The Inelastic Market Hypothesis: Explaining the Origins of Financial Fluctuations

Professor Jean-Philippe Bouchaud

FEBRUARY 2025

doi.org/10.33548/SCIENTIA1260

BUSINESS, ECONOMICS & FINANCE

Scientia

The Inelastic Market Hypothesis: Explaining the Origins of Financial Fluctuations

What drives movements in asset prices? Are markets efficient, with prices reflecting underlying fundamentals, or do uninformed trades impact prices long-term? Professor Jean-Philippe Bouchaud from Capital Fund Management and Académie des Sciences has devoted his career to developing models that can explain the complex dynamics of financial markets. His work provides compelling evidence that order flow itself, rather than just incoming information, is the primary driver of price changes. This finding has important implications for our understanding of markets and the strategies of traders, fund managers and policymakers.

A Centuries-old Debate About Market Efficiency

Since the dawn of modern financial markets, economists and investors have debated what causes asset prices to fluctuate. The prevailing academic view – the efficient market hypothesis – posits that prices instantly incorporate all available information about an asset's fundamental value. By this account, prices should only move in response to unpredictable news that changes the value.

However, Professor Bouchaud and other quantitative researchers have long questioned this theory, pointing to empirical findings that seem to contradict purely information-driven price changes. Excess volatility, the impact of uninformed noise traders, and the profitability of trend-following strategies all suggest that factors beyond just information may be at play in moving prices.

As Professor Bouchaud explains, the efficient market paradigm has difficulty explaining many real-world market phenomena we observe, from short-term microstructure effects to long-term bubbles and crashes. An alternative view is that order flow itself – the act of trading, whether informed or uninformed – is the primary driver of price movements.

Measuring the Market Impact of Meta-orders

Professor Bouchaud's research focuses on understanding the market impact of meta-orders – a collection of individual buy or sell orders originating from the same investor. When a fund wants to buy or sell a large quantity of an asset, it is typically broken up into smaller pieces executed incrementally to minimise the price impact.

Empirically, the average impact of a meta-order tends to scale approximately as the square root of its size Q, at least for small to intermediate Q. The square root law seems to hold across all sorts of markets, epochs and trading styles, Professor Bouchaud notes, which suggests there may be some universal underlying mechanism.

This is quite surprising from a theoretical perspective, as one might expect impact to scale linearly with order size. The sub-linear square root law implies that liquidity responds dynamically and adapts to soften the impact of larger orders. Professor Bouchaud and his collaborators have proposed that this reflects the existence of a liquidity memory time – a characteristic timescale over which the market digests a trade and past order flow influences the price.

Connecting High-frequency Liquidity and Low-frequency Equilibrium

While the square root law describes impact on intraday timescales, what happens over the longer run? In a landmark 2021 paper, economists Xavier Gabaix and Ralph Koijen analysed quarterly stock-level fund flows and prices. They found that buying 1% of a company's market capitalisation increases its valuation by around 1% – a substantial and permanent price impact, even for uninformed trades.

Professor Bouchaud argues that Gabaix and Koijen's finding is fundamentally connected to the intraday square root law, and both can be quantitatively explained by a theory he developed called the Latent Liquidity Model (LLM). The LLM proposes that investors have a reservoir of hidden trading intentions not reflected in the immediate order book. These intentions have a memory timescale over which they get revised and repositioned around the current market price.

Professor Bouchaud derived a precise quantitative prediction for the ratio between an asset's volatility, its trading volume, and the permanent price impact by explicitly modelling the dynamics of latent supply and demand. This prediction matches Gabaix and Koijen's estimate and clarifies the underlying mechanism for their result. Professor Bouchaud finds it remarkable to quantitatively reconcile high-frequency market microstructure with low-frequency asset pricing equilibrium, as it provides strong evidence for an order-driven view of markets.

Order-driven Markets and the Excess Volatility Puzzle

This order-driven perspective may help resolve some longstanding economic puzzles. Notably, it offers a compelling explanation for excess volatility – the fact that prices seem to move much more than could be accounted for by fluctuations in underlying value.

Professor Bouchaud elaborates that if order flow is the main driver of price movements, whether informed or uninformed, then the lion's share of volatility comes not from changes in fundamentals but from trading itself – from the aggregation of heterogeneous investor buying and selling. High-frequency traders and market makers can enforce local efficiency, keeping prices martingale-like, but this doesn't guarantee that prices track fundamental value.

Indeed, Professor Bouchaud's work estimates that up to 90% of volatility may be endogenously generated in this way. He reflects that the order-driven view implies that most of the information encoded in prices may be about predicting the behaviour of other market participants rather than news about fundamental value. This resonates with Keynes' famous 'beauty contest' analogy of stock markets.

Rethinking the Inelastic Market Hypothesis

Professor Bouchaud's research suggests that the long-term fate of uninformed trades and their price impact remains an open question. As he clarifies, his model predicts that prices should revert to the mean over very long horizons and the impact of uninformed meta-orders should decay. But measuring this directly is challenging, as you need a very long timescale and some way to identify truly uninformed trades.

Still, the order-driven paradigm has important practical implications. It helps explain many empirically observed market phenomena that are challenging for the efficient markets view, from mechanical short-term price impacts to long-term bubbles and crashes. For statistical arbitrage traders and execution algorithms, accurately modelling the dynamics of liquidity and market impact is crucial. For policymakers and asset managers, the finite elasticity of markets suggests the potential for large trades to influence prices, at least over medium-term horizons.

Looking forward, Professor Bouchaud hopes to gather more extensive data to further test the quantitative predictions of the latent liquidity model across different assets. He also wants to get a better understanding of how trading behaviour responds to market design choices By illuminating the complex mechanisms by which trading activity shapes asset prices, Professor Bouchaud's work is shedding new light on previously murky market dynamics. While much remains to be explored, this research is helping put the eternal debate about market efficiency on more solid scientific footing – and clarifying how and why markets often seem far from efficient in practice. For investors navigating the turbulent seas of the financial markets, this may offer invaluable insights.

> “
>
> Professor Bouchaud derived a precise quantitative prediction for the ratio between an asset's volatility, its trading volume, and the permanent price impact by explicitly modelling the dynamics of latent supply and demand.

MEET THE RESEARCHER

Professor Jean-Philippe Bouchaud
Capital Fund Management and Académie des Sciences

Professor Jean-Philippe Bouchaud completed his undergraduate and graduate studies at the Ecole Normale Supérieure in Paris. Professor Bouchaud was awarded his DPhil from the institute in 1985 with the thesis entitled '*Transport properties in spin-polarized quantum gases*'. Since then, he has held many academic positions at a wide range of institutions all over the world. He has published a vast range of research articles and papers, contributed to multiple books, and has been awarded numerous awards for his work. Most recently, Professor Bouchaud became a member of the French Académie des Sciences and continues his work as Professor of Complex Systems at Ecole Normale Supérieure. In addition, he holds the prestigious position of Chairman and Chief Scientist of Capital Fund Management.

CONTACT

jean-philippe.bouchaud@cfm.com

CFM

FURTHER READING

J-P Bouchaud, The inelastic market hypothesis: a microstructural interpretation, *Quantitative Finance*, 2022, 22(10), 1785–1795. DOI: https://doi.org/10.1080/14697688.2022.2068052