Fearing Losses:
The Psychology of the Credit Crunch

The recent market turmoil is ultimately a psychological phenomenon that has had economic consequences, rather than the other way around. In this brief, we discuss the mental mechanisms that underpin the panic that has gripped investors, lenders, and consumers alike and thereby generated the current recession.

In the process, we also demonstrate the fundamental flaws in the risk management practices hitherto used by banks and insurers, and the risk measurement techniques used by financial advisors to determine investment strategies for their clients. Likewise we highlight how traders, asset managers, and finance directors can benefit from the effects of framing and the malleability of investor's perceptions.

It is said that you should always introduce the elephant in the room. But the oft unmentioned elephant of financial risk currently needs no introduction. Last year three of the big five independent investment banks on Wall Street were forced into fire sales. The US government has undertaken five multi-billion dollar bailouts and the UK government has similarly been shoring up the Square Mile. Markets have gone up and down (and down again) more often than Ben Bernanke's eyebrows. The need to understand the psychology of risk is surely self-evident.

Depending on which day you read this, the world's stockmarkets are worth about $30 trillion, with bonds and real estate worth over twice that each. As such, the recent market gyrations have changed global asset values by at least $50 trillion. For a sense of scale, the US Federal budget is $3 trillion and the mortgage backed security losses that kicked off this whole debacle amount to less than $1 trillion. So where did all the money go? Clearly, deteriorating economic conditions have reduced short-term earnings expectations. Yet values have fallen far further than can be justified by these changes alone. For example, global price-earnings ratios that once averaged 35 are now down to 10, even after the recent fall in interest rates. So why have markets been gripped by so much irrational panic? In this brief we will try to lift the lid.

Don't Worry, Be Happy

Figure 1 explains the connection between the above question, Ricky Gervais and Bobby McFerrin's somewhat patronising 1980s hit.
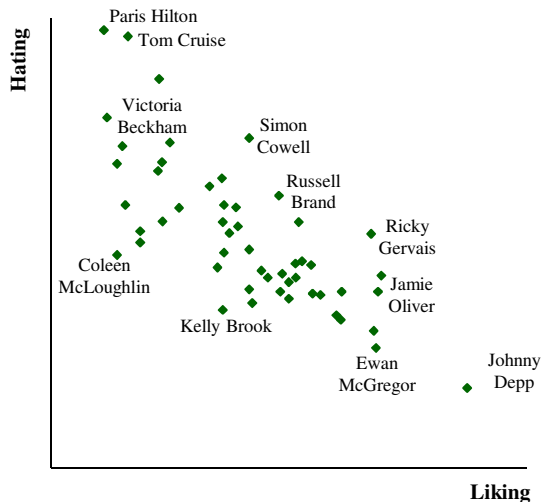

Figure 1. People's Reactions to Celebrities

Mr. McFerrin's assertion that one has to be both "happy" *and* "not worried" suggests that he believes feelings can be dissociated into two mechanisms which independently govern positive and negative emotion. To illustrate his point, we asked people how much they liked various celebrities, and then how much they

hated them. The figure shows that their responses aren't entirely correlated[a]. We unequivocally hate Paris Hilton and love Johnny Depp. But we simultaneously like and hate Ricky Gervais and don't care either way about Kelly Brook, whoever she is.

In animals these two mechanics govern approach and avoid behaviours. The intuition is that in humans too there are separate, competing punishment and reward systems that drive actions. So, there are things that make assets attractive and things that put investors off. The point is that markets are currently being dominated by the latter (fear) rather than the former (greed). In modern portfolio theory these are respectively equated with variance[b] and expected returns. Whilst we would disagree with both these claims, we'll stick with demolishing the former today.

