Meta-Risks

Beyond the scope of explicit financial risks.

Jack Gray

The prefix meta connotes “relating to” or “passing beyond the scope of.” Meta-risks are the qualitative implicit risks that pass beyond the scope of explicit financial risks. Most are born out of the complex interactions between the behavior patterns of individuals and those of organizational structures.

The archetypal meta-risk is the disarmingly named moral hazard, which occurs when the very act of hedging a risk encourages reckless behavior. The International Monetary Fund has been accused of creating moral hazard by providing countries with a safety net that tempts authorities to accept inappropriate risks, thereby making the need for the safety net more likely.¹

In the same spirit, Federal Reserve Chairman Alan Greenspan’s quick response to sharp market downturns in 1987 and in 1998 may have contributed to the current U.S. equity bubble. Moral hazard has long been recognized by the insurance industry, less so by the investment and finance industries.

We are all exposed to the venerable, quintessentially human meta-risk of hubris. We all risk acting like “masters of the universe,” believing we have correctly assessed, modeled, identified, managed, and controlled all risks; that having tamed yesterday’s risk we’ve tamed tomorrow’s. See, for instance, Putnam [1998, pp. 10-11] and Jacobs [1999, pp. 9-10]. This meta-risk surfaced during the Asian crisis when, according to Garten [1999, p. 80]:

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¹
the risk assessment and risk management of foreign investors in emerging markets failed to foresee the buildup of unsustainable financial leverage.

Quantitative analysts and other technicians are particularly exposed to hubris. With consummate ease we can so fall in love with our technology that we ignore threatening low-tech risks...such as using ten-year-old maps of Belgrade.

The heady confluence of hubris and moral hazard sank two famously engineered ships: the Titanic, and the now salvaged Long Term Capital Management. According to one survey, most companies cite third-party non-compliance as their biggest risk, a (meta-)risky attitude that also smacks of hubris, moral hazard, and unadorned organizational avoidance.

Meta-risks change one’s perception of risk management. A common perception holds that our growing awareness of and capacity to explain and model financial risks results in a smooth and inevitably progressive evolution from high to low risk. Meta-risks change that comforting view to a less progressive one where even sophisticated investors, with high levels of risk awareness, remain exposed to high levels of (meta-)risk, of which they are unaware, as illustrated schematically in the Exhibit.

RISKS OF INSUFFICIENT QUANTITATIVE ANALYSIS

Quantitative methods for assessing and managing risk, such as multifactor models and value at risk, and techniques such as GARCH and neural networks are now subtle, sophisticated, robust, and effective. Their power has a threefold source. First is their capacity to process large, complex, and particularly high-frequency datasets of information more effectively and more quickly than humans. Second is the genuine discipline they impose by exercising emotion from investment decision-making. Third is an underlying scientific/engineering methodology under which data are objectively classified and analyzed, hypotheses are formulated, tested, and modified, and robust hypothesis-based portfolios are constructed and managed.

The perceived complexity of quantitative tools and methods exposes some to the meta-risk of failing to capitalize on its potential. Many refuse to see the power of quantitative approaches. Consider the rejection by Congress and the Supreme Court of the use of statistical sampling in the 2000 census, partly on the grounds that it is “less accurate;” even though these techniques can both reduce costs and diminish the risk of miscounting. This counter-intuitive result is confirmed by Grantham, Mayo, Van Otterloo’s renewable resource specialist, who, having counted trees in a forest, found to his surprise that sampling is significantly more accurate.

In the same spirit are those who unreasonably choose to not apply quantitative discipline or to override it. Consider an investment committee that makes a global bet on commodities. The portfolio manager responsible for North America, who had previously been rolled on a similar decision, feels his views were not sufficiently considered and makes a stand: “Not in my portfolio.” Ever sensitive to deflated egos, the investment committee compromises and reduces the North American bet, but retains its overall size by squeezing more into less difficult “ego-free” sectors.

Does anyone record or measure the actual risks to which the portfolio is now exposed? In principle, they can and should be assessed quantitatively, but in practice, for human and organizational reasons they probably won’t be.

