

COLLOQUIUM

includes debate by practitioners and academicians on a contemporary topic

Uncertainty, Ambiguity, and Financial Decision-Making

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INTRODUCTION

Uday Damodaran

“The revolutionary idea that defines the boundary between modern times and the past is the mastery of risk”, says Peter Bernstein, while introducing his book, *Against the Gods: The Remarkable Story of Risk*.¹ He goes on to say, “By showing the world how to understand risk, measure it, and weigh its consequences, they (*here Bernstein is referring to the thinkers in history*) converted risk-taking into one of the prime catalysts that drives modern Western society”.

In no other domain of decision-making has the measurement of risk, the understanding and theorization of risk, and the weighing of the consequences of risk received as much attention as it has in the area of financial decision-making. Whether it be in the measurement of realized, historical volatility or in the econometric modeling of forward-looking volatility, or in the understanding and theorization of risk using models and frameworks like Mean-Variance Portfolio Theory, Prospect Theory, and the Capital Asset Pricing Model, or in the weighing of the consequences of risk using Monte Carlo Simulation or in the management of risk using Insurance or Financial Derivatives, the strides that have been made in finance over the last six decades truly define the boundary between the modern economic world and the old.

So influential has been the work done in the area of risk, uncertainty, and finance that Donald MacKenzie in his book, *An Engine, Not a Camera: How Financial Models Shape Markets*, argues “Financial Economics did more than analyse markets, it altered them. It was an ‘engine’an active force transforming its environment, not a camera passively recording it”.²

Have the methods and theories developed in financial economics really altered markets and transformed the environment? What metrics, frameworks and models, and products have been developed by theorists to deal with the uncertainty that is so ubiquitous in financial decision-making? Do practitioners share the same views as

KEY WORDS

Corporate Finance

Uncertainty

Decision-making

Systematic Risk

Entrepreneurial Challenges

Bootstrapping

Fund Managers

Buyback

R&D

Acquisitions

Capital Allocation

Bond Market

Hedge Fund

Emerging Market Equities

¹ Bernstein, Peter, L. (1998). *Against the Gods: The remarkable story of risk*. New York: John Wiley & Sons, pp. 400.

² MacKenzie, D. (2006). *An engine, not a camera: How financial models shape markets*. Cambridge, MA: MIT Press, pp. 392.

those of academicians? These are the questions that we set out to debate in this colloquium on “Uncertainty and Finance”.

Representing the practitioners are: Social entrepreneur, Kumar Ankit, founder of Green Leaf Energy Private Limited; presenting the perspective on the large corporation is Puneet Mahajan, Vice President, Corporate Financial Planning and Analysis, General Electric (GE); Maneesh Dangi, Co-Chief Investment Officer, Birla SunLife Asset Management Company brings in a perspective on the Fixed Income Markets, and Bryan D’Aguiar, Portfolio Manager, Ashmore Equities Investment Management provides a perspective on emerging market equities.

Kumar Ankit, an engineer and an MBA, started his company, Green Leaf Energy Private Limited just fifteen days into his MBA at XLRI Xavier School of Management, Jamshedpur. A regular speaker in TEDx and several other social entrepreneurship and renewable energy forums, Kumar Ankit has been featured as a youth icon of Bihar by *Hindustan* and showcased in the TV show, *Awaaz Entrepreneur* on CNBC Awaaz. He recently won the first prize in the Bihar Innovation Forum, a Government of Bihar initiative supported by the World Bank, for recognizing the most innovative projects across India.

Ankit, in his contribution, dwells on the challenges faced by an entrepreneur in raising funds. He stresses upon the importance of starting early and of getting to know the business thoroughly. Otherwise, he argues, external stakeholders (including potential investors) might shy away from forging relationships with a young enterprise because of the added uncertainty of not knowing whether the entrepreneur knows his business well enough. He talks about the importance of sending out credible signals (like good cash management) to overcome the information asymmetry related problems typically faced by young enterprises. While concluding, he highlights the challenges associated with growth and scaling up.

Prior to taking up his current role as Vice President, Corporate Financial Planning and Analysis, General Elec-

tric (GE), Puneet Mahajan was the Chief Risk Officer for GE. As Chief Risk Officer, he was responsible for Enterprise Risk Management, managing GE’s significant credit and market risk exposure and building a comprehensive risk management framework. He was directly reporting to the Risk Committee of the GE Board of Directors. Puneet has worked globally and across multiple businesses during his tenure with GE. He began in 1998 as a member of the Financial Management Programme after which he joined GE’s Corporate Audit Staff. In 2005, he joined GE Capital, where he served as the chief financial officer for GE’s consumer finance business in Japan and subsequently became the chief financial officer for GE Capital Asia.

In his contribution, Puneet focuses on the challenges typically faced by large corporations while trying to maintain growth. He focuses on the capital allocation decision under uncertainty; decisions of capital allocation between organic investments in R&D, Acquisition and Buyback. While discussing the diversification decision that invariably confronts a large conglomerate, Puneet talks about the dilemma between concentrating resources and taking smaller bets. He also stresses the importance of incorporating flexibility into the investment decision.

Maneesh Dangi heads Birla SunLife’s fixed income practice. He also manages his signature funds - the largest dynamic and gilt funds in the Indian mutual funds industry. Under his leadership, Birla SunLife’s fixed income funds have won more than 30 awards within the last six years and has been lauded as ‘Debt Fund House of the Year’ by at least two external agencies in every single year since 2008. His funds have an illustrious track record and have consistently won multiple awards and recognition for fixed income fund performance over the years. With over 13 years of investment experience, Maneesh has the distinction of managing the largest Assets Under Management (AUM) in the Mutual Fund industry in India across asset classes.

Reflecting on Uncertainty and Finance, Maneesh classifies uncertainty as ad hoc uncertainty that cannot be

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modelled and recurring uncertainty that can be modelled. He cautions against a continuous search for trends and against lethargy and loss of vigil after stacking up on risk. He classifies fund managers and then goes on to describe his personal experiences. Based on his personal experience, Maneesh advocates moderation, staying away from the crowd, and a readiness to respond to uncertainty.

With over 12 years' experience in equities at reputed firms in the Middle East, India, and USA, Bryan D'Aguiar is currently based out of Virginia as a Portfolio Manager with Ashmore Group, managing equity investments in Emerging Markets with active responsibility for investments in the Middle East and select other Frontier markets. Bryan manages the top rated 'Ashmore Middle East Fund' (Morningstar 5 Star rating) – the oldest and largest foreign fund focused on the Middle East. Prior to the current position, Bryan spent over seven years, building and managing equity research teams in Emerging Markets such as India, Bahrain, and Saudi Arabia.

As a minority portfolio investor, Bryan has two primary concerns from an uncertainty perspective. His first source of uncertainty stems from the fact that portfolio investors have no control over the actions of the managements of the businesses they are invested in. His second source of uncertainty is in determining whether the security is correctly priced by the market or not. Bryan believes that the response to the first source of uncertainty should be to invest time and effort to study the management and understand their thinking. And, the response to the second source of uncertainty, he believes, should be to 'reverse engineer' the price of the security to find out what assumptions or views of the market might be embedded in the market price. Bryan also talks of the importance of constantly monitoring the investments.

Bryant and I represent the academicians in this colloquium. Bryant is Associate Professor of Economics at Macquarie University, Sydney. He is the author of a well-regarded book on General Equilibrium, *General Equilibrium: Theory and Evidence* and is currently working on two other books including one on *Uncertainty and the Foundations of Finance*. I teach at the XLRI Xavier School of Management, Jamshedpur. Over more than 20 years, I have been teaching and researching in the areas of corporate finance, investments, derivatives, and behavioural finance. My research interests also extend to management education and cricket (the game of cricket!) analytics.

Bryant and I bracket the practitioners' contributions. Bryant (in his article that appears in the Research Section) looks at the theoretical underpinnings of the microeconomics of choice under risk and uncertainty. Starting with a formal representation of choice under uncertainty, he moves on to examine the validity of the Expected Value Maximization and Expected Utility Maximization Hypotheses. After presenting alternatives to the Expected Utility Hypotheses, he concludes by moving from the domain of decision-making under risk to the domain of decision-making under uncertainty.

I attempt to tie together the contributions of my co-contributors by identifying common threads of thought and putting it all together into a framework of decision-making under uncertainty in finance. I start off by looking at how the perspective on uncertainty differs when viewed from a Corporate Finance perspective as opposed to a Financial Markets perspective. After defining uncertainty and risk, I go on to identifying the sources of uncertainty and risk from both a Corporate Finance perspective and Financial Markets perspective. I conclude by looking at the various possible responses to uncertainty: in finance, and life in general. 

Uncertainty and the Entrepreneur

Kumar Ankit

As an entrepreneur, to me, uncertainty is both about unknown variables and unknown outcomes. At times you have an idea of the variables that are involved, but have uncertainty about the levels at which they will

manifest themselves. At other times, you, or others, do not even have an idea of the variables that are involved. I have thus realized that linearity and unitary methods do not work out in business, more so in young businesses.

As I complete this article, I am in Mazar-e-Sharif, in the North of Afghanistan, attending the India-Afghanistan Innovation Partnership. Being here in Afghanistan gives me an even wider view of uncertainty in businesses from an entrepreneur's perspective. The country is in shambles after being war-struck for decades; how do people even consider running businesses when they don't have a secure life? But a number of meetings with Afghan entrepreneurs have helped to reinforce my belief that entrepreneurs are indeed a rare breed. A war economy is currently running in Afghanistan with even hawkers easily accepting US dollars. The US Agency for International Development (USAID), the Government of Afghanistan, and the Indian Embassy have organized an innovation partnership, with the intention of promoting investment in Afghanistan. Why would businesses and entrepreneurs look at doing business in a war-struck country? Well, a lot of entrepreneurs seem to be seriously interested; they seem to believe they are looking at a completely virgin space full of opportunities. So, why is it that the entrepreneurs see opportunity where others see only uncertainty? What do they see that others don't? I believe that entrepreneurs are able to handle such uncertainty with ease because of the 4Ps that they possess: Passion, People Orientation, Perseverance, and Positivity.

