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'*It's all about bucks, kid. The rest is conversation*'. A critique of risk in modern investment management[i]

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ABSTRACT

Now the dust has settled and the worst of the housing crisis has passed and the resulting financial crisis in 2008, it is time to look back. What have we learned, particularly in the area of modern investment management? The Obama administration may have taken measures that partially undo the 1998 reversal of the Glass-Steagall Act but will this be enough? In this article I will use Charles Perrow's Normal Accident Theory to reflect on investment management – and more in particular Modern Portfolio Theory –, the financial crisis and what we can learn from that for the future. The article concludes that the financial world could have learned from Normal Accident Theory by perceiving the financial community as one integrated system and not simply the sum of independent parts. The financial crisis was a case of negligence, foolishness and unwillingness to look beyond the immediate present to the looming dangers in the real world outside of finance. As a consequence, it would be fair to demand from investors a real world check that goes much further than what is currently happening under the heading of (socially) responsible investing. Good governance and responsible investing need to be extended to material societal risk management. Part of this risk management needs to be the assessment of the nature of the impact of investments on society.

Keywords: Risk, Uncertainty, Financial Crisis, Normal Accident Theory, High Reliability Organisations, Ethics, Modern Portfolio Theory.

«Very intelligent and informed persons are at no advantage over cabdrivers in their predictions.»
Nassim Nicholas Taleb, 2007:14

1. SUMMARY

Now the dust has settled and the worst of the housing crisis has passed and the resulting financial crisis in 2008, it is time to look back. What have we learned, particularly in the area of modern portfolio management? The Obama administration may have taken measures that partially undo the 1998 reversal of the Glass-Steagall Act in order to limit the risk of another crisis happening but will this be enough? In this article I will use Charles Perrow's Normal Accident Theory to

reflect on Modern Portfolio Theory, the financial crisis and what we can learn from that for the future.

2. PRESIDENT HOOVER'S FOLLY?

"*Prosperity is just around the corner.*" When President Hoover made this claim in 1930 he was serious about his belief in the American economy and its capacity to quickly recover from the market crash the year before. Contrary to his belief, production fell in 1930 by 9.3% and in 1931 by 8.6%[iii]. On the basis of historic information Hoover's claim wasn't absurd or even overoptimistic. He simply assumed that similar events that have repeatedly taken place in the past are a good proxy for their occurrence in the future. Over the course of time we have learned that they are not. This paper deals with risks – the 'known unknowns' – and uncertainties – the 'unknown unknowns' – in economic life in general and in investment theory and practice in particular.

We will focus on the notion of investment risk in Modern Portfolio Theory (MPT) – and in other modern forms of investment management – and its blind spot for uncertainty as a moral issue. The theory has an eye for mitigating risk within a portfolio of investments but fails to recognize and acknowledge the risks or uncertainties at both the market and societal levels. What makes this problematic is that the behavior of investment professionals, including those working for banks, asset managers and (institutional) investors, actively contributed to the mounting set of uncertainties that gradually evolved into risks – without the majority of the investment community acknowledging it, until it was too late. The result was devastating – not only for those who were directly involved like investment professionals who lost their jobs, but also for those indirectly bearing the consequences of the actions and the behavior of the investment professionals.

It was (the mindset of) the investment professional, inspired by Modern Portfolio Theory that created this blind spot. The so-called professional only had an eye for risk and return on the level of the portfolio and ignored the consequences of their actions outside of their own realm – in particular those consequences resulting from a wide adoption of the theory. Taking (increasingly larger) risks is not per se an issue as long as investors have diversified portfolios consisting of non-correlated investment instruments. As a result, investment professionals – who are or at least should be agents acting in *the client's best interest* – failed to do their fiduciary duty by not explicitly taking their clients' interests into account[iv]. This resulted in clients being simply the recipients of the outcomes of the actions of the investment professionals – instead of being the cause or the reason for making well-balanced investment decisions. Before discussing these issues, we will first examine the notions of risk and uncertainty that are central to investment management in general and Modern Portfolio Theory in particular.

3. RISK AND UNCERTAINTY

3.1 Risk versus uncertainty

In its widest sense, according to Bernstein (1996), risk means, "that more things can happen than will happen" (1996:260). This does not mean, however, that risk is an object simply falling from the sky. As the German sociologist Ulrich Beck (1992) mentions in his seminal work 'Risk

Society", risk is a *condition of modernity.* Risk is self-made, produced and distributed. In our legislation, our education, our motivation, our infrastructures, et cetera, we implicitly or explicitly accept risk as the flip side of economic wealth creation. Without risk there would be hardly any economic progress. Risk-taking has become "one of the prime catalysts that drives modern Western society" (Bernstein, 1996:1). The idea of accepting and being able to manage risk has become a generally held presupposition of constant change and innovation. Manageable risk makes it acceptable to continuously strive for the next big thing and to have a 'greed for life, knowledge, and progress in every domain of human and natural life'[v]. Our modern infrastructure would have been impossible – even unthinkable – if it were not for the acceptance of risk and the steps man has taken to minimize it. Like Prometheus, over the course of time we have "defied the gods and probed the darkness in search of the light that converted the future from an enemy into an opportunity" (Bernstein, 1996:1). Inherent in the notion of 'opportunity' is the uncertainty about the future. Opportunity means that we do not precisely know the potential risks and rewards and the distribution of those risks and rewards. Opportunities have a positive connotation with regard to a better future without being able to a give precise account of the expected benefits and the costs. Of course, on the basis of historic data we have gained insight in the likelihood of some outcomes occurring rather than others. But statistical data do not provide a solid and reliable guide for the future. What do we do when a decision leads to a result that was not even contemplated in your set of probabilities? Take the following example:

> *«A group of hikers in the wilderness came upon a bridge that would greatly shorten their return to their home base. Noting that the bridge was high, narrow, and rickety, they fitted themselves out with ropes, harnesses, and other safeguards before starting across. When they reached the other side, they found a hungry mountain lion patiently awaiting their arrival.»* (quoted in Bernstein, 1996:259).[vi]

This example of the 'hungry mountain lion' marks the distinction between risk and uncertainty (cf. Knight, 1921). Risk deals with potential outcomes that fall within the *set of known outcomes* and the likelihood of each individual outcome occurring. Uncertainty, on the other hand, deals with *unknown outcomes*.

