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Examining speculative bubbles: Minsky's hypothesis and extrapolative expectations

Economics

Bachelor's thesis

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Abstract

Speculative bubbles have intensified within modern financial markets due to structural changes and information flows. Modern markets are more susceptible to short-term volatility and rapid price swings. Exuberant market behavior is tied to unrealistic expectations about future asset values, where the belief that prices will continue to rise creates a self-reinforcing loop in which inflated prices generate further speculation, as seen with the current surge in investments related to artificial intelligence.

This study focuses on examining mechanisms that fuel speculative bubbles and how expectations and credit conditions play a part in the detachment of asset prices from economic fundamentals. In addition, the study investigates how optimistic narratives and declining risk-perceptions intensify speculative dynamics. The theoretical framework outlines how periods of stability encourage greater risk-taking and how leverage expands during optimistic phases. In this optimistic phase expectations eventually become increasingly extrapolative as prices continue to rise. The empirical section examines Japan's 1980s asset bubble as a case study.

The reviewed empirical literature generally shows that asset prices accelerate beyond fundamentals when expectations become extrapolative. The main drivers behind speculative episodes include investor reactions that vary according to their beliefs, availability of credit and the structure of the financial market. These factors intensify boom cycles when limited short-selling opportunities and concentrated ownership shape expectations towards rising prices, pushing away pessimistic investors out of the market, amplifying speculative dynamics.

Findings suggest optimistic expectations with expanding leverage and delayed policy responses raise concerns about the resilience of modern financial systems. The study shows that in the amplification of speculative bubbles is the ease with which credit can expand. This ease allows expectations to be expressed through increasing asset demand. The influence of sentiment and market narratives can sustain belief-driven cycles even when fundamentals do not justify rising prices. Further research is needed on expectation formation, credit dynamics, and policy measures capable of mitigating the endogenous instability characteristic of speculative bubble episodes.

Tiivistelmä

Spekulatiiviset kuplat ovat voimistuneet nykyaikaisilla rahoitusmarkkinoilla rakenteellisten muutosten ja informaatiovirtojen vuoksi. Nykymarkkinat ovat alttiimpia lyhytaikaiselle volatiliteetille ja nopeille hintavaihteluille. Yli-optimistinen markkinakäyttäytyminen liittyy epärealistisiin odotuksiin omaisuuserien tulevista arvoista, joissa usko hintojen jatkuvaan nousuun luo itseään vahvistavan kierteen, jossa nousevat hinnat synnyttävät lisää spekulaatiota. Tämä ilmiö näkyy esimerkiksi tekoälyyn liittyvien investointien viimeaikaisessa voimakkaassa kasvussa.

Tämä tutkimus tarkastelee mekanismeja, jotka ruokkivat spekulatiivisia kuplia, sekä miten odotukset ja luottoehdot vaikuttavat omaisuushintojen irtautumiseen talouden perustekijöistä. Lisäksi tutkimuksessa selvitetään, miten optimistiset narratiivit ja heikentyneet riskikäsitykset voimistavat spekulatiivista dynamiikkaa. Teoreettinen viitekehys kuvaa, miten vakausjaksot kannustavat suurempaan riskinottoon ja velkavivun kasvuun optimististen vaiheiden aikana ja miten odotuksista tulee vähitellen yhä ekstrapoloivampia hintojen jatkaessa nousuaan. Empiirinen osuus tarkastelee tapauskohtaisena esimerkkinä 1980-luvun Japania.

Katsaus empiiriseen kirjallisuuteen osoittaa yleisesti, että omaisuushinnat kiihtyvät talouden perustekijöitä nopeammin silloin, kun odotuksista tulee ekstrapoloivia. Spekulatiivisten jaksojen taustalla vaikuttavat

sijoittajien uskomuksiin perustavat reaktiot, luoton saatavuus sekä markkinarakenteet. Noususyklejä voimistavat erityisesti rajalliset lyhytmyyntimahdollisuudet ja omistuksen keskittyminen, jotka ohjaavat odotuksia nousevien hintojen suuntaan ja syrjäyttävät pessimistiset sijoittajat markkinoilta.

Tulokset viittaavat siihen, että optimistiset odotukset, kasvava velkavipu ja viivästyneet politiikkatoimet herättävät huolta nykyaikaisten rahoitusjärjestelmien kestävyydestä. Keskeinen tekijä spekulatiivisten kuplien voimistumisessa on luotonannon helppo laajentuminen, joka mahdollistaa odotusten muuttumisen kasvavaksi omaisuuserien kysynnäksi. Markkinanarratiivit voivat ylläpitää uskomusvetoisia syklejä silloinkin, kun talouden perustekijät eivät tue hintojen nousua. Lisätutkimusta tarvitaan odotusten muodostumisesta, luottodynamiikasta ja politiikkatoimista, joilla voidaan lieventää spekulatiivisille kuplille ominaista endogeenista epävakautta

Keywords: speculative bubbles, extrapolative expectations, Minsky, financial instability hypothesis, credit dynamics, financial fragility

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1 Introduction

Speculative bubbles have repeatedly appeared throughout history and remain a defining feature of modern financial markets. Current research on market volatility such as Long & Guo (2025) indicates that the speed and scale of speculative bubbles within modern financial markets have intensified due to structural changes in market participation and information flows. Digital trading platforms and the rise of retail investors have increased short-term volatility and made markets more susceptible to rapid price swings detached from economic fundamentals. The study shows evidence of structural rise in volatility clustering across major equity markets, driven partly by coordinated retail behavior and accelerated spread of information. These developments highlight how speculative dynamics can distort investment decisions amplifying macroeconomic instability.

Exuberant market behavior in the modern era is closely tied to rapid technological advancements and the scientific progress underlying them. When investors collectively develop unrealistic expectations about the future value of an asset, believing prices will continue to rise indefinitely, in such conditions, stock prices detach from realistic valuations and begin rising uncontrollably. This creates a self-reinforcing feedback loop in which inflated prices generate further excitement and speculation. During the dot-com boom of the 1990s, analysts and investors became excessively optimistic about internet-based technologies, driving the stock prices of many tech companies far beyond what traditional valuation metrics could justify. Fundamental analysis based on earnings, assets, and cash flows failed to explain the extreme valuations of numerous dot-com firms, indicating that prices were driven largely by speculative behavior. The current surge in investment surrounding artificial intelligence shows similarities, where conventional valuation measures are often dismissed in favor of narratives about the potential future use of AI. This echoes the speculative dynamics of the dot-com era (Chelikavada & Bennett 2025).

Modern financial structures have increased the speed at which speculative dynamics can spread. High-frequency trading paired with widespread access to leverage, and algorithmic strategies have made markets more sensitive to rapid shifts in sentiment. Adrian et al. (2022) show that the interaction between leverage cycles and investor expectations has become a central driver of asset-price amplification, particularly in markets with high retail participation. These structural changes make understanding speculative bubbles essential for assessing contemporary financial-stability risks. The 2007-09 financial crisis demonstrates the economic consequences of a bubble collapse. The crisis erased nearly $16 trillion in home equity and retirement savings, while unemployment approached 10% and households were forced to rebuild savings in the US. (Luttrell

et al. 2013). By 2014 it was estimated that 23 advanced nations were permanently affected by the crash and on average a country had lost 8.4% of its potential GDP (Ball 2014).

