

# **INVESTMENT ANALYSIS AND PORTFOLIO MANAGEMENT**

**Title: How do the course materials relate to the US stock market volatility during the 2020-23 Pandemic?**

## **Brief Introduction About The Paper**

The 2020-2023 pandemic introduced an unprecedented combination of global health, economic, and psychological shocks. Financial markets, particularly the U.S. stock market became a battleground of fear, speculation, and hope. In the space of weeks, it experienced both historic declines and jaw-dropping recoveries. While the pandemic was unique, the way markets behaved can be interpreted through familiar tools from investment analysis and portfolio theory. This paper explores Four key topics covered in the Investment analysis and portfolio management course. The topics are going to be short-term investment risk, fat-tailed return behavior, limits of diversification and market efficiency, these will help in explaining what happened in the duration of pandemic and why. These frameworks don't explain everything, but they offer critical insight into how investors processed and responded to the chaos. This will help us in connecting classroom models with one of the most volatile periods in modern financial history.

**Topic 1: Stocks are particularly risky when the investment horizon is short**

One of the clearest lessons that the course has taught me is that stocks are especially risky when held over short periods. Data from the MSCI US Index and CPI (Problem Set 2, Q2) shows that the worst one-year real return was  $-37.19\%$ , while the best was  $+34.77\%$ , with an average return of  $7.79\%$ . In nearly 30% of the years, returns were negative which in return highlights that even historically strong markets can disappoint in the short run. These stats alone make a strong case that a one-year investment horizon is a gamble for any risk-averse investor.

The 2020 pandemic proved this risk in real time. From February 19 to March 23, 2020, the U.S. stock market fell over 34% in just 33 trading days (as per Severe drawdowns in the US stock market). The speed and depth of that drop shocked even seasoned investors. And while the market eventually bounced back, reaching pre-pandemic levels by August 2020, the experience underscored how violent short-term equity swings can be. Investors with longer horizons had the benefit of recovery, but those who needed liquidity or exited in panic likely crystallized huge losses. In short, this period reminded everyone that short-term investing in equities is not for the faint of heart.

This insight connects to how investment horizons influence strategy selection. While equities may outperform other asset classes over the long run, their short-term behavior can be punishing. Risk-averse investors, especially those close to needing liquidity, would benefit from diversifying into less volatile instruments or staggering entry points over time to manage downside exposure.

**Topic 2: Stock daily returns have ‘fat’ tails (‘extreme’ daily returns are more likely than what the Normal distribution suggests). What were the largest daily percentage losses in the history of the US stock market?**

Standard models often assume that daily stock returns follow a normal distribution. But in reality, markets have "fat tails", extreme outcomes that happen more often than expected.

Slide 7-6 notes illustrate this by comparing a model-based Value-at-Risk (VaR) of \$6,990 with an actual loss of \$8,000. That difference isn't just a rounding error, it shows that models can significantly underestimate the true risk of rare but severe events.

Historical data showcases that from 1926 to 2020, the U.S. market had 13 days where stocks lost more than 8%. If markets were truly normal, such events would occur once every 126 years, not every 7 or so. The pandemic saw several of these outsized moves packed into just a few weeks. These tail events matter because they're where many investors panic or are forced to sell. Tools like Conditional VaR or stress testing provide more realistic scenarios and highlight why it's crucial not to rely solely on elegant mathematical assumptions.

For investors, fat tails are more than just a technical issue. They affect portfolio design, stress scenarios, and even the psychology of holding through volatility. COVID-19 showed that fat-tail risk isn't just theoretical, but it is real and unavoidable. As a result, professional investors began allocating more resources to downside hedging and liquidity planning. Some hedge funds, for instance, thrived in early 2020 by betting on volatility spikes, while others suffered due to lack of preparation for extreme scenarios.

**Topic 3: Breakdowns in stock correlations limit diversification benefits during crises (Treasury bonds are typically useful) and How does stock diversification reduces unique risk but does not eliminate market risk?**

Diversification is often treated like a financial safety net, but it does not always works as a shield. Under normal market conditions, diversification across assets can reduce portfolio volatility. But when panic sets in, correlations tend to spike. Slide 9-11 shows how correlations between large companies like Coca-Cola and Pepsi can jump from 0.5 to 0.99 during a crisis.

In the first quarter of 2020, stock and corporate bond funds dropped by nearly 20% and 14%, respectively. Even Treasury bonds fell by more than 10% (slide 9-12). Only 3-month T-bills held up. This pattern shows that during crises, everything sells off together, and typical diversification strategies lose their effectiveness.

Slides 11-16 through 11-19 referring to market risk, unique risk and diversification, further clarify that diversification helps reduce firm-specific risk, but not market risk. Even portfolios with hundreds of stocks remain vulnerable to macro shocks like a global pandemic. Investors learned that in 2020, no amount of traditional diversification could fully cushion against the systemic impact of a world facing a standstill.

In hindsight, the lesson isn't that diversification fails, but that its limits need to be acknowledged. In times of extreme stress, only the most liquid and risk-free assets (like T-bills) maintain their defensive qualities. This reinforces the idea that true risk management

requires not just spreading capital across stocks, but across fundamentally different risk factors like credit, inflation, interest rate sensitivity, and geopolitical exposure.

**Topic 4: Do stock prices reflect/embed available information (e.g., the economic impact of the 2020-23 Pandemic)? Also are markets efficient or inefficient?**

According to the Efficient Market Hypothesis (EMH), stock prices incorporate all known information, meaning markets are always “right.” Slides 15-2 to 15-5 outline the weak, semi-strong, and strong forms of EMH. During the early stages of the pandemic, the market seemed to behave efficiently, where prices plunged in response to global shutdowns, then recovered as vaccines emerged and stimulus flooded in. That aligns well with the semi-strong form, where markets quickly rise in new public information.

But the rally that followed raised eyebrows. Slide 15-15 presents Fama's argument for efficiency, while slide 15-16 shows Shiller's more skeptical view. Meme stocks, SPAC bubbles, and surging crypto prices in 2021 suggest that investor psychology played a larger role than fundamentals. Many companies with little or no earnings saw their share prices skyrocket, driven by social media hype and retail trading frenzies.

All of this suggests that while markets are capable of efficiency, they are not immune to speculation, narrative, and crowd behavior. The pandemic didn't invalidate EMH, but it certainly tested its boundaries. A blended view that incorporates both rational pricing and behavioral excesses seems most consistent with what unfolded.

The divergence between price behavior and economic reality during this period offers fertile ground for further research. It also highlights why understanding behavioral finance is critical and not just to explain anomalies but to anticipate them.

## **Conclusion**

The COVID-19 pandemic shocked financial markets and revealed just how quickly theory meets reality. Through the lens of my course, the crisis reinforced important lessons like short-term investing in equities is risky; extreme events happen more often than expected; diversification has limits during systemic shocks; and markets can behave both rationally and emotionally.

No model perfectly captures how humans behave under pressure, but combining traditional frameworks with behavioral awareness can bring us closer. The market during 2020–2023 didn't break the rules, but it bent them, stretched them, and reminded us why those rules exist in the first place. As a future investor or analyst, understanding both the math and the mindset behind market behavior is essential. The pandemic was not just a historical event, but was an accelerated seminar in financial realism, leaving behind lessons that are likely to shape investment thinking for years to come.