3.2 The financial crisis as an unknown uncertainty?

On June 2, 2004 the US Department of Housing and Urban Development issued the following press release:

> *«Thousands of low-income families will be able to realize the 'American Dream' and purchase their first home because of $161.5 million in funding announced today by Housing and Urban Development Secretary Alphonso Jackson. The funding (...) will help first-time homebuyers overcome the single greatest obstacle to homeownership: the downpayment and closing costs. (...) The American Dream Downpayment Initiative will enable many first-time homebuyers earning less than 80 percent of their community's median income to purchase their first home.»*[vii]

The initiative was simply the next step in a process that started during the Clinton administration to facilitate members of minority groups to buy a house. In the US context, where high rates of homeownership convey "a sense of participation and belonging", encouraging homeownership

was seen as nothing less than "a worthy and admirable national goal" beneficial to a healthy society (Shiller, 2008:5). Nevertheless, as Robert Shiller (2008:24) comments:

> *«The subprime mortgages, for all their democratic appeal, were launched with a woeful failure to understand real estate risk.»*

The first signs of a bursting housing bubble surfaced as early as 2003 (Posner, 2009:77; Lewis, 2009). They were a prelude to the financial crisis that started in April 2007 when New Century Financial, one of the largest sub-prime lenders in the United States, sought Chapter 11 protection against creditors. The company was faced with fewer customers being able to keep up with mortgage and loan repayments. The increasing number of defaults was a direct result of the declining housing prices and rising interest rates in the US – from 1 percent in 2004 to 5.3 percent in 2006[viii]. Financial institutions had been lax to protect homeowners from taking too much risk. The risk climate in the early days of the Millennium was one of 'loosening standards and risk default' (Shiller, 2008:29). However, the collapse of the housing price bubble in the United States can also be tied to the demand for high-risk, high-return securitized mortgage-backed securities (Lydenberg, 2011). These securities provided banking institutions with opportunities to offload their risk to (inattentive) investors and widely opened the doors for moral hazard. Today the economy and society at large – as well as numerous individuals – are still negatively impacted by the structured finance products that disguised the real risks of sub-prime mortgage loans as so-called 'low-risk, high-return investment opportunities'. What may seem to be a case of overactive bankers, investment advisors and portfolio managers is in fact a global moral issue – without many investment professionals phrasing the issue in moral terms[ix]. They were simply doing their job.

3.3 Caveat emptor versus caveat vendor

Is the demise of the financial system a modern tragedy, the consequences of which the clients of the financial firms and society at large simply have to bear? Recently a variety of explanations have been given to clarify what caused the subprime crisis – and contributed to the resulting financial crisis.

In his book *The Subprime Solution* Robert Shiller (2008:24) points to our individual and collective irrationality as a result of a "failure to anticipate quite obvious risks – by 'irrational exuberance' at the prospect of profits". In other words, we were swept up in our "speculative enthusiasm"[x] (Shiller, 2008:9). The 'we' here refers to the government, the Fed, the financial sector, and the real estate business. However, 'we' also refers to the end consumer being afraid of missing the next big thing: his free lunch. Together, 'we' "did not comprehend that an epidemic of irrational public enthusiasm for housing investments was the core of the problem" (ib.:4)[xi]. Shiller (2008:41) refers in this respect to "the social contagion of boom thinking" that is supported by "new era stories" justifying the belief the booming economy will continue. Illustrative of this new era thinking is Michael Lewis' description of a convening of the American Securitization Forum in Las Vegas in early 2007 – just two months before the market would gradually start to fall apart (Lewis, 2010:148-159). Thousands of predominantly male participants gathered to celebrate the success of their subprime business without ever contemplating the possibility of having created a Ponzi scheme. Even between February and June of 2007 Wall Street firms created and sold $50 billion in new collateralized debt obligations (CDOs).

Just like Shiller, Richard Posner (2009) in his book *A failure of capitalism* attributes blame to the consumer, the government, the supervisory authorities and more in particular to Alan Greenspan and Ben Bernanke for the fall of the prevailing system[xii] and – unlike Lewis – not so much to the banks, the investment advisors or the portfolio managers of institutional investors and asset management firms. They were just doing their job – competing in an open environment that was (poorly) regulated by the government. They might be responsible for causing the crisis but they cannot be blamed for it "anymore than one can blame a lion for eating a zebra. Capitalism is Darwinism" (Posner, 2009:284). In our competitive economy there simply were no fences where they should have been to protect the interests of the consumer and society at large. But that is, according to Posner, something you can hold against the authorities, not the financial professionals[xiii].
In Mark Gilbert's (2010) quite agnostic version of this classical whodunit everyone is to blame. He claims that "we all allowed it to happen, and we're all to blame, either as active accomplices or complicit bystanders". Society as a whole allowed both the banks and the investment community to grow unchecked and, therefore, carries co-responsibility for the demise of the system. It explains the title of his book: *Complicit*.

