R. S. (1995). The Valuation of Cash Flow Forecasts: An Empirical Analysis. *Journal of Finance*, 50(4), 1059-1093. <https://doi.org/10.1111/j.1540-6261.1995.tb04050.x>
24. Koller, T., Goedhart, M., & Wessels, D. (2025). *Valuation: Measuring and Managing the Value of Companies* (8th ed.). Wiley / McKinsey & Company.
25. Lintner, J. (1965). The Valuation of Risk Assets and the Selection of Risky Investments in Stock Portfolios and Capital Budgets. *Review of Economics and Statistics*, 47(1), 13-37. <https://doi.org/10.2307/1924119>
26. Lundholm, R., & O'Keefe, T. (2001). Reconciling Value Estimates from the Discounted Cash Flow Model and the Residual Income Model. *Contemporary Accounting Research*, 18(2), 311-335. <https://doi.org/10.1506/W13B-K4BT-455N-TTR2>
27. Markowitz, H. (1952). Portfolio Selection. *Journal of Finance*, 7(1), 77-91. <https://doi.org/10.1111/j.1540-6261.1952.tb01525.x>
28. Marshall, A. (1890). *Principles of Economics*. Macmillan.
29. McKinsey & Company. (2026, February 18). How Are Companies Valued? McKinsey Explainers. <https://www.mckinsey.com/featured-insights/mckinsey-explainers/how-are-companies-valued>
30. Miles, J. A., & Ezzell, J. R. (1980). The Weighted Average Cost of Capital, Perfect Capital Markets, and Project Life: A Clarification. *Journal of Financial and Quantitative Analysis*, 15(3), 719-730. <https://doi.org/10.2307/2330405>
31. Miller, M. H., & Modigliani, F. (1961). Dividend Policy, Growth, and the Valuation of Shares. *Journal of Business*, 34(4), 411-433. <https://doi.org/10.1086/294442>
32. Miller, M. H. (1977). Debt and Taxes. *Journal of Finance*, 32(2), 261-275. <https://doi.org/10.1111/j.1540-6261.1977.tb03267.x>
33. Modigliani, F., & Miller, M. H. (1958). The Cost of Capital, Corporation Finance and the Theory of Investment. *American Economic Review*, 48(3), 261-297.
34. Modigliani, F., & Miller, M. H. (1963). Corporate Income Taxes and the Cost of Capital: A Correction. *American Economic Review*, 53(3), 433-443.
35. Mossin, J. (1966). Equilibrium in a Capital Asset Market. *Econometrica*, 34(4), 768-783. <https://doi.org/10.2307/1910098>
36. Myers, S. C. (1974). Interactions of Corporate Financing and Investment Decisions- Implications for Capital Budgeting. *Journal of Finance*, 29(1), 1-25. <https://doi.org/10.1111/j.1540-6261.1974.tb00021.x>

37. Ohlson, J. A. (1995). Earnings, Book Values, and Dividends in Equity Valuation. *Contemporary Accounting Research*, 11(2), 661-687. <https://doi.org/10.1111/j.1911-3846.1995.tb00461.x>
38. Ohlson, J. A. (2005). On Accounting-Based Valuation Formulae. *Review of Accounting Studies*, 10, 323-347. <https://doi.org/10.1007/s11142-005-1534-4>
39. Ohlson, J. A., & Gao, Z. (2006). Earnings, Earnings Growth and Value. *Foundations and Trends in Accounting*, 1(1), 1-70. <https://doi.org/10.1561/14000000001>
40. Ohlson, J. A. (1990). A Synthesis of Security Valuation Theory and the Role of Dividends, Cash Flows, and Earnings. *Contemporary Accounting Research*, 6(2), 648-676. <https://doi.org/10.1111/j.1911-3846.1990.tb00780.x>
41. Peasnell, K. V. (1982). Some Formal Connections Between Economic Values and Yields and Accounting Numbers. *Journal of Business Finance & Accounting*, 9(3), 361-381. <https://doi.org/10.1111/j.1468-5957.1982.tb01001.x>
42. Penman, S. H. (1998). A Synthesis of Equity Valuation Techniques and the Terminal Value Calculation for the Dividend Discount Model. *Review of Accounting Studies*, 2(4), 303-323. <https://doi.org/10.1023/A:1023688704798>
43. Penman, S. H., & Sougiannis, T. (1998). A Comparison of Dividend, Cash Flow, and Earnings Approaches to Equity Valuation. *Contemporary Accounting Research*, 15(3), 343-383. <https://doi.org/10.1111/j.1911-3846.1998.tb00564.x>
44. Plenborg, T. (2002). Firm Valuation: Comparing the Residual Income and Discounted Cash Flow Approaches. *Scandinavian Journal of Management*, 18(3), 303-318. [https://doi.org/10.1016/S0956-5221\(01\)00017-3](https://doi.org/10.1016/S0956-5221(01)00017-3)
45. Preinreich, G. A. D. (1938). Annual Survey of Economic Theory: The Theory of Depreciation. *Econometrica*, 6(3), 219-241. <https://doi.org/10.2307/1907053>
46. Preinreich, G. A. D. (1936). The Fair Value and Yield of Common Stock. *The Accounting Review*, 11(2), 130-140. <https://www.jstor.org/stable/238028>
47. Preinreich, G. A. D. (1937). Valuation and Amortization. *The Accounting Review*, 12(3), 209-226. <https://www.jstor.org/stable/239096>
48. Rappaport, A. (1981). Selecting Strategies That Create Shareholder Value. *Harvard Business Review*, May 1981.
49. Rappaport, A. (1986). *Creating Shareholder Value: The New Standard for Business Performance*. Free Press.
50. Rappaport, A., & Mauboussin, M. J. (2002). Valuation Matters. *Harvard Business Review*, March 2002.
51. Ricardo, D. (1817). *On the Principles of Political Economy and Taxation*. John Murray.
52. Robichek, A. A., & Myers, S. C. (1966). Conceptual Problems in the Use of Risk-Adjusted Discount Rates. *Journal of Finance*, 21(4), 727-730. <https://doi.org/10.1111/j.1540-6261.1966.tb00277.x>
53. Ruback, R. S. (2002). Capital Cash Flows: A Simple Approach to Valuing Risky Cash Flows. *Financial Management*, 31(2), 85-103. <https://doi.org/10.2307/3666224>
54. Sharpe, W. F. (1964). Capital Asset Prices: A Theory of Market Equilibrium under Conditions of Risk. *Journal of Finance*, 19(3), 425-442. <https://doi.org/10.1111/j.1540-6261.1964.tb02865.x>
55. Smith, A. (1776). *An Inquiry into the Nature and Causes of the Wealth of Nations*. W. Strahan and T. Cadell.
56. Stewart, G. B. III. (1991). *The Quest for Value*. HarperBusiness.
57. Williams, J. B. (1938). *The Theory of Investment Value*. Harvard University Press.

58. Young, S. D., & O'Byrne, S. F. (2001). EVA and Value-Based Management. McGraw-Hill.