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FORMULA SHEET

# CPA BAR

Business Analysis & Reporting

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TOPICS

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## BUSINESS ANALYSIS

16 items

**Return on investment (ROI)**

$$\text{ROI} = \frac{\text{Operating Income}}{\text{Invested Assets (Average)}}$$

Alternatively:  $\text{ROI} = \text{Profit Margin} \times \text{Asset Turnover}$  (DuPont decomposition).

**Residual income**

$$\text{RI} = \text{Operating Income} - (\text{Required Rate of Return} \times \text{Invested Assets})$$

Positive RI = earns above minimum required return. Used in decentralized performance evaluation.

**Economic value added (EVA)**

$$\text{EVA} = \text{NOPAT} - (\text{WACC} \times \text{Invested Capital})$$

NOPAT = Net Operating Profit After Tax. Positive EVA = value creation.

**Breakeven: units and dollars**

$$\text{BEP}_{\text{units}} = \frac{FC}{\text{CM per unit}}$$

$$\text{BEP}_{\$} = \frac{FC}{\text{CM ratio}}$$

$$\text{CM ratio} = \frac{\text{CM per unit}}{\text{Price per unit}}$$

**Contribution margin**

$$\text{CM} = \text{Sales Revenue} - \text{Variable Costs}$$

$$\text{CM per Unit} = \text{Selling Price} - \text{Variable Cost per Unit}$$

Fixed costs are excluded; CM covers fixed costs first, remainder is operating income.

**Sales volume variance**

$$\text{Sales Volume Variance} = (\text{Actual Units} - \text{Budgeted Units}) \times \text{Budgeted CM per Unit}$$

Favorable if actual units > budgeted units.

**Direct materials variances**

$$\text{Price Var} = (AP - SP) \times AQ_{\text{purchased}}$$

$$\text{Quantity Var} = (AQ_{\text{used}} - SQ_{\text{allowed}}) \times SP$$

AP/SP=actual/standard price; AQ/SQ=actual/standard qty.

**Direct labor variances**

$$\text{Rate Var} = (AR - SR) \times AH$$

$$\text{Efficiency Var} = (AH - SH_{\text{allowed}}) \times SR$$

AR/SR=actual/standard rate; AH/SH=actual/standard hours.

**Net present value (NPV)**

$$\text{NPV} = \sum_{t=0}^n \frac{CF_t}{(1+r)^t}$$

Accept project if  $\text{NPV} \geq 0$ . NPV uses WACC as discount rate. Accounts for time value of money and all cash flows.

**Internal rate of return (IRR)**

Rate  $r^*$  such that  $\text{NPV} = 0$ . Accept if  $\text{IRR} \geq$  required rate of return (hurdle rate).

For non-normal cash flows (multiple sign changes), multiple IRRs possible – use NPV instead.

**Payback period**

$$\text{Payback} = \frac{\text{Initial Investment}}{\text{Annual Net Cash Inflows}} \text{ (even flows)}$$

For uneven flows: cumulate cash flows until initial investment recovered. Ignores time value and post-payback cash flows.

**Weighted average cost of capital (WACC)**

$$\text{WACC} = w_d r_d (1 - T) + w_p r_p + w_e r_e$$

$w$  = weight (market value),  $r_d$  = pre-tax cost of debt,  $T$  = tax rate,  $r_p$  = cost of preferred,  $r_e$  = cost of equity.

**CAPM cost of equity**

$$r_e = r_f + \beta(r_m - r_f)$$

Used to estimate required return on equity for WACC.  $\beta$  reflects systematic risk of the firm/division.

**Degree of operating leverage (DOL) and financial leverage (DFL)**

$$\text{DOL} = \frac{\% \Delta \text{EBIT}}{\% \Delta \text{Sales}} = \frac{\text{CM}}{\text{EBIT}}$$

$$\text{DFL} = \frac{\% \Delta \text{EPS}}{\% \Delta \text{EBIT}} = \frac{\text{EBIT}}{\text{EBIT} - I}$$

$$\text{DCL} = \text{DOL} \times \text{DFL}$$

**Overhead variances (2-variance method)**

$$\text{Budget Var} = \text{Actual OH} - \text{Flex Budget OH}$$

$$\text{Volume Var} = \text{Flex Budget OH} - \text{OH Applied}$$

$$= \text{Fixed OH Rate} \times (\text{Denom Hrs} - SH_{\text{allowed}})$$

**Profitability index (PI)**

$$\text{PI} = \frac{\text{PV of Future Cash Inflows}}{\text{Initial Investment}}$$

Accept if  $\text{PI} \geq 1$  (equivalent to  $\text{NPV} \geq 0$ ). Useful for ranking projects under capital rationing.

**Governmental fund balance equation**

Fund Balance = Assets + Deferred Outflows – Liabilities – Deferred Inflows

Fund balance classifications (lowest to highest restriction): Nonspendable, Restricted, Committed, Assigned, Unassigned.

**Government-wide net position**

Net Position = Assets + Def. Outflows – Liab. – Def. Inflows

Categories: Net investment in capital assets; Restricted; Unrestricted.

Full accrual basis (economic resources focus).

**Modified accrual revenue recognition**

Revenues recognized when measurable AND available.

Available = collectible within current period or within 60 days after year-end (commonly).

Expenditures recognized when liability incurred (except debt service, long-term liabilities).