

# THE FIVE FACES OF FINANCIAL RISK

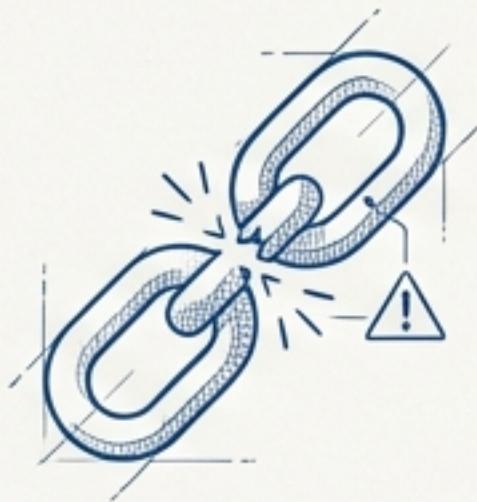
Financial institutions face five primary categories of risk, each with the potential to cause significant losses if not properly managed.



## MARKET RISK

Risk of losses in on- and off-balance-sheet positions arising from movements in market prices (interest rates, equity prices, FX rates, credit spreads, commodities, volatility, etc.).

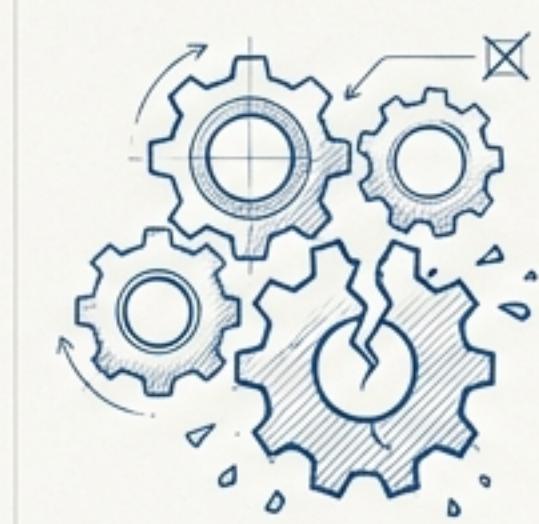
**Example:** A bank holding a portfolio of long-term fixed-rate bonds suffers losses when interest rates rise and bond prices fall.



## CREDIT RISK

Risk of loss due to a counterparty's failure to meet its contractual obligations in full and on time.

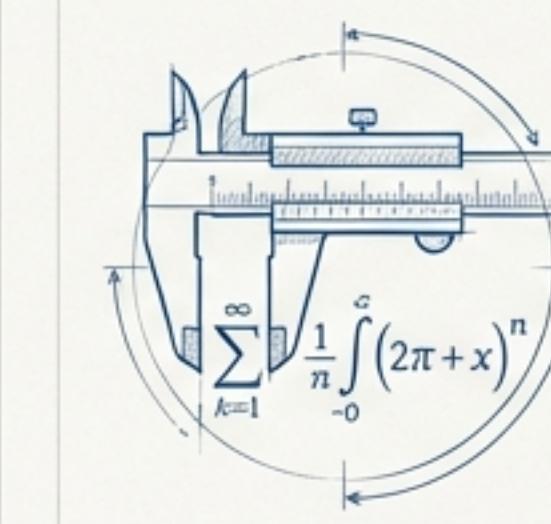
**Example:** A corporate borrower defaults on a term loan, or a derivatives counterparty fails to pay a large mark-to-market amount.



## OPERATIONAL RISK

Risk of loss resulting from inadequate or failed internal processes, people and systems or from external events. This includes fraud, processing errors, and legal failures.

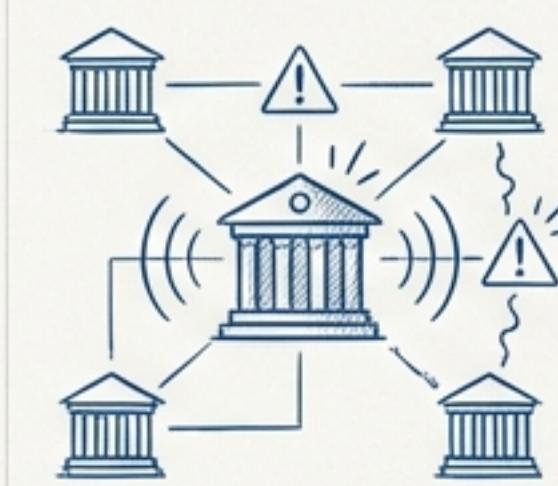
**Example:** A trader enters a "fat-finger" order that is not caught by controls, creating a large, unintended position and loss.



## MODEL RISK

Risk of losses or wrong decisions arising from the use of incorrect, mis-specified, mis-calibrated or mis-implemented models.

**Example:** A VaR model that assumes normal returns and ignores liquidity risk leads to a severe underestimation of tail losses in stressed markets.

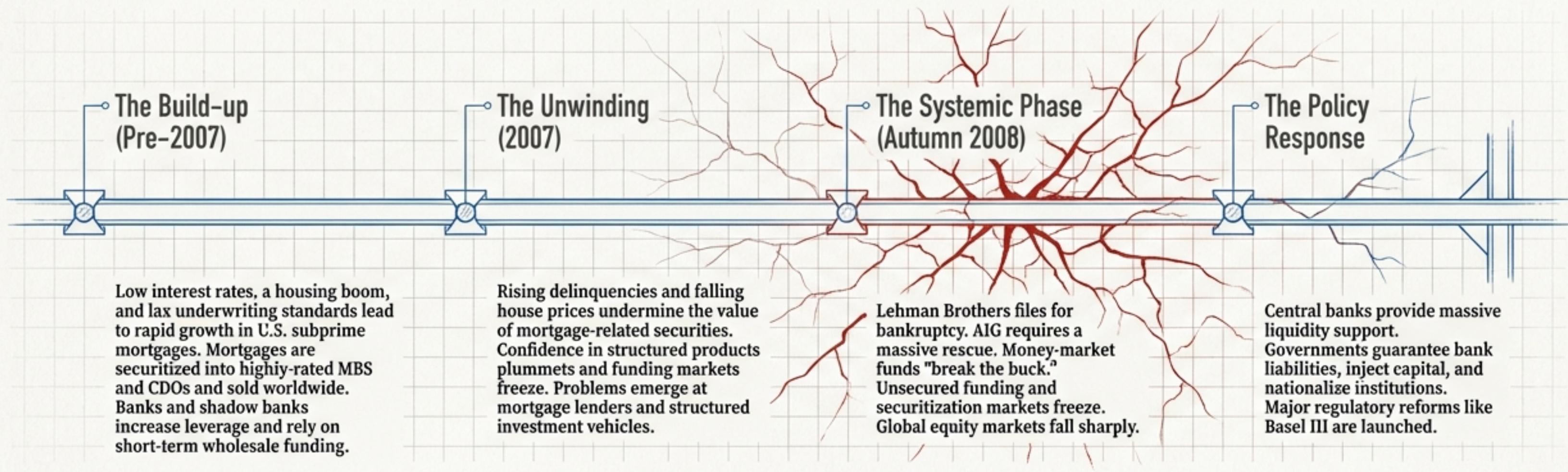


## SYSTEMIC RISK

Risk that distress or failure of a large or highly interconnected institution triggers serious dislocation of the broader financial system and real economy.

**Example:** The failure of a major dealer bank causing fire sales and funding stress across many other institutions.

# Anatomy of a Meltdown: The 2007–09 Financial Crisis



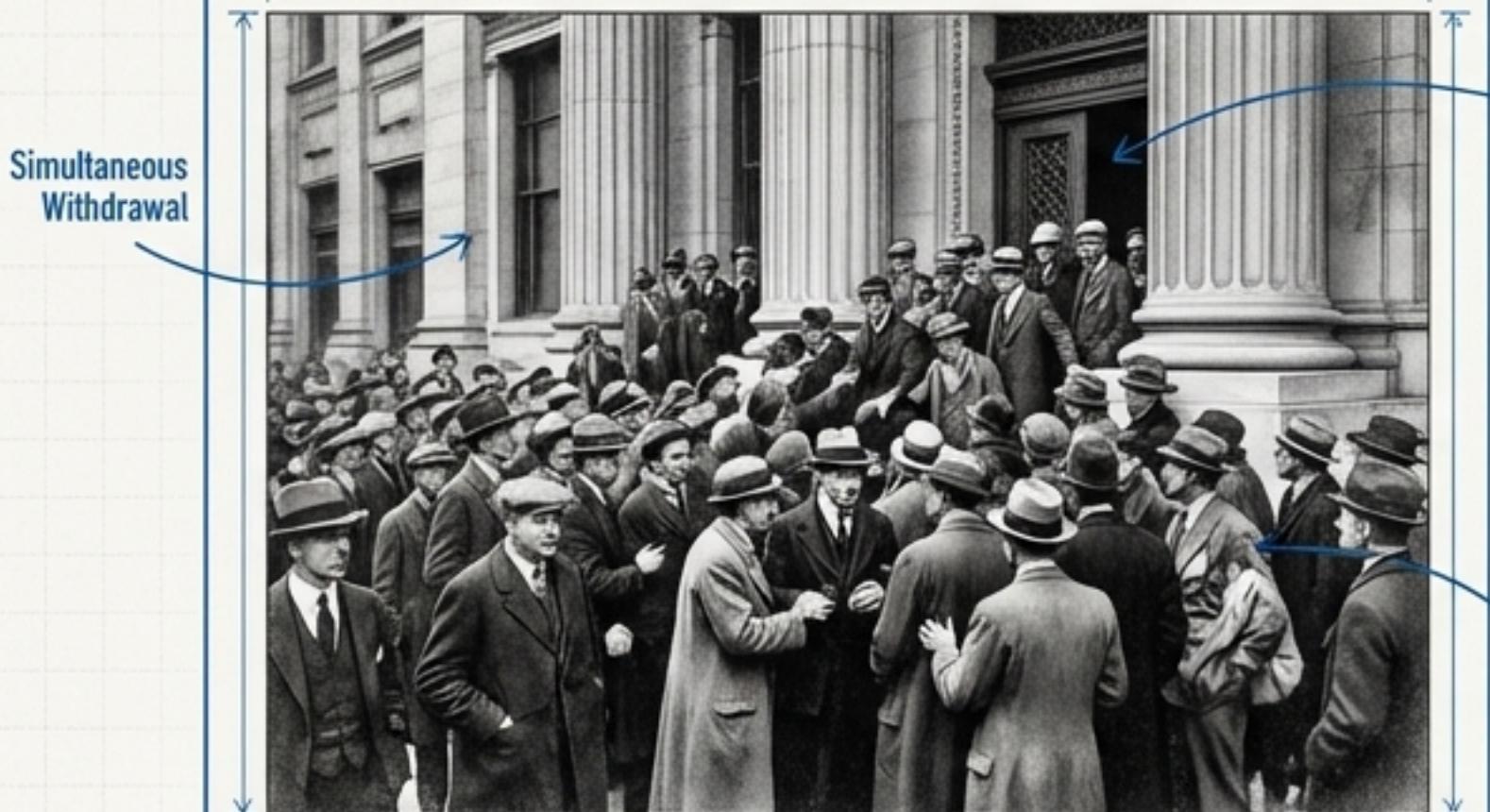
## Core Causes

- Excessive leverage and maturity transformation.
- Misaligned incentives in the originate-to-distribute model.
- Over-reliance on ratings and models.
- Inadequate liquidity and systemic-risk regulation.
- Weak governance and risk management.

