

FSA Note: Summary of Financial Ratio Calculations

This note contains a summary of the more common financial statement ratios. A few points should be noted:

- Calculations vary in practice; consistency and the intuition underlying the calculated ratio are important. This list is not exhaustive.
- A firm's fiscal year end often corresponds to the point in time at which business activity is at its lowest. Hence, ratios calculated using internal data at different points in the year may differ significantly from those based on published financial statements.

Pictorial Summary of Common Financial Ratios

<i>Liquidity</i>		<i>Debt Management</i>		<i>Asset Management</i>	<i>Profitability</i>		<i>Return to Investors</i>
Short Run Solvency	Liquidity of Current Assets	Amount of Debt	Coverage of Debt	Operating Efficiency	Margins	Returns	Earnings per Share
Current ratio	Collection period	Debt to assets	Times interest earned	Receivable turnover	Gross profit margin	ROIC	ROE
Quick ratio	Days inventory held	Debt to equity	CFO to interest	Inventory turnover	Operating profit margin	Cash ROA	ROCE
Cash ratio	Days payables outstanding	Long term debt to total capital	CFO to debt	Fixed asset turnover	Net profit margin	ROA	Dividend yield
CFO ratio	Net trade cycle		Cash flow adequacy	Asset turnover		ROE	Dividend payout
Defensive interval				Return on assets			P/E

(Not all ratios are represented in this picture; some ratios pertain to more than one category.)

Liquidity Ratios	<div>Numerator</div> <div>Denominator</div>		Interpretation and benchmark
Current ratio =	Current assets	Current liabilities	Short-term debt paying ability. Current assets less current liabilities = “working capital,” the relatively liquid portion of an enterprise that serves as a safeguard for meeting unexpected obligations arising within the ordinary operating cycle of the business. Benchmark: PG, HA, ROT (>2)
Quick (acid-test) ratio =	Cash + marketable securities + net receivables	Current liabilities	Immediate short-term liquidity Benchmark: PG, HA, ROT (>1)
Cash ratio =	Cash + marketable securities	Current liabilities	More conservative than quick ratio as it excludes net receivables (all of which may not be collected) Benchmark: PG, HA, ROT (>40-50%)
CFO ratio =	CFO	Average current liabilities	Ability to repay current liabilities from operations Benchmark: PG, HA, ROT (>40-50%)
Defensive interval = (Cash burn rate)	365 X Quick ratio numerator	Projected expenditures (= COGS + Other operating expenses except depreciation)	Conservative view of firm’s liquidity. Compares currently available quick sources of cash with estimated outflows needed to operate. Benchmark: PG, HA
Working capital =	Current assets – Current liabilities		Note: you may have used a different definition from corporate finance. Please use this definition for FSA.

Abbreviations for benchmarks:

ROT: rule of thumb.

EB: economic benchmark.

PG: peer group average.

HA: firm’s historical average.

Note: The rule of thumb numbers vary significantly depending on whose “thumbs” we are talking about. Provided here are the often-seen numbers.

Industry peer and firms’ historical average are always useful benchmarks.

Activity Ratios	Numerator	Interpretation and Benchmark
	Denominator	
Receivable turnover =	$\frac{\text{Net sales}}{\text{Average net trade receivables}}$	Liquidity of receivables Benchmark: PG, HA
Average receivables collection day =	$\frac{365}{\text{Receivable turnover}}$	Effectiveness of firm's credit policies and level of investment in receivables needed to maintain firm's sales level. Average number of days until A/R collected. Benchmark: PG, HA
Inventory turnover =	$\frac{\text{Cost of goods sold (COGS)}}{\text{Average total inventory}}$	Liquidity of inventory Benchmark: PG, HA
Average days inventory in stock =	$\frac{365}{\text{Inventory turnover}}$	Average number of days inventory held until sold. Benchmark: PG, HA
Payables turnover =	$\frac{\text{COGS} + \text{change in inventory} = \text{Purchases}}{\text{Average accounts payable}}$	Importance as source of financing for operating activities Benchmark: PG, HA
Average days payables outstanding =	$\frac{365}{\text{Payables turnover}}$	Average number of days until payables are paid Benchmark: PG, HA
Operating cycle =	Receivables collection days + Inventory holding days	Indicates the days in the normal operating cycle. Benchmark: PG, HA
Net trade cycle or cash cycle =	Operating cycle - Average days payables outstanding	Indicates the days in the normal cash conversion cycle of the firm. Benchmark: PG, HA
Working capital turnover =	$\frac{\text{Net sales}}{\text{Average working capital}}$	Amount of operating capital needed to maintain a given sales level Benchmark: PG, HA
Fixed asset turnover =	$\frac{\text{Net sales}}{\text{Average net fixed assets}}$	Efficiency of fixed assets (productive capacity) in generating sales Benchmark: PG, HA
Asset turnover =	$\frac{\text{Net sales}}{\text{Average total assets}}$	Efficiency of asset use in sales generation Benchmark: PG, HA
Average PPE age =	$\frac{\text{Accumulated depreciation}}{\text{Depreciation expense}}$	Estimate of how long the average fixed asset has been held. Benchmark: PG, HA
Average PPE useful life =	$\frac{\text{Ending balance of gross PPE}}{\text{Depreciation expense}}$	Estimate the average useful (depreciable) life of PPE assets. If annual data are used this ratio estimates the number of years of estimated useful life. Benchmark: PG, HA

