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Sentiment as Substrate

An Expanded Theory for Markets & Valuation

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> *"For the most part we do not first see, and then define, we define first and then see. In the great blooming, buzzing confusion of the outer world we pick out what our culture has already defined for us, and we tend to perceive that which we have picked out in the form stereotyped for us by our culture."*[1]
>
> — Walter Lippmann

Abstract

This essay argues that sentiment is not a distortion of an unbiased, objective market, but the constitutive substrate of price formation. Through a systematic examination of valuation methodologies and mechanics, the essay demonstrates that financial data remains inert without narrative context and that valuation multiples measure the distance collective belief has drifted from parity benchmarks rooted in mathematical identity or market convention. The mathematical identity of "1" is exposed as a zero-justification point of origin present in every valuation methodology, reframing existing metrics as quantifiable expressions of sentiment and not absolute measures of objective value. Deconstructions of financial concepts we leverage for insight into objective value (including Discounted Cash Flow Analysis, Intrinsic Value, and the Efficient Market Hypothesis) reveal a dependence on the subjectivity they claim to transcend.

The resulting causal chain is: *sentiment initiates* the conviction that commits capital; *price records* the settlement of competing convictions; *valuation rationalizes* the distance that settlement has traveled from an anchor. Reflexivity is conceptualized as the propagation mechanism through which sentiment-driven positioning compounds, distinguishing it from the originating (and necessary) impulse itself. Volatility, generally treated as an intrinsic property of assets, is reframed as the amplitude of sentiment revisions, with implied volatility representing second-order sentiment about the durability of those revisions. The nature of volatility (while not a necessary precondition of market activity) further extends the ontological reach of the established causal chain, recording the rate at which settlement is contested and beliefs are revised.

The Fundamental Objections section addresses potential sophisticated counterarguments to expand theoretical applicability and defend conceptual validity. These include, but are not limited to, mechanical arbitrage, the impacts of algorithmic trading, passive indexing, and fixed-income instruments. The essay concludes by exploring the empirical implications of novel operationalizing of sentiment, and suggests avenues for future research on how sentiment distributes across market channels. The essay does not deny the value of disciplined analysis, and aims to redirect investors from the impossible task of discovering objective value to the discipline of forming and informing beliefs that markets cannot easily displace.

Chapter 1

Introduction

In discussions around finance and economics, we often speak of the market as if it were an amorphous or mystical entity with a mind and will of its own. Conventional financial theory reinforces this tendency, often describing markets as neutral arenas where information enters, liquidity flows, and prices emerge. More recently, the rise of AI, LLMs, and NLP has shifted the focus to technology-driven analysis; these newer approaches assume measuring market outcomes is nearly deterministic, treating quantified data as the truth. But, in reality, a market is a structured forum where individuals meet to pursue their own economic ends. Whether these individuals cooperate as partners or operate as adversaries, the market remains nothing more (and nothing less) than the aggregate result of their choices.

The focus of this essay is to reframe the conversation around these choices, moving beyond conventional frameworks, to better understand the impulse behind market action. Markets, by their nature, are future-oriented, seeking to "price in" what has not yet occurred rather than valuing what has already happened. This quality is not semantic, and calls into question whether asset prices can ever be "correct" in any absolute sense, or whether "correctness" itself is a product of the beliefs that aggregate through positioning and settle via price.

A "good" earnings call is irrelevant if the consensus anticipated something better and "bad" financials are trivial if the world already expected a disaster. Markets do not simply react to facts; they respond to the disillusionment with, or fulfillment of, expectations. However nebulous or transient those expectations may be. Price movements therefore are not solely driven by data, but by the gap between what was predicted (or assumed) and what actually occurred. The cause of this disparity, how it is expressed in the market, and the foundation upon which we interpret it, is what is commonly known as *sentiment*.

When we discuss sentiment, we are not referring to a single emotion or individual stance. It is an intersubjective experience, providing us with our interpretive lens, one whose influence on price formation proves far more consequential than facts and "fundamentals" alone. This process of interpretation never occurs in a vacuum and every observation is filtered through ***a priori*** assumptions, incentives, and temperaments. Thus, we are not merely participants in the market; we are the essential catalyst, whose perception creates the market in the first place.

What follows is not an empirical study but a conceptual, abstract piece that establishes a philosophical schema for investigating sentiment's role in price formation. Testable implications that follow from this endeavor, including predictions about valuation convergence, multiple heterogeneity, or the sentiment-dependence of corrections, are reserved for future supporting work. The overall thesis presented applies across asset classes, though it was developed primarily through equity market examples. Conclusions remain valid regardless of investment horizon, as short-term traders and long-term allocators alike address ambiguity with judgment, even though the tenor of that judgment and what informs it can change.

I write from the perspective of an investor with over 20 years in the market, first having witnessed the effects of the Dot-com Bubble as a teenager; then the Sub-Prime Mortgage Meltdown and the resulting Great Financial Crisis, the subsequent rise of Bitcoin | Crypto, and now the emergence of Artificial Intelligence. These experiences have shaped the observation presented here: *that capital markets are collective manifestations of human experience, resolved via trading and settlement, and best understood through the lens of the human*

actor, not the idealized rational agent of traditional financial and economic theory.[2]

If this argument holds, the search for objective value is not just challenging, but irrational, as it pursues something that cannot exist in the form traditional theory assumes. Risk cannot be measured against a "true" baseline that does not exist, which reduces investment decisions to a contest for durable consensus instead of a discovery of hidden truth. The investor who recognizes this would not abandon analysis, but redirect it from the impossible task of discovering intrinsic worth to a disciplined understanding of which narratives can attract and retain capital. The resulting causal chain is simple: 1. **Sentiment Initiates**. 2. **Price Records**. 3. **Valuation Rationalizes**.

Although existing theories acknowledge the influence of sentiment on markets, they differ in how they conceptualize that influence. Some interpret sentiment as a deviation from rationality, others as a feedback mechanism, and still others as an exogenous force affecting otherwise rational markets. A common thread among these perspectives assumes the existence of an objective baseline, independent of sentiment, to which prices and valuations could (theoretically) converge. *This essay unravels that thread*.

Notes

[2] Thaler, Richard H. *Misbehaving: The Making of Behavioral Economics*. W. W. Norton & Company, 2016.

Chapter 2

Understanding First Cause in Markets

Modern financial theory is best conceptualized as a meticulous study of ripple effects: how information flows, how prices adjust, and how risk is distributed. Yet this often ignores that for a ripple to occur, someone first threw a stone. Before any trade is executed, before any model is consulted, before any price is quoted, someone must decide to act. The discipline's conversations are surprisingly lacking on this essential act of human volition, almost as if the human catalyst were a mere footnote.

As a result, financial analysis typically proceeds from **first principles**, in which we identify foundational truths and derive conclusions from them. With this perspective, it is easy to understand why financial commentary treats the market as though it possesses agency, actively "digesting" information or "pricing in" expectations. But this language obscures a fundamental question, one that appears uncomplicated, only because the framing is usually implicit: *what actually moves the market*? In order to answer that question, the arguments presented here take a different approach, one focused on **first cause**, that asks not what truths we can reason from, but what serves as the impetus for action in the first place.

The traditionalist view is *epistemological*, centered on what we know (the nature and scope of knowledge), while the view of this essay is *ontological*, concerned with the necessary conditions for action (what exists and the conditions for existence). This dichotomy leads us to ask whether or not the market is an *entity that acts,* or *a system that reacts*? With an ontological view, the logical conclusion is that the market has no independent agency or volition of its own. The market has no hands, no brain, no activity and no liquidity independent of its participants; by its very nature, it cannot act. Thus markets do not act; they react, with the human actor serving as the necessary conduit and condition in every market, at every moment.

This conclusion will elicit a natural, visceral, reaction from the entrenched, orthodox finance academics. In response, advocates of the *Efficient Market Hypothesis*[3] may claim that competition forces prices to reflect available information, but that does not avoid the interpretive step that leads to action after information gains meaning, nor explain why identical information produces divergent conclusions. *Behavioral Finance*[4] practitioners would emphasize systematic departures from rational expectations, but must still begin with human agency that seeks to transform uncertainty into choice. *Reflexivity*[5], in theory, could provide the best retort by asserting that expectations shape the very conditions they must then respond to, treating belief as both input and output. Even here, feedback loops cannot self-initiate; someone must assess the market and commit capital before feedback occurs.

Models, metrics, and valuation methodologies have their purposes, but they inevitably measure what they assume. This shows that characterizing markets as autonomous and inherently efficient systems is a conceptually incoherent stance. If we ignore the question of who or what instigates market action, we mistake the effect for cause, treating price as an explanation when it would be more accurately viewed as an outcome.

Notes

[3] Fama, Eugene F. 1970. "Efficient Capital Markets: A Review of Theory and Empirical Work." *The Journal of Finance*, Papers and Proceedings of the Twenty-Eighth Annual Meeting of the American Finance Association, vol. 25 (2): 383-417.

[4] Kahneman, Daniel, and Amos Tversky. 1979. "Prospect Theory: An Analysis of Decision Under Risk." *Econometrica* 47 (2): 263-92.

[5] Soros, George. 2013. "Fallibility, Reflexivity, and the Human Uncertainty Principle." *Journal of Economic Methodology* 20 (4): 309-29.

Chapter 3

The Role of Reflexivity in Markets

Outside of finance, *Reflexivity* refers to a self-perpetuating loop in which cause and effect shape outcomes and beliefs, with each recursively feeding the other. Within this dynamic, human beings are observers, creating a self-referential cycle in which the act of interpreting reality feeds back into our understanding of reality.

While **first-cause** framing explains the genesis of market activity, it does not account for why market moves appear self-reinforcing, often accelerating, seemingly validating the very beliefs that produced them. Reflexivity addresses what we often see manifested in price action where rising prices attract buyers whose activity then pushes prices higher, and the resulting move appears to validate the very judgment that initiated it. This describes how what begins as a sentiment leads to action, the action in turn becomes a market signal, and the signal reshapes incentives for subsequent participants, perpetuating the feedback loop. If "first-cause" explains how markets begin, then reflexivity explains how they gather momentum.

The implication is that markets do not merely reflect information, but that prices and valuations *alter* perceptions.[6] This is a relationship that may complicate cause and effect, but does not change the fact that sentiment ***initiates*** while reflexivity ***propagates***. In a reflexive system, feedback begins after someone commits capital, requiring only that market participants treat price as meaningful and then act on that meaning. When they do, sentiment produces the very conditions and artifacts that observers retroactively label as "fundamentals". With human actors initiating, and feedback loops converting decisions into new scenarios, price actively reshapes the very environment it describes.

Some might object that reflexivity is the source of sentiment, arguing that rising prices create the very bullishness that drives them. But this confounds effect with cause. Asset prices do not move spontaneously; they are the kinetic result of capital commitment that necessitates antecedent belief. Reflexivity may modify or accelerate that belief, but a feedback loop, by definition, presupposes an input and cannot not self-initiate. Therefore, to claim that prices increase unambiguously because they increase, is a tautology[7] that ignores the first cause: **human sentiment**. Reflexivity describes how it flows through the system, but *the mechanism of transmission is not the mechanism of origin*. This reveals market sentiment as the primary input, not a reaction, making reflexivity the mechanism by which subjective expectations become market reality.

Notes

[6] Soros, "Fallibility, Reflexivity, and the Human Uncertainty Principle."

[7] Wikipedia: Tautology)

Chapter 4

Sentiment, Price & Valuation

Even if we grant that reflexivity propagates sentiment, one might object that exogenous constraints or physical realities serve as objective anchors for price. Yet the nature of these elements remains inert until understood. Fundamental constraints (such as fixed supply caps) consistently fail to yield determinate valuations, illustrating that market complexity arises not from objective reality, but from the subjective understanding that gives it meaning.

Conventional theory treats sentiment, price, and valuation as distinct entities, with sentiment as a potential distortion, price as output, and valuation as a principled correction. This framing assumes that, somewhere beneath market noise, there is an objective truth that disciplined analysis uncovers. Since sentiment acts as the spark for all market action, and reflexivity transmits that action through the system, these concepts cannot occupy the roles traditional financial theories assign to them. Consequently, as that spark, sentiment is constitutive not peripheral, leaving valuation as a disciplined (but speculative) process by which analysts weigh assumptions and argue interpretations into place.