3.4 A financial Chernobyl?

In this article I am mainly concerned with the global investment community – consisting of banks, institutional investors, asset managers, rating agencies and investment consultants – using a wide range of investment instruments that are part of investment portfolios. Mortgage-backed assets, being only one type of investment vehicle albeit an important one in sparking the crisis, have been securitized and sold on to institutional investors in large quantities. These investment vehicles allowed US financial institutions to take on more risk than they could have, were they not able to transfer the risk to someone else. In other words, collateralized debt obligations consisting of asset backed securities spread like a virus to end up in investment portfolios all over the world leading to a tighter coupling between global financial markets and the US housing market. In the previous paragraphs it became clear that the US government was instrumental in the emergence of the crisis, just as the Fed, real estate brokers and the end consumers. Now the question comes up what there is to say about the role of financial professionals in causing the crisis? Posner's verdict is: 'not guilty'. But isn't there more to say about this verdict?
The issue here is that a broad account of responsibility as given by Gilbert, Posner, and Shiller hampers a thorough analysis of what each actor contributed to the demise of the system and, respectively, what each could have done given his or her limited resources and powers to prevent the system from crashing. A collective responsibility is not an excuse for individual inertia, free-rider behavior or irresponsibility. When some of the financial institutions specialized in subprime mortgages started to collapse in the spring of 2007 this was not only felt on Wall Street but also in London, Paris, Tokyo, and other major financial centers around the world causing major financial distress. Couldn't and shouldn't they have done more to protect the interests of their clients, the beneficiaries of their clients and of the financial system at large – even in the absence of legal, organizational, technical or social structures that limit their discretion, ability and willingness to act as predators ready to attack their prey? Don't they share in the responsibility of creating a system that ultimately caused a major financial crash? Can they simply continue doing business in ways that were instrumental in causing the crisis? Is there more to say about (the organization of) the financial system and the interdependencies in that system? The financial

actors – banks, investors, intermediaries – that have played a major role in causing the crisis have been scrutinized in recent years. The result, however, is that not much has changed so far from a systems perspective. Therefore, these questions deserve attention not only from a financial point of view but also from a moral point of view.

Since the focus of this article is on investors and investment professionals the next section starts with a short outline of Modern Portfolio Theory (MPT). In terms of complexity and interdependence the financial crisis has much in common with crises that occur in 'complex organizations' such as a nuclear power plant. These organizations are sometimes confronted with what Charles Perrow has called a 'system accident' or a 'normal accident': an "unanticipated interaction of multiple failures" in a complex system. Unlike a non-system accident, the negative consequences of which can be managed and curtailed, the result of a normal accident is usually a catastrophe. Examples are the implosion of the Chernobyl nuclear power plant, the decomposition of the Challenger, or the gas leak in Bhopal. The recent financial crisis shows signs of a 'normal accident' and we might be able to draw some lessons from the literature on complex organizations and normal accidents. It is particularly interesting to learn what this theory has to say about organizational couplings and the role and responsibility of professionals to prevent a crisis from occurring.

If we compare the financial crisis to a normal accident the obvious question that surfaces is whether the crisis could have been prevented if the investment industry would have been organized like a nuclear plant or some other complex system? Since it is not really possible to answer this 'what if' question my aim is more modest and focuses on the question: 'What can investment professionals[xiv] – very often acting on the basis of Modern Portfolio Theory – learn if they perceive themselves as part of a complex system?'

4. MODERN PORTFOLIO THEORY

4.1 MPT

Modern Portfolio Theory found one of its origins in the work of the Nobel Prize winner Harry Markowitz in the 1950s. Taking for granted that investors are rational, in the sense that they prefer to maximize their returns with a minimum of risk, the theory recommends that the risk of a particular asset should not be looked at on a stand-alone basis. On the contrary, risk should be examined in relation to how that particular asset's price varies compared to the variation in price of the market portfolio. Investors can reduce their exposure to individual asset risk by holding a diversified portfolio of assets. Diversification will allow for the same portfolio return with reduced risk.

4.2 Risk in Modern Portfolio Theory

The theory assumes that given an investor's preferred level of risk a portfolio can be constructed that maximizes expected return for that level of risk. There is an *efficient frontier* of investments where there is no portfolio with less risk given the level of return or where there is no portfolio with more value for this level of risk. However, MPT does not consider the 'known unknowns' at the level of the entire market – let alone the uncertainties in terms of 'unknown unknowns'. The model it uses simply is not comprehensive in terms of external consequences. MPT has no techniques for detecting and managing risk and uncertainty outside the level of the portfolio. By

not looking beyond its narrowly defined horizon MPT knowingly runs the risk of violating what Justice Samuel Putnam in 1830 called 'prudent man rule':

> *«Do what you will, the capital is at hazard. … All that can be required of a trustee to invest is that he shall conduct himself faithfully and exercise a sound discretion. He is to observe how men of prudence, discretion, and intelligence manage their own affairs, not in regard to speculation, but in regard to the permanent disposition of their funds, considering the probable income, as well as the probable safety of the capital to be invested.»* (Bernstein, 1996: 248)

In the real world, when the market came crashing down, asset classes that were supposed not to be correlated were correlated after all. In the words of Putnam: '*the permanent disposition of the funds' and 'the safety of the invested capital*' was at stake.

