

Economic Returns, Reversion to the Mean, and Total Shareholder Returns

Anticipating Change Is Hard but Profitable

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“. . . we draw two morals for our readers:

1. Obvious prospects for physical growth in a business do not translate into obvious profits for investors.
2. The experts do not have dependable ways of selecting and concentrating on the most promising companies in the most promising industries."

Benjamin Graham
*The Intelligent Investor, 4th Edition*¹

- Simply buying the best or worst businesses does not guarantee excess shareholder returns.
- The market rewards improvement and punishes decline in economic returns.
- There's no systematic way to correctly anticipate that a company will do better or worse than that implied by the price, but competitive strategy analysis is a good place to start when trying to anticipate revisions.
- Corporations and investors should focus on returns on capital first and growth second. Earnings growth by itself tells us little about value creation.

What Reversion Means for Stocks

Our recent report, “How to Model Reversion to the Mean: Determining How Fast, and to What Mean, Results Revert,”² argued that investors should take reversion to the mean into account when modeling the key drivers of corporate performance. These key drivers include sales growth, operating profit margins, and cash flow return on investment (CFROI^{®*}). However, the report did not consider the implications of the patterns of reversion to the mean for shareholder returns. This report addresses that gap. We look at how changes in CFROI correlate with total shareholder returns (TSR) for more than 1,000 companies. TSR is the annual shareholder gain including share price appreciation and dividends. Our goal is to understand the link between corporate performance and stock price in order to help investors anticipate future sources of excess returns.

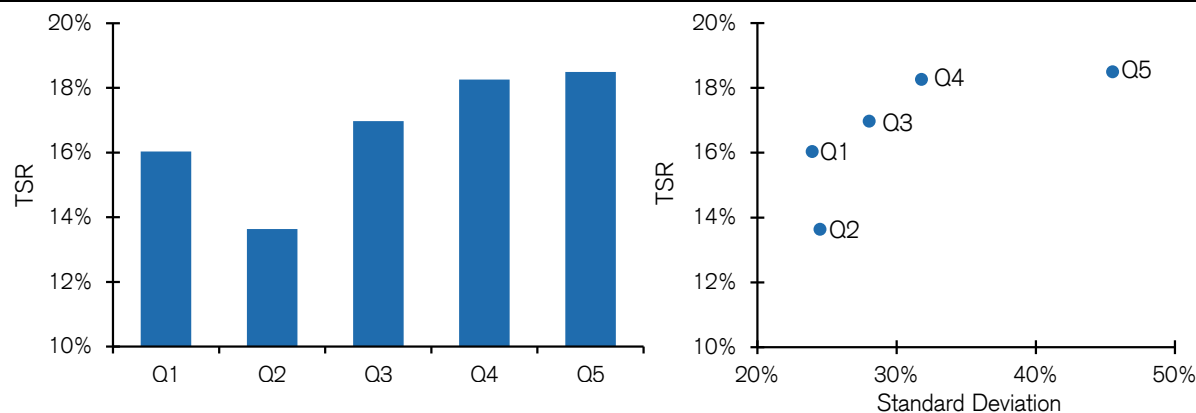
Follow the Leader or the Laggard?

Our analysis is based on a sample of 1,355 U.S. companies from the Credit Suisse HOLT[®] database. The sample excludes financial companies, regulated utilities, and any company that lacked annual CFROI data for each year from 2002 to 2012. We sorted our sample into quintiles based on 2002 fiscal year CFROI, creating five portfolios with each stock receiving an equal weight. The first quintile is the 20 percent of the sample with the highest CFROIs in 2002, and the fifth quintile is the 20 percent with the lowest CFROIs. We held the portfolios constant through 2012 and tracked the TSR for each.

The left panel of Exhibit 1 shows the TSR for each quintile from 2003 through 2012. The right panel shows the standard deviation as well as the TSR for each. The TSR for the entire sample was 16.8 percent with a 30.1 percent annual standard deviation. The TSR for the S&P 500 Index during the same period was 7.1 percent with an 18.3 percent standard deviation, and the TSR for the S&P Composite 1500 Index, which is more similar to our sample, was 7.5 percent with an 18.5 percent standard deviation. Our sample is biased because it excludes financials, failures, and is skewed toward small capitalization stocks. (See Appendix A for more detail.)

At first blush the TSRs on the left suggest that buying low quality companies, as reflected in low CFROIs, is a profitable strategy. But the Sharpe ratio, which measures the ratio of reward to variability such that higher numbers are better than lower numbers, tells a different story.³ Q1 has the highest Sharpe ratio for this period at 0.45, followed by Q3 and Q4 at 0.42 and 0.41, respectively. Q5 actually has the worst Sharpe ratio of any portfolio at 0.29, and Q2 is not far behind at 0.34.

Exhibit 1: Total Shareholder Returns (2003-2012) by Quintile Based on 2002 CFROI Ranking



Source: Credit Suisse HOLT and FactSet.

