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Risk Management: An Interdisciplinary Framework

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Abstract

Risk is shown to be based on both theory and practice. It is shown to be conceptual and technical, blending behavioral psychology, financial economics and decision making under uncertainty into a coherent whole that justify the selection of risky choices. Its applications are also broadly distributed across many areas and fields of interest. The examples treated here have focused on both finance, insurance and on a few problems in industrial management however

Mots-clés : Risque, Management, Interdisciplinarité

Résumé

La notion de risque est basée sur des considérations théoriques et pratiques conceptuelles et techniques, intégrant des comportements psychologiques d'économie et de finance ainsi que des principes de décision dans l'incertain dans un ensemble cohérent, qui justifient le choix des décisions porteurs de risque. Les applicateurs de la gestion du risque sont de même, d'intérêts à plusieurs disciplines et domaines. Les exemples traités sont toutefois spécialisés à des problèmes de finance, assurance et aux problèmes de risque industriel.

1. Introduction

Risk results from the direct and indirect adverse consequences of outcomes and events that were not accounted for or that we were ill prepared for, and concerns their effects on individuals, firms or the society at large. It can result from many reasons, both internally induced or occurring externally. In the former case, consequences are the result of failures or misjudgements while in the latter, consequences are the results of uncontrollable events or events we cannot prevent. A definition of risk involves as a result four factors: (i) consequences (ii) their probabilities and their distribution (iii)

individual preferences and (iv) collective and sharing effects. These are relevant to a broad number of fields as well, each providing a different approach to the measurement, the valuation and the management of risk which *is motivated by psychological needs and the need to deal with problems that result from uncertainty and the adverse consequences they may induce* [106].

For these reasons, the problems of risk management are applicable to many fields spanning insurance and actuarial science, economics and finance, marketing, engineering, health, environmental and industrial management and other fields where uncertainty primes. Financial economics, for example, deals extensively with hedging problems in order to reduce the risk of a particular portfolio through a trade or a series of trades, or contractual agreements reached to share and induce risk minimization by the parties involved [5, 27, 73]. Risk management, in this special context, consists then in using financial instruments to negate the effects of risk. By judicious use of options, contracts, swaps, insurance, an investment portfolio etc. risks can be brought to bearable economic costs. These tools are not costless and therefore, risk management requires a careful balancing of the numerous factors that affect risk, the costs of applying these tools and a specification of tolerable risk [20, 25, 32, 57, 59, 74, 110]. For example, options require that a premium be paid to limit the size of losses just as the insured are required to pay a premium to buy an insurance contract to protect them in case of unforeseen accidents, theft, diseases, unemployment, fire, etc. By the same token, Value at Risk [6, 11, 61] is based on a quantile risk measurement providing an estimate of risk exposure [12, 51, 105, 106]. Each discipline devises the tools it can apply to minimize the more important risks

it is subjected to. A recent survey of the Casualty Actuarial Society [28] for example, using an extensive survey of actuarial scientistis and practitioners, suggested a broad definition of Entrerprise Risk Management as "The process by which organizations in all industries assess, control, exploit, finance and monitor risks from all sources for the purposes of increasing the organization's short and long term value to its stakeholders. A large number of references on ERM is also provided in this report including books such as [31, 38, 42, 54] and [113] with over 180 paper references. Further, recently, a number of books focused on Risk Management has also appeared, emphasing the growing theoretical and practical importance of this field [2, 23, 30, 34, 35, 42, 74, 95, 108].

Engineers and industrial managers design processes for reliability, safety and robustness. They do so to reduce failure probabilities and apply robust design techniques to reduce processes' sensitivity to external and uncontrollable events. In other words, they attempt to render process performance oblivious to events that are undesirable and so can become oblivious to their worst consequences [9, 24, 39, 79, 98], as well as [26, 39, 40, 75, 109] for applications in insurance).

Similarly, marketing has long recognized the uncertainty associated with consumer choices and behavior, to sales response to the marketing mix. For these reasons, marketing also is intently concerned with minimizing its risk, conducting market research studies to provide the information required to compete and to meet changing tastes. Although the lion's share of marketing's handling of uncertainty has been via data analysis, significant attempts have been made at formulating models of brand-choice,

forecasting models for the sale of new products and the effects of the marketing mix on a firm's sales and performance, for the purpose of managing the risk encountered by marketers [43, 76, 77, 78, 90, 100, 101, 102].

