Quantifying the Standard of Care

A Framework for Quantitative Risk Measurement
in Fiduciary Investment Practice

February 13, 2026

Presented to:
The Commissioners of the U.S. Securities and Exchange Commission
The Board of Governors of the Financial Industry Regulatory Authority
The U.S. Senate Committee on Banking, Housing, and Urban Affairs
The U.S. House Committee on Financial Services
The Consumer Financial Protection Bureau
State Securities Commissioners
Registered Investment Advisors & the Investment Community
Public Investors Advocate Bar Association (PIABA)
North American Securities Administration Association (NASAA)

Investment advisors cannot fulfill their fiduciary duty without access to reliable, quantitative measures of the probability and magnitude of potential loss.

Those tools exist today. This report demonstrates how they work and why they matter—especially for the Americans who can least afford preventable losses.

EQUITY RISK SCIENCES
America's Independent Stock Risk Rating Agency™

Featuring Case Studies: Amazon, IBM, Microsoft, NVIDIA, PayPal, Pfizer, Tesla, and Walmart

All conclusions are probability-based and non-predictive.

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STATEMENT OF PURPOSE:

To encourage reforms that make investing safer and more profitable for ordinary investors.

This report advances a practical path to strengthen the investment management profession by fully aligning its practices with the rigorous protections promised by the legal definition of "fiduciary duty."

We propose a constructive evolution — from reliance on subjective judgment and narrative toward standards of care that are objective, quantitative, and testable. By anchoring investment advice in verifiable data, we can equip fiduciaries with an auditable framework — one that articulates the analytical process, documents the evidence it produces, and measures investment safety proactively rather than reactively.

Today, the absence of evidentiary rigor has created a systemic vulnerability — one that allows fiduciaries to outsource critical selection decisions to non-fiduciary entities and to overlook mathematically quantifiable risks in favor of comfortable market sentiment. We believe this is a solvable problem.

We introduce the **Scientific Standard of Demonstrable Evidence for Quantifying the Standard of Care**. We suggest that the probability and magnitude of investment loss need not remain a matter of opinion — it can be revealed using a disciplined process and valuation science. Risk can be measured. Outcomes can be reasonably anticipated. Significant losses can very often be avoided or at least greatly reduced.

This report offers the evidence, the methodology, and a framework for regulatory consideration — with the goal of advancing fiduciary duty from a broad, vague untestable legal concept toward a measurable, auditable discipline, where those entrusted with the public's savings are expected to articulate the reasoning and evidence behind their decisions.

The standard we propose does not require fiduciaries to predict the future with certainty. It requires them to identify known risks — and to act when the probability and magnitude of loss exceed acceptable thresholds. That is the standard applied in medicine, engineering, and every other profession entrusted with human welfare. It should be the standard applied here.

EXECUTIVE SUMMARY

"The greatest enemy of knowledge is not ignorance, it is the illusion of knowledge."
— **Daniel J. Boorstin,** Librarian of Congress, The Washington Post (January 29, 1984)

"Sunlight is said to be the best of disinfectants; electric light the most efficient policeman."
— **Justice Louis Brandeis**, Other People's Money and How the Bankers Use It (1914)

"How do we reassure investors that the markets will be fair? By compelling those who want to use the public's money to tell the truth, the whole truth, and nothing but the truth about the enterprise; and by going after them mercilessly when they don't."
— **SEC Chairman Arthur Levitt**, 1996, from a speech on the SEC's mission

"It is difficult to get a man to understand something, when his salary depends on him not understanding it."
— **Upton Sinclair**, I, Candidate for Governor: And How I Got Licked (1935)

The financial industry operates under a pervasive false assumption: that a *good growth company* is automatically a *good investment* at any price, to buy and hold indefinitely.

Wall Street devotes enormous resources to marketing stocks based on a familiar checklist of business virtues — convincing investors that if a company is growing and profitable, its stock price will follow. This is not analysis. It is salesmanship. It is the financial equivalent of advising someone to marry a person because they are tall, attractive, and earn a good salary — without inquiring into their debts, their character, or the terms of the prenuptial agreement. The *qualities* of a business and the *price* of its stock are two entirely separate questions, and confusing them has cost investors trillions of dollars. Ten straightforward questions expose how thoroughly these talking points collapse under scrutiny:

1. Do rising revenues reliably produce a rising stock price?
2. Do rising earnings reliably produce a rising stock price?
3. Does rising free cash flow reliably produce a rising stock price?
4. Does rising book value reliably produce a rising stock price?
5. Does having a competitive "moat" reliably produce a rising stock price?
6. Does operating in a growth industry reliably produce a rising stock price?
7. Does experienced management assure a stock's appreciation?
8. Does breakthrough technology reliably produce a rising stock price?
9. If earnings have risen 25% over three years, will the stock price follow?
10. Does a unanimous "Strong Buy" rating from Wall Street analysts guarantee a rising stock price?

The honest answer to every one of these questions is **no** — not reliably, and certainly not at every valuation level. Yet these narratives are precisely the hokum Wall Street uses to justify and recommend purchasing a security without adequate regard for the price being paid, or future probable losses. They are talking points, not analysis. Data science reveals patterns that these narratives obscure — patterns in which metrics and ratios such as price-to-sales and price-to-earnings, among others, have real, substantive, quantitative, and predictable consequences.

The natural response to this evidence is that fiduciaries should buy index funds instead. That response fails for the same reason — an index fund purchased at an elevated valuation carries the same price-you-pay risk as any individual stock, compounded by the surrender of all control over concentration, sector weighting, and valuation discipline. Part III examines why.

The Arithmetic of Impossibility

The clearest way to test whether a stock's price can be justified is to reverse-engineer what must happen for the investor merely to break even. **Michael Mauboussin**, while employed at Credit Suisse and Morgan Stanley, developed precisely this framework. Twenty-five years later **Equity Risk Sciences** developed a computer model called **What Must Happen™**. The results stemming from the analysis provided by this model are devastating to the consensus case for owning today's most high valuation stocks. The results from studies of stock valuations in the 2000 bubble identified the exact same pattern.

Consider PayPal at its 2021 peak. The "**What Must Happen™**" math proceeds as follows:

	Assumption	Value
Starting point	Share price at 2021 peak	$308
Market cap	At purchase	$362 billion
Trailing revenue	TTM at time of purchase	$24 billion
P/S at purchase	$362B ÷ $24B	**~15×**
Growth assumed	25% annual revenue growth for 5 years (generous)	$24B → ~$73B
Normalized P/S	Market reverts to 2× (above median for mature tech)	2×
Resulting market cap	$73B × 2	$146 billion
Investor loss	$362B − $146B = loss despite 5 years of exceptional growth	**−$216 billion**

Even assuming 25% annual revenue growth for five consecutive years — a generous assumption for a company already at PayPal's scale — the investor lost $216 billion because the starting valuation was too high. The company did not need to fail. The price simply needed to normalize. This is the mechanism documented across every case study in this report.

"Extraordinary claims require extraordinary evidence." — Carl Sagan, 1980

The Standard We Propose

Fiduciary standards do not require certainty of harm — only the identification of known risks and probabilities of loss above acceptable thresholds.

Every mature profession enforces this principle. A structural engineer who stamps a building plan without calculating its load capacity loses his license. A physician who prescribes a drug without screening for known contraindications commits malpractice. A pharmaceutical company that sells a medication without testing for toxicity faces criminal liability. Only in investment management is the professional permitted to place a client's life savings into a security, perform no quantitative risk analysis whatsoever, and call that conduct 'suitable.'

This report proposes that the SEC adopt a **scientific standard of demonstrable evidence** for fiduciary recommendations — replacing narrative with testable hypotheses, replacing opinion with measurable probability and magnitude of loss, and requiring fiduciaries to document, before purchasing a security, the specific conditions under which their thesis fails. Part VIII details this analytical framework. Part IX presents the specific regulatory reforms we believe are necessary to implement it.

What Follows

- **Part I** establishes the regulatory standard — the SEC's own 2022–2023 Staff Bulletin trilogy, the legal and economic foundations of the fiduciary duty to measure risk, and the gap between the standard the Commission has articulated and the standard the industry actually practices.
- **Part II** presents the most significant precedent for valuation and concentration risk: IBM's 25-year negative real returns despite 2,800% revenue growth — *and the parallel to **NVIDIA** in 2026*.
- **Part III** documents the universality of this pattern across 7 major companies spanning three decades.
- **Part IV** demonstrates the unsuitability of index funds as a fiduciary safe harbor.
- **Part V** diagnoses the systemic structural conflicts — in fee models, research distribution, and information supply chains — that permit these failures to persist.
- **Part VI** presents the Microsoft case study in granular detail — 3 critical dates across 26 years that demonstrate, using a single company, that investment risk is quantifiable, predictable, and actionable.
- **Part VII** dismantles the mythology of safety — the "blue chip" fallacy, the illusion of competitive moats, and the graveyard of consensus recommendations.
- **Part VIII** introduces the analytical framework: the scientific standard, the price-you-pay problem, risk-adjusted returns, and the "What Must Happen" protocol.
- **Part IX** presents the base-rate evidence, specific regulatory recommendations, and proposed disclosure and monitoring standards.
- **Part X** distills the ten things every investment advisor needs to know — the operational essentials drawn from the preceding nine parts.

The evidence in this report was not assembled to make a case against any single company. It was assembled to make a case *for* a standard of care that requires fiduciaries to measure what can be measured, to disclose what is already known, and to act before known risks produce irreversible consequences.

Consensus is not a life raft. Math is.

Overview of Terms and Concepts

Valuation Premiums, NPV Anchoring, and "Invert" Stress-Testing as a Prudential Framework for Loss Prevention

Purpose: To define a clear analytical framework for evaluating when market prices embed exceptional assumptions, and to outline observations and implications relevant to investor protection and fiduciary practice.

I. Defined Terms

1. **Market Price / Market Value ("P")** The observed trading price of a security and the resulting market capitalization (or enterprise value) implied by that price.
2. **Distributable Cash Flow ("DCF*")** Cash flows reasonably expected to be available to equity and/or debt holders over time, net of reinvestment required to sustain operations. *Note:* This is a definitional term here and does not refer to the "discounted cash flow" method as a brand; it is simply the cash stream being valued.
3. **Net Present Value ("NPV")** The present value of a reasonable range of expected future Distributable Cash Flows, discounted for time value and risk using transparent assumptions.
4. **NPV Range ("NPV_r")** A bounded set of NPVs (e.g., low/base/high) reflecting plausible dispersion in future operating outcomes and discount rates.
5. **Premium to NPV ("Premium")** The degree to which Market Value exceeds the NPV Range.
   A. **Premium (absolute):** $P - NPV_r$
   B. **Premium (relative):** P / NPV_r (expressed as a ratio range)
6. **Embedded Expectations ("EE")** The combination of revenue growth, profit margins, reinvestment needs, and terminal valuation multiples implicitly required for the current Market Price to be justified within the NPV framework.
7. **Valuation Multiple ("Multiple")** A price ratio (e.g., P/E, EV/Sales, P/S) reflecting how much investors are paying per unit of earnings or sales.
8. **Multiple Compression Risk ("MCR")** The risk that the market assigns a lower Multiple in the future, independent of the company's absolute earnings or sales growth.
9. **Inversion / "Invert" Stress Test ("Invert Test")** A prudential analytical method: identify adverse-but-plausible scenarios that would produce an unacceptable investor outcome, then test whether the current price leaves an adequate margin of safety under those scenarios.

II. Why the Measure of Earnings Quality Determines the Validity of Every Valuation

A security's price can only be justified by reference to cash or equity that investors will actually benefit from — whether as growing tangible equity per share, dividends, or share buybacks. Yet much of standard practice relies on measures of profitability that overstate, often dramatically, the cash truly available to shareholders. Three measures are commonly referenced, and they are not interchangeable.

1. **Reported Earnings (Net Income / EPS).** This is an accounting figure governed by GAAP conventions. It includes non-cash charges (depreciation, amortization, stock-based compensation) and excludes actual cash outlays (capital expenditures, working capital changes). Reported earnings can make a company appear profitable while the business consumes cash. A valuation

multiple applied to reported earnings (e.g., a P/E ratio) may therefore price a claim on income that does not exist in spendable form.

2. **Free Cash Flow (FCF).** FCF adjusts for capital expenditures: typically, operating cash flow minus capex. It is a better proxy than reported earnings but still overstates what is available to shareholders if it does not account for the *minimum reinvestment required to sustain the company's competitive position*. A company can report positive FCF while underinvesting in R&D, maintenance, or capacity — temporarily inflating the number at the expense of future earning power.

3. **Distributable Cash Flow (DCF*).** This is the cash available for distribution to shareholders *without adversely affecting the company's capital reinvestment needs to sustain future operations and competitive position*. It is FCF minus the reinvestment the business must make to preserve — not grow — its existing franchise. This is the only measure that represents a genuine, sustainable claim on cash by equity holders.

Why the distinction matters for valuation:

The gap between these three measures can be enormous, and the direction of the error is always the same — reported earnings and conventional FCF overstate the cash available to shareholders.

When a valuation multiple is applied to the wrong measure, the resulting "fair value" is inflated by precisely the amount of that overstatement. A stock trading at 30× reported earnings may in fact be trading at 50× or 80× distributable cash flow once required reinvestment is properly deducted.

This is not an academic distinction. It is the single most common source of systematic overvaluation in professional practice — and it is rarely disclosed to investors. A fiduciary process that applies a price multiple to reported earnings without reconciling to distributable cash flow has not performed a valuation. It has performed an approximation that systematically overstates the margin of safety and understates the risk of loss.

III. Observations

1. **A rising Premium narrows the set of justifying outcomes.** As **Premium** (over NPV) increases, the security's prospective returns become increasingly dependent on a smaller, more rare and less probable subset of scenarios characterized by **exceptional** business outcomes (e.g., unusually high growth and/or unusually high margins sustained for longer than typical) and/or the market's willingness to maintain an unusually high **Multiple**.
2. **A high Premium increases sensitivity to reversion due to "normal" outcomes, i.e., a large number of probable disappointments.** When price embeds exceptional **Embedded Expectations**, "merely good" results (as opposed to exceptional results) can produce disproportionate price declines because the market need not revise earnings downward dramatically for the Multiple to compress.
3. **Multiple Compression can dominate business improvement.** Even where a company's revenues and earnings grow, investor outcomes may be weak or negative if the market reduces the Multiple applied to those fundamentals (i.e., MCR materializes). Over time, assuming that valuation multiples across any company, sector, or index will remain at current levels is imprudent. Each target forecast must be 'performance tested' against normalized and maximum historic drawdowns. This effect is most pronounced for securities that begin at elevated valuations.

4. **Timing of repricing is uncertain; direction of risk is not.** While valuation extremes do not imply a deterministic time-to-correction, increasing the **Premium** systematically increases the dependence on exceptional conditions and therefore increases downside asymmetry (larger negative outcomes under adverse-but-plausible scenarios).
5. **"Invert" is a loss-prevention discipline aligned with prudential supervision.** The **Invert Test** is not a predictive claim about markets; it is a risk-control method that forces explicit identification of failure conditions and quantifies exposure under adverse-but-plausible scenarios.

IV. Implications for Investor Protection and Fiduciary Practice

1. **Require explicit disclosure of Embedded Expectations when Premium is material.** Where **Premium** is substantial, investors and fiduciaries should be able to see (in plain terms) what growth, margin, and terminal Multiple assumptions are required for the security to deliver a target return.
2. **Suitability analysis should incorporate adverse-but-plausible scenario testing.** A prudent process should evaluate whether the investment remains suitable if:
   (a) growth slows earlier than expected,
   (b) margins revert toward competitive norms, and/or
   (c) the valuation Multiple normalizes.
3. **"Margin of safety" is measurable as a Premium sensitivity analysis.** The larger the **Premium**, the smaller the margin of safety. A process can quantify how much of the current Market Price is supported by (i) a base-case NPV and (ii) incremental reliance on exceptional assumptions.
4. **Communications focused solely on "growth" are incomplete when Premium is high.** Disclosures and recommendations that emphasize growth without addressing valuation sensitivity (including **MCR**) risk omitting material information necessary for investors to understand downside exposure.
5. **A standardized Invert Test improves comparability across products and firms.** Requiring a consistent framework (defined terms, scenario bands, and stated assumptions) would increase transparency and reduce ambiguity in risk characterization.

V. Recommended Analytical Steps (Process Standard)

1. **Establish NPV_r (range) from transparent assumptions.** Use disclosed inputs for revenue, margins, reinvestment, and discount rates to produce a low/base/high **NPV Range**.
2. **Compute Premium metrics.** Report **Premium** as both absolute dollars and relative ratios P / NPV_r.
3. **Derive Embedded Expectations (reverse engineering, i.e., WMH™).** Identify the growth/margin/terminal Multiple combinations necessary for the current price to fall within **NPV_r** and meet a target return.
4. **Apply the Invert Test (adverse-but-plausible).** (Charlie Munger) Evaluate outcomes under scenarios including:
   A. growth deceleration,
   B. margin normalization,
   C. terminal Multiple normalization,
   D. macro/discount-rate shift (higher discount rate). Report resulting drawdowns and probability bands where supported by historical reference classes.
5. **Step 5 — Determine suitability and disclose limitations.** State whether the investment remains consistent with investor objectives under the adverse-but-plausible cases; disclose that timing of repricing is uncertain even when downside asymmetry is high.

VI. Summary Statement

1. As the **Premium to NPV** widens, the investment's success depends increasingly on exceptional assumptions *that may be highly improbable* and/or persistently elevated valuation multiples.
2. This increases downside asymmetry and the risk that valuation normalization can overwhelm business improvement.
3. A standardized **Invert Test** — identifying adverse-but-plausible failure conditions and quantifying outcomes — provides a prudential, non-predictive method to reduce avoidable large losses.

"Extraordinary claims require extraordinary evidence." — Carl Sagan, 1980

PART I: The Regulatory Gap

1.1 An Excellent Standard of Care Already Exists — The 2022–2023 SEC Staff Bulletin Trilogy

Before examining the empirical evidence, we begin with the regulatory standard itself, because the foundation this report builds on is not new. The SEC has already articulated a rigorous framework requiring advisors to evaluate alternatives, document their reasoning, and act as a fiduciary to their clients. What the Commission has not yet required is the logical next step: once an advisor determines that a client should hold a portfolio of securities, the same discipline of comparison and evidence should govern which securities, and at what prices. The tools of data science exist today to make that analysis nearly routine. This report proposes that the SEC use the language of its own existing framework to require it. The three Staff Bulletins that follow establish how close the Commission has already come.

The three bulletins establish four core obligations:

A. Fiduciaries are required to understand the potential losses of the investments they recommend.
B. They must consider whether lower-risk alternatives better serve the client.
C. They must monitor holdings continuously
D. They must identify and address their own conflicts of interest.

These are not novel proposals. **The SEC has already articulated each of these requirements in its own published guidance.**

In March 2022, August 2022 and April 2023, the SEC's Division of Trading and Markets issued three Staff Bulletins that, taken together, constitute the most detailed operational guidance the Commission has published on the care obligations of broker-dealers and investment advisers. Each bulletin is styled as questions and answers, addressed directly to firms and their financial professionals, clarifying what Regulation Best Interest (for broker-dealers) and the Investment Advisers Act fiduciary standard (for investment advisers) require in practice. The language is remarkably specific — and remarkably aligned with the standards this report proposes.

1. **Staff Bulletin: Standards of Conduct for Broker-Dealers and Investment Advisers — Account Recommendations for Retail Investors** (March 30, 2022). Key observation: Advisors must consider reasonably available alternatives — and the Commission has already pursued enforcement actions against those who did not.

   "The Commission has pursued enforcement actions against investment advisers for recommending higher-cost products to clients when similar, lower-cost products were available."

2. **Staff Bulletin: Standards of Conduct for Broker-Dealers and Investment Advisers — Conflicts of Interest** (August 3, 2022). Key observation: Conflict management is not a disclosure exercise — it is an ongoing operational obligation that requires documentation, mitigation, and in some cases elimination.

   "Identifying and addressing conflicts should not be merely a 'check-the-box' exercise, but a robust, ongoing process that is tailored to each conflict."

3. **Staff Bulletin: Standards of Conduct for Broker-Dealers and Investment Advisers — Care Obligations** (April 20, 2023). Key observation: The duty of care requires understanding potential losses *before* recommending — and the obligation is continuous, not transactional.

> "Investment advisers, broker-dealers, and their financial professionals need to understand the investments and investment strategies on which they provide advice and recommendations *before* advising on or recommending them to retail investors."

What follows examines each bulletin in turn.

I. The March 2022 Account Recommendations Bulletin: Alternatives, Costs, and Documentation

The first bulletin in the trilogy addresses a consequential and frequently overlooked decision: the recommendation of an account type. The SEC treats this as a fiduciary act — not an administrative one — and establishes three requirements that bear directly on the arguments of this report.

Reasonably available alternatives must be considered. The bulletin states without qualification that advisors must evaluate alternatives before recommending an account:

> "Under both Reg BI and the IA fiduciary standard you may recommend an account to a retail investor only when you have a reasonable basis to believe that the account is in the retail investor's best interest."

The bulletin then specifies that this obligation cannot be circumvented by limiting the advisor's product menu:

> "You cannot recommend an account that is not in a retail investor's best interest solely based on your firm's limited product menu or arising from limitations on your licensing. Any limitations on account types considered, in the staff's view, are material facts that should be disclosed."

Cost is always a relevant factor. The bulletin states that cost must be considered in every recommendation — and that recommending a higher-cost option requires an affirmative justification:

> "While Reg BI and the IA fiduciary standard do not always obligate you to recommend the least expensive type of account, both require you to have a reasonable basis to believe that the account recommendation is in the retail investor's best interest and does not place your or your firm's interests ahead of the retail investor's interest."

The bulletin then notes that the Commission has already acted on this principle through enforcement:

> "The Commission has pursued enforcement actions against investment advisers for recommending higher-cost products to clients when similar, lower-cost products were available."

The basis for recommendations must be documented. The bulletin states repeatedly — in the context of account recommendations, rollover decisions, and investor-directed exceptions — that documentation is not optional:

> "In the staff's view, it may be difficult for a firm to assess periodically the adequacy and effectiveness of its policies and procedures or to demonstrate compliance with its obligations to retail investors without documenting the basis for certain recommendations."

This language appears in substantially identical form in Questions 3.3, 4.1, 4.2, 5, and 6 of the bulletin. The repetition is not accidental. The SEC is establishing that undocumented recommendations are presumptively deficient — not because the recommendation was necessarily wrong, but because the absence of records makes compliance unverifiable.

Consider what this means in practice. An investment advisor who recommends an equity portfolio to a 70-year-old retiree — without documenting why that portfolio is superior to Treasury securities, FDIC-insured certificates of deposit, or fixed annuities for that specific client — has not satisfied the standard the SEC articulated in 2022. The alternatives exist. They are reasonably available. The advisor's failure to consider them, or to document why they were rejected, is not a gap in judgment. It is a gap in compliance with a published standard.

II. The August 2022 Conflicts of Interest Bulletin: Universal Conflicts, Structural Incentives, and the Limits of Disclosure

The second bulletin addresses the structural conflicts that pervade the investment advisory profession — and establishes that disclosure alone does not resolve them.

Every firm has conflicts. The bulletin opens with an acknowledgment that is remarkable for a regulatory publication:

> "All broker-dealers, investment advisers, and financial professionals have at least some conflicts of interest with their retail investors. Specifically, they have an economic incentive to recommend products, services, or account types that provide more revenue or other benefits for the firm or its financial professionals, even if such recommendations or advice are not in the best interest of the retail investor."

This is not a theoretical possibility the SEC is flagging. It is a universal condition the SEC is acknowledging — and requiring firms to address.

Disclosure is not sufficient. The bulletin is explicit that identifying and disclosing a conflict does not satisfy the obligation:

> "Disclosure of conflicts alone does not satisfy the obligation to act in a retail investor's best interest."

The bulletin then specifies that conflicts must be addressed through mitigation or elimination — not merely acknowledged:

> "Identifying and addressing conflicts should not be merely a 'check-the-box' exercise, but a robust, ongoing process that is tailored to each conflict."

And where mitigation is insufficient:

> "Where such conflicts cannot be effectively addressed through mitigation, firms may need to determine whether to eliminate the conflict or refrain from providing advice or recommendations that are influenced by that conflict to avoid violating the obligation to act in a retail investor's best interest."

Compensation structures are a primary source of conflict. The bulletin provides a detailed taxonomy of conflict sources, including:

> "Compensation based on assets gathered and/or products sold"; "differential or variable compensation based on the product sold"; and "quotas, bonuses, sales contests, special awards."

The bulletin further specifies that firms must evaluate whether their compensation practices "incentivize financial professionals to offer advice and recommendations that are not in their retail investors' best

interests" and whether the basis for calculating compensation "has the effect of passing along firm-level conflicts to their financial professionals."

Absence of records is evidence of non-compliance. The bulletin establishes a principle that is central to this report's argument:

> "It would be difficult for an investment adviser to demonstrate how it complies with its fiduciary obligations in the absence of records related to how the adviser addresses its conflicts."

This sentence — buried in the Background section of the bulletin — is among the most consequential statements the SEC has published. It means that an advisor who has no documentation of how conflicts are managed is not merely disorganized. The advisor is, in the SEC's own words, unable to demonstrate compliance. The absence of records is not a neutral fact. It is affirmative evidence that the work was not done.

Consider the standard AUM fee model: the advisor earns a percentage of assets under management. Moving a client to Treasury securities or fixed annuities to protect against a foreseeable equity decline directly reduces the advisor's income. The SEC's own bulletin acknowledges this as a conflict. The bulletin states that disclosure alone does not resolve it. The bulletin requires documentation of how the conflict is addressed. The question is: how many of the approximately 15,000 registered investment advisory firms in America can produce that documentation today?

III. The April 2023 Care Obligations Bulletin: Understanding Losses, Considering Alternatives, and Continuous Monitoring

The third and final bulletin in the trilogy is the most comprehensive — and the most directly relevant to the central argument of this report. It addresses the care obligation itself: what it means to understand an investment before recommending it, what it means to evaluate alternatives, and what it means to monitor holdings on an ongoing basis.

Advisors must understand potential losses before recommending. The bulletin opens with an unequivocal statement. Question 1 asks: "Do I need to understand the investment or investment strategy I am advising on or recommending?" The SEC's answer:

> "Yes. Under the care obligations, investment advisers, broker-dealers, and their financial professionals need to understand the investments and investment strategies on which they provide advice and recommendations *before* advising on or recommending them to retail investors. This includes developing a sufficient understanding of the potential risks, rewards, and costs of the investment or investment strategy to have a reasonable basis to believe that the recommendation or advice could be in a retail investor's best interest."

Question 2 then specifies what "understanding" requires. The SEC provides a non-exhaustive list that includes:

> **"The investment or investment strategy's likely performance in a variety of market and economic conditions"**

and:

> **"The expected returns, expected payout rates, and potential losses of the investment or investment strategy"**

*The implications are direct. An advisor who recommends a stock trading at 13× sales and 38× earnings — without analyzing the expected returns and **potential losses** under a variety of market conditions,*

including the historically normal condition of valuation compression — has not satisfied the care obligation as the SEC itself has defined it. The standard is not ambiguous. The SEC says: understand the potential losses. The industry does not do this. The question is enforcement.

Reasonably available alternatives must be considered — and the evaluation must be substantive. The 2023 Bulletin devotes Questions 9 through 12 to the obligation to consider alternatives and makes clear that this is not optional:

> "It would be difficult for firms and their financial professionals to form a reasonable basis to believe a recommendation or advice is in the retail investor's best interest without considering alternatives that are reasonably available to achieve the investor's investment objectives."

Consider what this means in practice. There are roughly 2,500 investable companies in the U.S. equity market. A typical advisor holds 40 to 50 stocks across client accounts. On what documented basis did the advisor conclude that these 40 or 50 — out of 2,500 — were the best reasonably available alternatives for each client?

And it cannot be coincidental that across the advisory profession, the stocks selected are overwhelmingly the same — the largest 50 to 100 companies in the market, which are also, by definition, the most expensive. Can the advisor demonstrate that the most expensive stocks have historically delivered the best performance, or fallen the least in recessions and market declines? If 90% of an advisor's holdings are concentrated in the same mega-cap names that 90% of the industry also holds, is that the product of independent analysis — or convenience? This is the heart of the matter: what process did the advisor use, and was it based on data or on the comfort that everyone else is buying the same thing?

And once purchased, does the advisor monitor whether the stock's price has outrun the company's improvement — a stock bought at $100 that rises to $200 while the underlying business improves by 30%, not 100% — and act on that divergence? If the advisor lacks independent tools to evaluate the full universe, at a minimum the client should be told.

The SEC further specifies that the consideration must go beyond token comparisons:

> "The staff likely would not view a firm as having sufficiently considered reasonably available alternatives if it merely considers different share classes of one fund. Rather, in the staff's view, the evaluation should, for example, begin with consideration of other investments and investment types that are reasonably available to investors through the firm and could be used to achieve the investor's investment objectives."

And the evaluation must happen at the beginning of the process — not after the fact:

> "Consideration of reasonably available alternatives should begin early in the process of formulating a recommendation or providing advice rather than as a retroactive exercise undertaken after the firm or financial professional has already decided what to recommend or what advice to provide."

The duty is continuous. The 2023 Bulletin reinforces that the obligation does not end at the point of purchase:

> "Where there is an ongoing monitoring obligation, the reasonable investigation will require continued analysis after purchase of the investment and over the course of the relationship."

Every public company publishes quarterly financial statements containing over 200 data points that reveal, in aggregate, whether the company's financial condition is strengthening, weakening, or stable —

whether liquidity is improving or deteriorating, whether leverage is rising or falling. These statements are public, timely, and available to every advisor. An RIA need not wait for a research report from a broker-dealer to act on changes that are already visible in the filings.

And critically, broker-dealer analysts are not fiduciaries. They owe no duty of care to the RIA's clients, and their research priorities are governed by their own commercial relationships, not by the RIA's monitoring obligations. An advisor who delegates the monitoring function to non-fiduciary sources has not fulfilled the continuous duty — the advisor has outsourced that duty to parties who do not share it.

The SEC has established that the duty to monitor belongs to the RIA. That duty requires established, measurable criteria, applied at minimum to every quarterly statement, for evaluating changes in liquidity, leverage, revenues, and cash flow, among other risk factors. And the RIA is required to disclose to clients the frequency and depth of its monitoring process, and whether it relies on independent, fiduciary-grade analysis or on third-party research produced by firms that are not held to a fiduciary standard.

This language extends and operationalizes the continuous duty of care established in SEC Release IA-5248 (2019). The standard is now stated in two independent SEC publications spanning four years. The monitoring obligation is not a theoretical construct. It is a documented regulatory expectation — one that, as documented in Part V of this report, the industry's structural dependencies on conflicted sell-side research render effectively impossible to fulfill without independent, quantitative monitoring tools.

Financial professionals cannot delegate their own understanding. The bulletin addresses a practice that is pervasive in the industry — relying on the firm's approved list or on third-party research in lieu of personal analysis:

> "Financial professionals cannot satisfy their own care obligations by solely relying on the efforts of others at their firm. Rather, financial professionals remain responsible for personally understanding an investment or investment strategy before they recommend or provide advice with regard to that investment or investment strategy."

This single sentence invalidates the most common defense offered by individual advisors: "My firm approved the product." The SEC says: that is not enough. You must understand it yourself — including its potential losses.