Price therefore is not a revelation of what an asset is, but a consensus on what participants believe it will become. These distinctions matter, and if we conflate them, we obscure the importance of the causal relationship between *sentiment*, *price* and *valuation* this paper seeks to establish. Taken together, these delineate a lifecycle of market belief, from formation, through settlement, to its ongoing justification. The market functions not as an arbiter of objectivity, but as an arena where competing convictions vie for hegemony and the most potent narrative is the one that commands the greatest concentration of capital.

Although the sequence this essay establishes runs from sentiment through price to valuation, the argument that follows deliberately proceeds in a different order. We begin with an accepted definition of price, then deconstruct that definition to expose the subjective architecture beneath it. This leads to a reconstruction of what we know about price and valuation within the framework that deconstruction reveals. This *define*, *deconstruct*, *reconstruct* approach allows us to be intellectually honest and meticulous with our assumptions.

Defining Price

To begin the deconstruction of price, we must first be precise about what it actually is. The standard economic definition is straightforward: **price** is the equilibrium where supply meets demand, the margin at which what sellers will accept meets what buyers will pay.[8] This definition (while accurate) is incomplete because it tells us *how* prices form, but not what supply and demand depend on.

When arguing that sentiment is requisite to shaping price, many appeal to the primacy of price objectivity, arguing that since price is where supply meets demand, it is a mechanical consequence and not a market construct. But what determines supply and demand? Supply is often more obviously constrained by physical realities, given costs of production, scarcity, and inventory. But even supply depends on expectations about prices and marketplace conditions. Demand is where this dependence becomes explicit, because the willingness to pay is inseparable from assumed value.

Many supply-and-demand arguments treat the relationship as given or self-evident: people desire something; therefore, demand exists. But this raises fundamental questions: *why do people want it*, *at what price*, and *for how long*? We cannot answer these questions without reference to expectations, narratives, and beliefs, all of which are sentiment-laden constructs. Sentiment operates as a collective lens of perception, which makes human judgment an essential driver of demand. Whether by inflating perceived value or amplifying perceived risk, it precedes and permeates demand, rendering the latter closer to a proxy than a distinct objective force, making clean separations between the two illusory.

Although this reasoning has primarily been applied to equities and other securitized assets, commodities also exhibit forward-looking prices that reflect expectations based on supply and demand conditions. Measurable production costs, physical constraints, supply inelasticity, and narrower valuation ranges do not absolve commodities from this quality. In fact, the physical constraints associated with commodities function more as ***contingent constraints***, reliant on the continued dominance of production and consumption narratives.

For example, demand for Silver, Copper, or Lithium is influenced by expectations about technological adoption, and in the case of Silver, by its dual role as a monetary metal. Gold demand is based on the narrative of over 5,000 years of monetary utility, and is heavily influenced by geopolitical dynamics and macro-economic utility as a reserve asset or inflation hedge. In both cases, even physical demand is constrained by and contingent upon expectations. When juxtaposed against a digital commodity such as Bitcoin, the limits of scarcity as a price determinant become even clearer. With a fixed supply cap of 21 million, it has a supply limitation that tells us nothing about whether it should trade at $10,000, $100,000, or $1,000,000. The collective beliefs about Bitcoin's monetary utility, adoption, and store-of-value properties drive demand; its fixed supply limits quantity, but neither determines where the price settles. The demand curve does not exist independently of perception; it is the aggregation of the market's perception.

Capital Markets do not discover price in the way a scale displays a weight; supply and demand are not objective constants, they are reflexive outcomes shaped by sentiment. The aggregation across many actors gives the appearance of objectivity, which in effect amplifies, not abolishes, their subjectivity. Prices may aggregate distributed knowledge across participants, as Hayek observed[9], but the aggregated knowledge is an interpretation being filtered through the perception, judgment, and conviction of each actor before it crystallizes through price. Furthermore, any claim that this knowledge aggregation converges upon a "correct" price invites the question: *correct as compared to what*? Verifying convergence presupposes an independent standard, yet no such standard exists against which to assess whether the process has arrived at the "correct" value.

Since market participants base their actions on expectations, and not solely on empirical findings, sentiment will contextualize market conditions before any fundamental assessments take place. While an essential aspect of price formation, supply and demand manifest downstream of these expectations and drive short-term volatility.[10] Price is not a neutral reflection of reality, but the resolution of competing beliefs by means of an observable number after the market has actualized its verdict.

Contextualizing Sentiment

What exactly is *sentiment*? Behavioral finance commonly defines investor sentiment as a belief about future cash flows and investment risks that present details do not justify.[11] This definition is helpful because it isolates a real phenomenon where markets express attitudes that data cannot explain. However, this framing is still

incomplete because it treats sentiment as a deviation from a rational baseline, implying that there exists a set of "facts" capable of justifying belief in a particular outcome.

But facts do not interpret themselves, and something must support the transition from belief to conviction. Sentiment serves this purpose, acting as the foundation upon which participants form and sustain beliefs about market outcomes. To understand why sentiment is a central part of this process as opposed to peripheral, consider that market action requires not one, but three subjective processes, all operating in tandem.

Sentiment As Perception

Before evaluating information, an investor must decide what qualifies as relevant and where to direct their attention. The decision of where to direct cognitive resources is itself shaped by narrative environment, professional orientation, personal biases, and prevailing market themes. Even then, two analysts reviewing the same quarterly report may focus on different line items, assign varying importance to specific metrics, and absorb identical figures within distinct contexts.

One analyst may see rapid revenue growth as evidence of a durable competitive advantage, while another may view it as a sign of an unsustainable trend. The facts remain unchanged; the only differences are the assumptions guiding each analyst in identifying "signals", "noise", and areas for further investigation. This is **perception**; an active process shaped by individual experience, introducing subjectivity even before formal analysis begins.

Sentiment As Judgment

After *perception* filters and frames information, the investor must evaluate it against their expectations, and actively assign probabilities to potential outcomes. This involves decisions on justifiable premiums or discounts, growth projections, risk, and other related factors. This act of **judgment** is informed by models and expertise, but builds upon the irreducibly subjective foundations of *perception*. Every decision embeds an assumption about the future, and since the future remains unknowable, the gap between what *is known* and what *must be assumed* can never be closed by analysis alone. Nevertheless, without capital at stake, judgment has no real effect on the market and exists only in the mind of the investor.

Sentiment As Conviction

Perception and *judgment* do not move markets in and of themselves; an investor can perceive, interpret, and evaluate without taking action. Markets move only when judgment leads to a commitment of capital and when the perceived reward justifies the perceived risk. Investors commit capital and express their **conviction** through the allocation of that capital. The intensity and distribution of conviction across participants is where individual sentiment enters the aggregate record we call price, determining not only its direction but also its stability.

Sentiment: The Medium of Investor Experience

Sentiment is not a singular phenomenon, it embodies the apparatus with which individuals relate to the unknown, and the medium through which investors experience the market. The market then aggregates these layered subjective acts across millions of participants and records their net settlement as a price. For the investor, what we call "market sentiment" is the observable result of this architecture operating at scale.

Critics may argue that including *perception*, *judgment*, and *conviction* in the definition of sentiment makes the thesis redundant or overly inclusive. However broad applicability is the strength of the thesis, and the definition

of sentiment is seemingly all-encompassing because of the breadth of its domain. An expansive definition does not imply an absence of standards; although sentiment is inherently subjective, it is possible to differentiate between informationally dense opinions and those that are superficial, as well as between narratives that are internally coherent and those that are self-contradictory. Such distinctions enable the application of analytical and definitional rigor, even when the attainment of an objective truth remains elusive.

It is important to acknowledge the structural differences between sentiment (as perception, judgment and conviction) and ***thinking***, since conflating them would incorrectly classify all cognition as sentiment. Consider that cognition refers to reasoning and understanding, while sentiment guides our approach to what we can classify as "open-ended" problems. For instance, an engineer calculating a steel beam's load-bearing capacity uses cognition with objective, "closed" data. Contrast this example with an analyst estimating a growth company's value that relies on "open-ended", *narrative contingent* information.

In the aforementioned example, the beam does not (and cannot) alter its properties based on what the engineer believes about it. Conversely, the analyst assessing a company is impacted by the expectations of other agents, and those expectations depend in turn on what they anticipate others will expect. The interdependence of expectations is what makes sentiment a fundamental aspect of market outcomes; distinct from engineering or mathematical problems that require only cognitive (not situational) insight. Any conventional theory that denies or obscures this reality implicitly carries the burden of proof and must show which part of price formation escapes sentiment.

There may be further resistance to granting sentiment primacy, stemming from a conceptual fallacy that conflates sentiment with ***emotion***. But the nature of emotion is individual, episodic, and subjective, while sentiment, though experienced individually, becomes intersubjective and collective once it aggregates through market activity. Market sentiment is not a residue that remains after reason finishes its work, but a preceding structural condition that makes choice possible when reason cannot close the gap between what is known today and has to be decided on tomorrow. Keynes captured this nuance in the idea of "*animal spirits*" stating that when individuals cannot make rational calculations based on expected values, confidence, impulse, or conviction likely drives decisions.[12]

Sentiment in this sense is not some subjective *qualia* that obfuscates an unbiased process, but is a necessary bridge between what analysis can resolve and what judgment must still decide. This reframing matters because if sentiment were merely noise, or temporary oscillation around a knowable signal, then disciplined investors could filter it out or safely ignore it. But if the very act of pricing the unknowable embeds sentiment, then subjectivity is not just an occasional distortion of markets. Markets produce prices through the aggregation of beliefs; sentiment shapes which beliefs become durable enough to attract capital.

A remaining objection may be that sentiment dominates for traders in the short term, while investors with a long-term horizon focus on fundamentals. Yet fundamentals only become valuation inputs after we assign importance and meaning and a longer time horizon would increase, not remove this dependence. The long-term allocator does not bypass sentiment by waiting; they merely express it differently through their assumptions about outcomes and risk distributions. Even though markets can stabilize around a consensus for a time, that consensus remains a tradable agreement, not a discovered truth.

Understanding Valuation

"*Valuation is inherently uncertain, since it involves the future. As I often remind our analysts, 100% of the information you have about a company represents the past, and 100% of the value depends on the future.*"[13] - Bill Miller

The transition from discussing subjective expectations to understanding market value requires a systematic approach for comparison. Valuation provides this structure through the application of standardized metrics that allow market participants to categorize price relative to its underlying drivers.[14] This normalization process relies on established ratios, such as earnings, book value, or replacement cost, to create a common language for appraisal. A proper discussion of valuation requires us to maintain conceptual rigor, and we must distinguish between two forms of "anchors" that exist in the appraisal of value: those rooted in *mathematical identity* and those rooted in *market convention*.

"The Anchor of 1" Framework

A common language of comparison naturally requires a reference point or generally accepted anchor; and in capital markets, valuations center around multiples of value. However, a "multiple", by definition, is a *quantity multiplied by a unit,* which has some very specific implications for how value is derived. If we strip the multiplier away, what remains in every case is "1": *the base unit against which the market expresses its premium or discount*. Whether the base unit is book value, replacement cost, net asset value, earnings, revenue, cash flow, or par value on a fixed-income instrument, the question that every valuation framework asks is universal: *how many units of the reference metric are participants willing to pay?* The answer is always expressed as a distance from the base unit of "1".

The universality of this question is not happenstance, and reflects the *mathematical identity* of "1" as a **zero-justification proof** in every valuation methodology. It is the only value that validates itself through its own structure, without requiring any external inputs. Any deviation from 1, in either direction, demands a narrative basis that the underlying information cannot supply. The **Anchor of 1** is therefore not a discovery, but an absolute structural feature of how valuation must operate, and acts as a natural point of origin in value assessment.