* CFROI[®] is a registered trademark in the United States and other countries (excluding the United Kingdom) of Credit Suisse Group AG or its affiliates.

That the Sharpe ratios are closely clustered suggests that there is no simple way to generate excess shareholder returns. Indeed, both panels generally support the idea of an efficient market. The left panel suggests that the market placed high valuations on the businesses with high CFROIs and low valuations on the businesses with low CFROIs, leading to a clear, albeit not perfect, relationship between risk and reward.⁴ (For those who want to learn more about these portfolios, Appendix B shows the frequency distributions for the TSRs of the stocks in each portfolio.)

Next, we examined the relationship between TSR and change in CFROI. Exhibit 2 shows the TSR for the 25 portfolios based on the possible combinations of where the companies start (2002 ranking) and where they end (2012 ranking). For example, the Q2-Q4 portfolio, which includes all the companies that began in Q2 and ended in Q4, delivered a TSR of 6.6 percent with an annual standard deviation of 26.0 percent.

Exhibit 2: Total Shareholder Returns (2003-2012) for All 2002 to 2012 Quintile Combinations

		2012 Quintile									
		Q1		Q2		Q3		Q4		Q5	
		TSR	St Dev	TSR	St Dev	TSR	St Dev	TSR	St Dev	TSR	St Dev
2002 Quintile	Q1	19.2%	22.8%	12.9%	27.4%	11.7%	41.8%	7.4%	23.9%	6.3%	27.2%
	Q2	17.9%	29.9%	17.2%	26.9%	11.1%	21.1%	6.6%	26.0%	3.9%	28.1%
	Q3	24.4%	27.7%	15.3%	26.0%	20.4%	31.4%	13.9%	28.3%	9.3%	32.2%
	Q4	29.0%	33.4%	23.0%	34.4%	15.1%	31.6%	18.9%	39.3%	10.9%	27.7%
	Q5	27.2%	54.3%	25.4%	43.7%	20.6%	59.6%	16.7%	38.3%	10.2%	44.5%

Source: Credit Suisse HOLT and FactSet.

The results clearly demonstrate that the market rewards improvement of CFROI and punishes deterioration of CFROI. For example, the portfolios of companies that began in the two lowest quintiles of CFROI (Q4 and Q5) and ended in the two highest quintiles of CFROI (Q1 and Q2) enjoyed an average TSR of 26.2 percent. You can see those results in the bottom left corner of Exhibit 2. In contrast, the portfolios of companies that began in the two highest quintiles and ended in the two lowest quintiles had an average TSR of just 6.1 percent. You can see those results in the top right corner of Exhibit 2.

Since Exhibit 2 is based on starting and ending dates, it fails to reveal the power of persistence. But persistence can be potent. For example, those companies that flouted reversion to the mean by remaining in Q1 for each year of the decade delivered a TSR of 20.6 percent with a standard deviation of 21.8 percent. The TSR for this group, representing just over six percent of the total population, was nearly four percentage points higher than that of the full sample with a standard deviation that was about eight percentage points lower. A Sharpe ratio of 0.70 shows the relationship between reward and variability was very favorable.

