## What Works On Wall Street - Chapter 20 Case Study: How Well Does Longer Term Relative Strength Work?

The data clearly supports that both positive and negative relative strength persists into the following six-month and one-year returns. But what about longer periods of time? One of the central tendencies of financial data series is reversion to the longer-term mean, when outstanding long-term performance is followed by more modest returns, and poor longer-term results are followed by better than average performance. The longer the time period you consider the more reversion to the mean you see. We do, in fact, begin to see a reversion to the mean after about five years with relative strength. The irony here is that when people are searching for a money manager or mutual fund, one of the most important things they look at is the manager's or fund's five-year track record. The evidence presented here suggests that very strong performance over a five year period is often followed by sub-standard returns. This supports the contrarian practice of buying stocks that have been badly beaten up over the past several years. So, while the performance of stocks with strong shorter-term positive or negative relative strength tend to keep heading in the same direction, the opposite is true when looking at longer, five-year periods. Stocks that have exhibited five years of strong relative strength - either positive or negative-are usually on the brink of a turnaround.

For this case study, I will rank stocks on absolute performance over the past five years, rather than by six- and 12-month price appreciation, Here, stocks with the worst five-year performance snapped back in the next one-year period, whereas those with the best five-year numbers performed much more moderately in the following year. If you had invested $\$ 10,000$ on December $31^{\text {st }}, 1930$ in the decile of stocks with the worst five years of relative strength, it would have grown to $\$ 133,744,327$ at the end of 2009.

TABLE 20.CS1
Summary Return and Risk Results for Annual Data: AS-60-Month Momentum-Decile 10, AS-60-Month Momentum-Decile 1, and All Stocks; January 1, 1931 to December 31, 2009

|  | AS-60-Month <br> Momentum-Decile 10 | AS-60-Month <br> Momentum-Decile 1 | All Stocks |
| :--- | :---: | :---: | :---: |
| Arithmetic Average | $17.27 \%$ | $12.51 \%$ | $13.69 \%$ |
| Geometric Average | $12.78 \%$ | $9.52 \%$ | $11.11 \%$ |
| Median Return | $15.59 \%$ | $17.30 \%$ | $18.80 \%$ |
| Standard Deviation | $28.86 \%$ | $23.12 \%$ | $21.58 \%$ |
| Upside Deviation | $24.05 \%$ | $14.29 \%$ | $14.98 \%$ |
| Downside Deviation | $19.19 \%$ | $17.09 \%$ | $15.74 \%$ |
| Tracking Error | 11.58 | 9.03 | 0.00 |
| Number of Positive Periods | 561 | 564 | 576 |
| Number of Negative Periods | 387 | 384 | 372 |
| Maximum Peak-to-Trough | $-77.66 \%$ | $-64.52 \%$ | $-72.86 \%$ |
| Decline | 1.25 | 0.99 | 1.00 |
| Beta | 4.94 | 4.56 | 5.31 |
| T-Statistic (m=0) | 0.27 | 0.20 | 0.28 |
| Sharpe Ratio (Rf=5\%) | 0.14 | -0.03 | 0.07 |
| Sortino Ratio (MAR=10\%) |  |  |  |


| $\$ 10,000$ becomes | $\$ 133,744,327$ | $\$ 13,143,684$ | $\$ 41,202,116$ |
| :--- | :---: | :---: | :---: |
| Minimum 1 Year Return | $-71.11 \%$ | $-61.56 \%$ | $-66.72 \%$ |
| Maximum 1 Year Return | $335.14 \%$ | $117.49 \%$ | $201.69 \%$ |
| Minimum 3 Year Return | $-29.18 \%$ | $-26.65 \%$ | $-18.68 \%$ |
| Maximum 3 Year Return | $57.74 \%$ | $44.21 \%$ | $51.03 \%$ |
| Minimum 5 Year Return | $-14.41 \%$ | $-14.04 \%$ | $-9.91 \%$ |
| Maximum 5 Year Return | $47.54 \%$ | $32.36 \%$ | $41.17 \%$ |
|  |  |  |  |
| Minimum 7 Year Return | $-3.87 \%$ | $-11.42 \%$ | $-6.32 \%$ |
| Maximum 7 Year Return | $30.64 \%$ | $28.83 \%$ | $23.77 \%$ |
| Minimum 10 Year Return | $-1.46 \%$ |  |  |
| Maximum 10 Year Return | $27.59 \%$ | $-3.00 \%$ | $0.99 \%$ |
|  |  | $25.28 \%$ | $22.05 \%$ |
| Minimum Expected Return* | $-40.46 \%$ | $-33.72 \%$ | $-29.48 \%$ |
| Maximum Expected Return** | $75.00 \%$ | $58.75 \%$ | $56.86 \%$ |

