

Accounting-Based Performance Measure - 1

Designing an accounting-based performance measure requires six steps:

1. Choose performance measures that align with top management's financial goal(s).
2. Choose the time horizon of each performance measure in Step 1.
3. Choose a definition for each performance measure in Step 1.

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Accounting-Based Performance Measure - 2

4. Choose a measurement alternative for each performance measure in Step 1.
5. Choose a target level of performance.
6. Choose the timing of feedback.

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Accounting-Based Performance Measure

A major weakness of comparing operating incomes alone is ignoring differences in the size of the investments in each subunit

Investment refers to the resources or assets used to generate income.

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Divisional Balance Sheet

Assets		easy to separate
Cash		
Receivables		Transfer prices
Inventories		Transfer prices
Long Term Assets		could be tough

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Divisional Balance Sheet

Liabilities and Equity

Accounts Payable }
 Taxes Payable } Free Liabilities
 Deferred Taxes }

Short Term Debt }
 Long Term Debt } Debt } Invested capital
 Equity } or
 Investment

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Divisional Investment

Divisional Investment =
 Divisional assets - Free liabilities

Note that Current Liabilities usually includes short term debt.

But as interest needs to be paid for all debt, short term debt should be included in invested capital.

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Divisional Income statement

Firm:

Operating Income	EBIT
- Interest Expense	
= Earnings Before Taxes	EBT
- Tax Expense	
= Net Income	NI

Can this be done for a Division?

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Net Operating Profit After taxes - NOPAT

$$NI = [1 - \text{Tax Rate}] \times [\text{Operating Income} - \text{Interest Expense}]$$

$$\begin{aligned} &\text{Operating Income} \times [1 - \text{Tax Rate}] \\ &= NI + [1 - \text{Tax Rate}] \times \text{Interest Expense} \end{aligned}$$

defined as = **NOPAT**

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Accounting-Based Performance Measure

Return on investment (ROI) is
 an accounting measure of income
 ÷ an accounting measure of investment.

For numerator some companies use
 operating income or net income.

For denominator some companies use
 total assets
 or total assets minus current liabilities.

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Accounting-Based Performance Measure

Return on investment (ROI)
 = NOPAT ÷ Investment

$$\begin{aligned} &NOPAT \\ &= \text{Operating Income} \times [1 - \text{Tax Rate}] \\ &= NI + [1 - \text{Tax Rate}] \times \text{Interest Expense} \end{aligned}$$

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Accounting-Based Performance Measure

The return on investment (ROI) is also called the
 accounting rate of return.

The ROI can be compared with

The rate of return on opportunities elsewhere,
 inside and outside the company

OR

The cost of capital

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DuPont Method

The DuPont method of profitability analysis
 recognizes that there are two basic ingredients in
 profit making:

- Using assets to generate more revenues
- Increasing income per dollar of revenues

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DuPont Method

$$\text{Investment turnover} = \text{Revenues} \div \text{Investment}$$

$$\text{Return on sales} = \text{NOPAT} \div \text{Revenues}$$

$$\text{ROI} = \text{Investment turnover} \times \text{Return on sales}$$

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Comparing Performance

Why are ROI or RI measures more appropriate than ROS to evaluate overall aggregate performance? Because they consider both income earned and investments made.

RI measures overcome some of the goal-congruence problems that ROI measures might introduce.

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Is ROI the best measure ?

	NOPAT	Investment	ROI
Current	\$20,000	100,000	20.00%
New	\$12,000	72,000	16.67%
Cost of capital = Target ROI			12.00%

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ROI

	NOPAT	Investment	ROI
Current	\$20,000	100,000	20.0%
Current +New	\$32,000	172,000	18.6%

Managers of decentralized divisions will not expand.

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Residual Income

Residual income (RI) is an accounting measure of income minus a required dollar return on an accounting measure of investment.

$$\begin{aligned} \text{Residual income (RI)} &= \\ &\text{Income} \\ &- (\text{Required rate of return} \times \text{Investment}) \end{aligned}$$

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ROI

$$\text{Cost of capital} = \text{Target ROI} = 12\%$$

	NOPAT	Investment	Residual Income
Current	\$20,000	- 100,000 x 12%	8,000
New	\$12,000	- 72,000 x 12%	3,360

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ROI

	NOPAT	Investment	Residual Income
Current	\$20,000	100,000	
		x 12%	8,000
Current	\$32,000	172,000	
+New		x 12%	11,360

Managers of decentralized divisions will expand. ¹⁹

Residual Income

The objective of maximizing ROI may induce managers of highly profitable divisions to reject projects that, from the viewpoint of the organization as a whole, should be accepted.

Goal congruence is more likely to be promoted by using residual income rather than ROI.

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Economic Value Added

Economic value added (EVA®)

- ⚡ a specific type of residual income calculation
- ⚡ recently attracted considerable attention.

Economic value added (EVA®) for firm

$$= \text{NOPAT} - [\text{Weighted-average cost of capital (WACC)} \times \text{Invested Capital}]$$

²¹
WACC

$$\frac{\text{Debt}}{\text{Debt} + \text{Equity}} \times [1 - \text{tax}] \times \text{Interest rate}$$

+

$$\frac{\text{Equity}}{\text{Debt} + \text{Equity}} \times \text{Cost of Equity}$$

²²
Economic Value Added for equity

Economic value added (EVA®) for Equity

$$= \text{NI} - [\text{Cost of Equity} \times \text{Equity}]$$

²³
ROE

Return on Equity ROE = NI ÷ Equity

$$\text{ROE} = \text{ROI} + \frac{[\text{ROI} - (1 - \text{tax}) \times \text{Interest rate}]}{\text{Debt} \div \text{Equity}}$$

²⁴

Return on Assets

$$\frac{\text{Net Income} + (1 - \text{tax rate})\text{Interest Expense}}{\text{Free Liabilities} + \text{Debt} + \text{Equity}}$$

=

ROA

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Economic Value Added

What can managers do to improve their EVA®?

