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Where's the Bar?

Introducing Market-Expected Return on Investment (MEROI)

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- **Calibrating a company's economic return on investment is a critical part of understanding market expectations and anticipating revisions in expectations.**
- **Standard rate of return measures—including ROE and ROIC—do not fully capture economic returns.**
- **Market-expected return on investment (MEROI) provides a clearer view of a company's true economic returns.**
- **MEROI is a valuable addition to an expectations-investing stock-picking approach.**

U.S. Investment Strategy

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Executive Summary

Both investors and managers must have a clear understanding of economic returns on investment to intelligently allocate capital. But the needs of investors and managers are different. Managers seek to make investments that generate returns above the cost of capital. Value creation is the guiding factor.

Investors, on the other hand, take a different approach. Their decisions are based on *revisions in expectations* for a company’s financial performance. Investors have no reason to believe that a company generating attractive economic returns will provide superior returns if the stock market fully reflects the company’s above-average prospects.

Investors need to be able to measure the economic return on investment that the market anticipates to calibrate whether or not the expectations embedded in stock prices are reasonable. Unfortunately, widely used measures do a poor job of capturing true economic returns on investment.

In this report, we introduce market-expected return on investment (MEROI) as an important complement to the expectations investing toolkit. MEROI provides a good sense of where the rate of return performance bar is set.

There are four key points in this report.

1. *Traditional measures miss the mark.* Most traditional return measures—such as return on equity, return on invested capital, and return on incremental invested capital—do not fully capture economic returns.
2. *MEROI provides a complete picture of expected returns.* MEROI is the internal rate of return a company is expected to earn on its incremental investments. It does not rely on sunk costs, but rather captures all operating sources of value inflows and outflows.
3. *A valuable addition to the expectations-investing process.* Expectations investing starts by reading market expectations for a company’s financial performance, and then applies appropriate strategic and financial tools to judge whether the market’s expectations are appropriate. MEROI can provide useful context in this judgment.
4. *Case study.* We use Cisco Systems as an example of this analysis. We first calculated Cisco’s return on investment for the 1990s (around 20%) and note that the expected returns embedded in its shares today (June 2001) are approximately 25%. These figures may be useful in determining the attractiveness of the shares.

Introduction

Finance theory suggests, and everyday experience corroborates, that the present value of future free cash flows determines the value of a financial asset. Further, most investors realize that the key to successful investing is to correctly anticipate revisions in expectations for a company's free cash flow. But a successful application of an expectations-based approach requires more than just an appreciation of *how* the market values a company, it also requires an understanding of *what* expectations of future financial performance a stock's price currently reflects.

We can distill valuation into three prime components: future cash flows, a required rate of return, and a period of excess returns (which we like to call competitive advantage period, or CAP). As it turns out, the stock market dictates the latter two determinants (discount rate and CAP), so analysts are correct to focus their energy on revisions to future cash flows.

In turn, we can specify cash flows with two variables that shape business models: growth in net operating profit after tax and return on investment. Investments are current outlays that have multiperiod returns. A company's typical investments include changes in working capital, capital spending (above and beyond depreciation), and acquisitions. Growth in net operating profit after tax is a function of sales growth and operating profit margins.[1]

Return on investment captures the relationship between a company's investments and its future net operating profit after tax. To state the obvious, the higher the return the better (all things equal), because the less capital a company requires to support its earnings growth, the more cash available for distribution to claimholders. We focus on defining the best measure of forward-looking return on investment.

While measuring market-expected returns is conceptually straightforward, investors rarely do it correctly in practice. This report provides investors with a valuable tool to measure market-expected returns, which we call *market-expected return on investment*, or MEROI. We believe that MEROI is a very useful number in the quest for revisions in expectations.

The math of MEROI closely follows the concept of corporate return developed by Alfred Rappaport[2], who wanted to demonstrate how corporate executives could measure their ability to deliver superior shareholder returns. The necessary hurdle was not simply the cost of capital, Rappaport argued, but rather the rate *expected* by the stock market. We tailor the concept for investors.