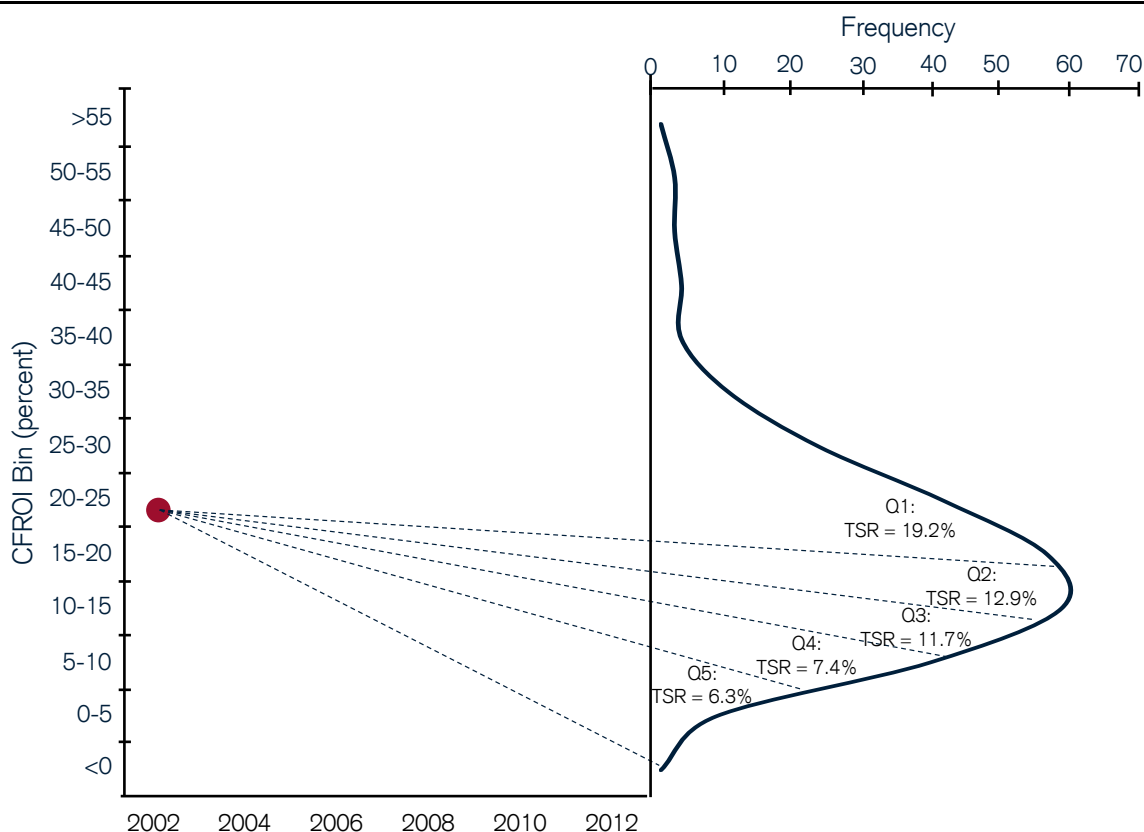
In contrast, the two percent of the universe that remained mired in Q5 in each year delivered a puny TSR of 5.5 percent with a standard deviation of 55.3 percent. This TSR was more than 11 percentage points lower than that of the full sample while the standard deviation was more than 25 percentage points higher. The Sharpe ratio for this portfolio was essentially zero. The stocks delivered low returns with a great deal of variability.

Companies that migrate a great distance from their initial CFROI, or companies that remain persistently good or bad, tend to produce substantial revisions in expectations. Those revisions, either positive or negative, are the source of TSRs that are well above or below average. If you can anticipate a sharp change in CFROI, you

have a chance of realizing an unusually high or low TSR. This is easier said than done, but a rigorous competitive strategy analysis is a good place to start when trying to anticipate revisions in expectations for financial performance.⁵

Exhibit 3 provides a visual representation of the quintile migration from the prior exhibit. The dot on the left is the average CFROI for the companies in the top quintile in 2002. The distribution on the right is where the CFROIs for those companies end up in 2012. Some companies see substantial improvement in CFROI, others see it plummet, and on average the CFROI is below the level of 2002 just as reversion to the mean predicts.

Exhibit 3: The Plight of Q1 Companies and Their Respective TSRs (2003-2012)



Source: Credit Suisse HOLT and FactSet.

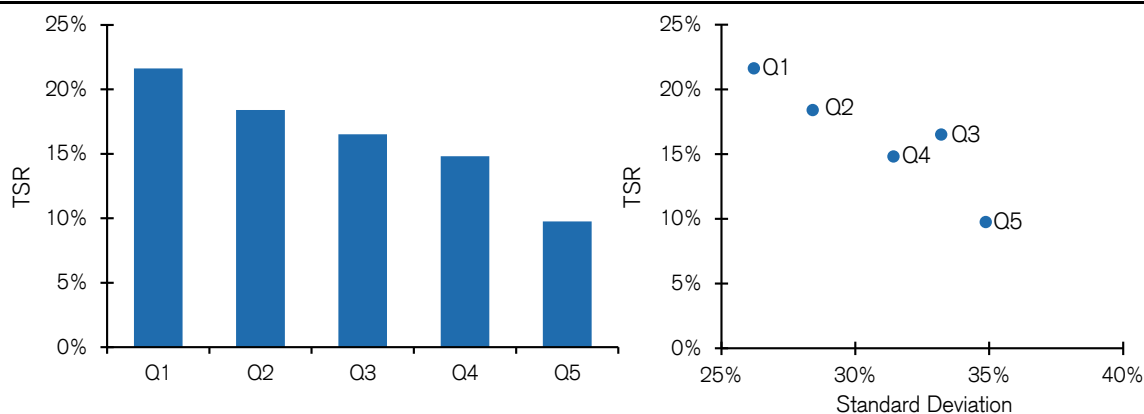
The dashed lines show the demarcation between the quintiles based on 2012 results. Now you can see both the distribution of CFROIs as well as the TSRs associated with the various paths of quintile migration. This exhibit expresses the same information as the top row of results in Exhibit 2, but provides some sense of what the patterns look like.