This article is more in the nature of personal reminiscences and reflections of an entrepreneur (coming from a middle-class family, studying in a top Business School, and refusing to join the rat race for a conventional career) than in the nature of a general article detailing every type of uncertainty encountered by entrepreneurs. Society values uniformity, conformance to standards and adherence to a well-traversed path. So, how and why does an entrepreneur venture out onto uncharted waters, and embark on a journey full of uncertainties?

There are a number of challenges that the entrepreneur faces. First of all, to start a business, the entrepreneur has to line up land and other physical assets, labour, and capital. But closer examination tells you that getting land,

other physical assets, and labour is possible only if you have adequate capital. So, the most critical challenge of business in its early stage is that of attracting capital. Uncertainty about the ability to attract capital can be the killer for many businesses at the inception stage. This is an example of a known (very well known!) variable with uncertain outcomes.

The entrepreneur has to arrange for the seed capital when nothing about the business is very certain. Even as he is taking his baby steps towards setting up the business, he is pre-occupied with the challenges of raising finances to fund his dream. The various funding sources available to

the entrepreneur at this stage are self-capital, loans from friends and family, and infusion of external capital. So, how does an entrepreneur decide on which source to pursue? While every entrepreneur dreams of the big things, personally, I have believed in "Dreaming Big, Starting Small". Rather than pursuing large infusion of capital from external sources, I believe, it is always better to bootstrap in the initial days. Bootstrapping is the process of arranging for the initial funds from personal savings, friends, and family. I prefer bootstrapping because at this early stage, the business is more in your head than in tangible assets that others can see; in your mind, the business is a whole bunch of variables with unknown outcomes. To everyone else, even these variables are an unknown. The only thing that others can see is your passion, perseverance, and

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positivity. That is why trust is also at a premium at this stage and why a strong people-orientation stands you in good stead. Thus, since the business has nothing else to showcase, the uncertainty is mitigated only through the four Ps of the entrepreneur. However, all your passion, perseverance, positivity, and people orientation might not be enough to overcome the fear of uncertainty of the potentially large external investor. So, rather than expending energy chasing the large investor who might never get convinced, I would think it better to first tap smaller pools of funds from friends and family who know you better and who can observe you more easily (being under

their close scrutiny can also act as a good disciplining device!)).

How does one respond to the myriad uncertainties that arise in the initial days? There is a tendency amongst people sometimes to become over-active and hyper action-oriented when faced with uncertainties. However, I believe it is important not to get cornered and rushed into taking decisions when faced with uncertainty; what is important is to give yourself time. One way of doing is to start early. I started conceptualizing my venture while I was studying in a Business School; in fact, I took the plunge of deciding to be an entrepreneur just 15 days into my MBA course. This early decision helped me marry my academics with my dream venture; I took my venture as the unit of analysis for each of the related course projects. I was thus able to get expert guidance from faculty on key aspects of business; I also got four of my batch-mates to work with me in developing the idea. Using the two years in the Business School to develop on my idea gave me a great deal of clarity and confidence in taking the plunge. This self-confidence is what, I think, gave confidence to the various external stakeholders that I had by then started interacting with: the government, the bureaucrats, the bankers, the farmers, and potential corporate partners. In summary, looking back, I was able to reduce the uncertainties associated with convincing others (including potential financiers) of the viability of my venture by building on my knowledge and ensuring that there were no holes in my story, by having a board of mentors (including faculty members from my Business School) who I could continuously fall back upon, and by building a team of associates who trusted that I knew what I was doing.

In the highly uncertain early stages of a business, the entrepreneur's depth of understanding of the business becomes a huge advantage. In this phase, external stakeholders face a double uncertainty: the entrepreneur does not know everything about his business but knows what he does not know; the external stakeholder is uncertain about how much the entrepreneur knows about

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his business. It is important that the external stakeholder's uncertainty about the entrepreneur's knowledge about the business is reduced to the maximum extent possible. And this is possible only if the entrepreneur has lived through and through with his venture. I remember making a presentation to a potential equity investor. The potential investor wanted to know why I had assumed a very low selling price (much lower than the prevailing market rates) for glycerin, a minor by-product of my venture. I had done it because I had worked out that at my planned level of output of the main product, my production of the by-product glycerin would create a glut in the market. My calculations might have lacked precision, but the fact that I had bothered to study the supply-demand dynamics for what was a minor product gave the

potential investor the confidence that I had done my home-work right. No one can remove the uncertainties that are inherent in business; the question is, are you prepared - or are you preparing yourself - to meet this uncertainty? If the external stakeholder is convinced that you are, you have obtained an advantage.


One feature of young enterprises that bears repeating is that early stage businesses have very little to show in terms of tangible achievements or assets. Therefore, to gain the confidence of both internal and external stakeholders, it is very important to build up credibility. One way to signal credibility to these stakeholders is through

very good cash management. Your employees, the owner of the property you have leased/ rented out, your utility provider, and your supplier cannot see your dreams/ your plans; what they can see is cash! Cash is King! Good cash flow management is integral to the well-being of an enterprise in its nascent stages. Since uncertainties related to cash inflows are lesser in your control than the uncertainties associated with cash outflows, prudent cash management would entail running a tight ship, watching over cash spends with an eagle's eye.

As the business grows, the entrepreneur is faced with another set of complexities related to infusion of further capital; options range from getting loans from banks to

getting equity investments from angel investors and venture capitalists. While loans from bank might be cheaper, you might have to put up collateral and adhere to restrictive covenants. Getting in angel investors and venture capital might entail dilution of control. So, how does an entrepreneur face such challenges? It is a good understanding of the value creation process within the business that will come to the aid of the entrepreneur yet again. The external financiers have their own assumptions, beliefs, and fears. A good understanding of your own business will help you quickly identify the pain-points in the mind of the external investor. They might be erroneously benchmarking you to reference firms/industries which are not exactly like yours; their assumptions of the supply-demand dynamics in your industry might not be correct; their assessment of the risks in your business might be wrong. A good understanding of your own business will help you correct these misperceptions to the extent possible and thus extract better valuations.

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As I scale up and grow, there are two other sources of uncertainty that loom larger and larger on the horizon. The first is the question of building up a second line of leadership. As I scale up, I will need to delegate more and more. Will I be able to identify others who I will be comfortable working with? Should I look for people who think like me or should I not? The second question is one of direction. As I have grown, I have been fairly nimble and have continuously re-defined my business. Starting off with only bio-diesel production in mind, we moved on to providing just biofuel plantations as a service; and then to integrated horticulture; and from there to building a chain of fresh fruit juice kiosks and now are into training of Self Help Groups (SHGs) under the National Rural Livelihood Mission (NRLM). Should I continue on this path of moving from one field to the other or should I remain focused on one venture? Or should I choose to diversify? These, then, are my current unknown variables! 

Uncertainty, Ambiguity, and Corporate Finance

Puneet Mahajan

Definition and Framework

In order to address this broad topic, it is important to start by defining what Uncertainty and Ambiguity mean. I thought I would start with what I found in the dictionary³: Uncertain - 'Something that is not exactly known or decided' and Ambiguous - 'Something that can be understood in more than one way or can have more than one outcome'. These are simple ways of defining these words; yet in business, they can be a source of concern and deliberation. Economists have variously defined uncertainty, ambiguity as well as risk. I once tried to read up papers written by Frank Knight (1921)⁴ and

about the Ellsberg paradox (1961)⁵ and found the concepts interesting but hard to translate into 'real' world solutions.

So, we are back to where we started: How should we think about Uncertainty and Ambiguity? It might be good to start with the simple notion that everything that is not certain is uncertain. Then, within the universe of uncertainty, there would be things that are less uncertain and others that are undeterminable. Thus, uncertain events can be grouped into a few categories:

- Uncertain events that have known/determinable probabilities derived from historical data/ events, even

³ Merriam Webster Learners' Dictionary.

⁴ Knight, F. (1921). *Risk, uncertainty and profit*. Boston, MA: Hart, Schaffner & Marx; Houghton Mifflin Co.

⁵ Ellsberg, D. (1961). Risk, ambiguity, and the savage axioms. *The Quarterly Journal of Economics* 75(4).

if they change with time

- Uncertain events that have unknown/undeterminable probabilities due to randomness or limitations of data/ events
- Uncertain events that have unknown/undeterminable probabilities due to non-availability of data or models, but which may or may not be known to others.

If we simply divide the universe of uncertainty into the three categories above, category three is what could be defined as 'Ambiguity', ambiguity being a partial subset of uncertainty.

Making critical decisions under uncertainty is difficult. It generally involves three key steps of validation:

- Understanding the known and unknown factors:** People find it easier to make decisions when they believe they have all available information or at least the same information that is available to all market participants.
- Understanding the probability distribution, if applicable:** This generally involves understanding the underlying assumptions, historical data, limitations of the analysis and applicability to the decision.
- Understanding the risk-rewards trade-offs:** People are finally interested in knowing whether the risk-reward outcome distribution meets their desired objectives.

However, decision-makers might still arrive at different decisions even with the same validated information because we are all influenced by our beliefs, past experi-

ences, goals, and our personal appetite to deal with uncertainty.

And now, how does all this get translated into the decision-making process in the corporate world?

Practical Application

I thought of an example of the process involved in one of the crucial decision-making areas for a firm, that of capital allocation. Typically, there are four key options for allocating capital within a firm (Table 1):

One good technique, which is adopted by many large companies, is to apply the venture funding approach to investing in R&D. This would mean making small incremental investments to validate and 'retire' certain risks and then deciding to proceed, change course or 'kill' the investments.

