Perspectives on risk management and behavioural finance

Abstract  The application of Behavioural Finance to Risk Management is still in its infancy and few models have evolved as to how to apply the theories and research findings to practical day-to-day risk management problems. In fact, the very topic of this Special Issue — Is there a role for Behavioural Finance in Risk Management? — is still a moot question. In addition to commissioning the papers in this issue, the editors asked a number of respected figures in the wider risk management community to provide their insights on the topic. In particular four thought-leaders were asked for their perspectives on two specific questions: (1) Should banks and regulators include the findings of psychological/behavioural research in their risk management frameworks; and (2) In the light of new UK legislation, should ‘reckless’ behaviour be regulated? The responses of these experts are enlightening, but as David Hillson notes the question is not whether behaviour should be considered in risk management ‘but how?’ Hopefully the perceptive answers will trigger debate among risk management professionals as to how the theories can be applied.

Keywords: behavioural finance, risk management, risk perception, reckless behaviour, financial models, judgment

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Known globally as The Risk Doctor, David Hillson, FRSA, FIRM, FCMI, CMgr, HonFAPM, is a thought-leader and expert practitioner who consults and writes widely on risk management. His ground-breaking advances in risk methodology, risk attitude, risk appetite and risk culture have been recognised by a wide range of awards, including ‘Risk Personality of the Year’ in 2010–11. David also holds a number of honorary fellowships reflecting his risk expertise.

Question 1: Should banks broaden their risk management scope and include the research results of ‘less precise’ sciences (eg psychology) in addition to those of classical disciplines (eg mathematics, statistics) into their risk management frameworks? If so, why? If not, why not?

It is important to recognise that risk is not managed by processes or systems, nor is it managed by tools and techniques. Risk is managed by people acting as individuals and in groups, responding to uncertainty and making decisions that they deem to be appropriate. Unfortunately despite the attractions of a contrary view, human beings are not dispassionate rational actors who make decisions based on pure utility. Decades of research and millennia of experience indicate that perception drives both our assessments of the situations in which we find ourselves and also our decisions on how to react or respond and perception itself is subject to multiple influences, both hidden and overt, including a wide range of heuristics and cognitive biases. The situation is only made more complex when uncertainty is present.

Consequently any approach to understanding and managing risk that ignores the human factor is flawed and incomplete and it is likely to lead to suboptimal outcomes. So at first sight the answer to
the question posed is an unambiguous ‘Yes’. The risk management frameworks of banks (and other organisations of all types) should take account of human psychology as well as statistics.

This simple answer begs a more difficult question: ‘How?’ While it is relatively simple to state in principle that risk psychology deserves a place in the risk management framework, it is less clear how this can be achieved in practice. It is also not entirely clear that consensus exists within the risk profession on which elements of risk psychology are important, how they can be described and measured, whether their effects can be influenced or should instead just be recognised, and so on. Until we have broad consensus on what we mean by ‘risk psychology’, with an accepted body of knowledge and a developing practice to implement the principles, it may be safer to give a different answer to the basic question. So perhaps the right answer is not a straight ‘Yes’, but a more considered ‘Yes but . . .’.

Two further issues arise from the detail of the question as posed. The first is the implication that psychology is somehow ‘less precise’ than other sciences. This misunderstands the nature of science, especially experimental science, and particularly as it is applied to managing risk. The challenge of risk management is to understand the degree of imprecision in the various parameters that define uncertain situations that matter. Under these circumstances an approach that is overly-reliant on high degrees of precision may be at a disadvantage. There is nothing wrong with using the science of imprecision to understand risky situations where precision is reduced, variable or absent.

Secondly, the question specifically suggests that the ‘research results of [psychology]’ should be included into risk management frameworks. This may be unnecessarily limiting, as the results of pure research are often not presented in a format that is amenable to practical implementation. Instead it is important to take such results and turn them into implementable guidance, which is a non-trivial exercise requiring specialist expertise and skills. Those who are tasked with modifying their risk management frameworks to take account of risk psychology should not need to be experts in human behaviour. Instead it is the responsibility of thought leaders and practice experts to translate research results into pragmatic guidelines that others can use.

**Question 2:** Should ‘reckless’ behaviour be regulated? If so, why? If not, why not? How would one measure ‘recklessness’ in making credit or market risk decisions?

While the proposed measure in the UK has obvious attractions, especially in the light of the recent global financial crisis, it has significant flaws that might well prove fatal. Chief among these is the difficulty in defining recklessness (or as the UK government act calls it, ‘reckless misconduct’). The precise definition of recklessness in law has been contested and has evolved. It generally involves a person pursuing a course of action while consciously disregarding the fact that the action gives rise to a substantial and unjustifiable risk.