# THE PSYCHOLOGY OF PANIC: UNDERSTANDING THE BANK RUN

A *bank run* occurs when many depositors simultaneously try to withdraw their funds because they fear the bank may become insolvent or illiquid. Since banks transform short-term deposits into longer-term, illiquid assets, they cannot meet large sudden withdrawals without selling assets at depressed prices or failing.

## The Great Depression (Early 1930s)



In the U.S., a wave of panic led depositors to rush to withdraw funds.

- **Outcome:** Thousands of banks failed, deepening the economic crisis and leading to the creation of deposit insurance schemes.

## Northern Rock (2007)



In the U.K., the bank required emergency liquidity from the central bank, sparking a modern-day bank run.

- **Outcome:** Depositors were seen lining up outside branches, a stark visual that accelerated the crisis of confidence and led to its nationalization.

# The Three Pillars of Financial Regulation

## Pillar 1: Quantitative Requirements

Concept: Establishes minimum financial resources firms must hold.

*Basel*: Minimum capital requirements for credit, market, and operational risk; leverage and liquidity ratios.

*Solvency II*: Solvency Capital Requirement (SCR) and Minimum Capital Requirement (MCR) based on an economic valuation of assets and liabilities.

## Pillar 2: Supervisory Review & Governance

Concept: Requires firms to assess their own risks and gives supervisors power to intervene.

*Basel*: Internal Capital Adequacy Assessment Process (ICAAP) and Supervisory Review (SREP).

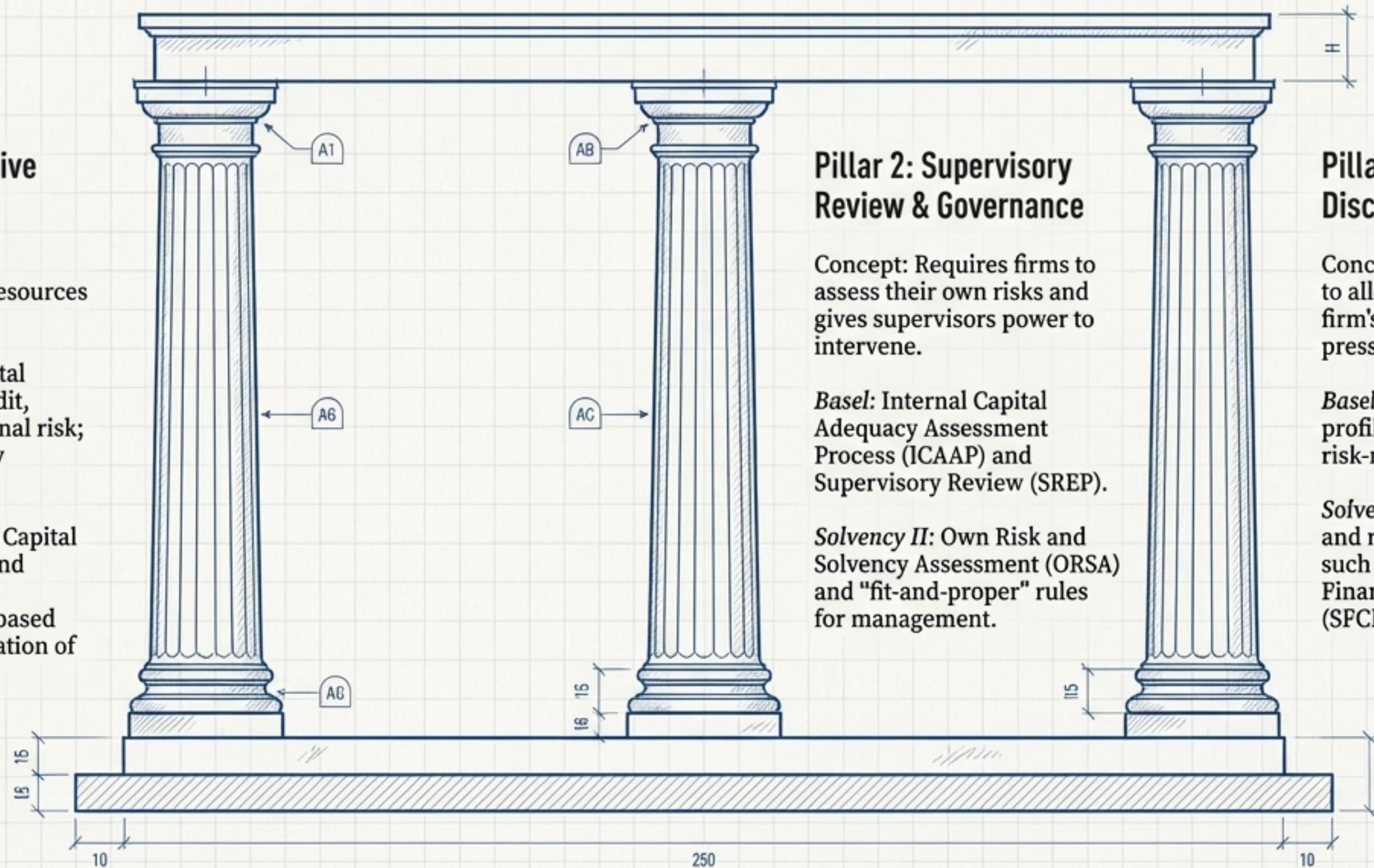
*Solvency II*: Own Risk and Solvency Assessment (ORSA) and "fit-and-proper" rules for management.

## Pillar 3: Market Discipline & Disclosure

Concept: Uses transparency to allow the market to assess a firm's risk profile and apply pressure.

*Basel*: Public disclosure of risk profile, capital levels, and risk-management practices.

*Solvency II*: Extensive public and regulatory reporting, such as the Solvency and Financial Condition Report (SFCR).



# A TALE OF TWO FRAMEWORKS: BASEL VS. SOLVENCY II

| FEATURE                      | BASEL FRAMEWORK (BANKING)   | SOLVENCY II FRAMEWORK (INSURANCE)   |
|------------------------------|---|---|
| <b>Sector &amp; Scope</b>    | Applies to banks and investment firms globally.   | Applies to insurance and reinsurance undertakings in the EU/EEA.                                      |
| <b>Primary Risk Focus</b>    | Credit, market, operational, liquidity, and interest-rate-in-the-banking-book risk.     | Market, credit, insurance underwriting, lapse, catastrophe, and operational risks.                    |
| <b>Capital Metrics</b>       | Ratios based on regulatory capital divided by risk-weighted assets (RWA).               | Based on an economic balance sheet, with capital calibrated to a high confidence level over one year. |
| <b>Internal Models</b>       | Allowed for specific risk types, but increasingly constrained by standardized “floors”. | Embeds a more “full balance sheet” internal-model approach, subject to supervisory approval.          |
| <b>Macroprudential Tools</b> | Explicitly includes tools like countercyclical buffers and G-SIB surcharges.            | Primarily microprudential, with macroprudential extensions still evolving.                            |

# Reinforcing the System: Key Upgrades in the Basel III Framework

Basel III addressed the shortcomings of Basel II by significantly raising the quantity and quality of capital, introducing new liquidity standards, and adding a macroprudential overlay.



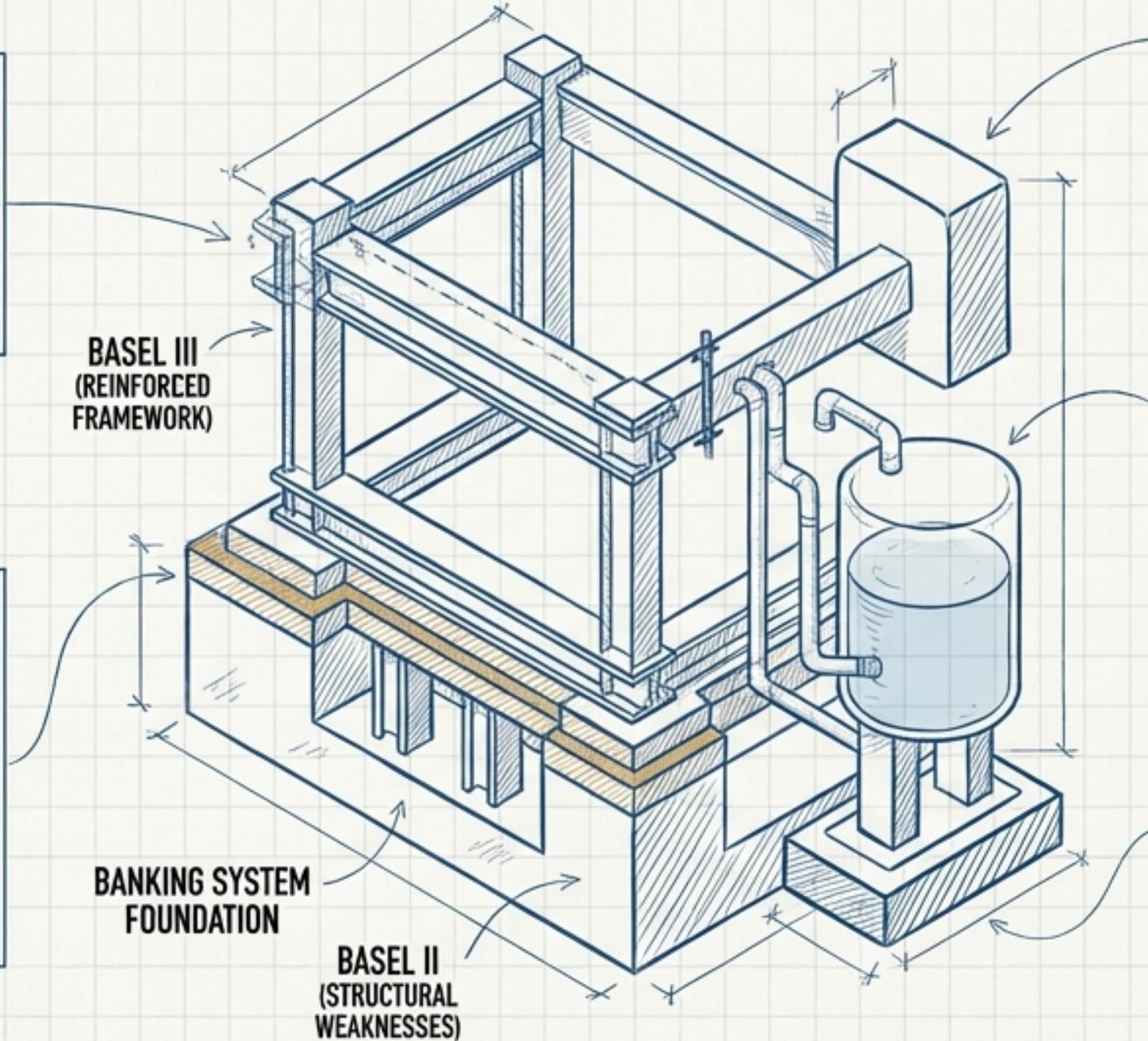
## Higher and Better-Quality Capital

Greater emphasis on Common Equity Tier 1 (CET1), the highest quality capital.



## New Capital Buffers

Introduction of the Capital Conservation Buffer, a Countercyclical Buffer, and additional surcharges for systemically important banks (G-SIBs).



## A Simple Backstop: The Leverage Ratio

A non-risk-based measure (Tier 1 capital / total exposure) to constrain overall leverage and guard against model error.



## Robust Liquidity Standards

**Liquidity Coverage Ratio (LCR):** Ensures banks hold enough high-quality liquid assets to survive a 30-day stress scenario.