The purpose of this research paper is to analyze what mechanisms fuel speculative bubbles and to examine how these mechanisms cause asset prices to become detached from economic fundamentals. Particularly focusing on how expectations and credit conditions interact to amplify speculative dynamics. This approach highlights how modern financial systems generate instability when risk perceptions decline and optimistic narratives dominate market pricing.

The study is carried out as a descriptive literature review. The theoretical framework is built around Hyman Minsky's Financial Instability Hypothesis (FIH), which explains how periods of stability encourage increased speculative financing and eventually lead to financial fragility. Modern interpretations of Minsky's framework, such as Keen (1995), formalize these dynamics by modelling how debt accumulation and profit expectations interact to generate instability. Camous & Van der Ghote (2024) strengthen the connection between Minsky's hypothesis and contemporary macro-financial models by incorporating extrapolative expectations and belief-driven credit cycles. These theoretical perspectives provide the foundation for analyzing how speculative mechanisms emerge and why they persist within economies.

The empirical research literature used in this study examines how these mechanisms work within speculative episodes, focusing on Japan's 1980s asset bubble as a case study. The literature includes macroeconomic analyses focusing on behavioral-finance studies, and empirical work on valuation ratios and credit dynamics. Understanding these mechanisms is important as modern financial markets exhibit many of the same structural vulnerabilities present in previous speculative bubble periods such as high leverage usage and sentiment-driven trading.

2 Speculative bubbles formation

2.1 The financial instability hypothesis

Financial bubbles are formed when the price of a financial asset in a particular sector rises rapidly over a short period of time, creating a prolonged upward trajectory that eventually collapses. While the rise and fall describe the price pattern, speculation points toward the role of fundamentals. Economists use the term “bubble” in a situation where a price deviation cannot be explained by fundamental values alone. These fundamentals are typically understood as the present value of expected future cash flows, and when market prices rise above this value, the excess is considered the bubble component. A speculative bubble is a specific type of financial bubble in which asset prices rise far above their fundamental value due to investors’ irrational behavior, buying primarily in the hope of selling at a higher price. This price increase is driven by self-reinforcing expectations rather than underlying economic factors. Without solid economic foundations, the bubble becomes vulnerable to collapse when market sentiment or economic conditions shift. (Baumann & Janischewski 2025).

The financial sector’s stability is often undermined not only by irrational market actors but also by the very policies designed to protect it. Financial speculation reveals a dilemma where central bank interventions aimed at preventing economic collapse can inadvertently encourage irrational behavior. Rational responses to financial fragility can generate the conditions for the next crisis with asymmetric monetary policy. This can be seen in central bank’s policy decisions, particularly the U.S. Federal Reserve, that have historically acted with a distinct bias. In multiple situations where growing asset bubbles rise unexpectedly the Federal Reserve has been reluctant to raise interest rates but reacts quickly to cutting rates and injecting liquidity when asset values start falling. This indirectly creates a put option for investors, as they believe that the central bank will shield them from losses. (Illing 2001).

Speculative bubbles exhibit asset pricing self-reinforcing dynamics that lead to a deviation from intrinsic values that cannot be explained with underlying economic fundamentals. On the financial markets these deviations arise when investors rely heavily on extrapolative expectations assuming recent prices will increase indefinitely (Baumann & Janischewski, 2025; Basele et al. 2025). This process reflects a shift from valuation based on discounted cash flows toward valuation driven purely by expectations of future resale opportunities. This mechanism amplifies volatility and contributes to the eventual formation of speculative cycles (Simsek 2021).

When speculative demand intensifies what follows is that asset prices become increasingly sensitive to shifts in sentiment, making the core financial system more vulnerable to sudden shocks once expectations change or liquidity conditions tighten (Simsek, 2021). Empirical research on leveraged bubbles shows that credit expansion plays a central role in sustaining these price dynamics, as rising leverage enables investors to bid up asset prices beyond levels supported by income or productivity growth (Jordà et al. 2015).

Speculative bubbles represent deep structural processes within the financial systems. Hyman Minsky (1992) evaluated with his Financial Instability Hypothesis, a theoretical explanation on why repetitive episodes of speculative bubbles occur in modern capitalist economies. The framework focuses on relationships between credit, leverage and financial fragility instead of individual investors' behavior. (Minsky 1977). According to the hypothesis, prolonged periods of economic stability encourage economic agents such as financial institutions to take on increasingly risky financial positions, as the lack of recent crises reduces overall perceived risk and fosters greater confidence in continued expansion (Minsky 1992).

This change in behavior leads economic units to transition from hedge financing, where cash flows cover all obligations, to speculative financing, where refinancing becomes necessary, and eventually to Ponzi financing, where repayment depends entirely on rising asset prices (Minsky, 1977). The progression across these financing states increases systemic fragility, as the financial structure becomes increasingly dependent on continuous asset price appreciation and accommodative credit conditions (Bhattacharya et al. 2015).

Modern reinterpretations of the financial instability hypothesis framework emphasize that this transition is reinforced by institutional incentives within the financial sector. Competitive pressures directly encourage lenders to relax credit standards during booms, thereby amplifying speculative dynamics (Bhattacharya et al. 2015). Empirical evidence supports FIH evaluation that financial fragility accumulates during periods of rapid credit growth and rising leverage thus creating conditions conducive to speculative bubbles (Jordà et al. 2015). Studies conducted of the subprime mortgage crisis demonstrate on how rising indebtedness and optimistic expectations paired with financial innovation combined to produce a financial structure consistent with Minsky's described Ponzi regime, thus ultimately leading to systemic collapse once asset prices stopped rising (Dymski 2010). Recent research on diagnostic belief formation further shows that investors tend to overweight recent price trends and underestimate risks, contributing to the formation and persistence of speculative bubbles in modern financial markets (Camous & Van der Ghote 2022).

This brings out a theme that financial stability itself breeds complacency as it is encouraging risk-taking behavior that ultimately destabilizes the system (Illing 2001). Theoretical and empirical literature suggests that speculative bubbles are not random events but rather recurring outcomes of the internal dynamics of leveraged financial systems (Ryoo 2009).

2.2 Effects on aggregate demand

Minsky's Financial Instability Hypothesis provides a conceptual explanation for how financial structures evolve toward fragility but a better way to understand these dynamics requires macroeconomic models that operationalize his insights. Steve Keen (1995) presents a framework where profitability, investment, and debt interact with each other to generate an endogenous cycle. (Keen 1995, 607). Keen's model is widely recognized as a formalization of so called Minskyan dynamics and provides a useful foundation for understanding how speculative bubbles influence aggregate demand (Keen 1995, 608).

This framework can be extended with research conducted by Durand et al. (2025) who argue that endogenous cycles can be prolonged into multi-decade Supercycle's with institutional and policy interventions. Since the 1980s financial expansions have heavily relied on monetary accommodation and policy innovation. This has resulted in debt-driven growth to persist far beyond what is implied in Keen's model. Analysis shows that central bank activism and fiscal backstops have repeatedly postponed the deleveraging phases predicted by Minsky's theory. Short cycles have evolved into long-term mechanisms of rising fragility. (Durand et al. 2025, 5–7).

