

**DECONSTRUCTING LEVERAGE: VARIOUS METHODS OF CORPORATE
FINANCIAL INSIGHTS**

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Abstract. This paper challenges traditional views of corporate leverage by proposing a financial statement analysis that differentiates between financing and operational liabilities. We introduce novel leveraging equations to illustrate how these distinct forms of leverage uniquely influence a firm's Return on Common Equity (ROCE) and Return on Net Operating Assets (RNOA), as well as its price-to-book ratios. Empirical observations and case studies of companies like Chubb, Dell, and Microsoft demonstrate that operating liabilities are often valued differently by the market than financing liabilities. This distinction provides superior explanatory power for variations in current and prospective rates of return on equity and offers a more robust framework for equity valuation. By dissecting leverage composition, this research offers invaluable insights for financial analysts, investors, and corporate strategists.

Keywords: Financing leverage, Operating liability leverage, Return on equity, Price-to-book ratio, Financial statement analysis, Corporate valuation.

Introduction. Leverage, traditionally viewed as the use of borrowed capital to finance assets, aims to amplify shareholder returns. Conventional financial analysis often treats all liabilities uniformly, overlooking critical distinctions that could obscure a firm's true financial health and market valuation. This paper argues for a more granular approach, separating leverage from explicit financing activities (e.g., bank loans) from that arising inherently from core operating activities (e.g., trade payables).

The standard total liabilities-to-equity ratio fails to differentiate between liabilities originating from efficient capital markets (financing liabilities) and those from less perfect product markets (operating liabilities). This fundamental difference suggests that a dollar of operating liability may be perceived and valued differently by the market. Our research investigates whether price-to-book ratios are influenced by the composition of a firm's book value, specifically the proportion of operating versus financing liabilities, and whether these distinct liabilities are associated with differing future book rates of return.

We present a refined financial statement analysis that explicitly accounts for both operating and financing liabilities' impact on shareholder profitability and price-to-book ratios. This analysis introduces leveraging equations, clarifying their effects on returns. We also consider two drivers for the differential pricing of operating liabilities: "real effects" from advantageous contracting and "accounting effects" from accrual accounting estimates.

The paper proceeds as follows: Section 2 details the financial statement analysis. Section 3 discusses the implications for equity value and price-to-book ratios, including case studies. Section 4 offers a concluding summary.

Financial statement analysis:

To effectively understand leverage's impact on Return on Common Equity (ROCE), a distinction between operating and financing activities in financial statements is crucial.

Distinguishing operating and financing activities:

Our analysis reformulates the balance sheet equation, focusing on common equity:

Common Equity = Operating Assets + Financial Assets - Operating Liabilities - Financial Liabilities

Operating assets (e.g., receivables, inventory, PPE) are core to business operations, while financial assets are investments. Crucially, we separate financing liabilities (e.g., bank loans, bonds), which raise cash, from operating liabilities (e.g., accounts payable, deferred revenue, pension obligations), which arise from daily transactions with customers and suppliers.

Rearranging, we get:

Common Equity = Net Operating Assets - Net Financing Debt

- **Net Operating Assets (NOA) = Operating Assets - Operating Liabilities:** Represents shareholders' net investment in the core business.
- **Net Financing Debt (NFD) = Financial Liabilities - Financial Assets:** Reflects the firm's true net borrowing position.

Similarly, the income statement is reconfigured:

Comprehensive Net Income = Operating Income - Net Financing Expense

Operating Income comes from the core business, while Net Financing Expense covers financing costs (after tax).

Key profitability measures derived are:

- **Return on Net Operating Assets (RNOA) = Operating Income / Net Operating Assets:** Measures operating profitability based on net assets. Firms can boost RNOA by effectively using supplier credit, reducing required shareholder capital. RNOA (e.g., median 10.0% for NYSE/AMEX firms, 1963-1999) is often higher than traditional ROA (median 6.8%), indicating its closer reflection of actual operating returns.
- **Net Borrowing Rate = Net Financing Expense / Net Financing Debt**

Financial leverage and its effect on shareholders' profitability

ROCE can be expressed as:

ROCE = RNOA + [FLEV * (RNOA - Net Borrowing Rate)]

Where, **Financing Leverage (FLEV) = Net Financing Debt / Common Equity**

FLEV specifically measures leverage from financing activities. If financial assets exceed liabilities, FLEV can be negative. This equation shows how financial leverage affects ROCE, with the effect's direction and magnitude dependent on FLEV and the spread between RNOA and the Net Borrowing Rate. A positive spread indicates favorable leverage.

Operating Liability Leverage and Its Effect on Operating Profitability

Operating liabilities primarily leverage operating profitability (RNOA). An increase in operating liabilities relative to operating assets, assuming no adverse effect on operating income, increases RNOA by reducing the NOA denominator.