* Minimum Expected Return is Arithmetic Return minus 2 times the standard deviation.
** Maximum Expected Return is Arithmetic Return plus 2 times the standard deviation.
That's an average annual compound return of 12.78 percent, well ahead of All Stocks, where the same $\$ 10,000$ grows to $\$ 41,202,116$, an average annual compound return of 11.11 percent. The standard deviation of return for the stocks with the worst five-year performance was 28.86 percent, versus 21.58 percent for the All Stocks universe, and the group's Sharp ratio of .27 is nearly the same as All Stock's. Table 20.CS1 shows the summary information for investing in the stocks from All Stocks with the best and worst five-year returns. Base rates, featured in Table 20.CS2, were all positive, with the group beating All Stocks in 64 percent of all rolling five-year periods and 66 percent of all rolling ten-year periods.
TABLE 20.CS2
Base Rates for AS-60-Month Momentum-Decile 10 and All Stocks; January 1, 1931 to December 31, 2009

| Item | "AS-60-Month Momentum- <br> Decile 10" Beat "All Stocks" | Percent | Average Annual <br> Excess Return |
| :--- | :---: | :---: | :---: |
| Single-Year Return | 536 out of 937 | $57 \%$ | $3.02 \%$ |
| Rolling Three-Year Compound Return | 552 out of 913 | $60 \%$ | $1.72 \%$ |
| Rolling Five-Year Compound Return | 572 out of 889 | $64 \%$ | $1.79 \%$ |
| Rolling Seven-Year Compound Return | 590 out of 865 | $68 \%$ | $1.74 \%$ |
| Rolling 10-Year Compound Return | 547 out of 829 | $66 \%$ | $1.74 \%$ |

Between 1930 and 2009, the strategy had 16 separate declines exceeding 20 percent, with the largest being a loss of 78 percent between February 1931 and May 1932. In the most recent bear
market between May 2007 and February 2009, the group declined 69 percent. Table 20.CS3 shows all the strategy's declines greater than 20 percent since 1926.

TABLE 20.CS3
Worst-Case Scenarios: All 20 Percent or Greater Declines for AS-60-Month MomentumDecile 10, January 1, 1931 to December 31, 2009

| Peak <br> Date | Peak <br> Index <br> Value | Trough <br> Date | Trough <br> Index <br> Value | Recovery <br> Date | Decline <br> $(\%)$ | Decline <br> Duration | Recovery <br> Duration |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Feb-31 | 1.28 | May-32 | 0.29 | Jun-33 | $-77.66 \%$ | 15 | 13 |
| Aug-33 | 1.42 | Mar-35 | 0.68 | Nov-35 | $-51.83 \%$ | 19 | 8 |
| Mar-37 | 2.35 | May-40 | 0.92 | Apr-43 | $-60.69 \%$ | 38 | 35 |
| May-46 | 5.61 | May-47 | 4.38 | Dec-49 | $-21.93 \%$ | 12 | 31 |
| Mar-56 | 15.28 | Dec-57 | 12.22 | May-58 | $-20.02 \%$ | 21 | 5 |
| Feb-62 | 27.22 | Oct-62 | 20.27 | May-63 | $-25.52 \%$ | 8 | 7 |
| Apr-66 | 55.76 | Oct-66 | 44.55 | Jan-67 | $-20.11 \%$ | 6 | 3 |
| Nov-68 | 102.02 | Jun-70 | 65.49 | Mar-71 | $-35.81 \%$ | 19 | 9 |
| Feb-72 | 119.56 | Dec-74 | 60.78 | Jan-76 | $-49.16 \%$ | 34 | 13 |
| Aug-78 | 245.93 | Oct-78 | 195.43 | Jun-79 | $-20.54 \%$ | 2 | 8 |
| Jul-87 | 1146.37 | Nov-87 | 719.78 | May-89 | $-37.21 \%$ | 4 | 18 |
| Aug-89 | 1196.80 | Oct-90 | 812.18 | Mar-91 | $-32.14 \%$ | 14 | 5 |
| Apr-98 | 5026.67 | Aug-98 | 3534.93 | Jun-99 | $-29.68 \%$ | 4 | 10 |
| Jun-01 | 7333.96 | Sep-01 | 5685.87 | Jan-02 | $-22.47 \%$ | 3 | 4 |
| Apr-02 | 7997.85 | Sep-02 | 5065.26 | Jul-03 | $-36.67 \%$ | 5 | 10 |
| May-07 | 17300.42 | Feb-09 | 5379.08 | N/A | $-68.91 \%$ | 21 | N/A |
| Average |  |  |  |  | $-38.15 \%$ | 14.0625 | 11.93 |