Keens model shows that investment is driven by the profit share of output. Firms invest more aggressively when profitability is high, reflecting Minsky's argument that periods of stability and strong profits encourage increasingly optimistic expectations and greater willingness to take on risk (Minsky 1977, 22). Formally, investment is expressed as:

$$I = \kappa(\pi) \cdot Y$$

where I is investment, Y is output, and $\kappa(\pi)$ is an increasing function of the profit share π (Keen 1995, 615). This shows that investments accelerate during the expansion phase of the financial cycle, contributing to rising aggregate demand. Debt grows when investment exceeds retained earnings, meaning firms must borrow to finance the difference (Keen 1995, 616). This relationship is expressed as:

$$\dot{D} = I - \pi Y$$

where D is private debt and $\dot{D}$ is its rate of change (Keen 1995, 617-618). This equation formalizes Minsky's ideas that firms increasingly rely on external finance as the boom progresses, especially as they transition from hedge to speculative and Ponzi financing (Minsky 1992, 6–7). At first rising debt levels support higher investment and demand, but they also increase the fragility of the financial system (Keen 1995, 617). This fragility does not become visible immediately rather prosperity hides it making it difficult to address through conventional policy.

Durand et al. (2025) argue that this rising fragility has been repeatedly masked by what they call pseudo-validation as the temporary monetary re-validation of financial claims through central bank interventions (Durand et al 2025, 8–9). Instead of allowing the debt-deflation mechanism to unfold, policymakers have repeatedly stepped in to stabilize asset prices, this in turn effectively extends the life of speculative and Ponzi units.

Aggregate demand consists of consumption and investment:

$$AD = C + I$$

Consumption is financed by wages and changes in debt:

$$C = \omega Y + \dot{D}$$

where ω is the wage share of income (Keen 1995, 616). Substituting this into the aggregate demand identity yields:

$$AD = \omega Y + \dot{D} + I$$

Using the debt accumulation equation, this becomes:

$$AD = \omega Y + (I - \pi Y) + I$$

Simplifying:

$$AD = (1 - 2\pi)Y + 2I$$

This expression focuses on Minky's insight on aggregate demand rising with investment but becoming increasingly sensitive to profit shares and debt dynamics. (Keen 1995, 617). When there is a boom in an economic period, high profits and optimistic expectations stimulate investments. This raises output and reinforces an upward trajectory of asset prices (Minsky 1977, 23). Debt also accumulates at the same time as firms finance investments through excessive borrowing. This leads to credit driven expansion that elevates aggregate demand far beyond what could be possible in

more conservative conditions in the financial sector. (Keen 1995, 617). The self-reinforcing nature of this process means that rising demand validates optimistic expectations that generated it, portraying sustainable expansion while underlying fragility deepens.

Durand et al. (2025) extend this logic by showing that the post-2008 period represents a shift from private-sector Ponzi finance to what they call a state-sponsored General Ponzi, in which central bank balance sheets and government deficits become the primary mechanisms sustaining financial expansion (Durand et al 2025, 6–7). Empirical evidence demonstrates that financial assets continued to grow relative to GDP throughout the 2010s, despite weak income growth, an outcome consistent with prolonged pseudo-validation rather than genuine profitability.

However, as the debt burden grows, the financial system becomes increasingly fragile. Once profitability declines or interest rates rise, firms face difficulty servicing their debt (Minsky 1992, 4). A fall in investment is magnified by the Keynesian multiplier effect on output as this triggers a sharp contraction in aggregate demand. This effect is amplified by declining consumption, as households and firms reduce spending to repair their balance sheets and the result is the opposite of a boom (Minsky 1992, 15-24). The collapse reflects an endogenous consequence of the expansion itself.

Durand et al. (2025) also argue that the post-COVID inflation shock represents a structural limit to this prolonged pseudo-validation regime. They introduce the concept of a Non-Asset-Busting Interest Rate (NABIR), where the maximum interest rate that a leveraged financial system can sustain without triggering widespread asset deflation (Durand et al 2025, 21). When inflation forces central banks to raise rates above NABIR, policy around compromising between either price stability or financial stability becomes impossible to manage, effectively marking the end of the Supercycle. This shows how institutional and policy dynamics can stretch these cycles over decades.

2.3 Problems related to the financial instability hypothesis

A central critique is that Minsky's framework lacks formalization as much of his work is presented narratively, relying on descriptive reasoning rather than explicit mathematical modeling. Palley, (2009) argues that the hypothesis only provides a partial count of modern crises because it does not offer a fully specified model capable of rigorous testing (Palley 2009, 2). Bhattacharya et al. (2015) similarly brings up that while the emphasis on optimism, leverage, and risk-taking is compelling, the original hypothesis was not formally modeled, requiring a later construction of mathematical

representations to make the theory analytically tractable (Bhattacharya et al. 2015, 1-2). This absence of a formal structure has limited the hypothesis's acceptance within mainstream macroeconomics, which increasingly demands micro-founded, mathematically explicit models.

Another problem is with the empirical ambiguity of Minsky's financing regimes. Distinction between hedge, speculative, and Ponzi finance is conceptually appealing but difficult to operationalize in practice. Palley (2009) highlights that modern financial systems involve complex balance sheets, securitization, derivatives, and off-balance-sheet vehicles, making it nearly impossible to classify firms or households cleanly into Minsky's categories (Palley 2009, 2–3). Bhattacharya et al. (2015, 1–3) argue that mechanisms described such as rising optimism and leverage are not directly observable and require assumptions about expectations formation and default behavior that are difficult to validate empirically.

While Minsky emphasizes how periods of stability generate optimism and increased risk-taking, similarly these mechanisms appear in behavioral finance, rational expectations learning models, and modern credit cycle theories. Borio (2012) presents that financial cycles can be explained through self-reinforcing interactions between risk perceptions, and asset prices without relying on Minsky's specific taxonomy of financing regimes (Borio 2012, 1–2). The hypothesis overstates the inevitability of financial instability according to Palley (2009) as instability arises not from capitalism per se but from specific institutional and policy choices under neoliberalism, including wage stagnation, deregulation, and globalization (Palley 2009, 3–4). Financial instability is not an inherent feature of capitalist economies but a consequence of particular policy regimes, suggesting that institutional reforms could mitigate the tendency toward fragility.

There is also a limited integration of Minsky's hypothesis within mainstream macroeconomic theory. Standard models, particularly those based on rational expectations and the efficient market hypothesis automatically assume that financial markets efficiently incorporate information and that agents optimize behavior based on stable preferences. These assumptions conflict with Minsky's emphasis on irrational optimism, balance-sheet fragility, and endogenous crisis dynamics. Palley (2009, 4) notes that Minsky focuses narrowly on financial markets and ignores deeper structural causes, making the hypothesis difficult to integrate into models built on micro foundations. Bhattacharya et al (2015, 1–3) have attempted to make sense of the hypothesis by embedding FIH mechanisms into a formal model of expectations, leverage, and default, but their work implicitly acknowledges that Minsky's original theory is incompatible with standard equilibrium modeling and requires substantial reinterpretation.