This report has four parts. First, we compare and contrast various "return" measures. Second, we provide the intellectual and economic underpinnings of MEROI, and show how to calculate it. Third, we place MEROI within the context of expectations investing. Finally, we provide an example of how to use MEROI.

Estimating Returns on Investment

While news of earnings growth tends to fill the business press headlines, astute investors recognize the importance of understanding growth in the context of economic returns. Indeed, growth just amplifies returns. For companies that generate returns above a required rate, growth is good. For those companies that earn returns below the required rate growth is bad. And growth has no effect on a business that earns exactly its opportunity cost.

The real question is how to measure returns. We look at a few of the most widely used metrics—including return on equity, return on assets, return on invested capital, and return on incremental invested capital—and show why they come up short in reflecting economic reality.

Each of these return metrics suffer from at least one of two broad shortcomings. The first is that they are typically not long-term oriented. Think of an example of a company that consists of a single project—say, a restaurant. The first day the restaurant is open for business the return will look awful; the denominator includes the full investment while the numerator reflects either losses or nominal profits. Fast forward a decade and a one-day return looks terrific; the restaurant is at peak earnings power and is completely depreciated. Neither short-term return reflects the long-term economics of the project.[3]

Second, these return metrics fail to accurately reflect value inflows and outflows because they rely either on accounting numbers or incomplete economic measures.

We next review the four most widely used metrics.

Return on Equity (ROE)

ROE, defined as net income divided by shareholder equity, probably remains the most widely used measure of investment efficiency. Despite its popularity, ROE is fraught with three shortcomings.

1. The numerator of ROE, earnings, is flawed because companies can compute it using alternative accounting methods.
2. The denominator of ROE, equity, is flawed because it is subject to accounting vagaries (i.e., share buybacks and FASB 106).
3. ROE mixes operating and financing issues. For example, often a company's ROE increases when it increases its financial leverage. Further, any debt-financed project that generates returns greater than the cost of debt will add to ROE, but may not create shareholder value.

Historic or prospective ROE has severe limitations in its ability to reflect expectations for economic returns on investment.[4]

Return on Assets (ROA)

Calculated as earnings divided by assets, ROA has the same shortcomings as ROE. It has both a flawed numerator and denominator, and can be affected by financing decisions.

Return on Invested Capital (ROIC)

ROIC equals net operating profit after tax divided by invested capital (or, equivalently, capital employed).[5] It is the best of the accounting-based numbers because the numerator is an economically sound starting point. But the denominator is still an accumulation of sunk costs, and does not provide insight about the future.

So historical invested capital may be an instructive figure—it provides some sense of past capital allocation skill—but it does not speak to the future. Investors can try to sidestep this problem in one of two ways. First, investors can consider *changes* in invested capital. This calculation, however, intermingles sunk costs with incremental investments.

The second alternative is to consider only incremental earnings and investment. These lead to our final return measure.

Return on Incremental Invested Capital (ROIIC)

ROIIC considers the relationship between incremental investment and incremental net operating profit after tax. As a result, it is totally forward looking and avoids the problem of sunk costs. ROIIC generally incorporates a one-year time lag. For example, a 20% ROIIC would assume that $100 invested this year would add $20 to next year's net operating profit after tax.

While ROIIC has substantial intuitive appeal, we believe that its primary and best use is as a method to estimate future investment needs. It is an inaccurate measure of economic returns: it overstates economic returns for value-creating businesses (especially those with long CAPs) and understates economic returns for companies not earning the cost of capital. As a result of these distortions, ROIIC provides little context for understanding true economic returns.

Why doesn't ROIIC approximate economic returns? We'll save the full explanation until after we describe market-expected return on investment in some more detail. But here's the intuition. A company's value creation in a given year is a function of two things: the cash flow it generates and the change in its residual value. You might think of the cash flow as dividends and the change in residual value as capital gains. ROIIC only reflects the dividends. Since ROIIC only captures part of the economic picture, it compensates by being more variant than the more sound market-expected return on investment.

We have now established two central points: understanding returns is important in understanding value creation, and the most widely used measures do a poor job of capturing economic returns. We now introduce a more robust framework.

