activity are common to both low-carbon and green finance approaches. At a development level, it can be argued that the sustainable energy transition is a core element to several of the global sustainable development goals (SDGs). Numbers 7 (Affordable and clean energy) and 13 (Climate action) have direct impact on that energy agenda but it is equally difficult to see how others, including 3 (Good health and wellbeing); 9 (Build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation); and 12 (Ensure sustainable consumption and production patterns), can be achieved without a focus on sustainable energy transformation. How indeed can goals 14 (Life below water) or 15 (Life on land) be achieved without a move from the fossil fuel driven pollution of our current energy mix?

Much progress has been made in recent years despite the setback of the Copenhagen COP and the failure then to reach a global agreement to set clear policy signals towards a low-carbon energy transition. The success of Paris 2015 COP and the launch of the SDGs have further encouraged market momentum in the development of green finance. The growth in green financing instruments and issuance has increased the flow of capital towards that transition. At the same time, the development and largely voluntary adoption of global integrated frameworks are providing the criteria for ESG integration into mainstream finance decision-making and encouraging capital flows away from negative sustainability outcomes. As a reality check, however, the environment is not yet conducive to raise the momentum to deliver the scale of capital required to fully finance that transition. Overarching incentives, such as carbon pricing, are growing but the market development is failing to send the strength of pricing signal to trigger the scale of change required. Negative externalities are still poorly recognised and understood. Disclosure by companies of their material ESG impacts and dependencies are being socialised through initiatives such as the CDP, GRI and integrated reporting. The uptake, however, is not uniform and widespread. To achieve the level of ambition required will demand a holistic transformation of the entire system. This necessitates sustainability criteria becoming mainstream in both public and private finance sectors led by clear policy signals and regulation. Only then will capital flow to support sustainable energy finance sectors worldwide. Only then will the sector be geared to finance the sustainable low energy society of the future.

MARKET CRISES: SHOULD WE DISCUSS THEM MORE – INCLUDING WITH OUR CLIENTS?

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Introduction

Although markets regularly have periods of falling prices, financial professionals seem to focus on the upside, directing relatively little effort towards spotting the next crisis. Equally, little emphasis seems to be placed on discussing the potential for negative outcomes with clients, especially prior to investment. This raises questions about the awareness of the regularity of market crises amongst financial practitioners as well as (despite difficulties in anticipating market crises) their role in forewarning clients of potential risks when markets are highly valued.

Portfolio managers, intermediaries and clients are all aware that stock markets can suffer from 'bear' markets, corrections and other periods of falling prices. Except at the time and in the immediate aftermath, this is a topic that seems to be little discussed. Press coverage seems short-term, and negative market events appear to be rapidly forgotten. Discussions with portfolio managers and intermediaries tend to concentrate on the positives, often to the extent that the potential for downward market moves can seem neglected.

Looking at market CAPE ratios (cyclically-adjusted price-earnings ratios), the S&P500 is currently valued at 34.1x (December 2017). By way of comparison, before the August 2000 sell-off, the S&P500 index level was 1485, with a CAPE of 42.7x, although a higher ratio of 44.0x had been seen a few months earlier in December 1999. [1] Between January 1970 and December 2017, the average was 19.9x, with a 25.6x average since January 2000. Thus at current levels, it is hard to say that markets are necessarily over-valued, but at the same time, neither do they look particularly cheap.

Global and political events often impact markets, and as recent events have shown (2016: Brexit, US presidential elections), the outcomes may not be as anticipated by mainstream opinion. In this context, it seems surprising that those in financial services (including portfolio managers and intermediaries) do not spend more time discussing the potential for future financial crises. These discussions might extend both amongst financial professionals themselves and to conversations with their clients. Although anticipating the precise timing of crises can be difficult, who else should clients look to for guidance but their financial advisers and portfolio managers?

In this context, it may be worth clarifying that 'clients' could mean not only the retail clients of financial intermediaries but also clients of investment portfolio managers within the financial services sector.

This paper reviews ideas around the fundamental causes of financial crises, which are often rooted in human nature. It also looks at characteristics identifying the top of a 'bull' market, the most financially dangerous period to invest, being the 'eve' of a 'bear' market, or other downward correction. It then asks what investors can do to remain rational and not get caught out by investing at a market top. The next question is what financial professionals should be doing given the known regularity of financial crises, including from a client perspective, and why they may find it difficult. Finally, some thoughts are offered on portfolio stress-testing as a response and how this could open the door to a better quality of conversation with clients.