If financial instability is inherent to capitalist economies, stabilizing the system may require continuous and extensive intervention by central banks and regulators. Such interventions risk creating moral hazard, encouraging the very risk-taking behavior they aim to prevent. Diamond & Rajan (2008) show that expectations of central bank intervention such as the Greenspan put where investors are given a right to sell an asset at a certain price level disregarding the actual market price of the asset, can lead banks to take on more leverage and illiquid positions, increasing systemic fragility (Diamond & Rajan 2008, 1–3). Similarly, Borio (2012, 6–7) warns that policy regimes that suppress financial cycles through accommodative monetary policy may amplify long-term vulnerabilities, making crises more severe when they occur. Palley (2009, 4) adds that focusing solely on financial regulation misses deeper structural issues in the real economy. Without addressing wage stagnation, inequality, and global imbalances, financial reforms alone may leave economies in a stagnation.

3 Extrapolative expectations

3.1 The dynamics of expectations

Exuberant market behavior, where investors become overly optimistic in their expectations is one of the core mechanisms behind speculative bubbles, making it essential to understand how expectations form in modern economies. Rational expectations describe a forward-looking process in which agents use all available information and the structural relationships of the economy rather than simple heuristics. Muth (1961) argues that expectations should coincide with predictions generated by the economic model itself because markets do not systematically waste information and agents learn from past errors. This implies that forecast errors are random rather than biased, and that expectations adjust as the system's structure changes. Expectations tend to cluster around the model-consistent prediction and reflect the informational efficiency of firms' forecasting behavior (Muth 1961, 315–317).

Barberis et al. (2018) show that investors do not simply project past price changes forward, but they combine a growth signal, so a weighted average of recent return with a value signal capturing perceived overvaluation, and their relative attention to these signals fluctuates over time. This wavering generates endogenous swings in optimism that amplify price run-ups after positive signals in the market and produces the high trading volume characteristic of bubbles, since even small shifts in attention lead to large portfolio adjustments when signals are strong (Barberis et al. 2018, 203–205).

Survey evidence shows that real-world expectations systematically diverge from the rational-expectations benchmark. Greenwood & Shleifer (2014) find that investor beliefs move strongly with past returns and market levels, revealing a pervasive extrapolative structure as measures of expectations were found to be positively correlated with past stock market returns. Crucially, reported expectations are negatively correlated with model-based expected returns, contradicting the idea that markets aggregate information efficiently. When investors expect high returns, subsequent realized returns are typically low. This behavioral pattern deepens the link between exuberant sentiment, mispricing, and the formation of speculative bubbles (Greenwood & Shleifer 2014, 715–716).

Camous & Van der Ghote (2022) show that expectations themselves become the source of amplification in evaluation when agents form beliefs about future economic conditions under uncertainty, even small shifts in optimism or pessimism can generate large shifts in asset prices and

real activity. Expectations act as a propagation mechanism and in turn optimistic beliefs relax borrowing constraints and fuel expansions. Pessimistic revisions tighten financial conditions and accelerate downturns. This framework highlights that expectations are active drivers of macro-financial dynamics, capable of producing boom-bust cycles even in the absence of large fundamental shocks (Camous & Van der Ghote 2022, 4-5).

An empirical study by Cutler et al. (1991, 529–531) show that returns across stocks, bonds, currencies, real estate, and commodities display short-run momentum and longer-run reversal, patterns consistent with agents mechanically projecting recent price movements forward rather than forming model-consistent expectations. Similar dynamics arise in household markets as Case et al. (2012, 265–270) display that U.S. homebuyers during the 2000s where economic conditions where favorable, formed expectations heavily influenced by recent price increases, with long-term forecasts reaching historically unprecedented levels before collapsing as sentiment turned. These expectations were not random but reflected a belief that past appreciation would persist, even when fundamentals no longer justify such optimism. Bask & Madeira (2021) estimate with a DSGE framework in which agents partially base asset-price expectations on past trends, finding that extrapolative beliefs significantly improve the model's ability to match observed persistence, hump-shaped investment responses, and deviations of asset prices from fundamentals (Bask & Madeira 2021, 1101–1104). Together, these findings show that extrapolative expectations are not confined to speculative episodes but represent a systematic pattern, shaping economic behavior across markets, influencing investment and risk-taking in ways that depart from the rational expectations.

Extrapolative expectations shape not only investor beliefs but also corporate decision-making. Deng (2019) demonstrates that when analysts become overly optimistic about a firm's future earnings when measured as a positive misperception. The wedge between subjective and model-implied earnings growth, firms tend to respond with aggressive real and financial expansion. In the short run, higher extrapolative optimism predicts increases in capital investment, employment, and both debt and equity issuance, as managers interpret recent favorable shocks as signals of persistently high productivity (Deng 2019, 1–3.) Financing conditions simultaneously improve because investors underestimate default risk, allowing firms to borrow more cheaply and issue equity at higher valuations. Yet these expansions are systematically reversed over in the long run as actual earnings fail to match extrapolated expectations, firms face deteriorating cash flows, and declining asset prices, producing predictable contractions in investment and issuance alongside lower future stock and bond returns (Deng 2019, 2–4). These boom-bust dynamics are especially frequent among

financially constrained firms, where extrapolative beliefs interact with leverage and default risk to amplify both the initial expansion and the subsequent reversal. Firm-level extrapolation therefore reinforces a broader macroeconomic pattern where expectations in recent performance generate short-run expansions and predictable long-run reversals as fundamentals reassert themselves.

3.2 Extrapolative expectations in asset markets

Extrapolative expectations distort asset markets by mispricing and destabilizing trading dynamics. When investors and analysts become overly optimistic after a sequence of favorable economic periods, they tend to extrapolate recent earnings growth into the future, thus inflating equity and bond valuations and easing financing conditions in the short run (Deng 2019, 2–4). Firms respond by issuing more debt and equity at elevated prices, reinforcing the boom. Liao et al. (2021) document a parallel mechanism in bubble environments where extrapolators aggressively buy assets with strong recent returns, pushing prices further above fundamentals, while the disposition effect causes them to sell quickly once gains materialize, generating rapid turnover and unusually high trading volume (Liao et al. 2021, 1–3). These forces interact as extrapolation fuels price run-ups, while realization-driven selling amplifies trading frenzies that produces the characteristic of a boom-bust pattern in an asset market. As fundamentals eventually fail to meet extrapolated expectations, eventually prices, financing conditions, and returns reverse predictably, with the sharpest corrections occurring among firms and investors most exposed to extrapolative beliefs (Deng 2019, 2–4.; Liao et al. 2021, 4–5).

Speculative assets consistently display short-run momentum and long-run reversal, a pattern attributable to traders mechanically projecting recent returns forward rather than updating beliefs based on fundamentals. In their cross-market evidence, prices deviate from fundamental value and later mean-revert, while periods of high short-term interest rates reliably predict lower excess returns, suggesting that belief-driven cycles, not changing risk, drive much of the variation in asset prices (Poterba et al. 1991, 529–531).

