Volatility – Stylized Facts

There are a handful of *stylized facts* about asset price volatility. (A *stylized fact* is a term widely used in economics that refer to empirical findings that are so consistent -- for example, across a wide range of instruments, markets and time periods -- that they are accepted as truth) [1]: Here are several stylized facts about financial asset price volatility confirmed in numerous studies

- Volatility Exhibits Persistence.[2]. The clustering of large moves and small moves (of either sign – positive or negative) in prices was one of first documented features of volatility behavior. Large changes in the price of a financial asset are often followed by other large changes. Small changes in asset prices are often followed by small changes. The implications are that volatility shocks today influence the expectations of volatility many periods into the future. The forecast of future volatility depends upon information in today's *information set* such as today's asset price returns.
- Volatility Varies Over Time[3]. Up until the 1980s, researchers and practitioners used models in which volatility was assumed constant or static over time. In real life, volatility may vary considerably over time. The truths that volatility persists and volatility varies are not inconsistent or contradictory. Modeling and forecasting of volatility are regime-dependent. There are bull markets, bear markets, sideway markets and Risk On/Risk Off. Recall that the S&P 500 is itself a "portfolio of stocks". The volatility of the S&P 500 is dependent on two factors: 1) The idiosyncratic volatility of the 500 constituent stocks; and 2) The SPX stocks' correlations to one another. If correlations fall, it is possible for individual stock volatilities to rise even as the "S&P 500 portfolio" volatility falls.[4]
- Volatility has a Half-Life.[5] A "half-life" of volatility is defined as the time taken for an asset's volatility to move halfway back towards its unconditional mean or average level. Volatility reverts at a certain *Speed* to its eventual destination—its long-term *Mean*.
- Volatility is Mean-Reverting.[6] Volatility clustering implies that volatility ebbs and flows. A period of high volatility eventually gives way to more normal volatility. Similarly, periods of low volatility will be followed by a rise in VOL. But epochs of higher or lower volatility (market regimes) can last for long periods – months or even years.
- Volatility News is Self-Reinforcing. News of increased (decreased) volatility for a stock can cause a subsequent decline (increase) in stock's value because it reduces (increases) demand for the stock because of investors' risk aversion (risk-seeking appetite). Negative news sentiment is one source of heightened volatility levels.[7]

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[1] Sewell, M., 2011, "What Are Stylized Facts?", Research Note, University College London (UCL).
[2] Engle, Robert F and Patton, A., "What Good Is a Volatility Model?", *Quantitative Finance, Institute of Physics Publishing,* Volume 1, 2000.
[3] Ibid, "Time Series Econometrics: Cointergration and Autoregressive Conditional Heteroskedasticity (ARCH)", 2003.
[4] Edwards, Tim, & Hamish, Preston, "Reading VIX ®: Does VIX Predict Future Volatility?", S&P Dow Jones Indexes, Nov-2017, page 20.
[5] Ibid, Engle, Robert F and Patton, A., "What Good Is a Volatility Model?", 2000.
[6] Ibid, Engle, R., & Patton, A.; Ibid, "Reading VIX ®: Does VIX Predict Future Volatility?", pages 7-11.
[7] Smales, L., "News Sentiment as an Explanation for Changes in the VIX Futures Basis", *The Journal of Investing,* June 2020.