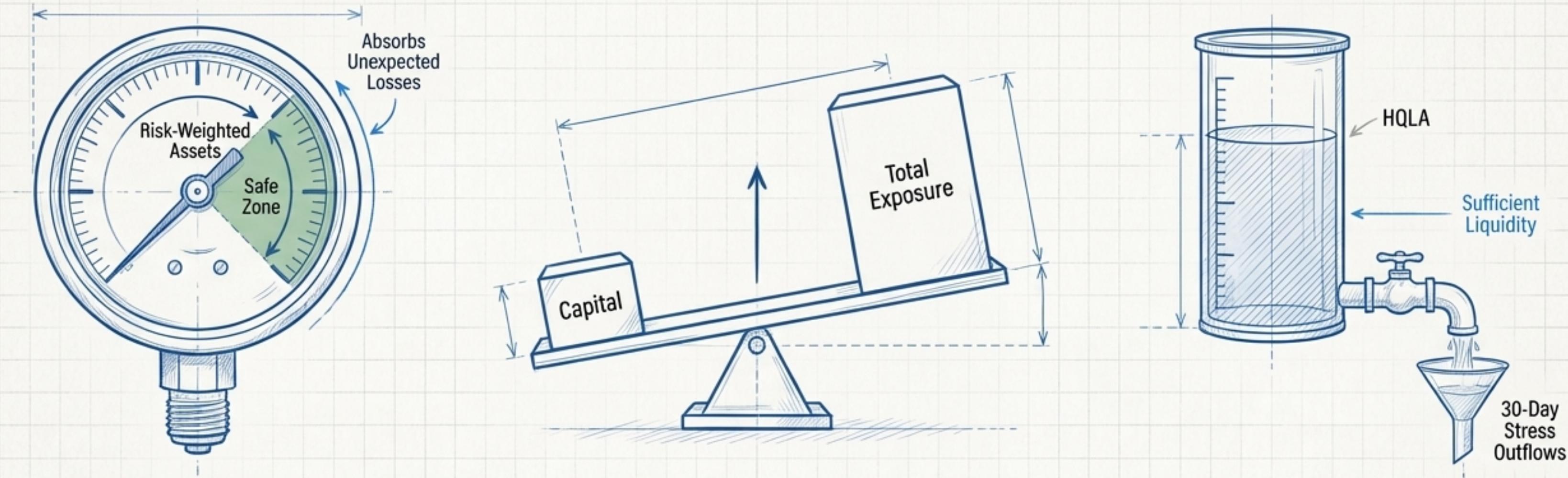
**Net Stable Funding Ratio (NSFR):** Promotes longer-term funding stability.



## Improved Risk Coverage & Model Constraints

Stronger capital treatment for trading book and securitization exposures, and an "output floor" limiting the capital benefit of internal models versus standardized approaches.

# The Trinity of Ratios: Measuring Solvency, Leverage, and Liquidity



## Capital Adequacy Ratios (e.g., CET1 Ratio)

**What it measures:** Solvency.

**How it works:** Compares a bank's high-quality regulatory capital to its risk-weighted assets (RWA).

**Purpose:** To ensure the bank can absorb unexpected losses given its specific risk profile. It is a risk-sensitive measure.

## Leverage Ratios

**What it measures:** Overall balance sheet size.

**How it works:** Compares Tier 1 capital to a broad measure of total exposures (on- and off-balance sheet).

**Purpose:** To act as a simple, non-risk-sensitive backstop against model error and underestimation of risk.

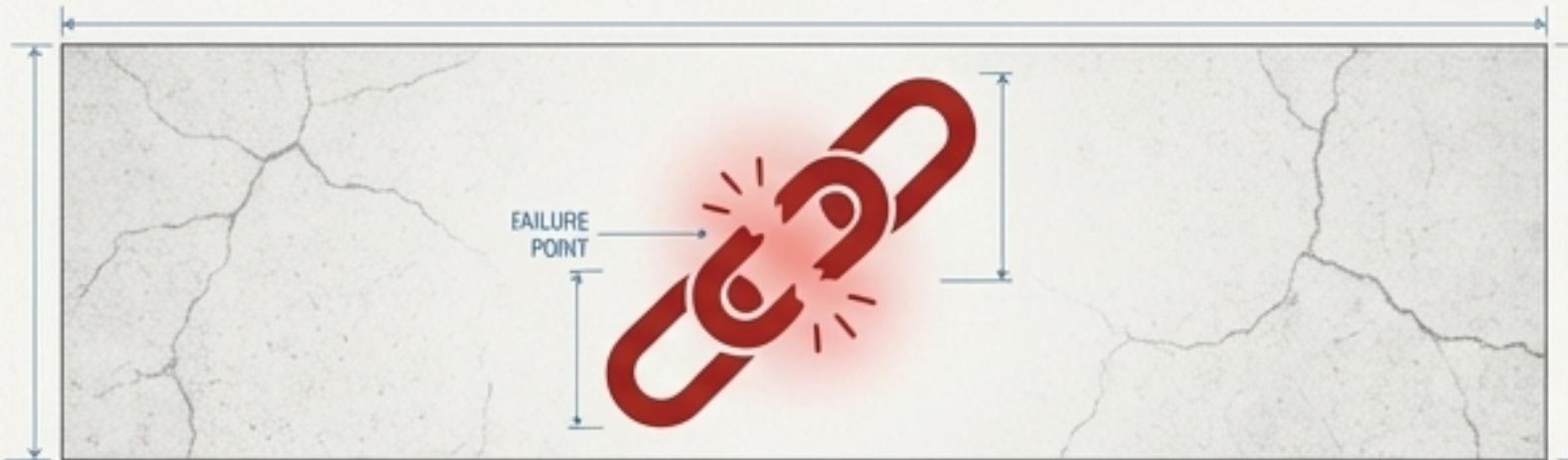
## Liquidity Coverage Ratios (LCR)

**What it measures:** Short-term liquidity risk.

**How it works:** Compares a stock of high-quality liquid assets to net cash outflows over a 30-day stress horizon.

**Purpose:** To ensure the bank can survive a severe short-term funding crisis without resorting to fire sales of assets. It targets liquidity, not solvency.

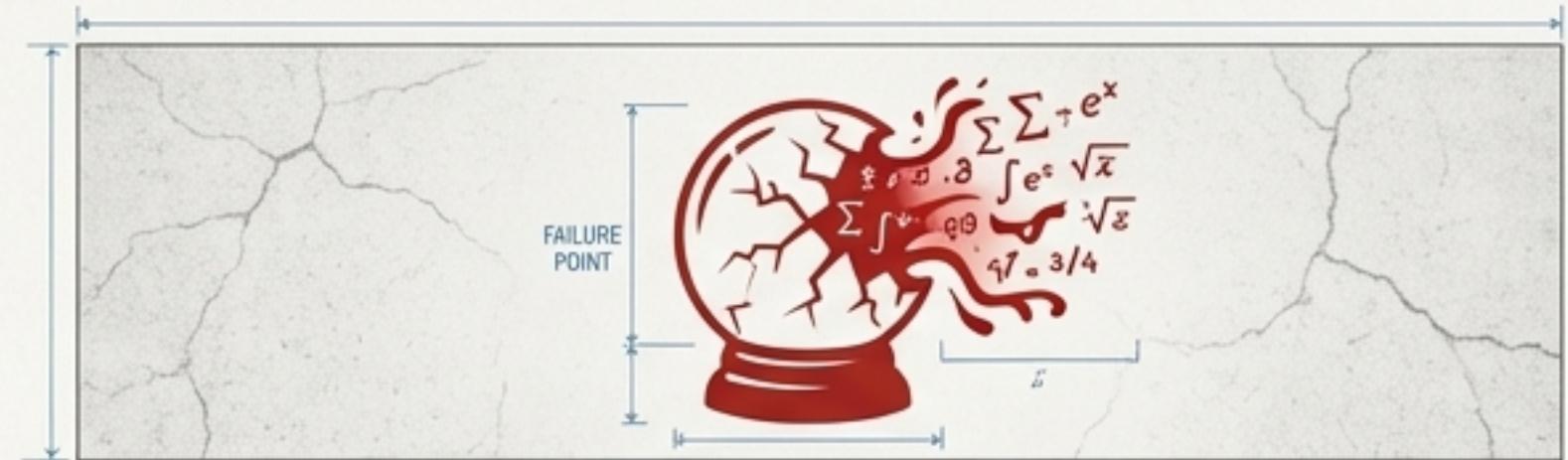
# A Gallery of Failure: Four Cautionary Case Studies



## Barings Bank (1995)

**What Happened:** A single trader (Nick Leeson) hid huge, unhedged futures positions, leading to the bank's collapse.

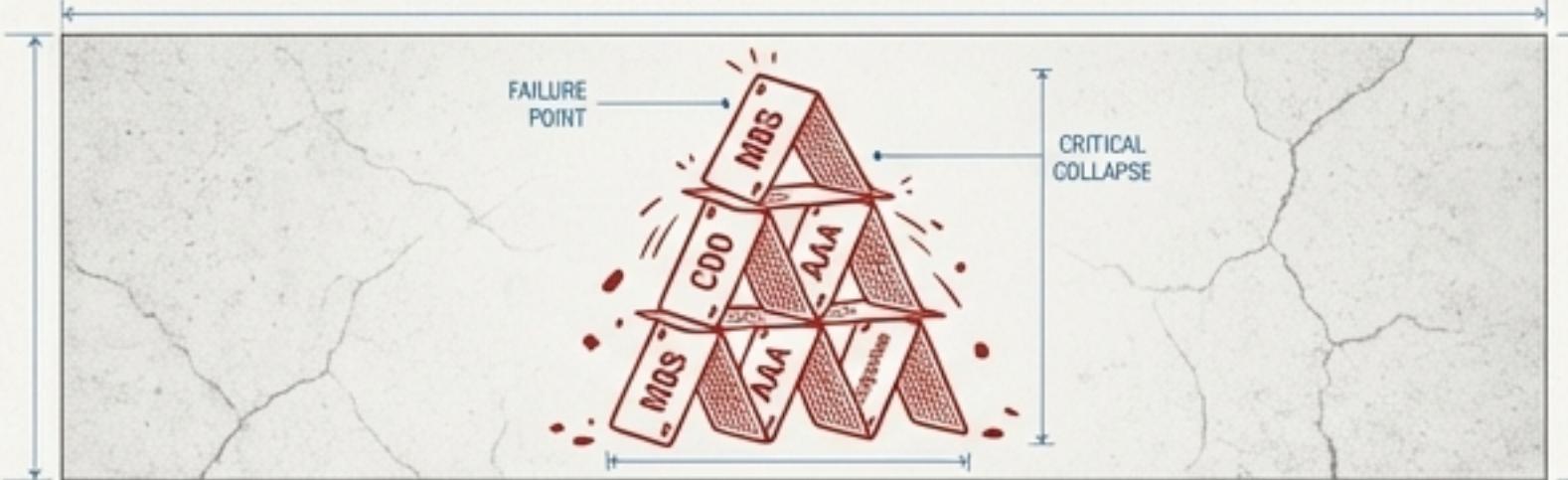
**Key Failures:** Lack of segregation of duties (front vs. back office), poor supervision, inadequate limits, concentration of operational risk.



## Long-Term Capital Management (LTCM) (1998)

**What Happened:** A highly leveraged hedge fund's relative-value models failed during the Russian crisis, requiring a private-sector bailout.