Operating Liability Leverage (OLLEV) = Operating Liabilities / Net Operating Assets

While seemingly "free," supplier credit often has an implicit cost. We estimate "Market Interest on Operating Liabilities" as:

$$\text{Market Interest on Operating Liabilities} = \text{Operating Liabilities} \times \text{Market Borrowing Rate}$$

This represents the cost at which suppliers or the firm would be indifferent between trade credit and market financing.

To analyze OLLEV's impact, we define Return on Operating Assets (ROOA):

$$\text{ROOA} = (\text{Operating Income} + \text{Market Interest on Operating Liabilities}) / \text{Operating Assets}$$

ROOA adjusts operating income for the full implicit cost of trade credit. If suppliers charge less than the market rate, ROOA captures the favorable implicit credit terms.

RNOA can be expressed in terms of ROOA and OLLEV:

$$\text{RNOA} = \text{ROOA} + [\text{OLLEV} \times (\text{ROOA} - \text{Market Borrowing Rate})]$$

This equation shows OLLEV's effect on RNOA, which can be favorable or unfavorable depending on OLLEV and the spread between ROOA and the Market Borrowing Rate.

Total leverage and its comprehensive impact:

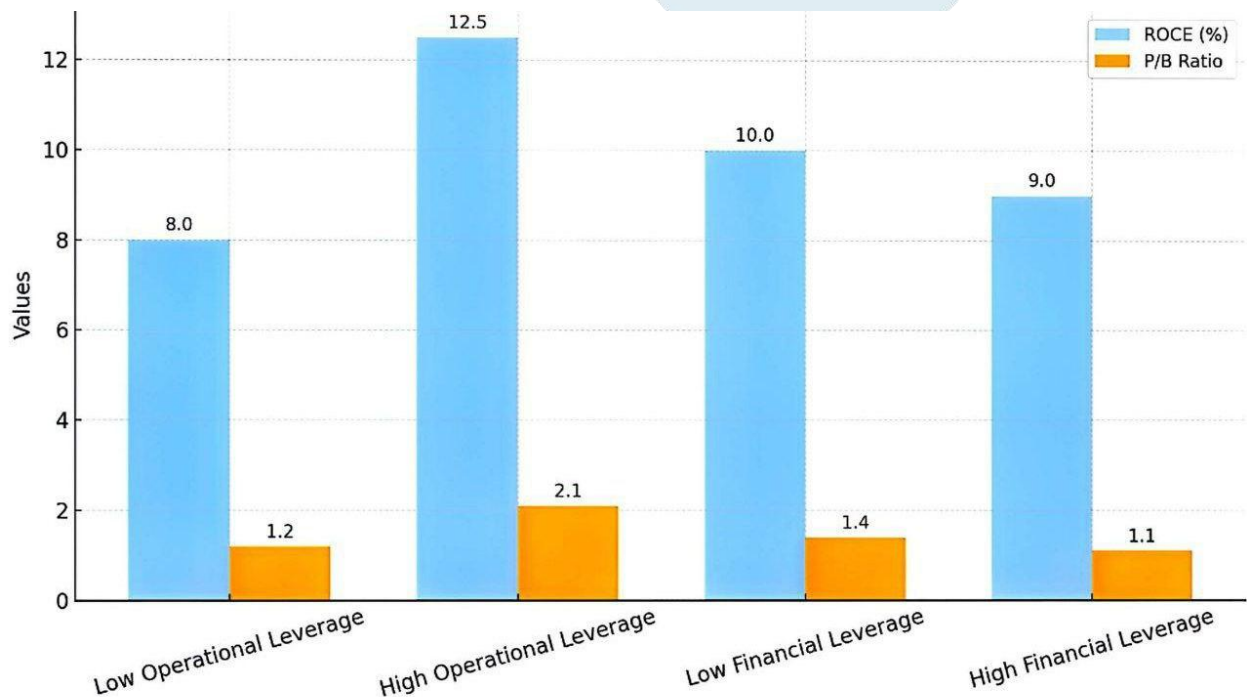


Figure 1: Impact of Operational and Financial Leverage on ROCE and P/B Ratios

Operating liabilities and net financing debt combine for Total Leverage (TLEV):

Total Leverage (TLEV) = (Net Financing Debt + Operating Liabilities) / Common Equity

The Total Borrowing Rate for all liabilities is:

Total Borrowing Rate = (Net Financing Expense + Market Interest on Operating Liabilities) / (Net Financing Debt + Operating Liabilities)

Finally, ROCE can be expressed as:

$ROCE = ROOA + [TLEV \times (ROOA - \text{Total Borrowing Rate})]$

These leveraging equations are deterministic, holding true for any firm. Accurate identification of profitability sources requires meticulous separation of operating and financing components in financial statements.

Leverage, Equity Value, and Price-to-Book Ratios

Leverage directly impacts shareholder value. The Residual Income Valuation Model links equity value (P_0) to book value (B_0) and future residual income ($X_t - rB_{t-1}$):

$$P_0 = B_0 + \sum (X_t - rB_{t-1}) / (1 + r)^t$$

Where residual income is significantly influenced by ROCE. Thus, leverage effects on projected ROCE directly impact equity value relative to book value. Our empirical analysis investigates leverage's impact on both profitability and price-to-book ratios, particularly whether the market differentially prices financing and operating liabilities.