The fundamental nature of financial crises

For investors, bear markets and corrections are a source of great concern since a stock market crash can result in a cumulative decline of 25% or more in real equity values. [2]Markets often appear to be driven as much by sentiment as by economic reality and, as famously suggested by Federal Reserve Board chairman Alan Greenspan during the dot-com bubble of the 1990s, can suffer from 'irrational exuberance'. [3]

Stock market values are perceived to be linked to economic market cycles, but since market participants seek to anticipate investment opportunities ahead of competitors, markets are forward-looking. Investors must, therefore, make judgements and forecasts about economic and investment outcomes in the face of incomplete information. This results in the possibility of error and decisions coloured by human psychological and behavioural biases. With many market participants a wide range of views is also generated. Logically, not all of these can be correct.

Even if 'normal' economic cycles could be predicted from interest rates, unemployment and other data, national economies are subject to external influences from foreign countries via trade, decisions made by their governments and wider geopolitical events. Some countries may be 'serial defaulters' on their sovereign debt. These countries tend to over-borrow during good times, leaving them vulnerable during the inevitable downturns. [4,5] Governments can be prone to treat favourable shocks as permanent developments, fuelling a spending spree and borrowing that eventually ends in tears. [4] Alternatively, financial innovations can appear to render illiquid assets more liquid, permitting them to command higher values than previously, such as during the US sub-prime mortgage crisis of 2007. [4]

Secular trends

Secular trends can significantly change the investment landscape, creating new opportunities while undermining others. Market practitioners have a range of opinions, so while some may correctly anticipate trends, others will not. Further, the results of elections or national referendums may turn slight popular biases into clear-cut outcomes which can come as a surprise to the consensus view. Examples of secular trends include:

- Growth in nationalism, including the UK's 2016 Brexit vote, and the election of more nationalistic political candidates, with potential for protectionist trade policies as a contrast to a previous era of increasing free trade.
- New technologies, including, more recently, the internet dot-com stocks bubble (the 1990s). [3] However, this is hardly a uniquely recent phenomenon considering, for example, the 1840s railroad mania and 1793 canal mania of earlier eras. [6]
- Demographic impacts as populations age, creating increased demand for healthcare and associated support services, combined with disinvestment associated with drawdown from pensions.

Human nature

Human nature often seems to lead to the over-anticipation of future developments (both good and bad) and exaggerated valuations. The fickle nature of human confidence plays an important role.[4] People prefer simple explanations, and prefer any explanation to none; that does not mean such explanations are correct. [5] Leaders in the financial sector may believe that their innovations have genuinely added value and underappreciate the risks their firms are taking. [4] Alternatively, financial product providers may be responding to inappropriate incentives in less well-regulated areas. [5] Almost all bubbles require some form of new financial technology or financial engineering. [5]

Governments

One economic role governments play is to maintain a balance between producers and consumers to assure fair market prices. However, other forces are at work in politics, with constituencies attempting to influence governments through money, polling or petitioning (the 'will of the people'). Governments respond to political influences both to silence critics and to stay in power. Market events can also provoke responses from financial authorities, which, although intended to address current difficulties, may sow the seeds of future problems, such as quantitative easing. [5] The outcomes that result can lead to financial bubbles, caused by creating artificial criteria to achieve political goals. Government can exert its power over financial markets and on public thinking in ways which can set things up for a future disaster. [7]

It is possible that the complexities of financial markets make them prone to fingers of instability which extend throughout the system, so they can amplify small events with potentially catastrophic consequences.[5] Hyman Minsky also pointed out that stability leads to instability. For example, long periods of stability can lead to debt accumulation until dangerous levels of leverage are reached. [5]

Some characteristics of the top of a bull market

At the top of a bull market (the 'eve' of a bear market), when a fall in market values is more likely, media commentary may justify stretched valuations by saying there has been a change in economic circumstances so that "this time it is different", [8,9] although almost certainly it is not. [4] Indeed, in the run-up to the 2007 sub-prime crisis, the International Monetary Fund concludes in its April 2007 World Economic Outlook that risks to the global economy have become extremely low. [4]

A simple outline of a financial mania is given by Slater: [8]

- An image of instant wealth attracts and forms the financial, psychological 'crowd'.
- People see what they want to see, a mixture of facts and fancy which builds an image in their minds. A few examples of exceptional gains in the new area of interest are promoted as representative of the profits that can be made by all.
- Acknowledged experts in the field urge the crowd on its way.
- The financial crowd becomes irrational and blind to danger, ignoring fundamentals and traditional measures of value, while prices continue to rise in a self-feeding process that encourages more buyers to participate.
- Suddenly the image that has attracted and formed the financial crowd changes.
- Fear replaces greed as the bubble bursts with disastrous financial consequences for those who invested near the top.