Investing with a "Crystal Ball" – Nice Work If You Can Get It

We have seen that simply buying the best businesses would have yielded solid, if unremarkable, TSRs. What if you knew, back in 2002, precisely which companies would end up in each quintile in 2012? Such foresight, while totally implausible, would have yielded impressive outcomes.⁶

Exhibit 4 reveals the results from the portfolios built using this foresight. For example, if on January 1, 2003 you had owned a portfolio of all of the companies that were to end up in the first quintile of CFROI in 2012, you would have earned a TSR in excess of 20 percent with a relatively low standard deviation. Further, TSRs decline monotonically from the first to the fifth quintile. (Appendix B shows the frequency distributions for the TSRs of the stocks in each portfolio.) One explanation for this pattern is that the market generally expects that CFROIs will revert to the mean. This means, more technically, that the expected value of each company's CFROI is something close to the mean. So companies that exceed those expectations should see their shares rewarded (Q1) and those that fall short should see their shares punished (Q5).

Exhibit 4: The Shareholder Returns on Foresight Are Great, If Improbable



Source: Credit Suisse HOLT and FactSet.

There is reversion to the mean whenever luck influences results, such as is the case in the performance of a population of companies. Competitive forces also contribute to the reversion process, as companies earning high economic profits attract competition while those earning low economic profits see investment flee. For these reasons, you must account for reversion to the mean when you model corporate performance.

But good analysis is not a blind process. Armed with a proper understanding of the competitive dynamics at work for a particular company, you may expect the results to be better or worse than what a simple model of reversion to the mean suggests. As this analysis demonstrates, the market rewards the ability to foresee which companies will end up in each quintile.

Economic Returns First, Growth Second

Most investors and executives still place substantial emphasis on earnings per share (EPS) and on the growth rate of EPS. In many cases there is an embedded assumption that earnings growth is synonymous with value creation.

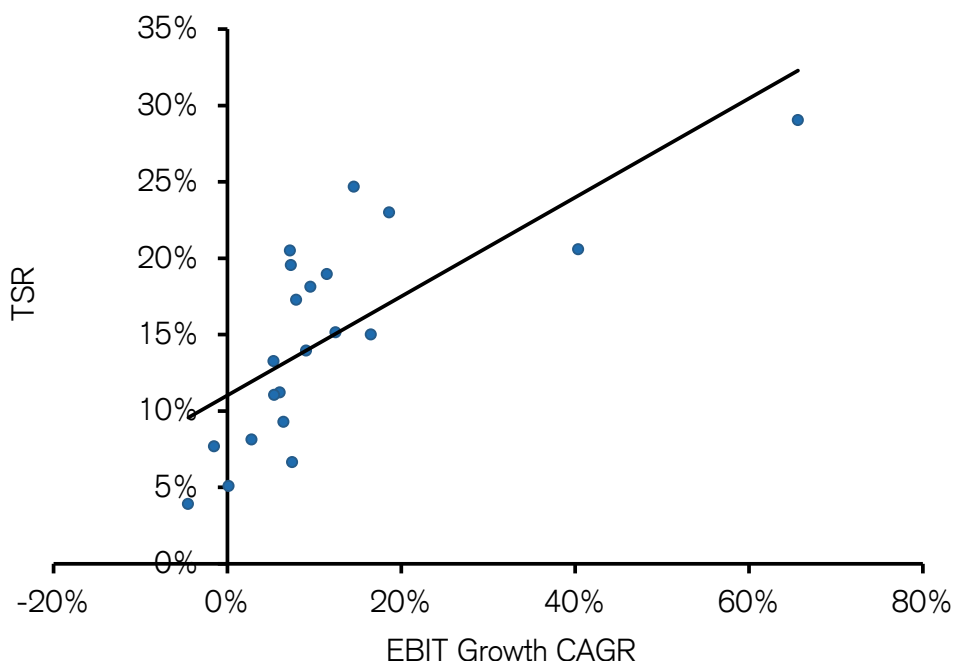
This view persists despite the tenuous link between earnings growth and value creation, as well as a host of surveys suggesting the widespread prevalence of earnings management. Instead of fixating on earnings growth in isolation, corporations and investors should focus on the relationship between earnings growth and returns on capital. EPS by itself reveals very little about the true value a company creates because it does not account for capital intensity or the cost of capital. Investors should consider returns on capital first and earnings growth second because earnings growth can be neutral, good, or bad based on the economic returns.

If a company is earning exactly its cost of capital, earnings growth is value neutral. Outside of that scenario, growth will serve to amplify: higher growth increases the value of companies with a positive spread and decreases the value of companies with a negative spread. On the other hand, for any level of earnings growth, improvements in CFROI always increase value, all else equal.⁷

And there's also the matter of executives managing earnings. One survey of executives revealed that 80 percent of respondents would sacrifice long-term investments, such as research and development and advertising, to meet a quarterly earnings target.⁸ In another survey, CFOs suggest that nearly one-fifth of firms manage their earnings to misrepresent results.⁹

Exhibit 5 shows the TSR and earnings growth for each of the beginning/ending CFROI quintiles.¹⁰ The figure shows a positive correlation over the past decade. This is at odds with past patterns, in which the link between growth and TSR was weak. The most logical explanation for the change is the fact that historically growth was more common and value creation was scarcer, whereas today growth is scarcer and economic spreads are near all-time highs. So, with more companies earning above their cost of capital, growth amplifies value creation and gets priced accordingly by the market.