As Nicholas Leeson’s performance reached stellar heights, his supervisors extended his trading limits. None had the instincts, wisdom, or courage to constrain them. Quantitative tools for controlling risk were available but were overridden by human and organizational behavior patterns.
RISKS OF EXCESSIVE QUANTITATIVE ANALYSIS

These instances notwithstanding, the quantitative approach has attained the high ground. Having run a masterful sustained marketing campaign that resonates with our ambient scientific culture, we quant's convinced the world that the mathematical sciences are the most demanding of all human activities. As I argued in 1997, however, our very success exposes us to the meta-risk of misusing quantitative tools, of overquantifying, of measuring the intrinsically unmeasurable. That's the danger inherent in the oft-heard and often ill-considered comparison: "It's not rocket science."

The secret is that quite a few aspects of rocket science are relatively straightforward compared to investments. First, in rocketry human and organizational factors have significantly less influence on outcomes, and the corresponding risks are far more quantifiable and controllable. This is highlighted by a vivid metaphor, reported by Lewis [1999, p. 71], created from a wisdom born of pain by an LTCM employee:

The hurricane is not...more...likely to hit because more hurricane insurance has been written...[but]...the more people write financial insurance, the more likely it is that a disaster will happen, because the people who know you have sold the insurance can make it happen.

Second, the underlying dynamics that drive rockets are understood and relatively predictable. But there may be no stable, general dynamic laws driving financial markets. What few specific laws there exist are remain ill-understood and, through arbitrage-induced erosion, intrinsically unstable. This is apparent in the Federal Reserve's recently released minutes, which suggest that even that most fundamental of economic drivers, inflation, is not well understood.

Too great an emphasis on quantitative techniques exposes us to the meta-risk of not managing that which is not modeled, which may explain how LTCM's "reliance on so many quantitative models blind[ed it] to liquidity concerns." That the critically important liquidity risk has no agreed-upon quantified definition in spite of an agreed-upon intuitive definition of liquidity as the ability to trade at the "right" price, at the "right" time, serves to underline its subtlety.

Although volatility, beta, and its variants are robust and effective proxies for risk, the multifarious, subtle, and often idiosyncratic nature of risk can transcend these models. See, for instance, Bernstein [1996], Kaufman [1999, p. 10], Bookstaber [1999], and Beder [1999, p. 33].

The partially quantifiable description of risk as "exposure to the likelihood of disappointment" explicitly addresses behavior and so encourages a dialogue on investors' expectations and how they are formed.

META-RISKS FOR QUANTS

Quantitative advocates are exposed to their own peculiar brand of meta-risks, one of which Bernstein [1999] hints at in his third explanation of what he sees as "the passion for risk management in today's world," namely, that "complex strategies like VaR, and ornate stress tests...make] the game...a lot more fun than it was in the day of slide-rule. Why not play?" Because play is an intrinsic and important modus operandi of discovery, the challenge is to manage the meta-risk that creativity can degenerate into value-subtracting tinkering.

The most insidious quantitative meta-risk is data mining, a risk to which we are all exposed, particularly when under pressure to produce results. Although specific techniques such as out-of-sample testing and specification of robust theoretical underpinnings can hedge this risk, its dangers bear continual repeating.

An almost-too-perfect example cited in Murray and Smithers [1999] arose through a long-term analysis of U.S. yield ratios. Over the bullish twenty years from 1977 to 1997, correlations between bond and equity yields were strong and positive (0.70 for earnings yields and 0.76 for dividend yields). The ready explanation is that rising equity prices make bonds relatively attractive, so bond yields fall together with equity yields. That the data have been mined to support the argument is revealed by the previous bullish twenty years from 1948 to 1968 where the respective correlations are equally strong but negative (−0.77 and −0.79), a phenomenon explained by rising inflation driving both up bond yields and future corporate profits. Over the entire period from 1871 to 1997, the correlations are essentially 0.

The widely recognized but poorly managed model risk, described in detail by Crouhy [1998], is the meta-risk that the failure of often known misspecifications, such as the assumption of continuous capital markets, has a far more damaging impact than expected. According to one study, 20% of the $24 billion in derivatives losses
incurred by banks over the past decade can be attributed to model risk.