We should understand that the existence of an *absolute anchor* does not constitute a discovery of *intrinsic value*, and "1" as a **zero-justification proof** is not a representation of objective worth. We do not arrive at "1" because it reveals itself as the correct intrinsic valuation; we arrive at "1" because it is all that remains when we strip away extraneous factors and intersubjective content. Intrinsic value, as traditionally conceived, is where rigorous analysis supposedly ends, yet is often where idiosyncratic projections begin. The **Anchor of 1** is diametrically opposite to this, both conceptually and practically, as a fixed construct where nothing beyond the reference data exerts influence. With a sentiment-attuned approach, it is an expression of *fundamental value*.

Valuation Anchors In Practice

Regardless of the asset class or valuation model, analysts and market participants repeatedly reach for anchors, and this tendency does not arise from any financial law that forces convergence to **1**, but from a human preference for reference points.[15] For companies that are valued based on their asset holdings, such as holding companies or REIT's, this exists as a **natural parity** consistently anchored around "**1**". Values above **1** indicate a premium to the anchor, and values below **1** indicate a discount. In this instance, a "multiple" of 1 means the market accepts (or defines) a **1-to-1** parity with *Net Asset Value* as the appropriate valuation.

Expanding this concept further, in the case of Bitcoin | Digital Asset Treasury Companies, *mNAV* (*Multiple to Net Asset Value*) conveys the same market signal: an *mNAV* of 1 means the equity trades at the market value of the underlying Digital Asset holdings, while a multiple above 1 represents a market premium or multiple (1.5, 2.0, etc.) to Net Asset Value. This concept extends effortlessly to a company with a *Price-to-Book* or *Price-to-NAV* (*P/NAV*) of 1, which implies the market values the firm at its net book value, while a multiple to P/NAV indicates a premium. Similarly, if we were to use Tobin's Q, a value of 1 would signal uniformity between market value and replacement cost[16], yet another example illustrating the universal reality of "1" as a fixture for valuation.

For earnings-based valuations, we find anchors on different reference points closer to **historical parity** or a psychological baseline for the average equity. In this case, a *P/E Ratio* of **1** (a near impossibility in modern markets) would mean investors are willing to pay $1 for every $1 of the company's annual earnings. The mean P/E ratio or "fair value" for the overall market historically averages around 15 (*a P/E multiple of 15 is still derived from a base unit of 1*), but what's "normal" varies significantly by industry and growth expectations.[17] With earnings based valuations, the historical parity of ~15 exists as a normalized belief about valuation that has become so collectively entrenched that it is mistaken for a rational baseline.

Furthermore, the fact that a P/E of 1 is a near impossibility is concrete proof that earnings-based valuation has never operated at parity and serves as an indictment to any claim of objectivity in earnings-based valuation. If markets have never traded at mathematical parity to earnings, then the entire history of equity valuation has been conducted at varying distances from parity, with the historical parity of 15 being nothing more than a multiple we've collectively acknowledged as a *market convention*, and no longer question.

No matter the source of the anchor, parity benchmarks do not act to *constrain sentiment* but effectively *expose sentiment* via a mathematical identity that supplies a neutral target, or an agreed-upon reference point; with sentiment expressing the deviation from that reference point. This reliance on benchmarks does not make valuations objective; the process is still inherently subjective, this merely changes what we use as justification for the belief. The valuation multiple, therefore, is simply a measurement of **sentiment drift**: *the distance which collective belief has drifted from the agreed-upon baseline*. While the degree to which sentiment determines the premium can vary with tightly constrained assets that trade closer to parity or highly volatile assets that exhibit wider drift; the dependence on sentiment is absolute, and never zero.

Measuring Sentiment Through Valuation Anchors

The **Anchor of 1** proves that every valuation multiple is a *measurement of distance from a mathematical constant* present in all valuations; providing us with a persistent unit of measurement that already exists in every multiple and valuation ratio. If we hold that distance as an indicator of *sentiment drift*, these instruments are not only a description of price relative to a numerical entity but are functionally a *quantification of collective belief*.

To conceptualize this, consider that each unit of distance from the anchor represents one unit of drift above or below parity. Here, a *Price-to-Book* or *Price-to-NAV* (*P/NAV*) of 3 reflects 2 units of drift from natural parity, while a P/E Ratio of 25 represents 10 units of drift from historical parity (~15), or 24 units from its mathematical anchor of 1. Adjusting our perception of valuation multiples helps identify avenues for more granular or novel analysis and this formulation gives sentiment a novel quantifiable expression through a conceptual reframing of existing metrics.

Other applications come to mind, for example, if we decompose sentiment drift into decimal increments and track it over time, the rate of drift change becomes a measurable signal of how fast a multiple is expanding or contracting relative to its anchor. This measure of the ***velocity of sentiment drift*** serves as a quantifiable

record of the speed of past belief revision around an equity, similar to how realized volatility operates now. Taken further, if combined with sentiment rich data from social media, news and other sources, there is the potential for a multivariate look into sentiment and its trends over time.

Establishing the proper computational boundaries for measuring sentiment drift advances measurability to the source of the denominator itself. Conventional analysis distinguishes between *trailing multiples* (backward-looking) and *forward multiples* (forward-looking) in valuation, but this is conceptually misleading since both are forward-facing instruments. Would an investor pay 20 times trailing earnings to own the past? Certainly not. They are simply expressing their conviction about a potential future price using historical performance as the informational basis for an allocation of capital. Trailing and forward multiples are not a juxtaposition of objective reality and informed speculation. They only help distinguish which temporal layer of sentiment, backward-looking (relying on actual earnings) or forward-looking (relying on forecasted earnings), that will inform the denominator.

This new schema for operationalizing market sentiment requires an important qualification: units of sentiment drift are specific to their respective valuation ratios, and are not interchangeable across metrics. Just as we should not compare the magnitude of a P/E ratio directly to oscillation in mNAV, one unit of drift expressed via P/E is not conceptually or economically equivalent to one unit of Price-to-NAV drift. However, the drift that is expressed *within a given metric* is directly comparable across companies, sectors, and time periods. If two companies in the same sector with similar financial profiles exhibit materially different levels of drift from historical parity, the differential can serve as a direct measurement of how much collective belief one company commands over another, or their **Narrative Premium**.

Measuring sentiment through valuation anchors would not just reclassify or reinterpret existing data; it would also expand the statistical assumptions and methods that are valid for analysis. If valuation multiples are reclassified as sentiment data, the convergence assumptions that underpin traditional ratio analysis such as mean reversion, equilibrium pricing, and fundamental anchoring, are supplanted by the dynamics of *belief formation* via *persistence*, *regime shifts*, and *contagion*. The specific methodological consequences of this are explored in the "Empirical Implications & Future Research" section of this essay.

The "Blind Ledger" Experiment: A Proof of Concept

A skeptic might still object that sentiment is an ephemeral artifact they do not need to account for or measure: if they have financial information for a company, and they see 20% growth, the math alone would justify a premium or multiple. However, without narrative context, how does one assess the cause of that growth and, as a result, its durability? Is it due to a potential monopoly, like Nvidia's GPU dominance, or is the growth a "one-off" event driven by liquidation? Furthermore, why would math, in and of itself, "justify" any multiple at all, and how high a multiple does the math justify? Without a market story, even if you grant that math supports *some* premium, it cannot specify *how much*. Market actors would have no choice but to assume a reversion to the mean or to a state of either natural or historical parity, proving that the multiple is the price of belief.

To demonstrate that valuation is a product of sentiment, consider the thought experiment of the "***Blind Ledger***". Imagine that an analyst has the complete financial history of a company, including its balance sheet, income statements, and cash flows. However, there is no additional context; they do not know the company's name, industry, management team, ticker symbol, or any other details. In this scenario, they possess all the informational structure but none of the interpretive context. Given these circumstances, how would someone value this entity? Without the story to explain the "how" and "why" of the growth, an analyst cannot assign a

probability to its continuation, and when faced with ambiguity, any logical path must assume a reversion to the mean.

With asset holding or commodity-based valuations, the analyst would have no choice but to revert to the **natural parity** as they can verify that the assets exist, but cannot assign a premium for intangible value they cannot identify. For earnings-based models, the analyst must revert to **historical parity** (~15x the Anchor of 1) since they cannot apply a premium for quality, or a discount for distress, without context to inform the valuation. If we were to reveal the name of the company as a member of the Magnificent Seven or as a legacy software company in decline, the analyst would have narrative justification to assign a premium or assume a discount.

Critically, the numbers would not change; the only change would be the introduction of a narrative that enables the analyst to justify (or defend) the valuation. In both cases, the **Blind Ledger** illustrates that multiples are not inherent to the fundamentals; they are exogenous and derived from market narratives attached to the entity. Fundamentals and financials inform the anchor, but sentiment drives the valuation, providing us with *specific structural consequences* that arise from sentiment, not just claims that are arbitrarily or logically true.

Further Contextualizing "Multiples"

It is evident that not only are markets heavily influenced by the subjective, but that any attempt at objectivity in markets is structurally impossible without a narrative input. The previous examples are norms, not anomalies, proving that any valuation above parity must be sentiment-driven. If valuation were entirely objective, and price merely the result of mechanically processed information, we would expect equities to consistently trade at book value, replacement cost, or in line with earnings. Deviations from parity necessitate explanation, which cannot be derived solely from the data, as the data itself establishes the anchor.

The causal sequence that results from this is revealing. Textbook approaches suggest that valuation precedes price: analysts estimate "intrinsic value" (which is entirely subjective), compare it to the market price, and respond to any perceived discrepancy.[18] In reality, the market establishes price first, with the multiple calculated afterward, with analysts subsequently debating the justification for the multiple. In this context, valuation acts less as a method of truth-seeking and more as a structured approach towards contesting the market's prior settlement.

The market valuation process does not reflect "fundamentals catching up", as popular parlance suggests. The multiple provides a conceptual basis for an ongoing valuation debate and should not serve as a verdict on the price's correctness. Conceptually, to claim that fundamentals catch up to price implies a progression from subjectivity to objectivity; however, this transition never occurs.[19] The actual sequence is *sentiment* **to** *price* **to** *valuation*, where valuation remains sentiment expressed through the agreed-upon language of ratios and multiples. There is no point at which objectivity intervenes; and valuation helps to rationalize the extent to which belief influences price relative to an anchor.[20]

Pricing Preference

When observers describe an equity as "overvalued" or "cheap", they are expressing a preference for a specific benchmark as opposed to invoking an unbiased law. As a consequence, debates about valuations continue indefinitely, and there is no empirical test that can determine whether a particular multiple is "correct" for a company, since any claim to correctness would require knowledge of the future. An analyst can argue that the current multiple is inconsistent with probable outcomes, yet "probable" itself remains a subjective judgment shaped by the same interpretive model that produced the premium. Understanding this, we see that every

multiple represents a wager that eventual developments will justify a premium, while discounts reflect a judgment that perceived flaws or risks warrant pricing the asset below its anchor value. While these are not irrational speculation, and may be well-reasoned, rigorously modeled, or informed by substantial expertise, they remain bets on uncertain outcomes.

Value practitioners may claim that as information improves or analysis becomes more sophisticated, valuation will approach objectivity asymptotically. But rather than reducing interpretive burden, adding information increases the effort needed to process it; each new variable introduces further questions of relevance that can only be answered by making new assumptions. The variables that guide valuation exist as branching possibilities that we assign probabilities to, and do more than compare price to an anchor; they reveal how aggressively the market is willing to lean into one set of expectations over another. Valuation completes a structured negotiation articulated through mathematics, with the anchor providing a shared language, and a shared story, but not a shared conclusion.

Notes

[8] Inoua, Sabiou, and Vernon Smith. 2023. "The Classical Theory of Supply and Demand." *Eprint arXiv:2307.00413* arXiv: Theoretical Economics. https://arxiv.org/abs/2307.00413.

[9] Hayek, F.A. 1996. *Individualism and Economic Order*. Reissue. University of Chicago Press.

[10] Baumeister, Christiane. 2021. "Measuring Market Expectations." *CESifo Working Paper No. 9305*. https://dx.doi.org/10.2139/ssrn.3929199.

[11] Baker, Malcolm, and Jeffrey Wurgler. 2007. "Investor Sentiment in the Stock Market." *Journal of Economic Perspectives 21* (2): 129-52. https://doi.org/10.1257/jep.21.2.129.