Herein lies the problem: What one person or group or organisation regards as ‘substantial and unjustifiable risk’ can equally be perceived by another as ‘insubstantial and fully justifiable risk’, resulting from different inherent risk appetites and/or different chosen risk attitudes. It is unreasonable and unrealistic to expect a regulator to produce unambiguous guidelines on what level of risk constitutes ‘substantial and unjustifiable’ in any given situation.

The second potentially fatal flaw in the proposed approach is alluded to in the question: How can recklessness be measured? The UK government act specifically states that ‘A regulator’s policy in determining what the amount of a penalty should be must include having regard to . . . the extent to which the contravention was deliberate or reckless . . .’. This implies that recklessness is not binary but it is a continuum, such that the extent of recklessness will determine the amount of penalty, but if recklessness is a function of inherent risk appetite and chosen risk attitude, both of which are internal and intangible attributes of individuals and groups, it is not amenable to reliable quantification.

In the absence of an agreed definition of recklessness that takes account of differing perceptions of risk and with an inherent inability to measure the degree of any recklessness that might (or might not) be present, it therefore seems impossible for ‘reckless behaviour’ to be regulated in any meaningful way.
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**Question 1:** Should banks broaden their risk management scope and include the research results of ‘less precise’ sciences (eg psychology) in addition to those of classical disciplines (eg mathematics, statistics) into their risk management frameworks? If so, why? If not, why not?

Risk taking, decision making and market reaction are the result of a wide range of events from economic and political changes to shifts in confidence and preferences of market participants and decision makers. Any meaningful framework for risk management has to be able to accommodate both the vagaries of the economy and the whims of human psychology.

The behavioural aspects of risk taking and decision making are not new topics. For decades, economists have been debating the effect that investors’ behaviour and imperfect information have on asset prices and financial markets. Although there is no shortage of behavioural models, there is still a strong need to understand the behavioural aspects of risk taking and decision making, which are particularly relevant during market booms, downturns and financial crises.

Despite continuous changes in financial products and market complexity, market booms, downturns and financial crises often exhibit common patterns associated with the peaks and troughs of the business cycles and, therefore, with the evolution of economic expansions and contractions. Market booms, downturns and financial crises are also associated with periods of a strong divergence between fundamental risk assessment and the market perception of risk, which is dominated by cognitive biases. This can lead to periods of excessive speculation or lax lending standards — where opportunities for profits are seized rapidly and investors are willing to take increasingly bigger risks at declining margins. Once the underestimated risks materialise into actual losses and the economic outlook changes, there is a rush to reverse the expansion and reassess risk that can occur precipitously, leaving institutions and investors vulnerable to sudden changes in economic conditions.

The dominant view in the economic literature of risk taking, decision making and market behaviour is that market participants are driven by rationality — that is, they are presumed to make rational decisions and quickly correct their behaviour motivated primarily by self-interest. In the idealised rational view of decision making and risk taking, price changes are only the result of market participants responding to a constant flow of new information on fundamentals or exogenous shocks and, therefore, their predictions of the future value of economically relevant variables are not systematically wrong in that all errors are random. In practice, investors and arbitrageurs are limited in their ability to restore price changes instantaneously owing to market uncertainty and trading limitations.

Also contrary to standard views on market rationality is the fact that sometimes asset price movements are the result of behavioural patterns and cognitive biases that may lead to under- and overreaction situations where investors seem to stray from rational decision making. These situations can be exacerbated when liquidity in one market or asset class is constrained forcing institutions to reduce their positions in other markets or assets as well.

Depending on the price elasticity of liquidity supply, institutions may be forced to liquidate increasing fractions of their assets at declining prices. This could result in further market declines that can force other firms to liquidate similar assets as prices fall or due to
demand for margin for their remaining assets. The flood of sales would act as a positive feedback mechanism that could accentuate the price drop propagating the downward price trend across markets or asset classes. Other feedback mechanisms based on investor behaviour and cognitive biases can also be at play during regular market upswings and downswings. As asset bubbles and market crises reoccur, and asset prices display persistent behavioural patterns at different points in the business cycle, it is becoming harder for supporters of the idealised rational framework of risk taking and decision making to water down these events.

