Assignment – 4 Analysis

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Mean Beta and Standard Deviation Over Time by Industry (1996-2023)
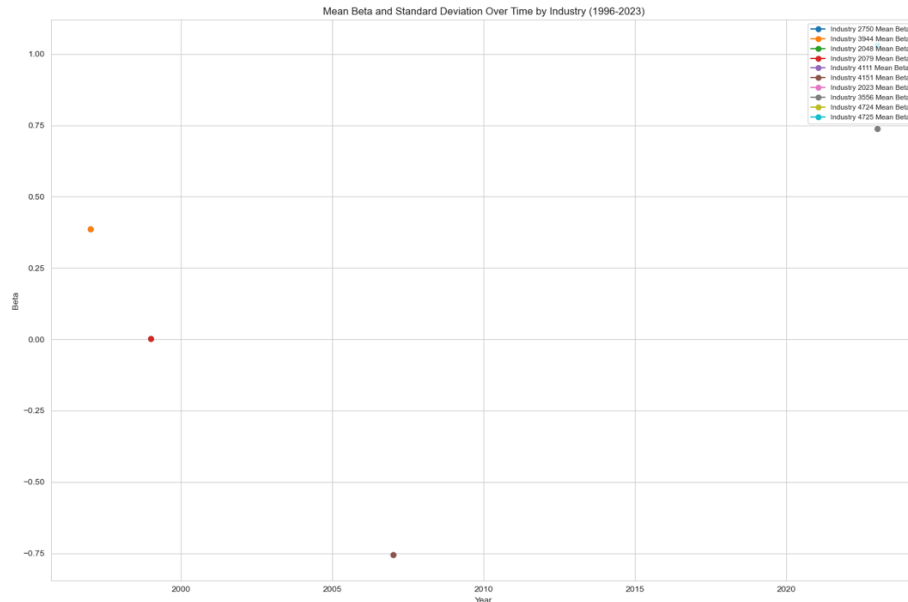
One of the interesting observations that can be drawn from the Mean Beta and Standard Deviation Over Time by Industry (1996-2023) plot is the varying relationship between industries and market risk exposure over the years. It is evident that different industries demonstrate distinct beta behaviors, which reflect their sensitivity to market fluctuations.

For example, Commercial Printing (SIC 2750) shows relatively stable beta values, indicating a consistent relationship with the market. This stability could be attributed to the less cyclical nature of this industry, as demand for printing services may not vary as significantly as other sectors during market changes. Similarly, industries like Frozen Specialties (SIC 2094) and Sausages and Other Prepared Meat Products (SIC 2019) exhibit steadier betas, further illustrating that their market sensitivity remains moderate despite economic shifts.

On the contrary, industries such as Games, Toys, and Children's Vehicles (SIC 3944) and Local and Suburban Transit (SIC 4111) display higher beta values, which suggest that these sectors have had periods of heightened market exposure. This could be due to their dependency on consumer demand and economic cycles, making them more vulnerable to macroeconomic conditions.

Interestingly, industries like Tour Operators (SIC 4725) and School Buses (SIC 4151), which show negative or low betas, reveal an inverse or limited relationship with the broader market. These industries likely benefited from countercyclical trends or were less impacted by market downturns, making them potential hedging opportunities in volatile times.

Furthermore, the variation in standard deviation across industries gives insight into the volatility of these sectors. For instance, Travel Agencies (SIC 4724) and Food Products Machinery (SIC 3556) exhibit higher standard deviations, signifying that they have faced more volatile market conditions compared to industries like Dry, Condensed, and Evaporated Dairy Products (SIC 2023), which appear to have maintained relative consistency.