Figures 20.CS1 and 20.CS2 show the five year average annual compound excess (deficient) return for deciles one and ten of five-year price appreciation from All Stocks.


FIGURE 20.CS1
Five year Average Annual Compound Excess (Deficient) Return AS-60-Month Momentum-Decile 10 minus All Stocks, January 1, 1931 to December 31, 2009


FIGURE 20.CS2
Five year Average Annual Compound Excess (Deficient) Return AS-60-Month Momentum-Decile 1 minus All Stocks, January 1, 1931 to December 31, 2009

As Table 20.CS4 shows, Large Stocks behaved in a similar manner. Investing \$10,000 on December $31^{\text {st }}, 1930$ in the decile of stocks from the Large Stocks universe with the worst fiveyear price performance grew to $\$ 37,162,107$ by the end of 2009 , a compound average annual return of 10.97 percent. A similar investment in Large Stocks grew to $\$ 19,358,299$, a compound return of 10.05 percent. The standard deviation for the stocks from Large Stocks with the worst five-year performance was 24.53 percent, versus 19.21 percent for Large Stocks. The downside risk was also higher- 16.99 percent versus Large Stock's 14.10 percent. Looking at the worstcase scenarios, the maximum decline for the strategy was a loss of 80 percent compared to a loss of 73 percent for Large Stocks, both of which occurred between February 1931 and May 1932.
TABLE 20.CS4
Summary Return and Risk Results for Annual Data: LS-60-Month Momentum-Decile 10, LS-60-Month Momentum-Decile 1, and Large Stocks; January 1, 1931 to December 31, 2009

|  | LS-60-Month <br> Momentum-Decile 10 | LS-60-Month <br> Momentum-Decile 1 | Large Stocks |
| :--- | :---: | :---: | :---: |
| Arithmetic Average | $14.18 \%$ | $11.07 \%$ | $12.08 \%$ |
| Geometric Average | $10.97 \%$ | $8.07 \%$ | $10.05 \%$ |
| Median Return | $12.14 \%$ | $14.15 \%$ | $16.60 \%$ |
| Standard Deviation | $24.53 \%$ | $23.29 \%$ | $19.21 \%$ |
| Upside Deviation | $20.06 \%$ | $14.59 \%$ | $13.22 \%$ |
| Downside Deviation | $16.99 \%$ | $17.16 \%$ | $14.10 \%$ |
| Tracking Error | 10.41 | 10.49 | 0.00 |
| Number of Positive Periods | 569 | 559 | 578 |
| Number of Negative Periods | 379 | 389 | 370 |
| Maximum Peak-to-Trough | $-80.25 \%$ | $-76.08 \%$ | $-72.65 \%$ |
| Decline | 1.17 | 1.09 | 1.00 |
| Beta | 4.83 | 4.03 |  |
|  | 0.24 | 0.13 | 5.30 |
| T-Statistic (m=0) | 0.06 | -0.11 | 0.26 |
| Sharpe Ratio (Rf=5\%) |  | 0.00 |  |
| Sortino Ratio (MAR=10\%) |  |  |  |