Conclusion: The Gap Is Not in the Standard — It Is in Compliance and Enforcement

The 2022–2023 Staff Bulletin trilogy establishes that the SEC has already articulated, in its own published guidance, substantially every standard this report proposes:

- **Understanding potential losses:** Stated in the 2023 Care Obligations Bulletin.
- **Considering reasonably available alternatives, including lower-cost options:** Stated in both the 2022 Account Recommendations Bulletin and the 2023 Care Obligations Bulletin — and enforced through prior Commission actions.
- **Documenting the basis for recommendations:** Stated in all three bulletins, with the 2022 Conflicts Bulletin establishing that absence of records is itself evidence of non-compliance.
- **Continuous monitoring:** Stated in the 2023 Care Obligations Bulletin, building on IA-5248.
- **Robust conflict management beyond mere disclosure:** Stated in the 2022 Conflicts of Interest Bulletin.

The regulatory gap documented in this report is therefore not a gap in the articulated standard. **It is a gap between what the SEC has told the industry to do and what the industry actually does.**

Advisors are not analyzing potential losses. They are not documenting why equity exposure is superior to lower-risk alternatives for specific clients. They are not monitoring holdings with objective technology. They are not addressing their conflicts in a manner more substantive than a compliance checkbox.

The standard exists. The compliance does not. The enforcement is insufficient — **as the SEC's own Division of Examinations reported, approximately 15% of the registered investment adviser population is examined in any given year. The remaining 85% operate under an honor system** with no mechanism to verify that the obligations articulated in these bulletins are being fulfilled.

This report proposes that the gap be closed — not by creating new obligations, but by requiring that the obligations the SEC has already articulated be fulfilled in a manner that is documented, quantitative, and auditable.

Sources

SEC Staff Bulletin: Standards of Conduct for Broker-Dealers and Investment Advisers — Account Recommendations for Retail Investors (March 30, 2022). https://www.sec.gov/about/divisions-offices/division-trading-markets/broker-dealers/staff-bulletin-standards-conduct-broker-dealers-investment-advisers-account-recommendations-retail

SEC Staff Bulletin: Standards of Conduct for Broker-Dealers and Investment Advisers — Conflicts of Interest (August 3, 2022). https://www.sec.gov/tm/iabd-staff-bulletin-conflicts-interest

SEC Staff Bulletin: Standards of Conduct for Broker-Dealers and Investment Advisers — Care Obligations (April 20, 2023). https://www.sec.gov/about/divisions-offices/division-trading-markets/broker-dealers/staff-bulletin-standards-conduct-broker-dealers-investment-advisers-care-obligations

1.2 The Crisis of Unmeasurable Risk

The investment profession, uniquely among the disciplines that manage human welfare, operates without a standardized, quantitative requirement to measure risk.

A structural engineer does not certify a bridge by stating, "Based on my experience, this design will hold." Every load-bearing element is stress-tested against physics-based failure models, built with mandatory safety margins, and subject to independent inspection. If the engineer fails to calculate the load limit, and the bridge collapses, the defense that "consensus opinion supported the design" is not a defense. It is an admission of negligence.

Yet the American financial regulatory framework currently permits investment fiduciaries to recommend securities without performing any equivalent calculation of risk. The typical advisor, when asked to define the risk of a specific stock in a client's portfolio, cannot produce a quantitative answer. They cannot state the statistical probability of a 30% loss based on historical valuation reversions. They cannot define the magnitude of potential decline if the stock's price-to-sales ratio returns to its historical median. They cannot produce a "load limit" for the portfolio.

Instead, the industry operates on **untestable opinions**: narratives about "growth," "quality," and "innovation" that sound authoritative but lack the essential characteristic of scientific knowledge: **testability**. As the philosopher Karl Popper established, a claim that cannot be tested—that makes no specific prediction capable of being proven wrong—is not knowledge. It is faith.

The consequences of this "faith-based" standard are not theoretical. They are empirical and catastrophic:

- **The Active Management Failure:** According to S&P Dow Jones Indices, over a recent twenty-year period, approximately 90% of actively managed large-cap domestic equity funds underperformed the S&P 500.
- **The Microsoft Collapse (2025-2026):** Between October 2025 and February 2026, Microsoft Corporation lost approximately $1 trillion in market capitalization. This loss was not an "Act of God." It was the mathematically inevitable result of valuation physics: the stock was priced at 13.7x sales and 38x earnings—levels that had historically produced zero returns for 17 years (1999-2016) in the exact same company.
- **The Systemic Blindness:** Fiduciaries held this stock at its peak not because they had calculated a favorable risk/reward ratio, but because "consensus" deemed it a "blue chip." They ignored the measurable probability of loss in favor of the comforting narrative of safety.

No other profession that manages human welfare permits its practitioners to ignore quantifiable risk simply because the outcome is not certain. A bridge engineer is not required to prove a bridge *will* collapse — only that the load exceeds documented safety thresholds. The fiduciary standard should operate on the same principle: not certainty of loss, but the identification of conditions under which loss becomes statistically probable and potentially severe.

We recognize that the Commission faces the complex and challenging mandate of balancing capital formation with investor protection. We respectfully submit that when the commercial interests of product distributors diverge from the safety needs of ordinary investors, specific, testable standards — including disclosure of the methods used to support a "target price" — serve as the most effective safeguards against very significant and preventable losses. This report offers a framework for what those standards might look like.

1.3 The Death of Caveat Emptor: Why the Burden Falls on Those Who Know

The SEC's 2022–2023 Staff Bulletins documented in Section 4.2 articulate *what* the standard requires. A separate body of legal and economic scholarship explains *why* the standard is correct — and why any lesser standard is indefensible.

The ancient doctrine of caveat emptor — "let the buyer beware" — once placed the entire burden of information gathering on the purchaser. If a seller concealed a defect, misrepresented a product, or withheld material facts, the buyer's remedy was to have been more careful. The doctrine has been systematically dismantled over the past century in every profession that manages consequential risk — except, in practice, the investment advisory profession.

The turning point came in 1965, when Ralph Nader published Unsafe at Any Speed and argued that automobile manufacturers — not drivers — bore the responsibility for vehicle safety, because the manufacturers possessed the engineering knowledge that consumers did not. Nader's argument was, at its core, an information argument: the party that knows the risk must disclose the risk. The result was a revolution in consumer protection — seatbelt laws, crash-test standards, mandatory recalls, and an entire regulatory architecture built on the principle that the seller's superior knowledge creates the seller's duty. That revolution transformed every consumer-facing industry in America. It has not yet reached the investment advisory profession — where the consequences of undisclosed risk are measured not in automobile fatalities but in the destruction of retirement savings.

In a landmark paper presented at the University of Chicago Law School, Professor Gerrit De Geest of Washington University School of Law documented what he called "The Death of Caveat Emptor." De

Geest demonstrated that modern law has replaced caveat emptor with a principle that is both economically obvious and legally pervasive: the **Least Cost Information Gatherer (LCIG) principle.** The principle holds that the party who can obtain information most cheaply has the duty to obtain it and disclose it to the other party.

The economics, as De Geest notes, are "simple — even banal":

> "Information is a good that needs to be produced in society. It is wasteful to let two parties produce exactly the same information — that would be like one party reinventing hot water. If one of them can obtain the information more cheaply, that party should obtain it and reveal it to the other."

The LCIG principle explains why pharmaceutical companies must disclose side effects — they are the least cost gatherers of that information, having conducted the clinical trials and accumulated the adverse event data. It explains why physicians must disclose the risks of a procedure — they possess the medical knowledge that the patient does not. It explains why home sellers must disclose termite infestations — they obtained the information as a by-product of living in the house, at zero cost. In each case, the party with the information bears the duty to disclose it, because requiring the other party to independently discover what is already known would be wasteful, duplicative, and — when the stakes are high — dangerous.

The Application to Investment Advice

The investment advisory profession presents what may be the most consequential application of the LCIG principle in modern commerce. The advisor possesses — or has the professional obligation to possess — detailed knowledge of the risks, costs, and probable outcomes of the securities they recommend. The client, by definition, does not. That asymmetry is the entire basis for the advisory relationship. A client who could independently evaluate the probability and magnitude of loss for every holding in their portfolio would not need an advisor.

De Geest addresses this directly in his analysis of professionals who claim to provide unbiased advice. When a client seeks guidance from an advisor, the honesty and completeness of that advice is itself a material fact. The advisor is the absolute least cost information gatherer — they know what they know, they know what they have analyzed, and they know what they have not analyzed. De Geest's conclusion is unequivocal:

> "Sellers who pretend to give unbiased advice should be held to fiduciary standards."

And for those who do not wish to meet that standard, De Geest proposes a simple remedy — honest disclosure:

> "If they want to give biased advice, that is fine, but then they should openly reveal that, by saying: 'Do not always believe what I say. I am committed to giving biased advice. My goal is not to help you but to help my own bank account.'"

This is, in essence, the disclosure this report proposes. An investment advisor who has not analyzed the probability and magnitude of loss for the securities they recommend — who has not compared equity exposure to reasonably available, lower-risk alternatives — who relies on sell-side research produced by entities with documented conflicts of interest — is not providing the unbiased, expert guidance the client believes they are receiving. The advisor is providing something closer to a sales recommendation. The LCIG principle says: if you are providing a sales recommendation rather than fiduciary advice, you must say so.

The Cross-Industry Standard

Every other profession that manages consequential risk on behalf of the public has internalized this principle. A pharmaceutical company cannot conceal that a drug causes adverse effects in 3% of patients — even though 97% will be unharmed. A structural engineer cannot certify a building without analyzing load-bearing capacity under stress conditions — even if the building will probably never experience an earthquake. A physician cannot prescribe a high-risk treatment without disclosing that a safer alternative exists — even if the high-risk treatment has a higher success rate.

In each case, the professional who possesses superior knowledge bears the duty to disclose what they know — including the risks, the alternatives, and the conditions under which their recommendation could fail. The standard is not perfection. It is disclosure. The professional is not required to guarantee the outcome. They are required to ensure that the person relying on their expertise understands the risks *before* committing to a course of action.

The investment advisory profession operates under a different regime — one in which the advisor's superior knowledge of valuation risk, historical base rates, and the structural conflicts embedded in sell-side research is not disclosed to the client in any quantitative or testable form. The client receives a recommendation. They do not receive the evidence — or the absence of evidence — on which that recommendation is based.

Caveat emptor is dead in medicine. It is dead in engineering. It is dead in pharmaceutical regulation. It is dead in real estate. It remains, as a practical matter, alive in the one profession where the consequences of information asymmetry are measured in trillions of dollars of preventable losses.

The LCIG principle — and the SEC's own 2022–2023 Staff Bulletins — say it should not be.

Source: *Gerrit De Geest, "The Death of Caveat Emptor," University of Chicago Law School, Law and Economics Workshop (February 18, 2014). Professor De Geest is the James Carr Professor of Law and Director of the Center on Law, Innovation & Economic Growth at Washington University School of Law, St. Louis.*

1.4 The Abdication of Due Care

The central failure of modern fiduciary practice is not a lack of good intentions. It is a regulatory gap that permits fiduciaries to outsource their duty of care to entities that have no legal obligation to the investor.

Under the *Investment Advisers Act of 1940*, particularly as clarified in *SEC Release IA-5248*, a fiduciary owes a duty of care that includes a "reasonable basis" for recommendations and a duty to seek "disconfirming evidence." The *Prudent Investor Rule* (Restatement Third of Trusts) further mandates the exercise of "reasonable care, skill, and caution."

In practice, the industry has adopted two strategies that violate the plain meaning of these requirements: reliance on conflicted research and delegation to index funds. The first is examined below. The second, the unsuitability of index funds as a fiduciary safe harbor, is examined in detail in Part III of this report.

The "Pharmaceutical Representative" Paradox

Most fiduciaries justify individual stock selections by citing research from major broker-dealers. This practice is fundamentally incompatible with the duty of loyalty, independence, and due care.

Broker-dealer research is produced by organizations that are exempt from fiduciary standards. Under Regulation Best Interest (Reg BI), broker-dealers must act in a customer's "best interest" only at the *moment* of a recommendation. They have no ongoing duty to monitor, and no obligation to disclose the probability or magnitude of potential losses. Their research reports are not required to disclose the statistical probability of loss, the magnitude of potential downside, or the historical accuracy of the analyst's prior recommendations.

Allowing a fiduciary to rely on non-fiduciary research is analogous to allowing a physician to prescribe medication based solely on the marketing literature of a pharmaceutical representative. The representative may be knowledgeable, but their compensation depends on distribution volume, not patient outcomes. Their "research" is authorized marketing material designed to highlight benefits while minimizing risks. By relying on it without independent verification, the fiduciary abdicates the independent analysis required by the 1940 Act.

The Enron Test

The consequences of this abdication are not theoretical. In October 2001, Enron was a member of the S&P 500. In 2008, Lehman Brothers, Bear Stearns, and Washington Mutual were members until virtually the moment of their collapse. Every fiduciary who "just bought the index" held these toxic assets — not because they had analyzed the balance sheets, but because the index methodology required it. Basic quantitative analysis of Enron's net liquid equity would have revealed its insolvency months in advance.

By adopting a strategy that forbids the exclusion of unsuitable assets, the fiduciary violates the duty of caution. Prudence does not mean buying everything; it means distinguishing the sound from the unsound.

Conclusion

The current regulatory environment permits fiduciaries to rely on tools — broker research and index funds — that are structurally incapable of measuring risk. This is not a standard of care; it is a standard of convenience. To protect investors, we must replace these passive proxies with direct, testable measurements of value. Advisors must be required to produce rational, defensible calculations of the probability and magnitude of potential loss and gain before committing client capital.

PART II: The 25-Year Precedent

Pattern recognition is the foundation of risk management. A trained radiologist sees the anomaly on the scan that the untrained eye walks past—not because one is more intelligent than the other, but because one has been taught where to look. As the Nobel laureate Daniel Kahneman demonstrated, even the most sophisticated investors routinely fail to recognize recurring market patterns—not from any lack of intellect, but because narrative overwhelms analysis, and the urgency of the present obscures the lessons of the past.

The purpose of this report is to make the pattern visible—so that the reader, once having seen it, cannot unsee it.

2.1 The Precedent

In 1967, a prudent fiduciary who followed the consensus of the investment management profession and concentrated a client's portfolio in IBM, the most defensible single-stock position available in the American equity market, subjected that client to **25 years of negative real returns.**

IBM was not a speculative holding. It was the #1 stock in the S&P 500. It was the most widely held institutional position in America. It was the stock that pension trustees and trust officers considered most consistent with their duty of care. No analyst downgraded it. No regulator questioned it. No reasonable person at the time would have called it imprudent.

And yet the documented result was permanent capital impairment.

This paper presents IBM's 1967–1993 record as a precedent—the most relevant case study available to any fiduciary evaluating concentration risk in today's equity markets. The question is not whether this history is interesting. The question is whether it is *foreseeable* now—and therefore whether ignoring it is consistent with the standard of care.

2.2 The Documented Record: IBM 1961–1993

The Fiduciary's "Safest" Holding (1961–1967)

By 1961, IBM occupied a position in American capital markets that was without precedent and, until recently, without parallel. Its System/360 family of computers—launched in 1964 with a $5 billion development investment (over $50 billion in today's dollars)—created the modern computing industry. Virtually every Fortune 500 company, government agency, and major research institution ran IBM hardware. The company's dominance was so total that the federal government maintained an active antitrust suit against it.

The stock market priced IBM accordingly. At its peak in 1961–62, IBM traded at approximately 60 times earnings. By 1967, it became the single largest stock in the S&P 500, a position it would hold for nearly three decades. IBM was the consensus fiduciary holding of its era—the stock that trust departments, pension funds, and registered investment advisors considered *most consistent* with prudent investment management. It was, in the language of the profession, a "one-decision stock": you bought it, and your duty of care was satisfied.

Multiple Compression (1968–1985)

The critical fact of the IBM record—and the fact most relevant to fiduciaries today—is that **the company continued to execute.** IBM's earnings grew substantially over the next two decades. Revenue expanded. New products shipped. The business performed.

None of it mattered to the investor who bought at a 60x price-to-earnings multiple, because **the valuation multiple collapsed.** The price the market was willing to pay for each dollar of IBM's earnings contracted relentlessly from approximately 60x toward 10x. The stock went nowhere for years—not because the company failed, but because the price already reflected decades of future success. The multiple compression alone destroyed more than 80% of the embedded valuation—even as the business grew.

This is the mechanism of permanent capital impairment in a high-quality company: the business grows, but the investor's return is determined by the price paid, not by the quality of the business.

The Technological Disruption (1986–1993)

Then the disruption arrived. The personal computer—technology IBM itself helped commercialize—accelerated a shift toward distributed, client-server computing and intensified price competition across the industry, pressuring IBM's legacy economics and business model. Neither IBM nor many of Wall Street's "best and brightest" fully anticipated how quickly new architectures and competitors—especially Digital Equipment Corporation (DEC) and other systems vendors—would erode IBM's historical dominance. By 1992, IBM reported one of the largest annual corporate losses in U.S. history at the time (variously reported around $5 billion to $8.1 billion depending on presentation and charges). The stock, which had traded at a split-adjusted peak near $25–30 in 1967–68, fell to approximately $10 by 1993.

Lou Gerstner was brought in as IBM's first CEO hired from outside the company. Market value had collapsed (commonly cited at roughly $29 billion in 1993), and industry analysts openly advocated breaking the company apart ("Baby Blues").

The Documented Result

An investor who purchased IBM at its 1967 peak and held until 1993 experienced a decline of approximately 60–70% in split-adjusted terms over 25 years—before accounting for the substantial inflation of the 1970s and 1980s, which roughly tripled the consumer price level over that period.

Even including dividends, an investor who bought IBM in 1967 and held until 1992 likely earned a negative real (inflation-adjusted) return over 25 years.

A 50-year-old client whose fiduciary concentrated their portfolio in IBM at the 1967 peak was 75 years old before breaking even in nominal terms—and never broke even in real terms during their investing lifetime.

IBM was the most widely endorsed fiduciary holding in American history.
The precedent is documented and undisputed.
Just as Nvidia is Today!

The Pattern Recurs — At IBM Itself

The following table places IBM's current price-to-sales ratio in historical context:

Period	P/S Ratio	Context
Late 1960s	**~6–7×**	$36B market cap on $5.3B revenue — preceded 25-year decline
2000 (dot-com peak)	2.85×	Highest P/S reached during the dot-com bubble
20-year average	1.93×	Long-term historical norm
February 9, 2026	**4.11×**	**Highest since the late 1960s — more than double the 20-year average**

IBM's current price-to-sales ratio is more than double its 20-year average, 44% above its dot-com peak, and has not been matched since the very period that preceded a quarter century of negative real returns. Those who do not study valuation history are condemned to repeat it. Buying IBM at 4.1 times sales requires extraordinary future financial performance for the investment to produce positive price gains. The data strongly suggests IBM's price may fall very significantly. Lacking rational evidence to support future extraordinary revenue and earnings gains by IBM may suggest the purchase of IBM is unsuitable for all but the most speculative accounts.

2.3 The Parallel: NVIDIA in 2026

NVIDIA Corporation today occupies the same structural position in American capital markets that IBM held in 1967. The parallels are not analogies. They are measurable, comparable facts:

Metric	IBM (1967)	NVIDIA (Feb 2026)
S&P 500 Rank	#1 (held ~25 years)	#1 by market cap
Index Weight	Largest single weight	~7–8%
Market Capitalization	Largest in the world	$4.6 trillion
P/E Ratio at Peak	~60x (1961 peak)	~47x trailing
Price/Sales	Extreme for era	~25x
Core Technology	Mainframe computing	GPU / AI accelerators
Competitive Position	Near-monopoly	Near-monopoly (data center GPU)
Market Consensus	"Growth is infinite"	"AI changes everything"
Fiduciary Consensus	"Negligent not to own it"	"You have to own it"
Antitrust Scrutiny	Active DOJ suit	Emerging regulatory focus

2.4 The Structural Risk: Why Technology Monopolies Are Temporary

In 1942, the economist **Joseph Schumpeter** identified the force that makes every technology monopoly inherently temporary. He called it *creative destruction*—the process by which new technologies, new commodities, and new forms of organization do not merely compete with incumbent firms on price or features, but eliminate the economic foundations on which those firms are built.

This is not a theoretical risk. It is a documented pattern with no known exceptions in the history of technology-based market dominance:

Dominant Company	Disrupted By	Result
IBM (mainframes)	Personal computers	$8.1B loss, near-bankruptcy
Cisco (networking)	Commoditization, cloud	Down ~75% from 2000 peak
Intel (x86 CPUs)	ARM, Apple Silicon, GPUs	Market cap down ~70%
Nokia (mobile)	Smartphone (iPhone)	Mobile division sold
BlackBerry (enterprise mobile)	Touchscreen smartphones	Hardware business abandoned

In each case, the dominant company was not displaced by a better version of its own product. It was displaced by an entirely different technological paradigm. IBM's mainframe did not lose to a better mainframe. It lost to a fundamentally different architecture.

The identifiable candidates for NVIDIA's eventual displacement are already visible: custom AI silicon designed by NVIDIA's own largest customers (Google's TPU, Amazon's Trainium, Microsoft's Maia), neuromorphic computing architectures, photonic processors, and quantum computing. A fiduciary is not required to predict which of these will prevail. A fiduciary is required to acknowledge that **no technology monopoly in recorded history has been permanent,** and to incorporate that documented fact into their risk analysis.

2.5 The Burden of Proof: The Mathematics of Current Valuations

NVIDIA currently trades at a market capitalization of approximately $4.6 trillion on trailing twelve-month revenue of approximately $187 billion—a price-to-sales ratio of approximately 25x. Its trailing price-to-earnings ratio is approximately 47x.

A fiduciary who maintains or adds to a concentrated position at these valuations is implicitly asserting one of two propositions:

Proposition 1: NVIDIA's revenue will grow at rates and to levels that have no historical precedent for a company of this size, and it current valuation through earnings growth alone. 50 years of investment data-science says it won't.

Proposition 2: The market will maintain an extreme valuation multiple on NVIDIA ***indefinitely***, defying the pattern of multiple compression that has affected every prior technology market leader. 100 years of investment data-science says it won't.

IBM's record demonstrates that the second proposition has never been sustained. Even as IBM's earnings grew substantially from 1962 through 1992, the P/E multiple collapsed from approximately 60x to approximately 10x. **The multiple compression alone destroyed more than 80% of the valuation—even as the underlying business grew.**

The burden of proof (for extraordinary claims) falls on the fiduciary. Keynes warned that major decisions are frequently made on "animal spirits," not on "a weighted average of quantitative benefits multiplied by quantitative probabilities." That observation is descriptive—not a standard of care. Fiduciaries and analysts should do the math, especially when valuations imply extraordinary outcomes; had that discipline been applied to IBM in 1967—by quantifying the growth and multiple assumptions required and the downside if multiples normalized—investors might have been spared a long period of capital impairment and the loss of very significant real client wealth.

The Competitive Reality: Documented Evidence

NVIDIA's valuation assumes durable dominance, yet the competitive response is massive and global. ASML—the Dutch cornerstone of advanced chip manufacturing—reported €9.6 billion in net income in 2025 and €4.7 billion in R&D expense, underscoring that the ecosystem is investing heavily, not standing still. At the same time, TSMC forecast $52–$56 billion of capital spending in 2026, while Samsung reported approximately KRW 52.7 trillion of capital expenditure (reported for 2025)—spending levels consistent with an industry-wide race to capture extraordinary AI profit pools.

Separately, China has launched a state-backed semiconductor fund with $47.5 billion of registered capital to accelerate domestic capability. In this environment, analysts urging "buy" at today's price should bear the burden of documenting, with evidence, why credible substitutes will not emerge on a 12–24 month horizon—and should quantify what happens to NVIDIA's margin and valuation multiples if performance parity or superiority appears and customers shift demand.

These are not speculative assertions. They are reported financial commitments by some of the largest technology companies on earth. A fiduciary who ignores this competitive landscape while maintaining a concentrated NVIDIA position at 25x revenue is not exercising care—they are exercising faith. And faith is not a fiduciary standard.

2.6 The IBM Precedent Applied: Three Lessons for Today's Fiduciary

The Prudent Investor Rule, as adopted in the Uniform Prudent Investor Act and the Restatement (Third) of Trusts, requires a fiduciary to consider the role each investment plays within the overall portfolio, to diversify investments unless the fiduciary reasonably determines that the purposes of the trust are better served without diversification, and to act with the care, skill, and caution that a prudent investor would exercise.

The IBM precedent is directly relevant to this standard in three respects:

1) **Consensus does not satisfy the duty of care.** Every institutional investor, every trust department, and every reputable financial advisor in 1967 endorsed IBM as a core holding. The consensus was unanimous---and the consensus delivered 25 years of negative real returns. A fiduciary who relies solely on the current market consensus regarding NVIDIA is *repeating the identical analytical failure*.

2) **Company quality does not eliminate valuation risk.** IBM was an excellent company throughout the period of its investors' losses. Revenue grew. Products shipped. The competitive position, while eventually eroded, remained dominant for decades. The source of the investor's loss was not corporate failure---it was the price paid for an excellent company. ***Does a fiduciary's duty include quantifying the risk of overpayment---i.e., measuring how much downside is embedded in the current valuation if growth, margins, or multiples revert toward normal ranges? If this is not required of fiduciary prudence and care, the SEC and FINRA should clarify that point explicitly to RIAs.***

3) **All technology monopolies have a documented expiration date.** NVIDIA's "moat" is being attacked with unprecedented capital. Four of NVIDIA's largest customers and platform peers (Alphabet, Microsoft, Amazon, Meta) will spend **over $600 billion** of combined AI/data-center spending in 2026, and a meaningful portion of that spend is explicitly aimed at reducing dependence on NVIDIA. Microsoft's Maia, Google's TPU efforts, Meta's pursuit of non-NVIDIA capacity are real threats. At the same time, **TSMC** is guiding **$52--$56 billion** of capex for 2026, and **Samsung**

reported roughly **$39.8B** of capex in 2025---spending levels that exist because competitors see a once-in-a-generation profit pool to capture. Globally, this is not "a few companies": China launched a state-backed "Big Fund" with **$47.5 billion** of registered capital to accelerate domestic semiconductor capability, while Europe's most important chip-infrastructure champion, **ASML (Netherlands)**, just reported **€4.7 billion of R&D expense**---hardly a picture of an industry "sitting idle."

The Burden of Proof: Who Must Justify the Position?

Because NVIDIA's current valuation depends materially on the continuation of its present competitive position, the burden should rest on brokerage firms and fiduciaries advocating purchase at today's prices to document, with evidence, why durable monopoly-like economics are likely to persist (and for how long) in the face of well-funded, capable competitors. That documentation should include (i) explicit, testable conditions under which NVIDIA retains pricing power and share, and (ii) a quantified downside scenario showing what the stock price would be if a credible competitor achieves performance parity or superiority (or if customers shift meaningful workloads to internal accelerators), causing margins and valuation multiples to normalize. Competition is a structural certainty in high-profit technology markets; the only variable is timing---so prudent analysis should treat "competitive disruption" as a scenario to be priced, not a possibility to be ignored.

The Active Decision

Today, NVIDIA constitutes approximately 7--8% of the S&P 500. An advisor whose clients hold index funds has accepted this concentration as a function of market-cap weighting. But an advisor who is adding individual NVIDIA positions on top of index exposure---or who is allowing clients to maintain concentrated positions from prior appreciation without documented review---is making an *active* fiduciary decision. IBM's 25-year record suggests that decision warrants rigorous, documented analysis---not merely the comfort of consensus.

Conclusion: The Record Speaks

The argument for IBM in 1967 was identical to the argument for NVIDIA today: the company is dominant, the technology is transformative, the growth is visible, the competitive moat is impregnable, and every reputable advisor in America agrees.

Every one of these statements was true about IBM. And none of them protected the investor from 25 years of negative real returns.

The price paid determines the return. Not the quality of the company. Schumpeter's gale has never failed to arrive. No technology monopoly has survived it.

As George Santayana warned, "***when experience is not retained, infancy is perpetual".***

IBM's 25-year precedent is documented, undisputed, and directly applicable. The question for every fiduciary is whether they will incorporate this precedent into their analysis---or whether, by ignoring it, they are condemned to repeat it.

PART III: The Universality of Valuation Risk

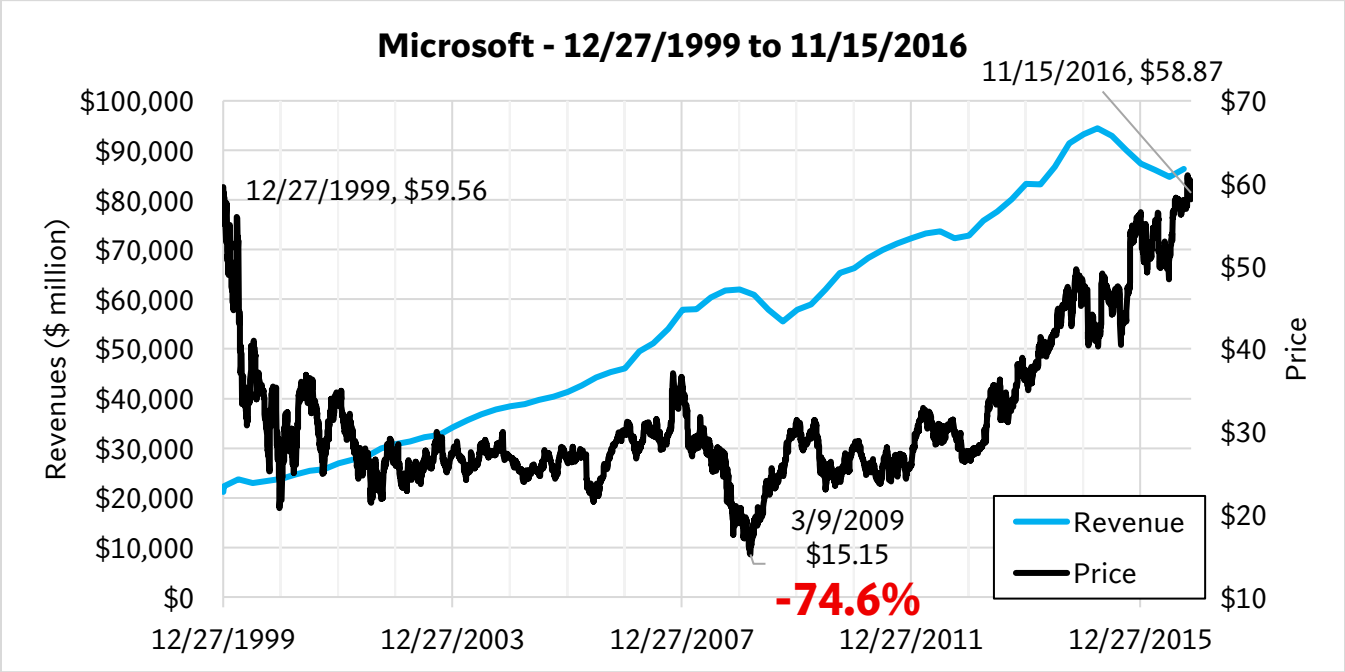
The preceding case study demonstrated that Microsoft's losses were not caused by business failure but by valuation mathematics. A reasonable question follows: is Microsoft an exception, or does this pattern repeat? The evidence across industries, eras, and company types is unambiguous.

