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M&M on Valuation

For the great enemy of truth is very often not the lie—deliberate, contrived and dishonest—but the myth—persistent, persuasive, and unrealistic. Too often we hold fast to the clichés of our forebears. We subject all facts to a prefabricated set of interpretations. We enjoy the comfort of opinion without the discomfort of thought.

John F. Kennedy
*Yale Commencement Address, 1962*¹

		CASH FLOW RETURN ON INVESTMENT			
		LOWEST	—————→		HIGHEST
EXPECTED EARNINGS GROWTH	LOWEST	56.9X	22.3X	18.7X	18.6X
		35.1	20.0	19.0	20.0
		26.1	19.0	19.4	22.4
	HIGHEST	23.5	19.4	20.3	22.3

Source: CSFB HOLT, LMCM analysis.

- **Price-earnings (P/E) multiples are by far the most popular valuation metric on Wall Street. Yet most investors don't clearly understand what a price-earnings multiple implies about a company's future financial performance, or how a company's price-earnings multiple will likely change over time.**
- **We offer an analytical bridge between valuation multiples and sound economic reasoning.**
- **The role of growth in valuation is completely contingent on a firm's return on capital.**
- **The key for an investor is to anticipate expectation revisions.**

Introduction

Price-earnings (P/E) multiples are by far the most popular valuation metric on Wall Street. A recent academic study found that 99.1 percent of analyst reports mention some sort of earnings multiple, and less than 13 percent provide any variation of a discounted cash flow model.² Still, most investors don't have a clear sense of what a price-earnings multiple implies about a company's future financial performance, or how a company's price-earnings multiple will likely change over time.

The widespread use of relative multiples often compounds the problem. Investors frequently justify their valuation conclusions with apples-to-oranges comparisons of businesses with very different economics. Multiples are ubiquitous but remain, on balance, poorly understood.

In this short piece, we offer an analytical bridge between earnings multiples (and multiples of any kind) and sound economic reasoning. We then discuss the role of relative multiples and finish with a brief discussion of the importance of price-implied expectations in valuation.

One of the investment industry's all-time great thinkers, Marty Leibowitz, covered many of these topics in a series of papers and monographs over the past 20 years (much of this work was in collaboration with Stanley Kogelman). These articles have been compiled for Leibowitz's new book, *Franchise Value: A Modern Approach to Security Analysis* (New York: John Wiley & Sons, 2004), which we recommend highly for readers who want to delve into this valuation topic in more detail.

M&M: Melt it into Your Head

One sound and intuitive place to start to understand price-earnings multiples is Merton H. Miller and Franco Modigliani's seminal 1961 paper, "Dividend Policy, Growth, and the Valuation of Shares". In the section that demonstrates the theoretical equivalence of various valuation approaches, they show that an investor can express the value of a company in two parts:³

Value = steady state value + future value creation

We can further define each of the terms in the right-hand side of the equation:

Steady state value = $\frac{\text{Net operating profit after tax (normalized)} + \text{cash and non operating assets}}{\text{Cost of capital}}$

And:

*Future value = $\frac{\text{Investment} * (\text{Return on capital} - \text{cost of capital}) * \text{Competitive advantage period}}{\text{Cost of capital} * (1 + \text{cost of capital})}$*

According to Miller and Modigliani (M&M), this formula "has a number of revealing features and deserves to be more widely used in discussions of valuation." What are these features, and how can they inform our valuation discussion? Here are some of the applications:

- The formula allows you to disaggregate a price-earnings multiple into a commodity component and a franchise component.
- Return on invested capital's central significance in valuation becomes immediately clear.
- The formula reveals the magnifying impact of growth—for better or worse.
- The equation illustrates the proper precautions in using relative valuation metrics.
- The formula offers a very handy guide for assessing the expectations in a stock.

Let's take a look at these features in some more detail.

