

THE (IR-) RATIONALITY OF INVESTOR HERDING

LEEF H. DIERKS; SONJA TIGGELBECK*

Fecha de recepción: **6 de septiembre de 2019**

Fecha de aceptación: **3 de diciembre de 2019**

“We perceive the world before we react to it,
and we react not to what we perceive,
but always to what we infer.”

Frank H. Knight (1885-1972)

I INTRODUCTION

In the past decades, behavioural finance has steadily gained importance with respect to better understanding decision-making under uncertainty. Traditional economic models, among them neo-classical capital market theories or Austrian Economics, for example, fail to adequately assess market agents' behaviour. In contrast to these theories, market agents appear to be prone to biased judgements. Individuals prefer to maintain the status quo as they are afraid of committing mistakes, which could *ceteris paribus* afterwards cause a feeling of regret. They thus rather refrain from any action and accept opportunity costs as these, according to Prospect Theory, are considered to be

* Prof. Dr. Leef H. Dierks, Professor for Finance and International Capital Markets, and Sonja Tiggelbeck, Research Assistant, Department of Business Administration, Lübeck University of Applied Sciences, Germany. E-Mail: leef.dierks@th-luebeck.de and sonja.tiggelbeck@th-luebeck.de. The authors wish to express their gratitude to the anonymous referees for their valuable input.

missed profits instead of realized losses. Another explanation for biased judgement is overconfidence, which implies that individual investors trade too often as they consider their information to be more valuable than that of others. Overconfidence and status quo preference, are just two explanations for biased judgements. This triggers the question to what extent *individual* decisions actually exist. According to Hayek (1996), individualism is non-existent in an environment in which subjectivism generates a spontaneous order by interacting with other (market) participants. Notwithstanding unpredictable future developments, there will always be particular behavioural patterns occurring repeatedly (Rapp and Cortés, 2017). Hence, the predictive power of any model could be greatly enhanced in case these patterns, typically shaped by the social environment, i.e. (a herd) could ex ante be reliably identified.

In light of the above, speculative bubbles, which, assuming strictly rational economic agents, are a prime example of how investors' biased perceptions about losses and gains trigger an emotions-based process of decision-making. Institutional Economics, among others, illustrates that investors appear to follow an institutional system, which shapes their behaviours and thus their decision-making. Simply mimicking a herd's decisions, it seems, can meaningfully reduce uncertainty. Preliminary findings, however, suggest contradictions concerning biases in decision-making of individuals versus those of a herd. Further, literature distinguishes between rational and irrational herd behaviour. Ultimately, this leads to the question to which extent investor herding could indeed be a rational phenomenon (Dierks and Tiggelbeck, 2019).

The remainder of this article is structured as follows: Chapter two outlines principles of (individual) decision-making under uncertainty and identifies select biases, which affect the behaviour of economic agents. Chapter three then portrays the phenomenon of investor herding and seeks to correctly embed the latter into Austrian Economics and Behavioural Economics. Chapter four investigates the extent to which any such behaviour can be considered (ir-) rational before chapter five provides both a conclusion and an outlook for future research.

II DECISION-MAKING UNDER UNCERTAINTY

1. Individual Decision-Making

With regards to describing human behaviour in the process of decision-making, neoclassical theories still are widely popular, despite systematically failing to adequately describe human behaviour under uncertainty. Hence, understanding modern behavioural economic approaches offers a different perspective and an opportunity to identify typical behavioural patterns arising from subjective perception (that might well be efficient) or cognitive biases, ideally before they occur. Eventually, this provides an important enhancement to traditional Austrian Economics.

Several economic paradigms claim to have capaciously explained consumer behaviour and how economic agents could be manipulated in their individual processes of decision-making. According to Thaler and Sunstein (2008), (market) agents can be subtly “nudged” into a behaviour other parties want them to exhibit. In this context, market anomalies could *inter alia* be explained by noise traders and (professional) traders who recognise opportunities to arbitrage through mistakes committed by other investors.