Extrapolative beliefs can be formalized to display how they distort pricing as Li & Liu (2023) show that when investors expect future returns to resemble recent ones, the pricing kernel and short rate adjust, generating discount-rate movements that depress return volatility and weaken the link between expected returns and risk premium. Return extrapolation therefore amplifies mispricing as prices rise too far when optimism feeds on past gains, then fall sharply when realized fundamentals fail to validate those beliefs. Together, these findings highlight that extrapolative expectations

create predictable boom-bust patterns in asset prices by pushing valuations away from fundamentals and shaping how investors perceive risk and future returns. (Li & Liu 2023, 1–3).

A way to formalize extrapolative expectations is to embed them directly into a standard Lucas-tree asset-pricing environment. Li and Liu (2023) developed a model in which subjective expected returns are formed by extrapolating past realized returns, rather than by using rational expectations. Investor's subjective expected return at time t is:

$$E_t^e[R_{t+1}] = \bar{R} + \theta(R_t - \bar{R}),$$

where $\bar{R}$ is the long-run average return, R_t is the most recent realized return and $\theta > 0$ captures the degree of extrapolation, so a higher θ means investors place more weight on the latest returns. In a consumption-based model with recursive utility, the equilibrium short rate r_t must satisfy

$$r_t = E_t^e[R_{t+1}] - g_t,$$

where g_t is the subjective risk premium. Extrapolation affects the means of expected returns but not perceived risk, the short rate absorbs nearly all the variation:

$$r_t \approx E_t^e[R_{t+1}]$$

When investors extrapolate recent high returns, the short rate rises mechanically. Even if fundamentals have not changed. This creates a discount-rate channel through which extrapolative expectations move asset prices. P_t is the asset price and D_t its dividend so the price–dividend ratio is:

$$\frac{P_t}{D_t} = \frac{1}{E_t^e[R_{t+1}] - g_t}$$

because $E_t^e[R_{t+1}]$ rises when recent returns are high, the denominator increases, and the price–dividend ratio falls. This is the negative feedback result emphasized in the study, as extrapolation raises discount rates, which suppresses prices even as investors become more optimistic (Li & Liu 2023, 1–3).

This demonstrates how extrapolative expectations operate in asset markets, as investors adjust their portfolio strategies in ways that amplify boom-and-bust dynamics. Gennaioli & Shleifer (2018) argue that such belief-driven cycles arise because investors form diagnostic expectations, overweighting recent signals and underestimating mean reversion. This mechanism aligns closely with the empirical evidence presented as extrapolation fuels expansions by lowering perceived risk

and raising valuations, while subsequent reversals occur when fundamentals fail to validate optimistic beliefs. The diagnostic-expectations framework therefore provides an explanation for why belief distortions persist and why asset markets repeatedly exhibit predictable cycles of overreaction and correction (Gennaioli & Shleifer 2018, 8–14).

3.3 Integrating Minsky's hypothesis with extrapolative expectations

Financial instability emerges when optimistic beliefs expand balance sheets and weakening financial constraints reinforce one another. Minsky's Financial Instability Hypothesis provides the conceptual foundation in which periods of stability reduce perceived risk, encouraging credit expansion, and rising asset prices, thereby creating a cycle in which stability itself becomes destabilizing.

Bordalo et al. (2018) present a diagnostic expectations framework that offers a modern behavioral micro-foundation for this process. Results show that investors overweight recent positive signals and underreact to base rates, causing them to extrapolate positive signals and underestimate risk. Diagnostic expectations tend to overreact to recent fundamentals and generate credit booms and subsequent busts (Bordalo, et al. 2018, 2–4). This belief distortion amplifies speculative expansion by justifying higher leverage and compressed risk premiums

Kubitza (2023) provides empirical support, showing that measures of spillover persistence indicate that during bubble run-ups, when diagnostic expectations and optimism are strongest - losses dissipate unusually quickly. This indicates loose financial conditions and hidden fragility. Spillover persistence is particularly low before financial crises and during run-up phases of stock market bubbles, and low persistence is found to predict higher leverage and a greater probability of future crises (Kubitza 2023, 2-4).

Camous & Van der Ghote (2024) strengthen the connection between Minsky's hypothesis and modern models of extrapolative expectations. The framework presented explicitly embeds leveraged investors, financial frictions, and diagnostic expectations into a unified macro-finance model. Consistent with Minsky's view that optimism and leverage rise together during expansions, they show that investors revise beliefs upward after favorable shocks, increasing risk-taking and borrowing even when fundamentals do not justify it. As investors become more optimistic about the future and thus become more eager to borrow (Camous & Van der Ghote 2024, 1-2).

A way to formalize the interaction between extrapolative expectations and financial fragility is to present the of belief distortions directly into a macro-finance environment with leverage constraints. Camous and Van der Ghote (2024) combine three elements central to Minsky's hypothesis with

leveraged investors, financial frictions, and extrapolative expectations. Agents form beliefs about future shocks by overweighting recent disturbances. The aggregate shock follows $dZ_t \sim N(0, dt)$ and expectations obey a diagnostic-expectations rule:

$$\widehat{E}_t[dZ_t] = \phi w_t \, dt,$$

where $\phi > 0$ is the diagnostic weight,

$$w_t = \int_0^t e^{-\delta(t-s)} \, dZ_s,$$

as such w_t summarizes recent shocks (Camous & Van der Ghote 2024, 7). This implies that agents extrapolate from recent outcomes as positive shocks raise expected future returns, while negative shocks induce pessimism. These distorted expectations feed into perceived returns on risky and safe technologies. For technology j, perceived expected returns satisfy:

$$\widehat{E}_t[dR_{j,t}] = \left(\frac{A_j - I_j}{q_t}\right) dt + \mu_{q,t} dt + (\sigma_{q,t} + \sigma_j)\phi w_t dt,$$

so that optimism inflates expected returns on risky technology, encouraging greater leverage and risk-taking. When recent shocks are negative, pessimistic extrapolation suppresses risk-taking and can trigger fire-sale dynamics, tightening constraints and amplifying downturns. This mechanism generates a cycle endogenously where favorable shocks raise w_t, this in increasing optimism and leverage make adverse shocks reduce w_t, depressing perceived returns and forcing deleveraging. (Camous & Van der Ghote 2024, 2–3).

López-Salido et al. (2016) provide further empirical support by showing that periods of unusually buoyant credit-market sentiment are characterized by narrow credit spreads and elevated junk-bond issuance that systematically precede economic downturns. Using U.S. data from 1929 to 2013, they find that when credit risk is aggressively underpriced, economic activity reliably weakens in the following years. This pattern reflects predictable mean reversion in credit conditions as compressed spreads today tend to widen sharply in the future, and this widening is closely tied to the start of recessions. As credit conditions tighten, firms shift from net debt issuance to net equity issuance, indicating a contraction in credit supply (López-Salido et al. 2016, 1–3).

Together, these theoretical and empirical findings show that financial fragility and extrapolative expectations are mutually reinforcing. Optimistic beliefs justify rising leverage, while expanding balance sheets validate those beliefs, until fundamentals fail to keep pace. The integration of

diagnostic expectations into macro-financial models demonstrates that belief distortions are central drivers of credit cycles, asset-price booms and lead to systemic financial crises.