Although only a stylised outline of a market crisis, awareness of this pattern may be of some help for avoiding developing market crises.

Additional guidance for rationality

What other guidance can be used to help ensure that investors do not get caught up in irrational behaviour?

In 1949 Benjamin Graham introduced an imaginary business partner called 'Mr Market' who makes daily offers to buy your share of a business that you had previously purchased for (say) $1,000, or else to offer you additional equity at the price he offers. Mr Market's offers depend upon his moods; sometimes they appear reasonable, but on other occasions he lets enthusiasm or fears run away with him and makes offers that seem foolishly high or low. [10] The message is that you should have your own idea of what your share in the business is worth and not let Mr Market's daily communications determine your assessment of the value of your holding.

Clearly, investment managers should develop and use their own asset valuation metrics to help guide them away from emotional responses. Of course, investment managers' valuation models are often based on their own theories, giving scope for a range of opinion, or even, more dangerously, on momentum in stock valuation.

In addition to flawed forecasts, external influences, secular trends, political activities and misinterpretation of underlying economic factors, investors are vulnerable to human psychological characteristics identified by behavioural finance theory. These can include herding behaviours (following the crowd) as well as tendencies for investors that result in irrational behaviours including loss aversion, framing relative

to some reference point, mental accounting, overconfidence, inertia, representativeness and basing decisions on information availability which may be incomplete. Overconfidence touches the irrational belief that financial crises happen to other people at other times; not us, here and now. [4] Behavioural finance theory has become a large topic – an overview can be found in. [11]

Actually, the appreciation of the importance of crowd psychology is long established, with a discussion of how a crowd can assume a personality of its own explored in Gustave Le Bon's classic work *The crowd* originally published in 1895. [12] Many historical manias are also outlined in Charles MacKay's *Extraordinary Popular Delusions* [13] which details a sobering list of human follies.

Financial professionals and market crises

The role of financial professionals' client relationships is worth consideration in the context of market crises. Clearly, clients would not wish to invest their hard-earned savings on the eve of a financial crisis. It is also natural that they would expect to be able to turn to financial professionals for guidance on when it is safe to invest and when it might be wiser to wait.

Financial professionals may be able to help identify periods when markets, asset classes and assets may be overvalued or undervalued, particularly in extreme cases. Of course, that is not to say that identification of overvalued markets is easy. With many opinions and different valuation models available at any point of time, there will be a wide range of opinion as to how advanced the level of the market is – however this should not absolve the financial professional from their obligation to try to do so.

Yet it appears to be a rare event that a fund manager, fund provider or sales team would admit that 'right now' might not be the best time to invest in their asset class and that it might be better to wait for a period. Usually, some argument can be found to justify an otherwise apparently high valuation for an asset. If the valuation method used differs from that used in the past, the argument might be used that "this time is different". [4]

One message appears to be that it is unwise to revise valuation methodologies simply to accommodate ever-rising market prices. The problem is that markets appear capable of price rises well beyond what might be expected from rational pricing models for extended periods. An investor relying purely on pricing models would likely find themselves missing out on periods of meaningful returns, creating difficulties for an adviser in determining whether to invest or not.

Long, strong positive trends in an asset price tend to generate a positive response from investors wishing to allocate funds to it. Of course, the price rise could be an overdue correction for a previously unloved asset class, or it could herald the development of genuine new investment opportunities. On the other hand, it may be an irrational response of the type documented by behavioural finance theory. The concern is that a fund management house could see this as an opportunity, perhaps launching new funds at or near the top of a strong positive asset class trend. One could argue that this would increase the probability that prospects for that asset class might be poor. However, given human nature, it also makes for an easier sell in the fund business.