Market-Expected Return on Investment (MEROI)

The intellectual roots for MEROI are in Merton Miller and Franco Modigliani's famous 1961 paper "Dividend Policy, Growth and the Valuation of Shares."[6] That paper demonstrated that a stock is valued equivalently as the present value of future free cash flows or as the sum of a firm's steady-state value plus all future value creation.[7]

While these two methods are mathematically equivalent, they represent very different analytical perspectives.

That a company's value is the present value of its future free cash flows is familiar to most investors, and was set forth in *The Theory of Investment Value,* a seminal book written by John Burr Williams in 1938. More specifically, this approach divides corporate value into two components: the present value of free cash flow during the competitive advantage period and the present value of the company beyond the CAP (or the present value of the residual value). Exhibit 1 shows an example of this approach.

Exhibit 1: Shareholder Value

Year		1	2	3	4	5	6	7
NOPAT		100.0	111.0	123.2	136.8	151.8	168.5	187.0
Investment		73.3	81.4	90.4	100.3	111.3	123.6	
Free cash flow		26.7	29.6	32.9	36.5	40.5	44.9	
PV of free cash flow		24.2	24.5	24.7	24.9	25.1	25.4	
Σ PV of free cash flow	148.8							
Residual value	1,870.4							
Σ PV of free cash flow	148.8							
PV of Residual value	1,055.8							
Corporate Value	1,204.6							

Note: Cost of capital = 10%

Source: CSFB.

The second valuation approach, which is the key to understanding MEROI, takes what the business is worth today and adds to it future value creation. Rappaport calls the first term baseline value and the second term shareholder value added (SVA).[8] Baseline value reflects the status quo: it assumes no additional value creation (i.e., future investments have a zero net present value). SVA, in contrast, captures the expected value change. For a company to improve its SVA over time, its net operating profit after tax must increase at a rate that more than compensates for its incremental investments.

There are two ways to calculate aggregate SVA. The first (which we alluded to above with our dividend and capital gains example) is to take the sum of the cumulative present value of free cash flows and the cumulative change in the present value of the residual value.[9]

Exhibit 2 shows the calculation. As an illustration, year one SVA of $33.3 equals the present value of free cash flow ($24.2) plus the change in the present value of the residual value ($9.1). Sum the SVAs from each of the six years of the assumed CAP, and you get aggregate SVA of $204.6.

Exhibit 2: Estimating SVA: PV of FCF's and Change in PV of the Residual Value

Year	Base	1	2	3	4	5	6	
Free cash flow		26.7	29.6	32.9	36.5	40.5	44.9	
PV of free cash flow		24.2	24.5	24.7	24.9	25.1	25.4	
Residual value		1,110.0	1,232.1	1,367.6	1,518.1	1,685.1	1,870.4	
PV of residual value	1,000.0	1,009.1	1,018.3	1,027.5	1,036.9	1,046.3	1,055.8	
Change in PV of residual value		9.1	9.2	9.3	9.3	9.4	9.5	Total SVA
Shareholder value added		33.3	33.6	33.9	34.3	34.6	34.9	204.6

Note: Cost of capital = 10%

Source: CSFB.

The other method of calculating shareholder value added is the key to understanding MEROI. Here, we capitalize each year's change in NOPAT and discount them back to the present at the cost of capital. We obtain SVA by subtracting the present value of all the incremental investments over the forecast period from the present value of the capitalized NOPAT increases in each year of the forecast period.

Here again, the intuition is straightforward: a company generates positive shareholder value added when the present value of its incremental earnings exceeds the present value of its incremental investments. This is simply a restatement of the tried-and-true net present value rule.

Exhibit 3 shows the calculation. We see that present value of capitalized NOPAT changes is $613.8 and the present value of future investments is $409.2. The difference between the two ($613.8 - $409.2) equals SVA of $204.6. When SVA is positive, we know that a company is earning at a rate (or investors expect it to earn at a rate) above the cost of capital. So we know that MEROI exceeds than the cost of capital.