4 Empirical analysis on speculative bubbles

4.1 Mechanisms of bubble formation in Japan's 1980's asset boom

The primary mechanism in which speculative bubbles form is the detachment of asset prices from economic fundamentals. As such it is important to understand which conditions allow this detachment. The theoretical framework presented in the previous chapters suggests that extrapolative expectations and credit driven amplification loosen financial constraints and thus raise aggregate demand that eventually reinforces optimistic pricing dynamics. By examining empirical research on Japan's 1980s asset bubble, this chapter assess whether the theoretical framework explains core mechanisms allowing the formation of speculative bubbles.

Research done by Okina et al. (2001) on the bubble's formation and lasting effects, utilizing macroeconomic and policy evidence, emphasizes that the bubble was driven by intensified bullish expectations that pushed asset prices far beyond fundamentals. Investors and financial institutions increasingly extrapolated past price increases into the future while reinforcing aggregate demand and speculative behavior (Okina et al. 2001, 396). Shiratsuka (2003), analyzing economic indicators and measures of investors sentiment, characterizes this as a period of euphoria in which excessive optimistic expectations about long-term economic growth persisted in the absence of supporting economic foundations. This dynamic reflects extrapolative mechanism discussed in the previous chapter, where recent favorable outcomes are projected forward and optimism becomes self-sustaining.

The decision making of the Bank of Japan (BOJ) played a large part in the formation of the bubble. Concerns around inflation and the risks of excessive monetary easing made the BOJ hesitate to tighten policy even as asset prices surged beyond sustainable levels. Prolonged monetary accommodation contributed to rapid credit growth and reinforced the belief that rising asset prices were sustainable (Okina et al. 2001, 396). Challenges that policymakers faced were recognizing real structural change instead of euphoric mispricing making pre-emptive tightening difficult as conventional price indices presented stability (Shiratsuka 2003,1-3). Barsky (2009) applies asset-pricing models and survey data to show that the bubble cannot be fully explained by fundamentals under homogeneous rational expectations but instead, heterogeneous beliefs and extrapolative optimism. Optimistic investors dominated market pricing when short-selling constraints prevented pessimists from disciplining valuations. As belief dispersion widened, asset prices increasingly

reflected the expectations of the most optimistic agents, making valuations fragile and prone to collapse once optimism subsided (Barsky 2009, 3–5).

Hu and Oxley (2017) used econometric bubble-detection methods to confirm that both stock and land prices exhibited explosive bubble-like dynamics (Hu & Oxley 2017, 4-5). Stock prices illustrate the scale of this speculative boom as the Nikkei 225 accelerated sharply from 1986 onward, peaking at ¥38,915 at the end of 1989 before collapsing to ¥14,309 by 1992. Land prices in September 1990 were four times higher than in September 1985 and followed a similar trajectory as they dropped around 80% from this peak (Hu & Oxley, 2, 2017.) The combined capital gains on stocks and land reached 452% of nominal GDP during 1986–89 (Okina et al. 2001, 399). The equity yield implied an unrealistically high expected nominal GDP growth rate of 8% during 1990 demonstrating that expectations drifted from fundamentals. (Shiratsuka 2003, 3-4). Long-term real interest rates fell roughly 120 basis points between 1985 and 1986 and then suddenly soared by 100 points between 1989 and 1990. Equity valuations could not be explained by these interest rates movements suggesting that investors over-extrapolated temporary monetary conditions into the future, consistent with Keen's model (1995), in which investments accelerated beyond what probability and income growth can support. GDP and dividend growth surged between 1986 and 1988 and total long-run earnings growth above 5%, yet valuations continued to rise (Barsky 2009, 13–17). Hu and Oxley (2017) also find evidence of bubble contagion, as speculative dynamics migrated from the stock market to the real estate market as the bubble intensified. The stock market bubble emerged first and peaked in 1989 while real estate prices continued to grow peaking at 1991 (Hu and Oxley 2017, 5-7).

Economic overheating further amplified the bubble as industrial production grew at an average annual rate of 7.2%, while real GDP expanded by 5.5%. Fixed investment remained near 20% of GDP, and households increased spending on housing and durable goods. Money supply and credit expanded rapidly after 1987 and financial deregulation with addition of soaring stock prices encouraged banks to expand lending aggressively, especially to small firms and property-related borrowers. As a result, total funding of the corporate and household sectors, including bank borrowing and multiple bond types rose sharply, reaching 14% year-on-year growth in 1989 (Okina et al. 2001, 403). The buildup of systemic risk was hidden by the appearance of stable inflation, which led policymakers and market participants to underestimate the scale of underlying imbalances (Shiratsuka 2003, 2-3). This dynamic is consistent with Minsky's central argument and Durand et al. (2025) concept of pseudo-validation, where stability encourages complacency and policy accommodation hides fragility.

Financial institutions themselves became increasingly speculative as deregulation eroded traditional interest-rate margins, pushing banks toward riskier lending strategies. Property-backed loans surged, and banks' capital bases expanded dramatically from ¥35 trillion in September 1988 to ¥46 trillion in September 1989 driven in part by unrealized capital gains on stockholdings (Okina et al. 2001,412–413). This aggressive behavior reflects inadequate risk management present in the financial system leading to excessive real-estate lending (Shiratsuka 2003, 3-4). This behavior demonstrates the transition from hedge state to speculative finance in large fueled by extrapolative optimism and reinforced by rising collateral values.

Hossain & Rafiq (2011) analyzed policy decisions around deregulation and provide evidence of inadequate risk management. Financial deregulation exposed Japanese banks to competition and altering incentives making the transition to a partially deregulated system more fragile, thus heightening systematic risk. A decline in profitability increased pressure on banks to seek alternative sources of return, explaining in the increasing aggressive risk-taking behavior. As the banks shifted towards riskier capital market sectors, they failed to recognize underlying risks with actual returns reflecting systematic mispricing of credit (Hossain & Rafiq 2011, 26-30).

Furthermore, survey data reveals that most investors did not view equity prices as excessive, indicating that the boom was sustained by fundamentally-based optimism rather than by perceptions of speculative excess. Even investors in 1989 who believed that prices were too high continued to hold equities showing the dynamic-heterogeneity mechanism in which economic agents expected optimistic investors to keep pushing the prices higher (Barsky 2009, 24–25, 30-31). This mirrors the same diagnostic expectations framework presented in Chapter 3 by Gennaioli & Shleifer (2018), where investors overweigh recent signals and underestimation of mean reversions sustain belief distortions.

The credit dynamics observed during Japan's asset bubble clearly align with the pattern documented by López Salido et al. (2016), where periods of compressed credit spreads and underpriced credit risk systematically precede economic downturns. The rapid expansion of bank lending and the mispricing of property-backed credit risk, reflects this dynamic. Optimistic expectations distorted credit pricing and created macroeconomic vulnerability that only became visible once asset prices reversed (López Salido et al. 2016, 7–10).

4.2 Analyzing price-to-earnings ratios

Price-to-earnings (P/E) ratios measure a company's share price relative to its earnings per share. Because they capture the relationship between market valuations and underlying profitability, P/E ratios provide a clear metric for assessing the extent to which equity prices diverge from fundamentals. This chapter examines empirical studies on how P/E ratios behaved during periods of speculative expansion and evaluate whether elevated valuations can be explained by economic fundamentals or whether they reflect belief-driven dynamics.