Exhibit 5: EBIT Growth and TSR, 2003-2012



Source: Credit Suisse HOLT and FactSet.

Despite the positive correlation between earnings growth and TSR in our sample over the past decade, buying the stocks of high-growth companies still does not ensure excess returns. To demonstrate this, we took the constituents of the S&P 500 Index, for each year between 2008 and 2012, and identified the 100 companies with the highest one-year EBIT growth rates and the 100 companies with the highest one-year TSRs. We then compared the two groups to see how many companies fell into both camps in each year. (See Exhibit 6.)

Exhibit 6: Growth and Shareholder Returns Don't Always Go Together



Source: Credit Suisse HOLT and FactSet.

On average, only 28 of the top 100 growers for each year were also in the top 100 for TSR. So, even if you knew in advance which companies were to have the highest growth rate for the coming year and purchased the shares of those companies, it would not ensure superior shareholder returns. Appendix C shows the relationship between earnings growth and TSRs for the S&P 500 from 1989 through 2012.

Academic research casts doubt on the ability to forecast long-term earnings growth and demonstrates that such growth shows no persistence beyond chance.¹¹ With little evidence that investors can systematically anticipate future economic returns, combining growth and economic returns at an attractive price is a tall task.

Summary

“How to Model Reversion to the Mean” addressed common misperceptions about reversion to the mean and offered a general model for thinking about the challenge. The report also provided some practical recommendations for corporate modeling based on substantial empirical data, including techniques for estimating the rate of reversion to the mean and the mean to which the results revert.

This report extends that analysis by examining the link between reversion to the mean in economic profitability and shareholder returns. The two reports highlight how hard it is for companies to maintain superior long-term financial performance as well as how hard it is for investors to benefit from changing patterns in economic returns. Here are some of the main findings from this analysis:

- A simple strategy of buying either the best or worst businesses, as measured by beginning-year CFROI, does not ensure excess shareholder returns. The Sharpe ratios for each quintile clustered around 0.35-0.45 for the ten years ended 2012.

- The market rewards improvement, and punishes decline, in CFROI. At the extremes of corporate performance, persistence historically provides attractive TSRs when CFROIs are good and poor TSRs when returns are bad.
- There's no simple way to correctly anticipate whether a company will do better or worse than what is implied by its stock price. That said, a thorough competitive strategy analysis is a good place to start when trying to anticipate revisions in expectations.
- Corporations and investors should focus on returns on capital first and growth second. Currently, CFROIs are at a very high level so earnings growth has translated into value creation and, ultimately, attractive shareholder returns. But earnings growth by itself tells us little about value creation, and simply buying the stocks of companies with strong earnings growth provides no guarantee of excess shareholder returns.
- The stock market equilibrates shareholder returns by placing higher valuations on high-CFROI, low-risk companies and lower valuations on low-CFROI, high-risk companies. Investors eyeing superior results must properly read market expectations and anticipate revisions.

Appendix A: Explaining the Difference in TSR between Our Sample and the S&P Composite 1500 Index

During our measurement period of 2003-2012, the TSR of 16.8 percent for our sample was a good deal higher than the TSR of 7.5 percent for the S&P Composite 1500 Index, a good proxy for the U.S. stock market. The disparity in returns stems primarily from three factors:

1. Survivorship bias

We limited our sample to companies that existed for the full sample period. As a result, we did not include companies that went bankrupt, were delisted, were acquired, or were spun off. S&P periodically revises the Composite 1500 Index to reflect these corporate events, which explains some of the disparity in returns.¹² For instance, survivorship bias likely biased our returns upward, as our sample excludes failed companies. On the other hand, excluding acquired companies (which usually received a premium) may have created a negative bias.