The definition of risk, risk measurement and risk management are closely related, one feeding the other to determine the proper-optimal levels of risk. Economists and Decision Scientists have attracted special attention to these problems, some of which were also rewarded for their efforts by Nobel prizes [3, 4, 5, 14, 15, 16, 17, 21, 22, 52, 53, 60, 68, 69, 70, 82, 97]. In this process a number of tools are used based on:

- Ex-ante risk management
- Ex-post risk management and
- Robustness

Ex-ante risk management involves "before the fact" application of various tools such as: Preventive controls; Preventive actions; Information seeking, statistical analysis and forecasting; Design for reliability; Insurance and Financial Risk Management etc.

"After the fact" or Ex-post risk management involves, by contrast, control audits and the design of flexible-reactive schemes that can deal with problems once they have occurred to limit their consequences. Option contracts for example, are used to mitigate the effects of adverse movements in stock prices. With call options, in particular, the buyer of the option limits the downside risk to the option price alone while profits from price movements above the strike price are unlimited.

Robust design, unlike ex-ante and ex-post risk management seeks to reduce risk by rendering a process insensitive (i.e. robust) to its adverse consequences. Thus, *risk management desirably alters the outcomes a system may reach and compute their probabilities. Or, risk management can reduce their negative consequences to planned or economically tolerable levels.*

There are many ways to reach this goal, however each discipline devises the tools it can apply. For example, insurance firms use reinsurance to share the risks of insured; financial managers use derivative products to contain unsustainable risks; engineers and industrial managers apply reliability design and quality control techniques and TQM (Total Quality Management) approaches to reduce the costs of poorly produced and poorly delivered products etc. ([41, 45, 49, 63, 64, 104] in quality management, [2, 13, 14, 33, 36, 50, 71, 91, 92, 109, 111] in insurance and finance). Examples to these approaches in risk management in these and other fields abound.

Controls (such as audits, statistical quality and process controls) for example are applied ex-ante and ex-post. They are exercised in a number of ways in order to rectify processes and decisions taken after non-conforming events have been detected and specific problems have occurred. Auditing a trader, controlling a product or a portfolio performance over time etc. are simple examples of controls. Techniques for performing such controls optimally, once objectives and processes have been specified have been initiated by [94].

Reliability efficiency and design through technological innovation and optimization of systems provide an active approach to risk management. For example, building a new six lane highway can be used to reduce the probability of accidents. Environmental protection regulation and legal procedures have, in fact, had a technological impact by requiring firms to *change* the way in which they convert inputs into outputs (through technological processes, investments and process design), by considering as well the treatment of refuse. Further, pollution permits have induced companies to reduce their pollution emissions and sell excess pollution to less efficient firms (even across national boundaries). References on reliability, network design, technological, safety etc. can be found in [9, 26, 66, 80, 88, 93, 99, 103, 104].

Forecasting, Information, their Sharing and Distribution are also essential ingredients of risk management. Forecasting the weather, learning insured behavior, forecasting stock prices, sharing insurance coverage through reinsurance and co-participation, etc. are all essential means to manage risk. Banks learn everyday how to price and manage risk better, yet they are still acutely aware of their limits when dealing with complex portfolios of structured products. Further, most nonlinear risk measurement, analysis and forecasts are still “terra incognita”. Asymmetries in information between insured and insurers, between buyers and sellers, between investors and hedge fund managers etc., create a wide range of opportunities and problems that provide a great challenge to risk managers because they are difficult to value and because it is difficult to predict the risks they imply. These problems are assuming an added importance in an age of Internet access for all and an age of "global information accessibility". Do insurance and credit

card companies who attempt to reduce their risk have access to your confidential files? Should they? Is the information distribution now swiftly moving in their favor? These issues are creating "market inefficiencies" and therefore are creating opportunities for some at the expense or risk for others.

Robustness, as we saw earlier expresses the insensitivity of a process or a model to the randomness of parameters (or their mis-specification). The search for robust processes, insensitive to risks, is an essential and increasingly important approach to managing risk. It has led to many approaches and techniques of optimization. Techniques such as scenario optimization [39, 40], regret and ex-post optimization, min-max objectives and their likes [52, 60, 89],, Taguchi experimental designs [79] etc. seek to provide the mechanisms for the construction of robust systems. These are important tools for risk management, augmenting the useful life of a portfolio strategy, provide a better guarantee that "what is intended will likely occur", even though, as reality unfolds over time the working assumptions made when the model was initially constructed turn out to be quite different [109].