1997 was especially graphic, and then in August 1998 "the perfect storm blew in," triggered by Russia defaulting on its debt. Alan Blinder, vice chairman of the G-7 Group, confesses to teaching his Princeton economics students that this event was impossible, that no nation would default on its sovereign currency-denominated bonds because it could simply print more money. But it happened, and models failed badly.

Over a twelve-month period, correlations typically doubled, with an impact substantially greater than expected. With even emerging market debt and REITs moving in unison, portfolios designed to be diversified became highly concentrated. Models that worked well under normal market conditions failed in a world of more frequent extreme events, where limits to market reason and rationality were severely tested. Regulators who refused to allow for the risk-lowering effects of diversification in estimating capital adequacy requirements may have been more prudent than was first thought if we are entering a "fat tail" period of more frequent extreme events.

Model risk might be hedged by the creation of new securities such as correlation options and by models based on extreme value theory, a branch of statistics derived from hydrology, which models the distribution of extreme events such as sixty-year floods, stock market bubbles, and genuine paradigm shifts. See Phoa [1999]. According to a Deloitte & Touche survey of risk management by banks, a quarter plan to add extreme value theory to their arsenal of risk management tools.

The consequences of failing to manage these meta-risks and others such as data snooping, data cleansing (and not data cleansing), overfitting, seeing non-existent patterns, uncritical acceptance of models' output, biases, and cognitive illusions can be considerable. Effectively managing them is problematic because they are remarkably resistant to eradication through learning and perhaps even through therapy.

GENERAL META-RISKS

The most dangerous meta-risk is unchallenged or insufficiently challenged views, the risk that we deny or heavily discount evidence and arguments that challenge our views and selectively accept or place a premium on evidence and arguments that confirm them or that are at least consistent with our priors. This is dangerous enough in rocket science but can be fatal in investment management where successful experts get only 55% of their calls right, yet where confidence and firmness (though not arrogance and rigidity) are major determinants of long-term investing success.

When asked whether there is a single maxim that could ruin an (investment strategy or firm), Confucius replied:

the only pleasure of being a prince is never having to suffer contradiction. If you are right and no one contradicts you, that’s fine; but if you are wrong and no one contradicts you, is this not...a case of [a] single maxim that could ruin an [investment strategy or firm]?

Robert Maxwell’s theft of pension assets unveils the risk of not challenging authoritarians. Orange County reveals the risk of not challenging those who believe they are experts. Metallgesellschaft exposes the risk of not challenging those who are experts. Experts and princes too are overconfident and overly optimistic, and commit cognitive errors and follow fashion.

The key to effective challenge is to establish the right platform or framework. The common experience of being totally unconvincing by a seemingly watertight, logically structured argument highlights this need. In this instance, the challenger’s platform is often more intuitive and inductive and the challenged’s is more formal and deductive. Excessive formalization runs the risk of generating ideas, processes, and arguments whose tightness makes them impenetrable; they appear beyond challenge. On the other hand, too great an emphasis on intuition runs the counter risk of generating investment ideas, processes, and arguments whose looseness makes them impenetrable; they too appear beyond challenge.

Balance is difficult, as every formalization necessarily abstracts from and hence destroys some intuition. Finding the right platform, one that encourages a meaningful debate between competing styles of intelligence, can produce an environment in which views are effectively challenged. Often this platform can be found by challenging the underlying basic assumptions, laws, and world views from which people operate.

At the end of the 1980s, and for solid rational reasons such as long-term thinking and financing, stable labor-management/government relations, the dominance of engineers rather than lawyers, and a strong industry policy, I believed Japan offered future high growth and
stock market excitement; that the American century was nearing its end as the U.S. became a boring, mature economy with low growth and an unexciting stock market. On reflection, the confluence of my Keynesian political/economic views and a passion for science and engineering blinded me to the underlying reality. I should have been challenged at this deep and personal level.