[12] Keynes, John Maynard. 1936. *The General Theory of Employment, Interest, and Money*. Harcourt, Brace and Company.

[13] Bill Miller, "The Question Is Not Growth Or Value, But Where Is The Best Value?," *The Acquirer's Multiple*, April 6, 2017, https://acquirersmultiple.com/2017/04/bill-miller-the-question-is-not-growth-or-value-but-where-is-the-best-value/.

[14] Damodaran, Aswath. 2006. "Valuation Approaches and Metrics: A Survey of the Theory and Evidence." November. https://pages.stern.nyu.edu/~adamodar/pdfiles/papers/valuesurvey.pdf.

[15] Baucells, Manel, Martin Weber, and Frank Welfens. 2011. "Reference-Point Formation and Updating." *Management Science* 57 (3): 506-19.

[16] Lewellen, Wilbur G., and S.G. Badrinath. 1997. "On the Measurement of Tobin's q." *Journal of Financial Economics* 44 (1): 77-122.

[17] Ghaeli, Reza. 2017. "Price-To-Earnings Ratio: A State of Art Review." *Accounting* 3: 131-36. https://doi.org/10.5267/j.ac.2016.7.002.

[18] Schaumburg, Ernst, and Zhi Da. 2011. "Relative Valuation & Analyst Target Price Forecasts." *Journal of Financial Markets* 14 (1): 161-92.

[19] Shiller, Robert J. 2019. *Narrative Economics: How Stories Go Viral and Drive Major Economic Events*. Princeton University Press.

[20] Marsat, Sylvain, and Benjamin Williams. 2009. "Does the Price Influence the Assessment of Fundamental Value? Experimental Evidence." *SSRN: Social Science Research Network*, June 1. https://dx.doi.org/10.2139/ssrn.1938927.

Chapter 5

Intrinsic Value

"Value is thus nothing inherent in goods, no property of them, nor an independent thing existing by itself. It is a judgment economizing men make about the importance of the goods at their disposal for the maintenance of their lives and well-being. Hence value does not exist outside the consciousness of men."[21] - Carl Menger

The previous sections demonstrated that valuation multiples arise from narrative context more so than they are derived from available information. If that claim holds, there are specific consequences for any model that assumes objective valuation targets are possible. The best-known such target is *intrinsic value*[22] which analysts frequently present as an impartial or discernible property of risk assets and commentators invoke as a force that eventually restores equilibrium when prices deviate from perceived or accepted norms.

This is a misleading and inaccurate characterization as it suggests there are qualities inherent to an asset that are independent of the one observing (valuing) it. We have no means of directly observing intrinsic value, thus any assumed valuation qualities are, in fact, relational properties that emerge from the interaction between the asset and the observer. What we refer to as intrinsic value is an assumption-driven, model-dependent estimate, shaped by assumptions that we cannot validate.[23]

What does this imply for valuation models that assume intrinsic value as their target? In the case of Discounted Cash Flow (DCF) analysis, consider that the inputs of *discount rate* and *beta* (typically derived from historical market prices) would naturally reflect prior sentiment about an asset. This *intrinsic link* with past data means any resulting analysis cannot be independent of prevailing sentiment, and would be functionally derivative of historical price. The very nature of these valuation inputs embeds a recycling of historical volatility, which contaminates any potential "signal" gleaned from DCF analysis.

This inherent self-referentiality reveals DCF as a tool for disciplined speculation[24] where altering narrative inputs leads to corresponding changes in mathematical outputs. Understanding this, the notion of intrinsic value follows price as a disciplined effort to justify, contest, or replace market consensus. It functions primarily as a rhetorical device that supports the structuring of valuation arguments, but does not precede price as an objective anchor.

Assuming that there are competent analysts operating with identical information, all else being equal, truly objective methodologies would yield consistent valuations. However, analysts examining the same balance sheet, earnings history, and competitive landscape frequently produce divergent, often irreconcilable valuations. These discrepancies occur because valuation requires judgment, and while intrinsic value provides a foundation for justification, reasonable individuals will differ in their interpretations.[25]

Bitcoin & The Myth of Intrinsic Value

There is ample evidence that popular estimation methods are compromised and intellectually flawed. To further validate this requires testing whether the fundamental assumptions underlying these methods are coherent across a diverse set of cases. To that end, we should test those assumptions, and apply similar logic against an especially "hard" asset; one with cryptographically guaranteed, objective properties. Bitcoin serves as an excellent conceptual test case for intrinsic value, as it has clear, discernible characteristics such as a fixed supply, immutability, decentralization, censorship resistance, and security.

While these attributes are inherent to Bitcoin; as we discussed in the "*Defining Price*" section, even though qualities may be objective, their impact on Bitcoin's price depends entirely on how market participants interpret and forward-model their implications. One could take the coherent and defensible philosophical position that Bitcoin's nature as sound money or digital gold imparts upon it an objective value that exists whether anyone recognizes it or not. Yes, these are verifiable properties; but every attempt to place a "number" on them requires sentiment-rich, future-facing assumptions. Even if we were to grant that Bitcoin has some intrinsic value embedded within, that value is epistemically inaccessible as no one can observe it, measure it, or validate it.

Case in point, Bitcoin requires energy to mine, and the energy cost of mining is often considered as a production-based floor for Bitcoin's value. But production cost tells us what was spent to mine the Bitcoin and nothing about what was gained. If a Bitcoin Mining company spends $100,000 to mine a Bitcoin that the market subsequently prices at $50,000, that gives a measure of the loss that was incurred, not a floor to the price. If the value were intrinsic, that $100,000 cost would serve as a valuation anchor *for* its worth, but price, regardless of production costs, is set by demand and market dynamics.

This shows that affirming objective or intrinsic value is a philosophical stance, not an empirical observation. That is why this essay draws a clear line between epistemological knowledge and ontological claims. To hold that Bitcoin possesses intrinsic value, one would have to logically support the claim that **unobservable** and **unmeasurable** quantities, **approximated only through subjective judgment**, somehow constitute an **objective truth**, that **supersedes sentiment**. Since none of Bitcoin's objective qualities contain a price or valuation; a distinction between *fact* and *value*[26] exists because both price and valuation emerge downstream of how those qualities are interpreted and perceived. To assume that because a thing has objective properties, it must also have *objective worth*, confuses the existence of objective facts with the attribution of market value.

Contingent Value & The Disconnected Individual

Taking the conversation into more concrete territory, consider that if Bitcoin's value were truly intrinsic and independent of observer and context, then logically it cannot be contingent on external forces and infrastructure. Bitcoin's functionality, however, depends upon electricity, internet connectivity, mining hardware, and node infrastructure. If we removed any of these, Bitcoin would become *nonfunctional*, but this does not mean that it would immediately become worthless. The protocol would still exist as code with all the qualities therein, but the value proposition those properties support would have no means of operation. If the value derived from these properties were truly intrinsic, it could not be neutralized by removing an external condition; Bitcoin without power to run on, or a network to exist on, shows itself as a digital abstraction whose value is not *innate*, but *relational* and *contingent*.

The **Blind Ledger** thought experiment from the "*Understanding Valuation"* section illustrated how stripping narrative context from financial data renders it inert. If we apply this framing to a **Disconnected Individual** model, we will understand that stripping practical context from Bitcoin's properties makes them equally inert. Consider an individual living in a rural area without internet or reliable power: *what would be their use case for Bitcoin*? Its properties, whether fixed supply, censorship resistance, or decentralization, are all meaningless abstractions to someone who cannot access the network. The supply cap that a person in New York considers the foundation of sound money is irrelevant to someone without internet access in rural China or the Appalachian Mountains. The properties in question have not changed; only the context and locale of potential interpretation have. If value were intrinsic to the properties, it would be invariant across observers or locations.

Here we see that the *Blind Ledger* and now the *Disconnected Individual* both demonstrate that information and properties require an interpretive framework to acquire value, without that framework, what presents itself as a claim about objective worth is faith and belief attempting to shield itself with the language of objectivity.

Notes

[21] Carl Menger, *Principles of Economics - First, General Part* (1871; The Free Press/Macmillan, Glencoe, Illinois, 1950), https://cdn.mises.org/principles_of_economics.pdf.

[22] Wikipedia: Intrinsic Value)

[23] Damodaran, Aswath. 2014. "Numbers and Narrative: Modeling, Story Telling and Investing." Presentation. https://pages.stern.nyu.edu/~adamodar/pdfiles/country/narrative&numbersDEShaw2024.pdf.

[24] Damodaran, Aswath. 2006. "Valuation Approaches and Metrics: A Survey of the Theory and Evidence." November. https://pages.stern.nyu.edu/~adamodar/pdfiles/papers/valuesurvey.pdf.

[25] Damodaran, "Valuation Approaches and Metrics: A Survey of the Theory and Evidence."

[26] Wikipedia: Fact-Value Distinction

Chapter 6

A Discussion On Price & Narrative

Because we have established that valuation requires narrative context, and that intrinsic value functions as a rhetorical device rather than an objective anchor, the causal relationship between price and narrative comes into question. There is a common adage that holds "*price leads and narrative follows*", observing that market participants construct stories after prices move, adjusting explanations to match whatever market movements took place. This observation is astute to a degree, as media pundits, investors, and traders alike do chase price action, flipping from bullish to bearish narratives as markets oscillate. But this phenomenon, however real, conflates two distinct things: the post-hoc rationalization that follows price, and the sentiment that generates price in the first place.

The *price leads* view treats price as primary and narrative as secondary, serving as explanation after the fact. But this framing obscures that narratives can and do exist without price through political expectations, economic forecasts, and macro theses, which all circulate as belief structures before any trade occurs. Price, however, cannot exist without narrative since every transaction requires a buyer who believes the asset is worth acquiring at the stated price and a seller who thinks it is worth selling. The specific beliefs about a transaction, and whether to buy or sell at a given price, do not exist prior to engaging with market conditions. These are all shaped by investor expectations and assumptions.

A competing view, associated with narrative economics, inverts the sequence and claims *narrative leads,* and *price follows*, but "fundamentals" eventually catch up.[27] This framing shares the same flaw albeit inverted, treating narrative as a temporary distortion and fundamentals as the corrective anchor, thereby resurrecting the myth of intrinsic value this essay has already deconstructed. The claim that fundamentals eventually "catch up" rests on the premise that an objective reality exists independent of market sentiment and can intervene to restore order. But fundamentals are simply data points that observers model, discount, and frame according to their own expectations.[28] In both views, "price leads" and "narrative leads", there is an assumption that a separation in narrative and price is possible, with one preceding the other; but this differentiation is illusory.

Here it becomes important to draw a distinction between sentiment and narrative to highlight that sentiment is what *generates* narrative. Narrative gives sentiment its structure and general communicability, allowing individual conviction to become a shared story. Narrative is the vehicle through which individual conviction scales to the collective, but the initiating force remains individual sentiment. Any narrative without this underlying conviction is just a story; it only becomes market relevant when sentiment animates it. Similarly to how narratives can and do exist without price, sentiment can exist without a fully articulated narrative; but narrative cannot exist without the sentiment that produces it.

Furthermore, what precisely qualifies as a "narrative"? Is it a social media meme, a macro thesis, a community slogan, a valuation story, or perhaps a political expectation? How is it measured or falsified? Without a clear operational meaning, "narrative" becomes universal in scope, where whatever price does is called narrative-driven, and whatever price does later is classified as fundamentals catching up. This betrays an inability to distinguish between narrative-as-cause and fundamentals-as-correction when discussing price. The result is a theory that cannot be disproven because it lacks specificity. Yet theories earn their usefulness by making testable predictions and risking falsification; if a theory explains everything, it explains nothing.[29]

The core fallacy lies in an imagined division between short-term narrative and long-term reality, as though markets oscillate between speculating on fiction today and retreating to objectivity tomorrow. Both short- and long-term investors who rely on DCF or other inputs as a means of mitigating sentiment are effectively applying filters that are constructs of prior narratives. This highlights that a market is not a *pendulum* of activity; but is a *continuum* of adversarial auctions, all wagering on potential outcomes. These wagers require judgment, and since fundamentals cannot function as self-interpreting truths, historical assumptions become the default, leading us to treat the past as prologue.