- Invest in Research and Development to build long-term competitive advantages and drive growth in earnings and cash flow
- Invest in an acquisition to drive growth in earnings and cash flow
- Buyback shares and reduce the outstanding shares of the company; each shareholder now owning a greater part of the company
- Pay out dividend to the shareholders and let them invest their funds where they can get their desired rate of return.

These alternative options for capital allocations ought to be evaluated against the goal of maximizing shareholder value or total shareholder return (TSR),

where the TSR is measured as the percentage increase in the company's share price over a certain period + dividend yield (dividend/share price) over that period. From the investors' perspective, they want to invest in companies that have the highest long-term growth rate and the most efficient return on invested capital. And, since these

Table 1: Capital Allocation Choices

Capital Allocation Choice	Shareholder Value	Uncertainty on Returns	Return Expectations
Research & Development	Organic growth in future earnings/ cash flow	Market risk & Technical risk	>Weighted average cost of capital (WACC)
Acquisition	Inorganic growth in future earnings/ cash flow	Market risk & Execution risk (Synergies/ Value creation)	>Weighted average cost of capital
Buyback	Growth in earnings per share (EPS) + future dividend savings	Limited execution risk, Purchase price of shares	Weighted average cost of capital > Alternative investment returns
Dividend	Higher dividend yield (provides a floor to total shareholder return)	Not applicable	Attractive alternative investor investment choices

capital allocation choices have different degrees of uncertainty about both risk and return, the choices made by management can influence investors' short-term and long-term decisions about investment in that company.

The choices and their characteristics in terms of returns and risk are represented below:

Taking this a step further, let's evaluate the four choices from a risk perspective:

Research & Development (R&D)

R&D investments form the core of a company's strategy and are the key to driving organic growth in earnings for companies. This helps create a competitive advantage and sometimes potential barriers to entry. Additionally, sometimes these investments are required to maintain current products and services and may not even be viewed as a discretionary capital allocation choice.

There is a significant amount being spent every year on discretionary research and development. Sixty four companies in the S&P 500 Industrials Index alone spent ~2% (~\$24 billion) of their revenue on R&D in 2013; this will be much higher for pharmaceuticals, consumer electronics and other industry segments. These investments are characterized by high degree of risk but can also result in significantly high returns in a lot of cases. The decision-making process around R&D investments are complex and have the highest degree of uncertainty, as described earlier. These uncertainties can relate to market creation/ adoption risks, technology performance risk or the risk of being able to produce at the desired price point. The basic validation framework is the same as described before.

One good technique, which is adopted by many large companies, is to apply the venture funding approach to investing in R&D. This would mean making small incremental investments to validate and 'retire' certain risks and then deciding to proceed, change course or 'kill' the investments. A big benefit of this approach is that it helps avoid making large investments with multiple 'leap of faith' assumptions that tend to have a high failure rate.

This helps reduce the amount of uncertainty on the incremental investment in the programme and reduce the over-all risk-reward of the total investment over time.

Another way to manage risk is to evaluate the investment based on a two-dimensional framework involving Market Risk and Technology Risk (Figure 1):

The idea is to make investments at levels of risk-reward outcomes compatible with your risk tolerance. The first group of investments, in the south-west quadrant, is low-risk ideas that are within your existing market/ applications or on the technology maturation curve. Then is the group of medium-risk ideas that are sometime referred to as 'Bolt-on' adjacencies, ideas that can add on to your

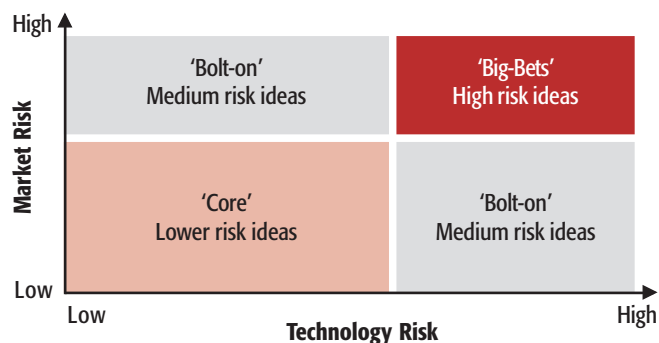
existing market/ applications. Finally, there is the group of high-risk ideas or the 'Big bets' that generally have the highest market and technology risk but are likely to leap-frog competitors and give the highest return on investment, if they are successful. Companies need to focus on diversifying and optimizing their development portfolio based on the facts they have in hand, circumstances, and risk tolerances.

In R&D, investment decisions are complicated and therefore we tend to try and build up a lot of data and models to help management teams get comfortable with the investment thesis. Even then, these investments are the hardest to demonstrate a good return on as it is generally difficult to quantify the returns versus the impact of other 'go

to market' variables like sales, marketing, price, and distribution.

Acquisitions help management teams improve their strategic positioning and drive growth in earnings and cash flows. They can be a quick way to enter a market, gain share or enhance a company's 'go to market' strategy. However, this can prove to be an expensive strategy for shareholders.

Figure 1: Two-dimensional Framework



Acquisitions

Acquisitions help management teams improve their strategic positioning and drive growth in earnings and cash flows. They can be a quick way to enter a market, gain share or enhance a company's 'go to market' strategy. However, this can prove to be an expensive strategy for shareholders. There are numerous examples of companies that have attempted to make large inorganic moves and resulted in destroying shareholder value or falling short of expectations.

Of all the capital allocation choices, this strategy, in my view, has the highest amount of uncertainty and risk. The risks range from poor financial performance, poor execution on achieving synergies or the risk of destroying value by forcing the acquired business to change its strategy/processes while trying to integrate them with your existing businesses.

To improve returns from acquisitions, management teams put in a lot of effort in understanding how to create incremental value. There is extensive amount of work done; business models, products, and liabilities, are put through comprehensive due diligence processes. Ways to integrate the acquisition are studied and opportunities for enhancing value are studied. These uncertainties are then modelled and an effort is made to incorporate this in the purchase price. This comprehensive analysis of organic growth versus growth through acquisition helps throw up alternatives as well.

Large companies are willing to take the incremental risk from uncertainties due to the benefits of diversification across their portfolio. They can generally realize the benefits and incremental value by leveraging the portfolio for both cost and revenue related synergies. Good examples of how to do this is to leverage the geographic

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In case of buyback, the company is effectively investing the excess capital in purchasing its own shares. This gives the investors an implied return equivalent to the company's weighted average cost of capital. Investors should be happy with this strategy so long as they believe that the intrinsic value of the shares is higher than the market value at that time.

footprint, technology, and cost structure of their existing business.

Despite all efforts, the purchase price may be dependent on the assumptions made by competitors in the bid process or valuation of similar companies. At the end, 'good' companies cost a lot of money and 'bad/distressed' companies can sometimes be purchased cheap. In an extremely liquid market, like the one we see today, investors are looking for reasonable returns and may be willing to pay a lot more despite the risks.

Unlike organic investments (R&D, etc.), management generally has a finite amount of information and time while making acquisition decisions. These decisions also tend to be "all in" choices, where we do not have the option to put in a small amount to start with and then make incremental investments.

This risk-reward trade-off drives some companies to shy away from making large bets and they may stick to consolidating acquisitions in their core markets or adjacencies that they understand well. These incremental investments tend to have incremental returns, but that might be acceptable to their investors. Companies have often adopted a joint-venture strategy to minimize their risk. This helps in getting a better understanding of the target, markets, and key risks.

Returns from acquisitions are quantifiable and investors often look at the track record of management teams to deliver value from acquisitions. Sixty-four companies from the S&P 500 Industrials index alone spent 18 percent (~\$23 billion) of their available capital on acquisitions in 2013.

Buyback/ Dividend

Buyback and dividends are the least risky ways to expend capital to improve returns to shareholders. There

is limited execution risk in both these strategies.

In case of buyback, the company is effectively investing the excess capital in purchasing its own shares. This gives the investors an implied return equivalent to the company's weighted average cost of capital. Investors should be happy with this strategy so long as they believe that the intrinsic value of the shares is higher than the market value at that time. In this way, they get to own a higher proportion of the company and enjoy upside in the future. Investors also push management teams to buy back stock when they perceive a higher degree of uncertainty in generating returns from organic or inorganic investments.

As regards dividends, this is a way to return some cash back to investors. Investors like this as dividend payouts provide a floor for the shareholder return and they can easily compare the investment against other fixed income investment options (like investing in bonds, etc.). Investors tend to like the dividend strategy when they can reinvest the cash at higher returns but like to retain the option to benefit, in the future, from the potential upside of retaining ownership in the company.

What is the Right Capital Allocation Strategy?

There is no one recommended capital allocation strategy to maximize return or minimize the risk/ uncertainty. Companies make these choices based on their perceived risk and return objectives. Companies within a given industry can end up having similar capital allocation strategies as they operate in similar environments.

One other variable that is important to consider in the decision-making process is the value you place on flexibility under uncertainty. You can easily delay a buyback programme or stop or delay R&D projects. Acquisitions are firm commitments that cannot be reversed and delays in follow-on commitments tend to reduce value of the ac-

In very uncertain environments, companies will favour buyback/dividends. High growth companies will focus largely on organic investments and acquisitions. Fragmented industries will tend to see more consolidating acquisitions.

Management is always looking to maximize the risk-reward equation and this is best done when they keep the risks they are advantaged to own as they can generally price for the risk. If everything was certain, there would be no competitive advantage and differentiation.

quired companies. Dividend allocations tend to be the hardest choice for management teams to make. Companies consider the payment of a long standing normal dividend (versus a one-time special dividend) to be the least flexible capital allocation choice.