Exhibit 3: Estimating SVA: Capitalized PV NOPAT minus PV Investments

	Base	1	2	3	4	5	6	
NOPAT	100.0	111.0	123.2	136.8	151.8	168.5	187.0	
Δ NOPAT		11.0	12.2	13.6	15.0	16.7	18.5	Inflows
Δ NOPAT capitalized		110.0	122.1	135.5	150.4	167.0	185.4	Sum
PV Δ NOPAT capitalized		100.0	100.9	101.8	102.8	103.7	104.6	613.8
Σ PV of Δ NOPAT capitalized								
								Outflows
Investment		73.3	81.4	90.4	100.3	111.3	123.6	Sum
PV of investment		66.7	67.3	67.9	68.5	69.1	69.8	409.2
					Inflows minus outflows equal			Total
								SVA
Shareholder value added		33.3	33.6	33.9	34.3	34.6	34.9	204.6

Note: Cost of capital = 10%

Source: CSFB.

Now that we have exposed the intuitive logic behind SVA, we can employ a mathematical shorthand. As it turns out, discounting the perpetuity value of the *change* in NOPAT each forecast year is equivalent to discounting free cash flow for each forecast year and adding the change in perpetuity value at the end of the forecast period. We demonstrate the equivalence of these approaches in Appendix 1. This simplifies the calculation.

We can now define MEROI as follows:

MEROI is the discount rate that equates the present value of the incremental NOPAT inflows with the present value of the investment outflows (the outflows are discounted at the cost of capital).

The market-expected return on investment can be estimated in three steps.

1. Create a discounted cash flow model that reflects a company's current stock price.
2. Calculate the present value of future investments discounted at the cost of capital.
3. Determine the discount rate that equates the present value of the capitalized annual NOPAT changes with the present value of the future investments.

Let's walk through an example to illustrate the MEROI calculation.

Step 1: Let's continue with our six-year discounted cash flow model. (See Exhibit 4.) We now define the assumptions that underlie the model.

- Year one NOPAT is $100, which grows at an 11% rate.
- Return on incremental invested capital (ROIIC) is 15%. You can check this by dividing the change in year two versus year one NOPAT ($111.0–$100.0=$11.0) by the year one investment (73.3). This equals 15% ($11/$73.3=15%).
- The cost of capital is 10%.
- An explicit forecast horizon of six years.
- The residual value equals year seven NOPAT ($168.5*1.11=$187.0) divided by the cost of capital, or $187/10%=$1,870.4.

Given these assumptions, corporate value is $1,204.6. We've made up the numbers for our illustration. But investors, in reality, will "read" prices and determine what value-driven expectations are actually built into the current stock price.

Exhibit 4: Discounted Cash Flow

Year		1	2	3	4	5	6
NOPAT		100.0	111.0	123.2	136.8	151.8	168.5
Investment		73.3	81.4	90.4	100.3	111.3	123.6
FCF		26.7	29.6	32.9	36.5	40.5	44.9
PV of FCF		24.2	24.5	24.7	24.9	25.1	25.4
Σ PV of FCF	148.8						
Residual Value	1,870.4						
PV of Residual Value	1,055.8						
Corporate Value	1,204.6						

Note: Cost of capital = 10%

Source: CSFB.

Step 2: Calculate the present value of future investments, discounted at the cost of capital. In this case, the present value of future investments equals $409.2. (See Exhibit 5.)

Exhibit 5: Present Value of Future Investments

Year	1	2	3	4	5	6
Investment	73.3	81.4	90.4	100.3	111.3	123.6
Discount Factor @ Cost of Capital	0.9	0.8	0.8	0.7	0.6	0.6
PV of Investment	66.7	67.3	67.9	68.5	69.1	69.8
Σ PV of Investment	409.2					

Note: Cost of capital = 10%

Source: CSFB.

Step 3: Solve for the market-expected return on investment. We now seek the discount rate that equates the present value of capitalized NOPAT with the present value of investments. We find that, given our assumptions, the MEROI in our example is about 13.5%. (See Exhibit 6.)[10]

Exhibit 6: Market-Expected Return of Investment

	1	2	3	4	5	6
Δ NOPAT in Next Year	11.0	12.2	13.6	15.0	16.7	18.5
Perpetuity = Δ NOPAT/MEROI	81.7	90.7	100.7	111.7	124.0	137.7
Discount Factor @ MEROI	0.9	0.8	0.7	0.6	0.5	0.5
PV of Δ NOPAT/MEROI	72.0	70.4	68.9	67.4	65.9	64.5
Σ PV of Δ NOPAT/MEROI	409.2					
Market Expected Return on Investment	13.47%					

Note: Cost of capital = 10%

Source: CSFB.