The discussion above stresses the fact that the elegant framework of optimal rational behaviour that underlies neoclassical economics cannot reconcile itself to actual human behaviour. The problem with this framework is that it does not reflect how humans act in the real world. Humans are not purely rational creatures. Our brains are composed of a messy network of functional areas, many of which are dedicated primarily to dealing with emotions while others are dedicated to processing, interpreting and censoring information, which influence our judgment. The expansion of the brain during human evolution did not make us closer to the idealised rational agents of economic theory but, to the contrary, allocated a significant part of our brains to deal with emotions and how we perceive the world around us. This in turn helped us dissect the world and parse reality into strings of causation even in situations with limited, uncertain or contradictory information.

People have different ways of forming opinions and making decisions given the contextual information available to them and the way they make inferences about the plausibility of different outcomes. Judgment is always driven in one direction or another by the particular way in which people combine new evidence with contextual information, emotions and preconceptions. In the mid-1970s Kahneman and Tversky found that when a person is confronted with an uncertain situation such as a financial decision, the individual usually does not evaluate the information or compute probabilities carefully. Instead, the decision depends on a brief list of emotions, instincts and inferences. This contrast with rational objectivity, which demands that judgment about the likelihood of occurrence of events needs to be based on all the available evidence, not just some arbitrary subset of it. Any such a choice would amount either to ignoring information that is available, or presuming information that is not. In practice, people do precisely this all the time. Our minds constantly filter information that does not conform to our perception of the world, sometimes leading to biased inference and erroneous or unsupported conclusions even when they may seem perfectly logical to us. That is, we see less of the real world than we think we do, and we act accordingly.

Evidence accumulated over years has shown consistently that investors and decision makers are far less rational in their decision making process than economic theory assumes. In most of day-to-day decisions people use primarily loose associations, analogies, heuristics and ‘plausible reasoning’ — as opposed to deductive reasoning, which may lead to erroneous conclusions based on preconceptions and biased contextual information. Furthermore, physiological and psychological studies revealed that certain aspects of emotions and feelings are indispensable for rationality and decision making. Human emotions are deeply empirical since they are rooted in the predictions of brain cells that constantly adjust and reinforce their connections to improve their perception of the world around us. Loose associations, emotions and feelings assist us with the daunting task of predicting in an uncertain environment and planning our actions accordingly without having to exercise logical deduction or induction in each action.

In some pathological situations, when people are cut off from their feelings as a result of illness or injury, even the most banal decisions can become impossible — loosely speaking, a brain that cannot feel cannot make up its mind correctly. Behavioural studies on financial decisions also found that usually the pain of losses is about twice as potent as the pleasure of generating a gain. This effect is known as loss aversion, which is part of a larger psychological phenomenon known as negativity bias (loosely speaking, for most people ‘bad’ is stronger than ‘good’ in their emotional responses). The fact that people cannot make everyday decisions without feelings and emotions contradicts the conventional view of humans as rational agents. Of course, the
discussion above does not mean that emotions should dominate the decision making process. Strong emotional reactions and attachment to financial gains or losses can actually be counterproductive. However, empirical evidence shows that there is a range of emotional responses and cognitive biases affecting risk taking and decision making in general, which need to be understood better by the risk management community.

Another area of risk management dominated by judgment and cognitive issues is actually the quantification of risk. To overcome the uncertainty in predicting future loss scenarios, risk management relies heavily on assumptions about the random nature of price changes and losses, and on probabilistic models of loss likelihood and loss severity based on statistical analysis of historical data. Note however that the purpose of using probability theory and statistics for estimating future losses is simply to help us in forming reasonable judgment in situations where we do not have complete information. Also note that the sole purpose of the statistical analysis of past data is to obtain a subjective judgment that allows us to estimate the likelihood of future events based on the belief that there is a causal relationship between past and future events. To illustrate this point, given any ‘real-world’ random sequence of events (such as tossing a fair coin), the likelihood of the next event (head or tail) is not derived from perfect information about the characteristics of the random draw (which are unknown in advance) but inferred statistically from events already observed. That is, the likelihood of the next event is ‘assumed’ to be determined by the limiting frequency of the events already observed. As we get more and more observations, this assumption may or may not become more solid. However, a prediction based only on past observations is always a ‘subjective’ judgment inferred from the available data and the belief that nothing else about the problem will change in an unexpected way (for example, unintentionally replacing the fair coin in our example with a biased coin after a few tosses). Every time we assume that some property of a random sequence will hold also in the future, we are making an educated — but completely subjective — judgment of this type. This is exactly the problem faced by financial institutions, which often have limited information on borrowers, counterparties or changes in the business environment and, therefore, need to complement their risk models with sound judgment and assumptions limited by cognitive issues.