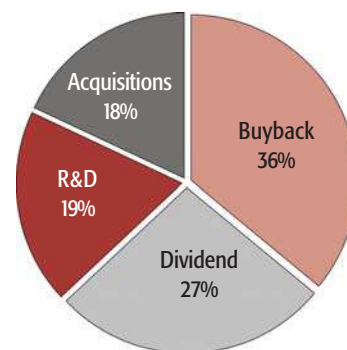
In very uncertain environments, companies will favour buyback/dividends. High growth companies will focus largely on organic investments and acquisitions. Fragmented industries will tend to see more consolidating acquisitions.

Here is an example of the capital allocation mix of 64 companies from the S&P 500 Industrial companies' index in the US for 2013 (Figure 2).

Ambiguity and Decision-Making

As discussed in the first section, people can generally make decisions when risks are uncertain and if they have models and historical data for decision support. However, in my experience, the same set of people have a harder time making decisions under ambiguity. It is harder, because they believe that someone else may have better information or the ability to influence certain factors, which in turn creates arbitrage. An entrepreneur with a higher appetite for risk may be more willing to make deci-

Figure 2: Capital Allocation [S&P 500 Industrials Index 2013]




Source: 2013 Financial Statistics for 64 US Industrial Companies of the S&P 500 Industrials Index (S5INDU) from Thompson Reuters

sions under ambiguity. Large companies wait to get more clarity and this might increase costs and lower returns but they are normally willing to make that trade-off.

Summing Up

Dealing with uncertainty is part and parcel of every-day business. Companies have developed various approaches to understand and deal with uncertainty. It is important to diversify, have flexibility, and leverage your core competitive advantage to drive shareholder value.

Management is always looking to maximize the risk-reward equation and this is best done when they keep the risks they are advantaged to own as they can generally price for the risk. If everything was certain, there would be no competitive advantage and differentiation.

The key to dealing with uncertainty is data and information. People who can understand the linkages between the data through analytics and the problems or uncertainties that information can help resolve are the ones who will succeed. 

Bond Market and Uncertainty: A Practitioner's Tale

Maneesh Dangi

While I write this, I am relaxing in the tranquil environs of Ananda, a Spa Resort at the foothills of the Himalayas, near Rishikesh. Ananda conducts lectures on *Vedanta* twice a day; I have been attending these lectures religiously for the past week. *Vedanta* suggests that every action of ours must be approved by our intellect - and we should refuse to get conditioned by the theories of our mind (or *manas*). Well, that thought shall anchor me as I write for *Vikalpa*.

I am aware that a lot of you would have already read many books on this subject, given its popularity in the financial world. With that in mind, I shall write only of my experiences and lessons, trying to escape the risk of being repetitive.

Uncertainty: Definition, Diagnosis, and Cure

To me, uncertainty is unexpected discontinuity. I believe that it generally pertains to bad outcomes (because an uncertain but good outcome is serendipity!) We don't like such occurrences either in markets or in any facet of life. In fact, many times our dislike for non-linear events itself leads to such unexpected bad outcomes. For a money manager, bad outcomes could be categorized into two types - one which recurs and the other which is ad hoc.

Recurring ones can often be modelled and hence we are expected to prepare for them, even though they are sel-

dom known to follow a set pattern. This ambiguity in the pattern may well be attributed to different reasons, but I think, notwithstanding the importance of the cause, the market's linear and large one-sided bets are equally, if not more, to be blamed for such bad outcomes. I have started to be a lot more indifferent towards the cause of such events and have begun to focus more on the frequency, the loss (given occurrence of the event), and strategies to unwind post such occurrence.

For a money manager, bad outcomes could be categorized into two types - one which recurs and the other which is ad hoc.

As a portfolio manager, I still think, I spend a lot less time on studying the non-recurring ad hoc outcomes than what is desirable. Maybe someday I will evolve. It is sad that a majority of fund managers in India are focused on unilateral outcomes, ignoring their

probabilistic nature. Even more unfortunate is our community's inability to communicate to investors the diverse and ad hoc nature of the outcomes that may materialize despite optical linearity or adherence to templates of past outcomes.

Over the years I have oscillated between two extremes - being a continuously worried man for a million reasons as uncertainty dawns upon us, to the other extreme of concluding that there is no point of being worried of ad hoc events which bring volatility to the markets. I have since been trying to negotiate a middle path for myself.

Types of Uncertainties

- There are certain uncertainties that can be modelled, e.g. the frequency of such events (but not the causes). These are typically the ones which arise from herd behaviour and our simplistic assumptions regarding the future. We tend to simplify the broader scheme of complex things, detect directions and start to price them in. We also draw comfort from the presence of many people moving in the same direction. Such things build momentum on their own and take the prices or (perceived) values of various assets, to levels which are substantially different from their realizable valuations. Invariably, in such times, some unforeseen events happen which force people to recognize the previous mistaken notions of their valuations and lead to sharp price corrections. Though many times, the events get extraordinary publicity as a cause of price correction, the real reason actually lies in people's or market's prior behaviour (e.g. blaming the Lehman collapse for the 2008 credit crisis rather than the mis-pricing of real estate happening prior to that, blaming the taper news for EM bond market collapse in 2013 instead of the prior frothy valuations despite their poor macro-economic situation). Broadly, faulty valuations are driven by human emotions; we can model them as they tend to recur with similar characteristics.
- There are other kinds of uncertainties, which happen due to unforeseen circumstances, such as natural disasters or quantum leaps in human ingenuity leading to big innovations. Both tend to happen suddenly and have no identifiable advance signal. Over the past few years, we have come to realize that such events tend to occur many times and it makes sense to stay prepared for them. Generally, preparation for such things is done by keeping liquidity in the portfolio and avoiding 'all in' trades.

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It is quite disturbing for us to accept that things, people or markets that we deal with, have no linearity. We love to reason and the biggest satisfaction to our minds is in detecting trends. Having convinced ourselves of a trend, we just don't like to get it wrong.

(More on this later.)

How to Model Uncertainty?

Since the ad hoc uncertainty cannot really be modelled, I have ignored it here. Instead, I have tried to build a four-part story on how to model recurring uncertainty.

1. Continuous Search for Trends and Inability to Understand Random Behaviour

We, human beings, do not like complexities. Not only do we love simple things, but we also love to simplify things. We like detecting directions. Three data points in a certain direction makes a trend for us. Reality, however, is a lot more complex. Events unfold in a random manner but we price them as if they are linear. Invariably, we get shocks as their seeming linearity fades away. Though I repeatedly talk about this to my fund managers, I myself fall prey to it often. It is quite disturbing for us to accept that things, people or markets that we deal with, have no linearity. We love to reason and the biggest satisfaction to our minds is in detecting trends. Having convinced ourselves of a trend, we just don't like to get it wrong. It hurts our ego. As fund managers, we believe that our key job is to detect trends and bet large money on them. It is generally right to do so. But markets don't necessarily have a trend. Their movements are generally random.

2. Lethargy and Loss of Vigil

Having detected the trend, our follow-up vigilance is generally inadequate. This isn't only due to lack of effort. Rather, it is because it also takes a big divergence to get us to question our set premises; we demand substantial data to convince ourselves against our hypothesized trend (and by the way, very little data convinces us that a trend has emerged). Once we have invested our faith in the detected trend, we expect it to deliver for us; we hate continuous efforts to keep a tab on it. The same holds good for a majority of fund man-

agers who take a view, position the portfolio, and then pray for its success. Post-view vigil, I have observed, is generally weak, and most certainly weaker than pre-view due diligence. Common sense suggests otherwise. Having taken some position in a certain direction, the vigilance must go up as we now “own the risk”. I am surprised how often this isn’t the case.

3. Role of One-sided Bets

As I wrote previously, we like trends. Having detected trends, we love to play big on them as money managers. If these ideas are high conviction ones, sooner than later, they begin to capture the imagination of the entire market. One-sided bets are undertaken. Soon the market creates a trap called LPHL (low probability high losses). The momentum for these trends begins to create bubbles. High conviction soon gives in to “certainty”. Any other probability is ignored for being needlessly pessimistic. The valuation of the underline assets soar. And then comes along an event which is often considered unknown and unpredictable which triggers a reassessment of the probabilistic distribution. Markets give in. Trends reverse. Losses multiply. Such a sequence of events tends to recur. Much of our time goes in the analysis of the associated local event which triggered the series of events. But over the years, I have learnt to pay a lot less attention to the specs of events. Instead, what surprises me is the frequency, which is a lot more rhythmic.

4. Market’s Duty

Are markets wrong? Why do they remain volatile and sometimes show substantial movement? In reality, various events unfold in a random manner. Markets assess the probability of various events and price multiple outcomes. Even though some events have very low probability but potentially large outcomes, the market has to price it in. (But given that these events are low probability ones, when they don’t fructify, it leads to sharp corrections in the market). Additionally, when events assume certain quantifiable shape, other plausible outcomes get crushed and asset prices

Many fund managers are extremely risk averse in the name of caution. Unfortunately, avoiding risk isn’t an option for fund managers. The ones, who are risk averse, remain so despite their over-cautiousness causing them poor returns.

come closer to the realized event. This leads to volatility. I have recently invested in a biotechnology company which has no cash flows. It is developing an RNA based model of reaching out to infected cells. This company is valued at a few 100 million dollars. But if the technology is successful, the company will be valued at a few billion dollars. One may argue that today’s valuation is exorbitant if it is valued on the basis of standard template of valuations. But the market has the ‘duty’ of valuing the low probability high value event as well, and this ex-

plains the high valuation of the company. If the technology isn’t successful, the stock price will collapse to a tenth of today’s levels. Many people have argued that markets are imperfect citing excessive volatility. It is important to keep in mind the duty that the market has, i.e. to price various outcomes on the basis of their probabilities. Given that God generally plays a dice and events unfold in a random manner (in some probabilistic distribution), the market has no other way but to price such outcomes. But eventually, events unfold embracing a certain outcome leading to a sharp or mild correction from the previous levels.

Types of Fund Managers

Based on their attitudes towards risk and their responses to uncertainty, I have come across four varieties of fund managers in the Indian fixed income markets.