The danger is that asset prices are often cyclical, so after a long period of strong growth, the potential for further meaningful upside may be reduced, while the likelihood of losses on the asset class may be growing. If a fund management house were to launch a fund in an asset class after a period of strong growth in that sector, would that be a case of self-interest? Although the intention may be genuine (perhaps making a new product type available to investors), financial practitioners that launch funds under such circumstances should perhaps be aware that they could stand accused of exploiting investors' behavioural weaknesses by encouraging investment after a period of strong growth in an asset class. If a fund launch transpires to have occurred at, or near the top of, the cycle for that asset class, one could ask whether the fund manager knew this and was acting in self-interest, or the fund manager did not appreciate the asset class was at the peak of its investment cycle. Either way the fund manager does not come out looking good: they were either self-serving or else not as knowledgeable about the asset class as they claimed.

Alternatively, a fund manager could wait until they are confident of further future upside potential. However, from a sales perspective, a fund management house might prefer investment immediately (even if this could place the client's wealth at additional risk), since judgements regarding the timing and extent of an asset's valuation cycle and prospects are not certain, and if the investment is delayed a client might change their mind.

A thought-chain for potential behavioural implications of client investments under fluctuating market conditions might be expressed in a question-and-answer format as follows.

Question	Answer
Are clients more inclined to invest after a long strong trend than when an asset is weak?	Yes (behavioural psychology, herding)
Should they be?	No (probably not as many asset classes can be cyclical in their returns)
Is a downturn or correction more likely after a long strong positive trend than before it?	Yes (probably, again due to the cyclical nature of returns on many asset classes)
Should financial professionals help try and protect their clients from their behavioural weaknesses?	Yes
Would that be an easy sell to clients?	Probably not, although if made aware, many clients might appreciate the additional effort on their behalf
Would clients appreciate it?	In the short term probably not, in the long term, quite possibly yes.
Does it increase the chance of a financial professional being seen to have mistimed the market?	Yes (the problem is that if an adviser recommends waiting and the market goes up they will look bad, and vice-versa)
Does it make a financial professional's job harder?	Yes, absolutely (the potential to look bad to a client is amplified)
But should financial professionals at least try?	Yes (but they need a strong framework to help support this)

The difficulty is that by advising clients to wait or invest, based on professional judgement of the state of the market, an adviser runs a clear risk of being seen to be wrong in their market timing decision. A view expressed as 'market timing is impossible, we cannot know' consistently applied makes for an easier sell to a client, although it transfers market timing risk from the (presumably more knowledgeable) financial professional to their (presumably less knowledgeable) client. In essence this seems to be something of an abdication of responsibility, but given the difficulties in reliably timing the market, what is an adviser to do? In the section below one possible response is offered.

Stress testing: a response to the risk of market crises

Given the difficulties in timing markets and challenges around dealing with clients, in this context a framework that offers a consistent approach is required. Ideally, this framework should facilitate discussion with the client around potential market risks (including market crisis events) and generally promote a better quality of dialogue. One potential solution might be to use tools like portfolio stress-testing to help identify and quantify non-standard investment risks.

Market practitioners know that assessing portfolio risks is difficult, and conventional risk measures such as volatility and value-at-risk may assume normally distributed returns, which may underestimate the true portfolio risks. Measures such as beta depend upon volatility and so are subject to the same difficulties. For clients, such measures are arcane, and while useful for financial practitioners, are unlikely to be helpful in relation to discussions with clients. Market crises tend not to fit into a convenient theoretical framework and are extremely unlikely to be captured by conventional assumptions of normal or log-normal returns distributions. Even other measures of risk, such as drawdown, are likely to depend on using data derived from some historical period, which may be insufficient to capture information from previous market crises. Forthcoming market crises are unlikely to replicate historical crises, and even if there are some similarities, usually some new aspect will be present.

To address concerns about a potential future market crisis, a portfolio manager or other financial practitioner may wish to consider stress-testing a portfolio against significant historical market events, or against invented scenarios that reflect their (or their clients) particular concerns. [14]

Portfolio stress-testing helps identify and quantify risks within a portfolio, to indicate how it might respond to specific market outcomes or other concerns. Stress-testing can include looking at the potential downside risk of portfolios, or methods that help estimate what response might be expected under difficult (crisis) conditions. Although not guaranteed to identify actual impacts of future events on a portfolio, it is a helpful tool in an investment portfolio manager's armoury. Stress tests should be designed to determine how a portfolio might respond to adverse developments so that weak points can be identified early and preventative action is taken. Typically the focus may be on key risk areas, such as credit or market risk and liquidity. [14]

A strength of this approach is that stressed scenarios can be discussed with clients in fairly straightforward terms ("we are worried in case the dollar collapses against the euro by 20%'" or "after the recent long bull market, we think there is a chance that stock markets could correct by 15%. Given your investment time horizon, how do you feel about that?"). Furthermore, clients can even express their own fears, which may be already captured by existing stressed scenarios, or may be worthy of further investigation.