| \$10,000 becomes | $\$ 37,162,107$ | $\$ 4,583,895$ | $\$ 19,358,299$ |
| :--- | :---: | :---: | :---: |
| Minimum 1 Year Return | $-74.58 \%$ | $-66.52 \%$ | $-66.63 \%$ |
| Maximum 1 Year Return | $300.35 \%$ | $95.15 \%$ | $159.52 \%$ |
| Minimum 3 Year Return | $-24.90 \%$ | $-34.95 \%$ | $-15.89 \%$ |
| Maximum 3 Year Return | $55.03 \%$ | $43.88 \%$ | $45.64 \%$ |
| Minimum 5 Year Return | $-13.80 \%$ |  |  |
| Maximum 5 Year Return | $43.74 \%$ | $-14.09 \%$ | $-9.62 \%$ |
|  |  | $35.50 \%$ | $36.26 \%$ |
| Minimum 7 Year Return | $-5.28 \%$ | $-10.42 \%$ | $-4.15 \%$ |
| Maximum 7 Year Return | $25.04 \%$ | $27.51 \%$ | $22.83 \%$ |
|  |  |  | $-0.51 \%$ |
| Minimum 10 Year Return | $-2.66 \%$ | $-4.56 \%$ | $19.57 \%$ |
| Maximum 10 Year Return | $22.42 \%$ | $24.64 \%$ |  |
|  |  | $-35.51 \%$ | $-26.34 \%$ |
| Minimum Expected Return* | $-34.88 \%$ | $57.65 \%$ | $50.50 \%$ |
| Maximum Expected Return** | $63.24 \%$ |  |  |

* Minimum Expected Return is Arithmetic Return minus 2 times the standard deviation.
** Maximum Expected Return is Arithmetic Return plus 2 times the standard deviation.
The Sharpe ratio was .24 versus .26 for the Large Stocks universe, and as with the All Stocks group, all base rates were positive, with the strategy beating the Large Stocks universe in 52 percent of all rolling one-year periods, 58 percent of all rolling five-year periods and 70 percent of all rolling ten-year periods. Table 20.CS5 shows all of the base rates.

| T A B L E 20.CS5 |  |  |  |
| :--- | :---: | :---: | :---: |
| Base Rates for LS-60-Month Momentum-Decile $\mathbf{1 0}$ and Large Stocks; January 1, 1931 to December 31, 2009 |  |  |  |
| Item | LS-60-Month Momentum- <br> Decile $\mathbf{1 0}$ Beat Large Stocks | Percent | Average Annual <br> Excess Return |
| Single-Year Return | 486 out of 937 | $52 \%$ | $1.80 \%$ |
| Rolling Three-Year Compound Return | 486 out of 913 | $53 \%$ | $0.99 \%$ |
| Rolling Five-Year Compound Return | 519 out of 889 | $58 \%$ | $1.10 \%$ |
| Rolling Seven-Year Compound Return | 527 out of 865 | $61 \%$ | $1.13 \%$ |
| Rolling 10-Year Compound Return | 581 out of 829 | $70 \%$ | $1.16 \%$ |

Figures 20.CS3 and 20.CS4 show the five year average annual compound excess (deficient) return for deciles one and ten of best and worst five year price appreciation from Large Stocks.


FIGURE 20.CS3
Five year Average Annual Compound Excess (Deficient) Return LS-60-Month Momentum-Decile 10 minus Large Stocks, January 1, 1931 to December 31, 2009


FIGURE 20.CS4
Five year Average Annual Compound Excess (Deficient) Return LS-60-Month Momentum-Decile 1 minus Large Stocks, January 1, 1931 to December 31, 2009

## Best Five-Year Performers Show Strong Mean Reversion

Unlike stocks with great six- or 12-month price appreciation, those with the best five-year performance clearly drop off the performance train by year six. A $\$ 10,000$ investment on December $31^{\text {st }}$, 1930 in the decile of stocks with the best five-year price appreciation from the All Stocks universe would be worth just $\$ 13,143,684$ at the end of 2009, an average annual compound return of 9.52 percent. That's $\$ 28$ million less than the $\$ 41,202,116$ you'd earn from the same investment in the All Stocks universe. The standard deviation of return was higher, 23.12 percent versus to All Stock's 21.58 percent. The downside risk for the decile of stocks with the best five-year price appreciation was 17.09 percent, compared to 15.74 percent for All Stocks. Table 20.CS1 details all of the other information for the strategy. The worst decline for the group was a loss of 65 percent between November 1968 and September 1974, and the group lost more than 20 percent on 14 separate occasions between 1930 and 2009. The Sharpe ratio
was a low .20 , compared to .28 for All Stocks, and all base rates were negative, with the strategy beating All Stocks in just 45 percent of all rolling one-year periods; 33 percent of all rolling fiveyear periods and in only 29 percent of all rolling ten-year periods.