The Microsoft case study demonstrates that valuation mathematics — not business quality — determined investor returns. But a single company invites a natural objection: so maybe Microsoft was the exception. **It wasn't.**

The pattern documented in Part III – extraordinary revenue growth, flat or negative stock returns, driven entirely by the compression of Price-to-Sales multiples (and other valuation metrics – repeats across industries, eras, and companies with nothing in common except a starting valuation that was too high.

The following seven cases span technology, retail, pharmaceuticals, and fintech, covering periods from 1999 to 2026. In every case, revenues grew — sometimes by hundreds or thousands of percent. In every case, the investor lost or made effectively nothing. The mechanism was always the same. The mechanism is “valuation compression”. And data-science (not experience) reveals both the greatest risks and the greatest opportunities. Happily, there are, at any time, companies that are overlooked, misunderstood and just plain unwilling to pay the Wall Street game to get the attention of so called analysts.

3.1 Microsoft (1999–2016): Revenue +310%. Stock return: -1%.

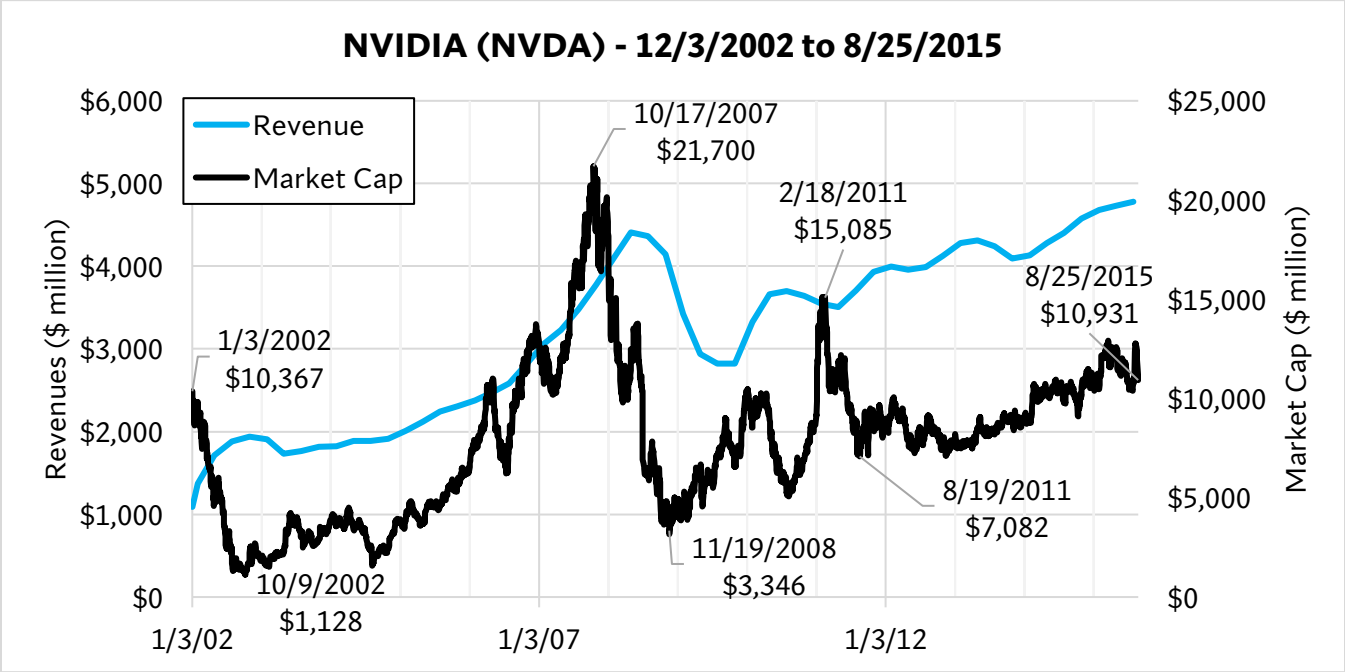


Date	Price	Revenue	P/S Ratio
12/27/1999	$59.56	$21,178	30.9
3/9/2009	$15.15	$61,981	2.3
11/15/2016	$58.87	$86,278	5.4
Change 12/27/99 to 3/9/09	-75%	193%	-93%
Change 12/27/99 to 11/15/16	-1%	307%	-82%

On December 27, 1999, Microsoft closed at $59.56 with a P/S ratio of 30.9 and a P/E of 73.9. Over the next 17 years, revenues more than quadrupled — from $21 billion to $86 billion. The stock went nowhere. At the 2009 low, shareholders who bought at the 1999 peak had lost 75% of their capital. **Revenue grew 307%. The investor made nothing.** This is precisely the kind of predictable, quantifiable loss that data science — applied to valuation multiples — exists to reliably identify before the damage is done.

The P/S ratio collapsed from 30.9 to 5.4 — an 83% compression. The 1999 valuation was so far above any reasonable estimate of the company's net present value that no amount of growth could close the gap within a normal investment horizon. It took more than a decade of compounding revenue just to absorb the excess built into the starting price.

3.2 NVIDIA (2002–2015): Revenue +339%. Stock +5%.

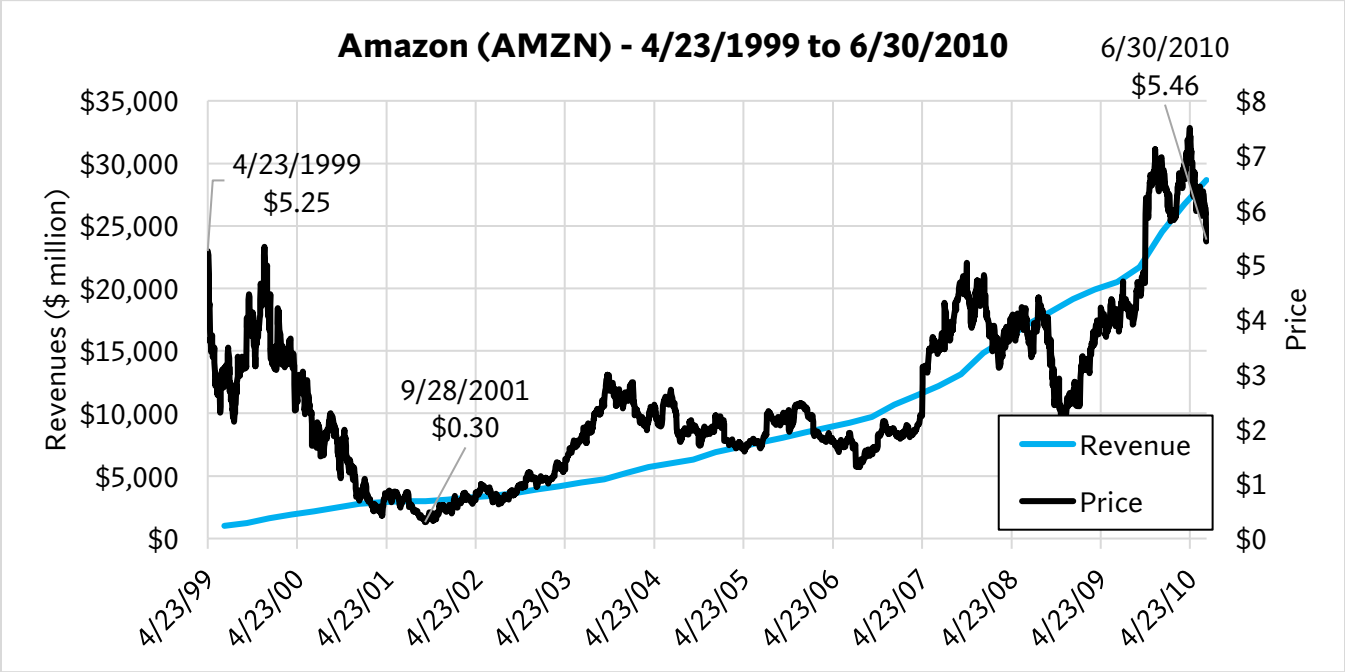


	Market Cap	Revenue	P/S	PRI™	V1	4D™
1/3/2002	$10,367	$1,090	9.51	-138	-202	-149
10/9/2002	$1,128	$1,878	0.60	104	126	105
10/17/2007	$21,700	$3,479	6.24	-80	-125	-95
11/19/2008	$3,346	$4,146	0.81	113	121	100
2/18/2011	$15,085	$3,543	4.26	-172	-50	-104
8/19/2011	$7,082	$3,709	1.91	-10	60	-54
8/25/2015	$10,931	$4,780	2.29	-21	17	23
Change 1/3/02 to 8/25/15	5%	339%	-76%			

NVIDIA's case strips the argument down to its simplest form. Between 2002 and 2015, revenues surged from $1.1 billion to $4.8 billion — a 339% increase. The stock's total return over those thirteen and a half years: 5%. Not annually. Total. During that period, the stock doubled and collapsed multiple times, tracing violent swings around a flat trendline, only to finish almost exactly where it began. **Revenue grew 339%. The investor made nothing.** This is precisely the kind of predictable, quantifiable loss that data science — applied to valuation multiples — exists to reliably identify before the damage is done.

NVIDIA was not a failing business. It was a growing business whose market capitalization had already priced in that growth and more. The result was over a decade of violent fluctuation around a flat trendline — the signature pattern of a stock oscillating around its net present value after starting above it.

3.3 Amazon (1999–2010): Revenue +3,413%. Stock +4%.

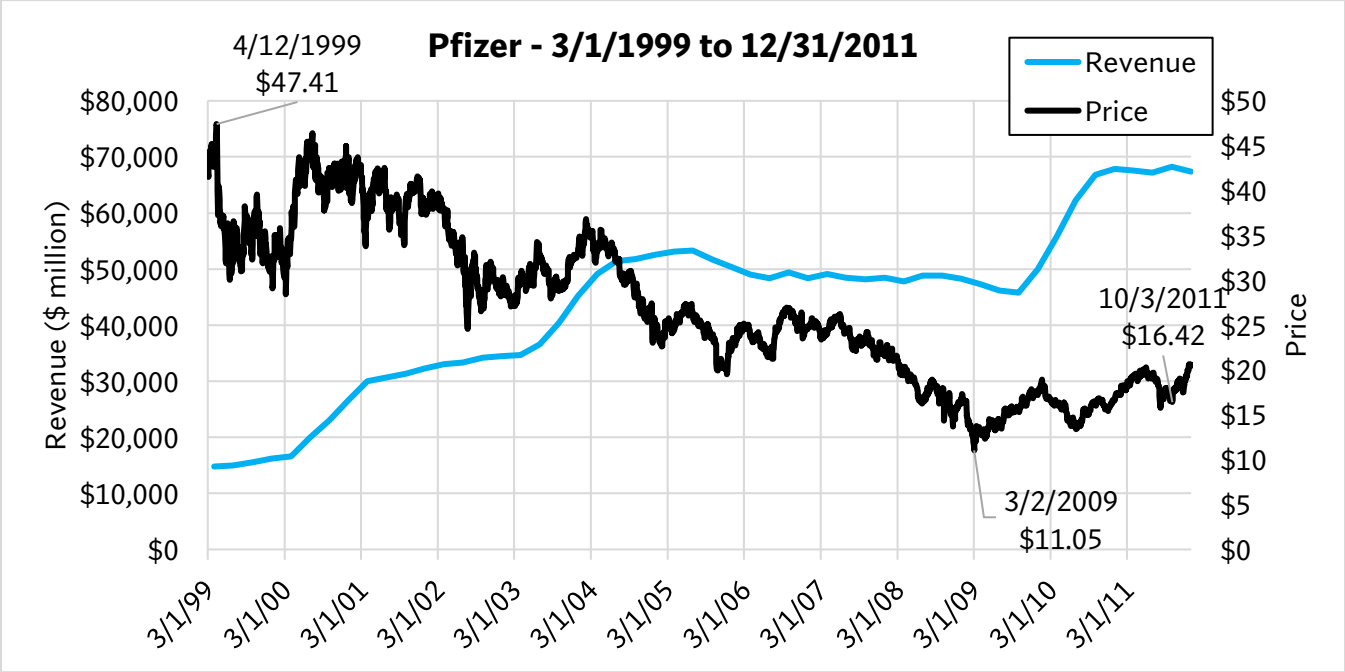


Date	Price	Revenue	P/S Ratio
4/23/1999	$5.25	$816	35.9
9/28/2001	$0.30	$2,978	0.7
6/30/2010	$5.46	$28,666	1.7
Change 4/23/1999 to 9/28/2001	-94%	265%	-98%
Change 4/23/1999 to 6/30/2010	4%	3413%	-95%

On April 23, 1999, Amazon traded at $5.25 with revenues of $816 million and a P/S ratio of 35.9. Over the next eleven years, Amazon grew revenues to $28.7 billion — one of the fastest sustained growth rates in corporate history. The stock returned 4%. **Revenue grew 3,413%. The investor made nothing.** This is precisely the kind of predictable, quantifiable loss that data science — applied to valuation multiples — exists to reliably identify before the damage is done.

The journey between those two points was brutal. By September 2001, the stock had fallen to $0.30 — a 94% loss — even though revenues had tripled. The P/S ratio collapsed from 35.9 to 0.7. Amazon then spent the next nine years growing its way back to the starting price. The company's first decade of wealth creation went entirely toward repairing the damage of overvaluation. Shareholders funded that repair with their time.

3.4 Pfizer (1999–2011): Revenue +415%. Stock –65%.



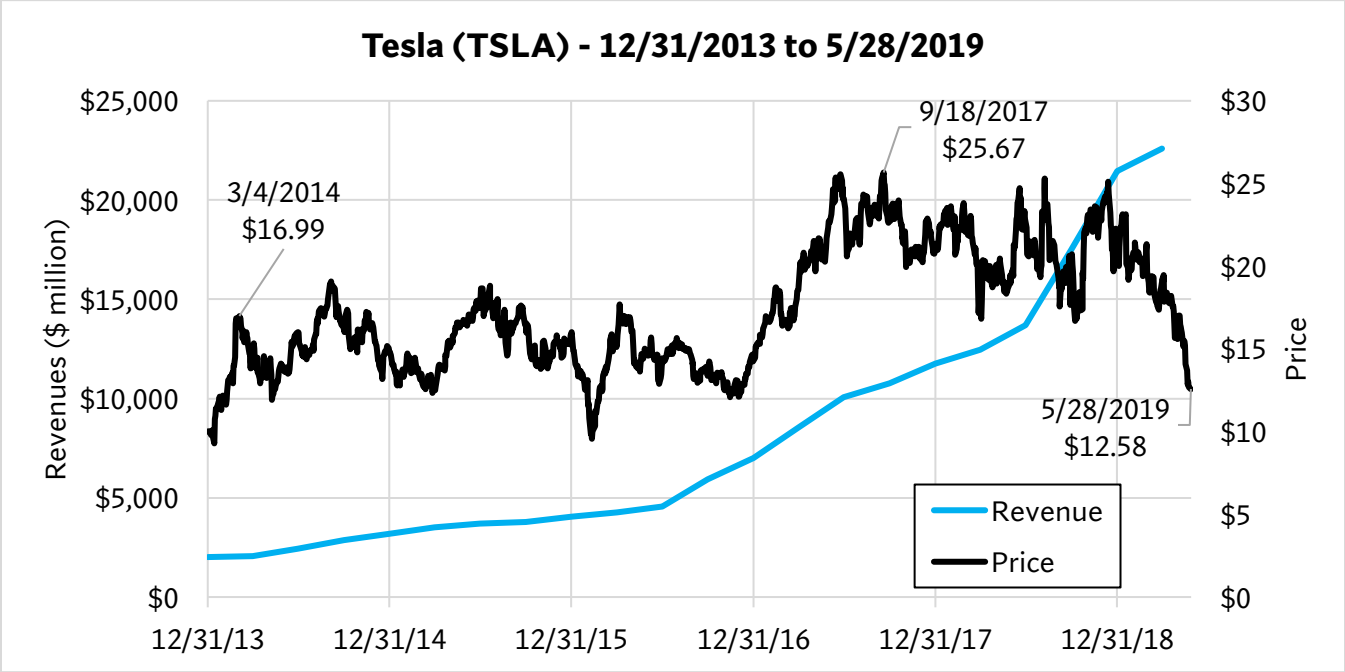
Date	Price	Revenue	P/S Ratio
4/12/1999	$47.41	$14,786	12.6
3/2/2009	$11.05	$48,296	1.5
10/3/2011	$16.42	$68,240	1.9
Change 4/12/1999 to 3/2/2009	-77%	227%	-88%
Change 4/12/1999 to 10/3/2011	-65%	362%	-85%

Pfizer extends the pattern beyond technology into pharmaceuticals — an entirely different industry with different economics, different growth drivers, and different competitive dynamics. The math, however, was identical.

On March 1, 1999, Pfizer traded near $47.41 with revenues of roughly $13 billion. Over the next twelve years, revenues climbed past $67 billion. The stock fell to $16.42 — still down more than 60% from its starting point, and that was after recovering from a low of $11.05 in 2009. **Revenue grew 362%. The investor made nothing.** This is precisely the kind of predictable, quantifiable loss that data science — applied to valuation multiples — exists to reliably identify before the damage is done.

Pfizer's valuation in 1999 implied margins and growth rates that no large pharmaceutical company could sustain indefinitely. As growth normalized, the P/S ratio contracted, and the stock price followed it down — regardless of what the revenue line was doing.

3.5 Tesla (2014–2019): Revenue +1,022%. Stock –26%.

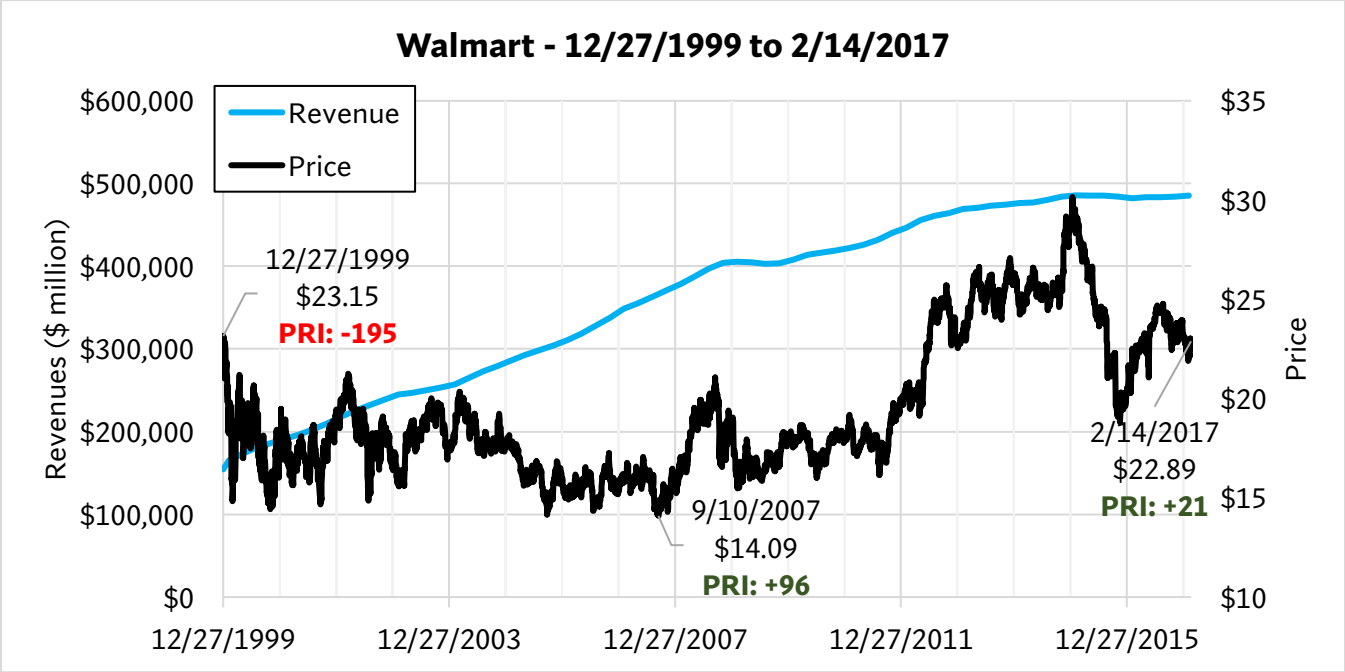


Date	Price	Revenue	P/S Ratio
3/4/2014	$16.99	$2,013	15.4
9/18/2017	$25.67	$10,069	6.1
5/28/2019	$12.58	$22,594	1.5
Change 3/4/2014 to 9/18/2017	51%	400%	-60%
Change 3/4/2014 to 5/28/2019	-26%	1022%	-91%

Tesla demonstrates that the pattern applies even to companies experiencing genuinely unprecedented growth. Between March 2014 and May 2019, Tesla grew revenues from $2.0 billion to $22.6 billion — a pace almost without parallel in industrial history. The stock fell 26%. **Revenue grew 1,022%. The investor made nothing.** This is precisely the kind of predictable, quantifiable loss that data science — applied to valuation multiples — exists to reliably identify before the damage is done.

On March 4, 2014, Tesla traded at $16.99 with a P/S ratio of 15.4. By September 2017, revenues had grown 400% and the stock had risen modestly — but the P/S had already compressed 60%, from 15.4 to 6.1. Then came the sharpest adjustment: revenues more than doubled again through May 2019, yet the stock dropped to $12.58. The P/S ratio hit 1.5 — a total compression of 91% from the starting point. Tesla did not stumble operationally. The market simply stopped paying a dream multiple for a company that was transitioning from concept to reality.

3.6 Walmart (1999–2017): Revenue +214%. Stock –1%.



Date	Price	Revenue	P/S Ratio	Metric V1	PRI™	FSN™	eVal.™
12/27/1999	$23.15	$154,404	2.0	-206	-175	-102	-21
9/10/2007	$14.09	$362,904	0.5	124	96	58	143
2/14/2017	$22.89	$485,144	0.4	78	21	46	114
Change 12/27/99 to 9/10/07	-39%	135%	-76%	+330	+271	+160	+164
Change 12/27/99 to 2/14/17	-1%	214%	-79%	+284	+196	+148	+135

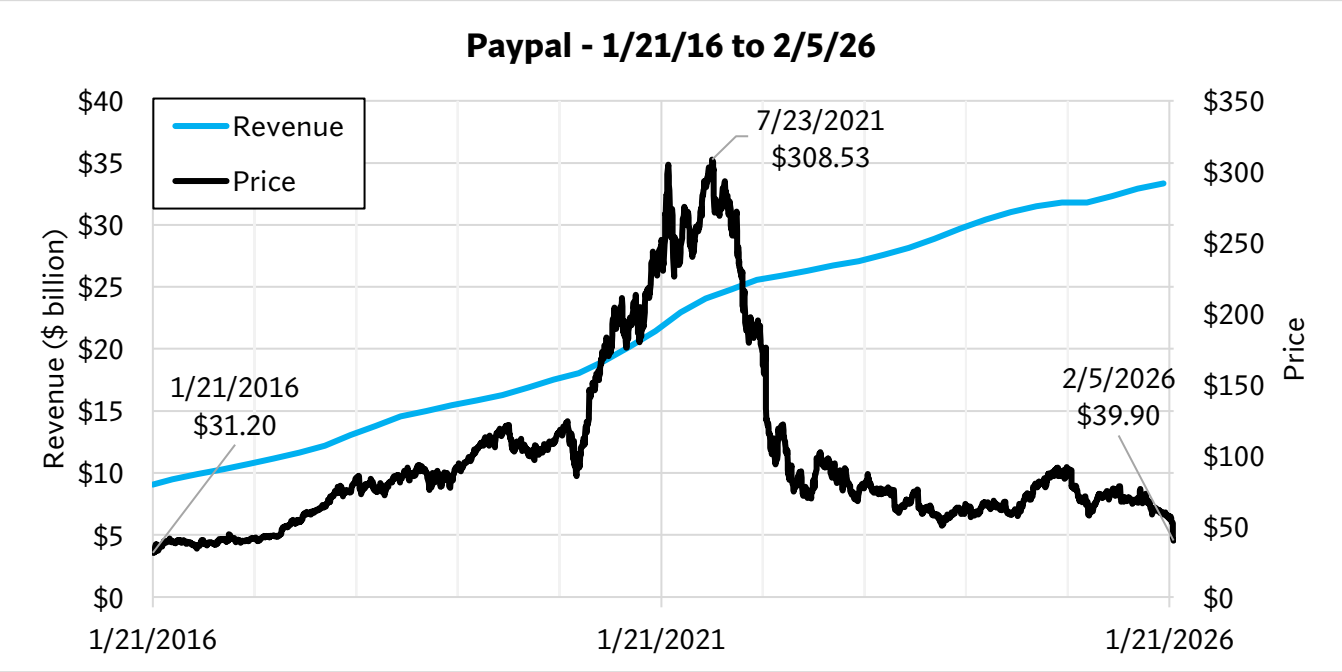
Walmart is the most instructive case precisely because its starting valuation was the most modest. On December 27, 1999, Walmart traded at $23.15 with revenues of $154 billion and a P/S ratio of just 2.0. That is not a bubble multiple. It is not a dot-com fantasy. By any conventional standard, 2.0× sales for the world's largest retailer looked reasonable.

It wasn't. By February 2017, revenues had surged to $485 billion — a 214% increase. The stock sat at $22.89. Seventeen years of dominant business performance, and shareholders had less than they started with. **Revenue grew 214%. The investor made nothing.** This is precisely the kind of predictable, quantifiable loss that data science — applied to valuation multiples — exists to reliably identify before the damage is done.

The P/S ratio had compressed from 2.0 to 0.4 — a 79% contraction. The most severe period came between 1999 and 2007, when the stock fell 39% while revenues climbed 135%.

Walmart matters because it eliminates the last refuge of the skeptic. If the argument were only about Cisco at 200× or Amazon at 36× sales, one could dismiss these as obvious bubbles. But Walmart at 2× sales was nobody's idea of a speculative excess — and it still produced 17 years of nothing. The threshold for "too high" is lower than most investors believe.

3.7 PayPal (2016–2026): It's Not Ancient History



Date	Price	Market Cap	Revenue	P/S
1/21/2016	$31.20	$38.2 billion	$9.1 billion	4.2
7/23/2021	$308.53	$362.5 billion	$24.0 billion	15.1
2/5/2026	$39.90	$36.7 billion	$33.3 billion	1.1
Change 1/21/16 to 2/16/21	889%	849%	165%	258%
Change 1/21/16 to 2/5/26	28%	-4%	268%	-74%
Change 7/23/21 to 2/5/26	-87%	-90%	39%	-93%

The first 6 cases span 1999 to 2019. A natural objection is that these are historical artifacts, lessons from a different market era. PayPal eliminates that objection. This case is not history. It is happening now.

In January 2016, PayPal traded at $31.20 with a P/S ratio of 4.2 — elevated, but not extreme by technology-sector standards. Over the next five and a half years, revenues grew 164%, from $9.1 billion to $24.0 billion. But the stock did not merely reflect that growth. It overshot it by a factor of five: price rose 889% while revenue rose 164%. By July 2021, the P/S ratio had ballooned to 15.1 — more than triple its starting level. The market was no longer pricing PayPal's business. It was pricing a fantasy.

Then the compression came. Over the next four and a half years, revenues continued to climb — from $24.0 billion to $33.3 billion, a further 39% increase. The stock fell 87%. Market capitalization collapsed from $362.5 billion to $36.7 billion — a 90% decline. **That is $326 billion of investor value, destroyed**. Not by fraud. Not by bankruptcy. By the elimination of a valuation premium that should never have existed. By February 2026, PayPal traded at $39.90, barely above where it started a decade earlier, with a P/S ratio of 1.1.

The full-period arithmetic: In 10 years, **revenues grew 268%, but investors made price gains of 28%** — roughly 2.5% per year — while the P/S ratio compressed 74%.

PayPal adds something the historical cases cannot: proof that the pattern is not a relic of the dot-com era or the financial crisis. It is operating in the present tense, in a stock that tens of millions of retail investors

own, covered by dozens of analysts, none of whom told their clients in July 2021 that the mathematics of a 15.1× P/S ratio made significant loss not merely possible but probable.

The instinct is to blame the individual advisor. But as **W. Edwards Deming** observed, "Eighty-five percent of the reasons for failure are deficiencies in the systems and process rather than the employee." The advisors who recommended PayPal at $308 were not incompetent. They were operating within a system that never required them to quantify the probability of loss at a given valuation multiple — a system with no process for translating price-to-sales arithmetic into a risk disclosure.

Deming's second insight applies with equal force: "If you can't describe what you are doing as a process, you don't know what you're doing." No major wireframe, no regulatory filing, and no compliance manual contains a defined process for answering the question: *at this price, what must happen for the investor not to lose money?* Until one does, the PayPal pattern will repeat.

(Source for Deming quotes: . Edwards Deming, Out of the Crisis (Cambridge, MA: MIT Press, 1986).)

PART IV: The Unsuitability of Index Funds for Fiduciary Accounts

Parts I and II of this report documented the valuation risk embedded in individual securities—the mathematically demonstrable pattern by which excellent companies deliver catastrophic investment results when purchased at extreme valuations. A natural response to this evidence is: *"This is why fiduciaries should buy index funds instead."*

That response is wrong. It confuses **diversification** with **due diligence**. An index fund does not eliminate the valuation risks documented in Parts I and II. It bundles them—and in doing so, it renders them invisible to the fiduciary who has a legal obligation to identify them. Worse, the fiduciary has surrendered all control over concentration, sector weighting, and valuation discipline to an algorithm that is explicitly designed to ignore these factors.

This Part poses five questions that any fiduciary purchasing an index fund on behalf of a client must be able to answer. They are not rhetorical. Each demands an evidentiary response. And the honest answer to each one exposes a gap between what fiduciary duty requires and what index fund purchases actually provide.

4.1 Five Questions Fiduciaries Must Answer Before Buying an Index Fund

Question 1: Probability of Loss

> ***What is the documented, security-level probability that this index fund will suffer a 20%, 30%, or 50% decline over the client's relevant time horizon—and where is that probability disclosed to the client before purchase?***

If the fiduciary cannot answer this question with quantified probabilities, then the risk was **unknown** at the time of purchase. An unknown risk cannot be prudently accepted on behalf of a client. The fiduciary has not evaluated the probability of loss—they have simply assumed it away by invoking the word "diversified."

The data to answer this question exists. Historical drawdown analysis, valuation-conditioned return distributions, and base-rate studies of index-level outcomes are all publicly available. A fiduciary who does not consult them has not performed due diligence. A fiduciary who consults them and purchases the fund anyway—without disclosing the findings to the client—has withheld material information.

Question 2: Magnitude of Loss

> ***What is the statistically expected magnitude of loss for this index fund under historically normal valuation reversion—and where is that magnitude measured, recorded, and communicated to the client?***

Risk is not volatility. Risk is **how much can be lost.** The standard deviation of returns tells an investor how much the price fluctuates. It does not tell the investor how much capital they may permanently lose if they purchased at an elevated valuation that subsequently compresses to its historical median.

If the magnitude of potential loss is not measured, it is **not monitored**. If it is not monitored, it is **not fiduciary care**—it is passive acceptance of an outcome the fiduciary made no effort to quantify.

Question 3: Valuation Discipline

> ***At the time of purchase, what objective valuation framework was used to determine whether the index fund was priced to deliver positive expected value rather than a negative one—and how does that framework differ from simply "being diversified"?***

Diversification does not cure overvaluation. A diversified collection of overpriced securities does not reduce risk—it **compounds** it, because the constituent holdings are correlated by a single factor: excessive valuation relative to underlying earnings and cash flow. This is precisely the mechanism that produced the 2000–2002 and 2007–2009 drawdowns, in which "diversified" index holders lost 45–55% of their capital.

