



## Research Note on S&P 500 Volatility

4/26/00

### Introduction

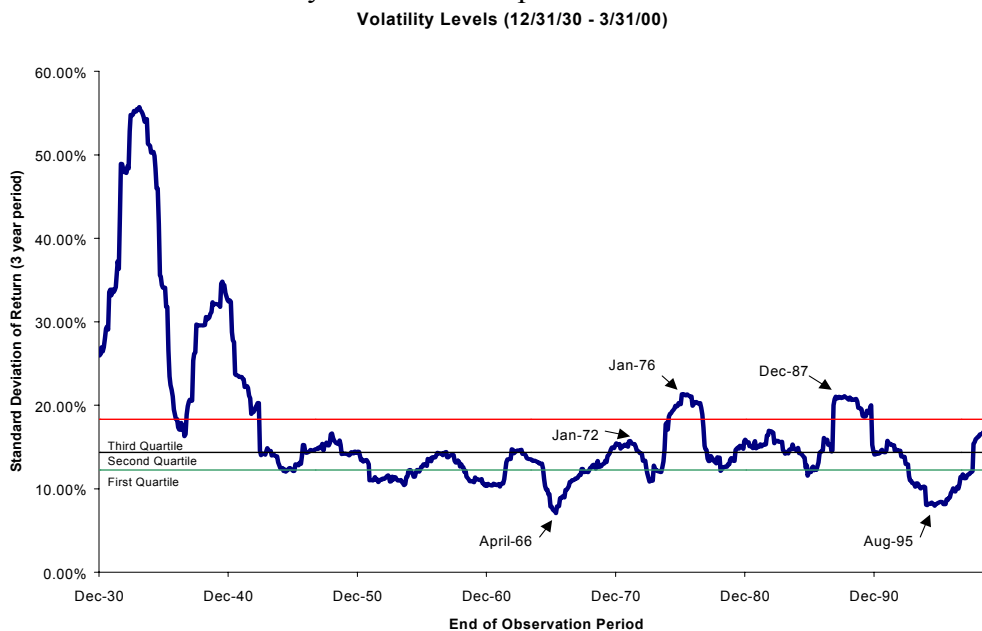
The volatility of the equity market appears to have increased dramatically in the last few months. For example, the NASDAQ Composite's 3.16% decline on April 11 was the 21<sup>st</sup> time this year that the daily change in the value of the index exceeded 3% in magnitude. There were only 20 daily price moves of this size for the NASDAQ all of last year and 1999 had been the most volatile ever recorded for the index. To help put the market's current level of volatility in historical perspective, we have conducted a study focusing on monthly price changes in the S&P 500 index from December 31, 1927 through March 31, 2000. The market's current level of volatility is lower than that observed in the 1930's and 1940's, but extremely high when compared to market activity since 1950. We also find that the market's recent increase in volatility is strikingly similar to the increase in volatility which occurred between April 29, 1966 and January 31, 1972, with today's core technology holdings playing the role of the 1970's "Nifty-Fifty".

### Methodology

Monthly values of the S&P 500 Index from December 31, 1927 through March 31, 2000 were retrieved from the Bloomberg data service. The index values were used to calculate monthly price changes for January 31, 1928 through March 31, 2000. We then estimated equity market volatility by calculating the sample standard deviation of monthly price changes within a 36 month rolling window and multiplying by the square root of 12 to annualize the results. This resulted in 832 monthly observations of our volatility measure, with the oldest observation covering the three years ending December 31, 1930 and the most current observation covering the three years ending March 31, 2000.

### Results

The values of our volatility measure are reported in the chart below.



The volatility measure's distribution is summarized in Table 1.

Table 1  
**Range of Volatility Levels Reported**  
12/31/30 – 3/31/00

Minimum	7.07%	(4/29/66)
25 <sup>th</sup> Percentile	12.25%	
Median	14.37%	
75 <sup>th</sup> Percentile	18.33%	
Maximum	55.74%	(1/31/34)

As of March 31, 2000, the S&P 500's level of volatility was 17.42%, placing it in the 74<sup>th</sup> percentile of the distribution. At first blush, this level of volatility may not seem to be particularly high. However, one should keep in mind how much these results are skewed by the 1929 crash and its aftermath. One hundred forty of the 208 periods with volatility levels exceeding 18.33% occurred in the 1930's and early 1940's. If one excludes this extremely volatile period, a much different picture emerges. Relative to levels of volatility observed since 1952, the S&P 500's current level of volatility is in the 87<sup>th</sup> percentile and is within striking distance of the fifty year high in the level of volatility recorded for January 30, 1976. (See Table 2.)

Table 2  
**Range of Volatility Levels Reported**  
12/31/52 – 3/31/00

Minimum	7.07%	(4/29/66)
25 <sup>th</sup> Percentile	11.41%	
Median	13.58%	
75 <sup>th</sup> Percentile	15.25%	
Maximum	21.34%	(1/30/76)

The market's sharp rise in volatility over the past 5 years is also quite striking. In less than 5 years, the level of volatility has risen from a low of 7.96% on August 31, 1995 to its current level of 17.42%. This is reminiscent of the late 60's and early 70's when the level of volatility rose from an all time low of 7.07% recorded on April 29, 1966 to peak at a level of 15.72% on January 31, 1972. In both instances, the increase in volatility resulted from a narrowing of investor focus to a small, select group of stocks. In the early 70's it was the Nifty-Fifty. Today, it is a core group of technology stocks. After surging in 1970 and 1971, the Nifty-Fifty paced the market through 1975 before beginning a sustained period of under performance. Technology stocks surged for 18 months before encountering difficulties in April of 2000. It will be interesting to see if April 2000 is truly the end of the technology boom and, if so, how long the period of correction will last.

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