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Black Monday and the Limits of Financial Knowledge

By Noah S. Shallman

AUTHOR BIOGRAPHY

Noah Shallman is a junior at the Harvard-Westlake School in Los Angeles. In his free time, Noah enjoys playing chess and playing upright bass for his school jazz band and at the prestigious Colburn School. Noah is the co-lead of several school clubs and affinity groups, including the Investment Club, JBop and Cadence for a Cause (students perform live music for senior citizens and at homeless shelters), and Do-It (affinity group for neurodivergent students). Noah also serves as an Ambassador for Our Big Kitchen Los Angeles, a non-profit that provides meals to the food insecure throughout Los Angeles, and tutors and plays chess competitively.

ABSTRACT

The stock market crash of October 19, 1987 is often explained through market microstructure or through investor psychology. This paper advances a more nuanced interpretation, in which it is argued that Black Monday revealed a fundamental epistemic limit of financial modeling in modern markets. Through an analysis of portfolio insurance, derivative expirations associated with “triple witching,” and contemporaneous market data, this paper shows how algorithmic trading bolstered uncertainty.

Keywords: *Black Monday, Investor Psychology, Market Microstructure, Epistemic Limit, Portfolio Insurance, Algorithmic Trading, Derivative Expirations, Financial Modeling*

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INTRODUCTION

On Monday, October 19, 1987 (also known as “Black Monday”), stock markets around the world fell in unison. In New York, the Dow Jones Industrial Average lost nearly a quarter of its value in a single trading day, while major indices in London, Hong Kong, and Sydney experienced similar collapses. The speed and breadth of the decline stunned investors who had never seen computers and financial engineering play such a large role in market panic. Automated trading systems and portfolio-insurance strategies further accelerated such panic.

Portfolio insurance programs, which were built to mimic the payoff of put options by selling stock-index futures as prices fell, flooded the market with automated sell orders. At the same time traders were preparing for a phenomenon known as “triple witching,” the quarterly expiration of stock-index futures, index options, and single-stock options, which already encouraged mass position-shifting. As prices continued to fall, each new futures sale pushed values lower and triggered even more sales that drained liquidity from the cash market.

This paper posits that the 1987 stock market crash exemplifies an epistemic limit of financial modeling in a modern market. While portfolio-insurance and derivative-based risk management were mathematically coherent under assumptions of continuous liquidity and independent decisions, conditions of stress led to their collapse. Algorithmic models destabilized the system they were created to protect. Additionally, the Federal Reserve’s intervention did not succeed because of its strict coherence to a model, but because it ignored algorithmic thinking and adapted discretionary authority. Black Monday thus is the first crisis in which formal financial knowledge was superseded by the stabilizing force of the Federal Reserve’s institutional judgement.

For clarity, portfolio insurance in this paper refers to dynamic hedging programs that adjusted futures positions in response to changes in stock indexes. Triple witching refers to the simultaneous expiration of the three main equity derivative contracts each quarter. The focus here is on exchange-traded derivatives such as futures and options; private contracts such as swaps are not included.

LITERATURE REVIEW

Scholarship on the causes of the 1987 crash is mainly divided into two camps. The first emphasizes market microstructure and engineering failures, particularly the interaction of portfolio insurance, program trading, and liquidity shortages. The second highlights macroeconomic or psychological triggers, often placing less weight on technical structures and more on investor sentiment or broader policy contexts. While both approaches illustrate important facets of the crisis, each in isolation obscures the interaction between trading mechanics and institutional response. A careful historiographical analysis reveals the evolution of these interpretations and the limitations of treating the crisis as either purely structural or purely macroeconomic.

The earliest official government investigations, most notably the Brady Commission, framed the crash in terms of structural failures. The Commission reported that three large portfolio-insurance programs accounted for approximately forty percent of S&P 500 futures sales on October 19, concluding that such concentration “accelerated and exacerbated” the market decline (Presidential Task Force on Market Mechanisms, 1988). Companion reports by the SEC, CFTC, NYSE, CME, and GAO broadly echoed this assessment, though several stopped short of identifying program trading as the sole cause (U.S. General Accounting Office, 1988). The strength of these reports lies in their empirical rigor, grounded in trade records, but their focus on identifying a “villain” oversimplified what was ultimately a system-wide feedback mechanism. By attributing disproportionate responsibility to portfolio insurance, they risked neglecting the interaction of automated selling with broader liquidity and expiration pressures.