At Variance with Variance

There is now strong evidence that people's perceptions of risk aren't captured by the volatility measures used in modern finance. For example[c]:

- *Happiness Research*: The empirical relationship between happiness and income is inconsistent with using variance as a risk measure.
- *Risky Decision-Making*: Lab studies of risky choice don't support variance, but do support alternate measures.
- *Behavioural Finance*: Using variance creates anomalies, such as the equity premium puzzle[c], that can be resolved using alternate measures.

But against such evidence, there's still a Volatility Index trading on the Chicago Board Options Exchange and it's often incorrectly touted as an index of investor fear. Indeed the most telling criticism of variance is that banks have already migrated to using Value at Risk[d] (VaR) for measuring and managing risk internally. But is VaR really any better? The recent disasters suggest not.
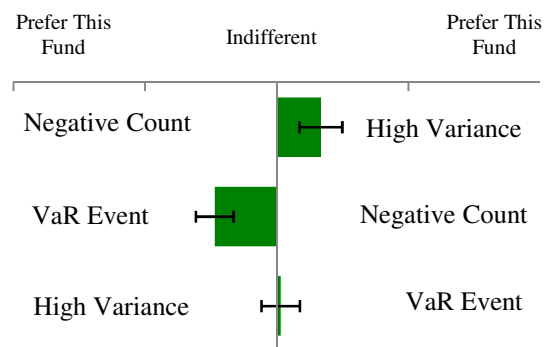

Figure 2. Investment Performance Preferences

Consider this experiment. We presented investors with ten years of returns for two investments, one after the other. We then asked them which investment they preferred. Both investments had the same average

return, but each was laced with one of three kinds of risk. In one case we increased the variance, in another we included a large negative VaR sized loss, and in the third we increased the number of years with negative returns. In each case the other risks remained at base levels (e.g. the funds with more negative years still had low variance and no VaR sized loss event).

Figure 2 shows the results of this bake-off. People always find the fund with more negative years more off-putting than either the fund with higher variance or the one containing a nasty shock. The crux of this finding is that people really hate losses, almost regardless of the magnitude. Whilst this goes against the grain of the current financial canon, it's certainly intuitive. Furthermore, loss aversion comes with an eminent academic pedigree, including a Nobel Prize for Daniel Kahneman.

Fear of Losses

A good example of loss aversion is that people typically reject gambles which offer an even chance of gaining or losing money, unless the amount that could be gained is at least twice the amount that could be lost (i.e. they often accept a 50/50 chance of winning £10 or losing less than £5). Similarly, loss aversion creates endowment effects. For example, I'll mow my lawn rather than pay a gardener £10, but I wouldn't accept £10 to mow your lawn[e]. In the former it hurts more to lose the money than gain the time, and in the latter it hurts more to lose the time than gain the money.
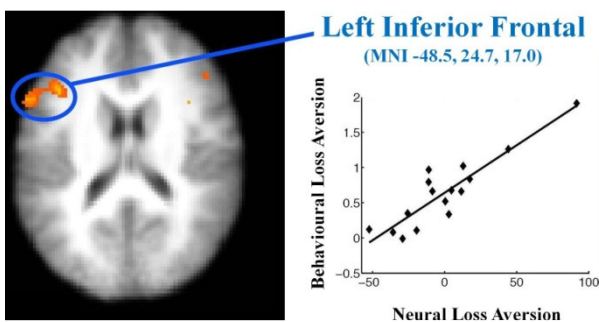

Figure 3. The Neural Basis of Loss Aversion[f]

So unlike variance and VaR, there is good evidence to suggest that people are motivated by loss aversion. First, it's psychologically plausible, since animals tend to learn faster from negative reinforcement than positive. Second, it's experimentally observable. Third, it appears to have a biological basis. This last point is illustrated by Figure 3. Participants were offered various gambles involving gains and losses and their degree of loss aversion estimated (i.e. based on what they were prepared to accept). At the same time their brains were scanned and areas identified where activity levels correlated with the sizes of gains and losses on offer. An example area is shown from the frontal cortex. For these areas a "neural loss aversion"

measure was calculated based on the area's sensitivity to gain and loss amounts. The figure shows that across participants, greater neural sensitivity is associated with greater aversive behaviour.