One risk induced by views that are insufficiently challenged and too rigidly held is failure to adapt to phase transitions, such as the transition that occurred in Japan at the beginning of the 1990s, and to other market changes, particularly, as in the LTCM case, to those induced by the very success of investment strategies based on those views. Some accuse quantitative analysts of having an unhealthily large exposure to this risk factor. They see their models as intrinsically incapable of adapting with sufficient urgency.

Although quantitative models can be adaptive, the accusation is broadly valid. Especially at risk are pure quantitative strategies and processes that lack the flexibility of an overlay of judgment and that don’t have a feedback loop into deep, tested investment intuition. Because consistency is the key to and the strength of Western logic, it tends to dominate the arguments and processes of quantitatively trained investment professionals.

Yet markets often seem to behave inconsistently. Eastern philosophy, where duality as opposed to mutual exclusivity is valued, and where, without anxiety, contradictory and even paradoxical events can be contemplated simultaneously, may provide a path to managing this meta-risk. If Western logic is a systematic method of coming to the wrong conclusion with confidence, Eastern logic may be a less systematic method of coming to the right conclusion with humility.

This meta-risk of rigidity must be balanced against the need to which less quantitative approaches are exposed: adapting to perceived but non-existent market changes. This eternal risk of theory mining is wrought by our conviction that we can create complicated arguments, build elaborate theories, and construct intricate justifications sufficiently powerful to explain (ex post) any price available, as is the case with the bond/equity yield arguments above.

An unjustifiably strong desire to believe in the quick efficiency of markets may have been the root cause of most professionals’ surprise at the post-Euro divergence in European bond markets. An overbelief in market efficiency, where arbitrage (almost) instantly restores current market positions to long-term equilibrium, stems from a scientific training that places a premium on the intellectual appeal, logical power, and elegance of an argument. When mixed with an overbelief in the completeness of markets, so that all risks can be hedged, the effect can be dangerous.

The meta-risk of complexity will only increase due to the combined impact of globalization, technology, new instruments, finer subdivisions of the market, increasing market micro-efficiency, competition, marketing, consumerism, and specialization. The essence of complexity lies in interactions that often defy reductionism. It is apparent in portfolios that defy rational explanation even though each security is rationally included according to an assessment of its incremental risk-adjusted return characteristics and its sensitivity to predetermined market factors.

Complexity is a meta-risk of which the Metallgesellschaft board was unaware. The board may have understood its risks line-by-line, but it failed to understand the interaction between lines. In fact, excessive complexity in a portfolio encourages investors to focus on the details of individual securities, thus undermining the basic tenet of modern portfolio theory that the risk of a security can be assessed only in the context of a portfolio.

A degree of complexity, however, can provide a robust stability, as it does in ecosystems and in multiasset sector funds. For instance, it adds discipline to the investment process for a bond manager’s view on yields to challenge and be challenged by an equity manager’s views on valuations.

Nonetheless, quantitative proponents need to be especially mindful of complexity risk, of overengineering. Too often we revel in building complexity into our processes and portfolios, a behavior compounded by our desire to ”play.” Reducing complexity is notoriously difficult due in part to pride of ownership and the potential for regret.

A practical description might encourage managers to attach a penalty to complexity: The complexity of an investment process (or of an organization or a product portfolio) is the minimum length of a complete written description that can be understood by a willing, interested intelligent non-expert expending reasonable effort. Because writing is essentially linear, more complex processes with more branches and interactions require longer minimum descriptions. A written but minimum description requires clarity of thought, exposes unnecessary complexity and correlations, and stresses the importance of communication.

22 META-RISKS
The surest global hedge against complexity risk is to practice Einstein's dictum that “everything should be made as simple as possible...but no simpler.” The sting in the tail is the obverse, simplicity risk, the risk of failing to capture the benefits of interactions through loss of valuable information. It arises when needed levels of complexity are underengineered, when processes and models are so oversimplified they provide such a poor representation of reality as to increase the risk of missed opportunities.