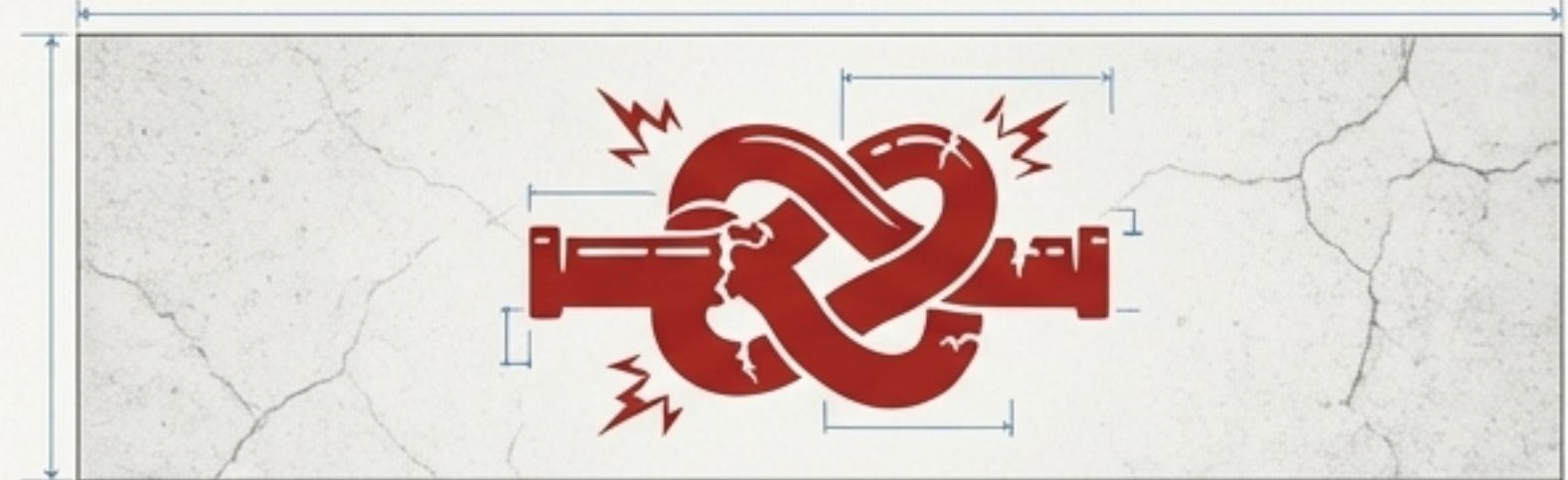
**Key Failures:** Excessive leverage, model risk (assuming stable correlations), liquidity and funding risk, concentration in crowded trades.



## American International Group (AIG) (2008)

**What Happened:** The Financial Products unit wrote massive volumes of credit default swaps on mortgage securities, facing a liquidity crisis from collateral calls.

**Key Failures:** Underestimation of tail credit risk, insufficient liquidity planning for collateral calls, weak group-wide risk aggregation.



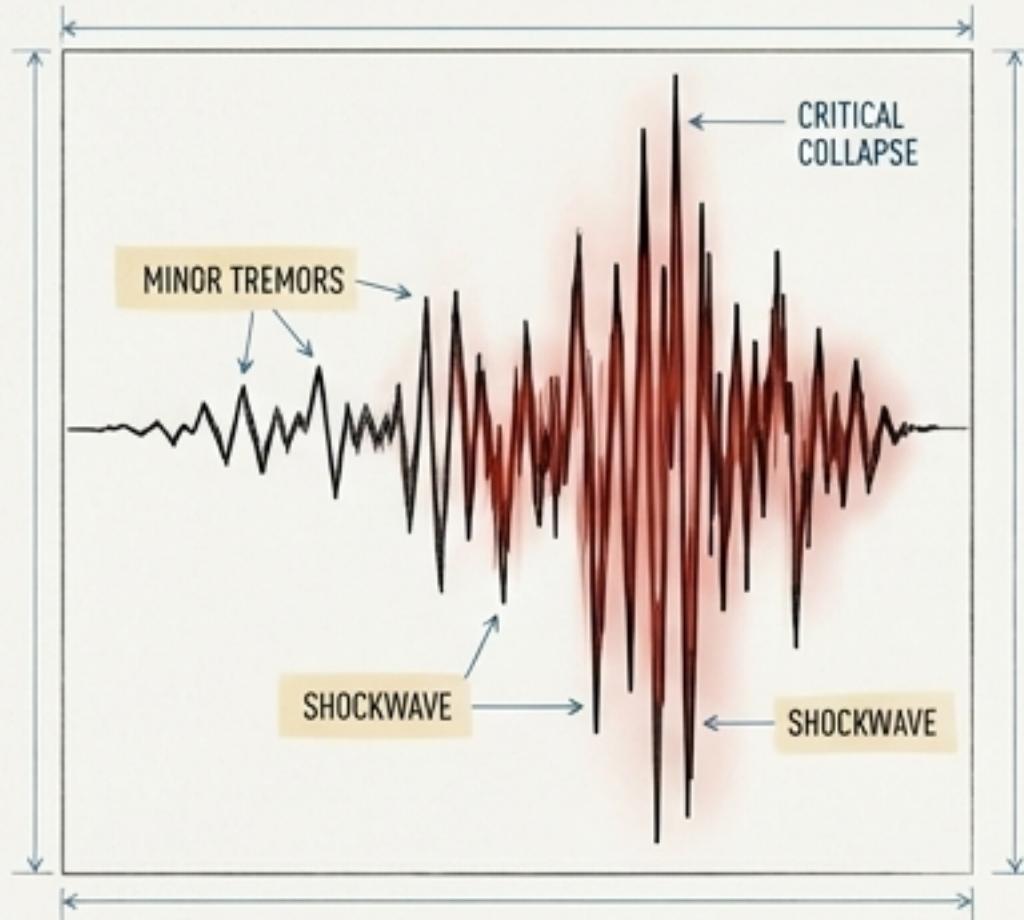
Metallgesellschaft (1994)

**What Happened:** A flawed hedging strategy for long-term oil contracts using short-term futures created a massive liquidity crisis from margin calls.

**Key Failures:** Maturity mismatch, basis risk, liquidity risk, poor governance of complex hedging programs.

# When Markets Break: Lessons from Three Historic Crashes

## 1929



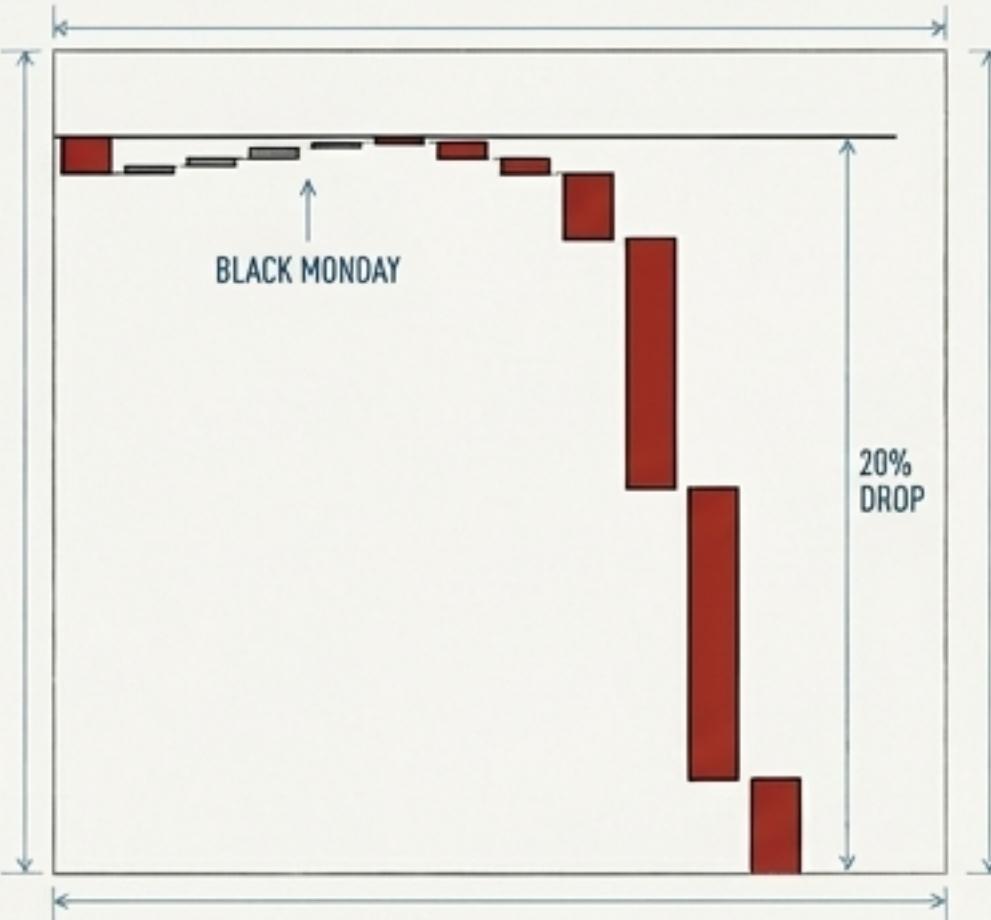
### The Wall Street Crash of 1929

**The Event:** Sharp stock market falls (Black Thursday, Monday, Tuesday) following a period of credit-fueled speculation.

**Key Lesson:** Highlighted vulnerabilities from excessive leverage and inadequate regulation.

**Regulatory Outcome:** Creation of securities regulators (like the SEC), restrictions on bank activities, and deposit insurance schemes.

## 1987



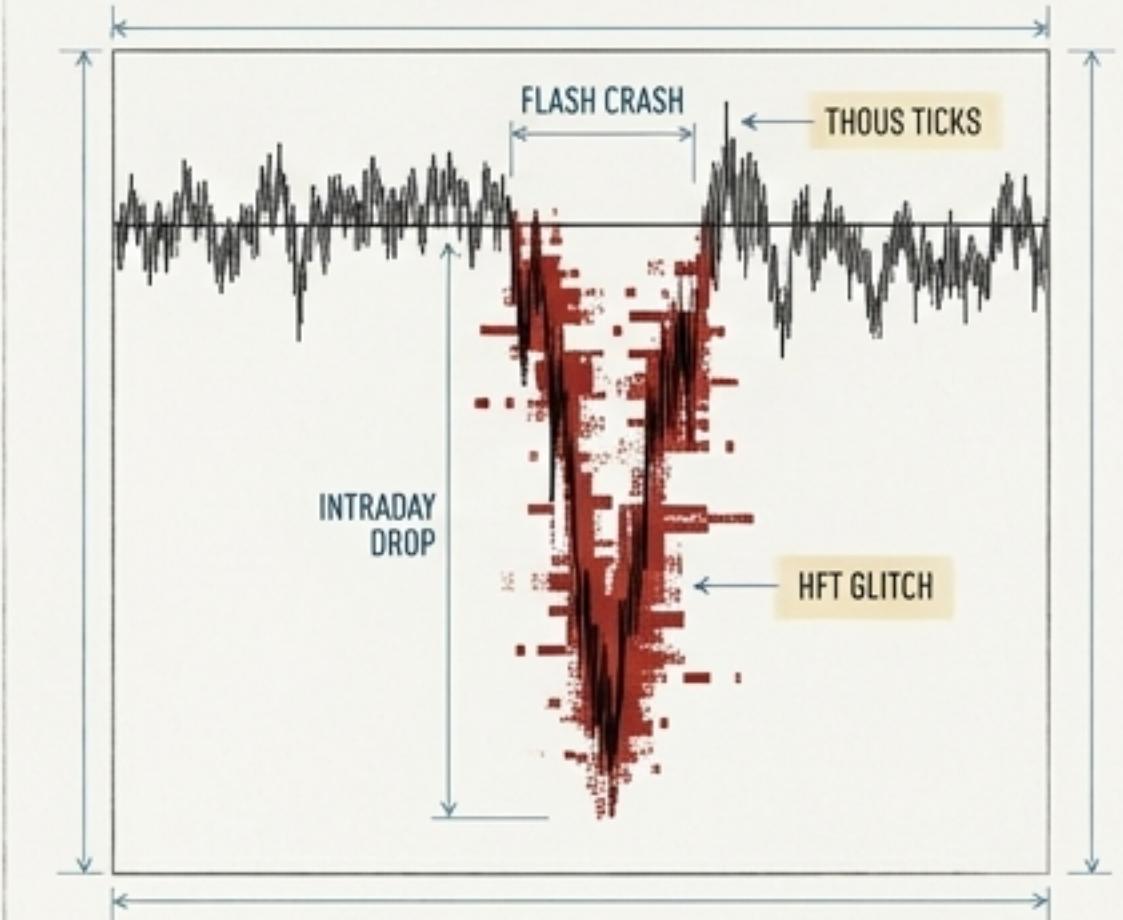
### Black Monday (1987)

**The Event:** The Dow Jones dropped over 20% in one day, driven by overvaluation concerns and amplified by automated selling from "portfolio insurance" strategies.