Note that the MEROI of 13.5% is quite different than the ROIIC of 15%. It is important to note, as we will see in a moment, that the longer the CAP, the more pronounced this distortion becomes.

Further, quantifying MEROI provides a critical third dimension to understanding expectations. Analysts can quantify growth, CAP, *and* MEROI to create the most complete portrait of expectations that is possible.

Notwithstanding MEROI's usefulness as an analytical tool, investors must be aware of some subtleties. First, the calculation embeds the simplifying assumption that all incremental earnings are the result of incremental investments. Stated differently, it assumes no changes in the base business economics.[11]

Second, knowledge-based businesses pose a particular problem for MEROI. Specifically, knowledge-based companies tend to *expense* their investments—R&D, training, marketing—not capitalize them. In arriving at NOPAT, then, the income statement commingles earnings with investments.

The solution to this problem is to reclassify certain income statement items as investments. In doing so, it's useful to think like an economist. Does the item reflect a cash flow outflow that will yield incremental earnings in the future? If so, the item is an investment.

The Role of MEROI in Expectations Investing

We now place MEROI in its appropriate context within expectations investing. The core expectations investing process has three steps.[12]

1. Estimate the market expectations for future cash flows, cost of capital, and CAP that justify a company’s stock price. It is important to remain agnostic in this step. The key is to reverse engineer embedded expectations: to read the mind of the market. Once you have determined the magnitude and sustainability of cash flows that solve for the price, you can calculate the implied MEROI.[13]
2. Identify potential opportunities for revisions in expectations. Here, you must apply the appropriate strategic frameworks to anticipate shifts in the competitive landscape. Further, financial tools allow you to understand the impact on shareholder value when expectations change for the fundamental triggers—sales, operating costs or investments—allowing you to focus analytical energy. MEROI is a useful benchmark for expectations: very high or low MEROI may portend revisions in expectations.
3. Make buy, sell, or hold decisions based on expected value analysis given a range of potential performance scenarios.

We noted at the outset that the market sets the cost of capital and competitive advantage period. As a result, investors are best served by focusing on potential revisions in cash flow expectations. MEROI can provide an important reference point, as investors (including those who use DCF models) often don’t explicitly consider the market expected return on investment.

Investors and managers can use MEROI to check the reasonableness of embedded expectations. This prompts some important questions.

- Are expected MEROIs consistent with what the company has earned in the past?
- Is the competitive environment conducive to the expected MEROI? and
- What MEROI does a target price imply?

Economic theory suggests that competitive entry and rivalry are likely to limit the upper bound of MEROI. Rapid expected growth rates and high MEROIs are fertile grounds for finding sell candidates.

ROIIC Is Not a Complete Economic Measure

As a practical matter, investors should note that ROIIC becomes more and more distorted the longer the assumed investment horizon, or CAP. The reason, again, relates to the sources of value creation. Since ROIIC only measures changes in NOPAT and doesn’t consider changes in the residual value, it captures less and less of the aggregate source of value as CAP extends.

Exhibit 7 illustrates this point. The rows represent various CAPs—periods of above-cost-of-capital returns. The columns span a wide range of ROIICs. The cells are populated with the MEROIs, a correct measure of economic returns. For example, a 70% ROIIC for 20 years equates an MEROI of about 24%—in other words, ROIIC overstates the economic returns by nearly a factor of three.

Exhibit 7: ROIIC Becomes Less Reflective of MEROI as CAPs Expand

		Return on Incremental Investment							
		5%	10%	20%	30%	50%	70%	100%	130%
CAP	5 years	5.66	10.00	16.76	22.12	30.64	37.50	46.03	53.23
	10 years	6.14	10.00	15.43	19.47	25.62	30.44	36.34	41.27
	15 years	6.55	10.00	14.57	17.85	22.77	26.59	31.23	35.12
	20 years	6.90	10.00	13.95	16.74	20.88	24.07	27.97	31.24

Note: Assumes constant 11% NOPAT growth and a 10% cost of capital.

