PORTFOLIO STRATEGIES

The Relationship Between Stock Market Volatility and Returns

Less volatility isn't always a good thing, especially when considering the returns that follow periods of high volatility.

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Investment markets always experience some degree of volatility. The important issue is developing a sense of what represents high and low volatility. With an accurate historical understanding of "normal" volatility, we will likely be more emotionally durable as investors and far less likely to react poorly when markets seem crazy.

For this analysis, we'll be focusing on the volatility of monthly returns of the S&P 500 index over the past 53½ years (from January 1, 1970, through June 30, 2023) as shown in Figure 1. Since 1970, the annualized volatility of the S&P 500 (i.e., the standard deviation of 12 monthly returns multiplied by the square root of 12) has been as low as 5% and as high as 30%. The average has been roughly 14.3% over the 631 rolling 12-month periods.

Unlike returns, standard deviation cannot ever be negative. As a result, the lower boundary of volatility is always a positive number. Returns, of course, can be significantly negative over rolling 12-month periods.

Past Periods of Very High Stock Market Volatility

Three periods of very high volatility are highlighted in Figure 1 and Table 1. The first particularly volatile 12-month period was from July 1, 1974, through June 30, 1975. During this period, the standard deviation of monthly returns for the S&P 500 was 29.93%.

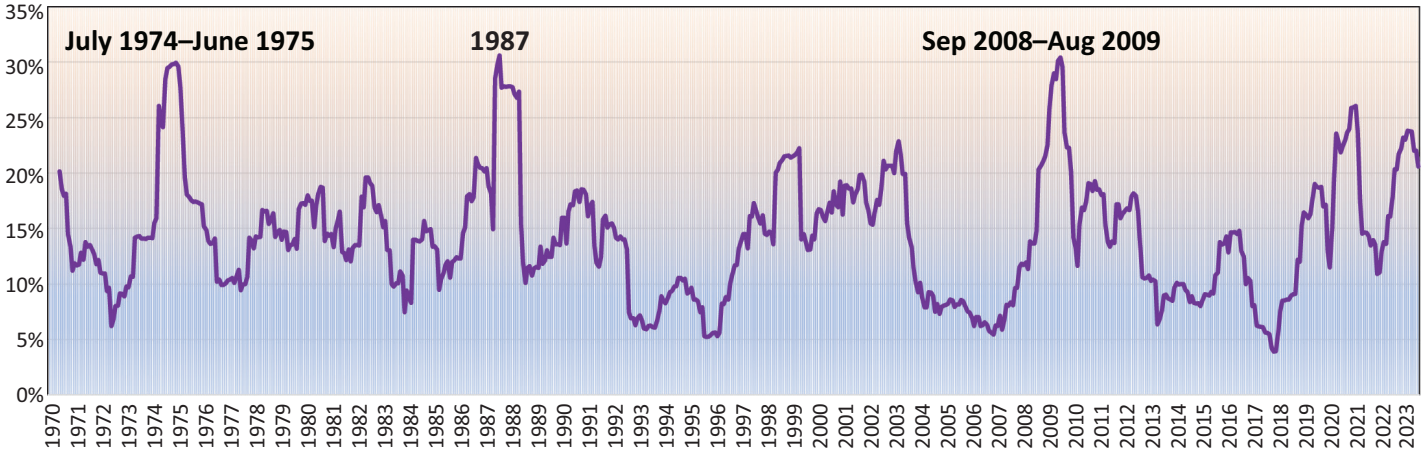
The second period was from January to December 1987. The standard deviation of monthly returns was 30.60% during this period. The third period was September 2008 to August 2009. It experienced volatility of 30.42% as measured by the standard deviation of monthly returns.

Periods of high annual volatility have a common

FIGURE 1

Historical Market Volatility

Market volatility is illustrated by the rolling 12-month standard deviation of S&P 500 monthly returns over the period of January 1970 through June 2023.



Source: Craig Israelsen.

TABLE 1

Past Periods of High Market Volatility

S&P 500 Monthly Returns	July 1974–June 1975 (%)	Jan–Dec 1987 (%)	Sep 2008–Aug 2009 (%)
Month 1	(7.42)	13.47	(8.91)
Month 2	(8.64)	3.95	(16.79)
Month 3	(11.52)	2.89	(7.18)
Month 4	16.81	(0.89)	1.06
Month 5	(4.89)	0.87	(8.43)
Month 6	(1.56)	5.05	(10.65)
Month 7	12.72	5.07	8.76
Month 8	6.38	3.73	9.57
Month 9	2.54	(2.19)	5.59
Month 10	5.10	(21.54)	0.20
Month 11	4.76	(8.24)	7.56
Month 12	4.77	7.61	3.61
12-Mo Std Dev*	**29.93**	**30.60**	**30.42**
12-Mo Return	**16.10**	**5.25**	**(18.25)**
12-Mo Forward Return	**13.98**	**16.61**	**4.91**