**Key Lesson:** Mechanistic trading strategies and leverage can create dangerous feedback loops that amplify shocks.

**Regulatory Outcome:** Introduction of market-wide "circuit breakers" and enhanced controls on program trading.

## 2010



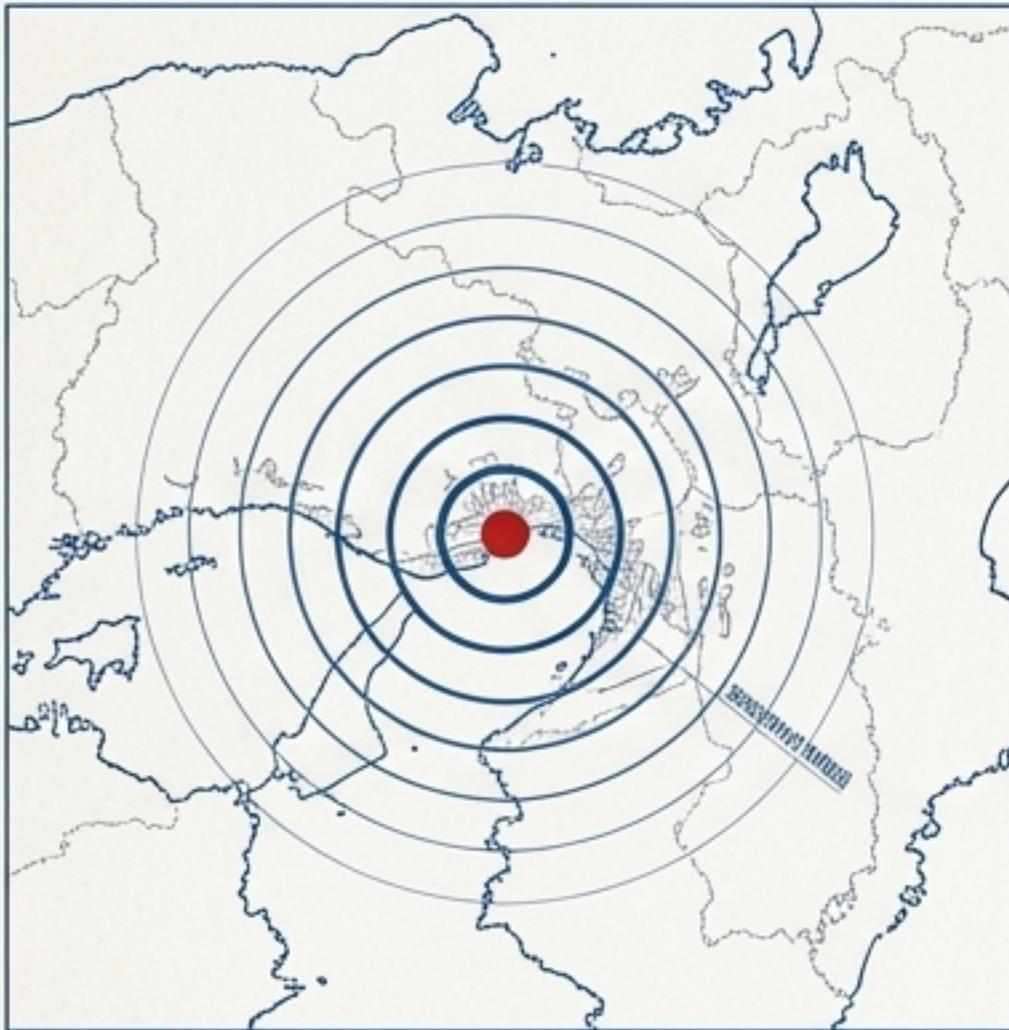
### The Flash Crash (2010)

**The Event:** U.S. equity indices experienced a sharp, minutes-long intraday drop and rebound, triggered by a large automated sell order interacting with high-frequency trading.

**Key Lesson:** Revealed new risks related to intraday liquidity and modern market structure.

**Regulatory Outcome:** Refined circuit breakers (limit-up/limit-down), tighter controls on erroneous orders, and greater scrutiny of algorithmic trading.

# Beyond the Markets: The Financial Impact of Natural Catastrophes

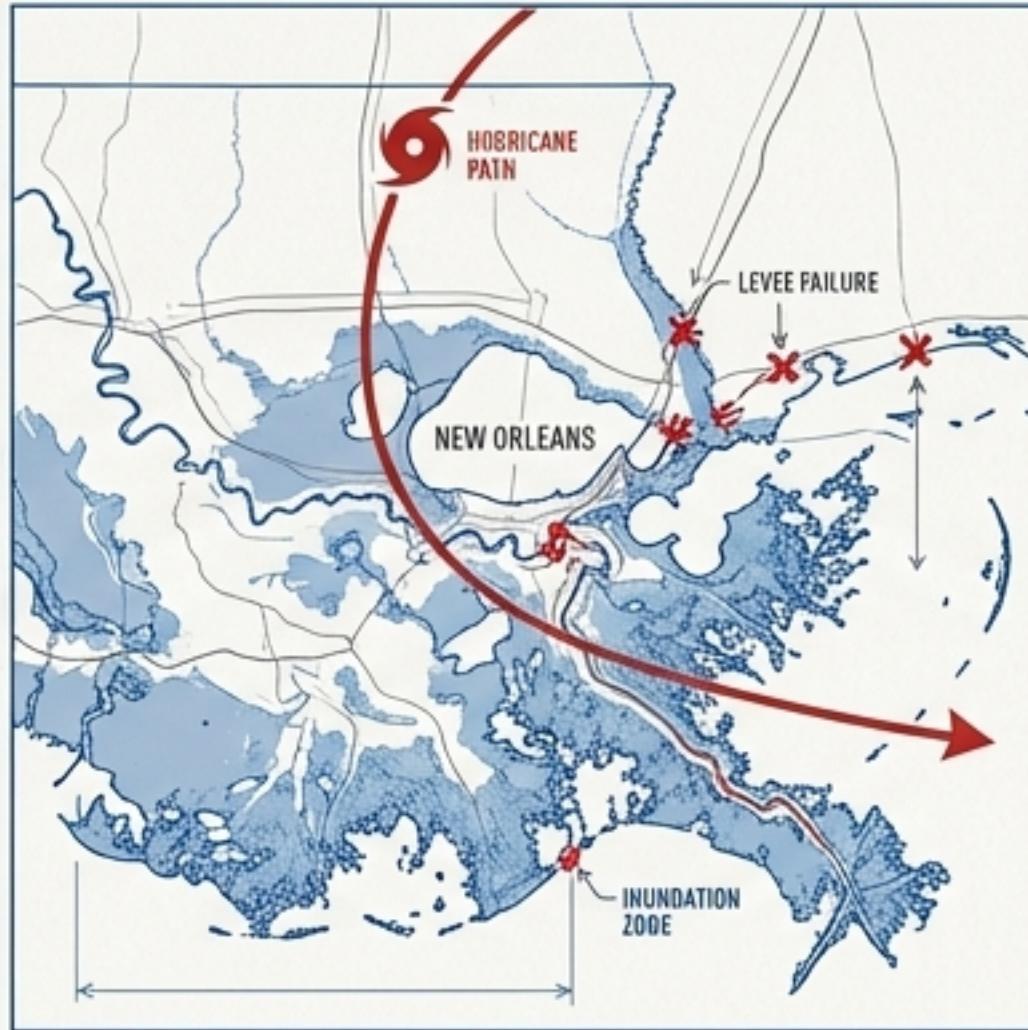


## Kobe Earthquake (1995)

**The Event:** A major earthquake in Japan caused extreme economic losses, but only a fraction was insured.

**Financial Impact:** Placed significant pressure on insurers and reinsurers.

**Key Lesson:** Spurred reforms in building codes and drove major advances in catastrophe-risk modeling for the insurance industry.

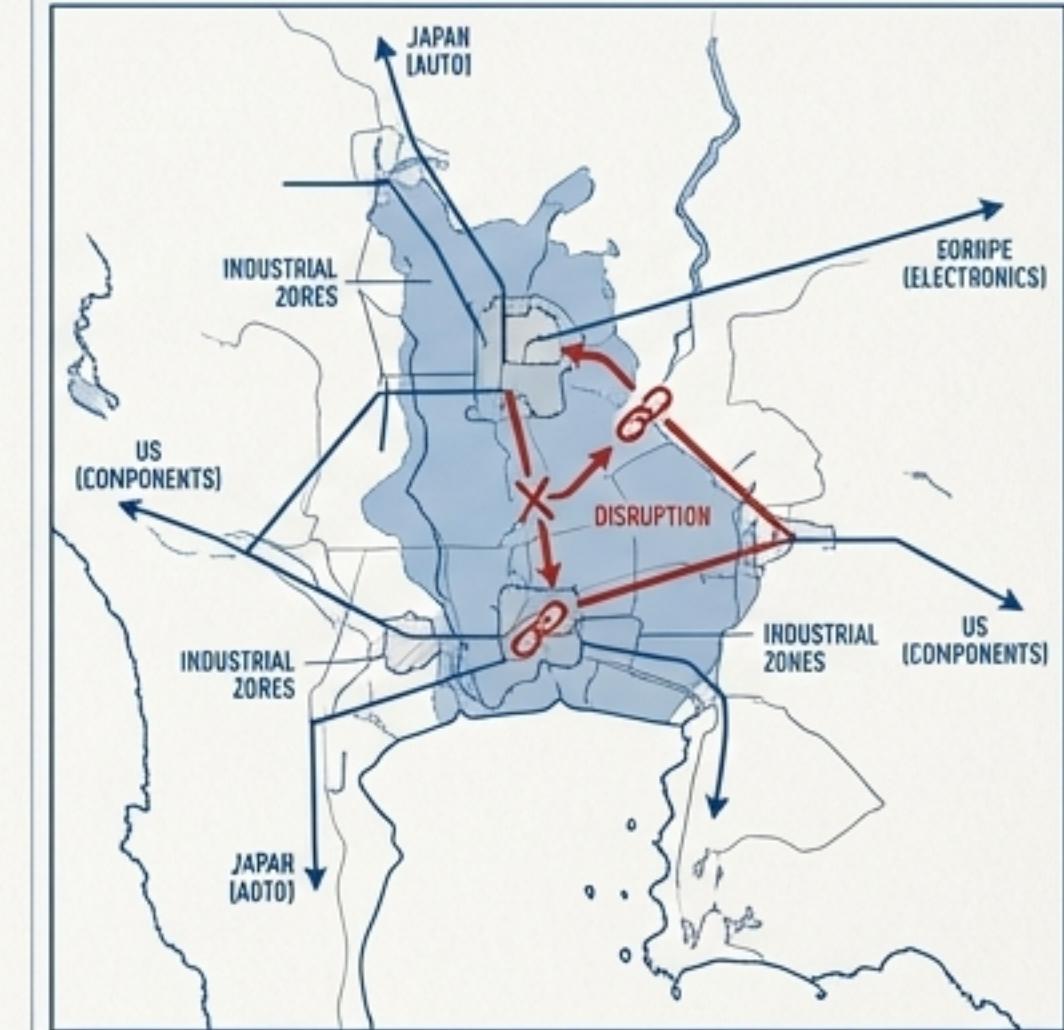


## Hurricane Katrina (2005)

**The Event:** Devastated the U.S. Gulf Coast, causing large-scale flooding after levee failures.

**Financial Impact:** Became one of the costliest natural catastrophes for the global insurance industry, with massive property and reinsurance claims.