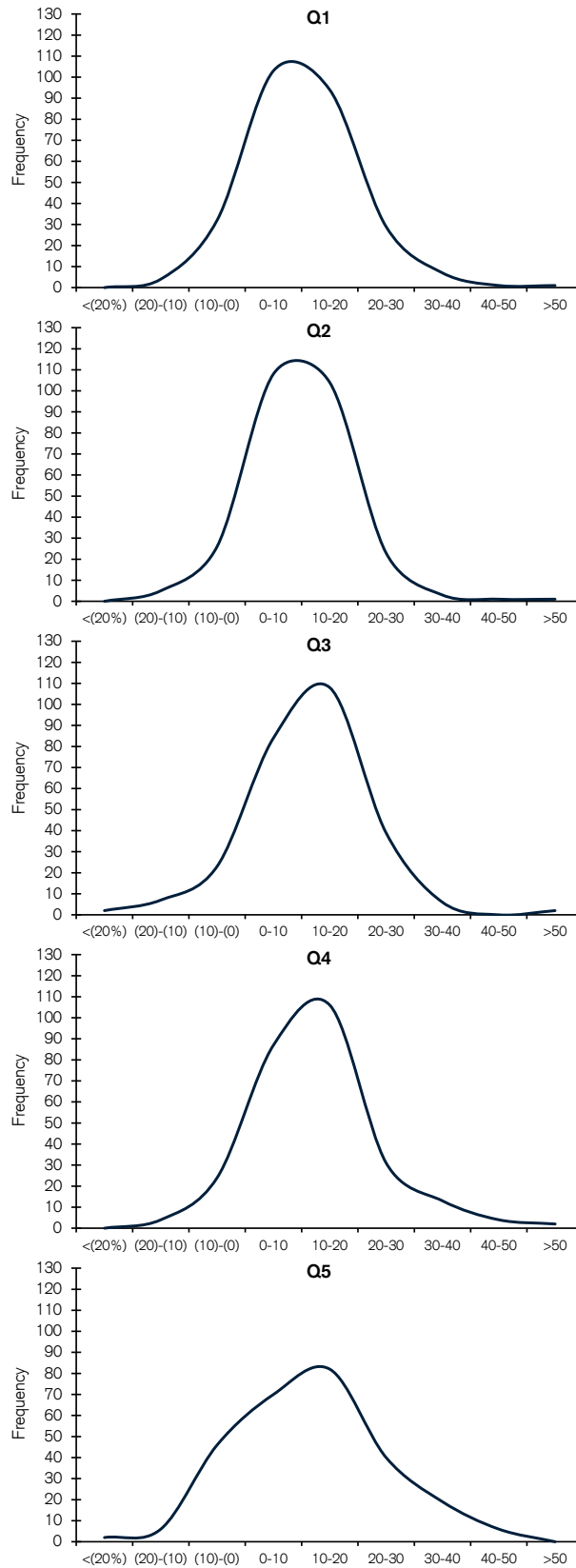
2. Sample members/constituency

The weightings within the S&P Composite 1500 Index are based on market capitalization, while the stocks in our portfolios (the quintiles) are weighted equally. This means that small- and mid-cap stocks have a higher initial weighting in our sample compared to the S&P Composite 1500 Index. This created an upward bias in our results because small- and mid-capitalization stocks outperformed large capitalization stocks during the period we measured. Specifically, the S&P 100 Index (large caps) had a TSR of 6.2 percent from 2003-2012, which compares to the 10.5 percent TSR for both the S&P MidCap 400 Index and the S&P SmallCap 600 Index.