In a very insightful contribution Steve Lydenberg (2011) has argued the reason MPT is deficient is a serious kind of myopia. The theory ignores the possibility that in the aggregate investors, while playing within the rules of the MPT game, can affect "systemic" risk – that is, risk at the market level. "It may seem counterintuitive to argue", Lydenberg writes, "that risk-control techniques increase risk". While reducing risk at a portfolio level, they increase it at the market level through the increase of the supply of, and demand for, risky products. (Lydenberg, 2011) The market risk was there, even though it was *not perceived as relevant* because the probability of a financial catastrophe was too small to contemplate for economists, politicians, bankers, investment analysts and consultants, portfolio managers, rating agencies, business managers and other '*influentials*'. Was it therefore impossible for MPT to prepare for the 'unknown unknowns'?

The answer to this question is not immediately affirmative. The fact that we do not know what the future will bring does not mean that it is completely unknowable. As Posner (2009:78) argues, bankers and investment professionals "had to know that there was a lot of risk in their capital structures, that the future doesn't always repeat the past[xv] and therefore that models of default risk based on historical experience in the housing and credit market might be unreliable". They used the wrong – or at least an incomplete – model of reality and therefore failed to adequately protect the interests of their clients. At that time the potential consequences, in all their severity, were looming on the horizon: a cascade of banks going bankrupt with the inherent potential of becoming a disaster for the nation[xvi]. Through this cascading process it becomes extremely difficult, if not impossible, to control the entire financial system if banks start to default. By not considering the (global) systemic characteristics and by ignoring the risk that is created by the multitude of portfolios at the level of society the theory itself is not necessarily flawed[xvii]. It does show, however, serious but unnecessary limitations that could have been prevented. This is not to say that the theory could have predicted the consequences of (the accumulation of) a vast amount of transactions all pointing in the same direction. As Bohr once remarked: 'prediction is very difficult, especially about the future'. However, the theory could have contemplated what would happen if more and more managers copy each other's behavior together creating a bubble. The fact that something is not known does not make it unknowable. In the end, with only a few exceptions, hardly any effort was made by theorists and financial practitioners to prepare for the 'unknown unknowns' to happen.

MPT provided no protection against the risk or uncertainty of the aggregate of portfolios in the financial economy[xviii]. In the financial system as a whole investments were correlated and led to extravagant losses for banks and investors and for the governments that had to bail them out –

thereby allowing moral hazard to occur (Nielsen, 2009:2-3; Posner, 2009:236). In other words, both the theory and the investment community failed to distinguish between internal portfolio risk and external uncertainties. Externalities created by the myopic implementation of the theory were not perceived or accounted for – leading to an amplification of moral hazard. The financial professionals took risks they very often did not perceive or understand and for which they were not held accountable.

4.3 The theory, but also the professional

It is not simply the theory itself that is deficient. Also the financial professionals should be faulted. As Myron Scholes riposted when criticized for his support of MPT: "There are models, and there are those who use the models." Scholes thinks much of the blame for the recent woe should be pinned not on economists' theories and models but on those on Wall Street and in the London City who pushed them too far in practice (Economist, 16 July 2009). Scholes' viewpoint is supported by Harry Markowitz himself, arguing that "portfolio theorists must make certain simplifying assumptions". The problem with these assumptions is not that they are incorrect. On the contrary, Markowitz remarks, they are generally true most of the time. "The problem is that they are not always true. It is precisely at the point where the assumptions break down that financial models, pushed to their limits, lead to disastrous consequences" (Markowitz, 2009:4). Echoing Nassim Taleb's *The Black Swan*, Markowitz reminds us to "recall that panics and black swans happen as often as water heaters leak" (ib:5). The unknown is part of our daily life and all we do is ignore it and live as if it is not relevant:

> *«Consider a turkey that is fed every day. Every single feeding will firm up the bird's belief that it is the general rule of life to be fed every day by friendly members of the human race "looking our for its best interests" as a politician would say. On the afternoon of the Wednesday before Thanksgiving, something unexpected will happen to the turkey. It will incur a revision of belief.»* (Taleb, 2007:40)

Most bankers, investment consultants, rating agencies, portfolio managers, and even ultimate beneficiaries acted during the financial crisis as if they were turkeys. They failed to observe the true nature of their risk-taking behavior. They added risk to portfolios by investing in tacitly correlated and highly leveraged CDOs without knowing and understanding the real danger of these products. They could not imagine a declining market because they embraced an unsubstantiated belief that housing prices would continue to rise and remain a driving force behind the growth of the American economy (cf. Lewis, 2010). With this in mind homeowners were provided mortgages the burden of which they could not carry in the long run. History hides black swans from us: it distorts "silent evidence" (Taleb, 2007; Posner, 2009:77-78). It is only *post factum* that we understand what happened to us. As a consequence, it is only after the fact that we redirect our efforts.

As a counter argument Michael Lewis (2010) asserts that the product designers exactly knew what they were doing – taking advantage of the ignorant rating agencies – without ever paying attention to the downsides of their financial engineering. They designed and built collateralized debt obligations that contained a meaningful but not substantial amount of BBB-rated loans, the end product resulting in an AAA-rating. These CDOs could then be sold to pension funds, insurance companies and other institutional investors who were only allowed to invest in top-

rated financial instruments. To illustrate the point, Lewis refers to Long Beach Financial, a wholly owned subsidiary of Washington Mutual:

> *«Long Beach Financial (...) was specialized in asking homeowners with bad credit and no proof of income to accept floating-rate mortgages. No money down, interest payments deferred upon request. (...) In Bakersfield, California, a Mexican strawberry picker with an income of $14,000 and no English was lent every penny he needed to buy a house for $720,000.»* (Lewis, 2010:97)