- **Elephants:** Many fund managers are extremely risk-averse in the name of caution. Unfortunately, avoiding risk isn’t an option for fund managers. I think of this trait as either genetic or cultural. It is surprising to observe how consistently fund managers behave. The ones, who are risk averse, remain so despite their over-cautiousness causing them poor returns. They invariably end up taking positions at the wrong time driven by competitive pressures or a management whip. Investors have to be extremely cautious of this type. I will advise them to avoid such fund managers as they don’t do justice in the risk-on mode. When I tried to as-

Moderation is the best policy. It is often good to be contrarian, to take large bets because associated losses of going wrong are rather low.

sess fund managers in Indian fixed income space, I found that there were about one in four managers in this category. They may be better placed in risk departments of their respective companies.

- *Hawks*: This type is always in risk-on mode. They ignore caution in majority of times. It is interesting to see them trapped in large incorrect moves, almost always. Investors could look at them only for a part of their portfolio allocation. Nearly one of two fund managers can be tagged as hawks.
- *Foxes*: Very few, fund managers can be categorized as foxes — those who have thermostats placed to modulate risk taking. They are flexible and change their modes after assessing market situations. These managers are the favourites of investors.
- *Turkeys*: There are managers who pretend to have thermostats but in reality they don't. Nearly one in four is such a fund manager. Invest with them only to create random profile of returns.

Reflections: Experiences and Lessons

- Post-Lehman crisis, my world view was formed by certain fundamentals and conviction of how world asset markets would behave. I saw equity markets melting and rates plunging across the world. I thought India was no different. We saw a sudden halt in activity. A majority of the high frequency indicators were supporting the thesis that Indian central bank would cut rates sharply and all rates would have to come off. The market momentum supported this thesis as well. As a money manager, I was positioned for a large move in bonds. The 10-year bond fell from 9.5 percent to 5 percent in 40 trading days. Frankly, those were heady days. I couldn't escape the ego trip in believing how smart I was to make such big gains in my portfolios. But let's save those details to be (re)told for some psy-

Though the reasons for the meltdown of 2013 are completely different from those of 2009, there is something in common. Large losses always occur on the back of high conviction, LPHL, and one-sided bets.

chology magazine. Here, the story had to end brutally. The market built a one-sided bet for lower rates for longer than warranted and then witnessed a fiscal and monetary attack on this thesis. The super active government doled out sops and the overzealous central bank cut rates sharply to a very low level. The slow-down that we feared would happen across the world, did happen, but India skipped it. The underlined momentum was just too strong. Growth recovered. Rates jumped. And, a nasty bear market began which no

one was prepared for. Could I have done anything different then? I reject the idea of poor analytics. I reject the notion that a fund manager could have thought that slowdown would be worldwide, but India would skip it. But, I think, a majority of the fund managers dealt with it in a rather simplistic manner, initiating a one-sided large bet without bothering about the LPHL event.

Moderation is the best policy. It is often good to be contrarian, to take large bets, because the associated losses of going wrong are rather low. I will advise moderation in bets related to high conviction and mostly consensus ideas. Even in present times, one such mistake the market may end up making in the next few quarters is with regards to the expected political change and its associated impact on India. It assumes that a right wing party will be good for the economy. Markets may not be rewarded adequately for this blind optimism. The euphoric reaction to political continuity, in 2009, in hindsight, was wrong.

Readiness to respond to uncertainty reduces the anxiety associated with it, dramatically. A money manager's job otherwise is extremely stressful as our markets have become global where unknown events recur just too often.

- A somewhat similar experience re-occurred in May 2013. Late in November 2012, almost the whole market developed a thesis that an entrenched slowdown will help the economy self-correct its macro problems, i.e. high current account deficit and high inflation, leading to lower rates for longer. The templates that we are used to working with, confirmed this thesis. Soon this became a consensus trade. Large long

bond positions were built to benefit from this trade. Investors queued up to initiate it. It was easy to convince anyone about it. But, precisely for this reason, the trade had a rude shock when the Federal Reserve announced its intent of tapering bond purchases. Our currency depreciated leading to an unprecedented move by the RBI, hiking up rates by 300bps on July 15. Though the reasons for the meltdown of 2013 are completely different from those of 2009, there is something in common. Large losses always occur on the back of high conviction, LPHL, and one-sided bets. Hard lessons have been learnt. Moderation in risk is best advised when market is convinced homogenously for a certain trend. But I must admit that I still struggle to know how and when moderation must be applied. Applying breaks too early may result in a lost opportunity. Even in hindsight, I don't know when I could have exited positions in 2008, when markets were rallying by more than 10bps every day. Maybe in mid-December, when the Chinese announced their stimulus and their equity markets started showing signs of recovery. But then, bonds were still at 7 percent. It needs guts to quit positions and get on standby mode when markets are rallying at such a ferocious speed.

Over the years, I have developed certain principles to handle uncertainty. Readiness to respond to uncertainty reduces the anxiety associated with it, dramatically. A money manager's job otherwise is extremely stressful as our markets have become global where unknown events recur just too often.

In conclusion, the following is my to-do/not-to-do list to deal with uncertainty:

- **No 'all in' trades.** Many times high conviction trades are traps and tempt fund managers for "all in" trades. One must remember that

Many uncertain outcomes tend to happen due to an investor's complacent one-sided bets. Staying away from a crowded trade may be a good method to avoid such traps. Just because many people are buying bonds, we need not buy.

Maintain vigil. Money managers should always look for confirmations of trends they have traded for. One must remember that the intrinsic bias of the market is to be random and trade for a trend in market requires unusually high amount of vigil.

large losses always happen in high conviction trades. As they tempt majority of the investors and in a rare eventuality of that not materializing, large losses happen in such positions. A fund manager always has this dilemma, but the solution lies in moderation - by keeping portfolios liquid and positions balanced and easy to unwind. (We find it in the animal kingdom so often; absolutely quiet water may befool some deer into drinking from that water body, but it could be a crocodile's trap. The slightest loss of vigil and the deer would find itself in the crocodile's captivity). We are much

more vigilant in matters of life and death. But when it comes to markets, we drop our guard as our minds don't process it as critical. So, there is a need to build models which can remind us to stay cautious.

- **Stay clear of 'wisdom of crowd' traps.** Many uncertain outcomes tend to happen due to an investor's complacent one-sided bets. Staying away from a crowded trade may be a good method to avoid such traps. Just because many people are buying bonds, we need not buy. Every single trade has to be well thought out. Invariably crowded trades tend to have sharp reverse movements at the slightest of negative news flow.
- **Always beware.** Maintain vigil. Money managers should always look for confirmations of trends they have traded for. One must remember that the intrinsic bias of the market is to be random and trade for a trend in market requires unusually high amount of vigil. Also stay detached from your positions (Alas! If only I could). If we get any signal of a trade going wrong, we should quickly rebalance our portfolios.
- **Stay prepared for ad-hoc events** by keeping liquidity in the portfolios and diversifying (avoiding all in trades), but stay tuned to taking risks as well. 🐟

Uncertainty, Risk, and Emerging Market Equities

Bryan D'Aguiar

Statisticians like to use the famous “the only certainty in life is death” quote when talking about probability and risk. There was an interesting Hollywood movie a few years ago named “*In Time*” which described a society over a century and a half in the future where people are born genetically engineered with a digital clock. When individuals turn 25, they stop aging, but their clock begins counting down and when it reaches zero, the person “times out” and dies instantly. “Time” became the universal currency with which workers earned their wages, paid for their coffee or travel, etc. Time could be transferred or gifted or stolen.

I still vividly remember our first corporate finance class where we learned the concept that money too has a time value attached to it; we were taught that an asset’s value is entirely determined by the quantity, quality, and timing of the cash flows it generates. Over the years, experience has progressively, painstakingly and often painfully taught me that the easier bit in valuation is estimating the quantity and timing of cash flows; assessing the quality, or riskiness, of cash flows, and incorporating it into the valuation is the tougher part. Which of the risks are the most relevant for us? How do we assess these risks and incorporate them into our investment decision-making?

As investment managers, dealing with risk and uncertainty is an integral part of what we do on a day-to-day basis. Oaktree Capital’s Howard Mark in his book, *The Most Important Thing*, says “Risk and uncertainty aren’t the same as loss, but they create the potential for loss when things go wrong. Some of the biggest losses occur when overconfidence regarding predictive ability causes investors to underestimate the range of possibilities, the difficulty of predicting which one will materialize, and the consequences of a surprise.” Both investment philosophy and the investment process influence how uncertainty and its consequences are handled by different

investment managers and how they are factored into their investment decisions. So, it is useful to highlight that the discussion below is from the particular perspective of an asset manager focused on investing in equities in the emerging / frontier markets, and adopting the traditional old-school strategy of buying for the long term and holding the investment (in industry parlance, a “long only” strategy). This precludes the possibility of getting fancy and incorporating the use of derivatives or of taking short positions (essentially selling what you do not own by first borrowing it and then selling it).

Some of the biggest losses occur when overconfidence regarding predictive ability causes investors to underestimate the range of possibilities, the difficulty of predicting which one will materialize, and the consequences of a surprise.

Typically, in the investment process that we follow, there are four broad areas that we focus on while evaluating the investment attractiveness of a potential opportunity:

- ***Evaluating the business opportunity:*** In simple terms, what is the base case scenario for the expected stream of cash flows from the investment opportunity, and what are alternative scenarios? What could be the consequences? What are the possibilities for the occurrence of each of these scenarios?
- ***Is it priced efficiently?*** Has the market priced the investment correctly?

What is embedded in the current valuations? In other words, what assumptions (about growth prospects of the target investment, for example) and views held by the market as a whole can be implied from the current market price? This is a process of reverse engineering: beginning with the market price and working backwards to ‘read the mind’ of the market in terms of inputs that might have gone into the price formation process.

