

Analysis of Betas

Dataset Overview:

- The analysis is based on a randomly selected subset of 250 stocks. This sample serves as a representative to gain insights into the broader market behaviour and individual stock performance.
- It's essential to understand that results might vary with different samples. Thus, the outcomes and insights derived from this analysis are specific to this set of stocks.

Summary Statistics for Beta Columns:

- General Behavior: All betas' average (mean) values are close to zero. This indicates that the betas for the majority of these randomly selected stocks are centred around zero.
- Variation: The standard deviation values are relatively small, suggesting most betas in this sample are clustered around their mean values.
- Range: The min and max values give us the extreme beta values, aiding in identifying outliers.

Deeper Insights from Beta Counts:

- Negative Betas: Among the provided beta columns, only the general beta, downbeta, and upbeta have negative values. These stocks move in the opposite direction to the market returns, offering potential diversification benefits.
- Betas Close to 1: None of the betas are close to 1, suggesting that none of these stocks move perfectly in tandem with the market.
- Top and Bottom Performers: The top records present stocks with the highest positive betas, expected to outperform the market in upward movements. In contrast, the bottom records for beta, downbeta, and upbeta show stocks that are likely to move counter to the market.

Implications & Insights:

- Relationship with the Market: A significant portion of the stocks in this sample has betas near zero, suggesting a weak correlation with the market.
- Diversification Potential: Stocks with negative betas can be intriguing for investors seeking diversification, as these stocks tend to move counter to the market.
- Risk and Returns: High positive beta stocks, being more sensitive to overall market movements, offer both higher potential returns and higher associated risks.
- Strategic Portfolio Management: This beta distribution can guide portfolio diversification. A mix of positive, near-zero, and negative beta stocks can strike a balance between potential returns and risk exposure.
- Monitoring and Adjustments: Keeping a regular tab on these betas can offer insights into changing market conditions, economic events, and other influencing factors.

Analysis of Risk Measures

Historical Distribution of Returns (2000-2010 vs. 2001-2011):

- The risk measures, specifically VaR and Expected Shortfall (ES), are influenced by the historical distribution of returns. This distribution reflects the past market conditions, economic events, and other financial indicators during a given period.

Value at Risk (VaR):

- 2000-2010: The one-day 5% VaR is -0.0101899004, implying that there is a 5% chance that the portfolio will experience a loss of 1.0189% or more on any given day.
- 2001-2011: The one-day 5% VaR is -0.00020712, suggesting a potential loss of only 0.0207% or more with a 5% probability on any given day.
- The VaR in the second period (2001-2011) is significantly lower than in the first period (2000-2010), indicating that the portfolio's risk profile in terms of potential losses has reduced over time.

Dollar Value at Risk (\$VaR):

- 2000-2010: The Dollar Value of VaR is -2,547,475.1, meaning there's a 5% chance the portfolio will lose more than 2.54 million in a single day.
- 2001-2011: The Dollar Value of VaR is -51,780, indicating a potential loss of 51,780 or more with a 5% probability on any given day.
- The difference in dollar VaR between the two periods is substantial, further emphasizing the decreased risk in the latter period.

Expected Shortfall (ES):

- 2000-2010: The ES is -0.0154725723741007, or -1.5473%. This implies that, given the portfolio experiences losses exceeding the VaR, the expected loss is 1.5473%.
- 2001-2011: The ES is -0.000362794579221643, or -0.0363%, suggesting that if losses exceed VaR, the expected loss would be only 0.0363%.

The ES for the 2001-2011 period is also significantly lower than the 2000-2010 period, reinforcing the idea of diminished risk in the latter decade.

Variance Analysis

Volatility Over Time:

- In the plots from the first decade (2000-2010), the volatilities are generally smoother with occasional spikes. This indicates periods of financial calm interspersed with short-term shocks or market events.
- The plots from the second decade (2012-2022), generated using GARCH, show a more pronounced variance. This suggests more frequent market events, shocks, or higher market uncertainty during this period.

Increased Variance in the Second Decade:

- The GARCH model often captures the clustering of volatility, which means that high-volatility days tend to be followed by high-volatility days and vice versa for low volatility. This "volatility clustering" feature of financial returns is a central reason why models like GARCH are popular.
- The higher variance in the second decade might be indicative of significant economic events or changes during this period. For example, we know from history that the 2010s saw significant geopolitical tensions, trade wars, and other macroeconomic events that might have caused increased market uncertainty.

Economic Implications:

- Financial Markets: Increased volatility often implies greater uncertainty in the financial markets. This can be due to a variety of reasons - from macroeconomic factors, policy changes, and geopolitical events, to shifts in investor sentiment.
- Investment: For investors, higher volatility usually means higher risk. Portfolios might need rebalancing to adapt to the changing risk profile of assets.
- Trading: For traders, especially those involved in short-term trading, increased volatility might mean more opportunities due to price fluctuations. However, it also means more risk.
- Economic Indicators: High volatility in stock returns can sometimes be indicative of broader economic issues. For instance, it might indicate problems with corporate profitability, changes in regulations, or concerns about economic growth.

Missing Data for Two Firms in the Second Decade:

- It's important to note that data was missing for two firms in the 2012-2022 dataset. The absence of these firms might skew the comparison slightly. The reasons for missing data can vary - the firms might have gone out of business, been acquired, or the data might just be unavailable.
- It would be interesting to investigate why data for these firms is missing, as that in itself could provide insights into the economic and corporate landscape of the second decade.

Comparison of Models:

While the RiskMetrics model provided a more general approach to volatility, GARCH(1,1) provides a more adaptable model where volatility is influenced by past returns (through the alpha parameter) and past volatilities (through the beta parameter). This adaptability is likely why the GARCH model picked up more pronounced variances in the second decade.

Conclusion: The increased volatility in the 2012-2022 period, as captured by the GARCH model, suggests a decade of higher market uncertainty compared to 2000-2010. While models provide a quantitative measure, understanding the qualitative economic, geopolitical, and corporate events of these periods can provide a comprehensive picture of the evolving risk landscape.