Source: CSFB.

Exhibit 7 highlights three points.

1. When ROIIC equals the cost of capital (10% in this case), MEROI will also equal the cost of capital. This occurs when a company has zero anticipated shareholder value added—future investments equal exactly the cost of capital.
2. When ROIIC exceeds the cost of capital, the ROIIC is always greater than the MEROI. Further, the degree of distortion increases as the CAP lengthens.
3. When ROIIC is below the cost of capital, ROIIC is always lower than MEROI.

MEROI is also important because it helps reveal where investors need to allocate analytical energy. Low MEROI companies warrant a focus on capital allocation. For companies with high MEROIs, growth is generally the most important factor in anticipating revisions in expectations.

Case Study

Investors can best use market-expected return on investment to assess the reasonableness of current price-implied expectations. MEROIs that appear unrealistically high may portend a downward revision in expectations—and hence a lower stock price—and a very low MEROI may signal room for upward expectations.

That said, we can demonstrate the mechanics of MEROI, as well as get a sense of perspective, by calculating a company's *actual* returns on investment. This calculation imagines that an investor (or manager) is standing at a point in the past and has perfect foresight about future NOPATs and investments. We use Cisco Systems as our example.

Before we proceed, we must emphasize two points. First, the value of this exercise is to observe the *actual* economic returns. This baseline may also be useful in assessing the market's *current* expected returns. Second, we do not assume here that the *actual* results reflected the market *expectations* at any given point in history. We do not use this ex post analysis to show how one would have invested in Cisco stock. MEROI is simply a means to calculate Cisco's past economic returns on investment.

Exhibit 8 shows the data for Cisco. We take the company's investments—including working capital changes, capital expenditures (net of depreciation) and acquisitions—from fiscal 1989 to fiscal 1999. Since we pretend as if we are standing at August 1, 1988, we take the present value those investments discounted at the cost of capital (12%). Note that we measure all acquisitions based on the *value* that Cisco imparted to the sellers, irrespective of financing or accounting treatment.

Next we determine the discount rate required (return on investment) to make the present value of the changes in annual NOPAT from fiscal 1990 to fiscal 2000 equal to the present value of investments. As it turns out, Cisco's return on investment in the 1990s was almost exactly 20%.

This analysis prompts an immediate question: what's baked into today's price? In early-June 2001, we estimate that Cisco's MEROI is about 25%, assuming 22% NOPAT growth off of the fiscal 2001 base and approximately a 60% ROIIC. Providing these growth and ROIIC assumptions are reasonable, investors must answer the question of whether future returns are likely to exceed those of the past.

Exhibit 8: Cisco System's Historical Returns, F1989-F2000

	F1989	F1990	F1991	F1992	F1993	F1994	F1995	F1996	F1997	F1998	F1999	F2000
Operating income	6.8	21.4	66.2	129.4	263.6	488.1	698.0	1,400.8	2,135.7	2,664.0	3,344.0	4,608.0
Amortization	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23.0	61.0	291.0
EBITA	6.8	21.4	66.2	129.4	263.6	488.1	698.0	1,400.8	2,135.7	2,687.0	3,405.0	4,899.0
Tax rate	37.0%	37.0%	37.0%	37.0%	37.0%	37.0%	37.0%	37.0%	37.0%	37.0%	37.0%	37.0%
NOPAT	4.3	13.5	41.7	81.5	166.0	307.5	439.7	882.5	1,345.5	1,692.8	2,145.2	3,086.4
Δ NOPAT		9.2	28.2	39.8	84.5	141.5	132.2	442.8	463.0	347.3	452.3	941.2
Δ working capital	2.0	5.4	15.3	-11.0	47.0	60.1	111.8	121.0	353.5	-402.1	-707.4	2,179.0
Capital spending	0.3	4.1	11.3	21.6	33.9	59.6	151.8	282.8	330.3	414.8	584.0	1,086.0
Depreciation	0.1	1.0	3.0	6.7	13.6	30.8	75.0	132.6	212.2	304.0	425.0	572.0
Acquisitions	0.0	0.0	0.0	0.0	0.0	0.0	137.9	4,000.0	582.0	718.0	751.0	20,151.0
Divestitures	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Investment	2.4	10.5	29.6	17.3	94.5	150.5	476.4	4,536.4	1,478.0	1,034.7	1,052.6	23,988.0
Cost of capital 12%	1.000	0.893	0.797	0.712	0.636	0.567	0.507	0.452	0.404	0.361	0.322	0.287