- ***Can we participate?*** The Investment process is invariably one of optimization of returns rather than of maximization of returns. The investment manager does not have a free play; typically the manager works under constraints imposed by external regulators or in-

ternal guidelines. These portfolio considerations might revolve around the liquidity of the investment (the ease with which the investor can get into an investment and out of it), regulatory environments, ownership restrictions or risk management.

- **Monitoring the investment and managing an exit:** Constant monitoring is crucial when investing in risky securities; it is suicidal to 'fill and forget'. Conditions may change rapidly. So, we constantly monitor whether everything is playing out as per our expectations. Also, since the investment is part of a portfolio and not a stand-alone investment, we also have to continuously monitor whether changing market conditions have led to the investment being inappropriately sized in our portfolios, accounting for too big or too small a relative share of the total portfolio.

At every stage of the process, there is uncertainty and risk. How do we respond to these uncertainties? That is what we detail next, in the section below:

- **Evaluating the business opportunity:** This area of analysis focuses on understanding the operating environment (political, economic, social) and the opportunities that exist for the enterprise that we are investing in. We spend a great deal of time studying the enterprises' management teams over the years, understanding them, and trying to figure out how they will act in a given scenario. Doing this is critical in determining our ability to chart out an assessment of how the business (and ultimately cash flow streams) will look like 3-5-10 years into the future. After all, unlike private equity investors who tend to seek a seat at the table and exert influence over the actions of their investee enterprises, we do not involve ourselves in the actual run-

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In some economies, regulations create significant pools of domestic capital that must invest locally (e.g. South Africa, Chile, Morocco), distorting risk premia between local and international investors. Being able to understand the nuances of each market tends to be integral in establishing if the opportunity is being priced efficiently.

ning of the businesses we invest in; instead we depend on the management teams to deal with changes in the operating environment, course-correct, and protect our long term interests. We often have a lot to think and worry about: the revenue drivers of the business, cost structures, working capital cycles, tax and regulatory changes, capital structuring decisions, utilization of cash, etc. The amount of information we have at our disposal to work with (and the levels of ambiguity) can vary wildly from situation to situation.

Essentially, we use probability weighted scenarios to chart and evaluate the various outcomes. Differences in information availability across markets or even within a single market can be significant. For instance, in developed markets, investors are often faced with a deluge of information; here the key differentiator is the skill and experience that the analyst brings to bear to decide which variables are material and deserve more in-depth focus/understanding and which are not. At the other extreme is the lack of basic information in some frontier/emerging markets where we occasionally have to physically knock on doors just to get a set of financials/annual reports. Within a market, there could be differences in information arising from the availability of sell side research on a firm; sell side research plays an important role in determining how well a business is understood by investors. For instance, Infosys today has 66 analysts covering the stock and so there is a great deal of analysis and research that is put out anytime there is a change to any of the key variables and hence these changes tend to get priced-in very quickly in the price of the stock. As economies get more competitive and markets get better understood, the opportunity gets assessed much more quickly and valued more efficiently. A simple example is variance of reported earnings from consensus estimates. In more efficient markets, estimates tend to be more tightly concentrated and

variance of actuals from estimates is typically smaller. On the other hand, whenever there are material variances, we typically observe large price volatility as markets grapple with re-assessing what has changed.

- *Is it priced efficiently?* Here the practical realities of applying fundamental theory to real world situations quickly move from being black and white to varying shades of grey. Adjusting historical statistics (beta, interest rates, risk premia, etc.) to arrive at suitable estimates for anticipated inputs (e.g. predicted beta, anticipated returns for various asset classes, covariance, etc.) gets very complicated given the heterogeneous nature of markets/economies and their rapidly changing nature. As global investors, we attempt to standardize the way we evaluate opportunities, for example, by translating into a single currency (in our case, US Dollars) or by harmonizing accounting standards and calendaring financials. In evaluating whether the base fundamental case is priced-in appropriately, we also assess the various risks that are embedded in the valuations; for example, liquidity discounts, conglomerate discounts, interest rates, sovereign and equity risks, currency risks, etc. Understanding these underlying factors helps bridge the perceived disconnect between sentiment of local and international investors, as reflected in the valuation differentials. At other times, the differing viewpoints stem from the differences in the universe of opportunities accessible to different classes of investors, their investment time horizons or assessments of risk. In some economies regulations create significant pools of domestic capital that must invest locally (e.g. South Africa, Chile, Morocco), distorting risk premia between local and international investors. Being able to understand the nuances of each market tends to be integral in establishing if the opportunity is being priced efficiently.
- *Can we participate?* Once we have established that there is an actionable idea that would make economic sense, we do a reality check to see if we can really

Minority rights, restrictions on capital flows, regulatory and compliance directives and changes to the macro environment in coming years are some of the grey areas that we have to contend with in determining whether we should put our capital to work.

participate. Minority rights, restrictions on capital flows, regulatory and compliance directives, and changes to the macro environment in coming years are some of the grey areas that we have to contend with in determining whether we should put our capital to work. In some geographies, we have to grapple with using derivative structures to gain access to opportunities and these add on to the layers of risks (such as counterparty risks).

- *Monitoring the investment and managing an exit.* Having made an investment, as a minority portfolio investor, we take a back seat and watch from afar how everything is playing out. If there are any material deviations from our expectations, we ensure that we study these deviations and re-assess the intrinsic value of the business. Over the ensuing periods, we establish if the investment is appropriately sized in our portfolios. Given the long-term views on businesses and companies that we adopt, we pay a great deal of attention to exit strategies and considerations like liquidity, capital constraints, tax implications, etc.

Equity markets: The role of behavioural finance. Fundamentally, we put significant effort to quantify and evaluate the different scenarios that can impact our assessment of the outlook for a business or for markets. But at the end of

the day, not all risks / uncertainties are quantifiable. Our role as allocators of capital is to know what risks we are taking and to take advantage of mispriced ones. As markets become increasingly more efficient, the role of behavioural finance tends to be an increasingly more important tool in being able to understand how a manager can generate value. One concept that I found particularly useful in illustrating this was a concept called 'second level thinking' - popularized in investment literature once again by Oaktree Capital's Howard Marks. For the avid poker fans (any inferences between investing and gambling is unintentional!), this is very similar to 'multiple level thinking'. In essence, this is a form of applied game theory where we realize that there is a factor of uncertainty that investors have priced into a base scenario. Deviations from these are a source of value addition. For

instance, in the early days of markets, if an investor thought a company's earnings will fall, the logical action was to sell. Second level thinking is the next level derivative, i.e. 'I think the company's earnings will fall less than people expect, and the pleasant surprise will lift the stock: buy.' In more mature markets, some have counted as many as fifth level implications at play. The behaviour of markets around economic data in recent quarters demonstrates the tussle in markets as they try to game how policy-makers are going to react (e.g. occasionally the release of bad economic data are met with a rally in equity market as investors hope for continued monetary stimulus while at other times good economic data can also be rewarded by investors as markets get excited about growth coming back).

Questioning tail risks and implications for Emerging Market equity investors:

The credit crisis has forced investors to re-evaluate their basic assumptions of normal distribution of tail risks. The bottom-line from an investor's perspective is that ignoring tail risks is at their own peril. It is no surprise then that when we look at which investment strategies have fared well in recent years, they are the ones where investors have rewarded visibility of growth (growth styles have widely outperformed value styles) and lower earnings volatility (consumer, healthcare, telecom, and utility sectors have outperformed commod-

When we look at which investment strategies have fared well in recent years, they are the ones where investors have rewarded visibility of growth (growth styles have widely outperformed value styles) and lower earnings volatility (consumer, healthcare, telecom, utility sectors have outperformed commodity/cyclical/financial sectors).

ity/cyclical/financial sectors). As investors focused on fundamental value, we recognize that investment styles can go through periods of rise and ebb. Instead of hoping on to a style that currently seems to be paying off, we believe in focusing on what we do best, assessing the underlying risks/uncertainties and the range of outcomes and the valuation disparities that get created in the process.

In summary, as minority portfolio investors in emerging market equities, we are exposed to considerable uncertainties arising from two fronts. The first major source of uncertainty is the fundamental nature of the environments in which the businesses that we have invested in operate; being emerging markets they have highly volatile social, economic, political, and regulatory environments. The second source of uncertainty arises from the fact that we do not have direct control over the actions of the management teams of these businesses; we cannot be sure of how they will react to changes in their environment. Our response to these uncertainties

is to invest a lot of time and effort in understanding the managements of these companies and to regularly track environmental changes. By focusing on liquidity we also ensure that we are always well-positioned to make the necessary changes in our holdings in these companies (through selling or buying) when unanticipated changes happen. ✓

Firms, Markets, and Uncertainty

Uday Damodaran

Largely because of the non-contemporaneous nature of events, uncertainty is ubiquitous in finance. Managers in firms, and investors in the markets, face uncertainty. Is the nature of this uncertainty the same for managers and investors? To understand the differing perspectives, we could start with a simple visual repre-

sentation of a business that raises funds, acquires assets, and then uses these assets to generate revenues and profits:

At each stage of this model, there are decisions to be made. But each of these decision points is also beset with un-

certainty. The decision stage at which the criticality of uncertainty peaks might vary from context to context (Figure 3). For example, for co-contributor and social entrepreneur Kumar Ankit, uncertainty is concentrated at the left end of the picture in terms of the uncertainties associated with raising funds. For co-contributor Puneet Mahajan, on the other hand, the uncertainty is concentrated at the right end of the picture; he talks about the uncertainties associated with the typical decisions that large corporations grapple with: decisions on how much dividend to pay out and how to allocate capital across investments in Research and Development, acquisitions, and buy back of shares.