So loss aversion is a real and tangible characteristic of people that's visible when you look at how they are wired. Accordingly, when financial advisors or fund managers work with clients to understand risk appetite, it is traits like these that they should be measuring. This is because such traits give rise to quantifiable and durable preferences. Similarly, it is real world cognitive effects like this that lie at the root of the current financial panic.

Valuing the Ups and Downs

Against this backdrop, Figure 4 summarises some of the main features of people's preferences over outcomes. First, as we have discussed, they are loss averse. Thus, the curve is steeper on the negative than the positive side (in this case a gain of 100 is as attractive as a loss of 30 is unattractive). Second, they exhibit diminishing sensitivity. Hence, the curve flattens off as the gains or losses get bigger. As such, people don't perceive such a big difference between a large loss and a gigantic loss. They just fear the loss. Third, gains and losses are defined relative to a reference point. Crucially, this reference point can be changed, thereby redefining what is a gain or loss.
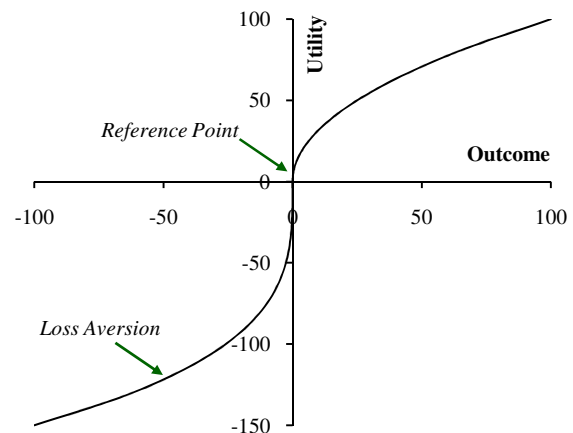

Figure 4. Preferences for Gains and Losses

We can now draw two conclusions from this figure. First, it provides a framework for evaluating different risk measures and interpreting the earlier findings. Variance performed poorly because it doesn't account for loss aversion. VaR, whilst at least focussed on losses, suffers because it uses a large and often arbitrary threshold that doesn't account for people's diminishing sensitivity[g]. It's only measures like frequency or probability of loss that properly capture what truly irks investors. In other words, the current financial crisis makes a convincing case against existing risk measures and the figure explains why they have failed. They simply don't capture investor

psychology and the impact of losses. Accordingly, new measures must be devised that redress the gap.

Second, because of the malleability of reference points and, moreover, how one chooses to measure outcomes, Figure 4 also illustrates the potential impact of manipulating people's perceptions of losses and gains. The most famous example of this was when Kahneman demonstrated that people will reverse a medical decision based on whether the outcomes are presented in terms of the chances of living or the chances of dying. In the current context, a financial advisor might similarly choose between measuring performance as an increase in the chances of attaining an adequate retirement income or a decrease in the chances of retiring destitute. Or a finance director might frame this year's profits by using either last year's or a competitor's profits as the reference point. Wherever people come together to discuss and evaluate assets, framing can be used to influence the perception of value. Such malleability is either an Aladdin's Cave or a Hall of Mirrors, depending on where you sit.

Conclusion

The issues described in this brief have important implications in different commercial contexts. As a finance director, a company's share price or cost of capital will be influenced by how divisional performance is aggregated, framed and communicated. As a fund manager, this aspect of Behavioural Finance offers the opportunity to exploit systematic errors in asset valuations to construct portfolios that feel less risky to investors and yet at the same time generate higher returns. As a financial advisor, these results highlight how to measure the underlying preferences of clients and then objectively differentiate their insurance and investment strategies accordingly. As a chief risk officer or chief actuary, this research raises important questions about how to measure, aggregate and manage risks.