**Key Lesson:** Prompted revisions to catastrophe models, re-pricing of flood insurance, and debates about public-private risk sharing.



## Thailand Floods (2011)

**The Event:** Prolonged flooding inundated major industrial parks.

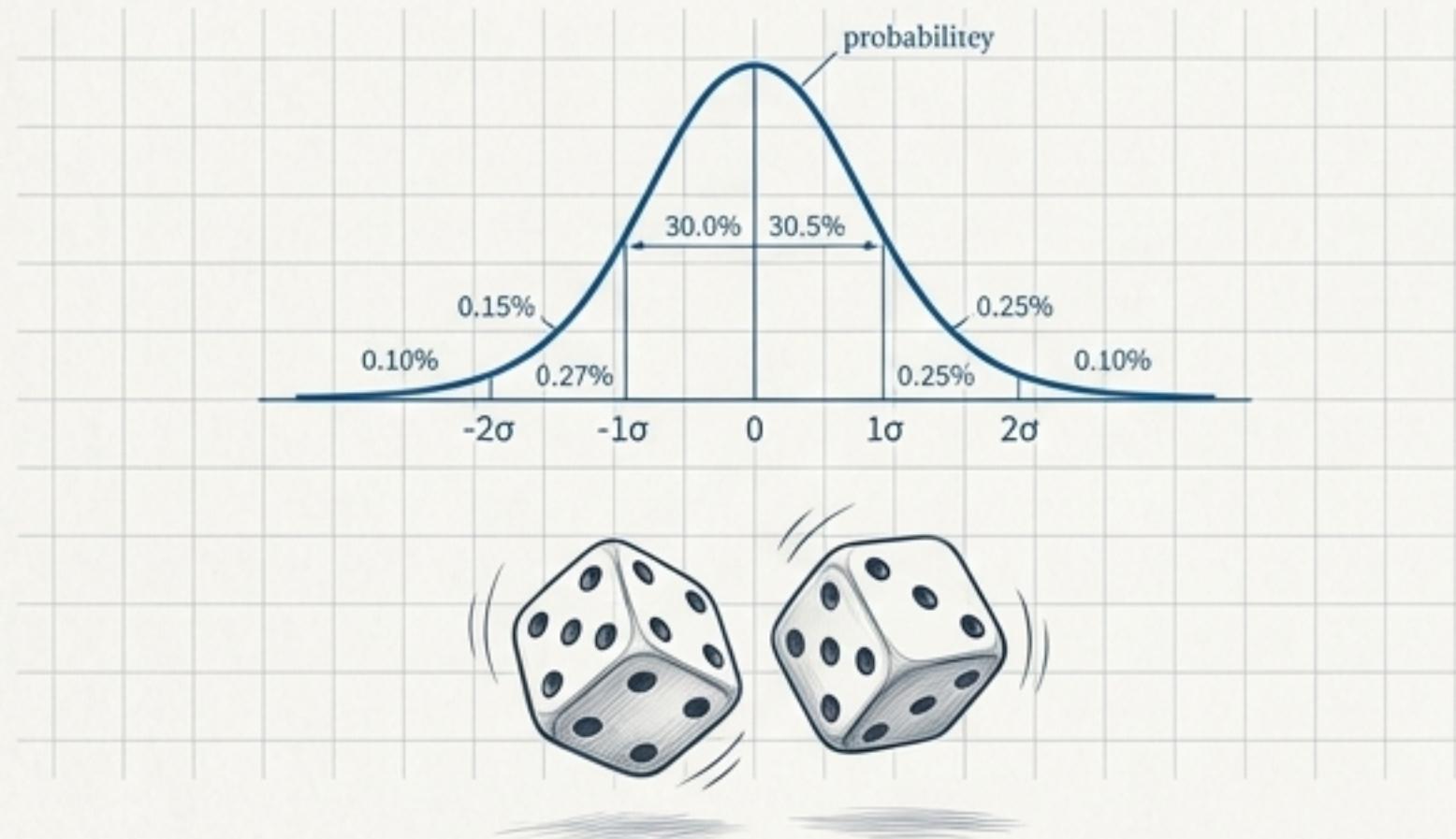
**Financial Impact:** Disrupted global supply chains (auto, electronics), leading to substantial business interruption and contingent business-interruption claims for insurers.

**Key Lesson:** Highlighted the critical importance of supply-chain risk management and geographic diversification of production.

# Known Unknowns: Distinguishing Quantifiable Risk from True Uncertainty

Risk: The effect of uncertain future events on objectives, typically characterized by a probability distribution of possible outcomes.

## RISK

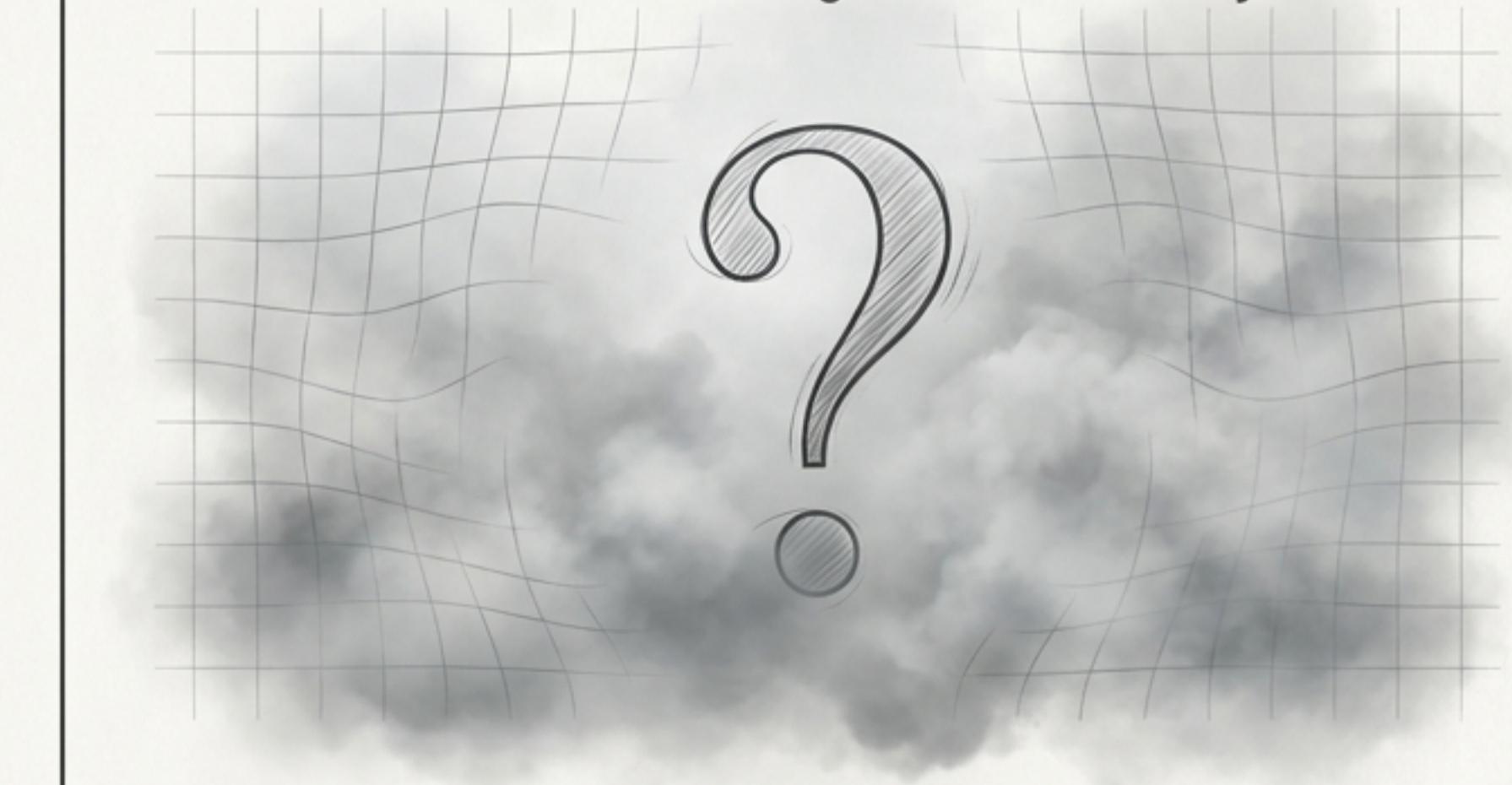


Refers to situations where probabilities can be meaningfully assessed or modeled based on historical data or underlying principles.

\*Example: The probability of loss on a large, diversified portfolio of consumer loans.

In practice, most problems have elements of both. Risk management often treats some uncertainty as if it were quantifiable risk, while recognizing the presence of model risk and residual uncertainty.

## UNCERTAINTY (Knightian Uncertainty)



Refers to situations where such probabilities are unknown or not reliably quantifiable. The future is not a reflection of the past.

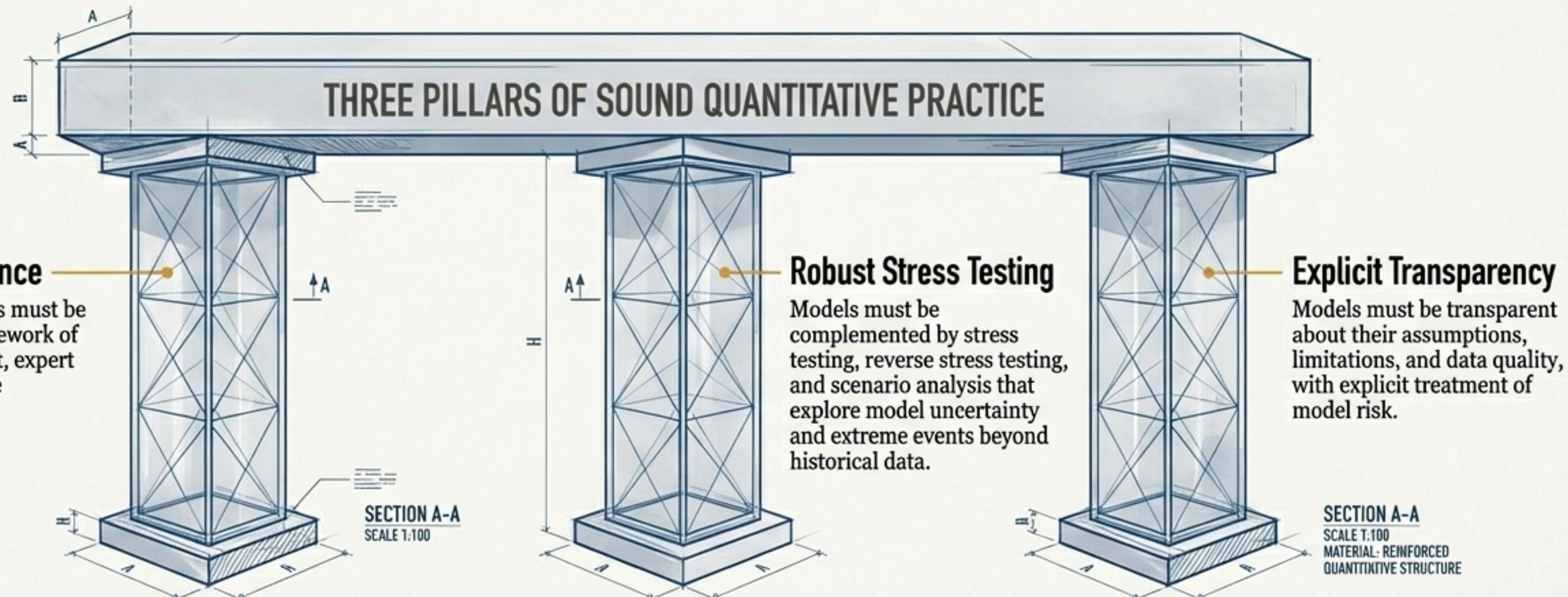
\*Example: The long-term geopolitical impact of a novel technology.