Profitability Ratios	Numerator	Interpretation and Benchmark
	Denominator	
Return on equity (ROE) =	$\frac{\text{Net income}}{\text{Average total shareholders' equity}}$	Profitability of all equity investors' investment Benchmark: EB (Cost of equity capital), PG, HA
Return on assets (ROA) =	$\frac{\text{Net Income} + \text{Interest expense} * (1 - \text{tax rate})}{\text{Average total assets}}$	Overall profitability of assets. Sometimes called return on investment (ROI). Benchmark: EB (WACC), PG, HA
Return on invested capital (ROIC) = (See Course Note for details)	$\frac{\text{NOPAT} = \text{EBIT} * (1 - \text{tax rate})}{\text{Average invested capital}}$	Overall profitability of invested capital. Sometimes called return on capital employed (ROCE) or return on net operating assets (RNOA). Benchmark: EB (WACC), PG, HA
Gross profit margin on sales =	$\frac{\text{Net sales} - \text{COGS} = \text{Gross margin}}{\text{Net sales}}$	Captures the relation between sales generated and manufacturing (or merchandising) costs Benchmark: PG, HA
Operating Margin =	$\frac{\text{EBIT}}{\text{Net sales}}$	Measures profitability independently of an enterprise's financing and tax positions Benchmark: PG, HA
Net profit margin on sales =	$\frac{\text{Net income}}{\text{Net Sales}}$	Net income generated by each sales dollar Benchmark: PG, HA
Cash return on assets =	$\frac{\text{CFO}}{\text{Average total assets}}$	Measures return on assets on "cash" basis. Benchmark: PG, HA
Earnings per share (EPS) =	$\frac{\text{Net income less preferred dividends}}{\text{Weighted common shares outstanding}}$	Net income earned per common share Benchmark: PG, HA
Price earnings ratio (P-E) =	$\frac{\text{Market price of stock}}{\text{Earnings per share}}$	Ratio of market price to earnings per share Benchmark: PG, HA
Market to book ratio =	$\frac{\text{Market value of equity}}{\text{Book value of equity}}$	Ratio of the market's valuation of the enterprise to the book value of the enterprise on its financial statements. Benchmark: PG, HA
Dividend Payout =	$\frac{\text{Cash dividends paid on common equity}}{\text{Net income}}$	Percentage of earnings distributed as cash dividends. Note: Some firms/analysts calculate this using cash dividends declared in the numerator instead. Benchmark: PG, HA
Dividend Yield =	$\frac{\text{Cash dividends paid per share of common equity}}{\text{Price per share}}$	Percentage of share price distributed as cash dividends Benchmark: PG, HA

Solvency Ratios	<div>Numerator</div> <hr/> <div>Denominator</div>		Interpretation and Benchmark
Debt to total assets =	<div>Total debt</div> <hr/> <div>Total assets</div>		Percentage of total assets provided by creditors. Total debt is a subset of total liabilities. Typically, you sum total long term debt and the current portion of long term debt in the numerator. Other additions might be made: notes payable, capital leases, and operating leases if capitalized. Benchmark: EB (optimal capital structure), PG, HA
Debt to equity =	<div>Total debt</div> <hr/> <div>Total shareholders' equity</div>		Percentage of total assets provided by owners. Benchmark: EB (optimal capital structure), PG, HA
Financial leverage =	<div>Total (average) assets</div> <hr/> <div>Total (average) shareholders' equity</div>		Degree to which enterprise uses owners' capital to finance assets. We'll calculate this ratio using the averages of the balance sheet accounts to facilitate our ratio decomposition. Benchmark: EB (optimal capital structure), PG, HA
Times interest earned (TIE) =	<div>EBIT</div> <hr/> <div>Interest expense</div>		Ability to meet interest payments as they mature. EBIT is sometimes called Operating Income. Benchmark: PG, HA, ROT (minimal 2-4)
CFO to interest =	<div>CFO + interest and taxes paid in cash</div> <hr/> <div>Interest expense</div>		Ability to meet interest payments from operating cash flow. Some analysts calculate the numerator using CFO + interest expense + tax expense. This calculation is less internally consistent as what we are striving for in the numerator is a <i>cash flow</i> number, not a mix of cash flow and accruals. Benchmark: PG, HA, ROT ($\geq 2-4$)
CFO to debt =	<div>CFO + interest and taxes paid in cash</div> <hr/> <div>Average total liabilities</div>		Ability to repay total liabilities in a given year from operations. See caveat above regarding numerator. Benchmark: PG, HA, ROT (?)
Cash flow adequacy =	<div>CFO</div> <hr/> <div>CAPEX + debt and dividends payments</div>		Measures how many times capital expenditures, debt repayments, cash dividends covered by CFO. Benchmark: PG, HA, ROT (1)
Book value per share =	<div>Common shareholders' equity</div> <hr/> <div>Outstanding shares</div>		Amount each share would receive if company were liquidated at the amounts reported on the balance sheet Benchmark: none
CFO to Operating earnings =	<div>CFO</div> <hr/> <div>Operating earnings</div>		Operating cash flow + accruals = operating earnings. This ratio gives an indication of how much CFO differs from operating earnings due to accounting accruals. Benchmark: PG, HA, ROT (>1).