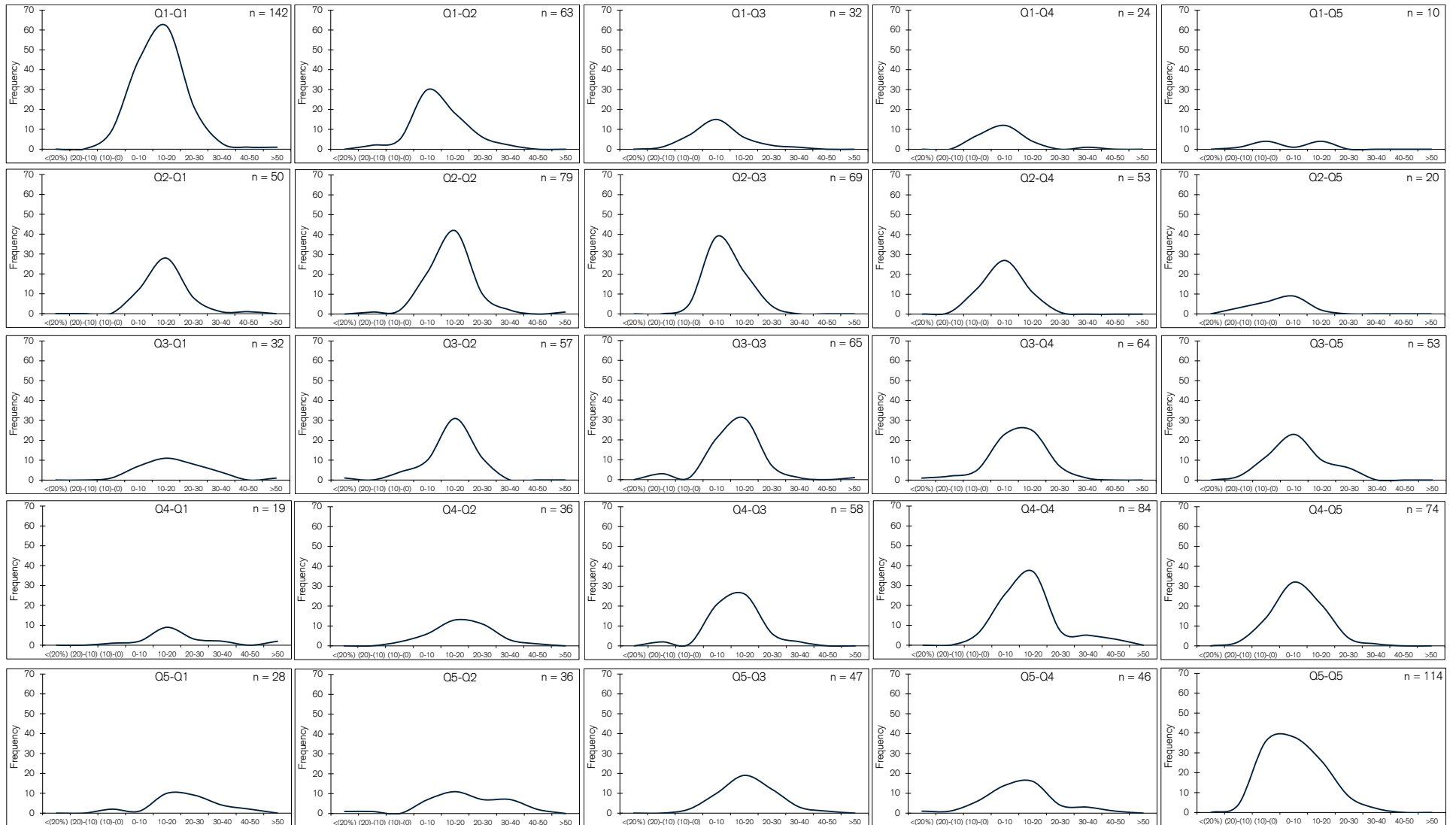
3. Excluded financials

We excluded the financial services sector in our sample. Financials sharply underperformed the overall index from 2003-2012. The S&P Composite 1500 Financials Index had a 0.2 percent TSR from 2003-2012. Moreover, the financial sector typically constitutes a large portion of the index, considered on an equal-weighted, or market-weighted, basis. We also excluded regulated utilities, but that choice did not greatly influence the results. Utilities are a small component of the index and the sector only moderately outperformed during the period, with the S&P Composite 1500 Utilities Index (includes non-regulated utilities) delivering a 10.6 percent TSR.

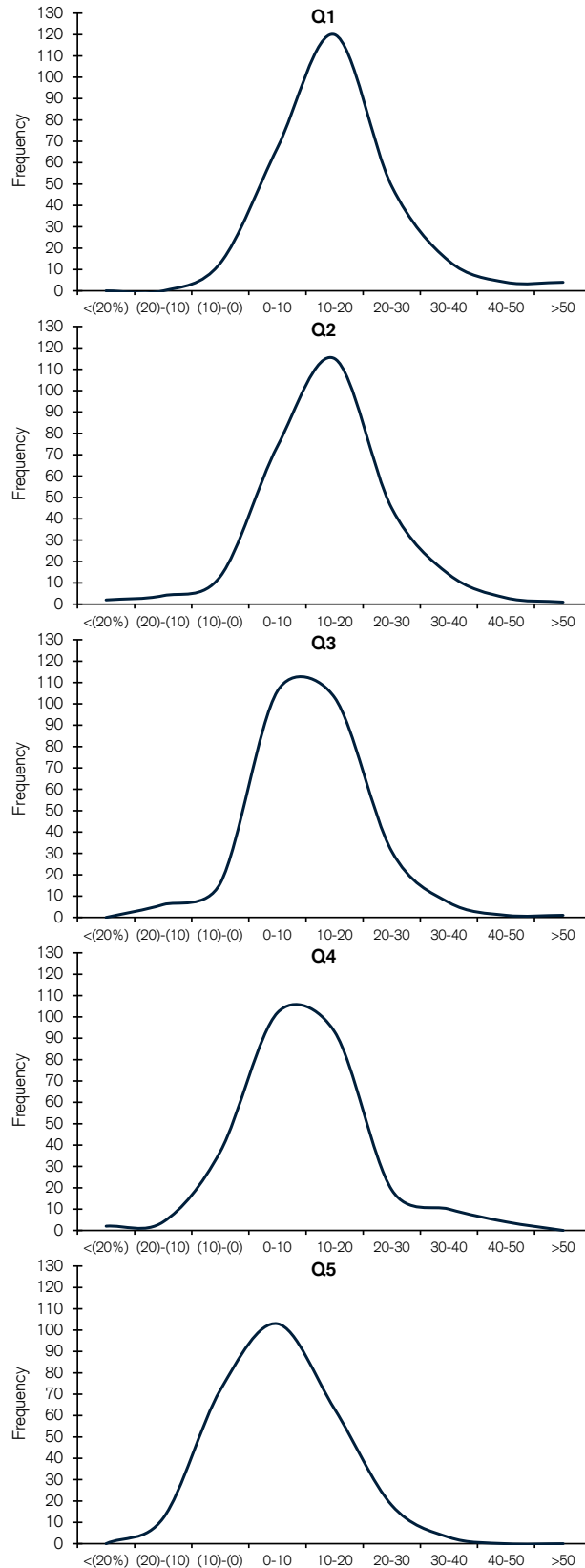
**Appendix B: TSR Distributions
Based on 2002 CFROI Quintile**



For All Quintile-to-Quintile Pairings Based on 2002-to-2012 CFROI Rankings



Based on 2012 CFROI Quintile



Source: Credit Suisse HOLT and FactSet.