Disrobing the Price-earnings Multiple Part I: The Steady State Value

The steady state value equals a business’s worth if it doesn’t create additional value and maintains its normalized earnings.⁴ Note that the steady state says nothing about corporate growth, it only assumes the incremental investments will earn the cost of capital. Companies can and do grow earnings per share without creating shareholder value. This term allows us to calculate a steady-state price-earnings multiple:⁵

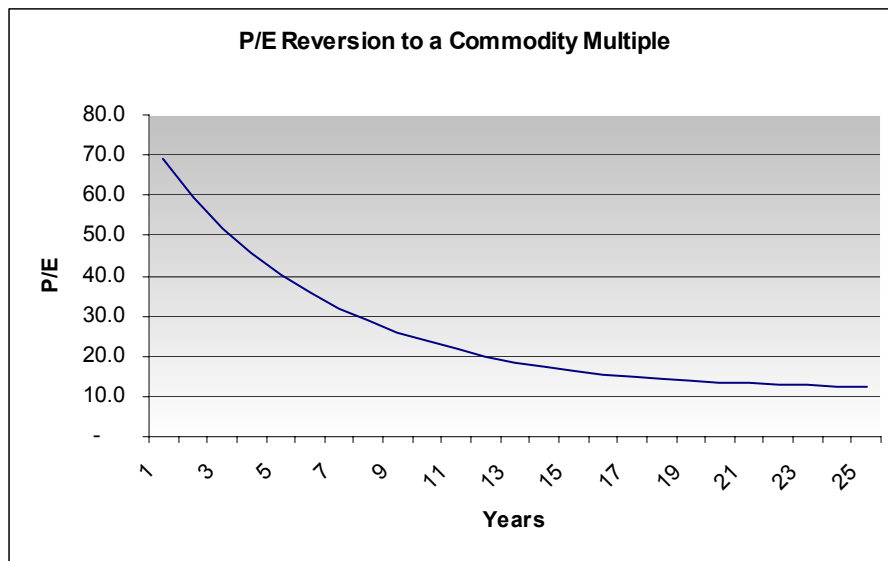
$$\text{Steady state price-earnings multiple} = \frac{1}{\text{Cost of capital}}$$

If we assume an 8 percent cost of capital—a 4 percent risk-free rate plus a 4 percent equity risk premium—the steady state price-earnings multiple is 12.5 times. The market expects any company with a P/E multiple above 12.5 to create future value. If a company has a P/E multiple at or below 12.5, the market either assumes no value creation or anticipates that future value creation will not offset a decline in the current base business.

We can also think of the steady state P/E as a commodity multiple, the level all companies reach at the end of their life cycle. Life cycle theory suggests that companies earning a return above the cost of capital will attract competition, eventually driving industry returns to the cost of capital. Over time, economic forces push multiples down to a commodity, or steady state, level.⁶

Exhibit 1 shows how the warranted P/E for a company changes over time. In this theoretical example, the company’s year 1 return on invested capital is 56% and the earnings growth rate is 25%. We then fade both the returns (from 56% to an 8% assumed cost of capital) and growth (from 25% to 5%) over 25 years. Note the warranted P/E is close to 70 for high growth, high return businesses.

Exhibit 1: Multiple Reversion to the Mean



Source: LMCM.

Of course, we can't assume all businesses will maintain their normalized earnings. For instance, we know fewer people in the U.S. are smoking and consumers will continue to migrate from traditional to digital photography. We can adjust the steady-state model for a declining business using a variation of the Gordon growth model. A negative growth rate lowers the value of the numerator and increases the rate at which we capitalize the cash flow:⁷

$$\text{Modified steady state value} = \frac{\text{Net operating profit after tax} (1 + \text{growth})}{\text{Cost of capital} - \text{growth}}$$

The last, obvious point here is that companies trading near a commodity multiple with a stable base business and reasonable prospects for future value creation are good candidates for purchase.

Disrobing the Price-earnings Multiple Part II: Value Growth Opportunities

At the time of this writing, the S&P 500's P/E is about 17.0 based on consensus 2005 estimates. If the formula applies, 25 percent or more of the market's value comes from future value creation. What are the key issues in thinking about future value creation?

An examination of the equation's second term, which Leibowitz calls the "franchise value", reveals three key drivers:

- The spread between the return on capital and the cost of capital
- The magnitude of investment
- How long a company can deploy capital at positive spreads

When investors and corporate managers think about valuation, they often start with growth. But the first of these drivers shows why this emphasis is totally misplaced. If a company earns exactly the cost of capital on incremental investment, the second term of the equation collapses to zero and the appropriate valuation is the commodity P/E. If a company earns excess returns, the second term is positive and the company will create shareholder value. Finally, if a company earns below the cost of capital, the second term *detracts* from value, and the company will trade below the commodity P/E.