**The annualized standard deviation of monthly returns is calculated in Excel as the standard deviation of the 12 monthly returns multiplied by the square root of 12.*
Source: Craig Israelsen.

characteristic: a combination of large positive and large negative monthly returns within a 12-month time frame. Wide swings in monthly returns are the natural cause of high volatility. Such swings do not necessarily produce negative 12-month returns. There is, however, a tendency for rolling 12-month returns to head into negative territory as volatility begins to increase.

Take a look at Figure 2. As the purple line begins to move upward, the downward-pointing red bars—which represent negative 12-month rolling returns—begin to appear. Positive rolling 12-month returns show up as upward-pointing green bars.

In fact, over this period of 53½ years, the correlation between rolling 12-month returns and rolling 12-month standard deviation was –0.29. In other words, there is a modest negative correlation indicating an inverse relationship between the two. Put more simply, as volatility rose, the other variable—meaning return—often went down.

How Stock Market Volatility and Returns Have Interacted

The story of how volatility and returns have interacted is best told by talking you through Figures 3, 4 and 5.

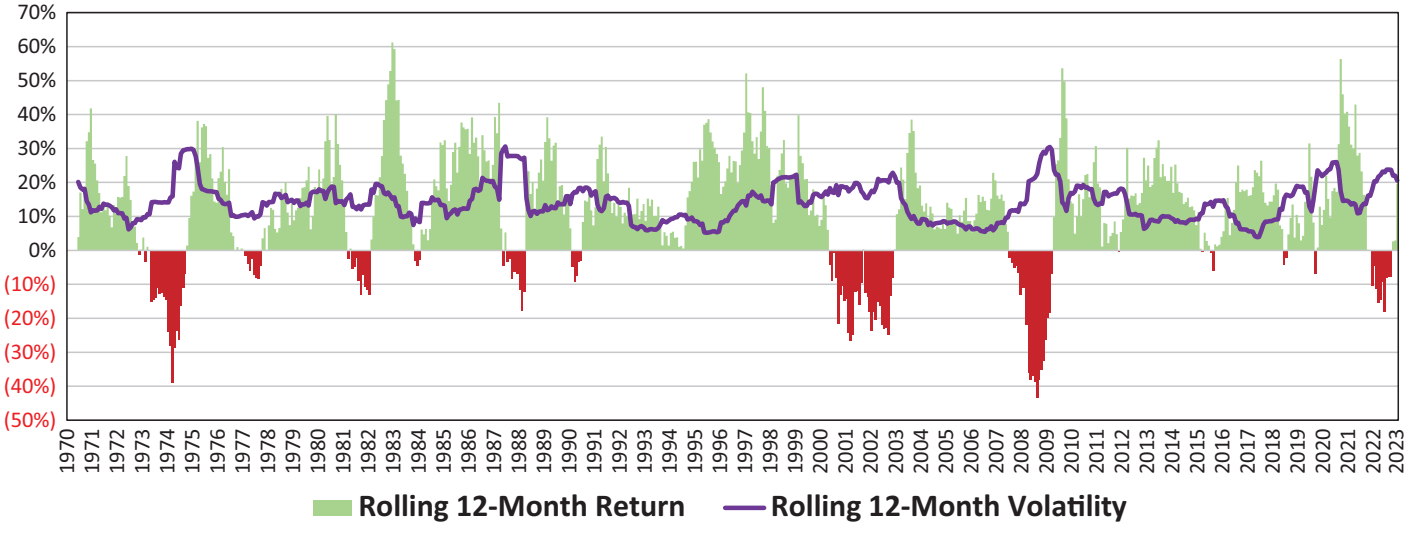
Figure 3 shows all 619 rolling 12-month standard deviations for the S&P 500 from January 1, 1970, through June 30, 2022. The reason the period ends in 2022 and not 2023 (as in Figures 1 and 2) will be explained in the "Stock Market Performance Following Periods of High Volatility" section.

The purple "line" in Figure 3 is actually made up of 619 dots. Each individual dot represents a 12-month standard deviation arranged from low to high regardless of when they occurred. In other words, the dots representing

FIGURE 2

Market Volatility and 12-Month Market Returns

Positive rolling 12-month returns for the S&P 500 are represented by the green bars, while negative returns are shown in red.



Source: Craig Israelsen.