	Year 0	1	2	3	4	5	6	7	8	9	10	11
Total Incremental Investment	$2.42	$10.54	$29.60	$17.32	$94.48	$150.50	$476.45	$4,536.40	$1,477.97	$1,034.71	$1,052.56	
Discount Factor @ Cost of Capital	0.8929	0.7972	0.7118	0.6355	0.5674	0.5066	0.4523	0.4039	0.3606	0.3220	0.2875	
Present Value of Investment (t)	$2.16	$8.40	$21.07	$11.01	$53.61	$76.25	$215.52	$1,832.18	$532.97	$333.15	$302.58	
Sum of the Present Value of Investments	$2.16	$10.56	$31.63	$42.64	$96.25	$172.50	$388.02	$2,220.20	$2,753.17	$3,086.32	$3,388.90	
Sum of the Present Value of Investments	$3,388.90											

	Year 0	1	2	3	4	5	6	7	8	9	10	11
Δ Cash Flow (NOPAT) in Next `		$9.22	$28.22	$39.81	$84.54	$141.46	$132.20	$442.79	$462.98	$347.32	$452.34	$941.22
Perpetuity = Δ NOPAT/MEROI		$45.72	$139.97	$197.46	$419.24	$701.57	$655.64	$2,195.95	$2,296.07	$1,722.50	$2,243.31	$4,667.84
Discount Factor		0.8322	0.6926	0.5763	0.4796	0.3991	0.3322	0.2764	0.2300	0.1914	0.1593	0.1326
Present Value of Perpetuity (t)		$38.05	$96.93	$113.80	$201.08	$280.03	$217.78	$607.02	$528.19	$329.76	$357.39	$618.87
Sum of Present Value		$38.05	$134.98	$248.78	$449.86	$729.89	$947.67	$1,554.69	$2,082.88	$2,412.64	$2,770.03	$3,388.90
Sum of Present Value	$3,388.90											

MEROI	20.16%

Source: Company data, CSFB estimates.

Appendix: Shareholder Value Added

As we have discussed, there are various equivalent ways to calculate shareholder value added (SVA). Exhibit 9 demonstrates that annual SVA equals either:

- the present value of the year's free cash flow plus the change in residual value or
- the present value of capitalized annual changes in NOPAT.[14]

Given that the latter calculation is analytically easier to handle, it is the one we use to calculate MEROI.

Exhibit 9: Demonstration of the Equivalence of Various SVA Calculations

	0	1	2	3	4	5
Sales	100.0	116.0	134.6	156.1	181.1	210.0
Operating Profit	29.0	33.6	39.0	45.3	52.5	60.9
Less: Cash taxes on operating profit	8.3	9.6	11.1	12.9	15.0	17.4
Net operating profit after tax (NOPAT)	20.7	24.1	27.9	32.4	37.5	43.6
Incremental fixed capital investment		4.6	5.4	6.2	7.2	8.4
Working capital investment		3.5	4.1	4.7	5.5	6.4
Total investment		8.2	9.5	11.0	12.7	14.8
Free cash flow		15.9	18.4	21.4	24.8	28.8
Present value of free cash flow		14.4	15.2	16.1	16.9	17.9
Σ present value of free cash flow		14.4	29.7	45.8	62.7	80.6
Present value of residual value	240.5	253.6	267.5	282.1	297.5	313.7
Σ PV of FCF + PV Residual	240.5	268.1	297.2	327.8	360.2	**394.2**
Present value of free cash flow		14.4	15.2	16.1	16.9	17.9
Δ present value of residual value		13.1	13.8	14.6	15.4	16.2
Shareholder value added (SVA)		27.6	29.1	30.7	32.3	34.1
Σ SVA		27.6	56.6	87.3	119.6	153.7
Baseline value		240.5	240.5	240.5	240.5	240.5
Σ SVA + Baseline Value		268.1	297.2	327.8	360.2	**394.2**
Δ NOPAT		3.8	4.5	5.2	6.0	7.0
Capitalized/Discounted NOPAT		35.0	36.9	38.9	41.0	43.3
Incremental investment		8.2	9.5	11.0	12.7	14.8
PV of investment		7.4	7.8	8.2	8.7	9.2
Shareholder value added (SVA)		27.6	29.1	30.7	32.3	34.1
Σ SVA		27.6	56.6	87.3	119.6	153.7
Baseline value		240.5	240.5	240.5	240.5	240.5
Σ SVA + Baseline Value		268.1	297.2	327.8	360.2	**394.2**