French & Poterba (1991) utilize long-run comparative valuation analysis to examine whether differences in reported earnings and market structure can explain the divergence in Japanese and U.S. P/E ratios. Calibrated valuation models were assessed on how changes in expected growth rates and required returns would affect implied P/E ratios (French & Poterba 1991, 358–361). Between 1984 and 1989, the Nikkei increased at an average annual rate of 27.5%, while the aggregate P/E ratio rose from 37.9 to 70.9 (French & Poterba 1991, 337–338). This increase in P/E ratio reflects that investors were ready to pay a premium for each unit of earnings, as valuations were driven by anticipated future profits. At the same time, dividend yields declined to 0.5%, indicating that valuations increasingly reflected extrapolated future growth rather than realized profitability. (French & Poterba 1991, 344).

Although Japanese P/E ratios were structurally higher than U.S. ratios due to accounting conventions, these differences cannot explain the explosive rise in valuations during the mid-1980s. Even after placing Japanese firms on the same accounting footing as their U.S. counterparts, the valuation gap between the two markets remains substantial. Adjustments for differences in reporting standards and depreciation methods narrow the disparity only modestly, leaving Japanese equities priced at levels that still exceed those implied by fundamentals. Once the mechanical effects of accounting practices are removed, the core pattern persists as Japanese share prices remain valued at unusually high multiples of earnings throughout the late 1980s, indicating that the elevation of P/E ratios cannot be attributed to bookkeeping conventions. Price-to-cash-earnings ratios, which are unaffected by depreciation methods, exhibit the same pattern. These findings confirm that accounting differences cannot account for the doubling of Japanese P/E ratios in 1986 or their persistence at elevated levels thereafter. (French & Poterba 1991, 351-352).

The study also highlights the role of intercorporate shareholdings in distorting the apparent size and depth of the Japanese equity market. Extensive cross-ownership such as Toyota's ownership of more than 40% of four listed firms and at least 5% of twenty-two others, while banks collectively

held nearly 30% of Toyota's stock. This created a substantial double-counting in market capitalization figures (French & Poterba 1991, 338-342). After adjusting for these holdings, the Japanese market never exceeded 80% of the U.S. market in outside equity value (French & Poterba 1991, 343). This illusion of market depth likely reinforced investor optimism, illustrating that financial structures can obscure underlying fragility.

Based on their results, French & Poterba (1991) conclude that fundamental factors can account for only part of the valuation differences between the U.S. and Japanese stock markets. While accounting practices explain a substantial share of the persistent gap in P/E ratios, they cannot account for the sharp rise in Japanese valuations during the mid-1980s or their subsequent decline. There was no evidence of improved growth expectations that could justify the boom, and although required returns fell in the mid-1980s, the decline was too small to explain the magnitude of the increase in P/E ratios. In contrast, the market correction of 1990 aligns more closely with rising required returns. Similar valuation patterns in land and equity markets suggest a broader speculative dynamic, as rising land prices cannot be explained by changes in rents or fundamentals. Overall, their findings imply that the Japanese asset boom of the late 1980s cannot be understood through fundamentals alone (French & Poterba 1991, 361–362).

Kumar & Hyodo (2001) provide a comprehensive empirical analysis of Japanese P/E ratios over the period 1975–1995, with the central objective of determining whether the exceptionally high valuation multiples observed in the 1980s can be explained by accounting practices or macroeconomic fundamentals. The sudden rise in the Nikkei's P/E ratio from 37.9 in 1984 to 70.9 in 1989 raised widespread concerns that Japanese equities had become detached from underlying earnings (Kumar & Hyodo 2001, 25). The study investigates whether these elevated ratios reflect genuine economic conditions or whether they are affected by Japan's distinctive corporate and accounting structures.

Japanese P/E ratios were adjusted to correct for three major accounting differences relative to the United States in the form of cross-holdings, special reserves, and accelerated depreciation. These adjustments are essential because Japanese firms' unconsolidated earnings systematically understate profitability, inflating reported P/E ratios. Using established correction procedures, they remove the effects of intercorporate shareholdings and undo the impact of reserve contributions and convert accelerated depreciation into straight-line equivalents (Kumar & Hyodo 2001, 26–33). Recalculating adjusted P/E ratios were examined with the goal of finding whether expected

earnings growth, real interest rates, inflation, and required returns can account for the observed time-series behavior of Japanese valuation ratios (Kumar & Hyodo 2001, 34–35).

The core findings show that accounting adjustments reduce Japanese P/E ratios substantially, particularly during the late 1980s when cross-holdings were at their peak. For example, adjusting for cross-holdings lowers the 1990 P/E ratio from 44.7 to 31.0 (Kumar & Hyodo 2001, 36). However, even after all corrections, Japanese P/E ratios remain significantly higher than U.S. levels and continue to rise sharply during the bubble years. This indicates that accounting differences explain only part of the valuation gap. Turning to fundamentals, results find that neither higher expected growth nor lower discount rates can justify the extreme valuations of the late 1980s. To rationalize observed P/E ratios, firms would have needed unrealistically high reinvestment opportunities or implausibly low required returns (Kumar & Hyodo 2001, 30–33). The study's main limitation stems primarily from the difficulty of precisely estimating adjustments for cross-holdings and depreciation, as well as the reliance on aggregate indices that may obscure firm-level heterogeneity. (Kumar & Hyodo 2001, 25).

Chan et al. (1990) examine with fundamental valuation ratios such as earnings-to-price ratio (E/P), being the inverse of P/E ratio, could predict stock returns in Japan between 1971 and 1988. The study addresses whether earnings-based valuation measures carried meaningful information in the years leading up to Japan's asset-price boom. Using a comprehensive dataset that includes delisted firms, non-manufacturing companies, and both sections of the Tokyo Stock Exchange, the study aims to test whether the relationships observed in U.S. markets also hold in Japan (Chan et al. 1990, 1–5).Firms were sorted annually into portfolios based on factors such as yield, size, and book-to-market ratios, and the resulting portfolios were analyzed using cross-sectional regression techniques (Chan et al. 1990, 6–9). The inclusion of delisted firms reduces survivorship bias, an issue that is present in similar studies. However, the reliance on parent-only financial statements may understate true profitability for some firms (Chan et al. 1990, 5).

The results reveal that the Japanese market behaves differently from the U.S. in ways directly relevant to interpreting P/E ratios. Most notably, earnings yield does not reliably predict returns in Japan once other fundamentals are controlled for. In some specifications, the coefficient on E/P even turns negative, implying that firms with low earnings yields but high P/E ratios, did not underperform as standard valuation theory would suggest (Chan et al. 1990, 10). Book-to-market ratios and cash-flow yields emerge as the most robust predictors of returns. This pattern indicates that reported earnings were a weak indicator of underlying profitability, reducing the informational

value of P/E ratios during this period. The study shows that earnings-based valuation metrics were less informative in Japan than in other major markets, particularly during the years when valuations were rising most rapidly. By demonstrating that E/P ratio failed to predict returns, Chan et al. (1990) provide evidence that Japanese P/E ratios were not embedded to fundamentals, supporting the view that Japan's valuations during the 1980's were sustained by belief driven dynamics.