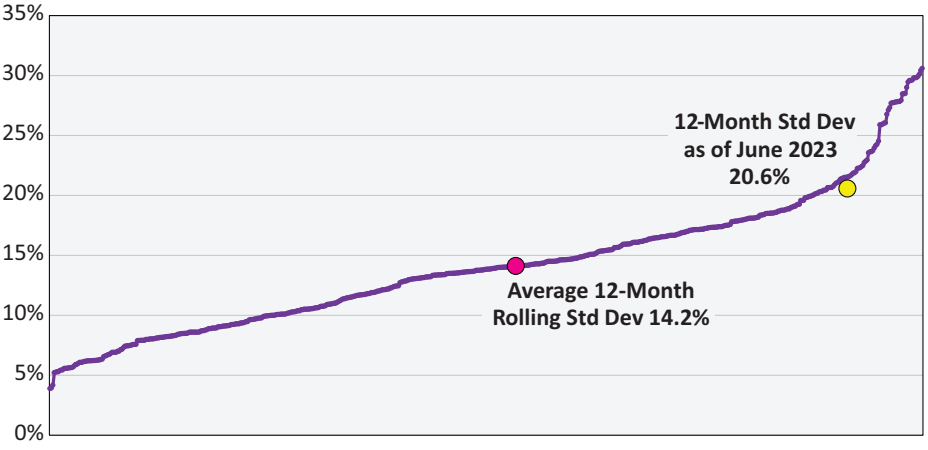
12-month standard deviations are not chronologically arranged. There are so many dots that they appear to be a line.

The pink-colored dot near the middle of the graph represents the average 12-month standard deviation of 14.2%. The yellow dot near the right side of the graph is the 12-month standard deviation of monthly returns from July 1, 2022, through June 30, 2023. This period had the most recent 12-month standard deviation as I was preparing this article. A current standard deviation of 20.6% indicates that recent volatility in the S&P 500 has been higher than average, but not all that close to the high-water mark of around 30%.

FIGURE 3

Historical Market Volatility From Lowest to Highest

Volatility is shown as the rolling 12-month standard deviation of S&P 500 monthly returns over the period of January 1970 through June 2022, sorted from lowest to highest.



Source: Craig Israelsen.

Rising Volatility's Impact on the Market's Returns

Now consider Figure 4. Here we introduce the 12-month returns that were coincident with each individual 12-month standard deviation. As the purple line of dots heads upward (indicating higher volatility), the frequency and severity of negative 12-month returns of the S&P 500 has increased. These negative returns are shown by downward-pointing red bars.

The green upward-pointing bars indicate positive 12-month returns. As the 12-month standard deviation (i.e., volatility) has increased, historically the 12-month returns have tended to decrease during the same 12-month time frame. The yellow dot indicates the 12-month standard deviation as of June 30, 2023, which was 20.6%.

Stock Market Performance Following Periods of High Volatility

We now turn our attention to Figure 5. As in Figures 3 and 4, the purple line of dots represents 12-month volatility arranged from low to high. In Figure 5, the green upward bars and red downward bars represent the 12-month return over the forward 12-month period associated with each 12-month standard deviation. In other words, if the standard deviation measurement was January 1, 1990, through December 31, 1990, the associated return displayed in Figure 5 (either a green or red bar) is for the 12-month return from January 1, 1991, through December 31, 1991—the "forward" 12-month return. Figure 5 displays the relationship between historical volatility and the returns realized over the subsequent 12 months.

The reason the time frames in Figures 3, 4 and 5 end in June 2022 (rather than June 2023) is because Figure 5 involves a forward 12-month return, which forced the last period in Figure 5 to end in June 2022. The forward 12-month return in this case ended in June 2023. As noted previously, June 2023 was the last 12-month return I had access to while preparing this article.

Figure 5 is segmented into quartiles, which are shown by the vertical black lines. The first quartile represents the smallest 25% of rolling 12-month standard deviations (meaning the lowest level of volatility). These are shown by the purple line of dots. The first quartile represents 155 rolling 12-month periods. The average 12-month standard deviation was 7.78%. The average forward 12-month return was 9.59% for this quartile. The frequency of positive 12-month forward returns was 82%.

In the second quartile, the average volatility was 12.01%. The average forward 12-month return was 12.96%. The frequency of positive forward 12-month returns was 80%.

In the third quartile, the average volatility was 15.36%. The average forward return was 10.20%. The frequency of positive forward returns was 75%. The third quartile is when the rolling 12-month volatility ranged between 13.85% and 17.23%. This level of volatility was associated with a forward 12-month return that was only slightly higher than the forward return in the first quartile. It also represented a material decline in forward return compared to the second quartile. Thus, the "danger zone" of volatility for the S&P 500 appears to be when the 12-month standard

deviation is between roughly 14% and 17%.