If valuation was not assessed at the time of purchase, the fiduciary knowingly accepted valuation blindness as a substitute for analysis. That is not prudence. It is convenience.

Question 4: Ongoing Monitoring

> ***What documented process exists to continuously monitor changes in valuation, concentration, and downside risk within the index fund—and what pre-defined conditions would trigger a duty to reduce or exit the position?***

A fiduciary duty is **continuous**, not transactional. It does not end at the moment of purchase. The *Investment Advisers Act of 1940*, as clarified in SEC Release IA-5248, imposes an ongoing duty to monitor. Yet the standard practice for index fund holdings is to perform no monitoring whatsoever—no quarterly valuation review, no assessment of concentration risk, no comparison to the risk-free alternative.

If there are no pre-defined exit criteria—no valuation threshold, no drawdown trigger, no conditions under which the fiduciary would act—then the fiduciary has no mechanism to respond when risk becomes excessive. That is not delegation to a passive strategy. It is **delegation to inertia**.

Question 5: Client-Specific Suitability

> ***How was this index fund's downside risk evaluated relative to the client's financial capacity, time horizon, and loss tolerance—and where is the written evidence that a 30–50% interim loss was affirmatively deemed acceptable for this specific client?***

Suitability cannot be inferred from popularity. It must be proven **client by client**. A 65-year-old retiree with $400,000 in savings and a 35-year-old executive with $4 million in liquid assets do not have the same capacity to absorb a 40% drawdown. Yet both receive the same index fund recommendation—because the recommendation is driven by the product's convenience, not the client's circumstances.

If a severe loss would impair the client's ability to meet their financial objectives—retirement income, education funding, estate preservation—then purchasing the fund without documenting that the client understood and accepted this risk was inherently unsuitable, regardless of what benchmarks the industry uses to justify it.

The Inescapable Conclusion

If a fiduciary:

- Cannot quantify the **probability** of loss,
- Cannot quantify the **magnitude** of loss,
- Relies on **diversification instead of valuation discipline**,
- Lacks **continuous risk monitoring**, and
- Cannot demonstrate **client-specific suitability**,

then the fiduciary has not exercised **due care**. They have exercised **convenience**. And convenience is not a fiduciary standard.

We are not aware of a single brokerage firm that answers these five questions before placing clients in index funds.

4.2 The Standard Applied Elsewhere: Three Analogies

The five questions above may seem demanding. They are not. They are the *minimum* standard applied in every other profession that manages consequential risk on behalf of the public. The following three analogies demonstrate that the standard we propose for investment fiduciaries is not novel—it is the standard that already governs food safety, public health, and pharmaceutical regulation.

Each analogy rests on the same governing principle: **safety standards do not require certainty of harm—only the identification of known risk above acceptable thresholds.**

Analogy 1: The Restaurant with Trace Carcinogens

A restaurant knowingly serves food containing small but measurable quantities of carcinogenic substances. The restaurant argues: the dose is small, not every customer will become ill, cancer cannot be traced to any single meal, and many customers will live long and healthy lives regardless.

Food safety law does not require proof that *this meal* will cause cancer, or that *this customer* will die, or that harm can be established with certainty. It requires only that **known carcinogens be excluded** and that **reasonable thresholds not be violated**, regardless of uncertainty about any individual outcome.

When a fiduciary purchases an index fund dominated by securities priced far above historical valuation norms, they are knowingly serving a portfolio that contains **valuation carcinogens**: excessive price-to-earnings ratios, excessive price-to-sales ratios, and debt burdens disproportionate to earnings power. The fiduciary does not need to know *which* holding will decline, or *when*, to know the environment is unsafe. Failing to test for known hazards is not prudence—it is negligence by omission.

Analogy 2: The School with "Acceptable" Asbestos

A school discovers asbestos in classroom air. Administrators argue: "Concentration is low. Measurement is imperfect. Most students will not develop illness. Symptoms may not appear for decades."

Schools are not permitted to say: *"We cannot prove this will harm this child."* The rule is that known hazardous substances must be removed, not averaged away—and that the latency of harm **increases** the duty of care rather than excusing it.

Valuation extremes function like airborne asbestos. The harm is delayed, not absent. Exposure compounds over time. The effect is probabilistic but thoroughly documented. History shows that when broad indices trade at extreme valuation multiples, subsequent long-term returns deteriorate sharply. That the decline may take years to materialize is not a defense—it is precisely why **monitoring and avoidance** are required. A fiduciary who ignores valuation concentration is doing the equivalent of saying: *"We will wait until symptoms appear."* That is not due care. That is deferred recognition of a known hazard.

Analogy 3: The Pharmaceutical with "Negligible" Toxins

A pharmaceutical company releases a drug containing a known toxic compound, arguing: the amount is small, many patients tolerate it, adverse effects are statistically rare, and causation is difficult to prove in any individual case.

Drug approval does not rely on hope. It relies on **dose-response analysis**, **probability of harm**, and **magnitude of adverse outcomes**. A drug is not approved because "most people will be fine." It is rejected if known toxic exposure exceeds acceptable risk, even probabilistically.

Index funds embed leverage risk, valuation risk, concentration risk, and earnings fragility. These risks are measurable, historically documented, and dose-dependent—the valuation level at the time of purchase determines the severity of the outcome. A fiduciary who buys the fund without evaluating the probability and expected magnitude of loss is prescribing a drug **without reading the toxicity profile**. That is not diversification. That is unexamined exposure.

4.3 The Governing Principle

We do not contend—and have never contended—that any rule guarantees appreciation, or that any investment can be made "safe."

We respectfully submit:

> In many regulated fields, professionals use explicit thresholds, testing, and safety margins to reduce significant or catastrophic harm even when outcomes cannot be guaranteed. In investment management, by contrast, "buy" recommendations are often delivered without a comparable, probability-weighted disclosure of downside at the client's purchase price—and large drawdowns are treated as inevitable rather than as risks that can be materially reduced through measurable, evidence-based controls.
>
> How many RIAs maintain written, consistently applied quarterly and interim monitoring policies and procedures—with predefined quantitative thresholds for evaluating changes in a company's financial condition—that trigger review, reduction, or sale when key measures worsen (e.g., declining liquidity, shrinking tangible equity, weakening revenues, rising long-term debt, or falling free cash flow), factors widely recognized as increasing the probability of loss over time? Are RIAs that manage portfolios of individual securities required to have such policies in place and follow them? What percentage of RIAs are examined for this issue? What percentage of clients of RIAs believe that their RIAs make such reviews and what percentage of RIAs have the skills necessary to understand, how to interpret, and when to act on changes in the thousands of numbers that appear in each quarterly financial statement of a large public company? What percentage would be able to recognize meaningful changes as "actionable"? What percentage of the RIAs just buy

the largest and most popular stocks, now and in every past era in stock market history? Don't most advisors just buy and sell based on what they read from the big Wall Street firms? And THEY are not fiduciaries. If a doctor prescribed vitamins based on the selling brochures, what would that be?

Today, technology can identify, measure and rate the statistical probability of future price declines. As in actuarial science – we assess probabilities – not certainties. The answer is not – we eliminate risks – data science informs users and investors of risks and importantly when risks are growing.

If debt relative to earnings is declared irrelevant—if valuation relative to cash flow is declared irrelevant—if price relative to economic output is declared irrelevant—then **there are no safety rules at all**. And a fiduciary without safety rules is not a fiduciary. They are merely a distributor of exposure.

The standard of care does not require fiduciaries to predict the future. It requires them to measure what can be measured, to identify conditions under which harm becomes materially probable, and to act before those conditions produce irreversible consequences. **The threshold for action is not certainty of harm. It is demonstrable probability and magnitude of loss above acceptable thresholds.**

PART V: The Systemic Flaw

5.1 Structural Parallels (CMOs vs. Index Funds)

To understand why the current definition of "prudence" is structurally flawed, one must examine the last time the financial industry convinced regulators that bundling individually risky assets made them collectively safe.

In the years leading up to the 2008 financial crisis, Wall Street created Collateralized Mortgage Obligations (CMOs). These were bundles of thousands of individual mortgage loans.

- **The Reality:** Individually, many of these loans were toxic — issued to borrowers with no income verification, no equity, and exploding interest rates. A fiduciary examining a single such loan would have rejected it as unsuitable.
- **The Narrative:** Wall Street argued that "diversification" across thousands of loans eliminated the risk. Rating agencies (S&P, Moody's) blessed the bundles with AAA ratings.
- **The Result:** Pension funds bought the bundles without evaluating the loans inside. When the housing bubble burst, the "diversification" proved worthless because the assets were correlated by a single factor: excessive valuation. $8 trillion in wealth was destroyed.

The Index Fund Parallel

As documented in Section 2.2, the S&P 500 index applies no screen for balance sheet solvency, operational sustainability, or valuation discipline. The structural parallel to the CMO is direct: fiduciaries are once again purchasing a bundled product — marketed as "diversified" and "safe" — without evaluating the suitability of the components inside.

The comparison is not rhetorical. It is structural. In both cases:

- The product bundles individually risky assets into a single package.
- "Diversification" is the narrative used to justify the absence of individual analysis.
- Fiduciaries delegate selection to a non-fiduciary entity — rating agencies then, the S&P Index Committee now — and treat that delegation as due diligence.
- The bundle is sold as inherently safe.
- The underlying risks do not disappear because they have been packaged together.

Just as pension funds held toxic mortgage bundles through the 2008 collapse, index fund investors held Enron until its bankruptcy, and Lehman Brothers, Bear Stearns, and Washington Mutual until virtually the moment of their failure — not because any fiduciary had analyzed these companies and found them sound, but because the index methodology required their inclusion.

The "Open the Box" Principle

The argument that "you cannot beat the market, so you should buy the market" is a logical trap. It confuses performance with suitability. Even if an active manager cannot beat the index's return, which does not absolve the fiduciary of the duty to ensure the assets held are suitable.

The principle should be straightforward: if a fiduciary would reject a specific asset — a company with negative equity, declining cash flow, or a valuation implying mathematically improbable growth — when evaluated on its own merits, then bundling that asset inside a pool and presenting the package as "safe

and diversified" does not make it suitable. It makes the risk invisible. And by any reasonable standard, it is a false claim.

The lesson of 2008 was not that bundling eliminates risk. It was that bundling conceals risk — and that concealed risk, when it materializes, is more destructive than risk that has been measured and managed. The fiduciary obligation is not to guarantee that no holding will decline. It is to ensure that known, measurable risks are identified, disclosed, and accounted for before client capital is committed.

5.2 The Structural Conflict (He Who Has the Gold)

Why do fiduciaries continue to recommend equity-heavy portfolios even when valuations reach extremes that mathematically assure poor returns? The answer lies in the **fee structure** of the investment industry.

The Fee Paradox

The standard compensation model for a Registered Investment Advisor (RIA) is a percentage of Assets Under Management (AUM), typically 1% per year.

- **The Equity Incentive:** Managing a portfolio of equities justifies a 1% fee because it is perceived as complex and volatile, requiring "professional management".
- **The Bond Disincentive:** A portfolio of high-quality Treasury bonds or AA-rated corporate bonds yields a fixed return (e.g., 4-5%). It is transparent, safe, and requires little management. An advisor cannot easily justify charging a 1% fee on a safe 4% return—it consumes 25% of the client's income.

Therefore, the advisor faces a **structural conflict**:

- **To protect the client** (by moving to safe bonds when stocks are overvalued), the advisor must recommend a strategy that reduces their own revenue.
- **To protect their revenue**, the advisor must keep the client exposed to equities, regardless of valuation risk.

The Invisible Alternative: What Fiduciaries Are Not Telling Their Clients

This conflict explains the industry's silence regarding a category of investments that the SEC's own 2023 Care Obligations Bulletin requires advisors to consider: **reasonably available alternatives.**

The 2023 Bulletin states that it "would be difficult for firms and their financial professionals to form a reasonable basis to believe a recommendation or advice is in the retail investor's best interest without considering alternatives that are reasonably available to achieve the investor's investment objectives." The Bulletin further specifies that this consideration "should begin early in the process of formulating a recommendation or providing advice rather than as a retroactive exercise undertaken after the firm or financial professional has already decided what to recommend." And the 2022 Account Recommendations Bulletin notes that "the Commission has pursued enforcement actions against investment advisers for recommending higher-cost products to clients when similar, lower-cost products were available."

Yet for millions of retail investors — particularly retirees and near-retirees whose primary objectives are income and capital preservation — the "reasonably available alternatives" are never presented. They exist. They are widely accessible. And for many clients, they are demonstrably superior to the equity-heavy portfolios that generate the advisor's fee income.

The Alternatives That Are Never Offered

Consider a client who is 70 years old, has $2 million in retirement savings, needs $50,000 per year in income, and cannot afford to lose 30% of principal. This is not a hypothetical. It describes millions of Americans. For this client, the following alternatives are reasonably available through any licensed financial professional:

A laddered portfolio of U.S. Treasury securities. A fiduciary can currently purchase a portfolio of Treasury bills, notes, and bonds with staggered maturities — a "bond ladder" — that provides approximately 4% annual income with the full faith and credit guarantee of the United States government. On $2 million, this produces $80,000 per year — exceeding the client's stated income need by 60%. The principal is returned at each maturity date. There is no possibility of a 30% loss. There is no possibility of any loss at all, short of the collapse of the U.S. government. The portfolio requires virtually no ongoing management, which is precisely why advisors do not recommend it — it cannot sustain a 1% annual management fee.

FDIC-insured certificates of deposit. Bank CDs currently offer yields in the range of 4–5% for terms of one to five years, guaranteed by the Federal Deposit Insurance Corporation up to $250,000 per depositor per institution. A client with $2 million can spread deposits across multiple institutions to achieve full FDIC coverage and generate $80,000–$100,000 in annual income with zero principal risk. Equity-indexed CDs — products offered by major banks that provide a guaranteed minimum return (typically 1–2%) plus a portion of any gains in a stock index — offer an additional option for clients who want some equity upside without the possibility of loss.

No-load fixed annuities. Insurance companies offer annuity products with no sales commission (no-load) that guarantee a fixed income stream for life. A 70-year-old client placing $2 million in a no-load fixed annuity can receive approximately $130,000–$150,000 per year for the remainder of their life, depending on the issuer and current rates — nearly three times the client's stated need. The growth is tax-deferred. The income is guaranteed regardless of stock market performance. The client cannot lose 30% of their money. They cannot lose any of their money.

The Common Feature

Every one of these alternatives shares two characteristics: the client's stated objective — $50,000 per year in income without the risk of catastrophic loss — is met or exceeded, and every one of them generates little or no advisory fees for the investment advisor. A 1% fee on a $2 million Treasury ladder that yields 4% consumes 25% of the client's income. A no-load annuity, by definition, pays no commission. An FDIC-insured CD purchased directly from a bank requires no advisor at all.

The Duty That Is Not Being Fulfilled

The SEC's 2023 Care Obligations Bulletin does not merely suggest that advisors consider these alternatives. It states that advisors must "develop a sufficient understanding of the potential risks, rewards, and costs of the investment or investment strategy" and must evaluate "the expected returns, expected payout rates, and potential losses." For a client whose risk tolerance and financial circumstances point directly to fixed-income solutions, the advisor's recommendation of an equity portfolio must be accompanied by a documented analysis showing why the equity exposure is superior — for this specific client — to the alternatives described above. If that documentation does not exist, the care obligation has not been met.

No other profession that manages consequential risk on behalf of the public operates this way. A physician presented with a patient whose condition can be resolved with aspirin does not prescribe surgery because surgery generates a higher fee. A pharmacist does not conceal that a generic drug is available at one-tenth the cost of the branded version. The standard in every comparable profession is the same: present the least harmful, most cost-effective solution first, and document the rationale if a higher-risk or higher-cost alternative is recommended instead.

The investment advisory profession has operated under a different standard — one in which the most expensive, most volatile, and most fee-generative option is presented as the default, and the safer alternatives are simply never mentioned. The SEC's 2022–2023 Staff Bulletins say, in the Commission's own words, that this is not consistent with the care obligation. The question is whether the industry will comply — and whether the Commission will examine for compliance.

The Disclosure That Should Be Required

At minimum, every RIA's ADV Part 2 — the disclosure brochure that the SEC requires advisors to provide to clients — should state clearly, in Item 8 (Methods of Analysis, Investment Strategies and Risk of Loss):

Whether the advisor considers and recommends lower-risk alternatives to equity investing, including Treasury securities, FDIC-insured bank products, and fixed annuities, as part of the advisory process — or whether the advisor's practice is limited exclusively to equity and equity-related strategies. If the latter, that limitation is itself a material fact. The client has a right to know — before committing capital — that the advisor's menu does not include the safest available solutions for their stated objectives.

As Justice Brandeis observed, sunlight is the best disinfectant. The disclosure need not be complex. It need only be honest: *We do, or we do not, recommend alternatives to stocks when those alternatives better serve the client's stated needs.* The advisor who does this work has nothing to fear from the disclosure. The advisor who does not may have a great deal to explain.

5.3 The Information Conflict: Why Sell Recommendations Do Not Exist

Section 5.2 documented the fee conflict---the structural incentive for RIAs to keep clients invested in equities regardless of valuation risk. There is a second structural conflict that is equally consequential and even less visible: the corruption of the information supply chain itself.

The Sell-Side Research Model

The vast majority of investment research consumed by RIAs is produced by the sell-side research departments of major broker-dealers---firms such as Goldman Sachs, Morgan Stanley, JPMorgan, and Bank of America. These firms derive substantial revenue from investment banking: underwriting IPOs, managing secondary offerings, advising on mergers and acquisitions, and providing corporate finance services to the very companies their analysts cover.

The economic incentive is straightforward. A "Sell" recommendation on a company that is a current or prospective investment banking client jeopardizes a revenue stream that can be worth tens or hundreds of millions of dollars. A "Buy" recommendation costs nothing and preserves the relationship. The result, documented across decades of academic research and regulatory proceedings, is a systematic bias: approximately 90% or more of all analyst recommendations at any given time are rated "Buy" or "Hold." "Sell" recommendations typically represent fewer than 5--10% of all ratings.

This is not a conspiracy theory. It is a documented structural reality that has survived every regulatory reform attempted since the Global Research Analyst Settlement of 2003. The settlement required physical separation between research and banking departments but did not---and could not---eliminate the economic reality that research departments are cost centers justified by their contribution to banking relationships.

The Consequence for Fiduciary Monitoring

Under SEC Release IA-5248, the fiduciary duty of care is continuous. It does not end at the point of purchase. An RIA who holds a security on behalf of a client has an ongoing obligation to monitor that security's risk profile and to evaluate whether that position remains suitable as conditions change. This requires, at minimum, a reliable signal indicating when a security's risk profile has deteriorated to the point where continued holding is no longer consistent with the client's objectives.

Consider the practical reality. An RIA managing 200 client accounts across dozens of holdings cannot personally read and interpret the thousands of line items in each portfolio company's quarterly 10-Q and annual 10-K filings. Most RIAs do not have the technical training in forensic accounting or quantitative analysis required to identify deteriorating liquidity, shrinking tangible equity, weakening revenue quality, rising long-term debt, or falling free cash flow---the financial warning signs that precede significant stock price declines. They are, as a practical matter, small business owners who entered the advisory profession because they are skilled at relationship management and client service---not forensic accounting or valuation science. Their primary activity is client acquisition and business development, not fundamental analysis of financial statements.

For the overwhelming majority of RIAs, the only readily accessible source of monitoring guidance is sell-side research. They do not have proprietary quantitative risk models. They do not employ forensic accountants to analyze quarterly filings. The notion that they independently analyze the thousands of line items in a large public company's 10-Q filing each quarter is, for the vast majority, a fiction.

They rely on brokerage research. And brokerage research will not tell them to sell.

The result is a fiduciary monitoring system that is structurally incapable of producing the signal it exists to produce. The RIA's continuous duty to monitor requires knowing when to reduce or exit a position. The RIA's only practical source of that information is an entity whose economic incentives ensure the signal will never arrive. This is not a failure of individual advisors. It is a systemic failure of the information supply chain upon which the entire monitoring obligation depends.

If a clinician based treatment decisions primarily on **vendor marketing materials**, regulators would call it a failure of due care. Why should securities recommendations---where losses can be life-altering---be exempt from comparable expectations of documented analysis and downside quantification?

The Missing Signal: A Quantitative Illustration

Consider the following scenario. An RIA holds Microsoft in client portfolios at the current price. The stock is trading at a market capitalization that represents a substantial premium to any reasonable net present value calculation, as demonstrated in Part VI of this report. The RIA's fiduciary duty requires monitoring this position for changes in risk.

Where will the sell signal come from? Not from Wall Street. As of this writing, the consensus rating on Microsoft from major sell-side firms is overwhelmingly "Buy" or "Overweight." Not because the risk/reward is mathematically favorable at these valuations---but because Microsoft is one of the most important

investment banking clients in the world. No analyst at a major firm will jeopardize that relationship by issuing a sell recommendation, no matter what the valuation arithmetic reveals.

The RIA, waiting for a signal that will never come, continues to hold. The monitoring duty exists on paper. It is structurally incapable of being fulfilled under current industry practices.

The Regulatory Question

How many RIAs maintain **written, consistently-applied quarterly and interim monitoring procedures**, with **predefined quantitative thresholds**, that trigger review, reduction, or sale when a portfolio company's financial condition worsens (e.g., declining liquidity, shrinking tangible equity, weakening revenues, rising debt, etc.), factors widely associated with increasing probability of loss?

RIAs are required to have written compliance policies and procedures under the SEC's Compliance Rule (Rule 206(4)-7), which mandates that SEC-registered advisers adopt and implement written policies and procedures reasonably designed to prevent violations of the Advisers Act, designate a Chief Compliance Officer, and review the program at least annually. The SEC's fiduciary interpretation (IA-5248) explains that the scope of the duty depends on the relationship and what the adviser undertakes to provide---so monitoring obligations are very often implicated. But the SEC does not prescribe a specific quarterly financial-statement threshold monitoring template.

The result is a gap between obligation and practice. If an adviser holds itself out as providing ongoing portfolio management and risk management, then an examiner can reasonably ask: Where is the written process? How is it implemented? What evidence exists that it is actually performed? Yet in fiscal year 2022, the SEC Division of Examinations reported examining approximately 15% of the registered investment adviser population. The probability that any individual RIA's monitoring procedures---or lack thereof---will be examined in any given year is low.

We are not aware of reliable, publicly available statistics that quantify what percentage of RIA clients believe their adviser reads 10-Qs and 10-Ks for every holding, what percentage of RIAs have the technical skill to interpret the financial data in those filings, or what percentage could consistently identify actionable deterioration. Those numbers may exist in proprietary industry research, but they are not stated as public, widely citable metrics. The absence of this data is itself an indictment of the current regulatory framework.

The Solution Is Not Impossible — It Already Exists

Today, technology can identify, measure, and rate the statistical probability of future price declines. As in actuarial science, the answer is not that we eliminate risk---data science informs users and investors of risks and, importantly, signals when risks are growing. Quantitative monitoring platforms can flag declining free cash flow, deteriorating balance sheet health, and valuation divergence from fundamentals on a quarterly or real-time basis---automatically, objectively, and without the conflicts that render sell-side research unreliable as a monitoring tool.

The question is not whether the monitoring duty can be fulfilled. It is whether regulators will require it to be fulfilled using tools that are actually capable of producing honest signals---rather than permitting fiduciaries to satisfy their continuous obligation by consulting sources that are structurally incapable of delivering the warning when it matters most.

PART VI: The Microsoft Case Study

6.1 Why Microsoft?

Of all the companies ERS could have chosen to demonstrate that investment risk can be quantified, why Microsoft?

The answer is simple: Microsoft provides **dispositive evidence** — not merely suggestive evidence, but a documented record so consistent across multiple time periods that alternative explanations become difficult to sustain.

The Scientific Value of Microsoft as a Case Study

Same company across three eras. By examining Microsoft in 1999, 2011, and 2025, ERS eliminates "company quality" as a variable. Mr. Mullaney is not comparing a strong company to a weak one. He is not comparing different industries, different management teams, or different competitive positions. He is examining the same company—one of the most successful businesses in history—at three different points in time.

Consistently dominant. Microsoft was a "great business" in all three periods:

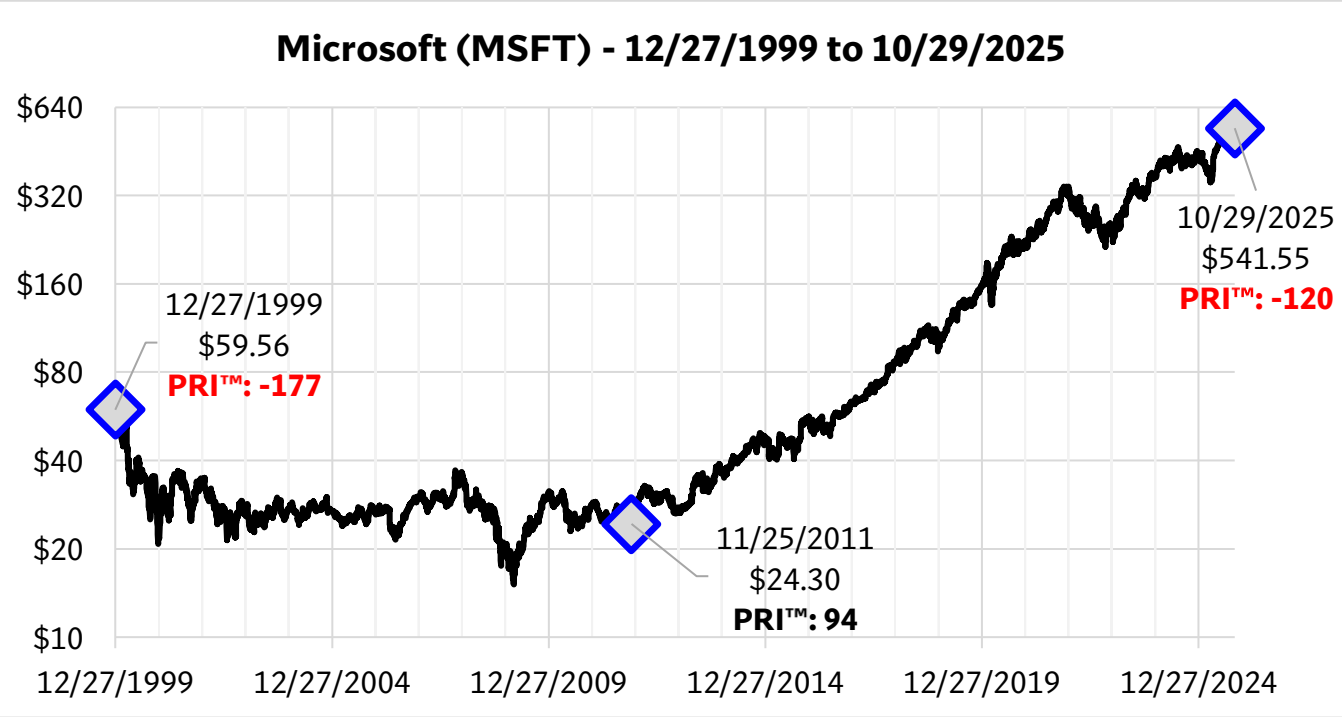
- In 1999, Microsoft dominated the PC operating system and productivity software markets
- In 2011, Microsoft dominated enterprise software and was building its cloud infrastructure
- In 2025, Microsoft dominated cloud computing, productivity software, and was a leader in artificial intelligence

Only changing variable: The valuation ratio. If the company remained excellent throughout, what explains the radically different investment outcomes? Only one factor changed: the price investors paid relative to the company's financial performance.

- In 1999, investors paid 29x sales and 74x earnings
- In 2011, investors paid 3x sales and 9x earnings
- In 2025, investors paid 14x sales and 38x earnings

6.2 The Three Critical Dates — Overview

The following chart displays Microsoft's stock price from December 1999 through October 2025, with three critical dates marked—the dates that prove our thesis:



The chart tells the story visually, but the data tells it precisely:

Metric	Dec 27, 1999	Nov 27, 2011	Oct 29, 2025
Stock Price	$59.56	$24.30	$541.55
P/S Ratio	29.29x	2.93x	13.70x
P/E Ratio	73.9x	8.88x	38.37x
ERS Profit Map™ Rating	F (Extreme Risk)	A (Safe)	F (Extreme Risk)
ERS Price Risk Indicator™ *(+150 (best) to -250 (worst))*	-177	+94	-120
Subsequent Result	17 years, 0% return	19x gain (~1,900%)	-~$1T loss

Understanding the Price Risk Indicator™ (PRI)

The **Price Risk Indicator** (PRI) shown on the chart is a proprietary measure developed by Equity Risk Sciences that synthesizes multiple valuation factors into a single score:

- **Negative PRI values** indicate that the stock is trading at valuations historically associated with poor forward returns. The more negative the value, the greater the risk.
- **Positive PRI values** indicate that the stock is trading at valuations historically associated with favorable forward returns. The more positive the value, the more attractive the opportunity.

6.3 Date One: December 27, 1999 — The Bubble

December 27, 1999 was four days before the turn of the millennium. The dot-com boom was at its peak. Microsoft was one of the most admired companies in the world—and one of the most expensive.

Mr. Mullaney ran Microsoft through ERS's **Profit Map**™ analysis using its financial condition as of 12/27/1999. What he found was unambiguous: Microsoft was priced for catastrophic loss.

6.3.1 The Valuation Picture

The following table summarizes Microsoft's financial condition as of December 27, 1999:

Stock Price	Market Cap	Annual Revenue	Net Income	P/S Ratio	P/E Ratio
$59.56	**$613.3B**	**$20.9B**	**$8.3B**	**29.29x**	**73.9x**

To understand what these numbers mean in context, they must be measured against Microsoft's own historical valuation norms:

Metric	12/27/1999 Value	20-Year Median
Price-to-Sales	**29.29x**	5.88x
Price-to-Earnings	**73.9x**	22.92x
Multiple of Normal (P/S)	**4.98x normal**	—

A P/S ratio of 29.29x meant investors were paying $29.29 for every $1 of annual sales—nearly **five times** Microsoft's normal valuation relative to revenue. A P/E of 73.9x meant it would take nearly 74 years of current earnings just to recover the purchase price, assuming no growth and no dividends.

The **Profit Map**™ then asked a straightforward question: *what happens if valuations simply return to historical norms?* Even assuming robust continued growth—30% annual revenue growth, 30% profit margins, and only 2% annual dilution over three years—the results were stark:

Reversion Scenario	Future Valuation	Projected Price	Gain / (Loss)
P/S reverts to 20-year median	5.88x	$24.74	**-58.5%**
P/E reverts to 20-year median	22.92x	$28.95	**-51.4%**

Under either measure, a reversion to Microsoft's own 20-year median valuation implied losses exceeding 50%—**even with extremely optimistic growth assumptions built in.**

6.3.2 The "What Must Happen" Analysis

ERS's **What Must Happen**™ framework inverts the conventional question. Rather than asking "Will this stock go up?"—a question no one can answer—it asks: *What specific, falsifiable conditions must be true for this investment to succeed?* This is the analytical standard proposed by the philosopher Karl Popper: a claim that makes no testable prediction is not knowledge.