Generally speaking, i.e. not exclusive to the scenario portrayed above, the human mind is overstrained by seeking to process too much information at a single point in time. Hypothetically, “better” judgements could be made if the number of alternatives within the process of decision-making were limited. This, however, strictly contradicts the neoclassical assumption of strictly rationally acting market participants. At first glance, the fact that the human brain simply is unable to process every information relevant for a *homo oeconomicus*’ theoretically “optimal” decision appears to cause disadvantages. Individual decisions, it seems, can easily be manipulated by the type of information an investor receives. At second glance, however, it enables an investor to think in an abstract manner and to eventually enhance its problem-solving capacities; even though partly in the unconscious mind. This capability is crucially important for the *efficient* application of heuristics (Gigerenzer, 2008).

Every investor is prone to biased judgement calls, i.e. if their very own perception of reality (as a subjective phenomenon) does not influence their decision-making, it will likely be frames of their social environment. For evolutionary reasons humans feel secure in herds as these allegedly provide certainty. Regardless of the environment it occurs in, investors will always prefer certainty to uncertainty. Even if it meant committing mistakes, investors would rather engage in herding (hiding in the crowd) as opposed to risking being wrong about a decision on their own. From a rational perspective, there is no difference between being wrong alone or in a herd, as the individual nonetheless has to deal with the consequences of a mistake. Although it seems irrational to strictly follow a herd by simply imitating the behaviour of others, there might well be circumstances under which herding can be considered a rational phenomenon after all (Dierks and Tiggelbeck, 2019).

2 Information Processing in a Subconscious and Conscious Mind

The human brain, especially the subconscious mind, typically receives more environmental impressions and information than a conscious mind is able to handle in a given time. Consequently, the “information surplus” is subconsciously stored and, rather often than not, little to no attention is paid in the subsequent decision-making. According to Kahneman (2012), the subconscious and conscious mind ought to be separated into so-called *systems I* and *II*.

System I corresponds to the subconscious mind. It is responsible for simple tasks and automatic processes an economic agent is familiar with. System I uninterruptedly absorbs information in an effective manner, which makes it convenient for economic agents to simply follow the suggestions provided without assessing or questioning them in greater depth. This saves (mental) resources, which can then be used for other tasks. As long as it leads to an efficient heuristic, any such approach is beneficial: It reduces the time allotted to a potentially inefficient process of decision-making, particularly in the ever-changing environment of (financial)

markets. Yet, due to its lack of in-depth analyses, it can be a source for cognitive biases and systematic errors.

Among others, reasons for biases and systematic errors in (individual) decision-making include the reliance on heuristics without “recognition” and “evaluation”. The subconscious mind supports decision-making to the extent that it stores almost every piece of information absorbed through senses. Investors thus need to identify (considering potential alternatives) whether an option appears to be familiar — or not (Gigerenzer, 2008). This is particularly relevant in an environment of uncertainty; less so, however, in the case of risk (Knight, 1921). Furthermore, the choice has to be evaluated with regards to its suitability of applying a problem-solving recognition heuristic. According to Gigerenzer (2008), the recognition heuristic is applied by the “subconscious intelligence”. The subconscious mind, i.e. system I, is not simply the source of cognitive biases and systematic errors — but also a reliable intelligence that provides efficient tools for reaching a substantial decision in an environment of uncertainty.

“If we stopped doing everything
for which we do not know the reason,
or for which we cannot provide a justification,
we would probably soon be dead.”

(F.A. Hayek, 1996)

The availability heuristic, on the other hand, suggests that economic agents make judgements about the likelihood of an event based on how easily they remember a pattern. Information with a so-called “high fluency” are more likely to be taken into consideration within the process of decision-making than those that are more difficult to remember (Kahneman, 2012). This might lead to systematic errors arising from the use of allegedly efficient heuristics suggested by the subconscious mind. For example, investors may judge the quality of an investment based on information that was recently in the news, ignoring other relevant facts (Tversky and Kahneman, 1974).

System II, in contrast, refers to the rational, i.e. the conscious mind. It insinuates a more analytic approach, evaluating and

assessing advice provided by system I. Whereas system I actively seeks for coherence (individual perception), system II operates under conditions of cognitive strain (instead of cognitive ease) and consequently processes information in a significantly slower manner. According to Kahneman (2012), the analytic mind rather appears to be an undemanding supporter of the subconscious than its critic. This might pave the way for biases within the process of decision-making as the human brain contains more than the frontal lobe to control judgements based on emotions.