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**Question 1:** Should banks broaden their risk management scope and include the research results of ‘less precise’ sciences (eg psychology) in addition to those of classical disciplines (eg mathematics, statistics) into their risk management frameworks? If so, why? If not, why not?

The functioning and development of financial institutions and world economies depend on the way human beings behave and on the decisions they make. The misleading interpretation or failures proceeded by economic decisions of any nature is often the result of cognitive errors, such as under- or overestimating the probability of an event, framing beliefs to an anchor, or emotional biases. Often, the outcome of these decisions yields either very positive or very negative effects, provoking the frontiers of risk management. Behavioural models aim to capture these effects and should therefore be considered as a steering tool.

Does this mean that risk management should incorporate behavioural components within their internal and external policies? Yes. However, it does not mean that behavioural models should be core to
every business decision. Banks should consider human behaviour as a variable in their equations, while also setting the constraints of their business model on a rational, mathematical and most-importantly, controllable framework. Whether or not behavioural effects occur, depends among other aspects on the time horizon of business decisions and risk analyses. There are behavioural components that are deemed to be significant on long time horizons whereas others are significant on short time horizons. Long term behavioural components can be found, for example, in liquidity models for retail deposits. Short term effects are, for example, the mass psychology effects that dynamically appear with shocks within the economy.

The big challenge is to assess which assumption good risk management should be based on, ie if a behavioural or a rational assumption of counterparts/clients is sensible for risk management purpose. Otherwise put, a good risk manager should know what is good and what is bad for business and this should be based on understanding new positions, industries, as well as one’s counterparties’ business intentions. A good risk manager should also know where the threats come from and how they can be avoided, or, if they cannot be avoided, how they can be controlled, because risk potential equals loss potential.

A very important differentiation is to be made at this point: the incorporation of behavioural models should be treated as a different issue when it comes to different institutions, ie we cannot generalise. It is true that asset prices have been reported to also follow behavioural patterns: we know that prices fluctuate based on supply and demand, and of course, supply and demand are influenced by actors in the economy, but this does not mean that financial institutions should drop the ‘random’ assumption on asset prices and embrace empirical models based on behavioural patterns. The consideration of such patterns is likely to differ between different types of financial institutions. Asset managers are likely to take into account such patterns within the modelling of asset prices, while banks would rather consider behavioural patterns within credit — and liquidity management.

The incorporation of behavioural finance models within a bank’s organisation should have two dimensions: a qualitative and a quantitative dimension. Qualitatively, risk managers need to relate the behavioural finance approach to their governance/business model. This is often related to operational risk and is best managed when people within the organisation attain both a deep understanding of risk and a good governance and communication model within the organisation. Risk managers should assess at which point their technical knowledge is no longer the effective solution to avoid emotional/cognitive biases and they should set-up an organisational structure that is not prone to market events that appear irrational. From the quantitative perspective, the models that are employed for instrument valuation and risk quantification can be adapted to include behavioural effects. For example, portfolio models can be adapted to also include mass psychology effects, such as taking higher risks when the already incurred losses are high. While banks have already recognised such behaviour and have taken a step towards minimising risks via stop-loss limits, behavioural effects could be treated in risk modelling via distributions that are transformations of probability measures that overweight small probabilities and underweight large probabilities. All in all, risk managers should aim for an ongoing assessment of weaknesses of any kind that can impact their business, while keeping their organisation in line with the regulatory requirements.

A prerequisite to management and regulation of risks induced by irrational human behaviour is that appropriate measures against reckless behaviour are in place. Reckless behaviour is, eg careless business activity, rogue trading, manipulation of economic data in one’s advantage and aiming at arbitrage opportunities or moral hazard, such as cashing out large bonuses on short time-horizons.

The rules set out by the regulatory authorities should indeed be the ones of a fair economic game, but is this really enough? Nowadays, the financial system has become so complex, that it is very difficult for authorities to track every little step and important decision of a bank. If history taught us anything, it is that there will always be clever individuals who are going to find a way to break the rules without being noticed for a while, or to find arbitrage opportunities and profit from them. In order to assure that the behaviour of
individuals is the one intended and placed within the framework of the rules, behavioural insights are one important hint on how one can design control procedures, which can also be tested empirically.

**Question 2:** Should ‘reckless’ behaviour be regulated? If so, why? If not, why not? How would one measure ‘recklessness’ in making credit or market risk decisions?