Mr. Mullaney modeled extremely optimistic assumptions:

Desired Annual Return	# of Years Later	Annual Revenue Growth	Future Profit Margin	Annual Dilution Rate
15%	3 years	30%	30%	2%

These were not conservative projections. A 30% annual revenue growth rate sustained for three consecutive years, combined with 30% profit margins, represented a best-case scenario for a company

of Microsoft's size. Yet even under these assumptions, **the stock would still require a P/S ratio of 21.52x at Year 3 just to deliver a 15% annual return.**

Microsoft's 20-year median P/S was 5.88x. The investment required the market to sustain a valuation **3.7 times the historical norm**—three years into the future, after all the optimistic growth had already been delivered—merely to break even on an annualized basis at the investor's target return.

Sensitivity Analysis: Future Returns Based on Projected P/S Ratios

Mr. Mullaney then tested what would happen under a range of future P/S scenarios, holding the optimistic 30% revenue growth assumption constant:

Scenario	Future P/S	Future Revenue	Future Mkt Cap	Future Price	Gain (Loss)
-50% Below Projected P/S	**2.94**	$46,001	$135,012	$12.36	**-79.3%**
-25% Below Projected P/S	**4.40**	$46,001	$202,518	$18.54	**-68.9%**
Projected P/S (20-yr median)	**5.87**	$46,001	$270,025	$24.71	**-58.5%**
25% Above Projected P/S	**7.34**	$46,001	$337,531	$30.89	**-48.1%**
50% Above Projected P/S	**8.80**	$46,001	$405,037	$37.07	**-37.8%**

At every P/S level tested—including scenarios 50% *above* the projected median—the investment showed losses ranging from **-37.8%** to **-79.3%**. There was no plausible P/S ratio at which the December 1999 purchase price could be justified.

Sensitivity Analysis: Future Returns Based on Projected P/E Ratios

The same analysis was performed using price-to-earnings ratios, holding both 30% revenue growth and 30% profit margins constant:

Scenario	Future P/E	Future Rev.	Net Income	Future Mkt Cap	Future Price	Gain (Loss)
-50% Below Projected P/E	**11.46**	$46,001	$13,800	$158,220	$14.48	**-75.7%**
-25% Below Projected P/E	**17.20**	$46,001	$13,800	$237,330	$21.72	**-63.5%**
Projected P/E (20-yr median)	**22.93**	$46,001	$13,800	$316,439	$28.96	**-51.4%**
25% Above Projected P/E	**28.66**	$46,001	$13,800	$395,549	$36.20	**-39.2%**
50% Above Projected P/E	**34.39**	$46,001	$13,800	$474,659	$43.44	**-27.1%**

The P/E analysis confirmed the P/S findings. Even at a future P/E of 34.39x—50% above the 20-year median—the stock would still lose **-27.1%**. At the projected median P/E of 22.93x, losses reached **-51.4%**. The two independent valuation measures converged on the same conclusion: **the December 1999 price could not be mathematically supported under any reasonable scenario.**

Complete platform output for all analyses at this date is reproduced in Appendix B, Figures B.1.1–B.1.7.

6.3.3 What Actually Happened

The analysis was validated by subsequent events:

Time Period	Outcome
1999–2001 (2 years)	Stock declined ~65%
1999–2009 (at March low)	Shareholders lost ~75% of capital
1999–2016 (17 years)	Zero total return
Revenue growth, 1999–2016	Revenue more than tripled (+310%)

The company did not fail. Microsoft continued to execute, ship products, grow revenue, and expand its competitive position throughout this entire period. The source of the investor's loss was not corporate failure—it was the price paid for an excellent company. The valuation compressed from 29x sales to under 3x sales, and no amount of business performance could overcome the mathematical consequences of that compression.

This is the mechanism of permanent capital impairment in a high-quality company: the business performs, but the return to the investor is determined by the price paid, not by the quality of the enterprise. Every data point that Wall Street cited as a reason to buy Microsoft in December 1999—growing revenue, rising earnings, dominant market position, visionary management, and breakthrough technology—was true. And none of it protected the investor.

6.4 Date Two: November 25, 2011 — The Opportunity

By late 2011, Microsoft had spent more than a decade in the wilderness. Shareholders who bought at the 1999 peak had endured 12 years of negative returns. The stock was widely dismissed as a "has-been"—a legacy technology company that had missed the mobile revolution and was being left behind by Apple and Google.

Sentiment was terrible. The narrative was bearish. However, the opportunity was exceptional! **The mathematics told a more accurate story.** Data science identifies when a company's price and market capitalization have a higher probability of expanding than contracting—and that is exactly what Microsoft's valuation metrics showed on this date.

6.4.1 The Valuation Picture

The following table summarizes Microsoft's financial condition as of November 25, 2011:

Stock Price	Shares O/S	Market Cap	Annual Revenue	Net Income	P/S Ratio	P/E Ratio	Div. Yield
$24.30	**8.4B**	**$204B**	**$71.1B**	**$23.5B**	**2.87x**	**8.7x**	**~3%**

The transformation from 1999 was dramatic—not in the business, which had grown substantially, but in the price the market was willing to pay for it:

Metric	Dec 1999	Nov 2011	Change
Revenue	$20.9B	**$71.1B**	**+240%**
Net Income	$8.3B	**$23.5B**	**+183%**
P/S Ratio	29.29x	**2.87x**	**–90%**
P/E Ratio	73.9x	**8.7x**	**–88%**

Revenue had more than tripled. Net income had nearly tripled. Yet the stock price had fallen from $59.56 to $24.30—a decline of almost 60%. The entire difference was valuation compression: the P/S ratio fell 90% (from 29.29x to 2.87x) and the P/E ratio fell 88% (from 73.9x to 8.7x). **The business performed. The investor's return was determined entirely by the price paid.**

Measured against Microsoft's own historical norms, the 2011 valuation was the mirror image of 1999:

Metric	11/25/2011 Value	20-Year Median
Price-to-Sales	**2.87x**	5.87x
Price-to-Earnings	**8.7x**	22.93x
Fraction of Normal (P/S)	**0.49x normal**	—

Where 1999 had been priced at nearly 5x the historical norm, 2011 was priced at **less than half** the historical norm. The **Profit Map™** asked the same question it asked in 1999: *what happens if valuations simply return to historical norms?* This time, the answer pointed to exceptional gains:

Reversion Scenario	Future Valuation	Projected Price	Gain / (Loss)
P/S reverts to 20-year median	5.87x	$58.93	**+142.5%**
P/E reverts to 20-year median	22.93x	$57.54	**+136.8%**

Under either measure, a reversion to Microsoft's own 20-year median valuation implied gains exceeding 135%—**even with conservative growth assumptions.**

6.4.2 The "What Must Happen" Analysis

Mr. Mullaney applied the **What Must Happen**™ framework to Microsoft at its November 2011 price—but this time with deliberately conservative assumptions, far more modest than those used for the 1999 analysis:

Desired Annual Return	# of Years Later	Annual Revenue Growth	Future Profit Margin	Annual Dilution Rate
20%	3 years	8%	25%	2%

Note the contrast with 1999: the desired return was *higher* (20% vs. 15%), yet the growth assumptions were far *lower* (8% revenue growth vs. 30%; 25% profit margin vs. 30%). This was not an exercise in optimism. It was a test of whether the stock could deliver strong returns under modest conditions.

The answer was unambiguous. Under these conservative assumptions, **the stock would only require a P/S ratio of 4.18x at Year 3 to deliver 20% annual returns.**

Microsoft's 20-year median P/S was 5.87x—**40% higher** than what was required. The investment did not need the market to sustain an extreme valuation. It did not need heroic growth. It only needed the valuation to remain *below normal*—and it would still deliver 20% annual returns. Both the P/S and P/E projection ratings were **A (Safe)**.

Sensitivity Analysis: Future Returns Based on Projected P/S Ratios

Mr. Mullaney tested what would happen under a range of future P/S scenarios, holding the conservative 8% revenue growth assumption constant:

Scenario	Future P/S	Future Revenue	Future Mkt Cap	Future Price	Gain (Loss)
-50% Below Projected P/S	**2.94**	$89,591	$262,949	$29.46	**+21.2%**
-25% Below Projected P/S	**4.40**	$89,591	$394,423	$44.18	**+81.8%**
Projected P/S (20-yr median)	**5.87**	$89,591	$525,898	$58.91	**+142.4%**
25% Above Projected P/S	**7.34**	$89,591	$657,372	$73.64	**+203.0%**
50% Above Projected P/S	**8.80**	$89,591	$788,846	$88.37	**+263.7%**

At every P/S level tested—including the most pessimistic scenario, 50% *below* the projected median—the investment showed gains. The range extended from **+21.2%** in the worst case to **+263.7%** in the best. There was no plausible scenario that produced a loss.

Sensitivity Analysis: Future Returns Based on Projected P/E Ratios

The same analysis using price-to-earnings ratios, holding 8% revenue growth and 25% profit margins constant:

Scenario	Future P/E	Future Rev.	Net Income	Future Mkt Cap	Future Price	Gain (Loss)
-50% Below Projected P/E	**11.46**	$89,591	$22,398	$256,789	$28.77	**+18.4%**
-25% Below Projected P/E	**17.20**	$89,591	$22,398	$385,184	$43.15	**+77.6%**
Projected P/E (20-yr median)	**22.93**	$89,591	$22,398	$513,579	$57.53	**+136.8%**
25% Above Projected P/E	**28.66**	$89,591	$22,398	$641,973	$71.91	**+195.9%**
50% Above Projected P/E	**34.39**	$89,591	$22,398	$770,368	$86.30	**+255.1%**

The P/E analysis confirmed the P/S findings. Even at a future P/E of 11.46x—50% below the 20-year median—the stock would still gain **+18.4%**. At the projected median P/E of 22.93x, gains reached

+136.8%. Both valuation measures converged on the same conclusion: **the November 2011 price was mathematically supported under every reasonable scenario.**

The 1999–2011 Contrast: Same Company, Opposite Mathematics

The following table makes the contrast explicit. The same analytical framework, applied to the same company at two different price levels, produced diametrically opposite conclusions:

Scenario	December 1999	November 2011
Best case (50% above median)	**-37.8%**	**+263.7%**
Base case (at 20-yr median)	**-58.5%**	**+142.4%**
Worst case (50% below median)	**-79.3%**	**+21.2%**

The company was better in 2011 than in 1999—more revenue, more earnings, a more diversified business. Yet in 1999 the stock was a catastrophic risk, and in 2011 it was an exceptional opportunity. **The difference was not the company. It was the price.**

Complete platform output for all analyses at this date is reproduced in Appendix B, Figures B.2.1–B.2.7.

6.4.3 What Actually Happened

The analysis was validated by subsequent events—spectacularly so:

Time Period	Outcome
Nov 2011 – Oct 2025 (14 years)	Stock price increased ~2,100%
$100,000 invested in Nov 2011	Worth ~$2,200,000 by Oct 2025

An advisor who said in November 2011 that "Microsoft is solid as a rock—its balance sheet is impeccable, its valuation ratios have never been more attractive" would have been stating **objective, measurable fact**—not opinion. The valuation metrics were publicly available. The historical medians were documented. The gap between price and intrinsic value was quantifiable. Any fiduciary with access to the same data and a disciplined framework would have reached the same conclusion.

This is the symmetry of valuation science: the same mathematical framework that identified catastrophic risk in December 1999 identified exceptional opportunity in November 2011. The method did not change. The data did not change. Only the price changed—and the price was the variable that determined the investor's outcome.

6.5 Date Three: October 29, 2025 — The Recurrence

By late 2025, Microsoft had become the poster child for the AI revolution. The company's investments in OpenAI and integration of artificial intelligence across its product suite had captured Wall Street's imagination. Sentiment was euphoric. The stock had risen more than 20-fold from its 2011 lows.

And the mathematics looked remarkably similar to 1999. Mr. Mullaney ran Microsoft through ERS's **Profit Map**™ based on its financial condition as of 10/29/2025. What he found was history repeating: Microsoft was once again priced for catastrophic loss.

6.5.1 The Valuation Picture

The following table summarizes Microsoft's financial condition as of October 29, 2025:

Stock Price	Market Cap	Annual Revenue	Net Income	P/S Ratio	P/E Ratio
$541.55	**$4.025T**	**$293.8B**	**$104.9B**	**13.70x**	**38.4x**

Measured against Microsoft's own historical norms, the 2025 valuation had returned to dangerous territory:

Metric	10/29/2025 Value	20-Year Median
Price-to-Sales	**13.70x**	5.87x
Price-to-Earnings	**38.4x**	22.93x
Multiple of Normal (P/S)	**2.33x normal**	—

A P/S ratio of 13.70x meant investors were paying $13.70 for every $1 of annual sales—more than **twice** Microsoft's 20-year median. While not as extreme as the 29.29x of 1999, the 2025 valuation was well within the range that has historically produced severe losses.

To understand how Microsoft reached this point, one must examine how much of the stock's appreciation from 2011 was driven by business improvement versus valuation expansion:

Metric	Nov 2011	Oct 2025	Multiple
Market Cap	$204.4B	**$4,025.4B**	**19.7×**
Revenue	$71.1B	**$293.8B**	**4.1×**
Net Income	$23.5B	**$104.9B**	**4.5×**
Tangible Equity	$45.8B	**$222.3B**	**4.9×**
Free Cash Flow	$25.1B	**$78.0B**	**3.1×**

The business improved by **3–5×** across all fundamental metrics. The market capitalization expanded by **19.7×**. This represents valuation multiple expansion of 4–5× *beyond* what business improvement alone would justify. If Microsoft's market cap had grown in line with its fundamentals, it would be worth approximately $800 billion to $1 trillion—not $4 trillion.

The **Profit Map**™ asked the same question it asked in 1999 and 2011: *what happens if valuations return to historical norms?* The answer again pointed to significant risk:

Reversion Scenario	Future Valuation	Projected Price	Loss
P/S reverts to 20-year median	5.87x	$294.62	**-45.6%**
P/E reverts to 20-year median	22.93x	$328.19	**-39.4%**

Under either measure, a reversion to Microsoft's own 20-year median valuation implied losses of 39–46%—**even with strong growth assumptions built in.**

6.5.2 The "What Must Happen" Analysis

Mr. Mullaney applied the **What Must Happen**™ framework to Microsoft at its October 2025 price. Unlike the deliberately optimistic assumptions used for 1999, these assumptions reflected Microsoft's actual recent performance—strong, but not extraordinary:

Desired Annual Return	# of Years Later	Annual Revenue Growth	Future Profit Margin	Annual Dilution Rate
15%	3 years	10.44%	28.52%	2%

A 10.44% annual revenue growth rate was in line with Microsoft's trailing performance. A 28.52% profit margin reflected the company's actual operating results. These were not fantasy projections—they were a reasonable extrapolation of what the company was already doing.

Yet even under these assumptions, **the stock would require a P/S ratio of 16.42x at Year 3 just to deliver a 15% annual return**—nearly **2.8 times** the 20-year median of 5.87x. It would simultaneously require a P/E ratio of 57.6x—more than **2.5 times** the historical median of 22.93x.

Both the P/S and P/E projection ratings were **F (Extreme Risk)**—the identical ratings the framework assigned to Microsoft in December 1999.

Sensitivity Analysis: Future Returns Based on Projected P/S Ratios

Mr. Mullaney tested what would happen under a range of future P/S scenarios, holding the 10.44% revenue growth assumption constant:

Scenario	Future P/S	Future Revenue	Future Mkt Cap	Future Price	Gain (Loss)
-50% Below Projected P/S	**2.94**	$396 bil.	$1.16 tril.	$147.26	**-72.8%**
-25% Below Projected P/S	**4.40**	$396 bil.	$1.74 tril.	$220.89	**-59.2%**
Projected P/S (20-yr median)	**5.87**	$396 bil.	$2.32 tril.	$294.53	**-45.6%**
25% Above Projected P/S	**7.34**	$396 bil.	$2.90 tril.	$368.16	**-32.0%**
50% Above Projected P/S	**8.80**	$396 bil.	$3.48 tril.	$441.79	**-18.4%**

At every P/S level tested—including scenarios 50% *above* the projected median—the investment showed losses ranging from **-18.4%** to **-72.8%**. As in 1999, there was no plausible P/S ratio at which the October 2025 purchase price could be justified.

Sensitivity Analysis: Future Returns Based on Projected P/E Ratios

The same analysis using price-to-earnings ratios, holding 10.44% revenue growth and 28.52% profit margins constant:

Scenario	Future P/E	Future Rev.	Net Income	Future Mkt Cap	Future Price	Gain (Loss)
-50% Below Projected P/E	**11.46**	$396 bil.	$113 bil.	$1.29 tril.	$164.06	**-69.7%**
-25% Below Projected P/E	**17.20**	$396 bil.	$113 bil.	$1.94 tril.	$246.09	**-54.6%**
Projected P/E (20-yr median)	**22.93**	$396 bil.	$113 bil.	$2.59 tril.	$328.12	**-39.4%**
25% Above Projected P/E	**28.66**	$396 bil.	$113 bil.	$3.23 tril.	$410.15	**-24.3%**
50% Above Projected P/E	**34.39**	$396 bil.	$113 bil.	$3.89 tril.	$492.19	**-9.1%**

The P/E analysis confirmed the P/S findings. Even at a future P/E of 34.39x—50% above the 20-year median—the stock would still lose **-9.1%**. At the projected median P/E of 22.93x, losses reached **-39.4%**.

Both valuation measures converged on the same conclusion: **the October 2025 price could not be mathematically supported under any reasonable scenario.**

The Three-Date Pattern: 1999, 2011, 2025

The following table presents the sensitivity analysis results across all three dates—the same framework, applied to the same company, at three different price levels:

Scenario	Dec 1999	Nov 2011	Oct 2025
Best case	-37.8%	+263.7%	-9.1%
Base case	-58.5%	+142.4%	-45.6%
Worst case	-79.3%	+21.2%	-72.8%

The pattern is unmistakable. When Microsoft was priced far above its historical norms (1999 and 2025), every scenario showed losses. When it was priced below its historical norms (2011), every scenario showed gains. **The method did not change. The company did not change. Only the price changed—and the price determined the outcome.**

Complete platform output for all analyses at this date is reproduced in Appendix B, Figures B.3.1–B.3.7.

6.5.3 What Actually Happened

The analysis was validated by subsequent events:

Time Period	Outcome
Oct 29, 2025 – Feb 4, 2026	Stock declined ~20%
Market cap loss	~$1 trillion (exceeds GDP of Saudi Arabia)
As of this writing	Valuations remain elevated; further downside risk persists

6.5.4 This Was Not a "Black Swan"

The approximately $1 trillion loss in market capitalization was not an unpredictable event. It was not caused by fraud, accounting irregularities, or business failure. Microsoft remained an excellent company throughout. Its revenue continued to grow. Its products continued to ship. Its competitive position remained strong.

The loss was caused by the same mechanism that produced 17 years of zero returns after December 1999: **valuation compression.** The market had priced the stock at 13.70x sales and 38.4x earnings—levels that required the sustained defiance of every documented pattern in valuation history. When sentiment shifted, the mathematics reasserted themselves.

The only question is why Wall Street analysts continued to recommend this stock to clients seeking capital preservation—when the mathematics clearly indicated extreme risk. The ERS framework identified the risk. The historical precedent was documented. The probability and magnitude of loss were quantifiable. And every fiduciary in America had access to the same underlying data.

Fiduciary standards do not require the certainty of harm—only the identification of known risks and probabilities of loss above acceptable thresholds. By that standard, the October 2025 valuation of Microsoft was a known, measured, and documented risk. The tools to identify it existed. The precedent to contextualize it existed. The only thing that was missing was the willingness to look.

6.6 NPV Analysis: What Must Be True to Justify $4 Trillion

If a stock's market capitalization dramatically exceeds the net present value of any reasonable earnings projection, the stock is priced for speculation, not investment.

The Assumptions

Assumption	Value	Rationale
Current Net Income	~$105 billion	Microsoft's actual 2025 earnings
Earnings Growth Rate	15% annually	Aggressive—above historical average
Discount Rate	8%	Standard equity discount rate
Time Horizon	10 years	Standard long-term projection
Terminal value	1x year-10 sales	Business is worth something after projection ends

These assumptions give Microsoft every benefit of the doubt. Sustaining 15% annual growth for a full decade is something very few companies of this size have ever achieved.

The Calculation

Year	Projected Revenue (15% growth)	Projected Earnings (15% growth)	Present Value (8% discount rate)
1	$338 billion	$121 billion	$112 billion
2	$389 billion	$139 billion	$119 billion
3	$447 billion	$160 billion	$127 billion
4	$514 billion	$183 billion	$135 billion
5	$591 billion	$211 billion	$144 billion
6	$680 billion	$243 billion	$153 billion
7	$782 billion	$279 billion	$163 billion
8	$899 billion	$321 billion	$173 billion
9	$1,034 billion	$369 billion	$185 billion
10	$1,189 billion	$424 billion	$197 billion
Total NPV	—	—	**$1.506 trillion**

The Gap

Metric	Value
10-Year NPV of Earnings	$1.506 trillion
Terminal Value: 1x year-10 revenue	$1.189 trillion
NPV of Terminal Value	$604 billion
Total Net Present Value	$2.110 trillion ($1.506 T + $604 B)
Market Cap at October 2025 Peak	$4.029 trillion
Gap	$1.919 trillion
Multiple of NPV	**1.91×**

Investors were paying approximately 1.91× the NPV of a decade of optimistic earnings projections. To justify this price, Microsoft would need to grow faster than 15% annually for a decade (unprecedented at this size), discount rates would need to remain near zero indefinitely, or investors would need to pay extreme multiples permanently. Each assumption requires speculation, not investment.

Under no reasonable set of assumptions does a 10-year NPV analysis support a $3–4 trillion market capitalization. When a company's market cap is 1.91× the NPV of optimistic projections, investors are buying hope, not earnings.

6.7 The Five Pillars of Valuation Collapse

Microsoft's October 2025 valuation was structurally vulnerable to five distinct forces, any one of which could trigger significant losses. Together, they made decline virtually inevitable.

Pillar 1: Multiple Compression

At 38× earnings, the stock price was basically assuming Microsoft would keep doing *amazingly well* for a long time. For perspective, on February 4, 2016, the ten most profitable U.S. companies averaged about 14× earnings—so 38× is more than double, almost triple.

That setup isn't great for a buyer: if Microsoft does a little better than expected, there may not be much extra upside because the stock is already expensive. But if it just does "fine," or has even a small stumble, the stock may decline very significantly because investors stop paying such high valuations.

Pillar 2: The Law of Large Numbers

At $4 trillion, Microsoft was larger than the GDP of every country except the United States, China, Germany, and Japan. Sustaining 15–20% growth would require the company to become larger than entire economies within a decade:

Year	MSFT's Revenue at 20% Growth	Context
2025	$294 billion	Current
2030	$732 billion	Larger than Saudi Arabia's GDP
2035	$1.82 trillion	Larger than Canada's GDP
2040	$4.53 trillion	About equal to Germany's GDP

Pillar 3: Competitor Entry

The bull case centered on AI and cloud computing, but Microsoft's largest customers were becoming its largest competitors. Google (Gemini, cloud infrastructure), Amazon (custom AI silicon, expanding AWS), Apple (on-device AI reducing cloud reliance), and Meta (open-sourcing AI models) were all eroding the "moat" that justified premium valuations.

Pillar 4: Margin Erosion

Microsoft's profit margins were near all-time highs, and the valuation assumed they would persist indefinitely. History shows margins revert to the mean as competition drives prices down, labor costs rise, reinvestment is required, and regulatory pressure increases on dominant companies. No company has maintained peak margins permanently.

Pillar 5: Median Gravity

The S&P 500's long-term average P/E is approximately 16–18×. Virtually every dominant company gravitates toward this median: IBM (40× → ~15×), Cisco (200× → ~15×), GE (50× → removed from Dow), Intel (50× → ~15×). Microsoft at 38× was priced as if it would be an eternal exception. History offers no such exceptions.

The Cumulative Effect

Any one of these pillars could trigger a decline of 30% or far more. The presence of all five made significant loss virtually inevitable. If a fiduciary had ERS's technology, they may have come to a very different conclusion than recommending Microsoft at a $4 trillion market cap.

PART VII: The Mythology of Safety

7.1 The "Blue Chip" Fallacy: Historical Precedents

There is a persistent myth that "blue chip" companies are inherently safe investments. The historical record says otherwise.

IBM (1962–1996): The Original "Safe" Tech Stock

In 1962, IBM was the Microsoft of its era—dominant, universally admired, held in every institutional portfolio.

Metric	1962	1996	Change
Revenue	~$2.5 billion	~$72 billion	**+2,800%**
P/E Ratio	~40×	~10×	**−75%**
*Shares Outstanding**	356.5 million*	511.6 million	**+43.5%**
Real Return	—	—	**~0%**

**Actual 1962 share count: 27.8 million. But adjusted for splits, 1 share became 12.8 shares, so the effective number of shares is equal to 356.5 million.*

- **The Performance:** Over the next 34 years, IBM's revenue grew **2,800%** (from $2.5 billion to $72 billion).
- **The Investment Result:** Investors who bought at the peak valuation (~40x earnings) earned **zero real returns** for three decades.
- **The Causes:** IBM's P/E ratio compressed from 40x to 10x, and it required X% share dilution to keep pace with their growing demand.

The collapse in valuation multiple completely erased the extraordinary business growth. This case proves that **business growth does not protect investors from valuation risk** .

Cisco (2000–2025): The "Microsoft of the Internet"

Metric	2000	2025	Change
Revenue	~$19 billion	~$57 billion	**+200%**
Stock Price	$80 (split-adj. peak)	~$60	**−25%**
Time Elapsed	—	25 years	—

Revenue tripled. Twenty-five years later, the stock remains below its 2000 peak. Mr. Mullaney rated Cisco "F" in his September 2000 SEC filing. Wall Street's consensus: "Strong Buy."

The Graveyard of "Safe" Stocks

Company	Status at Peak	Status Today
Kodak	Dominated photography, AAA-rated	Bankrupt (2012)
Polaroid	Iconic American brand	Bankrupt (2001)
Digital Equipment	#2 computer company globally	Acquired, dissolved
Compaq	World's largest PC maker	Brand discontinued
Enron	"Most Innovative Company" (Fortune)	Bankrupt, fraud
WorldCom	Largest telecom merger in history	Bankrupt, fraud
Lehman Brothers	158-year-old investment bank	Bankrupt (2008)
General Electric	"Most Admired Company" (Fortune)	Removed from Dow, split up

At their peaks, every one of these companies was recommended by respected analysts and held in institutional portfolios.

7.2 The Graveyard of Consensus: Merrill Lynch's "Focus 1" List - August 2000

In August 2000, Merrill Lynch published its "Focus 1" list in the firm's *Global Research Review*. These were not speculative picks. In Merrill's own words, each selection was "a timely investment value chosen from Merrill Lynch's BUY (1) rated stocks," reflecting "Merrill Lynch's current economic, investment strategy, and market analysis." These were Wall Street's most prestigious firm's highest-conviction recommendations — the stocks its analysts believed, after rigorous analysis, represented the best values available to investors.

Three highlighted stocks tell the story:

1. **Cisco Systems** — Priced at $68⅛ on July 25, 2000. The most valuable company in the world. Rated "Strong Buy." Subsequently lost approximately **81%** of its value and has never recovered its 2000 price — not in five years, not in ten, and not in twenty-five.
2. **General Electric** — Priced at 53^{9}/_{16}$. Named the "Most Admired Company" in America. Lost approximately **90%** of its peak value over the following two decades. Ultimately removed from the Dow Jones Industrial Average — a company that had been a member since 1907.
3. **Sun Microsystems** — Priced at $109. Acquired by Oracle in 2010 for approximately $9.50 per share — a loss exceeding **91%**.

Investors who followed Merrill Lynch's highest-conviction advice on these three companies alone suffered catastrophic, permanent capital destruction.

The damage extended far beyond three stocks. Of the 37 companies on this list:

- A significant number — including Lucent Technologies, Nokia, Sprint PCS, and Novellus Systems — produced severe losses over the subsequent decade
- Many no longer exist as independent companies
- These were not obscure, speculative ventures — they were among the largest, most widely held, most actively recommended securities in the world

The Pattern:

- **The Consensus said:** "Buy" — based on narrative, institutional authority, analyst confidence
- **The Math said:** "Sell" — based on Price-to-Sales ratios exceeding 20×
- **The Math was right. The Consensus was wrong.**

Why This Exhibit Matters

This exhibit is included not to single out Merrill Lynch — every major brokerage firm published comparable lists with comparable results. It is included because it is a documented artifact: a primary source showing exactly what Wall Street told investors to buy, at exactly what prices, at a moment of extreme valuation. The "Focus 1" list was not a casual suggestion. It carried the full institutional weight of the most recognized name in American finance.