3. Select Biases in (Individual) Decision-Making

In the following, this article will provide a brief description of select biases in decision-making. Not claiming to be exhaustive, emphasis will be placed on biases, which appear to be particularly well suited to explain investor herding. Interestingly, literature reveals contradictions between these (Samuelson and Zeckhauser, 1988).

a) Status-Quo Bias

The status-quo bias implies that economic agents tend to neglect opportunity costs by doing nothing as they prefer to avoid mistakes, which might (afterwards) cause a feeling of regret (so-called “regret aversion”, Bell, 1982). With regards to financial markets, the investors’ desire to maintain the status-quo likely is a cognitive bias arising from the combination of individual behaviour and bounded rationality in the absence of any institution (“herd”) to follow. Under these conditions, i.e. most notably uncertainty, individuals either tend to refrain from any action or instead let other market agents decide on their behalf.

In this context, literature distinguishes between three different aspects why individuals typically prefer the status quo to a change in their position (fig. 1).

Paradoxically, maintaining the status quo might well be a *rational* strategy as it allows market participants to postpone their decision

Figure 1: FACTORS SUPPORTING STATUS-QUO BIAS

-
1. **Rational decision-making** with transition (transaction) costs and/or under uncertainty: preferring status-quo over limited period can be rational as economic agents need time to generate subjective probabilities in case a decision under uncertainty has to be made.
 2. **Cognitive misperceptions**: preference to maintain status-quo as, according to Prospect Theory, losses hurt twice as much as gains cause a feeling of joy. Economic agents therefore typically display a loss aversion (Thaler, 1979, and Thaler, 1981).
 3. **Psychological commitment** stemming from misperceived sunk costs, regret-avoidance or drive for consistency: reluctance to write-off sunk costs means neglecting opportunity costs. Showing consistency (from a leading perspective) can be necessary to suggest certainty.
-

Source: Samuelson and Zeckhauser, 1988.

until they have gathered additional information (which could enable them to hence arrive at a better decision) (Samuelson and Zeckhauser, 1988). In hindsight, it often seems considerably easier to bear (negative) consequences if the decision made is perceived to have been the best possible alternative, i.e. there simply appeared to be no better solution at the time of decision-making. What is more, mistakes arising from an actively made decision not only cause costs directly related to the very decision but also so-called “mental costs”, which are related to the feeling of regret (Thaler, 1980).

b) Overconfidence Bias

On financial markets the overconfidence bias implies that wrongly neglecting transaction costs (private) investors trade far too often as they consider their own information to be more valuable than that of others (Barber and Odean, 2000).

Evidently, any such behaviour will lead to systematic errors. These arise from the associative coherence of the subconscious mind and support the formation of confirmation biases as a result of disregarding information, which does not support an agent's own opinion or perception (Beck, 2014). In other words: Investors consider their information to be more valuable than that of others and seek to obtain even more to confirm what they already claim

to know. Consequently, the selection of information sources is biased, too. To justify decisions that have already been made, (private) traders tend to neglect arguments, which could cast doubts over their originally made assumptions. For that reason, they often feature higher frequencies in their trading patterns. But with a higher trading frequency, both the likelihood of systematic errors and transaction costs are *ceteris paribus* set to increase (Barber and Odean, 2000). In other words: the overconfidence bias appears to be a contradiction to the status-quo preference.

Emotions such as loss aversion, for example, that (mis-)lead market agents to assume they made the right choice by simply imitating (mimicking) other investors' investment strategies and thus developing overconfidence, are processed in the limbic system. Generally speaking, the midbrain's limbic system is responsible for perceiving and processing emotions that influence decision-making. Rational decision-making, in contrast, requires intellect and reason (frontal lobe). It is possible to overcome suggestions generated by the associative coherence, although the limbic system determines the boundaries of the dorsolateral, prefrontal and orbitofrontal cortex, which means that there are no judgement calls without the participation of emotions. Thus, even though emotions clearly affect the process of decision-making; the extent can nonetheless be controlled by practice, experience and expertise. Unsurprisingly, professional traders typically feature a much higher tolerance considering the interference of the limbic system than individual traders (Rapp and Cortés, 2017).