4.3 Results

Empirical studies consistently show that Japan's 1980s asset boom was characterized by asset prices rising far beyond levels justified by economic fundamentals. For example, several studies document that investor expectations became increasingly extrapolative as investors projected past price increases into the future even when macroeconomic indicators no longer supported such optimism (Okina et al. 2001; Shiratsuka 2003). Similarly, Barsky (2009) finds that heterogeneous beliefs and short-selling constraints allowed the most optimistic investors to dominate market pricing, causing valuations to reflect the expectations of a narrow subset of market participants rather than broad economic conditions. Studies of financial conditions show that prolonged monetary accommodation and rapid credit expansion lowered perceived risk and encouraged speculative borrowing, further accelerating price increases (Okina et al. 2001; Hu & Oxley 2017). The findings on the drivers of Japan's asset boom are consistent across these studies, regardless of whether the focus is on expectations, credit dynamics, or market structure. Based on these results, it can therefore be stated that Japan's asset prices became increasingly detached from fundamentals due to the combined effects of extrapolative expectations and loose financial conditions that weakened market discipline.

Some studies also identify partial reversals or mitigating dynamics. For example, Hu & Oxley (2017) show that speculative dynamics migrated from the stock market to the real estate market with a later time difference. This shows that different asset classes responded to the bubble's drivers at different speeds. Similarly, Barsky (2009) finds that even investors who believed prices were excessive continued to hold equities, indicating that expectations of continued optimism among other market participants sustained the boom. These findings suggest that although the mechanisms unfolded at different times across markets, the overall pattern of detachment from fundamentals remained consistent.

When evaluating the economic mechanisms behind the bubble, it is also important to consider the reliability of empirical evidence. A key question is whether factors other than expectations and credit conditions could explain the observed valuation patterns. French & Poterba (1991) found that

accounting conventions or intercorporate shareholdings could account for Japan's unusually high P/E ratios but find that these factors explain only part of the valuation gap. Kumar & Hyodo (2001) similarly test whether differences in depreciation methods, reserves, or cross-holdings could account for the extreme multiples observed but similarly conclude that fundamentals cannot justify the valuations even after extensive adjustments. Chan et al. (1990) further show that earnings-based valuation metrics lost their predictive power during this period, indicating that reported earnings were not driving market prices. These findings collectively suggest that alternative explanations such as accounting differences or structural reporting issues cannot fully explain the bubbles magnitude.

Additional studies identify factors that may have intensified the bubble's effects. Hossain & Rafiq (2011) find that deregulation increased banks' exposure to risk by eroding traditional margins and encouraging a shift toward speculative lending. López-Salido et al. (2016) show that compressed credit spreads reflected underpriced risk rather than improved fundamentals, suggesting that investors systematically underestimated credit risk during the boom. These findings indicate that structural changes in the financial system, such as deregulation and mispriced credit risk, may have amplified the economic consequences of the bubble.

Taken together, the evidence suggests that Japan's asset boom was particularly severe due to speculative dynamics not being counteracted by policy interventions or market discipline. Consistency across studies supports the conclusion that the asset boom was fueled by a combination of extrapolative expectations and credit-driven amplification with structural financial vulnerabilities. The empirical evidence closely mirrors the theoretical framework presented in the preceding chapters.

5 Conclusions

The purpose of this study was to examine the mechanisms that fuel speculative bubbles and to analyze how these mechanisms cause asset prices to detach from economic fundamentals. The theoretical framework was built around Minsky's Financial Instability Hypothesis and extended with modern research on extrapolative expectations and identified several factors that contribute to this detachment. Periods of stability reduce perceived risk and encourage greater leverage, while investors increasingly rely on recent price trends when forming expectations. As a result, asset valuations become driven less by underlying cash flows and more by optimistic narratives about future price appreciation. Policy responses that should, in principle, restrain speculative excess often have the opposite effect. Financial deregulation, and insufficient risk management practices make extrapolating past price increases more appealing and enable investors to take on greater leverage. This creates a self-reinforcing feedback loop in which rising prices fuel optimism until valuations can no longer be sustained, at which point the speculative bubble bursts.

The theoretical analysis showed that speculative bubbles arise when financial structures and belief formation processes interact in destabilizing ways. Minsky's framework explains how stability encourages economic units to take on increasingly fragile financial positions gradually shifting toward speculative and Ponzi financing. Keen's (1995) formalization demonstrates how factors such as rising profits and investment with increased debt reinforce one another. This generates an endogenous financial cycle in which leverage expands faster than underlying income. Modern behavioral research complements this view by showing that expectations systematically deviate from rational benchmarks as investors overweight recent price movements and underreact to long-run fundamentals. This leads to the formation of extrapolative or diagnostic expectations that amplify boom-and-bust cycles (Greenwood & Shleifer 2014; Gennaioli & Shleifer 2018).

Empirical evidence from Japan's 1980s asset bubble supports these theoretical mechanisms. Studies show that expectations became increasingly extrapolative as the bubble progressed, with investors projecting past price increases into the future even when macroeconomic indicators no longer justified such optimism (Okina et al. 2001; Shiratsuka 2003). Research on financial conditions demonstrates that prolonged monetary accommodation with rapid credit expansion, and deregulation lowered perceived risk and encouraged speculative borrowing. These developments align with broader cross-country evidence showing that credit booms reliably predict financial crises (Jordà et al. 2015). The behavior of valuation ratios provides further confirmation: even after adjusting for accounting differences, Japanese equities remained priced far above levels implied by

earnings, growth expectations, or discount-rate movements (French & Poterba 1991; Kumar & Hyodo 2001). Earnings-based valuation metrics also lost their predictive power (Chan et al. 1990). These findings collectively show that factors like expectations, credit conditions, and valuation metrics all moved toward speculative dynamics rather than fundamental values.

Based on the theoretical and empirical evidence, speculative bubbles are driven by the interaction of extrapolative expectations and credit-driven amplification. Expectations become increasingly optimistic as prices rise. Financial deregulation, and declining risk perceptions enable greater leverage and speculative borrowing. These forces reinforce each other, causing asset prices to rise faster than fundamentals, eroding the informational content of valuation metrics, and increasing systemic risk. Empirical evidence regarding Japan's speculative bubble shows that when expectations detach from fundamentals and credit remains easily available, asset prices can move far beyond economic fundamentals, eventually resulting in a severe correction. Further research could examine how these dynamics operate in modern markets with high-frequency trading and rapid information diffusion. It would be also important to assess how regulatory frameworks and central bank communication can weaken the feedback loop between expectations and credit conditions.

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Appendices

Appendix 1 Explanation of the use of AI

I have used artificial intelligence during the preparation of this thesis in support tasks. The intended use of these tools is described below. The use of artificial intelligence tools is in accordance with university guidelines.

1. Tool: Microsoft 365 Copilot with University of Turku credentials

   • Operational phase: Writing and editing text

   • Intended use: Artificial intelligence was used to improve the overall clarity of sentences by checking for spelling mistakes and finding synonyms.

   • Verification: All submitted information and suggested changes by artificial intelligence have been evaluated and reviewed.