Hardly anyone saw any harm in this "prime example of financial incontinence" (ib:97). However, if nothing else, the example demonstrates that banks and bankers were failing to live up to the moral standards that we should hope for (Stiglitz, 2010:280). The professionals knew – or at least could have known – they were selling crap to people who would be in financial trouble the minute the market would stagnate. It is therefore that the crisis is not just a housing crisis, a credit crisis or a financial crisis, but 'a moral crisis'. By only looking at risk at the level of the investment portfolio Modern Portfolio Theory demonstrated its moral shortcomings – even before the financial markets crashed. Taleb argues that it is only after the event that we redirect our efforts. Financial professionals could, however, have done more in advance. Following Perrow (1999) MPT theorists like Markowitz and Scholes could have looked beyond their narrowly defined theoretical constructions by, for instance, incorporating the latent, but real system risks. One of these system risks was the notion of tail risk[xix]. This notion was, however, hidden behind a *veil of ignorance*[xx]. The following paragraph will focus on risk in high-risk technologies and high-reliability organizations, since important lessons can be learned from these fields of study.

5. NORMAL ACCIDENTS

Investment innovations with an impact beyond imagining, investment professionals who were ignorant about the consequences of the financial products on sale and the tight coupling of international markets, have, inter alia, contributed to the mother of all financial crises so far. Financial institutions operating in conjunction with each other, have become potentially 'hazardous organizations' (Roberts, 1990). The recent financial crisis shows characteristics of 'normal accidents' leading to catastrophes[xxi] in what Perrow (1990) calls 'complex organizations'. What can we learn from these 'normal accidents' occurring in complex organizations? In this paragraph I will briefly describe some of the insights coming from this literature and the lessons it comprises for dealing with a major crisis in the investment world.

5.1 Complex organizations

Safety is too important to be left to engineers and economists (Sagan, 1994:228). Although this remark primarily refers to physical high-tech installations like nuclear power plants, aircrafts and supertankers, the observation is as relevant to financial engineers and economists as it is to mechanical engineers. Their technical designs and models of rational decision-making are indispensable, nevertheless they can be very misleading. For systems entailing hazardous technologies are not simply large mechanical devices. They are complex organizations (Sagan, 1994:228). Similarities occur between the various crises in the financial world in the last thirty years and catastrophes like Three Miles Island, the Tenerife air crash, the decomposition of the

Challenger, the Union Carbide gas leak in Bhopal, the implosion of the nuclear power plant in Chernobyl, or the sinking of the Titanic, the Estonia or the Herald of Free Enterprise.

All these events appear to share the common element of an "unanticipated interaction of multiple failures" in a complex system, Charles Perrow's description of 'a normal accident' or a 'system accident' (Perrow, 1999:70). The complexity can either be technological or organizational, and often has elements of both. One important element in this complexity is the interconnectedness of processes in an organization or a system that is directly linked to the vulnerability of that organization or system (Weick, 1990). In Perrow's own words, if the coupling of processes becomes tighter the vulnerability increases. There is simply no slack between two processes. What happens in one process directly affects what happens in another. Loose couplings, on the other hand, entail a reduction of risk and vulnerability in organizations that are just waiting for the next accident to happen.

Perrow's second concept with which he studies risk-prone organizations – in the organization literature known as high-reliability organization[xxii] (Roberts, 1990a, 1990b; Roberts & Bea, 2001) – is complexity[xxiii]. Within and between organizations abundant interaction takes place. These interactions not necessarily contribute to the creation of complexity – linear interactions being a case in point. However, sometimes organizations are faced with interactions resulting in consequences that were not or could not reasonably be expected by the interacting parties. What distinguishes these interactions is that they were not designed into the system by anybody. No one intended them to be linked (Perrow, 1999:75).

Both distinctive characteristics of a hazardous, high-reliability organization – complexity and tight coupling – provide a useful framework for analyzing whether organizations are more or less catastrophe-prone. The simple truth is, as Roberts and Bea (2001:70) argue, "that any system, and especially any system that is complex and interdependent, *will eventually fail*". It is not that organizations can fail, but that they actually will fail. This simple fact requires top management of *all organizations* to consider the organization's processes and activities from a viewpoint of societal risk management. On face value this responsibility is more urgent for High Reliability Organizations (HROs) that can have disastrous consequences if something seriously goes wrong. Interestingly, however, HROs are often safer than organizations where management doesn't perceive the inherent risks of the products, processes or activities – whereas in reality the "roots of catastrophes are embedded in operational systems, latent until an undesirable combination of events occurs" (Roberts and Bea, 2001:71). Current risk management focuses extensively on organizations (such as nuclear plants) that have relatively done little harm to society[xxiv], while paying only scant attention to issues and organizations (like car safety, mining or chemical plants) that on total have a larger social or environmental impact on society (Perrow, 1999:305). We could easily add the financial services industry to this list with its long history of manias, panics, and crashes (Kindleberger, 2005).

The usual answer of organizations to prevent accidents getting out of hand is to create safety devices – in the literature often referred to as redundancies. If an engine, a safety valve or a computer system breaks down the task usually will be adequately performed by a redundant system. Unfortunately, life not always goes according to plan and for whatever reason a spare system might also fail to perform the particular function. Various reasons can cause a system to malfunction: human errors, technical errors, the system may have been inadequately designed or there may be a force majeure[xxv]. Usually these errors do not result in a system to crash and cause a catastrophe. But if incidents coincide they might produce an effect far greater than anyone