The differences in perspective about uncertainty become even more apparent when looked at from the position of the two other practitioner-contributors to this colloquium – Maneesh Dangi and Bryan D’Aguiar. Being outside investors and not internal strategists, Dangi and D’Aguiar have no direct control over the decisions made by the businesses/ entities whose securities they invest in. The one thing they do have control over, however, is

the price at which they buy and sell these securities. So, quite naturally, in their individual contributions, Dangi and D’Aguiar focus on the price risk. Visually, their perspective maybe represented as viewing the business from outside the box and trying to price it (Figure 4); outside investors bear all the risk that are inherent in the firm plus the added price risk of buying the securities of the firm for too much or selling for too low (Penman, 2007).

But what really is uncertainty? What is uncertainty in the context of finance and how do businesses and investors deal with it? Can uncertainty be satisfactorily dealt with?

Defining Risk and Uncertainty

In John Steinbeck’s novel *“Grapes of Wrath”*, the Joad family set off from Oklahoma in search of fruit-picking jobs in California. Young Al Joad who is driving the truck asks his mother whether she is scared about going to a new place: “Ma, you scared a goin’? You scared a goin’ to a new place?” “A little”, she replied. “Only it ain’t like

Figure 3: Uncertainty and The Firm: Business Risks

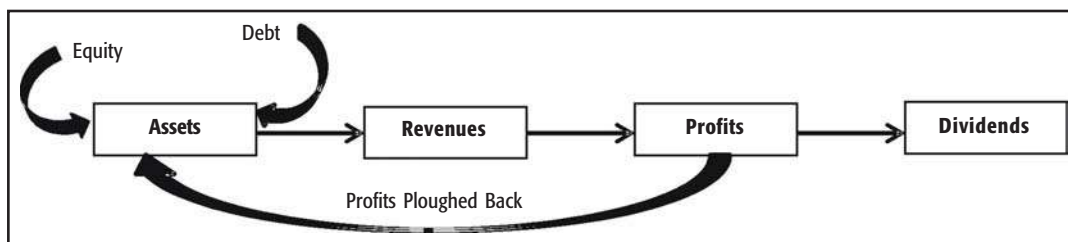
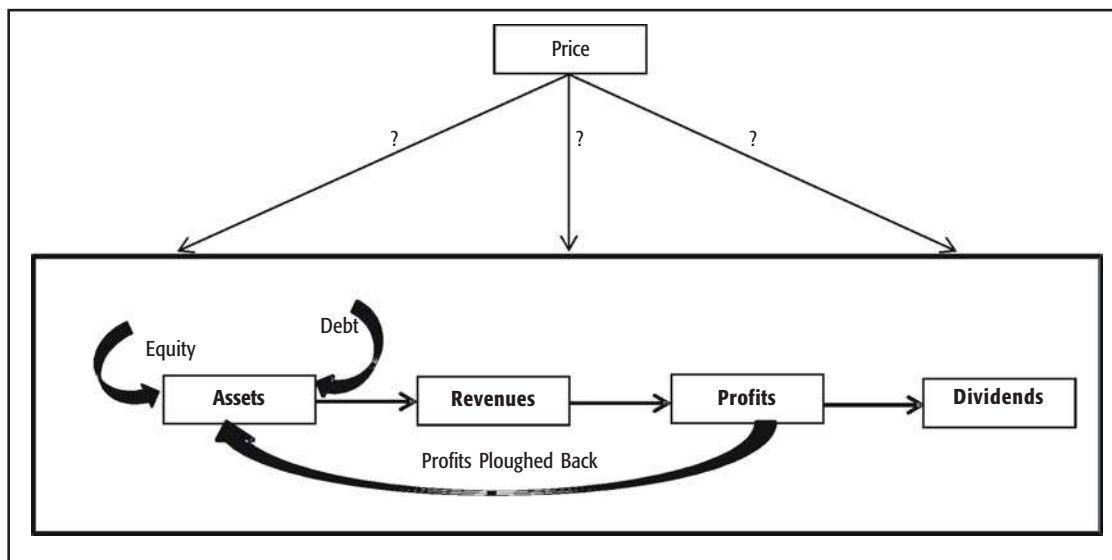


Figure 4: Uncertainty and the Markets: Price Risk



scared so much. I'm jus' a settin' here waitin'. When somepin happens that I got to do somepin- I'll do it". But Al carries on: "Ain't you thinkin' what it is gonna be like when we get there? Ain't you scared it won't be nice like we thought?" Ma quickly says: "No. No, I ain't. You can't do that. I can't do that. It's too much- livin' too many lives. Up ahead they's a thousan' lives we might live, but when it comes, it'll on'y be one. If I go ahead on all of 'em, it's too much. You got to live ahead 'cause you're so young, but- it's jus' the road goin' by for me."

Ma Joad's philosophical view of life is consistent with a definition of uncertainty attributed to Elroy Dimson of London Business School: Uncertainty means that more things can possibly happen than will happen (Bernstein, 1998). Under conditions of uncertainty, the decision-maker, having direct control only over the action set and not over the set of consequences, will not know in advance the consequences of an action taken (Refer to Tony Bryant's contribution to this colloquium). Formally defining 'risk' and 'uncertainty' and bringing in a distinction between them, Bryant defines risk as situations where the decision-maker has objective probabilistic information about the way actions are connected to consequences and defines uncertainty as situations where even such probabilistic information is not completely available. These definitions correspond to the Knightian definitions of Risk and Uncertainty (Knight, 1921).

In a similar taxonomy of knowledge, Gomory (1995) classified knowledge, in his very well-regarded article, into the Known, Unknown, and the Unknowable. In this classification, knowledge can be viewed from two perspectives: a measurement perspective and a theoretical perspective (Diebold, Doherty, & Herring, 2010). From a measurement perspective, the Known corresponds to a situation of Knightian risk where the distribution of outcomes is known, the Unknown to a situation of Knightian Uncertainty where the distribution of outcomes is not completely known,

Under conditions of uncertainty, the decision-maker, having direct control only over the action set and not over the set of consequences, will not know in advance the consequences of an action taken.

and the Unknowable to situation where even the set of actions and outcomes is not completely known. And from a theoretical frameworks perspective, the Known corresponds to a Knightian risky situation where the underlying theory is well understood, the Unknown to a Knightian uncertain situation where there are competing theoretical models but none that have achieved the status of a paradigm, and the Unknowable to a situation where there are no credible theoretical models. By investing in better

theory and better measurement, decision-makers stand to gain by moving from the domain of the Unknowable to that of the Unknown and then on to the domain of the Known (Diebold, Doherty, & Herring, 2010). This also forms the theme of Bernstein's (1998) book, '*Against the Gods: The Remarkable Story of Risk*'.

Ankit might be alluding to the Unknown and the Unknowable when he talks about 'unknown variables' in his contribution. Mahajan, however, speaks more from the domain of risk rather than that of uncertainty when he talks about capital allocation decisions, total shareholder returns, and risk-return trade-offs; for a large mature firm, the unknown and the unknowable are much lesser as compared to an entrepreneur both from measurement and theoretical perspectives. As external investors, Dangi and D'Aguiar operate more in the domain of uncertainty/ unknowable than risk when trying to assess the stand-alone performance of these entities at a micro level. However, at the macro level, because of the

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preference aggregations of the price formation process of the market that throws up an abundance of price data and with well-developed theories of risk-return, Dangi and D'Aguiar are at the risk end of the spectrum; D'Aguiar, for example, armed with data and theoretical models, searches for what is 'embedded in the valuation.

Decision-makers dislike risk, uncertainty, and the unknowable. Standard finance models recognize aversion to risk and incorporate it elegantly in

various theoretical models of decision making. The counterpart of risk aversion in the world of uncertainty is an aversion to uncertainty about uncertainty, or ambiguity (demonstrated by the Ellsberg Paradox; Refer to Bryant's paper).

Sources of Risk and Uncertainty

Where does uncertainty originate from? In our visual representation of the firm, the first source of uncertainty for the entrepreneur revolves around the ability to raise funds. With no historical data to fall back on, potential investors operate in the domain of Uncertainty/ Unknowable. However, from the perspective of the entrepreneur, the situation might be closer to the realm of the Known (or Knightian Risk) at least in terms of theory, if not in measurement. In other words, as Ankit says, "the business is more in your heads" and not in tangible assets that others can see. This asymmetry of information is the major source of uncertainty and risk for an early stage business. Equilibrium in markets with asymmetric information has attracted the attention of various researchers starting with the seminal work of Akerlof (1970). Brealey, Leland, and Pyle (1977), Stiglitz and Weiss (1981), Hellman and Stiglitz (2000) and others further studied how financial equilibrium under information asymmetry leads to rationing (demand exceeding supply) of both credit (debt) and equity.

Risk and risk aversion got formally introduced through Bernoulli's (1738) classic work of 1738 in which he demonstrated that risk aversion is equivalent to diminishing marginal utility. 'Determination of the value of an item must not be based on its *price*, but rather on the *utility* it yields', he wrote, thus introducing an element of subjectivity via the risk disposition of the decision-maker. Bryant's contribution traces the development of utility theory and alternatives like Prospect Theory. But it was Markowitz (1952) who developed an analysis based on the expected utility maxim and facilitated its direct incorporation into finance with his

From the perspective of the firm, uncertainty originates from the environment in which the firm operates, the socio-economic structure, and the industry structure. The uncertainty that comes from the environment is amplified by the micro-economic characteristics of the firm.

While the unsystematic risk may be irrelevant for an investor who is well-diversified, they are relevant for an investor who runs a concentrated portfolio.

seminal contribution in terms of the Mean-Variance framework. Developing on Markowitz's work, Sharpe (1964) developed a market equilibrium theory of asset prices under conditions of risk and provided an operational definition of risk; he categorized the total risk of returns from an asset into the relevant, 'systematic' risk and irrelevant unsystematic risk. In the single index model, the index of this systematic risk for a security is the well-known beta.