The claim that fundamentals eventually match narrative is a clever way of rebranding 20/20 hindsight as discipline, functioning more as a metaphor than a mechanism. In forward-looking markets, no ideal reality will ever arrive to correct the narrative present; there will only be ongoing revision of probabilities as new information challenges old assumptions. Price does not follow narrative and then yield to fundamentals; price registers the current settlement of beliefs, and valuation provides the language for contesting or defending that settlement. The difference between the two is clear: price is a **market fact**, and value is a **market narrative**. As such, we should not be focused on the causal relationship between narrative and price but with how sentiment, incentives, and reasoning conspire to make one set of assumptions tradable and another untenable.

Notes

[27] Shiller, Robert J. 2019. *Narrative Economics: How Stories Go Viral and Drive Major Economic Events*. Princeton University Press.

[28] Flynn, Joel P., and Karthik A. Sastry. 2024. "The Macroeconomics of Narratives." *National Bureau of Economic Research (NBER)* No. w32602. https://economics.mit.edu/sites/default/files/inline-files/Narratives_website.pdf.

[29] Olszewski, Wojciech, and Alvaro Sandroni. 2011. "Falsifiability." *American Economic Review* 101 (2): 788-818. https://doi.org/10.1257/aer.101.2.788.

Chapter 7

Dismantling the Efficient Market Hypothesis

If price emerges from the aggregation of belief how does this affect the claim that markets process information efficiently? The Efficient Market Hypothesis (EMH) asserts that asset prices reflect all available information, implying that consistently outperforming the market is nearly impossible.[30] The hypothesis presents three forms of increasing scope: **weak** (prices reflect past information), **semi-strong** (prices reflect all public information), and **strong** (prices reflect all information, including insider knowledge).[31] The availability of Information therefore dictates a valuation upon which markets converge, allowing prices to adjust instantaneously to new information. EMH also assumes that all investors consume this information identically and share similar expectations, rendering participants "rational" by default.

However, each form of EMH shares the same structural defect by assuming that broader information absorption guarantees convergence toward a correct price, conflating the *availability of information* with *uniformity of interpretation*. The strong form of EMH goes furthest, presuming that even privately held information somehow reaches the market; yet there are myriad examples of insiders profiting from asymmetries the market supposedly prices in. Beyond insiders, proximity to information creates its own advantage, a ***Cantillon-like*** effect, that EMH leaves unaddressed.

Policymakers privy to regulatory changes, or executives adjacent to strategic decisions, absorb context that cannot survive public transmission. Information degrades as it travels from source to market, and those nearest to the source act on a more context rich and complete dissemination of information than those who receive it downstream. The effects of informational proximity and latency are phenomena EMH does not account for within any of its three forms. Furthermore, the persistent outperformance of select investors, while often dismissed as survivorship bias or luck, is likely explained by superior interpretation of identical information; a nuance that further undermines claims to an efficient market.

In reality, the distribution of information *is asymmetric, not asymptotic*, and even when information is shared, its interpretation will diverge. This essential quality of information, and how it transmits through markets, grants nothing to EMH in any form. The existence or availability of information is an insufficient condition for price action; access to information does not guarantee agreement, eliminate the need for subjective interpretation, or lead to the commitment of capital. If the same information can support disparate beliefs, the market is better understood as reflecting a *distribution of interpretations*, not the result of the distribution of information. EMH would likely classify this distribution as an "inefficiency" or noise in the market, but it is this very heterogeneity of interpretation that explains diverse investment outcomes.

Proponents might argue that EMH requires only a sufficient majority of rational actors to drive prices; however, this defense merely shifts the locus of the problem and still presumes that rational actors can identify a correct price independent of interpretation and the subjective necessity we have already established. Information cannot mechanically dictate valuation any more than the market can independently process information; both cases would require human interpretation to acquire meaning. Yet EMH treats information as an exogenous force that arrives and then compels a response.[32] Conceptually, this reduces notions of efficiency to articles of faith, possible only once sentiment has been hand-waved away.

The Efficient Market as Interpretive Arena

The central issue that runs through all three forms of EMH is that each tends to assume sentiment temporarily distorts prices until rational arbitrage converges the price towards an equilibrium and corrects mispricing.[33] However, the value of assets depends on forward valuations, not present settlement. Markets, efficient or otherwise, only aggregate beliefs, and beliefs differ in intensity, distribution, and capitalization. Arbitrage and repositioning represents a shift in conviction, acting as a counter-bet that a new narrative interpretation will become the dominant view. Some describe this process as a market "correction", but the word correction still assumes the very point at issue: that there is a "correct" price.

The conclusion here is not that markets are entirely random or that analysis lacks value. Information matters, but it matters through shaping belief rather than automatically establishing value. Skilled investors distinguish themselves less by access to information than by the ability to anticipate how markets will interpret that information, how sentiment will consolidate, and where conviction will eventually concentrate. EMH mistakes a single observable price as evidence of rationality, but the market rewards those who are positioned ahead of the next trend, **not those who insist on defining it**.

Roll's Critique & The Joint Hypothesis Problem

In addition to its dismissal of sentiment, limits of information transmission and the distribution of interpretations, the Efficient Market Hypothesis contains a structural flaw that renders it empirically untestable. To perform a test of market efficiency, we must compare expected returns to actual returns, and expected returns require an asset-pricing model, such as the *Capital Asset Pricing Model* (CAPM), to be defined.[34] The CAPM is a model used to quantify an asset's sensitivity relative to the market through a metric known as *Beta*.[35] Very simply, an asset with a Beta of 1.5 rises (or falls) 1.5% for every 1% move in the market.

From a methodological standpoint, CAPM assumes the existence of a *market portfolio*[36] that contains every asset in the world. However this assumption is highly problematic and makes testing the validity of CAPM and its claims nearly impossible. Under CAPM, to truly measure an investment's Beta, we would need to compare it against a portfolio that includes every stock, every asset, all real estate, precious metals, art collectibles, bonds, and perhaps even all potential human capital. Obviously, an all-encompassing market portfolio is an impossible benchmark, which renders the "market portfolio" an unobservable and untestable artifact.

Since we cannot observe the complete market, we use proxies such as the S&P 500; however, doing so inevitably changes the assumptions and results of any analysis we perform. The CAPM tests whether the chosen proxy is efficient, but not whether its assumptions are accurate. As a result, if the CAPM shows mispricing in a particular asset, there would be no way for us to determine if it is the asset that is relatively cheap, or if the S&P 500 is just a poor barometer. Thus, the assessment of whether prices reflect information correctly cannot be proven or disproven because the "market portfolio" assumption required to test it is an abstraction we cannot measure.[37]

This creates a dynamic where the market proxy delivering the best possible return for its level of risk leads us to assume that the CAPM functions as designed; conversely, if the proxy is inefficient, the calculations and results are meaningless. This circular relationship is the core of what came to be known as "**Roll's Critique**".[38] Fama acknowledged this limitation, stating, "*...we can only test whether information is properly reflected in prices in the context of a pricing model that defines the meaning of properly*".[39] Although he presented this as a testing limitation, this highlights a fundamental problem within CAPM: what counts as "proper" is actually defined by the selected model, not by any objective standard.

Given Roll's Critique and issues with the CAPM, we now see the *Joint Hypothesis Problem* laid bare. If observed returns deviate from expectations, there is no way to determine whether the market is inefficient or whether the pricing model is simply incomplete.[40] In assessing the EMH, when value stocks outperformed in ways the CAPM could not explain, the response was not to reject the claims of market efficiency but to expand the model to include a *Three-Factor*, and eventually, a *Five-Factor* asset pricing model.[41] The revisions allowed for dismissing anomalies as errors rather than market failures, thereby insulating the EMH from refutation. This served to absorb anomalous results into a revised definition of risk, preserving the notion of market efficiency by measuring it against adjusted benchmarks. This methodological goalpost shifting illustrates that the EMH cannot function as a feature of markets, given its self-preserving and conjecture-laden nature.[42]

Notes

[30] Fama, Eugene F. 1970. "Efficient Capital Markets: A Review of Theory and Empirical Work." *The Journal of Finance*, Papers and Proceedings of the Twenty-Eighth Annual Meeting of the American Finance Association, vol. 25 (2): 383-417.

[31] Fama, "Efficient Capital Markets: A Review of Theory and Empirical Work."

[32] Shiller, *Narrative Economics: How Stories Go Viral and Drive Major Economic Events*.

[33] Pawelzik, Klaus, and Felix Patzelt. "An Inherent Instability of Efficient Markets." *Scientific Reports* 3, no. 2784 (2013). https://doi.org/10.1038/srep02784.

[34] Fama, Eugene F., and Kenneth R. French. "The Capital Asset Pricing Model: Theory and Evidence." *Journal of Economic Perspectives* 18, no. 3 (2004): 25-46. https://doi.org/10.1257/0895330042162430.

[35] Investopedia: Understanding the CAPM: Key Formula, Assumptions, and Applications

[36] Investopedia: Market Portfolio: Definition, Theory, and Examples

[37] Roll, Richard. "A Critique of the Asset Pricing Theory's Tests Part I: On Past and Potential Testability of the Theory." *Journal of Financial Economics* 4, no. 2 (1977): 129-76.

[38] Roll, "A Critique of the Asset Pricing Theory's Tests Part I: On Past and Potential Testability of the Theory."

[39] Fama, Eugene F. "Efficient Capital Markets: II." *The Journal of Finance* 46 (1991): 1575-617. https://doi.org/10.1111/j.1540-6261.1991.tb04636.x.

[40] Fama, "Efficient Capital Markets: A Review of Theory and Empirical Work."

[41] Fama, Eugene F., and Kenneth R. French. "A Five-Factor Asset Pricing Model." *Journal of Financial Economics* 116, no. 1 (2015): 1-22.

[42] Schwert, G. William. "Anomalies and Market Efficiency." *University of Rochester - Simon Business School; National Bureau of Economic Research (NBER)*, 2002. https://ssrn.com/abstract=338080.

Chapter 8

Understanding Volatility

How do markets measure the stability of sentiment-driven outcomes? If sentiment initiates, price records, and valuation rationalizes, then volatility, as the primary input for risk models, the basis for options pricing, and the most commonly referenced measure of market conditions, is a direct observable consequence of the same forces that drive price formation. In markets, volatility is a measurable tension that exists between competing positions, and while subjective terms such as "fearful" or "greedy" are applied to discussions of volatility, the standard definition remains statistical, describing the dispersion of an asset's returns around its average price.[43] This is a useful definition that describes how prices fluctuate over a given period, but does nothing to address the underlying causes of the movements.

The consensus view of volatility is that it is a feature of an asset itself that sophisticated models can estimate then mitigate through diversification and risk management. Similar to DCF and intrinsic value, assets are assumed to have an *intrinsic volatility* with high volatility interpreted as elevated "risk" and low volatility as "stability". This view shares the same flaw in treating what is a measurable outcome of investor behavior as an innate characteristic of the asset. Perceptions of risk differ by investor profile, position size, and investment horizon, making these assessments a consequence of that perception rather than objective reality. As market participants enter or exit positions, revise their views, and adjust their valuations, asset price stability will fluctuate. Volatility is not the underlying cause of these fluctuations but is an *amplitude of sentiment*, expressed through the scale and intensity of collective belief revision as quantifiable risk effects.

Volatility As A Revision of Sentiment

If price is understood as the settlement of belief, then volatility is ***observed*** in the market as the magnitude and velocity with which that belief transforms. To help conceptualize this, let us evaluate a scenario where two groups hold opposing views with equal conviction and capital, but neither side revises its position. This would manifest through a wide bid-ask spread and muted trading volume without significant price fluctuations; resulting in price stability and low volatility

When this equilibrium shifts, whether due to participants entering, exiting, reversing positions, or adjusting their convictions in response to new information, volatility increases. A low-volatility environment does not reflect consensus; it suggests that the predominant beliefs are durable enough to discourage repositioning. Conversely, a high volatility environment reveals fragile convictions and a change in the distribution of beliefs. The instability in positioning that occurs when markets oscillate between high and low volatility regimes is what we observe as *realized volatility*.[44]

A potential criticism of this view would claim that spikes in volatility are primarily driven by structural forces or liquidity, as opposed to shifts in sentiment. Even though structural mechanisms are real, and liquidity can impact position sizing or the overall volume of capital available, what drives those mechanisms remains fundamentally subjective. When a market maker widens a bid-ask spread, it signals to the market that conditions are too uncertain to offer a confident price in a narrow range. If (as a result) participants exit entirely, they express a belief that the reduced risk of selling exceeds the potential reward of holding. Liquidity is itself a direct extension of sentiment through flows and positioning; attempting to separate positioning from the beliefs that initiate it is a semantic and self-defeating endeavor.