The relevance to the present is direct:

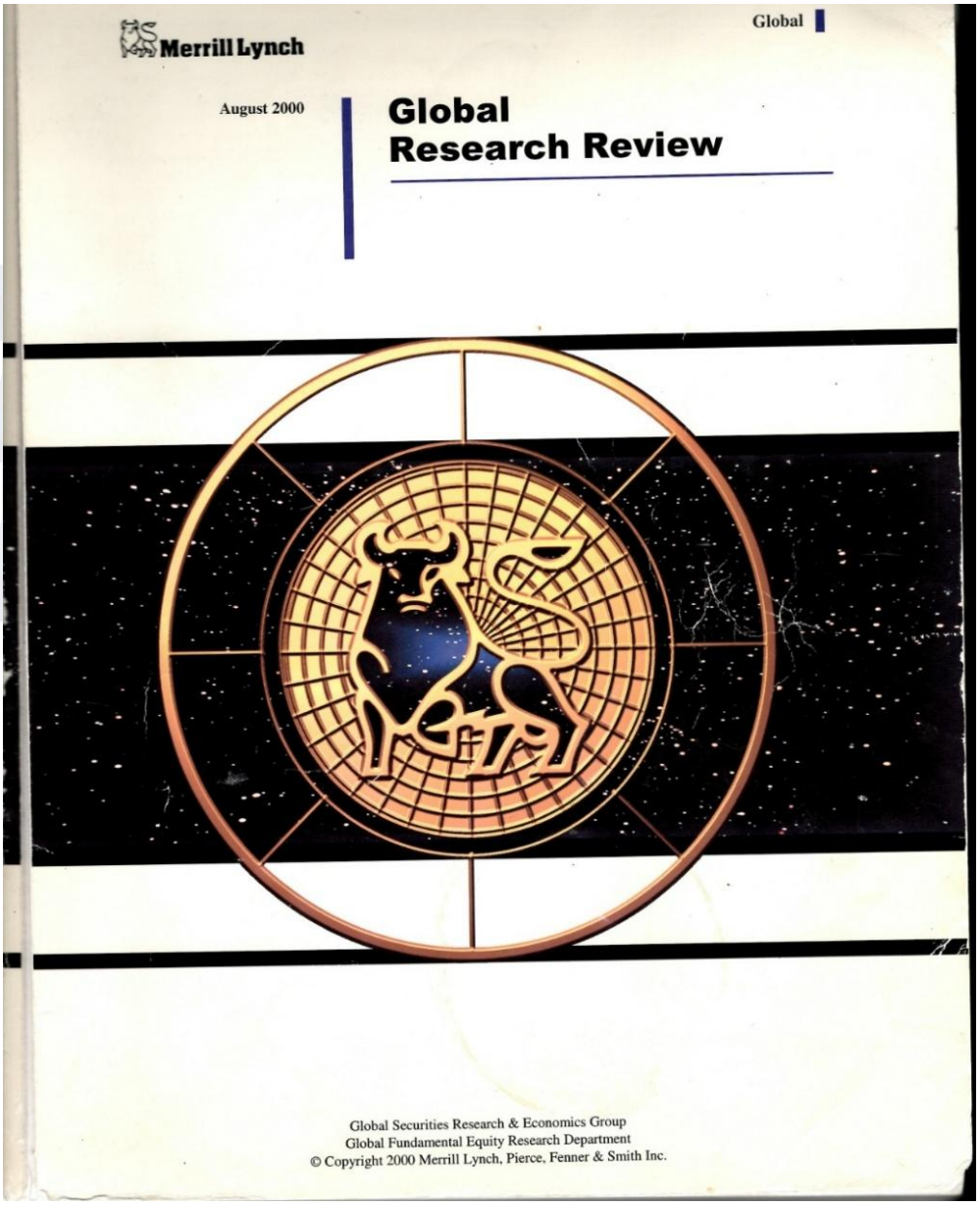
- Today's consensus "Buy" recommendations on the largest technology companies carry the **same institutional authority**
- They reflect the **same analytical confidence**

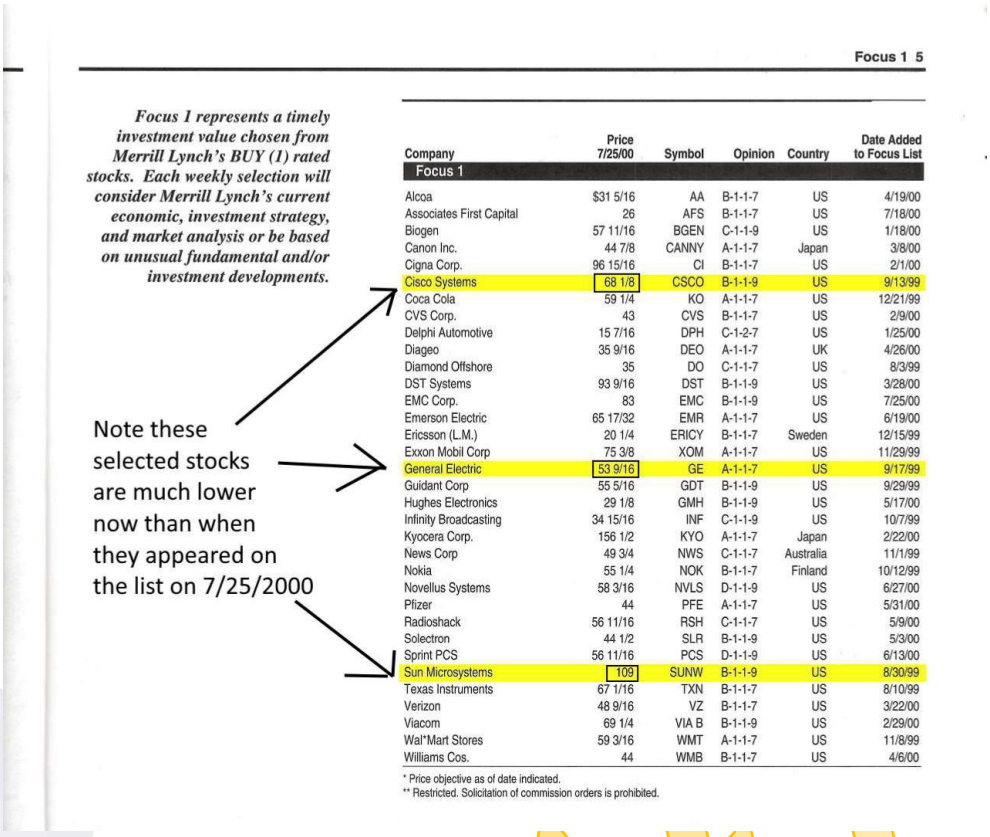
- They exhibit the **same structural inability to disclose the probability of loss**

The names have changed. The mathematics have not.

Great Company ≠ Great Stock. Fiduciaries must distinguish between the quality of the enterprise and the safety of the price. The failure to make this distinction is the primary source of preventable loss in client portfolios. For a fiduciary to rely on "consensus" today, while ignoring the same valuation metrics that predicted these past failures, is not prudent. It is a repetition of proven negligence.

Below is a photocopy of the physical book published by Merrill Lynch — a primary source document showing the firm's highest-conviction recommendations and the prices at which they were made, weeks before the market peaked.





Focus 1 5

Focus 1 represents a timely investment value chosen from Merrill Lynch's BUY (1) rated stocks. Each weekly selection will consider Merrill Lynch's current economic, investment strategy, and market analysis or be based on unusual fundamental and/or investment developments.

Note these selected stocks are much lower now than when they appeared on the list on 7/25/2000

Company	Price 7/25/00	Symbol	Opinion	Country	Date Added to Focus List
Focus 1					
Alcoa	$31 5/16	AA	B-1-1-7	US	4/19/00
Associates First Capital	26	AFS	B-1-1-7	US	7/18/00
Biogen	57 11/16	BGEN	C-1-1-9	US	1/18/00
Canon Inc.	44 7/8	CANNY	A-1-1-7	Japan	3/8/00
Cigna Corp.	96 15/16	CI	B-1-1-7	US	2/1/00
Cisco Systems	68 1/8	CSCO	B-1-1-9	US	9/13/99
Coca Cola	59 1/4	KO	A-1-1-7	US	12/21/99
CVS Corp.	43	CVS	B-1-1-7	US	2/9/00
Delphi Automotive	15 7/16	DPH	C-1-2-7	US	1/25/00
Diageo	35 9/16	DEO	A-1-1-7	UK	4/26/00
Diamond Offshore	35	DO	C-1-1-7	US	8/3/99
DST Systems	93 9/16	DST	B-1-1-9	US	3/28/00
EMC Corp.	83	EMC	B-1-1-9	US	7/25/00
Emerson Electric	65 17/32	EMR	A-1-1-7	US	6/19/00
Ericsson (L.M.)	20 1/4	ERICY	B-1-1-7	Sweden	12/15/99
Exxon Mobil Corp	75 3/8	XOM	A-1-1-7	US	11/29/99
General Electric	53 9/16	GE	A-1-1-7	US	9/17/99
Guidant Corp	55 5/16	GDT	B-1-1-9	US	9/29/99
Hughes Electronics	29 1/8	GMH	B-1-1-9	US	5/17/00
Infinity Broadcasting	34 15/16	INF	C-1-1-9	US	10/7/99
Kyocera Corp.	156 1/2	KYO	A-1-1-7	Japan	2/22/00
News Corp	49 3/4	NWS	C-1-1-7	Australia	11/1/99
Nokia	55 1/4	NOK	B-1-1-7	Finland	10/12/99
Novellus Systems	58 3/16	NVLS	D-1-1-9	US	6/27/00
Pfizer	44	PFE	A-1-1-7	US	5/31/00
Radioshack	56 11/16	RSH	C-1-1-7	US	5/9/00
Solectron	44 1/2	SLR	B-1-1-9	US	5/3/00
Sprint PCS	56 11/16	PCS	D-1-1-9	US	6/13/00
Sun Microsystems	109	SUNW	B-1-1-9	US	8/30/99
Texas Instruments	67 1/16	TXN	B-1-1-7	US	8/10/99
Verizon	48 9/16	VZ	B-1-1-7	US	3/22/00
Viacom	69 1/4	VIA B	B-1-1-9	US	2/29/00
Wal*Mart Stores	59 3/16	WMT	A-1-1-7	US	11/8/99
Williams Cos.	44	WMB	B-1-1-7	US	4/6/00

* Price objective as of date indicated.
** Restricted. Solicitation of commission orders is prohibited.

Figure 3.14: Merrill Lynch "Focus 1" List, Global Research Review, August 2000. Prices as of 7/25/2000. Highlighted stocks: Cisco Systems, General Electric, and Sun Microsystems—all of which subsequently suffered catastrophic losses. Source: Merrill Lynch, Pierce, Fenner & Smith Inc.

7.3 The Moat Illusion: Why Competitive Dominance Cannot Justify Extreme Valuations

The most common defense of extreme valuations is the "moat" — the claim that a company's competitive position is so durable that normal rules of mean reversion do not apply. The argument is familiar: this company has network effects, switching costs, proprietary technology, or regulatory barriers that make displacement impossible. Therefore, the investor can safely pay 30×, 40×, or 50× sales.

The argument has a problem. It has been made about every dominant company in history, and it has eventually been wrong about all of them.

The Historical Record

AT&T once charged $1.59 per minute for long-distance calls to Canada. The monopoly was absolute — enforced by regulation, protected by infrastructure that no competitor could replicate. The fact is, they owned the telephone lines, the poles, and the rights to build new lines. But that technology, like all technology, was made obsolete. There is no technology that won't be replaced. Today those calls cost nothing.

"Competition from the new technology … strikes not at the margins … but at their foundations and their very lives." – **Joseph Schumpeter**

IBM dominated enterprise computing so completely in the 1960s that the Department of Justice spent thirteen years trying to break up its monopoly. By the 1990s, the monopoly had dissolved on its own — not because of antitrust action, but because the personal computer made IBM's mainframe dominance irrelevant. Kodak held 90% of the U.S. film market. Nokia held 40% of the global mobile phone market. Blackberry defined the smartphone category. Sears was the Amazon of its century.

None of these companies failed because management was incompetent. They failed because the competitive landscape changed in ways that the moat narrative — by definition — cannot anticipate.

The Economist Who Predicted This

In 1942, Joseph Schumpeter identified the mechanism. Capitalism, he wrote, "is by nature a form or method of economic change and not only never is but never can be stationary." Its essential characteristic is not equilibrium but disruption — what Schumpeter called *creative destruction*: "the process of industrial mutation that incessantly revolutionizes the economic structure from within, incessantly destroying the old one, incessantly creating a new one."

Schumpeter's insight is not a theory about occasional disruption. It is a description of how capitalism operates as a permanent condition. The entrepreneur does not compete within existing market structures — the entrepreneur *destroys* existing market structures and replaces them. The railroad did not compete with the stagecoach. The automobile did not compete with the horse. The smartphone did not compete with Nokia — it eliminated the category Nokia dominated.

(Source: Joseph A. Schumpeter, Capitalism, Socialism and Democracy, 3rd ed. (New York: Harper & Brothers, 1950), Chapter VII.)

The Current Application: NVIDIA and the $50–60 Billion Question

NVIDIA's valuation at its recent peak implied that its dominance in AI chips would persist indefinitely. This assumption requires ignoring what is visible today.

Amazon, Google, AMD, and Qualcomm are collectively investing an estimated $50–60 billion in developing competitive AI silicon — and that accounts only for U.S.-based efforts. Samsung, TSMC, and state-backed semiconductor initiatives in China, Japan, and South Korea add competitive pressure on a scale that dwarfs any single company's R&D budget. NVIDIA's largest customers are becoming its largest competitors.

The history of semiconductor pricing is unambiguous: chip prices fall. Competition enters, manufacturing scales, architectures commoditize, and customers have every incentive to reduce dependency on a single supplier.

This does not mean NVIDIA will fail as a business. It means that a valuation implying permanent monopoly-level pricing power in semiconductors contradicts the entire recorded history of the industry — and the Schumpeterian reality that no competitive position is permanent.

The Fiduciary Implication

When an advisor justifies an extreme valuation by citing a company's "moat," the advisor is making an implicit claim: that this company is exempt from the forces of creative destruction that have reshaped every industry in the history of market capitalism. That is not an investment thesis. It is a faith statement — precisely the kind of unfalsifiable narrative that Part III of this report identifies as incompatible with a scientific standard of evidence.

A testable thesis would state: "NVIDIA's current P/S ratio requires that the company maintain its current gross margins and market share for X years, with no competitive alternative achieving more than Y% market penetration." That statement can be monitored, measured, and — when the conditions are not met — acted upon. The moat narrative, by contrast, provides no conditions under which it would be proven wrong. It is, in Popper's terms, immunized against refutation.

A fiduciary is not required to prove that a company's competitive advantage will disappear. A fiduciary is required to acknowledge that no technology monopoly in recorded history has been permanent — and that when a stock is priced as though permanence is assured, the probability and magnitude of loss have risen above any defensible threshold.

PART VIII: The Analytical Framework

8.1 The Scientific Standard of Demonstrable Evidence

Popper vs. Wall Street

The fundamental intellectual failure of the investment industry is not a failure of intelligence; it is a failure of epistemology. The industry has failed to distinguish between **knowledge** (which is testable) and **narrative** (which is not).

In 1934, the philosopher Karl Popper solved the "Demarcation Problem"—the challenge of distinguishing genuine science from pseudoscience. His answer was the principle of **falsifiability** (testability): a claim is scientific only if it makes a specific prediction that can be proven wrong by observable evidence. If a theory explains everything—if it cannot be contradicted by any possible outcome—it explains nothing. It is not knowledge; it is faith.

The Untestable Narrative

Wall Street research operates almost exclusively in the realm of the untestable. Consider the standard analyst recommendation: *"We believe Company X is a Buy due to strong secular tailwinds in AI."*. This statement cannot be tested.

- **If the stock rises:** The analyst claims validation.
- **If the stock falls:** The analyst claims "unexpected macro headwinds" or argues the "long-term thesis remains intact" .

There is no observable outcome that forces the analyst to admit the recommendation was wrong *at the time it was made*. The thesis is immunized against refutation. Under Popper's standard, this is not analysis; it is pseudoscience. For a fiduciary to base the financial security of a retiree on such untestable assertions is a violation of the duty of skill.

The Scientific Standard

A fiduciary standard of care must be anchored in testable hypotheses. A valid investment recommendation must state, in advance, the specific conditions under which the thesis fails.

The Fiduciary Test:

- **Opinion (Invalid):** "I like Microsoft here."
- **Hypothesis (Valid):** "At 13.7x Price-to-Sales, Microsoft requires 40% annual revenue growth for five years to justify its current price. If growth is less than 40%, or if the P/S ratio reverts to its 20-year median of 5.88x, the investment will lose money".

The second statement is scientific. It establishes a "load limit." It identifies a "kill switch." If the test criteria are met (e.g., revenue grows only 15%), the thesis is proven wrong, and the fiduciary is obligated to act.

The Moral Failure of Narrative

When fiduciaries rely on narrative rather than math, they abandon the primary tool required to protect capital: the ability to distinguish **price** from **value**. Narratives justify any price; math imposes limits.

The industry's reliance on narrative is not an accident; it is a necessity for a business model built on asset gathering. Math (valuation limits) restricts the number of "Buy" recommendations a firm can issue. Narrative (innovation stories) allows for an unlimited supply. By rejecting testability, the industry prioritizes product inventory over client safety.

The scientific standard we propose is not a demand for omniscience. It is a demand for honesty about what is already known. When documented historical patterns show that a specific valuation level has repeatedly produced losses of a specific magnitude, a fiduciary who ignores that evidence is not exercising judgment — they are declining to exercise it. The threshold for action is not certainty. It is demonstrable probability. The "What Must Happen" protocol, detailed in the following section, is the operational implementation of this standard.

8.2 The Price-You-Pay Problem

Every investment decision is, at its core, a bet on the range of possible outcomes — weighted by the probability of each outcome occurring. Yet investors today are asked to make these bets without the single piece of information that matters most: how do the odds change depending on the price at which they buy?

The investment industry treats risk as though it were a fixed property of a company — as if a stock is either "risky" or "safe" regardless of what the investor pays for it. This is the equivalent of saying a car is either safe or dangerous **without asking how fast it is traveling.**

The Speed Analogy

Consider the physics of automobile collisions. The vehicle is the same. The wall is the same. The only variable is speed — and yet the outcomes are radically different:

- **At 25 mph,** the probability of fatal injury is approximately 10%. The car's safety systems — airbags, crumple zones, seatbelts — are designed to absorb the impact. The occupant walks away bruised but intact.
- **At 50 mph,** the probability of fatal injury rises to approximately 50%. The same safety systems are now operating at the outer limits of their design capacity. Survival depends on variables the driver cannot fully control.
- **At 75 mph,** the probability of fatal injury exceeds 85%. No safety system can compensate. The energy of the impact overwhelms every protective mechanism the vehicle possesses.

The car did not become less safe. The wall did not become harder. **The price of entry — speed — changed the entire probability distribution of outcomes.**

The Application to Equity Investing

Equity investing works the same way.

A stock purchased at 10 times earnings, with a strong balance sheet, has financial "crumple zones" — cash reserves, tangible assets, manageable debt — that can absorb economic shocks. The same

company, purchased at 50 times earnings with identical fundamentals, has been stripped of those protections. The margin for error has been compressed to near zero. The investor is traveling at 75 miles per hour, and any wall — a recession, a competitive disruption, a regulatory change — becomes potentially fatal to the investment.

The price you pay determines the speed at which you hit the wall.
The company's balance sheet determines whether the airbags work.

This is the insight that the current standard of care fails to capture. A fiduciary who recommends a stock at 40× earnings and a stock at 10× earnings is not making two equivalent decisions with different growth expectations. They are placing their client in two fundamentally different risk environments — one in which the safety systems are intact and one in which they have been disabled by the price of admission.

Until fiduciaries are required to disclose how the probability and magnitude of loss change at different entry prices, investors are being asked to evaluate return claims **without knowing how fast the car is going.**

8.3 Risk-Adjusted Returns at Various Price Points

The preceding section established the principle: the price an investor pays changes the entire distribution of possible outcomes. This section illustrates what a rigorous application of that principle looks like in practice — the kind of analysis fiduciaries should be required to produce before committing client capital.

This is not a forecast. It is a framework for thinking about the distribution of possible outcomes — and how that distribution shifts as the price an investor pays moves higher or lower relative to the company's underlying financial reality. The framework requires investors to consider three dimensions simultaneously.

Dimension 1: What Could Go Wrong — and How Badly?

Every company faces a range of adverse scenarios: recessions, pandemics, competitive disruption, regulatory action, loss of key customers, technological obsolescence. The question is not *whether* adversity will occur — it will — but *what is the magnitude of the potential earnings decline, and how long might it persist?*

Dimension 2: What Resources Does the Company Have to Survive It?

This is where balance sheet analysis becomes essential. Two companies can experience the identical earnings shock — say, a 50% decline in net income sustained over three years — and emerge with radically different outcomes for their shareholders, depending entirely on their financial reserves.

Company A — The Fortified Balance Sheet: If Company A's net income falls 50% for an extended period — whether from a recession, a pandemic, a political crisis, or a competitor capturing its primary revenue sources — it may nonetheless survive and recover because it possesses current assets it can draw upon: cash, short-term investments, and liquid reserves sufficient to cover operating obligations during the period of diminished earnings. Additionally, it may own tangible assets — real property, equipment, inventory — against which it can borrow or which it can sell to bridge the shortfall. These financial resources function as the crumple zones and airbags of the investment: they absorb the shock and give the company time to recover.

Company B — The Exposed Balance Sheet: Company B, experiencing the identical 50% earnings decline over the same period, possesses neither of these cushions. It lacks sufficient cash or liquid investments to sustain operations during the downturn. It lacks tangible assets of meaningful value to pledge or liquidate. When the wall is hit, there is nothing between the impact and the investor's capital. The full force of the earnings decline is transmitted directly to the equity holder — often through dilutive capital raises, credit downgrades, dividend eliminations, or in the worst case, restructuring or insolvency.

Dimension 3: What Did the Investor Pay Relative to These Realities?

The entry price determines how much of the potential adversity has already been "priced in" — and how much remains as uncompensated risk borne entirely by the investor. A low entry price provides a margin of safety; a high entry price eliminates it.

An Illustrative Framework

To demonstrate how this analysis might be expressed, consider the following simplified illustration. The probabilities and magnitudes below are *hypothetical* and are presented solely to show the *structure* of the analysis — the kind of output that fiduciaries should be required to produce and disclose to clients before committing capital.

Company A — Strong balance sheet, purchased at 12× earnings:

Scenario	Estimated Probability	Estimated Price Impact
Severe earnings decline (50%+) sustained 3+ years	~15%	**−25% to −40%**
Moderate earnings decline (20–30%) sustained 1–2 years	~30%	**−10% to −20%**
Earnings stable or modestly growing	~35%	**+5% to +20%**
Earnings growth accelerates	~20%	**+25% to +50%**

Company B — Weak balance sheet, purchased at 45× earnings:

Scenario	Estimated Probability	Estimated Price Impact
Severe earnings decline (50%+) sustained 3+ years	~15%	**−60% to −80%**
Moderate earnings decline (20–30%) sustained 1–2 years	~30%	**−35% to −55%**
Earnings stable or modestly growing	~35%	**−10% to +5%**
Earnings growth accelerates	~20%	**+15% to +30%**

Note that the *probability of adversity* may be similar for both companies — recessions and disruptions do not discriminate by balance sheet strength. What changes dramatically is the *magnitude of loss* when adversity occurs. Company A's financial reserves cushion the blow. Company B's absence of reserves amplifies it.

Risk is not merely the probability that something goes wrong.
It is the probability multiplied by the magnitude of the consequence —
and both are functions of the price the investor pays.

Essential Disclaimers and Limitations

This analytical framework addresses a genuine and long-standing gap in the information available to investors and fiduciaries. However, full transparency about what this analysis is — and what it is not — is essential.

What this analysis provides: Probability-weighted estimates of potential outcomes, derived from quantitative analysis of a company's current financial condition, historical valuation patterns, balance sheet composition, and earnings variability. These estimates are designed to help investors and fiduciaries make more informed assessments of the range of plausible outcomes at various entry prices.

What this analysis does not provide: Forecasts, predictions, or guarantees of future stock prices, earnings, or investment returns. No analytical model can predict the future with certainty, and no responsible practitioner would claim otherwise.

What can cause these estimates to be wrong:

- **Current assets may decline in value.** Cash reserves, short-term investments, and liquid holdings that appear adequate today may lose value due to market conditions, counterparty failures, or currency fluctuations — reducing or eliminating the financial cushion the analysis assumes.
- **Intangible assets may possess unrealized value.** A company that appears to lack tangible resources may hold intangible assets — patents, brand value, proprietary technology, customer relationships, licenses — whose realizable market value substantially exceeds the amounts reported on the balance sheet. Conversely, intangible assets carried at significant book value may prove to be worth far less than stated.
- **Balance sheet composition changes.** Companies actively manage their balance sheets. Assets are acquired, sold, written down, or revalued. Liabilities are incurred, restructured, or retired. The financial condition analyzed at any point in time is a snapshot, not a permanent state.
- **Unprecedented events.** Scenarios outside historical experience — novel technologies, geopolitical disruptions, regulatory changes without precedent — may produce outcomes that no historical pattern would predict.
- **Management decisions.** Corporate leadership may take actions — strategic pivots, acquisitions, divestitures, capital allocation decisions — that fundamentally alter the company's risk profile in ways that cannot be anticipated by quantitative analysis of current financial statements.

Risk-adjusted return estimates of this kind are analytical tools — not crystal balls. They represent a quantitative assessment of the *range and likelihood* of potential outcomes based on currently available financial data and historical precedent. They are designed to make the invisible visible — to give investors and fiduciaries a structured, independent framework for evaluating what they are being asked to accept when they commit capital at a given price.

As the field of actuarial science candidly acknowledges: the value of probability analysis lies not in its precision for any single outcome, but in its reliability across a *population* of decisions over time. Systematic, quantitative risk assessment — even with all its inherent limitations — produces materially better outcomes than the alternative, which is no systematic risk assessment at all.

The **What Must Happen** protocol, detailed in the following section, is the operational implementation of this framework — the specific, testable process by which a fiduciary can convert these principles into documented, auditable investment decisions.

8.4 The Proposed Solution (The "What Must Happen" Standard)

The core problem identified in this report is the absence of testable standards for investment recommendations. Wall Street research consists of untestable opinions—"We believe MSFT is a Buy"—that can never be proven wrong because they make no specific predictions.

To protect investors, we must transform investment recommendations from opinion to science using the **"What Must Happen" (WMH)** protocol.

1. The WMH Protocol

The WMH standard requires that all discretionary equity purchases include documented analysis defining the specific financial conditions required for the investment to succeed. It follows a three-step scientific process :

- **Step 1: Condition Identification (The Hypothesis)** Instead of vague optimism, the fiduciary must state the hypothesis in measurable terms.
  - *Example:* "To achieve a 10% annual return on Microsoft at $541.55, the company must grow revenue at 15% annually AND maintain a P/E ratio of at least 45x through 2030". This forces the advisor to articulate exactly what must happen—not what they hope will happen, but what mathematically **must** occur.
- **Step 2: Plausibility Assessment (The Test)** The fiduciary must test whether the required conditions are historically plausible using reference class forecasting.
  - *The Test:* Has any company with $294 billion in revenue ever grown at 15% annually for a decade?
  - *The Data:* Statistical analysis of U.S. public companies (1950–2023) shows the probability of a company with $50B–$150B in revenue achieving 30% growth for just three years is less than 0.1%. If the answer is "No"—if the required conditions have never occurred in market history—the investment must be flagged as **Speculative (Low Plausibility)**.
- **Step 3: Test Criteria (The Kill Switch)** The fiduciary must define, in advance, what proves the thesis wrong.
  - *The Criterion:* "If the P/S ratio contracts to the historical median (5.88x), the thesis fails". This prevents the endless rationalization that characterizes failed investments. When the thesis is refuted, the advisor has a pre-committed obligation to act.

The purpose of the What Must Happen protocol is not to predict the future. It is to define — in advance, in writing, using testable conditions — the boundary between an investment supported by evidence and a speculation supported by hope. A fiduciary need not know whether harm will occur. A fiduciary must know whether the conditions for harm are present, and whether their probability exceeds the threshold a prudent professional would accept.

2. The "Sequential Buyer" Problem

The WMH framework also exposes the "greater fool" fallacy through **Sequential Buyer Analysis**. If an investor buys Microsoft at $451 expecting a 15% return, they must sell it in three years at roughly $686.

- **The Question:** Who will buy at $686?
- **The Math:** The future buyer (Investor #2) would need to pay a P/E of **72x** and a P/S of **7.2x** for a company growing even slower than today.

- **The Conclusion:** Because finding a buyer willing to pay 72x earnings for a mature company is implausible, the investment chain breaks. The current price is unsustainable because it requires a future irrational buyer.

8.5 The 10 Tests Every Fiduciary Must Apply

Before purchasing any stock—or accepting that an index has done it for them—a fiduciary must apply ten specific suitability tests. These tests effectively "open the box" of any investment product to reveal the financial health of the components.

Test 1: Net Liquid Equity

- **Question:** Is the company becoming worth less to the people who own it?
- **The Metric:** Measure the trend of Net Liquid Equity per Share (Total Equity minus Goodwill/Intangibles minus Illiquid Assets) over the trailing 3 years.
- **Fiduciary Warning:** If this number is declining while the stock price is rising, the investment ***may be*** a "melting ice cube" .

Test 2: Operational Cash Flow

- **Question:** Is the business burning more cash than it generates?
- **The Metric:** Compare Operating Cash Flow to Net Income.
- **Fiduciary Warning:** If Operating Cash Flow is negative while Net Income is positive, the "earnings" are likely an accounting fiction derived from accruals or one-time gains. It is not a business; it is a countdown.

Test 3: Dilution

- **Question:** Is the company printing new shares to pay bills?
- **The Metric:** Measure the Diluted Share Count over the trailing 3-5 years.
- **Fiduciary Warning:** If the share count is rising, existing shareholders are being diluted. A company growing revenue by 10% but growing share count by 12% is shrinking per-share value.

Test 4: Asset Quality (The "Goodwill" Test)

- **Question:** Is the company's value mostly things you cannot sell?
- **The Metric:** Calculate Goodwill + Intangible Assets as a percentage of Total Equity.
- **Fiduciary Warning:** If this ratio exceeds 50%, the majority of the company's reported "book value" is subjective and cannot be converted to cash in a crisis.

Test 5: Real Value Creation

- **Question:** Does the company's balance sheet demonstrate it has built shareholder wealth?
- **The Metric:** Has Tangible Equity per Share increased for three consecutive years?
- **Fiduciary Warning:** If the answer is "No," the investment thesis relies entirely on future hope rather than demonstrated performance.

Test 6: The Dividend Test

- **Question:** Does the business generate enough real cash to pay its owners?
- **The Metric:** Does the company pay a dividend? If not, does it have the *capacity* to pay one (Free Cash Flow > 0)?

- **Fiduciary Warning:** A company that has never paid a dividend and has negative free cash flow is a speculation, not an investment.

Test 7: Valuation Plausibility (The Yield Test)

- **Question:** Can the company ever pay me back?
- **The Metric:** Calculate the Earnings Yield (Net Income / Market Cap).
- **Fiduciary Warning:** If the Earnings Yield is below the risk-free rate (e.g., 2% vs 4% Treasury), the investor is assuming massive future growth just to break even with a bond. That is not ownership; that is charity.

Test 8: Insolvency Risk

- **Question:** Is the company actively dying?
- **The Metric:** Altman Z-Score or similar bankruptcy predictor.
- **Fiduciary Warning:** Companies in the "Distressed" zone are unsuitable for capital preservation portfolios, regardless of index inclusion.

Test 9: Insider Wealth Transfer

- **Question:** Who is the business working for?
- **The Metric:** Compare Stock-Based Compensation (SBC) to Net Income.
- **Fiduciary Warning:** If SBC exceeds Net Income, the company is effectively a mechanism for transferring shareholder capital to employees.

Test 10: Economic Value Added

- **Question:** Does the business earn its keep?
- **The Metric:** Is Return on Invested Capital (ROIC) greater than the Weighted Average Cost of Capital (WACC)?
- **Fiduciary Warning:** If ROIC < WACC, the company destroys value with every dollar it invests. Shareholders would be better off if the company liquidated.

The Index Failure: At any given time, scores of S&P 500 companies fail one or more of these tests. A fiduciary who "buys the index" is forced to hold every single one, violating the duty of caution.

8.6 The "Net Liquid Equity" Criterion

To replace the vague standard of “professional judgment,” regulators should require analysts to disclose the **specific, quantifiable metrics**—and any additional explicit assumptions—that form the foundation of their recommendations and target prices.

1. The Criterion

One of the primary metrics fiduciaries should consider is: **The degree to which a company grows its net liquid equity per share from operations**.

This single sentence contains six simultaneous filters that reduce the vast majority of investment risks:

- **NET:** Subtracts all liabilities, exposing leverage risks.
- **LIQUID:** Requires assets to be convertible to cash, eliminating "goodwill" inflation.
- **EQUITY:** Focuses on the residual claim of the owner, not the enterprise value (which includes debt).

- **PER SHARE:** Adjusts for dilution, exposing the "shell game" where aggregate growth masks per-share destruction.
- **FROM OPERATIONS:** Ensures value comes from the business itself, not financial engineering or debt-funded buybacks.
- **GROWTH:** Requires value to increase over time, ensuring the investment is not a melting ice cube.

2. The Absence Test

The necessity of this criterion is proved by what happens when any single filter is removed:

- Remove **"Net"**: You get Lehman Brothers (massive assets, insufficient equity).
- Remove **"Liquid"**: You get Valeant Pharma (equity dominated by fake goodwill).
- Remove **"Per Share"**: You get modern tech companies that grow revenue while diluting shareholders via stock comp.
- Remove **"From Operations"**: You get companies using debt to buy back stock, simulating growth while destroying solvency.

No fiduciary—regardless of the rules they follow—can eliminate all risk or guarantee improved performance in every market environment. Outcomes are not fully controllable; **process is**. And the more clearly a fiduciary identifies and avoids avoidable risks, the fewer losses—and especially catastrophic losses—fiduciary accounts are likely to sustain. That principle is consistent with the fiduciary duties of **due care, diligence, and prudence**.