Excessive simplification encourages a focus on component parts and discourages a holistic view that sees a well-managed portfolio as greater than the sum of its component parts. This can be manifested in a failure to appreciate and manage interactions and linkages between different risk categories, a risk that is highlighted in the Institute for International Finance’s report on risk assessment in the banking sector.8

Another example of current interest arises where under normal circumstances, the long duration of a portfolio’s assets matches clients’ investment horizon and interest rate sensitivity, but during crises the latter shortens quickly, exposing the fund to serious liquidity problems. The interaction between horizon and liquidity risks can produce profound disappointment if both risks are tightly compartmentalized.

Simplification risk is an evident and value-subtracting consequence of excessive style purity if managers are constrained to ever-narrower subcategories of styles, processes, and securities. The consequent weakening of the arbitrage mechanism induces market inefficiencies across market sectors that are potential sources of added value.

Agency risk, where an agent accepts a risk that is inappropriate for the principal, underlies most meta-risks and is Bernstein’s second explanation for our “passion for risk.” Increasingly, in investments, agents and principals suffer from different disappointments. Increasingly, agents are driven by the competitor risk of being, in Kritzman’s pithy phrase in Bernstein [1999], “wrong and alone.”

Agency risk can induce managers to take too little investment risk in their portfolios. Concerns about career and peer embarrassment induce them to hug benchmarks, to rarely reach tracking error targets, and to subminimally manage to self-imposed subranges far narrower than explicit sector ranges. The very act of encouraging portfolio managers to take more benchmark risk may encourage some to take less, a form of immoral hazard.

MANAGING META-RISKS

While in the capital markets investors rationally expect to be rewarded for accepting greater risk, accepting meta-risks may yield negative payoffs. For the narrower meta-risks such as model risk and data mining risk, utility is negative and decreases steadily with increasing risk.

More problematic are the general meta-risks, each of which has a complementary meta-risk. Insufficient challenge is complemented by the meta-risk of excessive challenge, which can lead to group-think, inertia, and avoidance. Overquantifying is complemented by underquantifying, and complexity is complemented by simplicity. Striking the right trade-off between complementary meta-risks is an outworking of the continual and evolving task of creating the right culture, peopled with those who can challenge all shibboleths and yet act decisively, a culture that treads the delicate path between the extremes of dominant personalities and committee-think.

One critical cultural trade-off to strike is that between street-smart and academically smart people. This became apparent to Black and Scholes when the first live use of their pricing formula failed because they were unaware of a takeover in progress. The importance of culture is evident in the management of compliance risk. This can be hedged in explicit technical ways such as daily reports, exception reports, separation of compliance from portfolio management, training, and firm oversight. All these safeguards can be evaded, though, unless supported by an organizational culture of integrity and openness, one in which people are expected to challenge authority and readily admit to mistakes, ignorance, and ethical dilemmas.

On joining this industry, I was struck by the lack of curiosity, genuine learning, and open, critical and tough debate I’d enjoyed in the academy, where collegial dialogue is the norm. This has potentially serious consequences. How will the industry learn the lessons of LTCM if those lessons remain behind closed doors because LTCM and its partners believe they have “paid” for them?9

Commercial confidentiality, reinforced by our strong need to conform, to be comfortable in the face of uncertainty when discomfort is necessary for investment success, and a misunderstanding of the role of experts conspire to produce low levels of meaningful challenge and debate. One consequence is herd behav-
ior and convergence of ideas, a behavioral pattern of which all are guilty. It is evident in the conformity of pension funds' strategic asset allocations across and within many countries in spite of wide variations in liability and liquidity profiles, a uniformity that must be risky for some funds in particular and far from a Pareto optimum in aggregate.

Computer scientists claim that UNIX was superior to the later DOS because it was designed and built in the open environment of universities, which promote the exchange and sharing of information, the rigorous testing of techniques, and the vigorous challenging of assumptions. The source code of the Linux operating system has been made freely available precisely to generate improvements through open criticisms. Openness was also crucial for the early development of the Internet, as it was for most theoretical advances in investments and finance, such as MPT, CAPM, Black-Scholes, asset-liability models, optimizers, and behavioral finance. Although LTCM's experience confirms that even a selectively open transparent environment will destroy a strategy's alpha-generating capacity, there is scope for more open criticism in investments.