Similarly, the well-documented tendency for volatility to cluster[45] (where periods of high volatility lead to even more volatility) is not a statistical property independent of sentiment but **reflexivity operating on risk perception**. Moreover, the observed instability of pricing causes participants to revise their own risk tolerances, generating the very repositioning that sustains the clustering. Because of this, some might argue that since volatility displays clearly emergent statistical idiosyncrasies, they are better described by stochastic models.[46] This observation is valid, but does not mitigate the fact that statistical artifacts observed in aggregate price behavior (mean reversion, volatility clustering, fat tails) are themselves downstream of sentiment effects. Stochastic models might describe these patterns effectively, but describing a pattern is not the same as identifying its cause. Novel qualities that emerge from sentiment can never exist outside of, or be held as something *distinct from*, sentiment.

Implied Volatility

In equity markets, *Realized Volatility*, as an indication of the scale and speed of previous sentiment revision, represents an expression of *first-order* sentiment while *Implied Volatility (I.V.)*[47], expressed via the Options Market, represents second-order sentiment, and the durability of that revision. Said differently, Implied Volatility is effectively a *derivative of human belief*, or *sentiment about sentiment*

This may seem counter-intuitive, but consider that when implied volatility rises, the market is surfacing which existing beliefs are unlikely to hold and that price action is provisional and subject to sudden change. The *CBOE Volatility Index (VIX)*[48], popularly labeled a "fear gauge", illustrates this market signaling perfectly, and represents how rapidly sentiment can shift over a 30-day period. Understanding its intended use, it would be more accurately characterized as a "*Narrative Fragility Index*", where a spike in the VIX is not framed as an emotional readout of fear, but an assessment of expected belief instability that falls as price and narrative demonstrate durability.

Through implied volatility, the options market acts as an amplifier; when dealers delta-hedge their exposure, they mechanically translate this second-order sentiment (instability) into first-order price movements (buying | selling), demonstrating that investor beliefs about volatility can reflexively create realized volatility. This transmission is a specific instance of reflexivity operating through derivative instruments, consistent with the sentiment-focused architecture established in this essay. The second-order reflexive loop propagates itself through beliefs about instability, that then generates hedging activity, hedging activity produces price movement, and price movement retroactively validates or invalidates the instability.

The nature of volatility is not a necessary precondition of market activity, but extends the ontological reach of this essay's established causal formulation, recording the rate at which settlement is contested and beliefs are revised. With this expanded application, realized volatility records the speed of past belief revision, and implied volatility then recursively prices the expected speed of future revision through its underlying architecture: **sentiment evaluating sentiment**, **layered upon itself**. In turn, *reflexivity* acts as the conduit through which these *recursive* expectations mechanically propagate into actual price movement.

Implications For Risk Assessment

Modern portfolio theory, the Capital Asset Pricing Model, and quantitative finance all rely on volatility as a proxy for risk.[49] It is assumed that if an investor can measure volatility accurately, they can address risk and hedge or optimize against it. But, if volatility is not an intrinsic property of assets, and instead is the result of fluidity in collective belief, then the foundational input to these models is sentiment-derived. Risk measures how unstable

market participants' beliefs have been (realized) or are expected to be (implied); this does not make it an objective feature of an investment. Additionally, this means that the metrics we use to price the unknown are products of subjective judgments. No level of mathematical rigor can restrain the human element, and similarly to claims of intrinsic value, risk assessment merely dresses our underlying assumptions with analytical language.

This does not render risk models useless, just as recognizing that valuation is sentiment-laden does not render valuation useless. Models can still serve as benchmarks for disciplined reasoning, but assessing risk does not provide the counterweight that traditional finance assumes. When proponents of traditional portfolio theory speak of "risk-adjusted returns", they presuppose that risk is measurable against an absolute standard. Yet if risk is itself a product of sentiment, then "risk-adjusted" is functionally "*sentiment-adjusted*", and the reasoning becomes structurally circular: risk assessment models define risk, their outputs help validate their assumptions, and at no point is risk measured against anything independent of the model itself.

The outputs of a *VaR (Value at Risk)*[50] Model or *Sharpe Ratio*[51] are the net result of today's human behavior compared to yesterday's human behavior, a self-referencing grading of current sentiment against *historical sentiment and its amplitudes*; there is no exogenous benchmark for the conclusions. The circularity that Roll's Critique exposed in the CAPM extends to the concept of market-risk that underlies every claim of risk assessment. Just as Roll proved we cannot form an objective baseline for the market portfolio, we similarly cannot objectively baseline risk itself.

Notes

[43] Wikipedia: Volatility)

[44] Investopedia: Realized Volatility: What Is It, Calculation, Importance & More

[45] Wikipedia: Volatility Clustering

[46] Wikipedia: Stochastic Process

[47] Wikipedia: Implied Volatility

[48] Wikipedia: CBOE Volatility Index (VIX)

[49] Proactive Advisor Magazine: Is Modern Portfolio Theory Seriously Flawed?

[50] NYU Stern School of Business: Value At Risk (VAR)

[51] NYU Stern School of Business: Time-Varying Sharpe Ratios and Market Timing

Chapter 9

Fundamental Objections

Market Sentiment Is Just A Proxy For "Human Action"

The human actor is the necessary ontological condition for market activity, and sentiment functions as the absolute catalyst within that condition that initiates a chain of market events. However, this does not imply it is the singular driver of all subsequent actions or outcomes. An apt analogy for sentiment is that of a **spark**: the *initial* spark ignites a *flame*, serving as the necessary precondition for the fire's existence. The spark alone does not account for the fire's propagation; that depends on the continuous draw of oxygen (reflexivity) and the available environmental factors (market structure).

Markets, at their essence, represent deliberate allocations of capital in the present, oriented toward anticipated future gains, amid risk and uncertainty. Since we cannot observe or interact with the future, sentiment is the apparatus through which we perceive information, render judgments, and gain the conviction required for action. When these individual acts of conviction aggregate across participants and settle as price, sentiment ceases to function merely as the medium of investor experience and becomes the **substrate**: *the foundational layer upon which markets, valuations, and risk assessments are constructed*. Without it, navigating ambiguity would devolve into paralysis; with it, markets achieve their dynamic equilibrium, underscoring sentiment's omnipresent, though not omnipotent, influence.

Reducing the nuances of this theory to a simple intermediary for "human action" cannot account for the insights of the *Blind Ledger*, the existence of parity anchors, or the intersubjective framing of valuation. The claim is not that humans act (no theory disputes this), but that the cognitive tools through which they act are irreducibly subjective at every stage, rendering the search for an observer-independent baseline incongruent with the reality of market activity.

The "Hard Floor" Objection

After a thorough analysis of price, sentiment, and valuation, some critics might assert a "hard floor" of reality. In a liquidation, for example, a company sells its assets, distributes cash to shareholders, and delivers objective (not sentimental) value. While intellectually honest discourse must acknowledge that liquidation produces a realized number, this result is not as absolute as it appears. This fundamentalist objection confuses *realized value* (the cash received upon liquidation) with *objective value* (an independent measure of the company's fundamental worth). Realized value shows that, under certain conditions, in the current market, with the current participants, management, and leverage, *"X" was* the *settlement*. However, as with any valuation, adjusting the variables changes the settlement.

In the event of a liquidation, assets are sold to buyers who decide what to pay based on their own expectations. The timing of the liquidation, however, would materially affect realized value; a rushed sale likely yields a lower return than an orderly dissolution. If the "hard floor" can move based on the seller's fear or the buyer's opportunism, it cannot be an unbiased constant. Depending on the speed and scope of the sale, the question would not be "did shareholders receive $10 Million?" but rather "was the company worth $10 Million?" A company liquidating for $10 Million today might net $15 Million in a bull market or $6 Million in a bear. The cash received is certainly real, but any claim that it represents absolute "true" value is not.

Finally, it is important to note that a liquidation event is a market verdict that the company deserves no forward multiple and that its future has no value worth pricing. This does not represent an absence of sentiment; the decision to strip away any premium and retreat to asset value is a clear proclamation about what the company is *not worth*. In this light, the hard floor is the lowest subjective price, not a bedrock for, or a claim to, objectivity.

Mechanical Arbitrage

Although financial markets are governed by mathematical relationships and constraints, we should not mistake these relationships for the cause of action. No-arbitrage bounds[52], such as put-call parity or covered interest parity, are logical requirements for relative pricing; they establish the relationships between two instruments, but do not determine the absolute values of those instruments.[53] These instruments can tell us the price of a call option given the price of the underlying stock, or the difference in interest rates, but hold no influence or input into why an asset is priced where it is.

Arbitrage devices ensure the market's instruments are consistent, but the foundation is a product of the belief-formation process. Mechanical logic may constrain price ratios, but sentiment determines absolute values. The same dependencies exist in the broader market architecture through order books, market-making, and execution infrastructure. These provide the channels through which sentiment flows and the mechanism by which it settles, but they do not determine its direction.

Forced Selling Events & Margin Liquidation

Another potential objection concerns forced selling under margin calls or position liquidations where the seller exercises no discretion over timing, price, or volume. Forced selling by itself moves price, which can make it seem like an entirely non-sentiment cause of price formation since positions are mechanically unwound regardless of the holder's conviction. If price formation requires perception, judgment, and conviction, then a margin call that bypasses all three would appear to constitute a non-sentiment cause of price movement.

However, yet again, we have an objection that mistakes the effect for cause, obfuscating the fact that this activity represents transmission of sentiment-determined bounds. The parameters that trigger liquidations are established by risk managers using subjective models of acceptable loss. The leverage that created the exposure reflects prior conviction about risk and reward; and the counterparty's decision to extend that leverage was itself a judgment about creditworthiness and collateral adequacy.

Every condition that makes the margin call possible is a product of sentiment-laden decisions made at earlier stages. The mechanical unwinding is the consequence of those decisions, not an independent cause. **Forced unwinds are not generating price movement from nothing**. A margin call is essentially converting *prior sentiment* (expressed as leveraged positioning) into *forced repositioning* when the market's settlement invalidates the assumptions that supported the original exposure. Once the liquidation is complete, the resulting price becomes the new starting point for (sentiment-driven) reassessment.

Market participants would then evaluate whether the post-liquidation price represents an opportunity (aka: "buy the dip") or continued risk; the subsequent positioning serves to re-establish an equilibrium. The forced sale may produce a *transient* price that is not supported by participant conviction, but this transience is precisely why such events are often classified as dislocations in price (a subjective assessment of another kind) rather than discoveries of value. If forced selling revealed objective value, post-liquidation recoveries would not occur, but they routinely do, because active participants reassess and reposition once the mechanical selling pressure

abates.

The Impact of Algorithmic Trading

Given that sentiment serves as the foundational driver of market prices, how do we account for the impact of trading algorithms? Algorithms, as rule-bound and human-designed tools, operate based on pre-established guidelines and historical sentiment patterns. These systems may act autonomously in the market; but this *autonomy in execution* is not the same as *independence in action*. Even advanced systems that can adapt beyond their initial programming rely on, and operate within, human-defined boundaries and risk parameters. In cases where these systems exhibit emergent behavior, such as when Machine Learning platforms uncover seemingly novel patterns, or execute strategies their designers did not anticipate, the behavior results from the crystallized record of prior sentiment in historical prices. The *objective functions* these systems optimize learn from the accumulated *non-objective inputs* of human preferences, and manifest as ciphers of human judgment.