The role of growth in valuation completely depends on a firm's economic returns. Importantly, companies can grow earnings per share without generating returns in excess of the cost of capital.⁸ Proper valuation considers the return spread first, and the magnitude of the investment, or growth, second. (See Appendix B for a discussion of current trends.)

Miller and Modigliani make this point clearly in their paper:

The essence of "growth," in short, is not expansion, but the existence of opportunities to invest significant quantities of funds at higher than "normal" rates of return.

Exhibit 2 illustrates this point. The columns of the table are different return on invested capital levels, and the rows are varying growth rates. The body of the table contains the P/E's that fall out of the return and growth relationships.

The table shows three fundamental principles. First, a company earning its cost of capital will trade at a commodity P/E multiple, irrespective of its growth. Second, companies earning excess returns trade at premium P/Es, and growth strongly amplifies the benefits of high returns. Finally, companies earning below the cost of capital trade at low multiples.

Exhibit 2: Return on Invested Capital

		RETURN ON INVESTED CAPITAL			
		4%	8%	16%	24%
EARNINGS GROWTH	4%	6.1x	12.5x	15.7x	16.7x
	6%	1.3	12.5	18.1	20.0
	8%	NM	12.5	21.3	24.2
	10%	NM	12.5	25.5	29.9

ASSUME ALL EQUITY FINANCED; 8% COST OF CAPITAL; 20-YEAR FORECAST PERIOD

Source: LMCM.

Return on invested capital (as we define it here) also represents the maximum sustainable growth rate for a business excluding external financing.⁹ Typically, high-return investment opportunities are scarce, not capital. The idea of sustainable growth shows why a capital-efficient business deserves a higher valuation multiple than a lower-capital efficiency business at a given growth rate.

While clearly sound in theory, Exhibit 2 also applies in reality. In Exhibit 3, we took over 2,600 U.S. companies and ranked them on CFROI[®] by quartile (columns). We then cross-ranked the CFROI quartiles by expected earnings growth rates (rows). Each resulting multiple is the median P/E of the companies that fall into that cell. For example, the companies in the highest CFROI quartile but lowest EPS growth quartile (upper right hand corner) have a median P/E of 18.6, while the highest growth companies in the same CFROI quartile (bottom right hand corner) have a P/E of 22.3. As theory suggests, higher growth adds value for high return businesses and detracts value for low return businesses. Further, multiples rise for a given growth rate as returns rise: the three columns on the right represent businesses earnings above the cost of capital.¹⁰

Exhibit 3: Returns, Growth, and P/E Multiples: Empirical Results

		CASH FLOW RETURN ON INVESTMENT			
		LOWEST	→		HIGHEST
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Source: CSFB HOLT, LMCM. CFROI[®] is a registered trademark in the United States of Credit Suisse First Boston or its subsidiaries or affiliates.

The textbook definition of return on invested capital divides an income-statement-derived earnings numerator (typically net operating profit after tax) by a balance-sheet-based denominator. An investment is a current outlay today with the expectation of a future financial return. Historically, most of the investments companies made, like capital equipment and inventory, went on the balance sheet. However, as we shift more towards a service and knowledge economy, many of the investments companies make, like R&D or training, show up on the income statement. To assess future returns accurately, investors must consider all investments, irrespective of where they show up in the financial statements.

The final driver of franchise value is the sustainability of excess-return investment opportunities. As we noted earlier, economic forces drive the return on invested capital down to the cost of capital over time. This return reversion is well documented empirically.¹¹

A central task for an investor is to assess how long a company earning above its cost of capital can continue to find productive investment opportunities. Stock prices often reflect ten to twenty years of value-creating cash flows. Competitive strategy analysis is particularly useful in this effort.

Relative and Comparable Multiple Valuation

A Barron's columnist recently suggested that a Wall Street analyst had won his "devoted admiration" with the simple proclamation, "We think Amazon.com is a retailer." Why was this seemingly innocuous statement so pleasing? Because, "I have been patiently waiting for the day when Wall Street ends this nonsense of giving blue-sky premiums and special treatment to Internet-era darlings, including, but not limited to, Amazon."¹²

The implication of this thinking is that since Amazon sells stuff, investors should value it like other companies that sell stuff. This simplistic thinking, while pervasive, is flat wrong.