Appendix C: Relationship between EPS Growth and TSR for the S&P 500 Index (1989-2012)

	Top-Down Reported EPS	Annual EPS Growth	Total Shareholder Returns
1988	\$23.75		
1989	22.87	3.7%	31.7%
1990	21.34	(6.7)	(3.1)
1991	15.97	(25.2)	30.5
1992	19.09	19.5	7.6
1993	21.89	14.7	10.1
1994	30.60	39.8	1.3
1995	33.96	11.0	37.6
1996	38.73	14.0	23.0
1997	39.72	2.6	33.4
1998	37.71	(5.1)	28.6
1999	48.17	27.7	21.0
2000	50.00	3.8	(9.1)
2001	24.69	(50.6)	(11.9)
2002	27.59	11.7	(22.1)
2003	48.74	76.7	28.7
2004	58.55	20.1	10.9
2005	69.93	19.4	4.9
2006	81.51	16.6	15.8
2007	66.18	(18.8)	5.5
2008	14.88	(77.5)	(37.0)
2009	50.97	242.5	26.5
2010	77.35	51.8	15.1
2011	86.95	12.4	2.1
2012	86.51	(0.5)	16.0

Correlations between EPS growth and TSR:

1989-2012	0.38
1989-2006	0.17
2007-2012	0.74

Endnotes

¹ Benjamin Graham, *The Intelligent Investor, 4th Edition* (New York: Harper & Row, 1973), xiv-xv.

² Michael J. Mauboussin and Dan Callahan, "How to Model Reversion to the Mean: Determining How Fast, and to What Mean, Results Revert," *Credit Suisse Global Financial Strategies*, September 17, 2013.

³ Here's the formula for the Sharpe ratio:

$$S = \frac{E[R - R_b]}{\sqrt{\text{var}[R - R_b]}}$$

Where E is the expected return (used in an ex-ante calculation), R is the TSR of the portfolio, and R_b is the risk-free rate.

⁴ For a similar analysis conducted nearly thirty years ago, see William E. Fruhan, Jr., *Financial Strategy: Studies in the Creation, Transfer, and Destruction of Shareholder Value* (Homewood, IL: Richard D. Irwin, 1979), 52-53.

⁵ Michael J. Mauboussin and Dan Callahan, "Measuring the Moat: Assessing the Magnitude and Sustainability of Value Creation," *Credit Suisse Global Financial Strategies*, July 22, 2013; Alfred Rappaport and Michael J. Mauboussin, *Expectations Investing: Reading Stock Prices for Better Returns* (Boston, MA: Harvard Business School Press, 2001), 51-66.

⁶ Correctly forecasting earnings also yields attractive TSRs. See Robert L. Hagin, *Investment Management: Portfolio Diversification, Risk, and Timing—Fact and Fiction* (New York: John Wiley & Sons, 2004), 75-80.

⁷ Alfred Rappaport and Michael J. Mauboussin, *Expectations Investing: Reading Stock Prices for Better Returns* (Boston, MA: Harvard Business School Press, 2001), 15-16; Tim Koller, Marc Goedhart, David Wessels, *Valuation: Measuring and Managing the Value of Companies*, 5th ed. (Hoboken, NJ: John Wiley & Sons, 2010), 21-24.

⁸ John R. Graham, Campbell R. Harvey, and Shiva Rajgopal, "Value Destruction and Financial Reporting Decisions," *Financial Analysts Journal*, November/December 2006, 27-39.

⁹ Ilija D. Dichev, John R. Graham, Campbell R. Harvey, and Shiva Rajgopal, "Earnings quality: Evidence from the field," *Journal of Accounting and Economics*, Vol. 56, 2-3, December 15, 2013, 1-33.

¹⁰ The exhibit only includes 21 of the 25 quintile-to-quintile pairings because we could not calculate the growth rate for 4 groups that had a negative total EBIT at the beginning of our measuring period.

¹¹ Louis K. C. Chan, Jason Karceski, and Josef Lakonishok, "The Level and Persistence of Growth Rates," *Journal of Finance*, Vol. 58, 2, April 2003, 643-684.

¹² S&P Dow Jones, "S&P U.S. Indices Methodology," September 2013.

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