- ❖ Earn more after-tax operating income with the same capital.
- ❖ Use less capital to earn the same after-tax operating income.
- ❖ Invest capital in high-return projects.

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Choosing the Time Horizon

The second step of designing accounting-based performance measures is choosing the time horizon of each performance measure.

The ROI, RI, EVA®, and ROS calculations represent the results of a single time period.

Many companies evaluate subunits on the basis of ROI, RI, EVA®, and ROS over multiple years.

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Choosing the Time Horizon

What are some reasons for evaluating subunits over a multi-year time horizon?

Managers could take actions that cause short-run increases in the measures used but are in conflict with the long-run interests of the organization.

Benefits of actions taken in the current period may not show up in a short-run performance measurements.

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Irrelevance of Accounting Methods

Period	1	2
Gross profit	\$400	\$400
Depreciation	\$200	\$100
EBIT	\$200	\$300
Assets beginning	\$1,000	\$1,100
Capital charge	\$120	\$132
Residual Income	\$80	\$168
Future value of 1	112.00%	125.44%
Present value	\$71	\$134
Total = \$205		

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Irrelevance of Accounting Methods

Period	1	2
Gross profit	\$400	\$400
Depreciation	\$150	\$150
EBIT	\$250	\$250
Assets beginning	\$1,000	\$1,150
Capital charge	\$120	\$138
Residual Income	\$130	\$112
Future value of 1	112.00%	125.44%
Present value	\$116	\$89
Total = \$205		

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Irrelevance of Accounting Methods

EBIT	1	-1
Assets beginning		+1
Capital charge		r
Residual Income	1	-(1+r)
Future value of 1	1+r	(1+r) ²
Present value of RI	1/(1+r)	-(1+r)/(1+r) ²
Total = \$0		

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SIGNED AND SEALED - BUT CAN EVA DELIVER?

The Postal Service is organized into 10 regional units, 85 "performance clusters," and hundreds of district offices and processing centers. The EVA program will evaluate performance at the performance cluster level.

to generate meaningful EVA numbers, the Postal Service developed a system of transfer pricing based on statistical analysis.

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Eli Lilly Is Making Shareholders Rich. How? By Linking Pay To EVA

Eli Lilly, maker of Prozac, is among a pioneering group of companies that are tying pay to EVA goals.

Shareholders are making out well too. Since the end of June 1994, when we first adopted EVA, the share price has gone up 105%. That's what really matters.

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Why EVA

Net Present Value of Cash Flows
= Present value of EVA

Market Value Added
= Net Present Value of Cash Flows

Market Value Added + Investment
= Net Present Value of Cash Flows
+ Investment

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Why EVA

Market Value
= Present Value of EVA
+ Book value of Investment

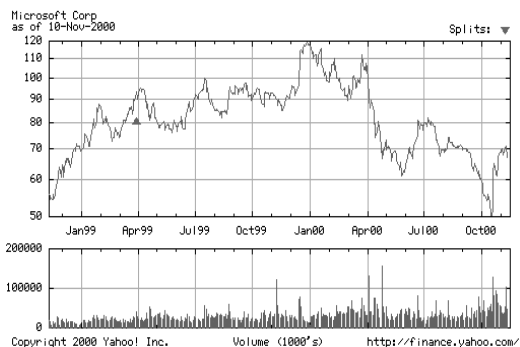
Market Value - Book value
= Present Value of EVA

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MICROSOFT CORP

2000, April 26
 NI = 8,719 (last 4 qtrs 12-31, 99) [9,800 on 11-14-00]
 Equity = 35,000; ROE = 24.9%
 EVA = 8,719 - .126 x 35,000 = 8,719 - 4414
 = 4,305
 Present value of EVA (with growth 11%)
 = 4,305 / (.126 - .114) = 359,585
 Market value = 353,000 mn [373.3 on 11-14-00]
 MVA = 353,000 - 35,000 = 318,000

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MVA 1999 Top Ten - Dec 99

BRISTOL-MYERS SQUIBB	\$119,350
LUCENT TECHNOLOGIES [\$50]	\$127,265
CISCO SYSTEMS [\$327]	\$135,650
PFIZER	\$148,245
MERCK	\$153,170
COCA-COLA [\$142]	\$157,536
WAL-MART STORES [\$174]	\$159,444
INTEL [\$219]	\$166,902
GENERAL ELECTRIC [\$ 462 11-15-00]	\$285,320
MICROSOFT [\$ 310 11-15-00]	\$328,257

EVA 1999 Top Ten

JOHNSON & JOHNSON	\$1,712
CISCO SYSTEMS [-410]	\$1,849
COCA-COLA [650]	\$2,194
SBC COMMUNICATIONS	\$2,219
BRISTOL-MYERS SQUIBB	\$2,273
MICROSOFT [4,020]	\$3,776
MERCK	\$4,175
INTEL [5,660]	\$4,280
GENERAL ELECTRIC [6,180]	\$4,370
PHILIP MORRIS [6,470]	\$5,180