As Exhibit 2 demonstrates, company valuation should not be based on what the company does, but rather what its economics look like. With rare exception, valuation disparities between companies within the same industry reflect legitimate differences in expected return on invested capital and growth. Cheap companies within an industry peer group often deserve to be cheap.

When considering comparable-multiple valuation, investors must look beyond the business attributes (they sell stuff) and focus on the business circumstances (what returns they earn and growth they promise). Investors must carefully describe the economic profile of a company before they can intelligently start the valuation process.

The same thinking applies to considering where stocks trade relative to their historical multiples. Life cycle theory tells us that the economic grim reaper—the commodity P/E—will eventually greet all companies. Reversion to the mean implies that the commodity P/E exerts a gravitational pull on companies. That said, some companies figure out ways to structurally improve their returns on capital—often through better balance sheet management.¹³ Historical P/Es do not help investors when a company's underlying economics change.

Pundits often compare today's market P/E to past P/Es to divine whether or not the market is attractive. But for market averages to be comparable over time, the statistical properties of the population must be the same, or stationary. If the population's properties change over time, the data are nonstationary and all bets based on comparisons are off (or should be).

Theoretical and empirical analysis of P/E ratios for the market suggests nonstationarity. Research of the past 125 years shows no statistically significant relationship between a P/E ratio at the beginning of the year and the subsequent 12- and 24-month returns.¹⁴ The three main drivers of P/E nonstationarity for the market are the role of taxes and inflation; changes in the composition of the market; and shifts in the equity risk premium.¹⁵

The Expectations Approach

One important point about this discussion: a company's stock price reflects a set of expectations about future financial performance. Low multiples generally reflect low (and justified) expectations and high multiples often indicate lofty expectations. An investor must anticipate expectation revisions.

There are three steps to an expectations process. The first is to understand where expectations are today. Using a metaphor of a high jumper's likely success, this step determines the bar's current height.

If a company trades at a P/E above the commodity level, this assessment requires understanding the market's expectations for future return on invested capital, growth, and sustainability. Reverse engineering the stock price using a discounted cash flow model and consensus estimates is a good start.

The second step is to determine "how high" the company can jump, or whether or not it is likely to exceed embedded expectations. This requires financial and strategic analysis.

The final step is to make a buy, sell, or hold decision. Using a range of possible value outcomes and probabilities, an investor can calculate an expected value. Stocks trading at a discount to expected value are attractive, but the *amount* of the price discount to expected value and *how long* it takes for the value-to-price disparity to close ultimately determine excess returns.

Value Investing and Value Creation

When taken together, the value equation and the expectations approach make it clear why distinctions between value and growth investing are vacuous. Growth considered in isolation is indeterminate; an investor needs first to understand returns on invested capital. Expectations investing shows that what matters is not the absolute level of today's implied performance but rather where expectations will move.

Classic value investors seek to arbitrage the difference between price and value. Often, they find their portfolios filled with justifiably cheap business that earn returns on capital near or below the cost of capital. We call these investors value traders.

Ideally, value investors can find businesses with prices below value where the value will increase over time. This value increase comes as management successfully deploys capital at attractive returns and fends off the migration to the commodity P/E multiple. In this case, value creation for the investor compounds in two ways—as the price to value gap narrows and as value grows.

Summary

Often what passes as valuation is the simple application of historical or relative multiples without full consideration of what a multiple means. Breaking down a valuation, as Miller and Modigliani did over 40 years ago, provides critical insights into what drives corporate value and hence valuations.

Here are three of the errors we see most often:

- *Focus on growth instead of returns.* Both companies and investors generally consider growth an absolute good. Indeed, a substantial part of corporate executive compensation still hinges on earnings growth. The value equation shows clearly that growth is only an amplifier—and can work for you or against you.
- *Comparisons of companies based on their attributes (industry) instead of their circumstances (economic model).* History is filled with companies that lost out to disruptive technologies. In many of those cases, the disruptive business learned to make money at a lower price point—often as the result of more efficient balance sheet utilization. Comparing companies to industry peers frequently doesn't properly take into consideration returns and growth.
- *Use of historical multiples.* Historical multiples only apply when the economic circumstances (both macro and micro) are unchanged. As a company loses its economic franchise, its multiple will drift to the commodity level. In some instances, companies do figure out ways to improve returns or extend their period of excess returns, both leading to higher multiples than history would indicate.