III

THE (IR-) RATIONALITY OF INVESTOR HERDING

1. Behavioural Economics' versus Austrian Economics' Perspective

Behavioural Economics and Austrian Economics feature considerable conceptual differences, making their relationship rather complex and multifaceted (Rizzo and Whitman, 2009). Yet, as both Behavioural and Austrian Economics insistently question the

nature of human rationality, combining the essential traits of these paradigms can create academic value-added.

At first glance, Behavioural Economics might seem to contradict Austrian Economics as to the issue of influencing individuals' behaviour in an attempt to arrive at a socially optimal outcome and to maximise economic welfare. Yet, among the essential characteristics of Austrian Economics is its view of market competition in terms of processes and rationality as opposed to merely an optimal equilibrium. This comes as Austrian Economics' principal interest lies in understanding the coordination of (potentially incompatible) plans among agents with limited knowledge, i.e. in individual learning, effectively. This, in turn, is assessed in terms of the capacity to allow market agents to discover new solutions to market problems and to realize and correct individual mistakes (Muramatsu and Barbieri, 2017).

2 Cascade Behaviour

Herding in financial markets emerges when investors mimic other investors. Such behaviour can destabilize financial markets, aggravate shocks, and lead to mispricing or asset price bubbles (International Monetary Fund, 2014). While herding can be the result of cognitive biases of heuristic-based decision making, it can also be rational. For instance, herding may emerge if less informed asset managers follow their possibly better-informed peers instead of relying in their own assessments (Bikhchandani, Hirshleifer, and Welch, 1992). Herding may also be rational for portfolio managers if they are evaluated against each other (Scharfstein and Stein, 1990) or vis-à-vis similar benchmarks (Maug and Naik, 2011).

In this context, it is worth clarifying the relation between the standard definition(s) of herd behaviour. Within the social learning literature, a herd is said to occur when a sequence of agents makes the same decision (not necessarily ignoring their private information) (see below). Within behavioural economics, however, herd behaviour is a particular type of cascade behaviour. Cipriani and Guarino (2008) understand the latter definition as being particular convenient for an experimental analysis. In their analysis,

Cipriani and Guarino (2008) elicit subjects’ strategies conditional of the signal realisations, which is more informative than merely observing the actions. That definition of herding allows them to study when subjects ignore their private information to conform to the established pattern of trade.

Figure 2: CASCADE BEHAVIOUR

Cascade Behaviour	
Herding Behaviour	Contrarian Behaviour

Source: authors’ own.

An informed market agent engages in cascade behaviour (fig. 2) if he chooses the same action independently of a private signal. If the chosen action conforms to the majority of past trades the trader engages in herd behaviour. If the chosen action goes against the majority of past trades the trader engages in contrarian behaviour. Cipriani and Guarino (2008) thus conclude that if a trader buys irrespective of whether or not he received a signal, he engages in cascade behaviour. If the buy order follows a history in which there are more buy than sell orders traders *herd*. If instead, the buy order follows a sell order, the trader acts as a contrarian.

What is more, price changes apparently do not always reflect genuine information (Shiller, 2003). Instead, evidence from Behavioural Finance suggests that the asset price inflation recently observed in the Eurozone (partly) has its origins in (human) misperceptions and arbitrary feedback relations. This has meanwhile generated a real and substantial misallocation of resources.

3 Financial Markets and Investor Herding

According to the International Monetary Fund (2014), “financial integration, especially if not managed well, can make asset prices and portfolio flows more sensitive to global “push” factors and pose

challenges to financial stability in emerging markets¹". The IMF's findings demonstrate that global mutual funds react more strongly to global financial shocks than large institutional investors. Its results confirm that flows from retail-oriented mutual funds react significantly more sensitive than flows from institutional investors for both bonds and equities. Mutual funds are also more likely to engage in return chasing ("hunt for yield"), thereby creating more cyclical flows. Such momentum trading amplifies cyclical swings of portfolio flows and can be destabilizing. Institutional investors, in contrast, do not engage in this type of behaviour. Yet, their behaviour must not always be more stability-enhancing: they pull back more strongly from bond markets than do mutual funds when confronted with extreme shocks (International Monetary Fund, 2014).

Institutional investors might benefit as individuals' mistakes, eventually caused by overconfidence, give rise to arbitrage opportunities. According to the *Greater Fool Theory*, financial markets are little else but *zero-sum-games*, i.e. one trader's gain is another's loss.