Is it possible for algorithmic or learning systems to discover novel or unanticipated patterns? Yes. But it is *impossible* for them to discover a pattern that exists outside the price record; as such, Machine Learning still expresses *derivative sentiment* via its outputs. Earlier in this essay, the discussion of reflexivity illustrated how mechanisms of transmission may differ from the mechanisms of origin. Building on that idea, algorithms and machine learning are best understood as extensions, or echoes, of human sentiment. They enter markets post price formation to detect, analyze, and react to prices established by human judgment, often amplifying existing trends through high-frequency execution. Even when algorithm-induced selling cascades occur, human-designed systems are responding to conditions created by human positioning. While those events may be unintended, they trace back to the objectives, constraints, and assumptions shaped by sentiment at every prior stage.

Passive Flows, Indexing & Mandatory Allocations

How do the conclusions of this essay fare when extended to domains of market activity where sentiment appears absent? With equities, a significant amount of daily trading volume is driven by passive index funds and algorithmic execution strategies (such as VWAP | TWAP) that purchase assets regardless of price. These flows are deterministic, mechanical, and occur at the periphery of price discovery; there is no active assessment of value at the point of execution. From this, a seemingly self-evident rebuttal emerges: there are no *perception*, *judgment*, or *conviction* artifacts driving these specific transactions.

Similarly to the conceptual error highlighted in the section on reflexivity, this is a rebuttal that confuses the *transmission mechanism* and how these trades execute, with the *price formation* mechanism and how prices settle. These trades execute and their flows exist downstream of sentiment, at levels determined by the marginal active trader's perception, judgment, and conviction. Passive index funds and execution algorithms are *price takers*[54] that accept prices that the market has already settled, they do not and cannot set the price of an asset. This reactive price-taker dynamic also applies to institutional participants bound by statutory or regulatory mandates. Whether driven by index construction, regulatory compliance, or contractual obligation, these participants do not set the prices of the assets they are required to hold; prices are set by the marginal active participants, all of whom operate through the intersubjectivity of the market

An informed critic may raise an objection focused on market microstructure, noting that passive inflows can create order imbalances that force market makers to adjust quotes, thereby influencing the "setting" price. This observation ironically works to reinforce, rather than undermine the market-driven, price-taking dynamics of

passive flows. What can guide the market-making adjustments to a quote other than perception, judgment, and conviction about the risk of absorbing that flow at a given level? The passive flow creates a condition; the active participant (whether human or algorithmic) then reacts to and prices that condition.

Any imbalance or inelasticity in supply exists precisely because active participants hold divergent views, or program divergent conditions, about where price should settle. What drives this divergence, regardless of its means of execution, is the substance of sentiment. The price impact is a transmission effect, not a price-setting cause, and the differentiation between the two is the same one this essay highlights with *reflexivity*, *forced selling*, and *algorithmic execution*.

Even at the individual level, the decision to invest in a passive index is itself a sentiment-rich act. The investor who allocates capital to an index fund does so under the assumption that the position will appreciate over time, or that the nature of markets makes active management inefficient. This decision is the net result of their conviction and beliefs about uncertain future outcomes; which are open-ended and contingent judgments. Passive flows and indexing do not exist outside of the sentiment substrate of markets, they in fact express a meta-narrative about markets that is no less a product of belief than any active allocation.

In addition, the very classification of these flows as *passive* directly implies that they are a response to market activity, not an active driver of market activity. Consider that if passive flows represented the totality of market volume **there would be no price formation at all**, and the index would be frozen at its first (and only) actively-determined level. This would clearly be impossible given that markets continue to clear moment by moment; further evidence that active, sentiment-driven participants set the price, and passive execution vehicles transact at whatever settlement they produce.

Treasuries, Fixed Income & Preferred Equity Products

If we expand this conversation into additional asset classes and we consider an investor purchasing a Treasury Bill they intend to hold to maturity, the nominal return is a mathematical certainty, not a sentiment-driven variable. Similarly, a dividend-paying equity offers a known cash distribution, and preferred shares carry a fixed coupon. In each case mentioned, the payouts from these instruments occur regardless of sentiment, with a defined cash flow anchoring the instrument's value independent of belief.

In order to properly discuss these instruments, and understand their drivers, we should not ask whether the outcomes in question are deterministic. Rather, we should ask why the investor chose a particular equity or treasury at a certain yield, or over a certain timeframe, as opposed to every other available use of their capital. The reason for this question is simple: while the instruments themselves are deterministic, the *decision to enter the trade* and lock up finite capital cannot be. The decision itself is the result of inflation expectations, assessment of opportunity costs, and credit risks, all of which are forward-looking judgments. A 5% yield invites a different assessment depending on whether the investor believes inflation will average 3% or 7% over the period.

The implication here is that the realized nominal cash flow in the form of yield is a *mathematical derivative* of a sentiment-driven allocation. The return is real once realized, but the perceived benefit of that return is entirely a function of expectations resolved through sentiment. More importantly, Treasuries and fixed income instruments demonstrate the **Anchor-of-1** thesis in action. The coupon functions as the *anchor*, a mathematical identity equivalent to *natural parity*, while the yield at which the market prices the instrument represents *sentiment drift* from that anchor. With treasuries, those trading at par sit at parity, while treasuries trading at a premium or

discount to the nominal dollar value reflect the market's collective expectations about interest rates, dollar strength or inflation. Bond markets exist because participants disagree about where yields should be, and even though they are designed to return the full face value at maturity, if nominal value certainty removed sentiment from fixed-income pricing, treasury yields would never have premiums or discounts.

For dividend-paying equities, the dividend establishes a known cash flow that functions as the anchor, while the multiple the market applies to that cash flow, expressed as dividend yield or price-to-dividend ratio, measures how far collective belief has drifted from parity. For preferred equity and fixed-income instruments with a stated par value (Strategy preferred instruments such as STRK | STRF | STRD | STRC | STRE come to mind), the anchor is even more explicit: *the par value itself is the mathematical identity, equivalent to the natural parity (anchor) of 1*. The market price's distance from par represents sentiment drift in a direct and quantifiable form. A preferred share with a $100 stated amount trading below $80 reflects the market's collective assessment of creditworthiness, opportunity cost, and forward-looking risk, none of which can be derived from the coupon alone. The coupon is a mathematical certainty; the price at which the market values that coupon relative to par is not. None of these instruments are devoid of sentiment, and through their structure, provide an interpretable anchor from which we can measure market sentiment.

Notes

[52] Wikipedia: No-Arbitrage Bounds

[53] NYU Stern School of Business: Foundations of Finance - Options: Valuation and (No) Arbitrage

[54] Investopedia: Price Taker: Definition, Perfect Competition, and Examples

Chapter 10

Informed Analysis Still Matters

The ultimate criticism to this essay might be that if sentiment constitutes all of price formation, and no objective baseline exists, then nothing distinguishes rigorous analysis from uninformed speculation. One might even go further and assert that this actively denies the potential for any analytical distinction since both the disciplined investor and the impulsive day-trader's decisions are entirely driven by sentiment.

While the proposed substrate is indeed universal; the methodologies and models informing it are not, and these objections conflate the universality of sentiment for equivalence with what is built upon it. If we were to recognize that all buildings are constructed from matter, that does not imply that all buildings are well-engineered nor would acknowledging that all arguments are composed of language make all arguments equally persuasive. Likewise, acknowledging that all valuation is sentiment-laden does not mean all valuations are not sound; it means the basis for distinguishing them must be refined.

A thesis built on a single datapoint is inherently fragile and easily refuted by contradictory evidence. In contrast, a thesis that integrates competitive dynamics, narrative shifts, macroeconomic factors, balance sheet constraints, and management incentives, while not guaranteeing complete antifragility or correctness, substantially reduces vulnerability to unforeseen challenges. This illustrates that the strength of an investment thesis rests upon the density or quality of its information, and the nature of its assumptions. Assumptions that would be much harder to challenge when there are fewer categories of new information that have not already been considered. A disciplined analyst produces a valuation that is more informationally dense, more internally coherent, and more resilient to revision than an undisciplined one. Therefore the value of the exercise is not to bring valuation closer to an ephemeral truth, but in its capacity to formulate beliefs that can withstand the market's ongoing interrogation.

These refinements would not be objective, but would be intersubjective and agreed-upon evaluative criteria that operate within a sentiment-aware framework, not above it. Much like the "natural parity" and "historical parity" benchmarks discussed earlier, these standards will provide shared reference points without making claims of unconditional correctness just as standards of evidence in law, coherence in philosophy, or reproducibility in science operate. Traditional theory tries to force a distinction between "objective" analysis (which discovers value) and "subjective" bias (which distorts it). This essay has demonstrated that no such demarcation exists, and the entire process, from perception through judgment to conviction, operates within sentiment. This requires a different standard for financial analysis, one that acknowledges, and actively manages the limitations of valuation, not ignores the reality of what drives it.

Chapter 11

Empirical Implications & Future Research

Methodology

The ideas presented in this essay can help formulate empirically testable predictions; with that said, a clarification on methodology is necessary. The conclusions of this essay imply that any attempt to decompose price movement into a sentiment component and a non-sentiment component will fail. This is not due to measurement limitations, or a flaw in methodology, but because no sentiment-free residual exists to isolate. What can be measured empirically is how sentiment distributes itself across distinct channels by means of valuation anchors, narrative conviction, capital concentration, reflexive feedback, and mechanical market structure. The relevant question is not "how much" of price is a result of sentiment, but how sentiment flows through market mechanisms and in what proportion relative to one another.

Operationalizing Sentiment

Establishing a new theoretical framework requires the premises behind the conclusions to be conceptually stress tested and validated across several modes before any empirical work can follow. If the assumptions driving the theory are wrong, any derived metrics are statistically meaningless. Exposing the **Anchor of 1** as a universal mathematical property in valuation provides the interpretive context that allows us to operationalize existing data as sentiment data and moves sentiment drift from a useful metaphor to a derivable, observable quantity. What changes is not data but its interpretation: mNAV, P/E, Price-to-Book, and every other valuation ratio cease to function exclusively as descriptions of price relative to a reference metric and become readable as a *time series of collective belief*. This reclassification is not approximating sentiment through an intermediary; if sentiment is constitutive of price formation, its direct quantifiable expression is the distance from the anchor.

Initial Findings

While a full empirical decomposition is beyond the scope of this conceptual paper, subsequent research will demonstrate how this framework is operationalized. Nonetheless, initial analysis suggests these dynamics are already observable in current markets. I performed a Variance Decomposition of Strategy (MSTR) price action using Multivariate Linear Regression[55] and Shapley Attribution[56] value methods to test these dynamics, and found that narrative expression channels in the form of directionality of Bitcoin and Options Market activity, explain orders of magnitude more return variance than strictly mechanical corporate capital events such as ATM Equity Offerings. This is consistent with the claim that sentiment-driven positioning operates as a foundation of market activity rather than as a single variable among many and acts as a testable use case for both asset-driven and earnings-driven equity premiums and valuations

Testable Predictions

If narrative context is what drives premiums above parity, then companies operating under weaker or less developed narratives (limited analyst coverage, lower media presence, fewer identifiable competitive advantages) should trade closer to natural or historical parity than those in richer narrative environments. This should hold true even when accounting for financial performance. The Bitcoin Treasury Company space provides a natural testing ground for this thesis where firms with less developed narratives than Strategy (MSTR) should display mNAV values closer to (or below) 1. Additionally (at the time of this writing) the severe

price correction in Bitcoin over the course of several months, and the extreme contraction in mNAV multiples across the space, may indicate the fragility of narratives that lack sufficient durability to sustain a market premium.

Among more "traditional" equities, in addition to measuring potential sentiment drift via equity multiples over time, added volatility around earnings or related news events that challenge narrative durability should provide insight into sentiment dynamics through price action. If narrative context is ambiguous, whether through sector disruption, regulatory uncertainty, or leadership transition, the divergence in analyst price targets should likely increase independent of changes in underlying financial viability or market volatility. This constitutes another observable channel through which sentiment expresses itself, one that the framework established in this essay makes directly measurable.