## Large Stocks Also Revert to the Long-Term Mean

Large Stocks saw similar returns, with the decile of stocks from Large Stocks with the best fiveyear price performance turning $\$ 10,000$ invested on December 31, 1930 into $\$ 4,583,895$ at the end of 2009, an average annual compound return of 8.07 percent and well behind the $\$ 19,358,299$ you'd have earned with the same investment in the Large Stocks universe. Like their brethren from All Stocks, the decile of stocks from Large Stocks with the best five-year price performance had a higher standard deviation of return- 23.29 percent versus Large Stocks' 19.21 percent. The downside risk for the group was 17.16 percent, higher than Large Stocks’ 14.1 percent. The worst case scenario for the group occurred between August 2000 and September 2002 when the suffered a 76 percent loss. The group had 14 separate times between 1930 and 2009 when they lost more than 20 percent. All this volatility is reflected in the group's low Sharpe ratio of .13. All base rates are negative, with the decile of stocks with the best fiveyear price performance from Large Stocks beating the Large Stocks universe in just 31 percent of all rolling five-year periods and 23 percent of all rolling ten-year periods.

TABLE 20.CS6
Worst-Case Scenarios: All 20 Percent or Greater Declines for LS-60-Month Momentum-Decile 10, January 1, 1931 to December 31, 2009

| Peak <br> Date | Peak <br> Index <br> Value | Trough <br> Date | Trough <br> Index <br> Value | Recovery <br> Date | Decline <br> $(\%)$ | Decline <br> Duration | Recovery <br> Duration |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Feb-31 | 1.25 | May-32 | 0.25 | Dec-35 | $-80.25 \%$ | 15 | 43 |
| Feb-37 | 1.75 | Dec-41 | 0.80 | May-43 | $-54.22 \%$ | 58 | 17 |
| Nov-68 | 32.62 | Jun-70 | 23.32 | Jan-71 | $-28.52 \%$ | 19 | 7 |
| Nov-72 | 41.58 | Sep-74 | 24.18 | Jun-75 | $-41.85 \%$ | 22 | 9 |
| Sep-87 | 361.24 | Nov-87 | 245.26 | Apr-89 | $-32.11 \%$ | 2 | 17 |
| Aug-89 | 432.50 | Oct-90 | 307.48 | Mar-91 | $-28.91 \%$ | 14 | 5 |
| Mar-02 | 2889.94 | Sep-02 | 1986.06 | Aug-03 | $-31.28 \%$ | 6 | 11 |
| May-07 | 5333.19 | Feb-09 | 1861.30 | N/A | $-65.10 \%$ | 21 | N/A |
| Average |  |  |  |  | $-45.28 \%$ | 19.625 | 15.57 |

TABLE 20.CS7
Worst-Case Scenarios: All 20 Percent or Greater Declines for LS-60-Month Momentum-Decile 1, January 1, 1931 to December 31, 2009

| Peak <br> Date | Peak <br> Index <br> Value | Trough <br> Date | Trough <br> Index <br> Value | Recovery <br> Date | Decline <br> (\%) | Decline <br> Duration | Recovery <br> Duration |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Feb-31 | 1.16 | Jun-32 | 0.40 | Feb-36 | $-65.66 \%$ | 16 | 44 |
| Jul-37 | 1.42 | Mar-38 | 0.62 | Dec-44 | $-56.04 \%$ | 8 | 81 |
| May-46 | 2.73 | Feb-48 | 1.59 | Dec-50 | $-41.79 \%$ | 21 | 34 |
| Aug-56 | 10.09 | Oct-57 | 7.67 | Sep-58 | $-23.98 \%$ | 14 | 11 |
| Nov-61 | 18.18 | Oct-62 | 11.37 | Feb-65 | $-37.47 \%$ | 11 | 28 |
| Apr-66 | 25.26 | Oct-66 | 18.91 | Mar-67 | $-25.14 \%$ | 6 | 5 |