Finally, the fact that human decision makers, from investors through to traders, have a disproportionate fear of losses sheds light on the current financial pile-up. Just like the endowment effect mentioned earlier, once a loss is threatened or starts to materialise, the loss averse decision-makers in the financial system slam on the brakes. The ensuing liquidity problems then generate more uncertainty, threatening further and larger losses, leading to a cycle that eventually stalls the economy. Ironically the fear of loss actually brings about its own fulfilment. The deadlock in the world's financial markets makes little economic sense. But given the primary, visceral fear of loss at the heart of the system, the credit crunch was never really an economic phenomenon at all. It was always about a contagious fear that swept through the markets and consumers alike via multiple new and old media channels to yield a swift and deep recession

Accordingly, an important solution will be to disseminate a better understanding of this psychology, so that governments and banks can both counteract and defuse the waves of irrational fear that are feeding the cycle. Unfortunately, in the meantime, the elephant of financial risk is running amok and the consequences for the economy will be very real. Under such circumstances one of the last remaining strategies is simply to buy into an irrationally oversold market and wait it out. For this second step, we suggest a good bottle of Brunello, ideally 1997 if you can find it, and then kick back and try looking on the bright side. For example, think about all the fantastic research data we've been accumulating.

References and Footnotes

a. This approach regales in the name "the affective circumplex". See Russell J. A. (1980) A Circumplex Model of Affect. *Journal of Personality and Social Psychology, Vol 39* pp: 1161-1178 for more insights into your adrenalized love-hate relationships. Ito, T. & Cacioppo, J. T. (2005) Variations on a Human Universal. *Cognition and Emotion, Vol 19(1)* pp: 1-26 also discusses the separability of positive and negative evaluations and individual differences thereof.

b. Including the different flavours of variance used in, for example, the Treynor and Sharpe ratios. Variance is the maximum amount your asset value will go up or down 66% of the time.

c. For these three examples see Layard, R., Mayraz, G., & Nickell, S. (2008) The Marginal Utility of Income, *Journal of Public Economics, Vol 92* pp: 1846-1857; Stott, H. P. (2006) Choosing From Cumulative Prospect Theory's Functional Menagerie, *Journal of Risk and Uncertainty, Vol 32* pp: 101-130; and Benartzi, S., & Thaler, R. (1995) Myopic Loss Aversion and the Equity Premium Puzzle, *The Quarterly Journal of Economics, Vol 110 (1)* pp: 73–92. The equity premium puzzle is the observation that it's hard to reconcile long term returns on equity compared to government bonds using variance based modern portfolio theory.

d. VaR is the maximum amount that your holding will fall 95% of the time (or sometimes 99%). Clearly bigger is scarier.

e. The original paper involved mugs (i.e. that's what they traded, not the student participants). Kahneman, D., Knetsch, J., & Thaler, R. (1990) Experimental Test of the Endowment Effect and the Coase Theorem. *Journal of Political Economy, Vol 98(6)* pp: 1325-1348.

f. See Sabrina, T., Fox, C., Trepel, C. & Poldrack, R. (2007) The Neural Basis of Loss Aversion in Decision-Making Under Risk. *Science, Vol 315* pp: 515-517 and impress your colleagues with fancy long words like functional T2*-weighted echoplanar imaging with a 3T Siemens Allegra MRI scanner. Huh?

g. Because we originally came from Oliver Wyman's Risk Practice and helped develop their risk methodologies back in the early 90s (including VaR) we can't resist a small qualification here. It's important to remember that Figure 4 is for individuals and that things may be different for a company. At Oliver Wyman we implicitly believed that losses weren't a problem until they threatened an institution's solvency. Thus the left hand side of Figure 4 was shaped like a cliff. In such cases VaR is an appropriate risk measure. However, there are several problems with that approach, not least of all that an institution's shareholders are still ultimately people that have preferences like those shown in Figure 4.