Early academic literature contested the scale and significance of portfolio-insurance selling. Economist and academic Robert Shiller framed it as an “investor fashion,” emphasizing self-reinforcing psychological dynamics more than mechanical design flaws (Shiller, 1989). These findings collectively reveal the fragility of causal attribution in fast-moving crises. However, while Shiller’s focus on investor sentiment usefully broadens the discussion, it risks underestimating the structural dynamics that set the pace of selling.

As archival material became more accessible, scholarship shifted toward the Federal Reserve’s role in crisis management. Economist Mark Carlson’s reconstruction of intra-day funding strains demonstrated that the Fed’s rapid injection of liquidity, combined with its public commitment to serve as a “source of liquidity,” brought down the effective federal funds rate within a day (Carlson, 2007). This interpretation challenged earlier accounts that portrayed the central bank as reactive, instead emphasizing its proactive stabilization efforts. The strength of this literature is its recognition of central-bank communication and liquidity policy as integral to crisis management. Its limitation is that it often treats market structure and policy intervention as separate spheres. A more integrated analysis suggests that the Fed’s actions functioned as a direct counterweight to portfolio-insurance-driven selling, thereby blurring the line between structural mechanics and institutional response.

Recent scholarship cites Black Monday as the beginning of the algorithmic-liquidity era. Comparative studies with the 2010 Flash Crash and the 2020 Covid sell-off argue that feedback-based rules continue to threaten market stability when automated flows exceed manual market-making capacity. These comparisons illuminate the enduring relevance of feedback loops, but they also risk overstating technological differences. While modern protections such as circuit breakers reduce the likelihood of an identical replay, the fundamental vulnerability remains: concentrated hedging flows can destabilize liquidity even in deeper and more electronic

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markets. The persistence of this feedback problem underscores the need to frame the 1987 crash as a template for crises in increasingly automated environments.

PORTFOLIO INSURANCE

On October 19, 1987, portfolio-insurance programs became one of the most visible structural elements shaping the crisis. These strategies, promoted by major investment banks and adopted widely by institutional investors, were designed to replicate the returns of put options by automatically selling stock index futures as prices fell. Their advocates, such as Leland and Rubinstein, framed them as a way to engineer downside protection in increasingly volatile markets. Yet on Black Monday, their logic intersected with the clearing and settlement system, producing systemic stress.

The volume of automatic sales overwhelmed exchanges and clearinghouses. Former Federal Reserve chair Ben Bernanke later wrote: “[T]he clearing and settlement process... did survive the critical days intact, [but] there were undeniably severe stresses and strains,” adding that fears of failure “added to the sense of panic” (Bernanke, 1990, p. 134). This source shows that fragility was not confined to market prices but extended to the infrastructure of financial stability.

Economist and author David Bates provided further evidence that the decline was structurally amplified rather than spontaneously generated (Bates, 1991). Bates’ options-market study demonstrated that while traders priced in the possibility of a significant decline earlier in 1987, volatility measures subsided in the weeks before October. The absence of anticipatory signals strengthens the conclusion that the crash reflected endogenous mechanisms within market design. Yet portfolio insurance rested on a particular epistemology of risk. It assumed that markets were sufficiently liquid to permit continuous rebalancing and that individual hedging actions would not materially affect aggregate outcomes. These assumptions were relatively consistent with an equilibrium-based financial theory but seemed fragile under a collective stress.

Portfolio insurance did not independently “cause” Black Monday, but by linking futures sales to automatic triggers, it made equity markets structurally fragile. Most importantly, it revealed the limits of formal risk management in interconnected markets. The next section looks at another mechanical feature of 1987 markets: the clustered expiration of derivatives contracts known as “triple witching.”

TRIPLE WITCHING

Another structural feature of the 1987 markets was the periodic convergence of multiple derivative expirations, known as “triple witching.” On these dates, stock index futures, index options, and single-stock

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options expired simultaneously. This would force traders to close or roll over large positions. In October 1987, these expirations occurred at an unusually large scale, adding stress to already fragile markets.

