# Editorial

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The classical finance paradigm relies on the notion that financial markets are efficient and that prices always fully reflect all available information. This traditional framework relies on fully rational agents that always act in a value-maximising and homogenous way. It is this view that has led to the so-called representative agent models, where agents all act in the same way. However, many empirical studies have provided evidence of anomalies that are hard to reconcile with this traditional framework. In particular, the view that all agents act homogenously and that one represents all is broadly rejected by the behavioural finance literature. According to this literature, agents could act irrationally and display different behavioural biases. The exposition of heterogeneity in the behaviour of agents has led to the development of 'heterogeneous agent models'. These models can be seen as an in-between case, where agents are not fully rational at all times, but also not fully irrational at all times. Within the heterogeneous agent framework, agents often act in a boundedly rational way, i.e., there are times when their behaviour is dominated by irrationality, but when prices are pushed too far away from their fundamental values, there will be a switch in their behaviour towards rationality.

Indeed, past literature on heterogeneous agent models has been able to explain many stylised facts in financial markets that are hard to reconcile in the traditional framework. For example, the development of bubbles and subsequent crashes can be attributed to the irrationality and subsequent switch to rational behaviour (see Hommes, 2006). Also, common distributional properties of asset returns can be attributed to the boundedly rational behaviour of agents (see Chiarella et al., 2009). Similarly, the skew in the volatility implied by option prices has been attributed to the changing behaviour of agents (Frijns et al., 2010).

This special issue on heterogeneity in financial markets explores the dynamics that can be generated by these heterogeneous agent models, and the empirical stylised facts that can be explained by them.

The first article by Chiarella, Dieci and He provides an overview of the complex dynamics that can be generated by a heterogeneous agent model. In particular, the paper studies an asset pricing model with heterogeneous agents under different market clearing mechanisms. The paper clearly demonstrates the rich dynamics that can be generated by a heterogeneous agent model and shows that non-fundamental steady-states can coexist with fundamental ones. Simulation analyses show how this can lead to bubble and crash behaviour and how such a model can generate asset return dynamics and distributional

properties. The simulated results resemble the dynamics and properties of observed asset returns, such as fat tails and volatility clustering.

The second article by Frijns, Gilbert and Tourani-Rad applies such a heterogeneous agent model empirically and assesses whether the switching behaviour between fundamental strategies and non-fundamental strategies of agents is related to market sentiment. Estimating heterogeneous agent models for both the USA and UK stock markets, this study finds that the switching behaviours in both markets are correlated and that this correlation changes over time. Their findings suggest that the switching behaviour in both markets is clearly not independent and that this bounded rationality (i.e., fundamentalism versus non-fundamentalism) spills over between these markets.

The third article by Heck and Muller investigates how Japanese Central Bank interventions affect the beliefs of analysts when making foreign exchange rate forecasts. In particular, the study shows that large interventions provide a clear signal to analysts, which subsequently reduces the heterogeneity in their opinions and forecasts. The reduction in dispersion of opinions subsequently reduces exchange rate volatility. The results from this study imply a switching behaviour in the way analysts form their opinions about future exchange rate movements.

The fourth article by Badshah assesses the role of investor heterogeneity in explaining the asymmetric relationship between index returns and implied volatility indices. The study confirms the established strong negative relationship between stock market returns and implied volatility indices. In addition, this observed relationship is asymmetric, where negative returns have a greater impact on implied volatility than positive returns. It could be argued that different traders, with different expectations, are active in the stock market. Risk averse hedgers, as opposed to speculators, have different demands for different types of options affecting the market volatility in an asymmetric way. The different clusters of traders with different objectives could explain the skew in implied volatilities.

All-in-all, these studies contribute to the rapidly developing field of heterogeneous agent models and fill an important gap between the models using only representative agents (homo economici) and models using only irrational agent (homo irrationalli).

## References

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