| Nov-68 | 28.24 | Jun-70 | 15.56 | Feb-72 | $-44.89 \%$ | 19 | 20 |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Dec-72 | 31.06 | Sep-74 | 12.97 | Jan-80 | $-58.24 \%$ | 21 | 64 |
| Nov-80 | 49.64 | Jul-82 | 28.29 | Apr-83 | $-43.00 \%$ | 20 | 9 |
| Jun-83 | 55.58 | Jul-84 | 38.63 | Dec-85 | $-30.50 \%$ | 13 | 17 |
| Aug-87 | 95.70 | Nov-87 | 59.07 | Jul-89 | $-38.27 \%$ | 3 | 20 |
| Apr-98 | 401.82 | Aug-98 | 303.00 | Dec-98 | $-24.59 \%$ | 4 | 4 |
| Mar-00 | 835.70 | May-00 | 668.02 | Aug-00 | $-20.06 \%$ | 2 | 3 |
| Aug-00 | 882.42 | Sep-02 | 211.11 | N/A | $-76.08 \%$ | 25 | N/A |
| Average |  |  |  |  | $-41.84 \%$ | 13.07 | 26.15 |

TABLE 20.CS8
Worst-Case Scenarios: All 20 Percent or Greater Declines for AS-60-Month Momentum-Decile 1, January 1, 1931 to December 31, 2009

| Peak <br> Date | Peak <br> Index <br> Value | Trough <br> Date | Trough <br> Index <br> Value | Recovery <br> Date | Decline <br> (\%) | Decline <br> Duration | Recovery <br> Duration |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Feb-31 | 1.16 | Jun-32 | 0.42 | Apr-35 | $-63.54 \%$ | 16 | 34 |
| Mar-37 | 1.86 | Mar-38 | 0.71 | Dec-44 | $-61.56 \%$ | 12 | 81 |
| May-46 | 3.89 | May-47 | 2.16 | Dec-50 | $-44.43 \%$ | 12 | 43 |
| Jun-57 | 14.67 | Oct-57 | 11.64 | Jul-58 | $-20.61 \%$ | 4 | 9 |
| Nov-61 | 32.78 | Oct-62 | 21.00 | Oct-64 | $-35.93 \%$ | 11 | 24 |
| Apr-66 | 51.28 | Oct-66 | 38.21 | Apr-67 | $-25.48 \%$ | 6 | 6 |
| Nov-68 | 70.82 | Sep-74 | 25.12 | Nov-79 | $-64.52 \%$ | 70 | 62 |
| May-81 | 132.33 | Jul-82 | 84.83 | Dec-82 | $-35.89 \%$ | 14 | 5 |
| Jun-83 | 184.53 | Jul-84 | 132.69 | Nov-85 | $-28.09 \%$ | 13 | 16 |
| Aug-87 | 321.04 | Nov-87 | 202.45 | May-89 | $-36.94 \%$ | 3 | 18 |
| Jun-90 | 371.41 | Oct-90 | 284.51 | Feb-91 | $-23.40 \%$ | 4 | 4 |
| Apr-98 | 1106.55 | Aug-98 | 759.30 | Oct-99 | $-31.38 \%$ | 4 | 14 |
| Feb-00 | 1853.66 | Feb-03 | 731.62 | May-07 | $-60.53 \%$ | 36 | 51 |
| Oct-07 | 2117.53 | Feb-09 | 803.60 | N/A | $-62.05 \%$ | 16 | N/A |
| Average |  |  |  |  | $-42.45 \%$ | 15.79 | 28.23 |

TABLE 20.CS9
Worst-Case Scenarios: All 20 Percent or Greater Declines for LS-60-Month Momentum-Decile 1, January 1, 1931 to December 31, 2009

| Peak <br> Date | Peak <br> Index <br> Value | Trough <br> Date | Trough <br> Index <br> Value | Recovery <br> Date | Decline <br> (\%) | Decline <br> Duration | Recovery <br> Duration |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Feb-31 | 1.16 | Jun-32 | 0.40 | Feb-36 | $-65.66 \%$ | 16 | 44 |
| Jul-37 | 1.42 | Mar-38 | 0.62 | Dec-44 | $-56.04 \%$ | 8 | 81 |
| May-46 | 2.73 | Feb-48 | 1.59 | Dec-50 | $-41.79 \%$ | 21 | 34 |
| Aug-56 | 10.09 | Oct-57 | 7.67 | Sep-58 | $-23.98 \%$ | 14 | 11 |
| Nov-61 | 18.18 | Oct-62 | 11.37 | Feb-65 | $-37.47 \%$ | 11 | 28 |
| Apr-66 | 25.26 | Oct-66 | 18.91 | Mar-67 | $-25.14 \%$ | 6 | 5 |
| Nov-68 | 28.24 | Jun-70 | 15.56 | Feb-72 | $-44.89 \%$ | 19 | 20 |
| Dec-72 | 31.06 | Sep-74 | 12.97 | Jan-80 | $-58.24 \%$ | 21 | 64 |