Traditional decision problems presume that there are *homogenous* decision makers, deciding as well what information is relevant. In reality, decision makers may be heterogenous, exhibiting broadly varying preferences, varied access to information and a varied ability to analyze (forecast) and compute it. In this environment, risk management becomes extremely difficult. For example, following oligopoly theory, when there are few major traders, the apprehension of each other's trades induces an endogenous

uncertainty, resulting from a mutual assessment of intentions, knowledge, knowhow etc. A game may set in based on an appreciation of strategic motivations and intentions. This may result in the temptation to collude and resort to opportunistic behavior. In this sense, risk minimization has both socio-psychological and economic contexts that cannot be neglected (see [46, 47, 65, 67, 70, 72, 81, 112] and [84, 85] for game applications to quality control).

2. Risk Management Applications

Risk Management, Insurance and Actuarial Science

Insurance is used to substitute payments now for potential damages (reimbursed) later. The size of such payments and the potential damages that may occur with various probabilities lead to widely distributed market preferences and thereby to a possible exchange between decision makers of various preferences [10, 33, 44, 50, 82, 83]. Risk is then managed by aggregating individual risks and sharing the global (and variance reduced) risks [21, 22]. Insurance firms have recognized the opportunities of such differences and have, therefore, capitalized on it by pooling highly variable risks and redistributing them, thereby using the "willingness to pay to avoid losses " of insured. It is because of such attitudes and broadly differing individual preferences towards risk avoidance that markets for fire and theft insurance, as well as sickness, unemployment, accident insurance, etc., have come to be as lucrative as they are today. It is because of persons or firms' desires to avoid too great a loss (even with small probabilities) which would have to be borne alone, that markets for reinsurance (i.e., sub-selling portions of

insurance contracts) and mutual protection insurance (based on the pooling of risks, government support to certain activities) have also come into being.

While finance and financial markets require risk averters and risk takers to transfer risk from parties to parties, insurance emphasizes a different (albeit complementary) approach based on aggregation and redistribution of risk. While it may not eliminate risk globally, it may contribute to a greater ability for individuals to deal, individually and collectively, with risk and thus contribute to the pricing and optimization of risk distribution. In some cases, this risk shifting is not preferable due to the effects of moral hazard, adverse selection and generally information asymmetry [1, 5, 55]. To compensate for these effects however, a number of actions are taken such as monitoring and using incentive contracts to motivate and alter the behavior of the parties to the contract so that they will comply to the terms of the contract whether willingly or not [1, 5, 56, 96].

While insurance is a *passive form of risk management* based on shifting risks (or equivalently, to "passing the buck" to some willing agent), *loss prevention* is an *active means of managing risks.* It consists in altering the probabilities and the states of undesirable, damaging states. For example, driving carefully, locking one's own home effectively, installing fire alarm for the plant, etc. are all forms of loss prevention. Car insurance rates tend, for example, to be linked to a person's past driving record, leading to the design of (incentive) bonus-malus insurance schemes. Certain clients (or geographical areas) might be classified as "high risk clients", required to pay higher

insurance fees. Inequities in insurance rates will occur, however, because of an imperfect knowledge of the probabilities of damages and because of the imperfect distribution of information between insured and insurers [21, 22] that do not lead necessarily to risk minimization. Thus, situations may occur where large fire insurance policies will be written for unprofitable plants leading to "over-insured" and to lessened motivations in engaging in loss prevention. Such outcomes, known as "moral hazard", counter the basic purposes of "fair" insurance and risk minimization and are thus the subject of careful scrutiny by insurance and risk managers [1, 5, 55].

Risk management in investment finance by contrast, considers both the risks investors are willing to sustain and their desire for larger returns, "*pricing one at the expense of the other*". In this sense, finance, has gone one step further than other fields in using the market to price the cost an investor is willing to sustain to prevent or cover the losses he or she may incur. Derivative products provide a typical example and are broadly used. There are currently many studies that recognize the importance of financial markets for pricing insurance contracts.

Actuarial science is in effect one of the first applications of risk management. Tetens and Barrois, as early as 1786 and 1834 respectively, attempted to characterize the «risk » of life annuities and fire insurance so that they may be properly covered. It is, however, due to Lundberg in 1909, and to a group of Scandinavian actuaries [21, 33, 107] that we owe much of the current actuarial theories of insurance risk. The insurance literature has mainly concentrated on the definition of the rules to be used in order to establish in a just

and efficient manner, the terms of such a contract. In this vein, "Premium Principles" , expected utility theory and a wide range of operational rules worked out by the actuarial and insurance profession have been devised for the purpose of assessing risk and in particular the probability of survival. This problem is of course, extremely complex, with philosophical and social undertones, seeking to reconcile individual with collective risk and through the use of the market mechanism, concepts of fairness and equity.