And what influences systematic risk? From the perspective of the firm, uncertainty originates from the environment in which the firm operates (refer to D'Aguiar's section on 'Evaluating

the Business Opportunity), the socio-economic structure, and the industry structure. The uncertainty that comes from the environment is amplified by the micro-economic characteristics of the firm. The cyclical nature of revenues of a firm, its operating leverage (determined by relative proportions of fixed and variable costs), and financial leverage are now widely recognized as sources of systematic risk. A number of studies have examined how the systematic risk of the securities of the firm is affected by the microeconomic and environmental characteristics of the firm like monopoly power, demand elasticity, and the labour-capital ratio (Subrahmanyam & Thomadakis, 1980), leverage (Mandelker & Rhee, (1984), and firm's spend on advertising and R&D (McAlister, Srinivasan, & Kim, 2007).

And for investors like Dangi and D'Aguiar, how does firm-level risk get transmitted to price risk in the financial markets? What are other factors that affect price risk? Asset prices vary when investors change their expectations about cash flows, discount rates, or both (Sadka, 2007). However, price volatility of securities would also be affected by the design of the markets in which these securities are traded (Pagano, 1989; Kupiec & Sharpe, 1991). Asset prices are also affected by events in related markets (for example, the effect of derivative markets on the

cash markets, Bessembinder & Seguin, 1992) and by psychological biases of investors (Hirshleifer, 2001). Dangi, for example, talks of the market's one-sided bets as adding on to market volatility.

And finally, while the unsystematic risk may be irrelevant for an investor who is well-diversified, they are relevant for an investor who runs a concentrated portfolio. The sources of unsystematic risk, being unique to the firm, could be many: accidents, employee strife, managerial fraud, natural calamities, etc.

Responses to Uncertainty

We have seen definitions of uncertainty and seen the sources of uncertainty in firms and the markets. The question that still begs an answer is: what do we do about uncertainty? How do we respond to it? This is the most fascinating area of study, multi-disciplinary in nature and ever evolving. Failing to put it into an integrated framework that is concise enough to be accommodated in this colloquium, I have instead chosen to examine a few fascinating facets of what could be the responses to uncertainty.

Hedge-Fund Thinking

If we are looking for responses to uncertainty, it should be something that is actionable. And therefore a useful way to distinguish between various types of uncertainty is to again fall back on Knight's (1921) classic treatise. Defining risk as situations where the actuarial value can be ascertained and uncertainty as where it cannot be, Knight (in Chapter II of his book) argued that risk, if measurable, should not give rise to profit because it can be eliminated by insurance or some equivalent device. In Chapter VIII ('Structures and Methods for Meeting Uncertainty'), he goes on to say "But that it is *possible* does not necessarily mean that it will be done'.

Knight's way of looking at risk and uncertainty is also at the core of what could be termed a 'hedge-fund way of thinking' or a 'hedge-fund philosophy': Collect all the

information you can gather, crunch numbers, arrive at an estimate of risks, hedge out (that is, remove) the risks that you do not want to carry and then carry the risks that you are confident about carrying (Mallaby, 2010). And this, in turn, could form the base for a framework for dealing with uncertainty in firms and markets, in general: classify situations into those of risk and uncertainty; decide which risks you would carry; remove the remaining risks through market and institutional mechanisms. It is as if you can sculpt your own figure, chiseling away all that you do not want.

Better Measurement, Better Theory

The response to uncertainty has to begin with — and be sustained by — a search for better measurement (data) and better theory. Investing in knowledge helps one move from the domain of the unknowable to the unknown and then the known because 'better measurement provides grist for the theory mill, and better theory stimulates improved measurement'.

The response to uncertainty has to thus begin with — and be sustained by — a search for better measurement (data) and better theory. Investing in knowledge helps one move from the domain of the unknowable to the unknown and then the known because 'better measurement provides grist for the theory mill, and better theory stimulates improved measurement' (Diebold, Doherty, & Herring, 2010). The areas in which decision-makers dig deeper in the search for better theory and better measurement may however differ from context to context: for example, D'Aguiar might focus on operating environments and management quality; Mahajan might focus on 'building up on data and models' to better evaluate R&D investments, and Dangi might focus on modeling 'recurring uncertainty' in the bond markets.

The Value of Openness

While processing information and 'building up on data and models', there is a danger that decision-makers might fall into the trap of a 'confirmatory bias', thus leading them to selectively choose information and thinking models consistent with their current hypothesis, thoughts or belief. Karl Popper (1945, p.79) puts it beautifully when he says, "discovery of instances which confirm a theory means very little if we have not tried, and failed, to discover refutations. For, if we are uncritical we shall always find what we want: We shall look for, and find,

confirmations, and we shall look away from, and not see, whatever might be dangerous to our pet theories". This is what Dangi talks about in his contribution when he warns against 'lethargy and loss of vigil'. And to combat the confirmatory bias is why Charlie Munger (Kaufman, 2006) says that investors need to adopt a 'multiple mental models' approach and have 'lattice-work of mental models' in their heads. Scott E. Page (2007) too talks about the power of diversity and says (while introducing his course on 'Model Thinking'), "Evidence shows that people who think with models consistently outperform those who don't. And, moreover people who think with lots of models outperform people who use only one."

Action Responses

Open-minded and diligent use of data and models leaves the decision-maker armed with a better knowledge of the set of actions and the set of consequences. And then the decision-maker chooses between the available actions either by employing risk-return frameworks as described by Mahajan or by using approaches like the Expected Utility approach or alternative approaches as described by Bryant. But what are the set of actions? Besides the traditional ways of risk reduction like insurance and diversification, modern finance has armed decision-makers with tools like financial derivatives. Using tools like financial derivatives as building blocks, decision-makers can today – in the spirit of Arrow's (1964) work – design actions that can throw up specific outcomes for any given state of the world; it is akin to having a market in which all the components that are required to build a car to suit any buyer's choice is available. However, the availability of a large set of actions can sometimes lead to an action bias, a tendency under conditions of uncertainty to blindly choose action over inaction. And, therefore, it is important to remember that 'no action' is one of the options available. As an example from the world of soccer, Bar-Eli et al. (2007) showed that bias amongst goalkeepers in soccer leads them to jump left or right before they can clearly observe the kick direction during a penalty kick, though the optimal strategy is to stay in the goal's centre. Apart from inaction, action bias may also be countered through de-

layed action; sometimes delayed actions can turn a bad decision into a good one (Partnoy, 2012).

Flexibility

Even if you have been open-minded and diligent in your use of data and models, by the very definition of uncertainty, you can never be sure that your choice of action is the right one. It is important therefore to build in flexibility into the decisions (as Mahajan notes). There is a vast amount of literature (e.g. Trigeorgis, 1996) on how flexibility can be built in, and valued, while making investment decisions in a firm. However, in the context of decision-making under uncertainty, flexibility is also needed in the outlook of the decision-maker. For example, describing Berkshire Hathaway's performance,

Charlie Munger says: "If Berkshire has made a modest progress, a good deal of it is because Warren and I are very good at destroying our own best-loved ideas" (Kaufman, 2006). Willingness, even an eagerness to change one's mind is a valuable asset, he says; and this view finds echo in Dangi's contribution.

Ex-post Responses

Of whatever nature the uncertainty may have been – known, unknown or unknowable – more things can possibly happen than will happen. That means the outcome in many cases will not be the desired outcome. What, then, should the response be? One possible response could be that of Steinbeck's Ma Joad: Sit and wait for that something to happen, and when it happens, do something; fight the fire when it breaks out. Another response would be to think through all the possible outcomes and extract some systematic, common factor that could help you deal with unanticipated outcomes; for Dangi, it is to ensure that he has enough liquidity if the markets move against him.

Organizational Responses

Despite all efforts, decision-makers will never have complete comfort under situations of uncertainty; many cases would even continue to remain in the domain of unknowables. How do firms deal with these residual uncertainties that do not even have an actuarial value

Of whatever nature the uncertainty may have been – known, unknown or unknowable – more things can possibly happen than will happen. That means the outcome in many cases will not be the desired outcome.

and therefore are not actionable? Knight (1921) drew an analogy between the task of meeting uncertainty and the brain of a living organism. Comparing it to the process of cephalization in the evolution of organic life whereby nervous tissue, over many generations, becomes concentrated toward one end of an organism, eventually producing a head region with sensory organs, Knight believed that the role of judgment and consciousness that are so crucial in decision-making under uncertainty gets concentrated at certain points in an organization (Langlois & Cosgel, 1993). This raises many interesting questions: Through an evolutionary process, will managers with a greater capacity to deal with uncertainty be the ones who are more likely to move towards the 'head' region, just as Ma Joad asks son Al to do the worrying? When Ankit says that entrepreneurs are a 'rare breed', does it mean that through a process of cephalization in society, residual uncertainty without an actuarial value gets concentrated in entrepreneurs? And, within an organization, would one response to uncertainty be that of uncertainty-shifting; for example, would the response of the marketing function to uncertainty in demand be to push the uncertainty on to the manufacturing function?

Summing Up

We started off this colloquium wondering whether financial economics has been an 'engine' that has altered markets and transformed the environment; we wondered whether practitioners share the same views as academicians. Aided by a little bit of 'translation' and interpretation, we find that though the exact language that is used differs, academicians and practitioners do share lot of common territory; so, either practice has followed theory or theory practice. However, in this colloquium, limited as it is in participation, space and time, we find that there are very little references from the practitioners' side to the use of institutional mechanisms and market tools like insurance or derivatives (the institutional and market mechanisms that MacKenzie (2006) refers to in his book when he says that financial economics has been an engine of change rather than a camera recording events); instead, the focus has been far more inward-directed. Maybe it is because the use of market and institutional mechanisms to hive off the uncertainty you do not want to carry is already well understood and assimilated; maybe both for theory and practice, the challenge now lies in understanding the internal responses to uncertainty – a theme that Knight introduced in 1921.

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