



*Options,
Futures, and
Other
Derivatives
(FIN 4366)*

Dr. James R.
Garven

Financial Risk:
Risk vs.
Uncertainty

Financial Risk:
Market
Volatility
(VIX)

Options, Futures, and Other Derivatives

Finance 4366, Spring 2024

Dr. James R. Garven

Department of Finance, Insurance and Real Estate
Hankamer School of Business
Baylor University

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Risk and Uncertainty

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Risk and Uncertainty, according to Knight, F. H. (1921). Risk, Uncertainty and Profit:

- Risk involves calculable probabilities, either *a priori* (e.g., coin toss outcomes) or based on empirical frequencies (e.g., stock market returns, probabilities of insurable events).
- Uncertainty arises when there's insufficient information for anticipating a future event and calculating its probability (e.g., events such as recessions, wars, acts of terrorism, pandemics, climate-related catastrophes, etc.).
- The key distinctions between Risk and Uncertainty are the extent to which future events can be anticipated, and event probabilities calculated (*a priori* or based on empirical frequencies).



Financial Risk: Market Volatility (VIX)

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- A particularly useful measure of future short-term market volatility is VIX; VIX is the ticker symbol for the Chicago Board Options Exchange (CBOE) Volatility Index.
 - VIX is intended to measure the “implied” volatility of a “synthetic” at-the-money option on the S&P 500 index, with 30 days to expiration.
 - Thus, VIX represents a short-term (30-day) forecast (market consensus) of the future stock market (S&P 500) volatility.
 - VIX is commonly referred to as a “fear” gauge, in that it proxies for the degree to which investors are averse to risk.
 - Higher (lower) VIX → higher (lower) risk aversion → higher (lower) cost of risk!



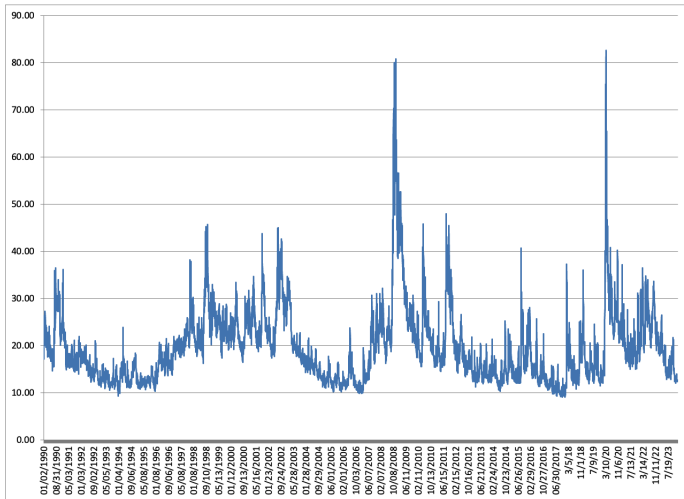
VIX Time Series, 1/2/1990 - 1/12/2024 (n=8,574)

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VIX Stats, 1/2/1990 - 1/12/2024 (n=8,574)

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No. of Observations	8,574	Date
Mean	19.58	
Standard Deviation	7.91	
Skewness	2.16	
Kurtosis	8.34	
Minimum	9.14	11/3/17
First Decile	12.08	
First Quartile	13.88	
Median	17.76	
Third Quartile	22.99	
Ninth Decile	28.87	
Maximum	82.69	3/16/20



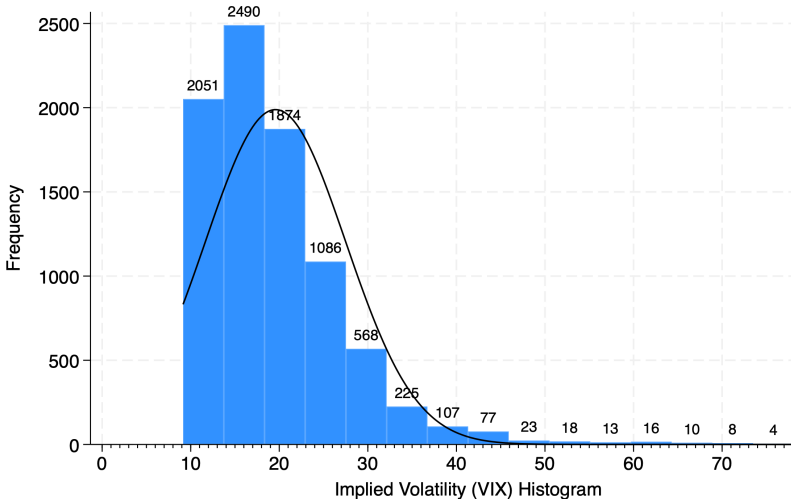
VIX Histogram, 1/2/1990 - 1/12/2024 (n=8,574)

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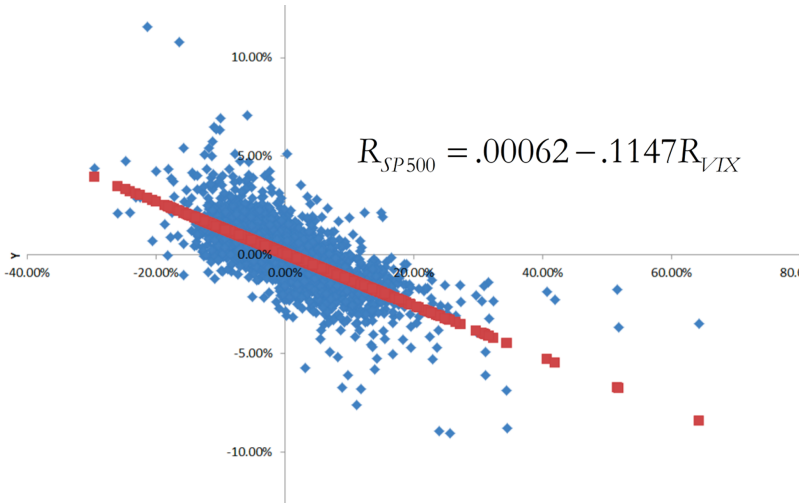
SP500/VIX Returns, 1/2/1990 - 1/12/2024 (n=8,574)

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On the relationship between the S&P 500 and VIX

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See “On the relationship between the S&P 500 and the CBOE Volatility Index (VIX).”