If financial markets were *perfect* in a strictly neoclassical sense, no investor whatsoever were in a position to systematically outperform markets. An investment performance, which exceeded (positive alpha) or fell below the market average (negative alpha) would simply not be observable. In contrast to private investors, institutional investors typically benefit from a more thorough analysis and hence often of a better understanding of market developments. They will probably not hold "losers" for too long or sell "winners" too early (disposition effect of Prospect Theory).

And even if this occasionally occurred, institutional investors' trading volumes and frequencies are that high that losses could be compensated in another manner. For this to occur, however, there must be a sufficiently large number of (individual) traders who, as a result of their overconfidence bias, consider themselves apt to systematically outperform markets. Reality, it seems, is the product of a subjective perception (Dierks and Tiggelbeck, 2019).

¹ Capital flows are driven by so-called "push" factors reflecting common global conditions (such as monetary and fiscal policies in advanced economies, global liquidity, and global risk aversion) and country-specific "pull" factors (such as local macroeconomic fundamentals and institutional quality). (International Monetary Fund, 2014).

Compared to individual traders, their professional, i.e. institutional counterparts typically are in a better position. They operate in an environment, in which rules that need to be obeyed are defined by an institution (e.g. a herd). As an institutional investor's performance is often measured relative to that of his peers, simply mimicking other's strategies might well be considered rational — as the investor cannot perform worse than his peers (herd). Or, as Keynes put it, “it is better for reputation to fail conventionally than to succeed unconventionally” (Devenow and Welch, 1996). In other words, herding might be rational in the sense of minimizing risks but might also give rise to the hindsight bias in case of “failing conventionally” together (as a herd). Ex post, (institutional) investors might well realise that they could have outperformed their peers in case they had not neglected their own information in favour of overrating the quality of their (social) environment's strategy.

The hindsight bias is defined by a human's inability to reconstruct circumstances correctly, thereby leading to specific judgments. It is less about a *correct* decision-making, but more about positive or negative outcomes generated (Kahneman, 2012). By evaluating decisions ex post, i.e. when already knowing the outcome, attitudes change and the supposed opinion is adjusted. Knowledge and information a market participant possesses at present lead to misperceiving and misevaluating the past through cognitive illusions (Kahneman, 2012). There can be good, i.e. correct decisions with a negative outcome, and vice versa. Frankly, it is outright impossible to *correctly* reconstruct the past on the basis of information and circumstances, which were revealed at a later point of time.

IV

RATIONALITY AND IRRATIONALITY

1. Irrational Investor Herding

Literature distinguishes between irrational and rational herd behaviour. Irrational herding emerges in case the market agent

disregards own information for no reasonable aspects simply to join a herd. These judgements arise through cognitive biases and systematic errors. It might be uncertainty causing the need to follow (investment) decisions other economic agents made. In a second step, however, it might be greed that leads to overconfident investment decisions (overconfidence bias), dissolving self-control and self-knowledge.

“The investor’s chief problem,
and even his worst enemy,
is likely to be himself.”

Benjamin Graham (1894-1976)

How a majority of investors evaluates particular information plays a crucial role with regards to the formation of speculative bubbles (Daxhammer und Facsar, 2017). As a result of media coverage, stocks might experience unfounded price swings. With regards to the availability heuristic (i.e. considering the associative coherence shaped by system I), media coverage of recent events typically triggers a higher fluency. As an investor needs to generate subjective probabilities in an environment of uncertainty (there usually are no objective probabilities available to make an investment decision, high fluency equals a high error rate. Once a private investor receives (media) information, financial markets most likely already reflect these, i.e. prices have adjusted (Odean and Barber, 2000).

As soon as a herd has formed an opinion regarding the value of a particular investment, purely relying on fundamentals, i.e. behaving rationally becomes almost impossible. Investors hence have to adjust their behaviour according to market developments as opposed to (Kitzmann, 2009). In other words, even (professional) institutional investors that recognize certain behavioural patterns caused by bounded rationality often find themselves unable to correct exaggerations caused by the majority’s (herd’s) assessment. The extent to which anomalies can be corrected through arbitrage is thus limited (Daxhammer and Facsar, 2017). According to Fama’s (1970) efficient market hypothesis (EMH), in contrast, arbitrageurs will dampen any irrational exaggerations to the

extent, which prevents the formation of speculative bubbles. Consequently, from the neoclassical EMH perspective, bubbles markets have experienced principally are non-existent.