# The Quantitative Imperative: Integrating Math with Judgment

Quantitative methods are indispensable for measuring exposures, pricing risk, setting capital, and performing stress tests. However, the 2008 crisis proves that quantitative models **alone are not sufficient**.

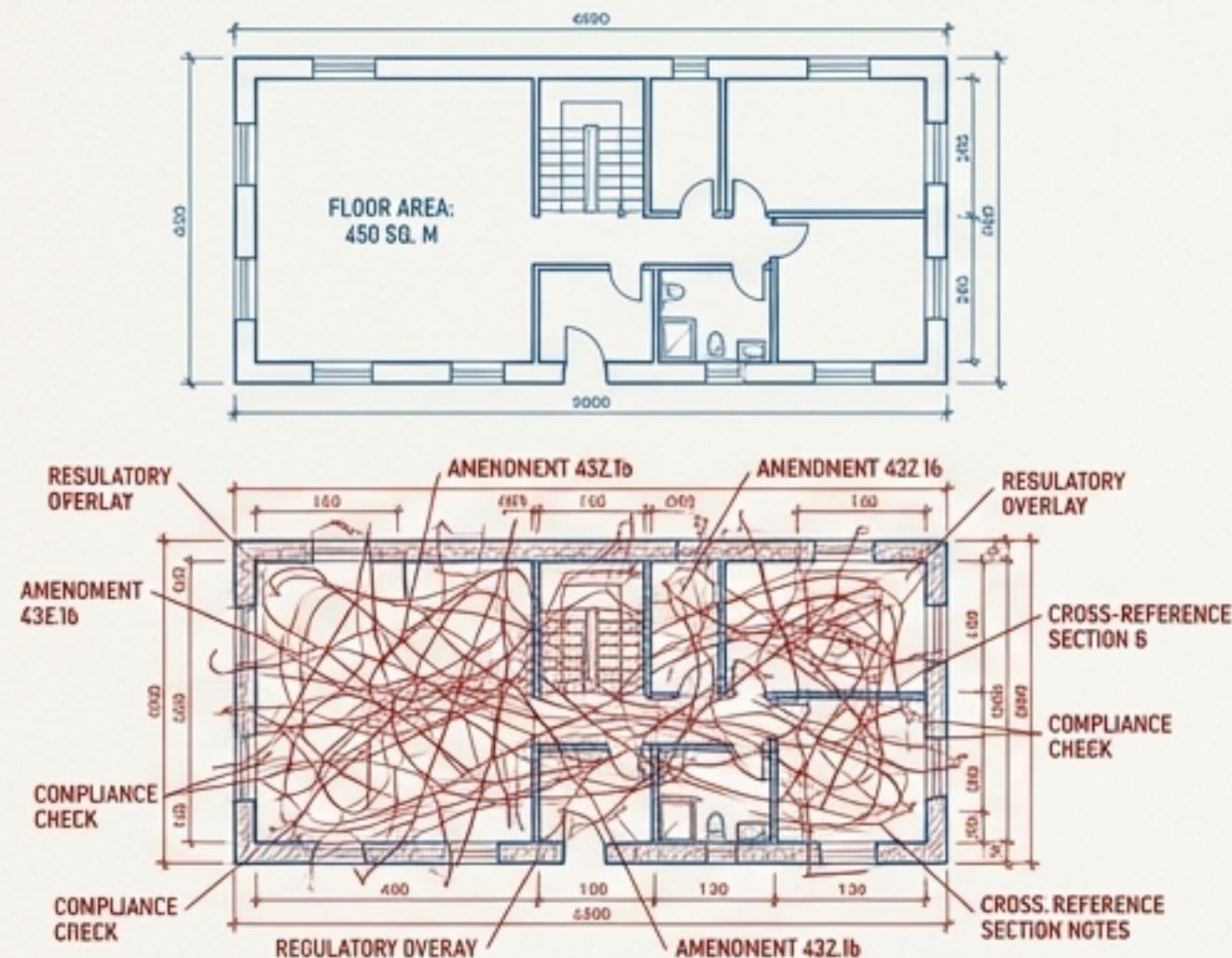
## The Balanced View

The aim is not “more or less maths” in isolation, but better integration of quantitative tools with judgment, incentives, and a culture of risk awareness. A reasonable view is that quantitative methodology should play a central, but not dominant, role.



# The Regulatory Frontier: Navigating Complexity and Model Skepticism

## Debate 1: Has Risk Regulation Become Too Complex?



### The Argument for “Yes”

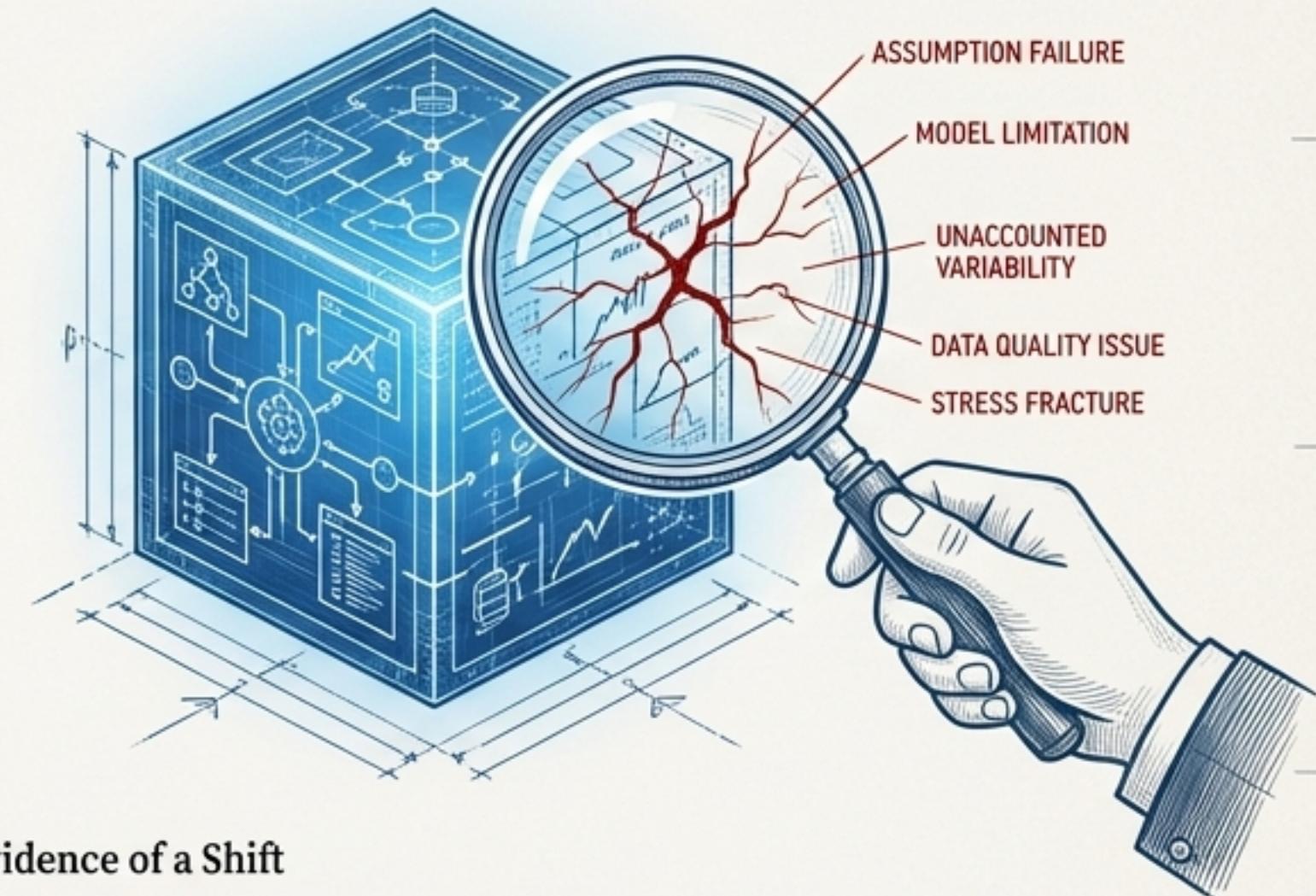
- Rules are harder to understand and implement, especially for smaller firms.

**The Verdict:** An ongoing debate about the right balance between risk sensitivity and simplicity.

### The Argument for “No”

- Complexity is necessary for risk sensitivity and reflects genuine lessons from crises.
- Compliance costs and reliance on specialists increase.
- Creates scope for regulatory arbitrage and opacity.

## Debate 2: Is There a Move Away from Internal Models?



### Evidence of a Shift

- Basel reforms introduce “output floors” to limit model benefits.
- Supervisors show increased scrutiny of model risk and unjustified variability in results.
- Simpler backstops like the leverage ratio are now central.

**The Nuance:** This is not a complete rejection of internal models, but a shift towards a more constrained and complementary role for them.

# The Price of Stability: Does Tighter Regulation Strangle Credit?

“Increased regulation strangles credit provision.”

Higher capital and liquidity requirements can raise bank funding costs, leading to higher lending spreads and tighter credit standards.

Complex rules may discourage lending to riskier but valuable borrowers like SMEs.