| Nov-80 | 49.64 | Jul-82 | 28.29 | Apr-83 | $-43.00 \%$ | 20 | 9 |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Jun-83 | 55.58 | Jul-84 | 38.63 | Dec-85 | $-30.50 \%$ | 13 | 17 |
| Aug-87 | 95.70 | Nov-87 | 59.07 | Jul-89 | $-38.27 \%$ | 3 | 20 |
| Apr-98 | 401.82 | Aug-98 | 303.00 | Dec-98 | $-24.59 \%$ | 4 | 4 |
| Mar-00 | 835.70 | May-00 | 668.02 | Aug-00 | $-20.06 \%$ | 2 | 3 |
| Aug-00 | 882.42 | Sep-02 | 211.11 | N/A | $-76.08 \%$ | 25 | N/A |
| Average |  |  |  |  | $-41.84 \%$ | 13.07 | 26.15 |

TABLE 20.CS10
Base Rates for LS-60-Month Momentum-Decile 1 and Large Stocks; January 1, 1931 to December 31, 2009

| Item | LS-60-Month Momentum- <br> Decile 1 Beat Large Stocks | Percent | Average Annual <br> Excess Return |
| :--- | :---: | :---: | :---: |
| Single-Year Return | 433 out of 937 | $46 \%$ | $-0.66 \%$ |
| Rolling Three-Year Compound Return | 347 out of 913 | $38 \%$ | $-1.56 \%$ |
| Rolling Five-Year Compound Return | 277 out of 889 | $31 \%$ | $-1.87 \%$ |
| Rolling Seven-Year Compound Return | 234 out of 865 | $27 \%$ | $-1.96 \%$ |
| Rolling 10-Year Compound Return | 190 out of 829 | $23 \%$ | $-1.89 \%$ |

## Deciles

Figure 20.CS5 shows the results for the All Stocks universe ranked by five-year performance and Figure 20.CS6 shows the results for the Large Stocks universe.


FIGURE 20.CS5
Average annual compound return by 60-Month Momentum decile, All Stocks universe, January 1, 1931 to December 31, 2009

TABLE 20.CS13
Summary Results for 60-Month Momentum Decile Analysis of All Stocks Universe, January 1, 1931 to December 31, 2009

| Decile | $\$ 10,000$ Grows to: | Average Return | Compound <br> Return | Standard <br> Deviation | Sharpe Ratio |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 1 (Highest) | $\$ 13,143,684$ | $12.51 \%$ | $9.52 \%$ | $23.12 \%$ | 0.20 |
| 2 | $\$ 25,578,361$ | $12.83 \%$ | $10.44 \%$ | $20.57 \%$ | 0.26 |
| 3 | $\$ 34,422,201$ | $13.00 \%$ | $10.86 \%$ | $19.52 \%$ | 0.30 |


| 4 | $\$ 46,411,813$ | $13.35 \%$ | $11.28 \%$ | $19.29 \%$ | 0.33 |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 5 | $\$ 62,263,052$ | $13.81 \%$ | $11.69 \%$ | $19.53 \%$ | 0.34 |
| 6 | $\$ 56,328,739$ | $13.77 \%$ | $11.55 \%$ | $20.10 \%$ | 0.33 |
| 7 | $\$ 63,087,591$ | $14.02 \%$ | $11.71 \%$ | $20.58 \%$ | 0.33 |
| 8 | $\$ 81,561,057$ | $14.54 \%$ | $12.08 \%$ | $21.32 \%$ | 0.33 |
| 9 | $\$ 109,794,628$ | $15.54 \%$ | $12.50 \%$ | $23.75 \%$ | 0.32 |
| 10 (Lowest) | $\$ 133,744,327$ | $17.27 \%$ | $12.78 \%$ | $28.86 \%$ | 0.27 |
| All Stocks | $\$ 41,202,116$ | $13.69 \%$ | $11.11 \%$ | $21.58 \%$ | 0.28 |

In each instance, we see that stocks that had great five-year performance go on to do less well, whereas stocks that had been weak over the last five years tend to snap back. Tables 20.CS13 and 20.CS14 summarize the results for the deciles.