Note: Cost of capital = 10%

Source: CSFB.

All prices as of the close, June 8, 2001.

Cisco Systems (CSCO: $20.49)

[1] Net operating profit after tax (NOPAT) also incorporates cash taxes. More formally, NOPAT equals earnings before interest taxes and amortization minus cash taxes.
[2] Alfred Rappaport, *Creating Shareholder Value* (New York: Free Press, 1998), pp. 103-109.
[3] Ibid., pp. 25-28.
[4] Return on equity is most useful for measuring the performance of financial institutions. See Tom Copeland, Tim Koller and Jack Murrin, *Valuation: Measuring and Managing the Value of Companies* 3rd ed. (New York: John Wiley & Sons, 2000), pp. 427-469.
[5] Invested capital equals current assets minus non-interest bearing current liabilities, plus net PP&E and other operating assets. Alternatively, invested capital equals all debt plus equity plus "equity equivalents." See Copeland et al., pp. 159-163.
[6] Merton H. Miller and Franco Modigliani, "Dividend Policy, Growth and the Valuation of Shares", *The Journal of Business* of the University of Chicago, 34 (October 1961) pp. 411-33.
[7] The text that accompanies Miller and Modigliani's famous equation 22b says it all: "The current value of a firm is given by the value of the earning power of the currently held assets plus the market value of the special earning opportunity multiplied by the numbers of years for which it is expected to last."
[8] Rappaport, pp. 49-51.
[9] We recommend that investors calculate the residual value using either by assuming a perpetuity, or a perpetuity with inflation. The perpetuity assumption capitalizes the final year's net operating profit after tax (NOPAT) by the cost of capital.
[10] This spreadsheet is available upon request. [MEROI-report.xls].
[11] There are analytical techniques to mitigate this shortcoming, including using various techniques for estimating "baseline value."
[12] Alfred Rappaport and Michael J. Mauboussin, *Expectations Investing* (Boston: Harvard Business School Press, 2001).
[13] Alfred Rappaport, "How to Link Executive Pay with Performance", *Harvard Business Review* (March-April 1999), p. 94.
[14] Rappaport, p. 50.

AMSTERDAM 31 20 5754 890	KUALA LUMPUR.........603 2143 0366	SAN FRANCISCO.......1 415 836 7600
ATLANTA.................. 1 404 656 9500	LONDON..................44 20 7888 8888	SÃO PAULO 55 11 3841 6000
AUCKLAND 64 9 302 5500	MADRID 34 91 423 16 00	SEOUL 82 2 3707 3700
BALTIMORE 1 410 223 3000	MELBOURNE 61 3 9280 1888	SHANGHAI 86 21 6881 8418
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BUDAPEST 36 1 202 2188	MUMBAI......................91 22 230 6333	TOKYO.......................81 3 5404 9000
BUENOS AIRES 54 11 4394 3100	NEW YORK.................1 212 325 2000	TORONTO..................1 416 352 4500
CHICAGO.................. 1 312 750 3000	PALO ALTO...............1 650 614 5000	WARSAW...................48 22 695 0050
FRANKFURT................ 49 69 75 38 0	PARIS........................33 1 53 75 85 00	WASHINGTON...........1 202 354 2600
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