Actuarial science for example has focused on calculating the insurance firm's survivability, while risk management has focused on selecting policies to assure that this is the case. Given the valuation of the surplus, (such as earning capacity, solvency, dividend distribution to shareholders, etc.), the risk management decisions reached by insurance firms may include among others: (1) The choice of investment assets. (2) A learning mechanism assessing the various implicit costs of uncertainty sustained by the firm risk absorption approaches used by the firm, insofar as portfolio, diversification strategies, derivatives etc. are followed. (3) Risk sharing approaches such as indexed and linked premium formulae, co-insurance, re-insurance approaches, etc. (4) Risk incentives applied to insured such as bonus-malus.

Risk management models consist then in optimally selecting a number or all of the policy parameters implied in managing the insurance firm and its risk.

Finance and Risk Management

Finance, financial instruments and financial risk management, currently available through brokers, mutual funds, financial institutions, commodity and stock derivatives etc. are motivated by three essential reasons [29, 44, 45, 48, 106, 110]:

- To price the multiplicity of claims, accounting for risks and dealing with the adverse effects of uncertainty or risk (that can be completely unpredictable, partly or wholly predictable)
- To explain and account for investor's behavior. To counteract the effects of regulation and taxes by firms and individual investors (who use a wide variety of financial instruments to bypass regulations and increase the amount of money investors can make while reducing the risk they sustain).
- To provide a rational framework for individuals' and firms' decision-making and to suit investors needs in terms of the risks they are willing to assume and pay for.

These instruments deal with the uncertainty and the management of the risks they imply in many different ways [73]. Some instruments merely transfer risk from one period to another [18, 19] and in this sense they reckon with the *time phasing of events.* One of the more important aspects of such instruments is to supply *"immediacy"*--i.e. the ability not to wait for a payment for example. Other instruments provide a *"spatial" diversification"* (in other words the distribution of risks across independent investments) and *liquidity.* By liquidity, we mean the cost to convert instantly an asset into cash at its fair price. This liquidity is affected both by the existence of a market (in other words, buyers and sellers) as well as the cost of transactions associated to the conversion of the asset into cash. As a result, some of the financial risks include (a) market-industry specific risks and (b) term structure - currency-liquidity risks [2].

Options, Derivatives and Portfolio of Derivatives

Finance is about making money, or conversely not losing it, thereby protecting investors from adverse consequences. To do so, pricing (valuation), forecasting, speculating and risk reduction through fundamental and technical analysis, trading

(hedging) are essential activity of traders, banker, and investors alike. Derivative assets are assets whose value is derived from some underlying asset about which bets are made. Options are broadly used for risk management and for speculating, singly or in a combined manner to create desired risk profiles. Financial Engineering, for example deals extensively with the construction of portfolios with risk profiles desired by individual investors [57, 62, 110].

Options are traded on many trading floors and are therefore defined in a standard manner. Nevertheless, there are also "over the counter options" which are not traded in specific markets but are used in some contracts to fit the needs of financial managers and traders. Recently, options on real assets (which are not traded) are used to value numerous contract clauses between parties. For example, consider an airline company that contracts the acquisition (or the option to acquire) a new (technology) plane at some future time. The contract may involve a stream or a lump sum payment to the contractor (Boeing or Airbus) in exchange for the delivery of the plane at a specified time. Since payments are often made prior to the delivery of the plane, a number of clauses are added in the contract to manage the risks sustained by each of the parties if any of the parties were to deviate from the contract stated terms (for example, late deliveries, technological obsolescence etc.). Similarly, a manufacturer can enter into binding bilateral agreements with a supplier by which agreed (contracted) exchange terms are used as a substitute for the free market mechanism. This can involve future contractual prices, delivery rates at specific times (to reduce inventory holding costs, [87]) and of course a set of clauses intended to protect each party against possible failures by the other in fulfilling the terms

of the contract. Throughout the above cases the advantage resulting from negotiating a contract is to reduce, for one or both parties, the uncertainty concerning future exchange operating and financial conditions. In this manner, the manufacturer will be eager to secure long term sources of supplies, and their timely availability while, the investor, the buyer of the options, would seek to avoid too large a loss implied by the acquisition of a risky asset, currency or commodity, etc.