Overall, the plot reveals how industries have reacted to market conditions over time. This information can be instrumental in developing investment strategies that account for both the systematic risk associated with each industry and the potential for volatility.
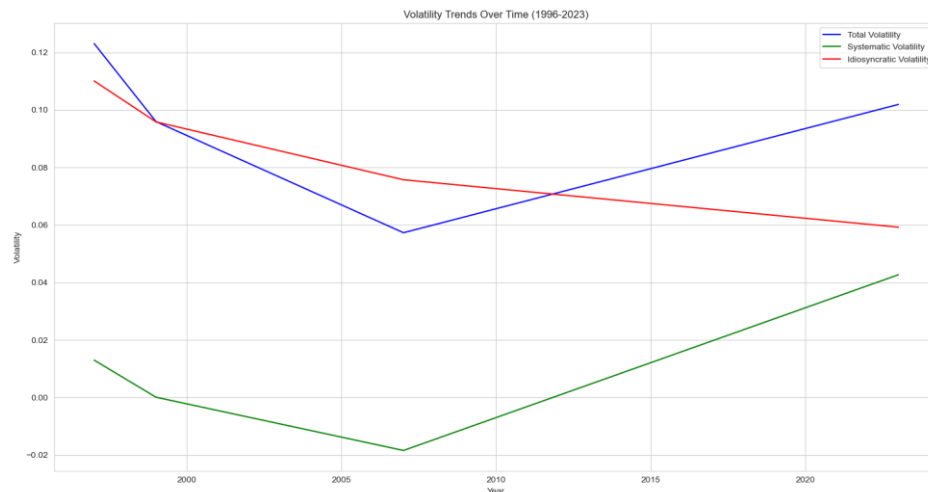
The graph shows how overall, idiosyncratic, and systematic volatility changed over this time in the market. The total volatility shows a declining trend from the late 1990s to approximately 2010, at which point it begins to steadily rise, suggesting an increase in market instability in the recent past. The systematic volatility, begins the timeline with a tiny dip and stabilises temporarily around 2010, after which it rises rapidly through 2023. This rise suggests increased market-wide uncertainty, which could be influenced by world events or macroeconomic variables. On the other hand, firm-specific risks are captured by idiosyncratic volatility (red line), which has been steadily decreasing, indicating that individual enterprises have gotten less volatile in comparison to the market.
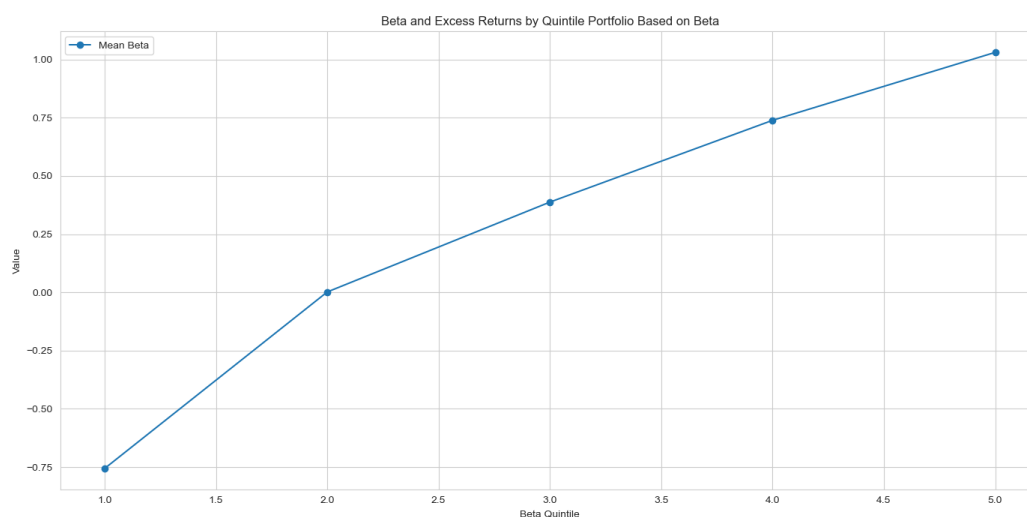
The plot demonstrates a steady upward trend, showing that as beta increases across the quintile portfolios, average excess returns also grow. This signifies that portfolios with higher beta values tend to deliver stronger returns compared to those with lower betas. The consistent positive slope reflects how portfolios with greater market exposure and sensitivity (higher betas) yield better performance. In a risk-on environment, where investors are more willing to take on risk, this behavior is logical—riskier stocks demand higher compensation,

which manifests in greater excess returns for portfolios with higher beta. Furthermore, this pattern reinforces the idea that riskier stocks tend to outperform during periods of market expansion, contributing to the steeper returns seen in higher-beta portfolios.

The plot shows a clear fluctuation in beta across quintile portfolios based on idiosyncratic volatility. The second quintile has the highest beta, indicating that portfolios with moderate idiosyncratic volatility are more sensitive to market movements. However, there's a sharp drop into negative beta territory in the third quintile, suggesting that as volatility increases, company-specific risks start to outweigh market factors. As we move to higher quintiles, beta begins to recover, indicating that portfolios with the highest idiosyncratic volatility regain some market exposure, though not as strongly as in the moderate volatility range.