could have imagined in advance. As Perrow (1999:7) mentions, failures that are trivial in themselves can become serious when they interact.
In our personal life these interactions may have a great impact, they usually do not have a major effect on society at large. Complex organizations, however, may create problems that are overwhelming and harmful for many more individuals and groups than those who are directly involved in causing the problem. What makes it worrisome is that when things get out of hand the interactions causing them where not only unexpected, "they are *incomprehensible* for some critical period of time" (Perrow, 1999:9). Catastrophes materialize because the actors involved did not comprehend the potentiality of the event taking shape in front of their eyes. They do not understand what is going on and they are unaware of how to stop the event from having disastrous consequences.
For normal accidents to occur – including the financial crisis – usually numerous relevant signals are ignored. According to Weick this is perfectly comprehensible from a point of view of "contextual rationality" (Weick, 1993:634). Decision-making is not a rational process; it is bound to the context in which people operate. Individuals – including professionals – need to create and maintain "intersubjectively binding normative structures" to make sense of what is happening in front of their eyes and to sustain their relationships. "The basic idea of sensemaking is that reality is an ongoing accomplishment that emerges from efforts to create order and make retrospective sense of what occurs" (Weick, 1993:634/635). This means that a warning is only effective "if it fits our mental model of what is going on" (Perrow, 1999:31). To bring the point home Roberts and Bea (2001:72) argue that organizations with higher frequencies of accidents tend to suffer from *organizational hubris*. Because they do not face accidents, very often managers in these organizations tend to believe that they are in control. Managers "fail to contemplate inherent risks" (Roberts and Libuser, 1993:15). They simply do not comprehend that processes and activities in their respective organizations pose a threat to society – and that certainly counts for managers working in the financial industry as Roberts and Libuser have shown in their paper. It simply is not part of their sense-making repertoire. Only if a disaster takes place their eyes may be opened[xxvi]. The financial crisis in general and Modern Portfolio Theory in particular have shown that the financial community does not perceive its products, processes and activities as an inherent threat to its clients or to the industry itself, not to mention society. In the next paragraph I will focus on normal accident theory applied to the financial industry.

5.2 Normal accidents in the financial services industry

With a few exceptions (Mezias, 1994; Roberts and Libuser, 1993; Bookstaber, 2007; Figlewski, 2009) the financial sector as a whole is not considered to be a 'complex organization' or a 'complex system' in the strictest sense of the word – even though individual financial organizations may show far-reaching signs of complexity[xxvii]. Unlike a nuclear power plant, an aircraft carrier, a cruise ship, or a chemical factory, financial organizations are not likely to create a catastrophe[xxviii] on their own[xxix]. Collectively, however, financial organizations can create more devastation then any single high-reliability organization[xxx] can do (Roberts, 1990a, 1990b; Roberts & Bea, 2001). As numerous bubbles and crashes (Kindleberger 2005; Shiller, 2002, 2008; Sorkin, 2009) have shown financial institutions – acting in collaboration with the financial authorities, governments, intermediaries and consumers – are perfectly capable of causing financial markets to falter and ultimately stagnate. They can even bring economies

down. What is special about the recent crisis is that it had an impact beyond imagination caused by the tacit or implicit organization and coordination of the actions of the individual players. Financial organizations operated as if they were *one institution* or *one system*. That tacit or implicit system was capable of creating financial and economic chaos leading to human hardship and misery far beyond their individual circle of direct control and influence. But it all started with a bullish market in mortgage lending and securitization of mortgages.

5.2.1 From mortgage lending to structured finance[xxxi]

With the support of both the Clinton and the Bush Administration homeownership was strongly promoted in the US during the nineties of the last century and the first decade of the new millennium. According to the US Census homeownership increased between 1997 and 2005 from 65.7% to 68.9%, while house prices rose in this period on an annual basis between 5 and 20 percent (Allen and Carletti, 2010:6). In the aftermath of the bursting dotcom bubble and the 9/11 disaster the Fed reinforced this increasing demand for houses with its loose monetary policy. Potential homeowners could go out and borrow at 1% to buy houses, with prices going up at a much higher rate.

During this period, stimulated by large money supplies "looking for investment opportunities" (Neal, 2008:19) subprime mortgage appeared to be just the thing. Overall, subprime mortgage loans at the time only made up a small part of the entire portfolio of mortgage loans. Nevertheless, originations of subprime mortgages swelled from less than 2.5% of total mortgages serviced in 2000 (Greenspan, 2010:3) to 20% of all U.S. home mortgage originations in 2005 and 2006[xxxii]. In absolute figures the subprime originations were respectively US$ 625 bn (on a total of US$ 3,120) in 2005 and US$ 600 bn (on a total of US$ 2,980) in 2006 (Gorton, 2009:18).

As Lewis (2010) explains, many of the mortgages were sold to consumers for speculative reasons. Believing that the rising housing prices would provide the mortgage banks as well as the commercial banks with sufficient guarantees in case the homeowner would default, mortgages were sold without any deposits made or to people without jobs or a regular income, the so-called NINJAs[xxxiii]. More precise, Gerardi et al. (2008:8) argue that the proportion of 'low doc' or 'no doc' subprime loans origination rose from 20 percent in 1999 to more than 35 percent by mid-2006.

A second characteristic that contributed to the popularity of subprime mortgages was attractive payment conditions, varying from no cost at all during the first two or three years to relatively low, but fixed interest rates (Gerardi, 2008:6; Goodhart, 2008:341; Gorton, 2009:13; Weaver, 2008:24). After this first period of fixed interest rates a long period – usually 27 or 28 years – of adjustable rates would commence, giving these 'hybrids' (Gorton, 2008:13) their name: Adjustable Rate Mortgages (ARMs). Because the interest rates would rise significantly after the honeymoon period was over, there was a clear incentive for the borrower to refinance the mortgage – which was encouraged as long as the value of the property would rise with at least the same rate as the interest rates[xxxiv]. Teaser rates, therefore, clearly attracted immigrants and low-income Americans but also "Classic Middle America" (Gerardi et al., 2008:27)[xxxv] to buy or refinance property using a subprime mortgage – until housing prices started falling and interest rates started climbing rapidly and significantly.