We consider both "real effects" from contracting and "accounting effects" from estimates.

Real Effects of Contractual Liabilities

The ex post effects of leverage on profitability are established by the leveraging equations. However, valuation focuses on ex ante effects. Modigliani and Miller's (1958) financing irrelevance proposition suggests that under perfect conditions, debt financing doesn't affect value; increased expected ROCE from financial leverage is offset by a higher required equity return.

Subsequent research relaxed M&M's conditions, showing that tax benefits, reduced transaction costs, and informational advantages can make debt beneficial. These considerations apply to both operating and financing debt, though differently. Firms can "make money off trade creditors" in less competitive product markets by extracting value from suppliers, unlike financial leverage, where shareholders can replicate "homemade" leverage.

ROCE is affected by total leverage composition only if the implicit interest rate on trade credit differs from the market borrowing rate for financing debt. This means that if the implicit borrowing cost for operating debt is distinct, ROOA will be affected by substituting financing debt for operating liabilities. Our analysis examines OLLEV's effect on ROOA and ROCE, controlling for total leverage, to identify these real economic effects.

Effects of Accrual Accounting Estimates

Accrual accounting estimates directly impact operating liability leverage: higher reported operating liabilities increase leverage. While conservative accounting might increase ROOA, higher book values of operating liabilities simultaneously lever RNOA over ROOA. Conservative accounting for operating liabilities effectively leverages book rates of return, which then flows to ROCE.

Even if biased accounting for operating liabilities doesn't alter true firm value, it impacts the book value of equity and price-to-book ratios. Leveraging equations (12) and (13) captures these accounting effects on rates of return. The residual income model shows how accounting practices can influence price-to-book ratios even without a change in firm value. This highlights the importance of distinguishing between financing and operating liabilities, as the latter are more susceptible to accrual accounting nuances.

Case Studies: Illustrating Leverage Dynamics

Case Study 1: Property and Casualty Insurers (e.g., Chubb Corp)

Insurers like Chubb Corp often have "negative net operating assets" due to significant operating liabilities (e.g., unpaid claims, unearned premiums). In 2000, Chubb had -\$9.454 billion in negative NOA. This "float"—premiums received before claims are paid—is invested. Even with

near-zero or negative underwriting profits, insurers generate positive residual income because a charge against negative NOA yields a positive amount. This illustrates a real effect where operating liabilities provide a cost-effective capital source, despite seemingly muted direct operating profitability.

Case Study 2: Dell Computer Corporation

Dell is an extreme example of negative net operating assets. In fiscal year 2001, Dell reported operating assets of \$5.583 billion against operating liabilities of \$6.543 billion, resulting in -\$0.960 billion in negative NOA. Despite this, Dell generated \$1.896 billion in after-tax operating income, largely due to its efficient inventory and substantial accounts payable (\$4.286 billion vs. \$0.400 billion inventory). Dell's suppliers effectively finance a significant portion of its operations, allowing shareholder fund withdrawals. This exemplifies a firm's market power to extract value from suppliers, showcasing a real economic effect of operating liability leverage. While \$4.286 billion was contractual (accounts payable), \$2.257 billion was accrued liabilities, subject to estimates, illustrating both real and accounting effects.

Leverage as Information

Leverage also serves an informational role, signaling a firm's profitability and intrinsic value. Beyond direct impacts, both financing and operating liability leverage offer insights into future profitability deviations. This informational content can stem from real economic factors and accounting practices.

Suppliers might possess superior information, so higher operating debt could signal greater value, or excessive payables could signal distress. Accounting treatment of book value is also critical. If a firm increases operating liability leverage through practices like booking higher deferred revenues or accrued expenses, it initially reduces current profitability but implies higher future operating income on a lower book value of equity. Thus, lower current profitability due to accrual accounting can signal higher future profitability. Operating liability leverage acts as a signal for future profitability evolution, driven by economic realities and accounting nuances.

Financing liabilities are generally less affected by accounting biases. Therefore, operating liability leverage, when controlling for total leverage and current profitability, significantly explains differences in price-to-book ratios.

Conclusion

This paper presents a comprehensive analysis of corporate leverage, focusing on the impact of financing and operating liabilities on profitability and valuation. The study reveals that traditional aggregated views of leverage are insufficient, as operating liabilities have a distinct leveraging effect on operating profitability, which flows to overall shareholder returns. The pricing of a firm's book value is not uniform across all liabilities, with operating liabilities being priced differently from financing liabilities due to advantageous contractual relationships and accounting effects. The paper also highlights the importance of understanding operating liability leverage for accurate profitability forecasting, valuation, and strategic decisions. Future research could explore industry-specific variations, long-term sustainability of operational contracting advantages, and more sophisticated models for quantifying implicit costs and benefits of operating liabilities.

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