Since for each contract there, necessarily, must be one (or many) buyer and one (or many) seller, the price of the contract can be interpreted as the outcome of a negotiation process where both parties have an inducement to enter into a contractual agreement. For example, the buyer and the seller of an option can be conceived of as involved in a two-person game, the benefits of which for each of the players are deduced from the risk transfer. Note that the utility of entering into a contractual agreement is always positive ex-ante for all parties; otherwise there would not be any contractual agreement (unless such a contract would be imposed on one of the parties!). When the number of buyers and sellers of such contracts becomes extremely large, transactions become « impersonal » and it is the « market price » that defines the value of the contract. Strategic behaviors tend to break down the larger the group and with many market players prices tend to become more efficient.

To apply these tools for risk management it is important to be aware of the many statistics that abound and how to use the information in selecting risk management policies that deal with questions such as:

- When to buy and sell (how long to hold on to an option or to a financial asset). In other words, what are the limits to buy-sell the stock or the asset.
- How to combine a portfolio of stocks, assets and options of various types and dates to obtain desirable (and feasible) investment risk profiles. In other words, how to structure an investment strategy.
- What are the risks and the profit potential that complex derivative products imply (and not only the price paid for them).
- How to manage productively derivatives and trades
- How to use derivatives to improve the firm position.

The decision to buy (assuming a Long contract) and sell (assuming a Short contract, meaning that the contract is not necessarily owned by the investor) is not only based on risk profiles however. Prospective or expected changes in stock prices, in volatility, in interest rates and in related economic and financial markets (and statistics) are essential ingredients applied to solve the basic questions of "what to do, when and where".

In practice, options and derivative products (forward contracts, futures contracts, their combinations etc.) are also used for a broad set of purposes. These purposes span hedging, risk management, incentives for employees (serving often the dual purpose of an incentive to perform and a substitute to cash outlays in the form of salaries as we saw earlier) and constructing financial packages (in Mergers and Acquisitions for example). Derivatives are also used to manage commodity trades, foreign exchange transactions, to manage interest risk (in Bonds, in mortgage transactions etc.). The application of these financial products spans the simple "buy-sell" decisions and complex trading strategies over multiple products, multiple markets and multiple periods of time.

Spare Parts, Inventory Policies and Logistic Risk Management

Modern spare parts inventory management emphasizes: (1) Availability of parts when they are needed. (2) Responsiveness to demands which may not be known. (3) Economics and Cost/Efficiency criteria

These problems are in general difficult, since these goals are sometimes contradictory. This is particularly the case when there are many parts distributed over many places and their needs may be interdependent (correlated) and non stationary. In other words, the demand for each part may be correlated with other parts and in some cases exhibit extremely large variance. As a result, industrial and logistic risk management procedures are designed to augment the availability of parts and design robust policies which are insensitive to unpredictable shifts in demand. Risk management policies may imply organizing the supply chain, managing deliveries effectively, better forecasting methods and appropriate distributions describing parts usage, life and reliabilities. In addition, emergency "preparadeness" and needs, large demand variability, supply constraints—in particular regarding substantial supply delays (and probably uncertainty in supply delays), a large mix of equipment (that require a broad range of spare parts), repair policies and depots, maintenance and replacement policies. may be some of the factors to reckon with in designing a logistic risk management policy seeking to save money.

Because of the complexity of the problems at hand, risk management is decomposed into specific and tractable sub-problems; for example, designing a maintenance policy, a replacement policy, reliability and the design of parallel systems, parts to augment system

reliability, a quality and statistical control policy, a quality assurance policy, management policies for (logistic) cycle time reduction, sharing and contingent measures for special situations etc. Practically, systems integration through simulation and the development of reliability support and software are also brought to bear in the management of risks in logistics and spare parts management [37, 80].

By the same token, buffer stocks are needed to manage risks associated to demands that are not met, to build the capacity to meet demands, to smooth productions processes, resumed by a desire to save money or reduce risks, i.e. reduce the costs associated to adverse consequences. Stocks or inventory policies, when they are properly applied can increase efficiency and reduce industrial and logistic risks. However, stocks also cost money! In a factory, in a hospital, in a warehouse and elsewhere, one should, therefore, seek to balance the costs associated with these stocks together with the benefits to have sufficient, or insufficient, stocks on hand when they are needed. The inventory risk management policy can be summarized by "how much", and "how often" to order or produce a given product. Early developments in inventory model building were made during the First World War. Since then, an extremely large number of models have been constructed and solved. This is due, probably, to the fact that managers in business, in government, in hospitals, in the military etc., have recognized the great importance of managing stocks.