The fourth quartile, which is the right-most section in Figure 5, illustrates the highest 25% of rolling 12-month standard deviations. The average 12-month volatility was 21.38%. The average forward return was 15.06%. The frequency of positive forward 12-month returns was 82%—the same frequency as in the first quartile.

It appears that within 12 months after periods of high volatility, the S&P 500 tends to produce positive returns. Often these are large returns. Another interesting observation in Figure 5 is the yellow dot, which represents the 12-month standard deviation as of June 30, 2023. Since 1970, there has never been a forward 12-month negative return after a 12-month period with a standard deviation of around 20.6%.

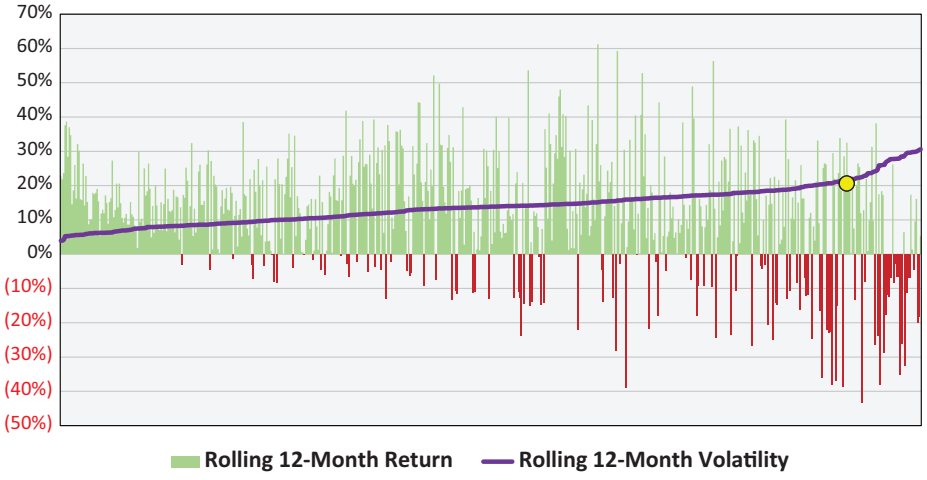
Said differently, there are no red bars (negative 12-month returns) to the right of the yellow dot in Figure 5—only green bars. Should the standard deviation of the S&P 500 continue to increase into late 2023, history would suggest that the forward 12-month return would be positive and likely large. Conversely, if standard deviation declines as we progress toward 2024, the likelihood of a negative return in the S&P 500 over the subsequent 12 months actually increases based on what has historically occurred.

Odd, isn't it? We generally suppose that less volatility is a good thing. Not necessarily, at least when considering the returns that follow periods of high volatility. ■

FIGURE 4

Market Performance During Periods of High and Low Volatility

The 12-month returns for the S&P 500 that were coincident with each individual 12-month standard deviation for the period of January 1970 through June 2022.

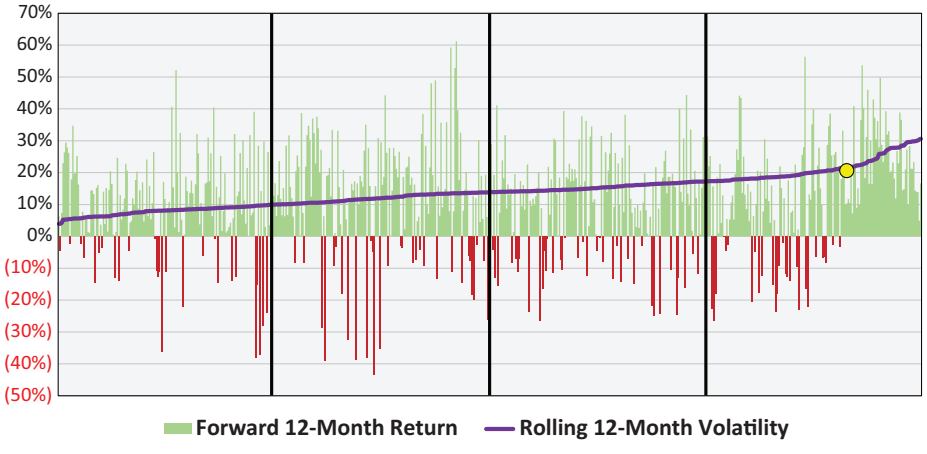


Source: Craig Israelsen.

FIGURE 5

Volatility and the Stock Market's Returns 12 Months Later

The relationship between 12-month rolling standard deviation and the S&P 500's forward 12-month rolling returns starting from January 1970 through June 2022.



Source: Craig Israelsen.

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