We are not asking the Commission to mandate investment success. We are asking the Commission to require clear disclosure of **non-proprietary processes** so consumers can evaluate which risks an advisor is willing to accept, and which risks the advisor actively works to reduce in order to limit potential losses.

PART IX: Growth Analysis & Regulatory Reform

9.1 The Statistical Improbability of Sustained Growth

The most common justification for extreme valuations is the expectation of sustained, high-rate growth. Fiduciaries who recommend stocks at 30×, 40×, or 50× earnings are implicitly accepting analyst projections that a company will grow at high double-digit rates for a decade or more.

These projections deserve closer examination. Growth rates are not opinions — they are historical phenomena with measurable frequencies. Every industry, at every scale, has a statistical ceiling beyond which sustained growth becomes not merely unlikely but nearly unprecedented. A company generating $100 billion in annual revenue faces fundamentally different arithmetic than one generating $1 billion. The larger the base, the more new revenue is required simply to maintain the same percentage growth — and the fewer addressable markets remain to supply it.

When fiduciaries accept growth forecasts without comparing them to these historical realities, they may be exposing their clients' capital to outcomes that, statistically, have an extraordinarily low probability of occurring. The question is not whether a company *can* grow — it is whether the *rate and duration* of growth implied by the current price has ever actually been achieved by a company of comparable size.

The Base Rate Analysis

To evaluate the credibility of a growth projection, the appropriate discipline is **reference class forecasting**: ignore the company's story and ask a simpler question — ***among companies that started in a similar position, what percentage actually achieved the projected outcome?*** This is the discipline of **base rates**: measuring what has happened often enough to treat it as evidence.

Based on historical market data (1950–2023) and widely cited research on corporate growth and lifecycle constraints:

The cohort: companies with revenue bases between $50 billion and $150 billion.

The projection: growing revenue at 30% or more for three consecutive years.

The reality: the statistical probability of this event occurring is **less than 0.1%.**

For a company with $100 billion in revenue to grow 30% for three years, it must generate approximately **$119.7 billion of new revenue** in 36 months. That is the equivalent of creating an entirely new Fortune-scale business, repeatedly, in a very short period of time. **Scale imposes an arithmetic constraint** — a governing force on what large companies can realistically compound, regardless of how compelling the narrative may be.

9.2 The Base-Rate Evidence: What the Published Studies Show

The conclusion that extreme growth from a large revenue base is statistically near-impossible is not unique to this report. It is consistent with a large body of base-rate research produced inside major investment institutions and confirmed in peer-reviewed finance journals: **as starting size increases, the range of achievable growth outcomes collapses**, and extreme multi-year growth becomes vanishingly rare.

The evidence below is drawn from three high-reputation, independently verifiable research streams.

The Flagship Institutional Base-Rate Study (Credit Suisse)

Michael Mauboussin — known for **expectations-based investing** (reverse-engineering what current prices already imply and comparing that to what is realistically achievable) — and coauthors compiled long-horizon base rates in *The Base Rate Book* (Credit Suisse, 2016), using corporate growth data going back to 1950. The practical conclusion is that **scale compresses the distribution of achievable growth.**

The base-rate data are granular enough to answer the question directly. For companies with $3.5–$6.0 billion in annual sales — firms that are already large by any conventional standard — Mauboussin's tables show that fewer than one in four sustained even 10% annual revenue growth over three years, and fewer than one in five did so over five years. At the 15% threshold, the odds drop to roughly one in seven over three years and one in eight over five. For companies in the next size tier ($6–$13 billion), the probabilities are lower still.

Growth hurdle (Sales CAGR)	$3.5 - $6.0 billion firms, 3-yr	$3.5 - $6.0 billion firms, 5-yr	$6 - $13 billion firms, 3-yr	$6 - $13 billion firms, 5-yr
≥ 5%	43.8%	40.1%	39.8%	36.4%
≥ 10%	24.9%	21.4%	22.3%	17.8%
≥ 15%	15.1%	13.1%	13.2%	9.0%
≥ 20%	9.4%	7.0%	7.8%	4.5%
≥ 30%	4.6%	1.6%	2.6%	1.1%

Source: Mauboussin, Callahan, and Majd, "The Base Rate Book — Sales Growth," Credit Suisse Global Financial Strategies, May 2015, Exhibit 4. Cumulative probabilities computed from reported frequency distributions. S&P 1500 constituents, 1994–2014, inflation-adjusted.

These are not projections. They are the historical record of what actually happened to thousands of companies over two decades. When a current price implies sustained 15–20% revenue growth, it is implying an outcome that fewer than one in ten comparable firms have ever achieved.

Morgan Stanley examined whether companies already above **$100 billion** in sales could sustain roughly **16% annual revenue growth from 2016 through 2025** (about nine years). Their base-rate summary was blunt: ***"No company with $100 billion or more in base year sales had ever grown at that mid-teens rate for that long."***

The Authority Behind the Data

Michael Mauboussin authored and co-authored four books on expectations-based investing over a 25-year career. The central theme: reverse-engineer what the market price already implies, and invest by comparing those implied expectations to what is realistically achievable.

Clayton Christensen (Harvard Business School) called his work "a conceptually brilliant, highly practical book" and added that "Mauboussin has no peers." **Philip Tetlock** (Wharton) wrote that "Mauboussin seems to know everything there is to know about how to skillfully disentangle skill from luck."

Updated Analysis: Tangible vs. Intangible-Heavy Businesses (Russell 3000)

Mauboussin and Dan Callahan then tested how the shift toward intangible-heavy business models affects base rates using a large modern universe: the constituents of the Russell 3000 from 1984–2020.

Their results quantify both the upside *and* the dispersion (risk): over five-year periods, median compound sales growth was 10.4% (healthcare), 7.9% (technology), 6.0% (consumer), and 5.0% (manufacturing), with an all-company median of 6.5%.

They also show how wide outcomes can be — about two-thirds of healthcare companies fell between −18.0% and +43.2% five-year sales growth, versus manufacturing between −7.0% and +19.2% — supporting the core point: **intangibles may extend the right tail, but they also widen dispersion, and they do not erase the arithmetic constraint of large starting size.**

Independent Peer-Reviewed Confirmation (Journal of Finance)

Chan, Karceski, and Lakonishok's peer-reviewed study "The Level and Persistence of Growth Rates" (*Journal of Finance*, 2003) reaches a compatible conclusion about "story" forecasts versus empirics. They write that ***"there is no persistence in long-term earnings growth beyond chance"*** and ***"IBES growth forecasts are overly optimistic and add little predictive power."***

This directly reinforces the base-rate message: **extreme long-term growth is rare, hard to identify in advance, and commonly over-projected by widely distributed analyst forecasts.**

Why This Deserves Emphasis

Taken together, these sources establish a practical standard: **when a stock is priced for extreme growth from an already-massive revenue base, the burden of proof (for extraordinary claims) is not on the skeptic.** The burden is on the projection — because the base rate for that outcome is extraordinarily low.

And this is where the issue becomes more than academic. Much of this base-rate research was produced inside premier Wall Street institutions. The evidence and the marketing often coexisted under the same roof.

Mauboussin produced his research while employed at Credit Suisse and Morgan Stanley. These firms possessed the "base rate data" within their own walls — and their research departments continued issuing aggressive growth projections and "Strong Buy" ratings on stocks priced for outcomes their own data showed were near-impossible.

The evidence and the recommendations coexisted under the same roof.

Investors received the recommendations.

They did not receive the evidence.

The "Expert" Failure

Fiduciaries often defend growth projections by citing Wall Street analysts. However, statistical analysis of forecast accuracy demonstrates that these "experts" are reliably wrong.

Optimism Bias: Research by Chan, Karceski, and Lakonishok found that analysts consistently overestimate long-term growth. The median forecast is typically **1.5× to 2× higher** than the actual realized growth.

Mean Reversion Neglect: Analysts extrapolate current high growth into the future. Historical data show that high growth decays rapidly; a company growing at 20%+ today has a less than 20% chance of maintaining that rate for five years.

The Conclusion: When a fiduciary accepts a growth projection that defies the base rate to justify an extreme valuation, they are not making a "judgment call." They are making a statistical error that exposes the client to a near-certainty of loss.

9.3 The PayPal Case: When Institutional Evidence and Institutional Recommendations Diverge

The base-rate evidence documented in Sections 9.1 and 9.2 was not produced in an academic vacuum. It was compiled inside the same institutions that simultaneously issued the recommendations it contradicts. The PayPal case illustrates this divergence with specific, documented, and quantifiable precision.

1) **Summary Finding**
   a) **Finding:** The WMH ("What Must Happen") framework indicates that PayPal's 2021 market price embedded a set of operating and valuation conditions that required **exceptional** outcomes to avoid investor underperformance---conditions that were not clearly disclosed as prerequisites for the then-prevailing "Strong Buy" style recommendations.
   b) **Definition (WMH):** "What Must Happen" refers to a reverse-engineered expectations analysis that starts with the current price and identifies the specific combinations of: (a) future revenue growth, (b) future operating/net profit margins, and (c) future valuation multiples (P/S, P/E), that would be required for an investor to realize a given return.
   c) **Observation (Mechanism of Loss Without Business Failure):** The principal mechanism of loss can be **valuation normalization** (multiple compression), even where the underlying business continues to grow. In such cases, investors may experience severe drawdowns not because the company fails operationally, but because the purchase price required outcomes materially above normal base-rate ranges *and/or* required elevated multiples to persist.
2) **Stated Context**
   a) PayPal's shares declined substantially from their 2021 peak; as of this writing, the stock trades around the low-$40s and the price-to-sales ratio is approximately ~3×
   b) During the period when PYPL traded around ~$300, multiple major broker-dealers published target prices at or above that level and characterized the stock favorably (the specific firms and targets should be documented with dated reports and/or archived sources).
3) **Questions for Examination / Investor-Protection Review**
   a) **Disclosure of embedded conditions:** In the 2021 research reports that assigned target prices >$300, did the reports clearly disclose---prominently and quantitatively---what conditions were required for investors to achieve those targets, including:

i) **Revenue growth prerequisites:** the implied revenue path required for the target price to be reasonable; and whether that path was **base-rate consistent** for a company already at PayPal's scale.
ii) **Margin prerequisites:** the implied profit-margin levels required; whether those margins were historically typical for the business model and competitive environment; and how sensitive the target price was to margin shortfalls.
iii) **Multiple prerequisites:** the implied **future valuation multiple** required (P/S and/or P/E), and whether the target assumed that elevated multiples would persist despite maturation, competition, and discount-rate risk.

b) **Downside sensitivity / valuation normalization:** Did any report provide a standardized sensitivity analysis showing the expected price impact if valuation multiples reverted to historically typical ranges (for PayPal itself, for comparable companies, and/or for broad-market norms), *holding the analysts' own forecasted revenues and earnings constant*?
c) **Probability ranges / uncertainty disclosure:** Did any report disclose probability distributions or scenario bands (base / adverse / optimistic) indicating the likelihood that the embedded conditions would be met---and the magnitude of investor loss if they were not?

4) **Materiality of the Omission**
a) **Materiality:** For a security priced such that expected returns depend on exceptional assumptions, the omission of embedded prerequisites and downside sensitivity can be materially misleading by presenting a directional conclusion ("Strong Buy," high target price) without disclosing the quantitative conditions necessary for that conclusion to be realized.

5) **The Scientific Standard**
a) **Principle:** As Carl Sagan famously summarized, "Extraordinary claims require extraordinary evidence." In the securities context, a high-confidence target price on a security already priced for exceptional outcomes is an "extraordinary claim" unless accompanied by extraordinary disclosure---i.e., explicit prerequisites, base-rate context, and downside sensitivity.

The Firms and the Record

In 2021, **Morgan Stanley, Wells Fargo, Deutsche Bank, Barclays, Oppenheimer, KeyBanc Capital Markets, Raymond James, Evercore ISI, and RBC Capital Markets** (among others) published bullish PYPL research all with target prices above $300, some significantly above $300. Perhaps the SEC would consider examining, in their **ordinary course research practices,** obtaining the **underlying workpapers, models and supervisory records** supporting those recommendations. At the time issued, were the stated targets and "Strong Buy"-type conclusions reasonably grounded and consistent with a **best-interest** standard, did they include what explicit growth, margin, and valuation-multiple assumptions were required for clients to achieve the recommended outcome?

Observations on the Pattern of Omission

ERS has documented numerous instances in which prominent Wall Street recommendations were followed by severe investor losses. This is not an isolated phenomenon; it appears recurrent and measurable. An impartial and systematic review of common research and recommendation practices would confirm that the frequency and magnitude of these outcomes are inconsistent with what investors reasonably assume they are receiving as analysis.

Did any of these reports indicate to "clients" what PayPal's share price might reasonably be if revenues grew at an average rate for a company of PayPal's scale, and/or if profit margins and valuation multiples (P/S and P/E) reverted toward normal historical ranges?

ERS is unaware of another consumer-facing context in which a recommendation can expose a customer to substantial financial harm while the recommending party is compensated by, or economically dependent upon, the same industry whose products are being evaluated---without a standardized requirement to disclose the precise conditions required for the recommendation to succeed and the magnitude of loss if those conditions are not met. In that setting, calling recipients of "free" research "clients" risks implying a level of professional duty and alignment that may not, in fact, exist.

In other regulated professional contexts, it is customary to disclose the conditions and failure modes associated with a recommended course of action---especially where downside outcomes are large and foreseeable. A recommendation that is materially dependent on exceptional assumptions, without clear disclosure of those assumptions and the consequences if they are not met, warrants scrutiny under investor-protection principles.

The Evidence They Already Possessed

Mauboussin's base-rate research, compiled inside these same institutions, showed why such outcomes are not anomalies but near-certainties. For companies above $6 billion in revenue, fewer than one in eleven sustained 15% annual growth over five years. Far fewer sustained even higher rates of revenue growth. For companies above $100 billion in revenue, no company in history had sustained mid-teens growth for a decade. ***The institutions possessed this data. Their research departments continued issuing aggressive growth projections and "Strong Buy" ratings on stocks priced for outcomes their own evidence showed were near-impossible.*** Investors received the recommendations. They did not receive the evidence.

9.4 Regulatory Recommendations

The recommendations that follow rest on a single premise: the fiduciary duty of care does not require advisors to foresee every market outcome. It requires them to measure what can be measured, to disclose what is known, and to refrain from committing client capital to positions where the documented probability and magnitude of loss exceed prudent thresholds. This is the standard applied in every profession that manages consequential risk. It is time to apply it to the profession that manages the public's retirement savings.

The gap between what fiduciary duty requires and what the industry practices will continue to produce preventable catastrophes until regulators mandate that duty be anchored in mathematics. We propose the following specific enhancements to the regulatory framework.

1. To the Securities and Exchange Commission (SEC)

We petition the SEC to update Regulation Best Interest and Fiduciary standards to require:

- **Quantitative Risk Assessment Documentation:** Require Registered Investment Advisors (RIAs) to document quantitative risk analysis for all recommendations involving securities trading above historical valuation medians (e.g., P/S ratios >2x historical norms).

- **Loss Probability Disclosure:** It is insufficient to disclose "past performance." Advisors must disclose the **statistical probability of loss** based on historical mean reversion at the time of the recommendation.
- **Independent Analysis:** Clarify that reliance on broker-dealer research **alone** does not satisfy fiduciary due diligence, as these sources are legally exempt from disclosing loss probabilities.
- **The "Bond Baseline":** Every equity recommendation must be explicitly compared to the risk-free rate of return (Treasury securities). The advisor must document why the equity risk is justified given the available risk-free alternative.

2. To FINRA

- **Research Transparency:** Require broker-dealer research reports to disclose the **historical accuracy rates** of their recommendations and price targets.
- **Testable Targets:** Require that price targets be accompanied by a "What Must Happen" statement (e.g., "This target assumes a P/E of 35x in 12 months").

3. To State Regulators

- **Enforce the "Prudent Expert" Standard:** Under ERISA, a fiduciary must act with the care of a "prudent expert." An expert knows that valuation determines return. State regulators must treat the recommendation of historically overvalued assets without risk mitigation as a prima facie violation of the expert standard.

9.5 The SEC's Own Standard: Why These Recommendations Are Not New

The regulatory recommendations that follow are not requests for the Commission to adopt novel obligations. They are requests for the Commission to enforce, with specificity and consistency, the obligations it has already articulated in its own published guidance — and to require that compliance with those obligations be documented in a manner that is testable and auditable.

In 2022 and 2023, the SEC's Division of Trading and Markets issued three Staff Bulletins that collectively represent the most detailed operational guidance the Commission has published on care obligations under Regulation Best Interest and the Investment Advisers Act fiduciary standard. These bulletins establish, among other things, that:

Advisors must understand potential losses before recommending. The 2023 Care Obligations Bulletin requires that firms and financial professionals develop "a sufficient understanding of the potential risks, rewards, and costs of the investment or investment strategy," including "the expected returns, expected payout rates, and potential losses" and "the investment or investment strategy's likely performance in a variety of market and economic conditions."

The recommendations below — particularly the requirement for quantitative risk assessment documentation — ask only that this stated obligation be fulfilled using testable methods and preserved in auditable records. An advisor who recommends a security trading at historically extreme valuations without analyzing the probability and magnitude of loss under valuation reversion scenarios has not satisfied the standard the SEC itself has defined.

Advisors must consider reasonably available alternatives. The 2023 Bulletin states that it "would be difficult for firms and their financial professionals to form a reasonable basis to believe a recommendation or advice is in the retail investor's best interest without considering alternatives that are reasonably

available to achieve the investor's investment objectives." The 2022 Account Recommendations Bulletin reinforces this point and notes that "the Commission has pursued enforcement actions against investment advisers for recommending higher-cost products to clients when similar, lower-cost products were available."

The recommendation below for a "Bond Baseline" — requiring every equity recommendation to be explicitly compared to the risk-free rate of return — is a direct application of this existing standard. For a client whose primary objective is capital preservation and income, the "reasonably available alternatives" include Treasury securities, FDIC-insured certificates of deposit, and fixed annuities. If the advisor has not documented why equity exposure is superior to these alternatives for this specific client, the care obligation has not been met.

Advisors must monitor continuously. The 2023 Bulletin states that "where there is an ongoing monitoring obligation, the reasonable investigation will require continued analysis after purchase of the investment and over the course of the relationship." The recommendations below for ongoing monitoring standards and predefined quantitative thresholds are mechanisms to make this stated duty operational and auditable.

Conflicts must be managed robustly, not merely disclosed. The 2022 Conflicts of Interest Bulletin states that "identifying and addressing conflicts should not be merely a 'check-the-box' exercise, but a robust, ongoing process that is tailored to each conflict." The recommendation below for aligning advisor compensation with client protection addresses the structural conflict the SEC itself has identified — the economic incentive "to recommend products, services, or account types that provide more revenue or other benefits for the firm or its financial professionals, even if such recommendations or advice are not in the best interest of the retail investor."

In sum: The 2022–2023 Staff Bulletin trilogy provides the regulatory foundation for every recommendation in this section. We are not asking the Commission to change the standard. We are asking the Commission to require that the standard be met — with evidence, with documentation, and with consequences for non-compliance.

9.6 Required Risk Management Disclosures for RIAs

Investors currently have no standardized way to evaluate how their advisor identifies, measures, or responds to investment risk. An RIA may state that they “actively manage” a portfolio, yet provide no documentation of the specific process by which they determine whether a holding has become unsuitable.

We suggest that the Commission consider requiring RIAs to disclose, in plain and specific language, the following:

The methodology. What quantitative process does the advisor use to evaluate the risk profile of each holding? Is it systematic and repeatable, or does it rely on subjective judgment and third-party ratings? Investors deserve to know whether their advisor employs a defined, testable framework—or simply follows consensus.

The triggers. What specific conditions—deteriorating financial metrics, valuation thresholds, or fundamental changes in a company’s business—would cause the advisor to reduce or eliminate a position? If no such triggers exist, that absence is itself a material fact that should be disclosed.

The frequency. How often does the advisor formally review each holding against these criteria? Quarterly? Annually? Only when a client calls? A fiduciary obligation that is not exercised on a regular, documented schedule is, in practice, not being exercised at all.

These disclosures would cost advisors nothing to produce if they are already doing the work. The reluctance to provide them would itself be informative—to both regulators and investors.

9.7 Ongoing Monitoring Standards: The 3 Measures That Matter

A fiduciary's duty does not end at the point of purchase. It is a continuous obligation. Yet there is no current standard requiring advisors to systematically monitor the financial health of the companies they hold on behalf of clients using the companies' own reported data.

We suggest that the Commission consider establishing minimum monitoring standards requiring RIAs to evaluate, at minimum quarterly and upon each earnings release, three critical indicators of financial deterioration:

1. Declining free cash flow. Free cash flow is the clearest measure of a company's ability to sustain its operations, service its debt, and return capital to shareholders. A sustained decline signals that the business engine is weakening regardless of what the stock price suggests.

2. Deteriorating balance sheet health. Rising debt relative to equity, shrinking book value, or the emergence of negative shareholder equity are warning signs that a company's financial foundation is eroding. These are not matters of opinion—they are reported on the company's own quarterly statements.

3. Valuation divergence from fundamentals. When a company's market capitalization grows significantly faster than its earnings, cash flow, or book value, a gap opens between price and underlying worth. The wider this gap, the greater the mathematical probability of mean reversion. Monitoring this divergence is not speculation—it is arithmetic.

An advisor who does not review quarterly financial statements is making decisions without current evidence. An advisor who reviews them but takes no action when these indicators deteriorate is documenting a failure of duty. Establishing minimum monitoring standards gives both advisors and investors a shared, objective foundation for evaluating whether a fiduciary obligation is being met.

The Regulatory Foundation for Minimum Monitoring Standards

The legal basis for requiring quantitative monitoring procedures already exists. The SEC's Compliance Rule (Rule 206(4)-7) requires SEC-registered advisers to adopt and implement written policies and procedures reasonably designed to prevent violations of the Advisers Act and to designate a Chief Compliance Officer who reviews the program at least annually. The SEC's fiduciary interpretation (Release IA-5248) further clarifies that an adviser's fiduciary duty of care includes the duty to provide advice and monitoring that is in the client's best interest, and that the scope of this duty depends on the relationship and what the adviser undertakes to provide.

If an adviser holds itself out as providing ongoing portfolio management—as virtually all RIAs do—then the duty to monitor is not optional. It is inherent in the relationship. An SEC examiner can and should ask: Where is the written monitoring process? What are the predefined thresholds that trigger review? What evidence exists that the process is actually performed each quarter? And what action was taken when the thresholds were breached?

Yet in fiscal year 2022, the SEC Division of Examinations reported examining approximately 15% of the registered investment adviser population. This means that in any given year, 85% of RIAs are not examined at all. For those that are examined, there is no published standard specifying what constitutes adequate fundamental monitoring. The combination of a vague obligation and infrequent examination creates an environment in which the monitoring duty exists in theory but is rarely fulfilled in practice.

The Practical Reality

Most RIAs are small business owners managing client relationships, not quantitative analysts reading quarterly financial statements. They entered the advisory profession because they are skilled at relationship management and client service—not forensic accounting or valuation science. When they need guidance on what to buy, hold, or sell, they turn to the only readily available source: sell-side research from brokerage firms.

As documented in Section 5.3 of this report, that source is structurally incapable of providing timely sell signals. Brokerage firms will not issue sell recommendations on companies that represent current or prospective investment banking clients. The RIA who relies on brokerage research for monitoring guidance is relying on a source whose economic incentives ensure the critical warning will never arrive.

This is not an accusation against individual advisors. Most RIAs care about their clients and want to do the right thing. But wanting to protect clients is not the same as having the tools, training, and information necessary to do so. The current system sets advisors up to fail their monitoring obligation by providing no clear standard for what monitoring requires and no reliable, unconflicted source of the information monitoring demands.

A Proposed Minimum Standard

We respectfully suggest that the Commission consider establishing a minimum monitoring standard that requires RIAs managing portfolios of individual securities to maintain written, consistently applied quarterly monitoring procedures with predefined quantitative thresholds. At minimum, these procedures should require evaluation of the three measures described above—free cash flow trends, balance sheet health, and valuation divergence from fundamentals—using data from the company's own published financial statements, not from sell-side research reports.

The standard should require that when predefined thresholds are breached, the adviser must document the review performed, the analysis conducted, and the rationale for any decision to continue holding the position. This is not a mandate to sell. It is a mandate to think—and to document the thinking. It is the minimum standard that the word "fiduciary" should imply.

Establishing such a standard would benefit both advisors and investors. Advisors would have clear guidance on what their monitoring obligation requires, reducing regulatory uncertainty. Investors would have a shared, objective foundation for evaluating whether their adviser is fulfilling the duty of care. And regulators would have testable criteria for examination, replacing the current vague standard with something measurable and auditable.

9.8 Aligning Advisor Compensation with Client Protection

The current standard compensation model for RIAs—a percentage of assets under management, assessed quarterly—creates a structural incentive to remain fully invested in equities at all times, regardless of risk conditions. An advisor who moves client assets to cash or lower-risk positions to protect

against a foreseeable decline directly reduces their own income. This is a conflict of interest that, under the current framework, is largely unaddressed.

This does not imply bad faith on the part of advisors. It recognizes that incentive structures shape behavior, and that a compensation model which penalizes prudence will, over time, produce less prudent outcomes.

We respectfully encourage the Commission to explore compensation frameworks that align the long-term interests of both advisors and their clients. Such frameworks might consider rewarding advisors not only for portfolio appreciation but also for the degree of protection provided during periods of market stress—measuring success over full market cycles rather than individual quarters.

An advisor who preserves 85% of client capital through a major downturn while the broad market loses 40% has delivered extraordinary value—yet under current models, that advisor's revenue declined along with the account balance. A compensation structure that recognized downside protection as a ***highly valuable and measurable skill*** would encourage exactly the kind of vigilance that fiduciary duty demands.

Both advisors and investors would benefit from contracts that reward long-term stewardship over short-term asset gathering. We believe the Commission is well-positioned to initiate this conversation and to establish guiding principles for compensation arrangements that genuinely serve the investing public.

Part X: Ten Things Every Investment Advisor Needs to Know

This report spans ten Parts, two Appendices, and decades of documented evidence. The following ten items distill the findings, standards, and regulatory developments most directly relevant to the practice of every Registered Investment Advisor in America. Each item references the section of this report where the full evidence and analysis can be found.

If you read nothing else in this report, read these ten items — and ask yourself whether your current practice satisfies the standards they describe.

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1. The SEC already requires you to understand the potential losses of what you recommend — and you are probably not doing it.

In April 2023, the SEC's Division of Trading and Markets published a Staff Bulletin on Care Obligations stating that advisors must develop "a sufficient understanding of the potential risks, rewards, and costs" of any investment before recommending it, including "the expected returns, expected payout rates, and potential losses" and "the investment or investment strategy's likely performance in a variety of market and economic conditions." This is not a proposed rule. It is the SEC's published interpretation of your existing obligation. If you cannot produce a documented, quantitative analysis of the probability and magnitude of loss for the securities in your clients' portfolios, you have not satisfied this standard.

(See Section 1.1: The 2022–2023 SEC Staff Bulletin Trilogy; 2023 Care Obligations Bulletin, Questions 1–2)

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2. You must consider reasonably available alternatives — including alternatives where the client cannot lose 30% of their savings.

The same 2023 Bulletin states that it "would be difficult for firms and their financial professionals to form a reasonable basis to believe a recommendation or advice is in the retail investor's best interest without considering alternatives that are reasonably available to achieve the investor's investment objectives." The 2022 Account Recommendations Bulletin adds that the Commission has pursued enforcement actions against advisors who recommended higher-cost products when lower-cost alternatives were available. For a client whose primary need is income and capital preservation, the reasonably available alternatives include Treasury securities, FDIC-insured certificates of deposit, equity-indexed CDs, and no-load fixed annuities — products where catastrophic loss is impossible. If you have not documented why equity exposure is superior to these alternatives for each specific client, the care obligation has not been met.

(See Section 1.1; 2023 Care Obligations Bulletin, Questions 9–10; 2022 Account Recommendations Bulletin, Question 3.1)

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3. Company quality does not protect your client from loss. The price paid determines the return.

This report documents seven companies — Microsoft, NVIDIA, Amazon, Pfizer, Tesla, Walmart, and PayPal — in which investors suffered years or decades of zero or negative returns despite extraordinary

business growth. In every case, revenues grew dramatically while the stock price stagnated or declined, because the valuation at which the stock was purchased was too high to sustain. IBM's revenue grew 2,800% from 1967 to 1993 while delivering negative real returns for 25 consecutive years. Microsoft's revenue grew 310% from 1999 to 2016 while the stock returned negative 1%. The mechanism is always the same: valuation compression. A "great company" purchased at an extreme multiple is not a great investment. It is a mathematically predictable loss.

(See Part II: The 25-Year Precedent; Part III: The Universality of Valuation Risk)

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4. Your monitoring duty is continuous — and the tools you rely on cannot fulfill it.

The SEC has stated, in both Release IA-5248 (2019) and the 2023 Care Obligations Bulletin, that the fiduciary duty of care is continuous. You have an ongoing obligation to monitor every holding in your clients' portfolios. Yet the only readily available source of monitoring guidance for most RIAs is sell-side research from brokerage firms — and approximately 90% of all analyst recommendations are rated "Buy" or "Hold." Sell recommendations are vanishingly rare, not because companies rarely become overvalued, but because issuing one jeopardizes the investment banking relationship. You are relying on a monitoring system that is structurally incapable of producing the signal it exists to produce. The sell signal will not come from Wall Street. If you do not have an independent, quantitative monitoring process, you are not fulfilling your continuous duty of care.

(See Section 5.3: The Information Conflict; 2023 Care Obligations Bulletin, Questions 2 and 6)

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5. If a stock's price requires historically unprecedented growth to justify it, recommending it is not a "judgment call" — it is a statistical error.

For companies with revenue above $6 billion, fewer than one in eleven have sustained 15% annual revenue growth over five years. For companies above $100 billion in revenue, no company in history has sustained mid-teens growth for a decade. These are not opinions — they are the documented base rates compiled by Michael Mauboussin and colleagues at Credit Suisse and Morgan Stanley, using corporate data going back to 1950. When you accept an analyst's growth projection that defies these base rates to justify an extreme valuation, you are not exercising professional judgment. You are making a statistical error — one that exposes your client to a near-certainty of loss and exposes your practice to a well-documented claim of negligence.

(See Section 9.1: The Statistical Improbability of Sustained Growth; Section 9.2: The Base-Rate Evidence)

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6. The "What Must Happen" test can be applied to every stock in your portfolio — and the results may surprise you.

For any security, a straightforward reverse-engineering analysis can determine the specific revenue growth, profit margins, and future valuation multiples that must all occur for the current price to be justified. This is the "What Must Happen" framework. When applied to PayPal at its 2021 peak ($308/share), the math showed that even assuming 25% annual revenue growth for five consecutive years, the investor would lose $216 billion if the price-to-sales ratio simply normalized to 2×. The company did not need to

fail. The price needed to normalize. If you have not performed this analysis for the securities in your clients' portfolios, you do not know the conditions required for your recommendations to succeed — or the magnitude of loss if those conditions are not met.

(See Section 8.4: The Proposed Solution — The "What Must Happen" Standard; Part VI: The Microsoft Case Study)

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7. Index funds are not a fiduciary safe harbor.