There are many reasons for using stock of inventory even though they can be costly. First, there might be some uncertainty regarding future demands and thus, if we find

ourselves under stocked, the costs of being caught short (for example, losing a customer, being insufficiently equipped under attack or the opportunity profit), will justify carrying stocks. Stocks, thus act as a hedge against demand uncertainty and future needs. Alternatively, stocks are used as a buffer between, say production and the requirement for production output. For this reason, production plans, established on the basis of capacities, manpower, resources and other constraints are facilitated by the use of stocks. To facilitate these plans and ensure smooth production programs, warehouses are built, money is invested to maintain goods and materials in storage, (either/or or both finished goods and in process materials), just to meet possible contingencies. These holding costs may, in some cases, improve the efficiency of production plans, by reduced variability in these plans, built in a greater ability to meet unforeseen demands (and thereby induce substantial savings). Some of the direct and indirect adverse effects of inventories include for example loss of profits and goodwill, interruption in the smooth flow of materials in a production process, delay in repair (in case there are no spare parts stock) etc.

Reliability and Risk Minimization

A process that operates as expected is reliable. Technically, reliability is defined by the probability that a process fulfills its function, without breakdown over a given period of time. As a result, reliability is a concept that expresses the propensity of a process to behave as expected over time. Reliability analysis requires that we define and appreciate a process; Operating conditions; The definition of what an event is; The statistical properties of that event; The occurrence of that event over time. Such an event

may be a claim by an insured, a machine breaking down etc. Other terms such as the residual lifetime, the MTBF (Mean Time Between Failures) are used by industrial managers and engineers and are essentially calculated in terms of the reliability function. Thus, risk management in industrial and engineering management is often equated to; reliability design, maximizing reliability subject to cost constraints and vice versa, minimizing system costs subject to reliability constraints. By contrasts, techniques such as TQM (Total Quality Management) and their variants are risk prevention concepts based on the premise that risks do not depend only on tangible investments in machines, processes or facilities, but they depend also on intangibles, such as the integration and the management of resources, the corporate and cultural environment, personnel motivation etc. TQM focuses on a firm's function as a whole and develops a new "intentionality" based on the following premises: Reduce the complexity of systems through simplification and increased manageability; Be market oriented; Be people oriented by increasing awareness through participation, innovation and adaptation to problems when they occur. In practice, TQM can mean something else to various firms but in its ultimate setting it seeks to manage risks by prevention.

Conclusion

Risk management is multi-faceted. It is based on both theory and practice. It is conceptual and technical, blending behavioral psychology, financial economics and decision making under uncertainty into a coherent whole that justify the selection of risky choices. Its applications are also broadly distributed across many areas and fields of interest. The examples treated here have focused on both finance, insurance and on a few problems in industrial management however. We have noted that the management of

risks is both active and reactive, requiring on the one hand that actions be taken to improve a valuable process (of an investment portfolio, an insurance company cash flow etc.) and, on the other, preventing recurrent problems and hedging for unforeseen consequences. Generally, problems of risk management occur for a number of reasons including:

- Unforeseeable events we are ill prepared to cope with.
- Adversarial situations resulting from a conflict of interests between contract holders. Adversarial relationships combined with private information lead to situations when one might use information to the detriment of the other and thereby possibly leading to opportunistic behavior (such as trading on inside information).
- Moral hazard, arising from an information asymmetry inducing risks that affect parties trading and society at large.
- Oversimplification of the problems involved or their analysis (which is often the case when the problems of globalization are involved). Such oversimplification may lead to erroneous assessments of uncertain events and thereby can lead to the participants to be ill prepared for their consequences.
- Information is not available or improperly treated and analyzed. This has the effect of inducing uncertainty regarding factors that can be properly managed and, potentially leading to decisions that turn out to be wrong. Further, acting with no information breeds incompetence that contributes to the growth of risk.
- Poor organization of the investment, cash flow and other processes. For example, a process that does not search for information, does not evaluate outcomes and situations. A process with no controls of any sort, no estimation of severity and consequences and no long run evaluation of consequences but myopicity can lead to costs that could have been avoided.
- Non adaptive procedures to changing events and circumstances. With decision makers oblivious to their environment blindly and stubbornly following their own agenda is a guaranty for risk.

These problems recur in many areas and thus one can understand the universality and the importance of risk management.

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