Once the outcomes of stress tests are known, a portfolio manager can determine what actions may need to be taken, if any. If the test reveals that an identified scenario has little impact, the manager and client may be reassured. On the other hand, if the testing suggests that the portfolio may be adversely impacted to an unacceptable degree, it can be restructured to reposition the portfolio to make it more resilient to the events considered.

Portfolio stress-testing is a large topic in its own right, with a wide range of techniques used. For an introduction and overview see, [14,15,16] while [17] explores a portfolio diversification stress-testing.

Conclusions

Anticipating market crises is not easy. Financial professionals must overcome their inbuilt human biases, as well as political and economic systems that can leave markets prone to periodic crises. Given difficulties in anticipating such crises, market practitioners should constantly be on the alert for them, particularly during quiescent periods when everything seems to be sound and markets are generating consistent positive returns.

Although difficult, portfolio managers and intermediaries should be attempting to form judgements about the likelihood of near-term market crises and having conversations with their clients about this topic.

One tool available to professionals for exploring and assessing the impact of non-standard risks on investments is portfolio stress-testing. This provides a framework for financial professionals and advisers to discuss what may be seen as 'outlier' risks amongst themselves and with their clients. In this context, the clients of investment managers may include other financial professionals, such as intermediaries, as well as retail clients and other underlying investors.

By discussing potential future market crises with clients, as well as carrying out regular portfolio stress-testing designed to capture specific concerns raised both by themselves and their clients, this will promote a better quality of dialogue. It will stimulate a more open and rounded discussion about the potential for market crises and the damage they could cause to investment portfolio values. This, in turn, can lead to portfolio restructuring to address key concerns. As a result, portfolios would be more robustly positioned and it would also be clear that portfolio managers and financial intermediaries are actively working to protect the value of their clients' assets.

References

1. DQYDJ, 'A calculator for the cyclically adjusted pe ratio (CAPE) – in any timeframe!' 15 January 2018. [Online]. Available: https://dqydj.com/shiller-pe-cape-ratio-calculator/.
2. R. Barro and J. F. Ursua, 'Stock-market crashes and depressions,' NBER Working Paper 14760, National Bureau of Economic Research, Cambridge, Mass, 2009.
3. Federal Reserve Board. [Online]. Available: https://www.federalreserve.gov/boarddocs/speeches/1996/19961205.htm. [Accessed January 2017].
4. C. M. Reinhart and K. S. Rogoff, *This time is different*, Princeton: Princeton University Press, 2009.
5. J. Maudlin and J. Tepper, *Endgame*, New Jersey: John Wiley & Sons, 2011.
6. C. P. Kindleberger, *Manias, panics and crashes, a history of financial crises*, 3rd ed, London: MacMillan Press, 1996.
7. J. Blessings, *The anti-demographic cliff*, Createspace, 2014.
8. J. Slater, *The Zulu principle*, Butler & Tanner, Somerset, UK, 1992.
9. J. Slater, *Beyond the Zulu principle*, Butler & Tanner, London, 1996.
10. B. Graham, *The intelligent investor*, 4th ed, New York: HarperCollins, 1973.
11. Q. G. Rayer, *Portfolio construction theory* (exam workbook), 4th ed, London: Chartered Institute for Securities and Investment, 2017.
12. G. Le Bon, *The Crowd*, New Brunswick: Transaction Publishers, 1995.
13. C. Mackay, *Extraordinary popular delusions and the madness of crowds*, Wordsworth Editions, 1995.
14. Q. G. Rayer, 'Dissecting portfolio stress-testing,' *Review of Financial Markets*, vol. 7, pp. 2-7, 2015.
15. Q. G. Rayer, 'Testing times,' *STEP Journal*, vol. 24, no. 8, pp. 62-63, October 2016.
16. Q. G. Rayer, 'Testing times, part 2,' *STEP Journal*, vol. 25, no. 3, pp. 66-69, April 2017.
17.Q. G. Rayer, 'An investigation of hypothetical variance-covariance matrix stress testing,' *Journal of Risk Management in Financial Institutions*, vol. 9, no. 3, pp. 264-288, 2016.