Companies such as Nvidia (NVDA), Palantir (PLTR), and Tesla (TSLA), whose valuations carry significant narrative premiums, should exhibit greater price target variance during periods of narrative instability than companies whose multiples trade closer to historical parity. Because existing narratives are well established and require reactivation rather than construction, price corrections that align with narrative restoration should recover faster than those that follow the introduction of new information.

Notes

[55] Wikipedia: Linear Regression

[56] Wikipedia: Shapley Value

Chapter 12

Methodological Consequences of Reclassification

Reclassification of valuation data fundamentally changes the statistical assumptions driving their analysis. Methods centered around *mean-reversion*, *regression models*, *historical averages*, and *comparative benchmarks* against sector averages all assume convergence around a normative value or deviations that require correction. Sentiment data operates under different assumptions that do not presume mean reversion but rather anticipate *persistence*, *clustering*, *propagation* across related entities, *regime changes*, and *contagion effects*.

This requires analytical methodologies suited to **belief-centered** data: tools that can detect transitions between distinct market states, persistence and survival analysis that measures the duration of a sentiment drift before revision, network propagation analysis tracking how sentiment drift transmits between related entities, and dynamic correlation models that can measure whether co-movement in drift intensifies during stress periods.

The sentiment-driven nature of what is assumed to be purely financial data may explain why value traps in financial modeling persist. An equity that is "undervalued" (trading at a discount to historical parity) may not be mean-reverting toward fair value but expressing a durable negative sentiment regime that convergence-based models cannot detect. **The Anchor of 1** provides us with a testable case: if the traditional interpretation of mean reversion holds, then valuation will converge toward fundamental value. As the zero-justification proof, and the only multiple that requires no narrative defense, fundamental (not intrinsic) value must be parity (1).

With an intersubjective framing for this data, we arrive at a falsifiable formulation of a standard empirical question: *do multiples mean-revert toward parity*, or *toward something else*? Based on typical market trends, we also have a clear answer: *multiples do not revert toward parity*. This essay has established that mean reversion is not convergence toward truth; it is convergence toward sentiment equilibrium in the form of an established market convention (a P/E Ratio of ~15). Even though mean reversion remains a valid statistical phenomenon, the framework of this essay eliminates the traditional explanation. Reversion is not and cannot be toward an objective value, because the only objective value (1) is not where the data converges. Under a sentiment-attuned methodology, it is more akin to regime cycling around a collectively entrenched anchor that has no objective authority beyond market consensus, and should be modeled as such.

There is an additional dimension of analysis that has no existing parallel in financial modeling. If **realized volatility** records the speed of past belief revision (*first-order sentiment*), and **implied volatility** prices the expected speed of future revision (*second-order sentiment*), then combining first-order data from valuation multiples with second-order data from implied volatility creates a *two-dimensional surface for the analysis of sentiment*. A unified sentiment architecture would allow us to measure belief and the market's confidence in that belief *simultaneously*, using existing datasets. This pairing provides a **Sentiment State Analysis** that maps drift magnitude against belief stability in a unified metric. Developing an effective method of interpretation for this surface, and understanding the predictive signals it may contain, represents a primary objective of future empirical research.

Chapter 13

The Causal Chain from Sentiment to Price to Valuation

Markets are future-oriented by nature, seeking to price in today what may occur tomorrow. Every market outcome requires human action and interpretation to commit capital to an unknowable future. Because the future is unknowable, no aspect of price formation is independent of sentiment, rendering the search for objective residuals that are free from subjectivity impossible, irrational, and incoherent. The result is a tripartite crisis that cannot be eliminated or engineered away, only navigated through sentiment.

This crisis is the result of the *intrinsic subjectivity* (the innate permanence of subjectivity in market activity) that creates structural uncertainty. We see this originating at the individual level, manifesting at scale, expressing through a multitude of channels, then amplified and transmitted through market structures. Every analytical or theoretical tool at our disposal from statistical models, to discounted cash flows, to hypotheses on efficient markets, even the metrics we use to quantify risk and volatility, have sentiment at their core. It is erroneous to think of valuation as a compass that points to a *True North*, valuation is more like a magnet that we use to pull the needle toward wherever we believe the crowd should go. No matter the formulation, sophisticated market analysis remains derivative of the subjectivity that forms the substrate of the market.

The arguments presented in this essay reveal how sentiment flows through the market, from origin to expression, in a clear causal chain: **1. Sentiment initiates the conviction that commits capital. 2. Price records the settlement of competing convictions. 3. Valuation rationalizes the distance that settlement has traveled from its agreed-upon anchor.** It is the role of the investor to refrain from pursuing a truth that markets cannot contain and develop the discipline of forming beliefs that markets cannot easily displace.

References

1. Walter Lippmann, *Public Opinion* (1922; Harcourt, Brace and Company, 1922).

2. Thaler, Richard H. *Misbehaving: The Making of Behavioral Economics*. W. W. Norton & Company, 2016.

3. Fama, Eugene F. 1970. "Efficient Capital Markets: A Review of Theory and Empirical Work." *The Journal of Finance*, Papers and Proceedings of the Twenty-Eighth Annual Meeting of the American Finance Association, vol. 25 (2): 383-417.

4. Kahneman, Daniel, and Amos Tversky. 1979. "Prospect Theory: An Analysis of Decision Under Risk." *Econometrica* 47 (2): 263-92.

5. Soros, George. 2013. "Fallibility, Reflexivity, and the Human Uncertainty Principle." *Journal of Economic Methodology* 20 (4): 309-29.

6. Soros, "Fallibility, Reflexivity, and the Human Uncertainty Principle."

7. Wikipedia: Tautology)

8. Inoua, Sabiou, and Vernon Smith. 2023. "The Classical Theory of Supply and Demand." *Eprint arXiv:2307.00413* arXiv: Theoretical Economics. https://arxiv.org/abs/2307.00413.

9. Hayek, F.A. 1996. *Individualism and Economic Order*. Reissue. University of Chicago Press.

10. Baumeister, Christiane. 2021. "Measuring Market Expectations." *CESifo Working Paper No. 9305*. https://dx.doi.org/10.2139/ssrn.3929199.

11. Baker, Malcolm, and Jeffrey Wurgler. 2007. "Investor Sentiment in the Stock Market." *Journal of Economic Perspectives 21* (2): 129-52. https://doi.org/10.1257/jep.21.2.129.

12. Keynes, John Maynard. 1936. *The General Theory of Employment, Interest, and Money*. Harcourt, Brace and Company.

13. Bill Miller, "The Question Is Not Growth Or Value, But Where Is The Best Value?," *The Acquirer's Multiple*, April 6, 2017, https://acquirersmultiple.com/2017/04/bill-miller-the-question-is-not-growth-or-value-but-where-is-the-best-value/.

14. Damodaran, Aswath. 2006. "Valuation Approaches and Metrics: A Survey of the Theory and Evidence." November. https://pages.stern.nyu.edu/~adamodar/pdfiles/papers/valuesurvey.pdf.

15. Baucells, Manel, Martin Weber, and Frank Welfens. 2011. "Reference-Point Formation and Updating." *Management Science* 57 (3): 506-19.

16. Lewellen, Wilbur G., and S.G. Badrinath. 1997. "On the Measurement of Tobin's q." *Journal of Financial Economics* 44 (1): 77-122.

17. Ghaeli, Reza. 2017. "Price-To-Earnings Ratio: A State of Art Review." *Accounting* 3: 131-36. https://doi.org/10.5267/j.ac.2016.7.002.

18. Schaumburg, Ernst, and Zhi Da. 2011. "Relative Valuation & Analyst Target Price Forecasts." *Journal of Financial Markets* 14 (1): 161-92.

19. Shiller, Robert J. 2019. *Narrative Economics: How Stories Go Viral and Drive Major Economic Events*. Princeton University Press.

20. Marsat, Sylvain, and Benjamin Williams. 2009. "Does the Price Influence the Assessment of Fundamental Value? Experimental Evidence." *SSRN: Social Science Research Network*, June 1. https://dx.doi.org/10.2139/ssrn.1938927.

21. Carl Menger, *Principles of Economics - First, General Part* (1871; The Free Press/Macmillan, Glencoe, Illinois, 1950), https://cdn.mises.org/principles_of_economics.pdf.

22. Wikipedia: Intrinsic Value)

23. Damodaran, Aswath. 2014. "Numbers and Narrative: Modeling, Story Telling and Investing." Presentation. https://pages.stern.nyu.edu/~adamodar/pdfiles/country/narrative&numbersDEShaw2024.pdf.

24. Damodaran, Aswath. 2006. "Valuation Approaches and Metrics: A Survey of the Theory and Evidence." November. https://pages.stern.nyu.edu/~adamodar/pdfiles/papers/valuesurvey.pdf.

25. Damodaran, "Valuation Approaches and Metrics: A Survey of the Theory and Evidence."

26. Wikipedia: Fact-Value Distinction

27. Shiller, Robert J. 2019. *Narrative Economics: How Stories Go Viral and Drive Major Economic Events*. Princeton University Press.

28. Flynn, Joel P., and Karthik A. Sastry. 2024. "The Macroeconomics of Narratives." *National Bureau of Economic Research (NBER)* No. w32602. https://economics.mit.edu/sites/default/files/inline-files/Narratives_website.pdf.

29. Olszewski, Wojciech, and Alvaro Sandroni. 2011. "Falsifiability." *American Economic Review* 101 (2): 788-818. https://doi.org/10.1257/aer.101.2.788.

30. Fama, Eugene F. 1970. "Efficient Capital Markets: A Review of Theory and Empirical Work." *The Journal of Finance*, Papers and Proceedings of the Twenty-Eighth Annual Meeting of the American Finance Association, vol. 25 (2): 383-417.

31. Fama, "Efficient Capital Markets: A Review of Theory and Empirical Work."

32. Shiller, *Narrative Economics: How Stories Go Viral and Drive Major Economic Events*.

33. Pawelzik, Klaus, and Felix Patzelt. "An Inherent Instability of Efficient Markets." *Scientific Reports* 3, no. 2784 (2013). https://doi.org/10.1038/srep02784.

34. Fama, Eugene F., and Kenneth R. French. "The Capital Asset Pricing Model: Theory and Evidence." *Journal of Economic Perspectives* 18, no. 3 (2004): 25-46. https://doi.org/10.1257/0895330042162430.

35. Investopedia: Understanding the CAPM: Key Formula, Assumptions, and Applications

36. Investopedia: Market Portfolio: Definition, Theory, and Examples

37. Roll, Richard. "A Critique of the Asset Pricing Theory's Tests Part I: On Past and Potential Testability of the Theory." *Journal of Financial Economics* 4, no. 2 (1977): 129-76.

38. Roll, "A Critique of the Asset Pricing Theory's Tests Part I: On Past and Potential Testability of the Theory."

39. Fama, Eugene F. "Efficient Capital Markets: II." *The Journal of Finance* 46 (1991): 1575-617. https://doi.org/10.1111/j.1540-6261.1991.tb04636.x.

40. Fama, "Efficient Capital Markets: A Review of Theory and Empirical Work."

41. Fama, Eugene F., and Kenneth R. French. "A Five-Factor Asset Pricing Model." *Journal of Financial Economics* 116, no. 1 (2015): 1-22.

42. Schwert, G. William. "Anomalies and Market Efficiency." *University of Rochester - Simon Business School; National Bureau of Economic Research (NBER)*, 2002. https://ssrn.com/abstract=338080.

43. Wikipedia: Volatility)

44. Investopedia: Realized Volatility: What Is It, Calculation, Importance & More

45. Wikipedia: Volatility Clustering

46. Wikipedia: Stochastic Process

47. Wikipedia: Implied Volatility

48. Wikipedia: CBOE Volatility Index (VIX)

49. Proactive Advisor Magazine: Is Modern Portfolio Theory Seriously Flawed?

50. NYU Stern School of Business: Value At Risk (VAR)

51. NYU Stern School of Business: Time-Varying Sharpe Ratios and Market Timing

52. Wikipedia: No-Arbitrage Bounds

53. NYU Stern School of Business: Foundations of Finance - Options: Valuation and (No) Arbitrage

54. Investopedia: Price Taker: Definition, Perfect Competition, and Examples

55. Wikipedia: Linear Regression

56. Wikipedia: Shapley Value