2 Rational Investor Herding

In light of the above, as any rationally acting investor will likely adjust his strategy to (correctly) react to the herd's investment decisions, (unconsciously) supporting the build-up of a speculative bubble might well be considered a *rational* phenomenon, too. This view is supported by Mises (1949), who concluded that "However one twists things, one will never succeed in formulating the notion of 'irrational' action whose 'irrationality' is not founded upon an arbitrary judgement of value."

However, special emphasis needs to be placed on the difficulties of correctly identifying the different phases of (potential) speculative bubbles (Daxhammer and Facsar, 2017). Thus, arbitrageurs might be able to benefit from irrational price swings. These could be the result of an investor herding due to e.g. panic or euphoria; i.e. phenomena, which do not necessarily reflect professional (fundamental) market analyses. The opportunity to generate above-average returns (positive alpha) in these circumstances can prompt contrarian investors (fig. 2) to maintain their positions, i.e. to not sell financial assets, whereas investors pursuing a "buy-low, sell-high-strategy" understand falling prices to represent buying opportunities (anticipating a later market recovery). A rally, in contrast, often triggered by improving market sentiment, could prompt investors to adopt other strategies, i.e. to mimic the herd for a given period, thereby actively contributing to an irrational exuberance in an attempt to later benefit from arbitrage opportunities. From this perspective, joining a herd and adopting its strategy at the expense of one's private information can indeed be rational (fig. 3). *Ceteris paribus*, in an environment characterized by uncertainty and for a limited period of time, arbitrageurs seek to become part of a herd, whose investment strategy is largely driven by the majority of noise trading (private) investors.

Figure 3: RATIONAL VERSUS IRRATIONAL INVESTOR HERDING

Irrational Herding	Emotional and psychological aspects determine behavioural patterns — crowd develops opinion to generate certainty in uncertain environment — psychological spill-over effects; neglecting private information and moving with herd as it generated institutional decision frames — individual risk of being wrong alone has become too high; leads to biased judgements out of associative coherence; assimilation based on subconscious mind (system I) — “what-you-see-is-all-there-is” phenomenon (Kahneman, 2012)
	Utility maximizing aspects determine behavioural patterns — based on irrational price exaggerations — rational investors (i.e. arbitrageurs) unable to correct market anomalies (contrast to neoclassical theories) (Daxhammer and Facsar, 2017) — ceteris paribus profitable as long as a bubble remains in its early phase (greater fool principle) — assimilation based on conscious mind (system II)

Source: authors’ own based on Daxhammer and Facsar, 2017.

Further, rational herding can also be observed in case of (institutional) investors being subject to the *principle-agent phenomenon*. This comes as an (institutional) investor’s performance is typically compared to that of his peers (as opposed to that of a benchmark) (Chang et. al., 2000). Yet, it is worth emphasising that these investors typically are embedded within a very different type of herd as they continue to be subject to different institutional frames. Consequently, opportunities to (financially) benefit from systematic trading errors committed by other (active) investors are rather limited in light of obligations towards the principals (i.e. passive investors) who might withdraw their capital in case the expected returns do not materialise within a certain amount of time.

Whereas in an early stage, the principal-agent phenomenon triggers (rational) investor herding, it also is crucial in suppressing rational behaviour in later stages as agents (i.e. investors) are forced to submit to the respective institutional frames. This becomes particularly evident in the case of portfolio managers and the respective investment strategies they apply (Dierks and Tiggelbeck, 2019).

V CONCLUSION

Investor herding can be considered both rational and irrational at the same time; eventually even being subject to reciprocal stimuli. Incorporating this apparent dilemma into (traditional) neoclassical models of economic behaviour poses a substantial challenge. Nonetheless, as Behavioural and Austrian Economics insistently question the very nature of human rationality, and by no means are mutually exclusive, any combination of these paradigms enhances today's fragmentary understanding of investors' behaviour.