Appendix A

This short appendix makes two main points. First, valuation does not change in the face of rising rates *unless* the real (inflation-adjusted) discount rate and/or the real growth rate change. Substantial evidence suggests that these rates are very sticky over time in the aggregate. But investors must exercise judgment for an individual company.

Second, investors tend to be very poor at adjusting their earnings growth rates to reflect inflation. Generally, investors take recent inflation rates and extrapolate them. Modigliani and Cohn forcefully argued this point 25 years ago, and Campbell and Vuolteenaho reiterate the point in a current paper.¹⁶

Valuation and rate changes

A logical starting point is to show that you get the same value if you model a financial asset on a real or nominal basis.

Assume a firm and the following conditions:¹⁷

Distributable earnings =	\$100
Growth next 3 years (real) =	5%
Growth beyond 3 years (real) =	3%
Ten-year note =	4.75%
Equity risk premium =	4%
Beta =	1.0
Expected inflation =	3%

What are the growth rates?

	<u>Real</u>	<u>Nominal</u>
First 3 years	5%	$(1.05)*(1.03) - 1 = 8.2\%$
3 years +	3%	$(1.03)*(1.03) - 1 = 6.1\%$

What are the discount rates?

	<u>Real</u>	<u>Nominal</u>
	$(1.0875/1.03) - 1 = 5.58\%$	$4.75\% + 1*(4.0\%) = 8.75\%$

What are the cash flows?

<u>Year</u>	<u>Real Cash flow</u>	<u>Nominal Cash flow</u>
1	105.0	108.2
2	110.3	117.0
3	115.8	126.5

What are the terminal values?

	<u>Real</u>	<u>Nominal</u>
	$115.8*(1.03)/(0.558 - 0.03) = \$4,617$	$126.5*(1.061)/(0.0875 - 0.0601) = \$5,045$

What are the present values?

<u>Real</u>	<u>Nominal</u>
$105/1.0558 +$	$108.2/1.0875 +$
$110.3/(1.0558)^2 +$	$117.0/(1+1.0875)^2 +$
$(115.8 + 4,617)/(1.0558)^3$	$(126.5 + 5,045)/(1+1.0875)^3$
= \$4,219	= \$4,219

The main message is the importance of consistency in matching cash flows with discount rates when you model. Provided you feel real growth rates haven't changed (i.e., the company can price its goods or services at the rate of inflation) a change in nominal discount rates due to inflation will not change value.

Broadly speaking, rising rates are consistent with rising earnings growth rates.

The Inflation Illusion

In 1979, Modigliani and Cohn claimed stock market investors are subject to "inflation illusion." Specifically, they argued stock market investors fail to understand the effect of inflation on nominal growth rates. Rather, they extrapolate historical nominal growth rates even in times of changing inflation.

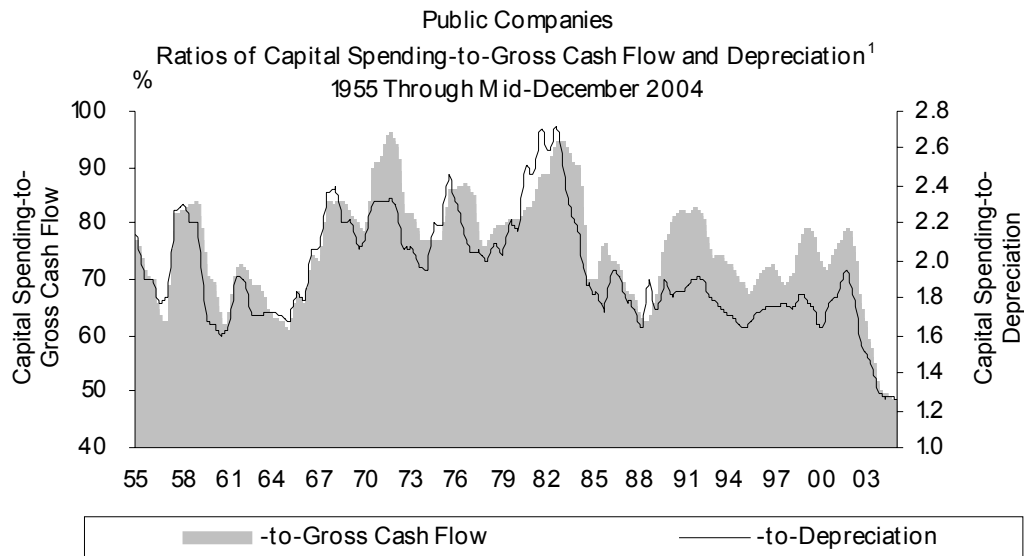
Recognizing this tendency, investors must remain very careful to make sure cash flows and discount rates are consistent.