Program traders, who executed arbitrage between futures and cash prices, were extremely important figures. Their activities, usually stabilizing, became destabilizing when conducted on a large scale. As Bernanke (1990) observed, clearing members faced urgent calls for “cash or government securities” to meet obligations precisely as liquidity was evaporating. The simultaneity of expiration and forced margin demands concentrated risk in narrow windows.

Author and investor John Bogle later described the event as a “black swan,” highlighting both the rarity and unpredictability of such compounded stresses. The description suggests that structural timing, not fundamental deterioration, was decisive in shaping the crash’s intensity (Bogle, 2008). Triple witching magnified structural fragility by clustering trades, margin calls, and liquidity demands into concentrated bursts. While it did not initiate the downturn, it showed the inability of a formal trading model to accommodate continuous stress, thus demonstrating how market structure can amplify a crisis when a theoretical assumption fails.

FEDERAL RESERVE

If portfolio insurance and expirations created instability, the Federal Reserve was instrumental in preventing collapse. On October 20, 1987, the Fed issued a short statement affirming its ability to provide liquidity (Federal Open Market Committee, 1987). This was a commitment that was widely heard across financial markets.

The archival record shows that the Fed instructed banks to extend credit to securities firms and inject liquidity through repurchase operations. Bernanke (1990) later emphasized that the central bank was embedded in the very infrastructure at risk: “If firms could not pay margins or settle trades, the entire system could freeze.” By signaling unlimited support for liquidity, the Federal Reserve was able to stem panic before it turned into an extensive institutional failure.

Not everyone saw this as unambiguously good. Investor George Soros argued that while the Fed’s actions kept the system intact, they also encouraged more risk-taking in the future. This is the beginning of what later critics would call the “Greenspan put” (Carlson, 2007). It is widely accepted, however, that the Fed’s intervention was decisive. Without it, the crash could have turned into a much broader financial crisis.

The Fed’s intervention prevented Black Monday from becoming a Great Depression-style collapse, but it also created long-term changes in investor expectations. This section demonstrates that crisis management

cannot be separated from structural fragility: the architecture of trading created the crisis, while the architecture of central banking contained it. The next section looks at contemporaneous interpretations, illustrating how economists at the time debated causes and consequences.

Black Monday generated immediate debates about causation and meaning. Government commissions and theorists offered divergent interpretations, thus revealing tensions between the structural and psychological explanations. The Brady Commission attributed the crash largely to investor psychology and the Government Accountability Office underscored the role of program trading (Presidential Task Force on Market Mechanisms, 1988; U.S. General Accounting Office, 1988). This difference illustrates how different institutions had vastly different opinions on the reasons for the crash.

Soros (1988) interpreted the crash through his theory of reflexivity: “Markets do not simply reflect reality; they shape it.” For Soros, the crash was proof that feedback loops in expectations could destabilize systems. By contrast, Bogle (2008) emphasized unpredictability, calling the crash a reminder that “markets can move in ways models fail to capture.”

For ordinary investors, the crash was terrifying. Yet within months, stock markets had regained much of their losses. This rebound suggested that the fundamentals of the economy had not collapsed. Instead, the crash was a dramatic event caused by trading structures and psychology, not by a deep and continuing economic downturn. These competing interpretations reveal the central question on whether the crash was primarily structural or psychological. Evidence suggests that the two reinforced each other. Structural features magnified changes in the market, while psychology accelerated them.

This section attempts to describe the contested understanding of 1987, ultimately preparing for a final reflection on its long-term lessons for modern finance. In retrospect, the 1987 crash marked a turning point in the architecture of global finance. Computers, derivatives, and interconnected markets created new systemic risks that were invisible until stress revealed them. Portfolio insurance, triple witching, and margin rules were not individually novel, but their convergence produced vulnerabilities that regulators failed to anticipate. Bernanke, Bogle, and Soros each highlighted different dimensions of this fragility, but all agreed that structural dynamics transformed a correction into a systemic crisis. At the same time, the rapid recovery of equity markets demonstrated resilience. Fundamentals remained intact, and within months, losses were largely erased. This juxtaposition of fragility in structure, and resilience in substance remains central to historical analysis. Black Monday demonstrated that financial markets are not computational systems that can be completely mastered, they possess an intellectual limit. Modern markets ultimately rely on judgment to contain the risks that they generate.

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