FIGURE 20.CS6
Average annual compound return by 60-Month Momentum decile, Large Stocks universe, January 1, 1931 to December 31, 2009

T ABLE 20.CS14
Summary Results for 60-Month Momentum Decile Analysis of Large Stocks Universe, January 1, 1931 to December 31, 2009

| Decile | $\$ 10,000$ Grows to: | Average Return | Compound <br> Return | Standard <br> Deviation | Sharpe Ratio |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 1 (Highest) | $\$ 4,583,895$ | $11.07 \%$ | $8.07 \%$ | $23.29 \%$ | 0.13 |
| 2 | $\$ 12,541,595$ | $11.70 \%$ | $9.45 \%$ | $20.08 \%$ | 0.22 |
| 3 | $\$ 11,608,555$ | $11.34 \%$ | $9.34 \%$ | $18.94 \%$ | 0.23 |
| 4 | $\$ 20,904,865$ | $12.03 \%$ | $10.16 \%$ | $18.38 \%$ | 0.28 |
| 5 | $\$ 22,534,274$ | $12.17 \%$ | $10.27 \%$ | $18.62 \%$ | 0.28 |
| 6 | $\$ 22,771,901$ | $12.18 \%$ | $10.28 \%$ | $18.71 \%$ | 0.28 |
| 7 | $\$ 24,638,175$ | $12.35 \%$ | $10.39 \%$ | $19.05 \%$ | 0.28 |
| 8 | $\$ 35,364,654$ | $12.98 \%$ | $10.90 \%$ | $19.74 \%$ | 0.30 |
| 9 | $\$ 37,247,410$ | $13.25 \%$ | $10.97 \%$ | $20.69 \%$ | 0.29 |
| 10 (Lowest) | $\$ 37,162,107$ | $14.18 \%$ | $10.97 \%$ | $24.53 \%$ | 0.24 |
| Large Stocks | $\$ 19,358,299$ | $12.08 \%$ | $10.05 \%$ | $19.21 \%$ | 0.26 |

## Results Favor Shorter-Term Relative Strength

Thus, our research shows that while winners over the previous year continue to win in the next, the reverse is true when you look at longer-term price appreciation. Short-term relative strength is one of the most powerful of the growth factors, especially-as we will see in coming chapters-when married to other factors. Longer term, you're much better off using a contrarian strategy that selects from the group of stocks with the worst five-year price appreciation from both All Stocks and Large Stocks. Tables 20.CS11 and 20.CS12 show the results for both groups by decade.

T ABLE 20.CS11
Average Annual Compound Rates of Return by Decade

|  | 1930s* | 1940s | 1950s | 1960s | 1970s | 1980s | 1990s | 2000s** |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| LS-60-Month Momentum-Decile 1 | 0.88\% | 7.88\% | 19.05\% | 5.89\% | 2.46\% | 13.26\% | 20.92\% | -4.04\% |
| LS-60-Month Momentum-Decile 10 | 1.46\% | 11.08\% | 13.07\% | 9.43\% | 12.02\% | 17.17\% | 17.35\% | 6.09\% |
| Large Stocks | 3.09\% | 9.65\% | 17.06\% | 8.31\% | 6.65\% | 17.34\% | 16.38\% | 2.42\% |

* Returns for January 1, 1931 to December 31, 1939
** Returns for January 1, 2000 to December 31, 2009

TABLE 20.CS12
Average Annual Compound Rates of Return by Decade

|  | 1930s* | 1940s | 1950s | 1960s | 1970s | 1980s | 1990s | 2000s** |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| AS-60-Month Momentum-Decile 1 | $2.57 \%$ | $9.09 \%$ | $22.86 \%$ | $8.61 \%$ | $3.53 \%$ | $16.68 \%$ | $15.24 \%$ | $-1.09 \%$ |
| AS-60-Month Momentum-Decile 10 | $3.59 \%$ | $15.65 \%$ | $14.74 \%$ | $13.25 \%$ | $13.89 \%$ | $14.49 \%$ | $16.91 \%$ | $9.37 \%$ |
| All Stocks | $4.69 \%$ | $11.57 \%$ | $18.07 \%$ | $10.72 \%$ | $7.56 \%$ | $16.78 \%$ | $15.35 \%$ | $4.39 \%$ |

* Returns for January 1, 1931 to December 31, 1939
** Returns for January 1, 2000 to December 31, 2009