Appendix B

Level of investment and return on invested capital form two of the three drivers of future value. What's going on today is interesting on both counts.

First, let's look at the investment side. Corporate investment spending today is well below historical levels as a percentage of cash flow and depreciation. (See Exhibit 4.) Three factors help explain why corporate chieftains currently have tight purse strings.

Exhibit 4: Purse Strings Remain Tight



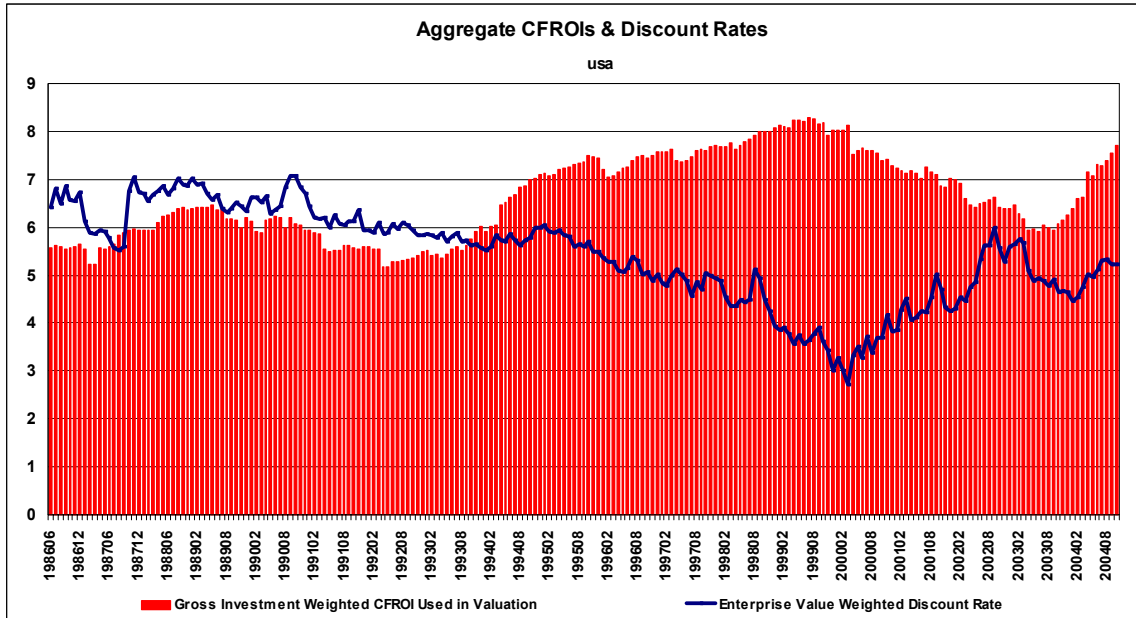
Source: Corporate Reports, Empirical Research Partners Analysis. 1 Largest 1,500 stocks, data smoothed on a trailing six-month basis. Copyrighted material, used by permission.

First, there was a period of overinvestment in the late 1990s. Second, the government has placed regulatory burden on companies, prompting companies to turn inward. Finally, there has been a lack of confidence due to economic, regulatory, and political uncertainty.

As a result, corporate balance sheets are the strongest they have ever been. There is evidence, though, that executives are more actively deploying capital, including an uptick in M&A activity.

Next, consider the return side. Following a return boom in the late 1990s and a bust in the early 2000s, corporate returns are now approaching all-time highs again. (See Exhibit 5.) These high returns likely reflect the judicious—or perhaps timid—capital deployment in recent years. Corporate America is earning well above its cost of capital.