At the technical/quantitative level, where truth is relatively static, hard, explicit, and convergent, limited, open debate does occur, and is a relatively effective means of managing the risk of objective errors and mistakes. Debate, discussion, and challenge are even more critical forms of risk management at the non-technical, judgment level of decision-making, because here the nature of truth is dynamic, soft, implicit, and divergent. It is the truth of novelists, lawyers, psychologists, historians, and painters. The most effective technique for unraveling it may be a legal-like process of interrogation. In turn this demands a broadening of outlook in the spirit of Charles Munger's view that to mount effective challenges in investing it is crucial to have many mental models covering a wide variety of areas of human endeavor.

The coming century of biology and its experience with aggregation and path-dependent systems may provide fresh insights, techniques, and mental models. For instance, training in the neoclassical economics of equilibria and the physical and engineering sciences stresses a search for order, smoothness, and uniqueness. Because the evolutionary process cannot be modeled by extrapolating continuous trends and is not one of inevitable progress, it might better prepare minds for doing battle with the market.

Will the image of the market as a living, learning organism be developed into a formal and useful model? Might molecular biologists offer deeper insights into how we process information? Will biophysicists elaborate on the nature of feedback mechanisms? Can gene-splicers extend our vision about product development? Can psychology unravel the essence of rationality? Will the artificial sciences lead to more effective management of complexity? Will biology improve understanding and communication about investing through a rich new source of metaphors à la Bookstaber [1999]?

If a critical mass of the next generations' investment managers are biologists with MBAs rather than physicists with MBAs, their different mental models may herald a world change in investing.

CONCLUSION

In principle, the risks in capital markets, particularly the quantified ones, are relatively easy to assess and manage because there is no such thing as a bad capital market risk, only a mispriced one. Too narrow a focus on those risks misses the equally important non-quantifiable meta-risks, those that pass beyond capital market risks. Here there are bad ones that are more difficult to identify, assess, and manage because they center around people, organizations, and their interactions. For these, an open dialectic of risk may be the ultimate form of risk management. New emerging forces and structures that encourage greater openness, debate, flows of information, and sharing of knowledge might lead to such a dialectic. These include client-driven cooperative ventures between competing investment managers; more sophisticated manager/consultant relationships that facilitate non-threatening dialogue; the industry's simultaneous consolidation and fragmentation of both investment firms and retirement funds that at least initially will bring contrary views together; and finally, potential regulatory and legal forces.

That two U.K. pension funds are contemplating a suit against their investment manager for its failure to adequately address "explicit and implicit risk parameters" may be an inchoate warning about the importance of meta-risks, an importance that will increase with the growing transference of risk to individuals.
ENDNOTES

This article is a version of a talk, “Risks of Becoming Too Quantitatively Oriented,” at the AIMR Annual Conference in Orlando in May 1999.

1 The severity of the potential for moral hazard induced by the IMF (and the Pension Benefit Guarantee Corporation) has probably been overstated. See Brealey [1999, p. 7].

2 See Grantham and Gray [1999] for a brief discussion of the ubiquitous law of regression to the mean.


5 Financial Times, August 26, 1999, p. 5.

6 For a revealing story on the power of the efficient market paradigm in the academy, see Lo and MacKinlay [1999, p. 4].

7 This definition is stimulated by the formal definition of the complexity of computer programs and proofs.

8 Available at www.iif.com.

9 André Perold is writing a book on LTCM. Elsewhere we may have to rely on Hollywood to reveal all, as in Rogue Trader, an expose of Nicholas Leeson.

10 Even without the growing commercialization of the academy, scientists are often secretive and closed; they too are exposed to career risk: they too strive for their fifteen minutes of fame. See "Dishonest Science" in The World in 1999, The Economist, 1999, pp. 112–113.

11 Munger is well-known as Warren Buffett’s advisor.

12 See also “Managing Pension Fund Risk: Where Do We Go From Here?” The Ambachtsheer Letter, 161, May 25, 1999.

REFERENCES