Reckless market or credit decisions are difficult to model, however, they can be handled by implementing corresponding control processes, such as smart limit systems. The regulation of reckless behaviour is currently pursued by imposing more responsibility on risk managers and by diminishing risk that is not sustainable. Moreover, risks induced by human behaviour should be linked to the impact that they have on the payoffs that they induce. While this is not common practice within risk models suggested by regulatory guidance and while this is not yet applied within current state of the art models of the financial industry, recent advances in research show that it is possible to link behavioural components to risk measures.

To sum up, a successful risk management practice should assess at which point and for which decisions, a behavioural component should be included within the steering of risks. It should conduct a careful management of risks, to always aim for the identification of threats that could impact their organisation even if these threats seem unlikely and to dynamically assess model weaknesses and potentially unexpected market events. Most importantly, a healthy and well-functioning risk management practice should aim for the understanding of risk and its sources — human or not.

**Perspective 4 — Frank Riedel**

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**Question 1:** Should banks broaden their risk management scope and include the research results of ‘less precise’ sciences (eg psychology) in addition to those of classical disciplines (eg mathematics, statistics) into their risk management frameworks? If so, why? If not, why not?

I take the freedom to modify and enlarge slightly the scope of the [first] question by taking banks’ risk management and a proper regulation, two intrinsically related topics, into account. Let us thus ask: Do regulatory authorities and banks’ risk management departments need to take findings from psychology or related behavioural sciences into account?

Economic theory is based on decision theory, a rich building of mathematically oriented, axiomatic theories that describe ways to come to a ‘rational’ decision in complex environments. Such decisions are typically based on (rather complex) utility functions, a way of ranking various alternatives and assessing which option is better or worse in a given situation.

Facing such a theory, the common complaint of a practical man or woman is: ‘But I do not have/know my utility function’ — and indeed, human beings are not rational agents nor do they have a utility function encoded in their brain. Common sense, or, to enlightened persons, a short reading of Freud’s ‘Psychopathology of Everyday Life’ would be more than enough to support this conclusion. Behavioural economics and psychology have reinforced the common sense and psychoanalytic knowledge with many a study. If we want to understand humans — a difficult task — we certainly need psychology.

Does this imply that banks, or regulatory authorities, should take behavioural findings into account? No, it does not.

The rules set by regulatory authorities and used by risk management departments, should ideally be the rules of a fair economic game. In general, these rules allow, even promote free economic activity in the interest of the involved trading partners, but they
need to prevent misuse of freedom and misuse of market power. In the context of financial markets, good rules support reasonable risk taking, credit provision and insurance, promoting a society’s economic well-being and wealth, as well as banks’ profits; good rules also hinder economically undesirable activities like excessive risk-taking, or manipulations of risk management that make the bail-out of large banks necessary, or put a bank’s survival at risk.

A crucial aspect of good risk management is the following. The rules should not set incentives to ‘trick the system’. Many tax rules are a case in point, but, as I have explained in detail elsewhere,5 the basic risk measure, value at risk, also sets the wrong incentives and gives the wrong numbers, and it can be, and was, exploited. Value at risk induces smart agents to speculate on small probability events and is easily manipulated.

The LIBOR scandal is another example. The LIBOR, to recall, is determined by asking a number of banks about their ‘cost of money’ for certain maturities. The problem is not so much the traders’ psychology here. The LIBOR system was a silly game in as far as it is optimal for rational traders to lie in such an environment and to manipulate the LIBOR in order to make gains from their banks’ exposure in derivatives — and this happened.

The design of good rules is a job for rational analysis. We want to assess how the game we come up with is played by smart, rational and, yes, ‘greedy’ actors, in order to assess if we have set the right incentives. In order to do so, it is necessary to understand how rational agents behave in the game defined by risk management rules. Good risk management and regulation is thus based on rational analysis, or in other words, mathematical economics.

The recent literature on ‘risk measures’ is a good starting point here. It has shown how one can replace the catastrophe-triggering value at risk by better risk measures that assess the riskiness of financial positions in a robust way. Such risk measures promote diversification, and thus prevent speculation on small probability events, to give one example. Their robustness makes them immune to human behavioural biases as well, in a certain sense. It would thus be worthwhile to finally replace value at risk by a robust risk measure (as it is currently being done in some places).

What about the role of psychology then? First, and maybe obviously to the readership of this journal, judgment (‘Urteilskraft’) is crucial for risk managers. This typical human skill is both necessary and important, and it cannot be totally replaced by rules, neither by ‘mathematical’ nor by ‘behavioural’ algorithms. Second, for the implementation of new rules, testing in the laboratory and in the field remains important. We need mathematical economics to come up with the right rules, ‘Urteilskraft’ for managers, and empirical tests to check the consequences and the robustness of our theories.

References