Exhibit 5: Aggregate CFROIs and Discount Rates (1986-2004)



Source: CSFB HOLT. Copyrighted material, used by permission.

What's next? Companies are now turning their attention to capital deployment. Possible outcomes include a boost in M&A activity, a further recovery in investment spending, and a more concerted effort to return cash to shareholders via dividends and share repurchases.

Endnotes

¹ <http://www.jfklibrary.org/j061162.htm>.

² Paul Asquith, Michael B. Mikhail, and Andrea S. Au, "Information Content of Equity Analyst Reports," *National Bureau of Economic Research Working Paper 9246*, October 2002.

³ Merton H. Miller and Franco Modigliani, "Dividend Policy, Growth, and the Valuation of Shares," *The Journal of Business*, 34, October 1961. The authors first express this concept in equation 12. Equation 22b in footnote 15 provides the simplest version of this equation.

⁴ This version of the steady state assumes that future cash flows are constant in nominal terms but decrease in real terms. For a full discussion of the difference between the perpetuity and perpetuity-with-inflation methods, see Alfred Rappaport and Michael J. Mauboussin, *Expectations Investing* (Boston, MA: Harvard Business School Press, 2001), 36-38. Please see the appendix for a brief discussion of how rising rates affect valuation.

⁵ See Bruce C. N. Greenwald et al., *Value Investing* (New York: John Wiley & Sons, 2001), 71-87.

⁶ G. Bennett Stewart, *The Quest for Value* (New York: HarperBusiness, 1991), 294-297. Also, see Dennis C. Mueller, *Profits in the Long Run* (Cambridge, UK: Cambridge University Press, 1986), 17-27.

⁷ Myron J. Gordon, *The Investment, Financing, and Valuation of the Corporation* (Homewood, IL: Irwin, 1962).

⁸ Rappaport and Mauboussin, 15-16.

⁹ Return on invested capital here = $\Delta \text{NOPAT}_{T2-T1} / \Delta \text{Invested Capital}_{T1-T0}$.

¹⁰ For this exhibit, we screened for earnings growth from fiscal year 1 to fiscal year 2 and CFROI for fiscal year 1. We sorted the sample by CFROI quartiles, and then sorted by EPS growth. The P/E's in the table are the median for sample of companies that fall into each cell.

¹¹ See Palepu, Healy and Bernard, *Business Analysis and Valuation* (Cincinnati, OH: Southwestern College Publishing, 2000), 10-6; Pankaj Ghemawat, *Commitment: The Dynamic of Strategy* (New York: The Free Press, 1991), 82; Bartley J. Madden, *CFROI Valuation* (Oxford, UK: Butterworth-Heinemann, 1999); and Mauboussin, Schay, and McCarthy, "Competitive Advantage Period: At the Intersection of Finance and Competitive Strategy", *Frontiers of Finance, Credit Suisse First Boston Equity Research*, October 4, 2001.

¹² Mark Veverka, "Super-Seller Amazon Rates a Sell," *Barron's Online*, November 29, 2004.

¹³ For an example of improved balance sheet efficiency, see the McDonald's example in Rappaport and Mauboussin, 148-149. For a fuller discussion of increasing returns, see Michael J. Mauboussin, "Exploring Network Economics," *Mauboussin on Strategy*, October 11, 2004.

¹⁴ Kenneth L. Fisher and Meir Statman, "Cognitive Biases in Market Forecasts: The Frailty of Forecasting," *Journal of Portfolio Management*, Fall 2000, 72-81.

¹⁵ Michael J. Mauboussin and Kristen Bartholdson, "Leaving the (non)Station(arity)," *The Consilient Observer*, May 6, 2003.

¹⁶ Franco Modigliani and Richard Cohn, "Inflation, rational valuation, and the market," *Financial Analysts Journal*, 1979; John Y. Campbell and Tuomo Vuolteenaho, "Inflation and Illusion and Stock Prices," *NBER Working Paper*, December 15, 2003. See <http://kuznets.fas.harvard.edu/~campbell/papers/inflation20031215b.pdf>.

¹⁷ We adapted this from Aswath Damodaran, *Damodaran on Valuation* (New York: John Wiley & Sons, 1994), 56-58.

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