In an attempt to determine economic principles, Austrian Economics relies on praxeology (rather than empirical studies). Based on the action axiom, objective and universal conclusions about human behaviour can be drawn, e.g. the notion that investors engage in acts of choice implies that they have preferences. This must be true for anyone who exhibits intentional behaviour. Further, Austrian Economics suggests that individualism is non-existent in an environment in which subjectivism generates a spontaneous order by interacting with other investors. Notwithstanding unpredictable future developments, there will always be particular behavioural patterns occurring repeatedly. As Behavioural Economics, in contrast, is primarily concerned with investors' bounds of rationality and seeks to explain how market decisions are made, the explanatory power of any economic principle could *ceteris paribus* be greatly enhanced by combining these paradigms.

BIBLIOGRAPHY

- Barber, B. M. and T. Odean (2000): "Trading is hazardous to your wealth: The common stock investment performance of individual investors", *Journal of Finance*, vol. 55, 773-806.
- Beck, H. (2014): *Behavioural Economics*, Springer.
- Bikhchandani, S., D. Hirshleifer and I. Welch (1992): "A Theory of Fads, Fashion, Custom, and Cultural Change in Informational Cascades", *Journal of Political Economy*, vol. 100, issue 5, 992-1026.

- Chang, E. C., J. W. Cheng and A. Khorana (2000): "An examination of herd behavior in equity markets: An international perspective", *Journal of Banking and Finance*, Elsevier, vol. 24 (10), 1651-1679.
- Cipriani, M. and A. Guarino (2008): "Herd Behavior and Contagion in Financial Markets", *The B.E.. Journal of Theoretical Economics*, vol. 8, issue 1, 1-56.
- Daxhammer, R. J. and M. Facsar (2017): *Behavioural Finance*, Beck Verlag.
- Devenow, A. and I. Welch, I. (1996): "Rational Herding in Financial Economics". *European Economic Review*, 40, 603-615.
- Dierks, L. H. and S. Tiggelbeck (2019): *Zur Irrationalität ökonomischer Entscheidungen: Herdenverhalten und Finanzmarktstabilität*, WiSt, December, 26-32.
- Gigerenzer, G. (2008): *Rationality for mortals: How people cope with uncertainty*. New York, Oxford University Press.
- International Monetary Fund (2014): *World Economic Outlook*, Washington.
- Kahneman, D. (2012): *Thinking, Fast and Slow*, Penguin.
- Kitzmann, A. (2009): *Massenpsychologie und Börse*, Gabler.
- Knight, F. (1921): *Risk, Uncertainty and Profit*.
- Maug, E. and N. Naik (2011): "Herding and Delegated Portfolio Management: The Impact of Relative Performance Evaluation on Asset Allocation", *Quarterly Journal of Finance*, vol. 1, issue 2, 265-292.
- Mises, L. (1949): *Human Action, A Treatise on Economics*.
- Muramatsu, R. and F. Barbieri (2017): "Behavioral Economics and Austrian Economics: Lessons for policy and the prospects of nudges", *Journal of Behavioral Economics for Policy*, vol. 1, issue 1, 73-78.
- Rapp, H.-W. and A. Cortés (2017): *Cognitive Finance*, Springer.
- Rizzo, M. J. and D. G. Whitman (2009): "The Knowledge Problem of New Paternalism", *BYU Law Review*, vol. 2009, issue 4.
- Samuelson, W. and R. Zeckhauser (1988): "Status quo bias in decision making", *Journal of Risk and Uncertainty*, vol. 1, issue 1, 7-59.
- Scharfstein, D. S. and J. C. Stein (1990): "Herd Behavior and Investment", *American Economic Review*, 80, 465-479.
- Shiller, R. J. (2003): "From Efficient Markets Theory to Behavioral Finance", *Journal of Economic Perspectives*, vol. 17, no. 1, 83-104.

- Thaler, R. H. (1979): *Individual intertemporal choice: A preliminary investigation*. Research memorandum (mimeographed).
- (1980): “Toward a Positive Theory of Consumer Choice”, *Journal of Economic Behavior and Organization*, vol. 1, Issue 1, 39-60.
- (1981): “Some empirical evidence on dynamic inconsistency”. *Economics Letters*, 8, 201-207.
- Thaler, R. H. and C. R. Sunstein (2008): *Nudge: Improving Decisions about Health, Wealth, and Happiness*. New Haven, Yale University Press.
- Tversky, A. and D. Kahneman (1974): “Judgement under uncertainty: Heuristics and biases”, *Science*, 185 (4157), 1124-1131.