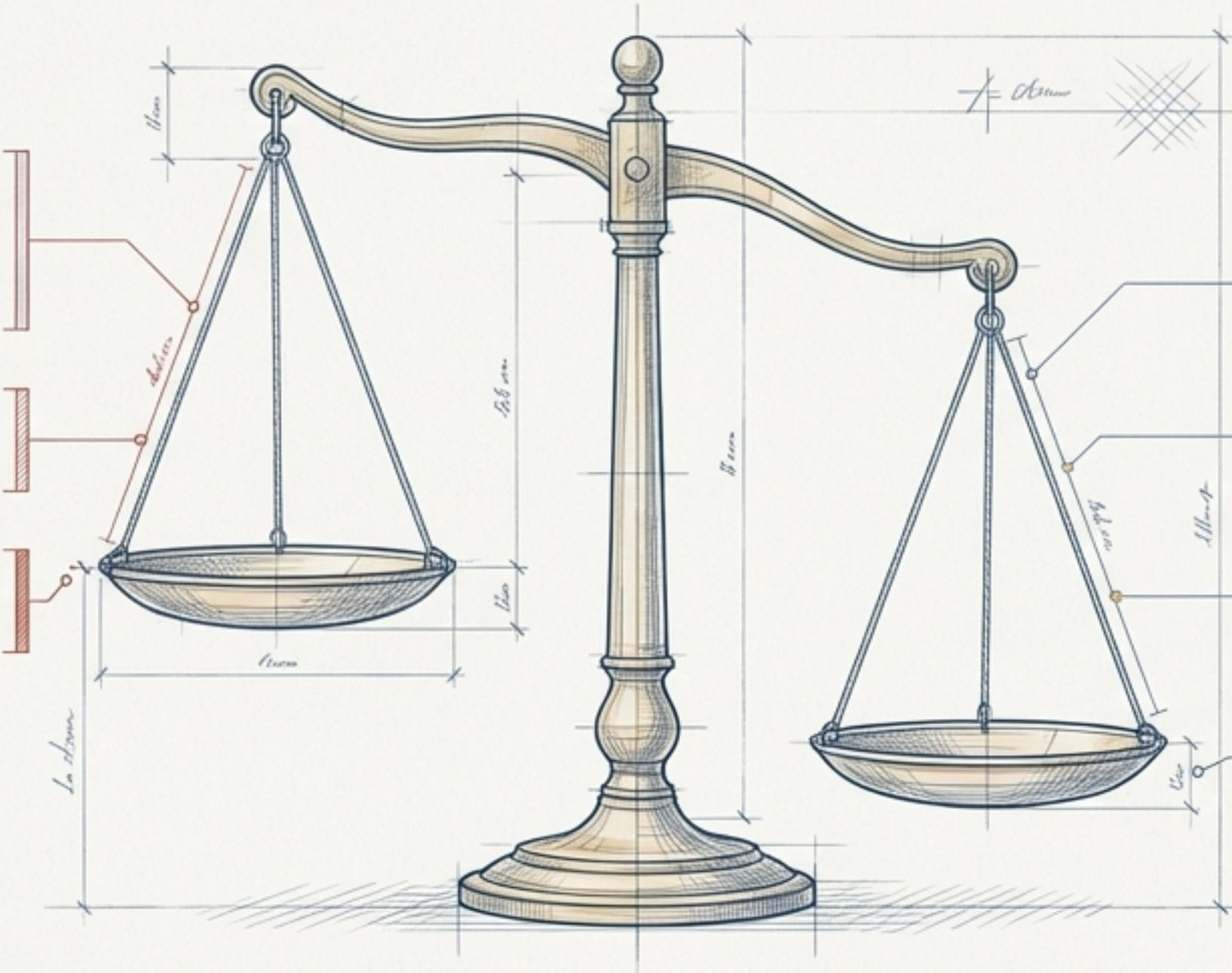
Compliance costs can disproportionately burden smaller institutions, reducing competition.

Well-capitalized banks are more resilient and better able to lend during a crisis.

Banking failures cause far larger and more persistent contractions in credit than regulatory tightening does.

Empirical studies often find only a limited impact on lending volumes over the medium term.

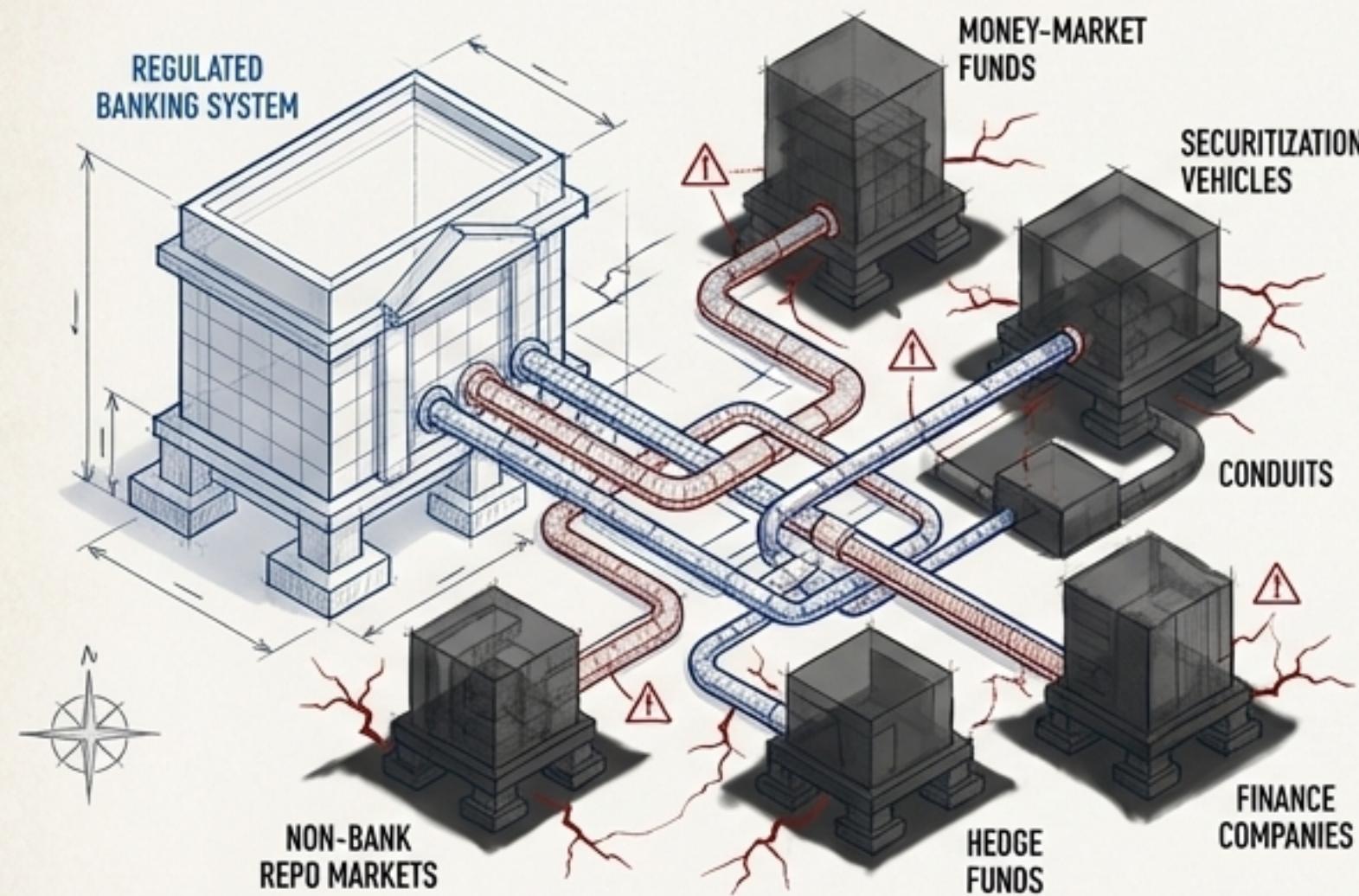
Good regulation curbs boom-bust cycles and supports sustainable credit growth.



While tight regulation can have some short-run costs, it likely increases the availability and stability of credit over the long term by reducing the frequency and severity of financial crises.

# The New Perimeters: Confronting Risk in Shadow Banking and Insurance

## Shadow Banking

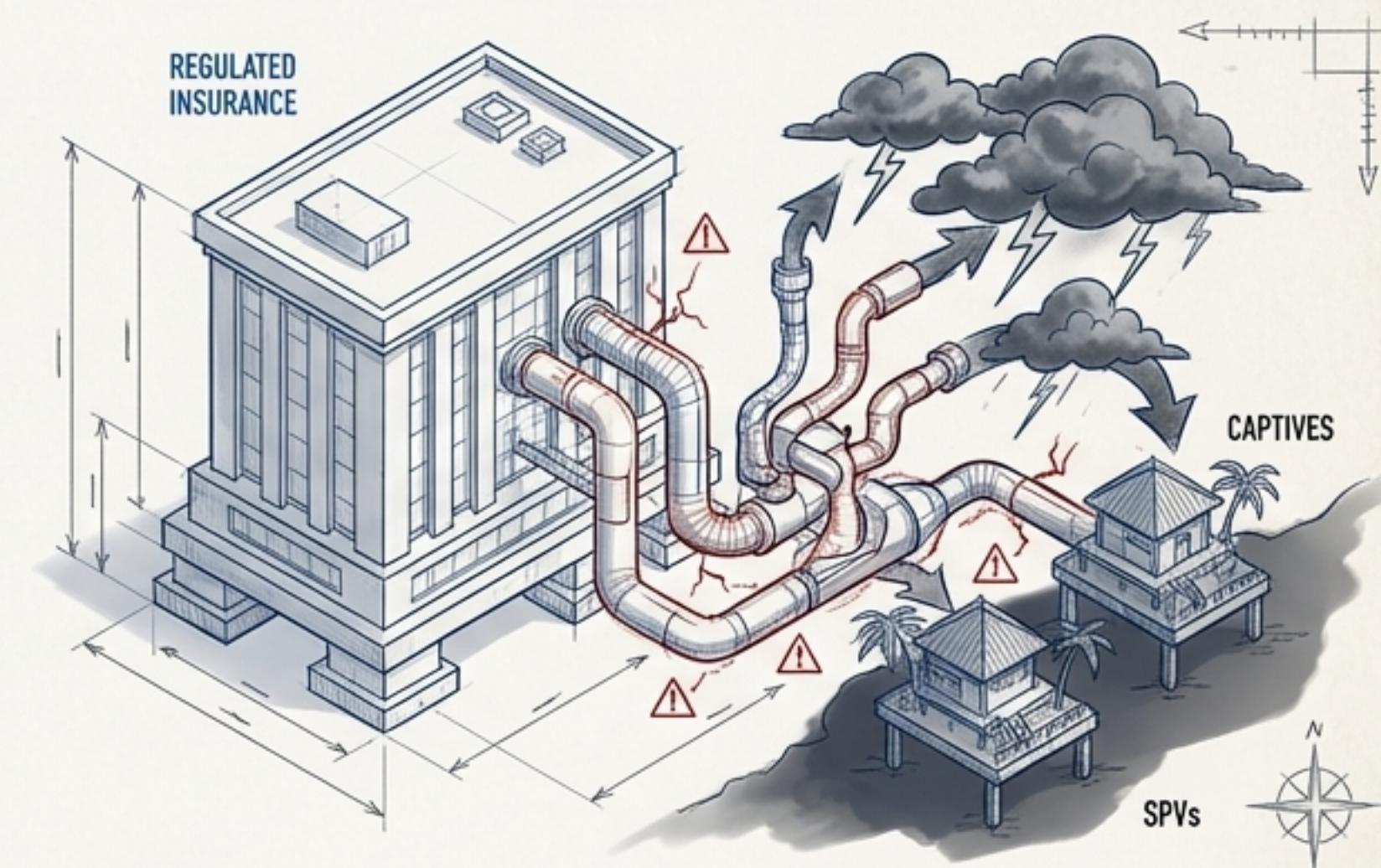


**Definition:** Credit intermediation activities performed by entities outside the traditional regulated banking system, often involving maturity transformation or leverage but without direct access to central bank liquidity or deposit insurance.

**Examples:** Money-market funds; Securitization vehicles and conduits; Non-bank repo markets; Some hedge funds and finance companies.

**The Risk:** Can create systemic vulnerabilities through runs on short-term funding, fire sales, and interconnectedness with the core banking system.

## The 'Shadow Insurance' Industry



**Concept:** A parallel concept describing risk transfer and creation outside the core insurance regulatory perimeter.

**Examples:** Use of captive reinsurers and special-purpose vehicles for regulatory capital relief; Insurance-linked securities (ILS) and other capital-market risk transfer structures; Non-traditional investment activities conducted by insurers.

**The Risk:** Can obscure where risks ultimately reside and create leverage outside the core framework, prompting supervisors to adopt group-wide and system-wide views.