The most common response to the evidence in this report is: "This is why we use index funds." That response fails for the same reason. An index fund purchased at an elevated valuation carries the same price-you-pay risk as any individual stock — amplified by the fact that you have surrendered all control over concentration, sector weighting, and valuation discipline to an algorithm that is explicitly designed to ignore these factors. If you cannot quantify the probability and magnitude of loss, cannot demonstrate that valuation was assessed at the time of purchase, have no continuous monitoring process, and cannot document client-specific suitability for a 30–50% drawdown, you have not exercised due care. You have exercised convenience. And convenience is not a fiduciary standard.

(See Part III: The Unsuitability of Index Funds for Fiduciary Accounts; Section 3.1: Five Questions Fiduciaries Must Answer)

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8. If your client holds both an index fund and individual stocks in the same names, you have created undisclosed concentration risk.

NVIDIA currently constitutes approximately 7–8% of the S&P 500. Apple, Microsoft, Amazon, Alphabet, and Meta collectively represent roughly 25–30% of the index. An advisor whose client holds an S&P 500 index fund has already accepted this concentration. An advisor who then adds individual positions in any of these names — or who allows clients to maintain concentrated positions from prior appreciation without documented review — has compounded the concentration. The client now has double or triple the exposure to a single security that the index alone would provide. If this concentration has not been disclosed, quantified, and documented as suitable for the specific client, it is a fiduciary failure — not a portfolio management decision.

(See Section 2.6: The Standard of Care)

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9. Your compensation model creates a conflict the SEC says you must address — not merely disclose.

The standard RIA compensation model — a percentage of assets under management — creates a structural incentive to remain fully invested in equities at all times, regardless of risk conditions. Moving client assets to cash or lower-risk positions to protect against a foreseeable decline directly reduces your income. The August 2022 SEC Conflicts of Interest Bulletin states that "identifying and addressing conflicts should not be merely a 'check-the-box' exercise, but a robust, ongoing process." The bulletin further acknowledges that all firms have "an economic incentive to recommend products, services, or account types that provide more revenue or other benefits for the firm or its financial professionals, even if such recommendations or advice are not in the best interest of the retail investor." Disclosure alone

does not satisfy this obligation. You must address the conflict — which means you must demonstrate that your investment decisions are not being driven by the fee structure that penalizes prudence.

(See Section 9.8: Aligning Advisor Compensation with Client Protection; Section 1.1; 2022 Conflicts of Interest Bulletin, Questions 1–3)

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10. If you cannot show your work, you did not do the work.

The cumulative weight of the SEC's 2022–2023 Staff Bulletins, Release IA-5248, the Compliance Rule (Rule 206(4)-7), and the Prudent Investor Rule establishes a standard that is auditable by design. You must document: the quantitative process you use to evaluate risk; the specific conditions that would trigger a review, reduction, or exit; the frequency of your monitoring; and the basis for concluding that each recommendation is in each specific client's best interest. If no such documentation exists — if your file contains only a risk tolerance questionnaire and a brokerage statement — then in the event of a significant loss, the absence of records is not a neutral fact. It is evidence that the analysis was not performed. The 2022 Conflicts of Interest Bulletin states directly that "it would be difficult for an investment adviser to demonstrate how it complies with its fiduciary obligations in the absence of records related to how the adviser addresses its conflicts." The same logic applies to every aspect of the duty of care. The standard is no longer ambiguous. The question is whether you can prove you met it.

(See Section 9.6: Required Risk Management Disclosures for RIAs; Section 9.7: Ongoing Monitoring Standards; 2022 Conflicts of Interest Bulletin, Background)

Conclusion: The Moral Imperative

The Securities and Exchange Commission is asked to support both capital formation and market efficiency and investor protection. In a rational market, those goals can align. In a valuation-driven asset bubble, they become **structurally conflicted**.

- **Wall Street benefits from elevated valuations** that maximize fees, deal flow, and executive compensation.
- **Main Street depends on rational valuations** to avoid catastrophic losses and preserve the value of lifetime savings.

By permitting fiduciaries to operate without **testable, quantitative disclosure of downside risks**—especially valuation risks—regulators have allowed an imbalance to persist: the industry can communicate "return potential" in precise language, while leaving risks—**the probability and magnitude of loss**—vague or entirely absent. That is a disclosure problem, not merely a communication style.

An Inflection Point

America is at an inflection point in investor protection.

Over the past century, with rare exceptions, Congress and regulators have moved our country toward stronger consumer safeguards and fairer disclosures. The premise has been simple: **ordinary Americans deserve protections they cannot realistically build for themselves.** That principle matters here because the typical retirement saver does not have the time, training, data access, or analytical tools to evaluate whether a major stock is priced at a level where loss is statistically more likely than gain.

A person with **$500,000** set aside for retirement cannot afford a 50% drawdown. And when that investor is told that broad index exposure is "safe" because it is diversified—without a clear explanation of valuation risk, drawdown history, and probability ranges—the result is not an informed choice. It is a decision made with material information missing, which constitutes misinformation.

Investor Protection as a Truth Standard

Investor protection is not only about preventing fraud. It is also about preventing **material omissions**—the absence of information that a reasonable investor would consider essential to understanding what they are buying.

Investors have a right to truthful, complete disclosure—especially where retirement security is at stake. They should not receive a sales narrative about "return" while being denied the mathematics of "loss."

The Technology Exists

We do not claim perfection, and we do not ask regulators to mandate success. In medicine, actuarial science and engineering, professionals cannot predict the exact day an outcome will occur—but they **can** quantify risk with enough reliability to guide safer and prudent decisions.

The exposed analytical tools exist today. It is possible right now — using publicly available financial data, documented historical base rates, and standard statistical methods — to calculate the probability that a stock trading at 15× sales will deliver negative returns over the next three, five, and ten years. It is possible

to compare that probability against the guaranteed yield of a Treasury security or an FDIC-insured certificate of deposit. It is possible to generate that comparison for every holding in a client's portfolio, update it quarterly, and document it in a format that is auditable by regulators. The technology is not theoretical. It is operational. What is missing is not the capacity to do this work — it is the requirement to do it.

The Minimum Question Fiduciaries Must Answer

At a minimum, fiduciaries should be required to address a question like this, in plain English, supported by evidence:

What is the statistical probability that, within three to five years, this company's valuation multiple (e.g., price-to-sales) will be materially lower than it is today—and what would that imply for the investor's outcome?

This is not a technical or academic question. The answer goes directly to suitability.

When a stock is priced at an extreme multiple, the most common historical outcome is not that fundamentals collapse—it is that **the multiple compresses** as growth rates slow, expectations normalize, or competitive dynamics shift. And when multiples compress sharply, a stock can produce large losses **even if revenues, earnings, and cash flow rise.**

The Choice

Enforcing the standards proposed in this report—requiring **testable risk measurement and clear probability-range disclosure**—will likely cause valuations to decline in the short term. It will "prick the bubble." That will be uncomfortable, and it will be resisted.

But the alternative is worse: allowing the bubble to expand until it collapses under its own weight—like 2000 and 2008—taking the retirement security of millions of Americans with it.

We do not ask the Commission to guarantee that no investor will ever suffer a loss. We ask that the standard of care require what every other consequential profession requires: that known risks be identified, that their probability and magnitude be estimated using the best available evidence, and that professionals who ignore documented hazards be held to the same standard of accountability as the engineer, the physician, and the pharmacist. The question is not whether harm is certain. The question is whether the conditions for harm are present, measurable, and being ignored.

Final Call

We appreciate the Commission's mission and the difficulty of balancing competing demands. But the moral logic is straightforward: **investors cannot evaluate return claims responsibly if they are denied quantified risk.**

We have the data. We have the tools. We have decades of precedent for base-rate analysis and probabilistic methods in other high-stakes fields. What we lack is a consistent regulatory requirement that makes risk quantification standard practice—especially for registered fiduciaries who hold themselves out as trusted professionals.

It is time to require the math—so investors can evaluate return claims in context, understand the probability of loss, and protect the savings they cannot replace.

We are committed to making ourselves available to regulators and policymakers to explain these methods, share evidence, and help implement standards that are practical, testable, and focused on the minimum disclosure the public deserves.

EQUITY RISK SCIENCES, INC. *America's Independent Stock Risk Rating Agency™*

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Raymond M. Mullaney | CEO and Founder 49 Years of Investment Experience

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Appendix A: Why Target-Price Reports Should Include Probability-and-Magnitude Downside Disclosure

Purpose

Equity Risk Sciences (ERS) urges the Commission to modernize analyst-report disclosure so investors and fiduciaries can see — not merely the possibility of loss — but a statistically supportable estimate of the probability and magnitude of price decline under realistic scenarios. Current market practice permits a target price to be published without any standardized disclosure of the likelihood that the target will be reached, the probability of significant loss over the same horizon, or the assumptions and reference class used to derive the estimate.

A target price, by definition, implies material upside from the current price. When the implied upside is small or marginal, the recommendation provides little economic justification after transaction costs, taxes, and the opportunity cost of capital. In those cases, the only way a buyer earns a meaningful return is if the stock overshoots the target — an outcome that depends on continued incremental demand rather than fundamental value creation.

Documented Market Mechanisms

As documented in the body of this report, extreme valuations can persist far longer than fundamental analysis would predict. The peer-reviewed literature identifies several specific mechanisms that explain this persistence:

A. Positive-feedback beliefs can amplify price advances. Large price increases tend to produce rising investor optimism and return expectations — expectations that track past returns and market levels. This creates a self-reinforcing feedback loop: higher prices can cause higher demand, which pushes prices higher still. (Greenwood & Shleifer, 2014)

B. Index-linked and benchmarked demand can produce price pressure disconnected from fundamentals. A substantial body of research supports the idea that demand curves for individual stocks are not perfectly elastic, and that index-linked investing can distort prices and risk-return tradeoffs, especially when substitutes are imperfect and arbitrage is constrained. This mechanism is consistent with the structural parallel between index funds and collateralized mortgage obligations described in this report. (Wurgler, 2010)

C. Mispricing can persist because arbitrage is limited and risky. Even when sophisticated investors suspect overvaluation, the academic literature explains why mispricing can last: arbitrage typically requires capital, is risky, and is subject to agency and funding constraints. As a result, overvaluation can persist longer than a rational observer expects, and corrections — when they arrive — tend to be sharp. (Shleifer & Vishny, 1997)

D. Sophisticated investors may participate in run-ups and reduce exposure later. Evidence from the technology bubble period shows that sophisticated investors (e.g., hedge funds) did not necessarily function as a stabilizing force during the run-up and instead reduced exposure later — capturing much of the upside while avoiding more of the downturn. This pattern underscores a practical asymmetry: institutional participants may benefit from elevated valuations while retail investors and fiduciaries bear the greatest losses when sentiment reverses. (Brunnermeier & Nagel, 2004)

Why This Matters for Target Prices

A target price only has practical meaning if it is significantly higher than the current price. If the upside is not material, the investor's expected net gain is often dominated by ordinary market volatility, spreads and fees, and the non-trivial probability of drawdown. In such circumstances, the trade is not an "investment" in any economically meaningful sense — it is a bet on continued marginal demand.

ERS therefore recommends that target-price publications be paired with a standardized statistical disclosure that answers, at minimum, the questions a prudent investor must ask:

1. Probability of reaching the target price within the stated horizon (base rate + company-specific adjustment).
2. Probability distribution of downside over the same horizon (e.g., likelihood of −10%, −20%, −40%, −50% outcomes).
3. Expected drawdown magnitude under adverse but plausible scenarios.
4. Probability of remaining above the target price for a meaningful period (e.g., 30/90 trading days), not merely "touching" it intraday.
5. Assumptions and reference class used (size cohort, valuation cohort, sector cohort).

This disclosure would align target-price communications with the realities documented in the finance literature: feedback dynamics can lift prices; index-linked flows can add non-fundamental demand; and corrections can be severe when sentiment and flows reverse.

Proposed Caution Standard for Target Prices

ERS is requesting truth-in-risk disclosure.

Recommendation: Require that every target price be displayed alongside a standard caution label when implied upside is not meaningfully greater than ordinary volatility and drawdown risk.

Sample caution label:

Risk Disclosure: This target price implies limited upside relative to normal price volatility and historical drawdowns. Investors should review the estimated probability of loss and expected drawdown over the stated time horizon. A target price is not a probability statement.

Enhanced label (when probability of achievement is low):

Probability Disclosure: Based on the stated reference class and assumptions, the estimated probability of reaching this target within the horizon is low, and the probability of a material decline is non-trivial. Investors should not rely on the target price alone.

Enhanced label (when "touch risk" is high):

Persistence Disclosure: Reaching a price level is not the same as maintaining it. This report includes an estimate of the probability that the stock remains above the target price for a meaningful period.

Implementation: A Standardized "Target-Price Probability Panel"

ERS recommends a one-panel, standardized disclosure — analogous to nutrition labels — that can be appended to all analyst reports:

Field	Disclosure
Implied upside	+X%
Probability of reaching target (12 months)	Y%
Probability of ≥20% decline (12 months)	Z%
Probability of ≥50% decline (12 months)	W%
Expected max drawdown (12 months)	D%
Reference class	Revenue/size cohort; valuation cohort; sector
Methods/data	Dataset; period; model type; limitations

This panel would bring analyst communications closer to the disclosure norms used in other risk-critical domains: it forces the "headline number" (target price) to be accompanied by the statistical context required for informed consent.

When Marginal Upside Depends on Marginal Demand

When a target price offers only marginal upside, the investment thesis depends disproportionately on continued incremental demand rather than fundamental value creation. In such circumstances, the risk of drawdown may dominate the expected net benefit, particularly for investors who cannot afford material capital loss. Disclosing this dependency is not an accusation — it is a description of the economic structure of the trade.

Citations

Greenwood, R. & Shleifer, A. (2014). "Expectations of Returns and Expected Returns." *Review of Financial Studies*, 27(3), 714–746.

Wurgler, J. (2010). "On the Economic Consequences of Index-Linked Investing." *NBER Working Paper No. 16376*.

Shleifer, A. & Vishny, R. (1997). "The Limits of Arbitrage." *Journal of Finance*, 52(1), 35–55.

Brunnermeier, M. & Nagel, S. (2004). "Hedge Funds and the Technology Bubble." *Journal of Finance*, 59(5), 2013–2040.

Appendix B: ERS Analytical Platform — Detailed Output for Microsoft at Three Critical Dates

This appendix reproduces the complete analytical output generated by the Equity Risk Sciences Profit Map™ and What Must Happen™ platforms for Microsoft Corporation at each of the three critical dates examined in Part VI of this report.

These proprietary tools apply the **Scientific Standard of Demonstrable Evidence** described in Part VIII — quantifying the probability and magnitude of investment loss under documented valuation assumptions rather than relying on subjective judgment or market consensus.

The output is organized chronologically:

- Section B.1 presents the analysis as of December 27, 1999
- Section B.2 presents the analysis as of November 25, 2011
- Section B.3 presents the analysis as of October 29, 2025

Each section follows an identical analytical sequence — beginning with current financials, proceeding through growth assumptions and multi-year projections, and concluding with sensitivity analyses showing projected returns under a range of future valuation scenarios.

The methodology underlying these platforms is described in Part VI.

B.0: Three-Date Overview

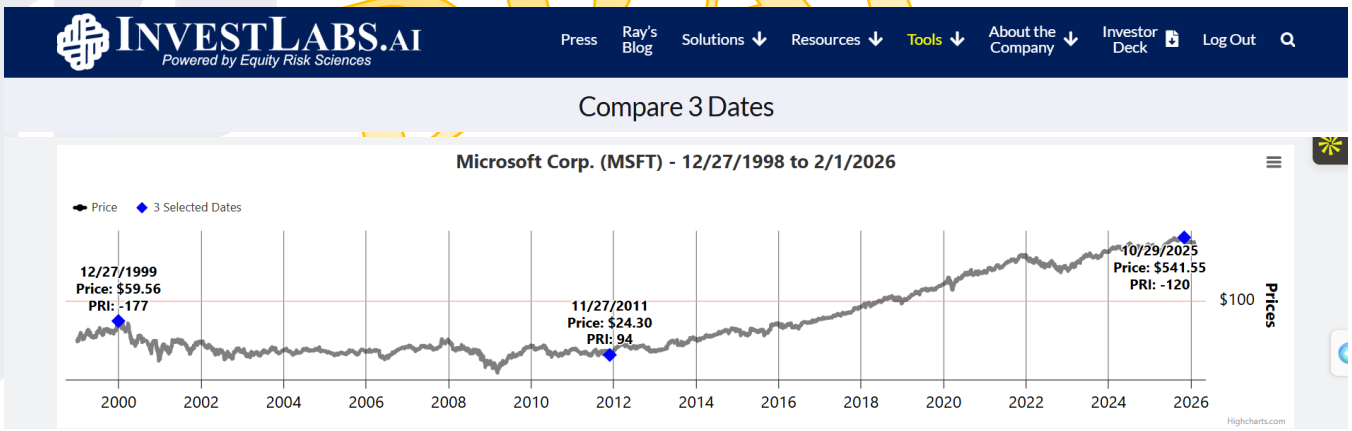


*Figure B.0: Microsoft stock price with ERS **Price Risk Indicator**™ (PRI) at three critical dates. Negative PRI values indicate elevated risk; positive values indicate favorable risk/reward.*

B.1: December 27, 1999 — The Bubble (Figures B.1.1 through B.1.7)

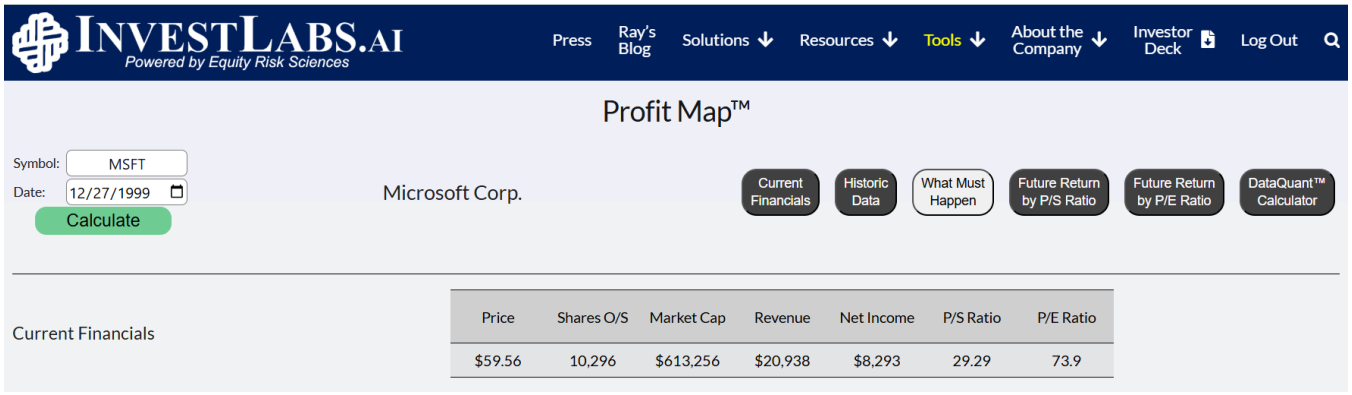
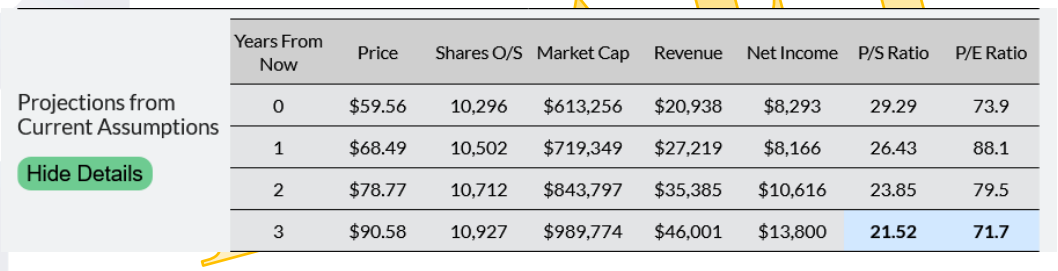


Figure B.1.1: Microsoft Current Financials as of 12/27/1999.

Figure B.1.2 — What Must Happen™: Growth and Return Assumptions

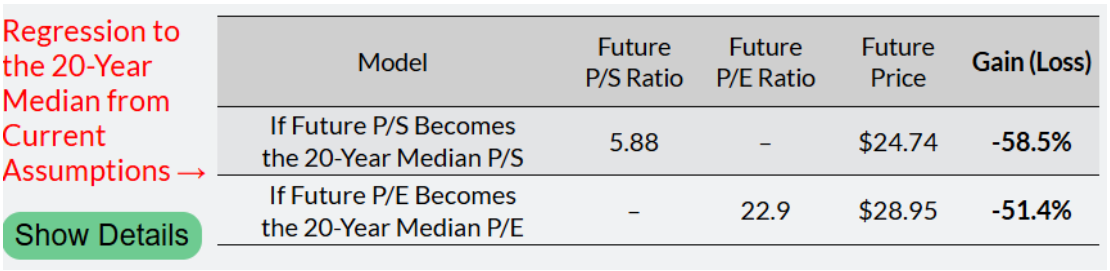


Years From Now	Price	Shares O/S	Market Cap	Revenue	Net Income	P/S Ratio	P/E Ratio
0	$59.56	10,296	$613,256	$20,938	$8,293	29.29	73.9
1	$68.49	10,502	$719,349	$27,219	$8,166	26.43	88.1
2	$78.77	10,712	$843,797	$35,385	$10,616	23.85	79.5
3	$90.58	10,927	$989,774	$46,001	$13,800	**21.52**	**71.7**

Figure B.1.3 — What Must Happen™: 3-Year Revenue and Valuation Projections

P/S Projection Rating	Projected P/S: 21.52	20-Yr Median P/S: 5.87	Rating: F
P/E Projection Rating	Projected P/E: 71.72	20-Yr Median P/S: 22.93	Rating: F

Figure B.1.4 — What Must Happen™: Projection Ratings Summary



Model	Future P/S Ratio	Future P/E Ratio	Future Price	Gain (Loss)
If Future P/S Becomes the 20-Year Median P/S	5.88	–	$24.74	**-58.5%**
If Future P/E Becomes the 20-Year Median P/E	–	22.9	$28.95	**-51.4%**

Figure B.1.5 — What Must Happen™: Regression to 20-Year Median Valuations

Future Returns Based on Projected P/S Ratios

	Future P/S	Revenue Growth	Future Revenue	Future Market Cap	**Future Price**	**Gain (Loss)**
-50% Below Projected P/S	2.94	30%	$46,001	$135,012	$12.36	**-79.3%**
-25% Below Projected P/S	4.40	30%	$46,001	$202,518	$18.54	**-68.9%**
Projected P/S	5.87	30%	$46,001	$270,025	$24.71	**-58.5%**
25% Above Projected P/S	7.34	30%	$46,001	$337,531	$30.89	**-48.1%**
50% Above Projected P/S	8.80	30%	$46,001	$405,037	$37.07	**-37.8%**

Figure B.1.6 — What Must Happen™: Projected Returns Under P/S Scenarios

Future Returns Based on Projected P/E Ratios

	Future P/E	Revenue Growth	Future Revenue	Future Profit Margin	Future Net Income	Future Market Cap	**Future Price**	**Gain (Loss)**
-50% Below Projected P/E	11.46	30%	$46,001	30%	$13,800	$158,220	$14.48	**-75.7%**
-25% Below Projected P/E	17.20	30%	$46,001	30%	$13,800	$237,330	$21.72	**-63.5%**
Projected P/E	22.93	30%	$46,001	30%	$13,800	$316,439	$28.96	**-51.4%**
25% Above Projected P/E	28.66	30%	$46,001	30%	$13,800	$395,549	$36.20	**-39.2%**
50% Above Projected P/E	34.39	30%	$46,001	30%	$13,800	$474,659	$43.44	**-27.1%**

Figure B.1.7 — What Must Happen™: Projected Returns Under P/E Scenarios

B.2: November 25, 2011 — The Opportunity (Figures B.2.1 through B.2.7)

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Profit Map™

Symbol: MSFT
Date: 11/25/2011
Calculate

Microsoft Corp.

Current Financials | Historic Data | What Must Happen | Future Return by P/S Ratio | Future Return by P/E Ratio | DataQuant™ Calculator

Current Financials

Price	Shares O/S	Market Cap	Revenue	Net Income	P/S Ratio	P/E Ratio
$24.30	8,412	$204,416	$71,120	$23,478	2.87	8.7

Figure B.2.1: Microsoft Current Financials as of 11/25/2011.

Your Investment Assumptions

Desired Annual Return (%)	Years Later	Annual Revenue Growth (%)	Future Profit Margin (%)	Annual Dilution Rate (%)	Projected Future P/S	Projected Future P/E
20	3	8	25	2	5.87	22.93

Figure B.2.2 — What Must Happen™: Growth and Return Assumptions

Projections from Current Assumptions

Hide Details

Years From Now	Price	Shares O/S	Market Cap	Revenue	Net Income	P/S Ratio	P/E Ratio
0	$24.30	8,412	$204,416	$71,120	$23,478	2.87	8.7
1	$29.16	8,580	$250,205	$76,810	$19,202	3.26	13.0
2	$34.99	8,752	$306,251	$82,954	$20,739	3.69	14.8
3	$41.99	8,927	$374,851	$89,591	$22,398	**4.18**	**16.7**

Figure B.2.3 — What Must Happen™: 3-Year Revenue and Valuation Projections

P/S Projection Rating	Projected P/S: 4.18	20-Yr Median P/S: 5.87	Rating: A
P/E Projection Rating	Projected P/E: 16.74	20-Yr Median P/S: 22.93	Rating: A

Figure B.2.4 — What Must Happen™: Projection Ratings Summary

Regression to the 20-Year Median from Current Assumptions →

Show Details

Model	Future P/S Ratio	Future P/E Ratio	Future Price	Gain (Loss)
If Future P/S Becomes the 20-Year Median P/S	5.87	–	$58.93	**142.5%**
If Future P/E Becomes the 20-Year Median P/E	–	22.9	$57.54	**136.8%**

Figure B.2.5 — What Must Happen™: Regression to 20-Year Median Valuations.

Future Returns Based on Projected P/S Ratios

	Future P/S	Revenue Growth	Future Revenue	Future Market Cap	**Future Price**	**Gain (Loss)**
-50% Below Projected P/S	2.94	8%	$89,591	$262,949	$29.46	**21.2%**
-25% Below Projected P/S	4.40	8%	$89,591	$394,423	$44.18	**81.8%**
Projected P/S	5.87	8%	$89,591	$525,898	$58.91	**142.4%**
25% Above Projected P/S	7.34	8%	$89,591	$657,372	$73.64	**203.0%**
50% Above Projected P/S	8.80	8%	$89,591	$788,846	$88.37	**263.7%**

Figure B.2.6 — What Must Happen™: Projected Returns Under P/S Scenarios.

Future Returns Based on Projected P/E Ratios

	Future P/E	Revenue Growth	Future Revenue	Future Profit Margin	Future Net Income	Future Market Cap	**Future Price**	**Gain (Loss)**
-50% Below Projected P/E	11.46	8%	$89,591	25%	$22,398	$256,789	$28.77	**18.4%**
-25% Below Projected P/E	17.20	8%	$89,591	25%	$22,398	$385,184	$43.15	**77.6%**
Projected P/E	22.93	8%	$89,591	25%	$22,398	$513,579	$57.53	**136.8%**
25% Above Projected P/E	28.66	8%	$89,591	25%	$22,398	$641,973	$71.91	**195.9%**
50% Above Projected P/E	34.39	8%	$89,591	25%	$22,398	$770,368	$86.30	**255.1%**

Figure B.2.7 — What Must Happen™: Projected Returns Under P/E Scenarios.

B.3: October 29, 2025 — The Recurrence (Figures B.3.1 through B.3.7)

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Profit Map™

Symbol: MSFT
Date: 10/29/2025
Calculate

Microsoft Corp.

Current Financials | Historic Data | What Must Happen | Future Return by P/S Ratio | Future Return by P/E Ratio | DataQuant™ Calculator

Current Financials

Price	Shares O/S	Market Cap	Revenue	Net Income	P/S Ratio	P/E Ratio
$541.55	7,433	$4,025,389	$293,812	$104,912	13.70	38.4

Figure B.3.1: Microsoft Current Financials as of 10/29/2025.

Your Investment Assumptions

Desired Annual Return (%)	Years Later	Annual Revenue Growth (%)	Future Profit Margin (%)	Annual Dilution Rate (%)	Projected Future P/S	Projected Future P/E
15	3	10.44	28.52	2	5.87	22.93

Figure B.3.2 — What Must Happen™: Growth and Return Assumptions

Projections from Current Assumptions

Hide Details

Years From Now	Price	Shares O/S	Market Cap	Revenue	Net Income	P/S Ratio	P/E Ratio
0	$541.55	7,433	$4,025,389	$293,812	$104,912	13.70	38.4
1	$622.78	7,582	$4,721,781	$324,486	$92,543	14.55	51.0
2	$716.20	7,733	$5,538,649	$358,362	$102,205	15.46	54.2
3	$823.63	7,888	$6,496,836	$395,775	$112,875	**16.42**	**57.6**

Figure B.3.3 — What Must Happen™: 3-Year Revenue and Valuation Projections

P/S Projection Rating	Projected P/S: 16.42	20-Yr Median P/S: 5.87	Rating: F
P/E Projection Rating	Projected P/E: 57.56	20-Yr Median P/S: 22.93	Rating: F

Figure B.3.4 — What Must Happen™: Projection Ratings Summary.

Regression to the 20-Year Median from Current Assumptions →

Show Details

Model	Future P/S Ratio	Future P/E Ratio	Future Price	Gain (Loss)
If Future P/S Becomes the 20-Year Median P/S	5.87	–	$294.62	**-45.6%**
If Future P/E Becomes the 20-Year Median P/E	–	22.9	$328.19	**-39.4%**

Figure B.3.5 — What Must Happen™: Regression to 20-Year Median Valuations

Future Returns Based on Projected P/S Ratios

	Future P/S	Revenue Growth	Future Revenue	Future Market Cap	**Future Price**	**Gain (Loss)**
-50% Below Projected P/S	2.94	10.44%	$395,775	$1,161,601	$147.26	**-72.8%**
-25% Below Projected P/S	4.40	10.44%	$395,775	$1,742,401	$220.89	**-59.2%**
Projected P/S	5.87	10.44%	$395,775	$2,323,201	$294.53	**-45.6%**
25% Above Projected P/S	7.34	10.44%	$395,775	$2,904,002	$368.16	**-32.0%**
50% Above Projected P/S	8.80	10.44%	$395,775	$3,484,802	$441.79	**-18.4%**

Figure B.3.6 — What Must Happen™: Projected Returns Under P/S Scenarios

Future Returns Based on Projected P/E Ratios

	Future P/E	Revenue Growth	Future Revenue	Future Profit Margin	Future Net Income	Future Market Cap	**Future Price**	**Gain (Loss)**
-50% Below Projected P/E	11.46	10.44%	$395,775	28.52%	$112,875	$1,294,113	$164.06	**-69.7%**
-25% Below Projected P/E	17.20	10.44%	$395,775	28.52%	$112,875	$1,941,170	$246.09	**-54.6%**
Projected P/E	22.93	10.44%	$395,775	28.52%	$112,875	$2,588,227	$328.12	**-39.4%**
25% Above Projected P/E	28.66	10.44%	$395,775	28.52%	$112,875	$3,235,283	$410.15	**-24.3%**
50% Above Projected P/E	34.39	10.44%	$395,775	28.52%	$112,875	$3,882,340	$492.19	**-9.1%**

Figure B.3.7 — What Must Happen™: Projected Returns Under P/E Scenarios

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