By itself selling an increasing amount of subprime mortgages to (potential) homeowners is no sufficient cause for an international financial crisis to occur. As Goodhart observes:

«Perhaps one of the most interesting features of this crisis is that the US sub-prime mortgage market is a relatively small part of the overall US mortgage market, and, as its name indicates, was confined to the USA.»

How then did the primarily American financial crisis become a global disease more contagious then the Mexican flu pandemic, causing worldwide financial stress, bankruptcies and personal tragedies? Various scholars (Gerardi, 2008:4; Goodhart, 2008:341,342; Weaver, 2008:24) argued that the main trigger to cause the crisis was the "*origination and distribution model*". The originators of the most toxic structured finance products, Weaver (2008:27) argues, had no 'skin in the game'[xxxvi]. They sold all the different parts – from the senior tranche to the lowest and most risky 'equity tranche'[xxxvii]. The selling was done on a worldwide market with hedge funds very often taking the most risky tranches, while mezzanine tranches usually ended up with long term investors, such as pension funds. Bank conduits or special investment vehicles held the senior tranches (Goodhart, 2008:342). One of the issues that materialized over time is that originators of mortgage-backed securities, because they did not have any exposure to the financial instrument, did not particularly care about credit quality. Lewis (2010:143) tells the story of Wing Chau, a CDO manager, who "simply passed all the risk that the underlying home loans would default on to the big investors" leaving Wing Chau with no exposure to the CDOs at all. Hungry investors all over the world, afraid of missing upside opportunities, were happy to take on the risk – a risk they ultimately misperceived. The origination and distribution model also flourished because the asset-backed securities were all seen to have a credible and sufficient credit rating given by Moody's or Standard and Poors. Ultimately, as nearly all scholars point out, their credit rating was falsified in the course of events taken place during 2000 and 2008[xxxviii]. Some, like Lewis and Gorton, disqualified the rating agencies as not having sufficiently done their homework or not being able to do so.
When in 2007 home prices declined leading to a drop in the S&P/Case-Shiller quarterly home price index declined by 4.5% compared to 2006[xxxix], the market was shocked and faltered[xl]. At the beginning of 2009, Gorton explains, eighty subprime mortgage lenders had ended their business since the first one tipped over – including Option One, Ameriquest and New Century. Large banks had to write-off hundreds of billions of dollars, mutual trust between financial institutions was severely damaged and the financial system nearly came to a complete stop. As Goodhart (2008:340) summarizes the chain of events: "the 2007 financial crisis was, in reality, an accident waiting and ready to happen". Actually, it was not simply an accident that resulted, it was a mere 'financial tsunami' that came over the financial community following the demise of Bear Sterns in June 2007 and the announcement of BNP Paribas on 9 August 2007 to prevent investors from redeeming cash from its hedge funds.

5.2.2 Lessons from Normal Accident Theory

What can we learn from authors like Perrow, Weick, Roberts and Sagan whose reflections on complex organizations, at least on face value, appear to be useful in understanding what happens in the financial community? Just like Bhopal, Chernobyl or Three Mile Island, the financial industry was faced with a set of small failures that – once they became interdependent – caused major societal upheaval and nearly resulted in a complete breakdown of the entire financial system (cf. Sorkin, 2009). Using Perrow's distinctions of loose versus tight coupling and linear versus complex systems it appears that the financial system was increasingly entangled and tightly coupled. Also the complexity of the financial transactions and relations soared

tremendously in the years preceding the crisis. Greenspan (2010:8) even speaks of "the virtually indecipherable complexity of a broad spectrum of financial products". We start with a brief examination of the increasing amount of couplings in the financial world.

5.2.3 Tight coupling

Perrow describes tight coupling as: "no slack or buffer or give between two items". He adds to the observation: "What happens in one directly affects what happens in the other." With increasing interdependencies between parts of a system if something goes wrong in one part it automatically impacts the following part and so forth. There is no way to stop the cascade. During the last two decades the financial community has become more and more interdependent, leading to increased susceptibility for system failures. Among others the following factors have contributed to this heightened susceptibility for system failure:

1) *Politics and finance intertwined*
   The roots of the subprime crisis can be found in the monetary policy of Fed Chairman Alan Greenspan to keep interest rates low to stimulate the economy, as various authors have argued (Achterhuis, 2010; Posner, 2009)[xli]. In addition, both the Clinton and the Bush Administration were instrumental in causing the crisis by ordering Government Sponsored Enterprises (GSEs) Fannie Mae en Freddie Mac to provide (subprime) mortgage loans to the low-income working class and to immigrants. As Alan Greenspan (2010:4) testified: *"a significant proportion of the increased demand for subprime mortgage backed securities during the years 2003-2004 was effectively politically mandated"*. There was no better way to include Americans and immigrants in the American dream of individual freedom and prosperity than to have them owning their own house. As I mentioned in paragraph 2.2, homeownership, it was thought, would create 'a sense of participation and belonging'. There was also another intervention by the Clinton Administration that actively promoted homeownership and consumer lending. When the administration agreed to sign the Gramm-Leach-Bliley Act in November 1999 (see also below) it only wanted to do so under the condition that minority-lending requirements would be upheld. It is ironic that the combination of deregulation and social policy ultimately went hand in hand causing the crisis.
2) *Slack, buffers and circuit-breakers*
   Some eight years before the crisis materialized, Charles Perrow (1999:385) wrote: *"Breaking up a loan on a home into tiny packages and selling them on a world-wide basis increased interdependency"*. Perrow, nor anyone else at that time, could foresee the collapse of the worldwide market of mortgage-backed securities nearly a decade later. But what he did notice is that *"there is twenty-four hour trading, high-speed trading, the high volume of trading, and the sheer amount of it all, all suggesting tight coupling"* (Perrow, 1999:385)[xlii]. Another example of tightened couplings was the 1999 Gramm-Leach-Bliley Act. The act repealed the Glass-Steagall Act in order to allow commercial banks, investment banks, securities firms, and insurance companies to consolidate. Former Treasury Secretary Lawrence H. Summers was quoted saying in the New York Times of October 23, 1999:

«At the end of the 20th century, we will at last be replacing an archaic set of restrictions with a legislative foundation for a 21st-century financial system." The measure, he added, "would provide significant benefits to the national economy.»

Quite elegantly, Andrew Sorkin remarked that the interdependencies in the financial world – to which the removal of the 'archaic' Glass-Steagall Act made a significant contribution – had become a recipe for a cascading disaster. There would be no stopping the crisis if giants like Morgan Stanley and AIG would go down. In that case even the previously unthinkable could happen: the fall of Goldman Sachs. In his testimony to the Congress committee inquiring the financial crisis, former Fed Chairman, Alan Greenspan, came to the conclusion that "the doctrine of 'too big to fail' (or, more appropriately, 'too interconnected to be liquidated quickly') cannot be allowed to stand". (Greenspan, 2010:10)

Finally, in an enlightening article Jim Hawley (2011) argues that the lack of slack was also caused by grossly inadequate governance on behalf of the CEOs and CIOs of (financial) companies and by the failure of institutional investors – acting as universal owners – to exert control. The investors only had an eye for risk at the firm level, not for risk at the level of their financial and investment portfolios, or for any kind of systemic risk. Referring to the US 1940 Investment Company Act Hawley accuses institutional investors of a failure to act as a 'sophisticated investor'. They did not adequately monitor their investments in financial firms, products and services and therefore failed to protect the interest of the ultimate end-owners: human beings dependent for their future income on these universal owners.

3) *The internationalization of financial markets*

One of the main reasons the financial crisis could evolve into a crisis of gigantic proportions was the worldwide interest in assets with seemingly low risk profiles, while generating a high return (Lydenberg, 2011). The demand for these 'assets' was overwhelming (cf. Lewis, 2010) providing the banks that originated CDOs and related structured finance products with abundant opportunities to offset their risk. Eager investors all over the globe bought products without knowing and fully appreciating the risk that was involved in these products. Without any critical reflection the investors trusted the assessments of S&P, Moody's and Fitch ratings, as they were used to – not appreciating the fact that the rating agencies hardly had any experience with assessing the new set of financial instruments. As Goodhart (2008:337) argues, "the whole system depended crucially on the reputation and 'say so' of the credit rating agencies", making the agencies an element in the coupling of financial institutions worldwide and in the distribution of "financial weapons of mass destruction"[xliii].

5.2.4 Increasing complexity

In addition to the nature of coupling between system parts, Perrow refers to the role of complexity in causing a crisis. At least three elements of complexity have contributed to the financial crisis taking shape. These mechanisms are:

1) *The increasing complexity of the financial products*

Already in 2003 Warren Buffett expressed serious doubts concerning the risks banks were exposed to by using a wealth of derivatives. Having read "the long footnotes detailing the derivatives activities of major banks, the only thing we understand is that we *don't* understand how much risk the institution is running." (Buffett, 2003:15) The warning came

at a moment when most of the origination of subprime Collateral Debt Obligations (CDOs) had not even begun yet.

Many scholars (Gorton, 2009; Lewis, 2010; Adelson and Jacob, 2008) refer to the complexity of the financial products as one of the major causes of the crisis. This complexity became manifest on at least three levels: the nature of the subprime loan, the composition of the CDOs, and the composition of the investment portfolio. Illustrative is Gorton's observation (2009:37) that information got lost "due to the complexity of the chain". By that he means that for CDO investors it was "not possible to penetrate the chain backwards and value the chain based on the underlying mortgages". As a result the investors relied "to a lesser extent on the information about the structure and the fundamentals and more on the relationship with the product seller" (Gorton, 2009:37).

Quite telling in this respect is Lewis' example of how a new, but very complex financial future was structured. The financial firms used a bet to short the subprime market to synthesize more financial derivatives. When an investor bought a credit-default swap, he enabled a bank "to create another bond identical in every respect but one to the original. The only difference was that there was no actual homebuyer or borrower." The only assets backing the bonds were the side bets the investors made with firms like Goldman Sachs. These investors, in effect, were paying to Goldman the interest on a subprime mortgage. "In fact, there was no mortgage at all." (Lewis, 2008:11)

2) *The prevailing free market ideology veiling the increasing complexity*

When the crisis unfolded governments in the USA, Europe and Japan – each acting in its own right and territory a 'superior insurance company' (Achterhuis, 2010:33) – had to bail out risky bankers and greedy consumers. Alan Greenspan, a strong believer in the ideology of the free market, admitted the "flaw in the free market theory" when giving a testimony for the US Congress on 23 October 2008. Greenspan was shocked by this flaw and by the limited ability of himself and his team to see the crisis coming:

> *«I mean, you point out quite correctly that the Federal Reserve had as good an economic organization as exists, and I would say, in the world. If all those extraordinarily capable people were unable to foresee the development of this critical problem, which undoubtedly was the cause of the world problem with respect to mortgage-backed securities, I have to – I think we have to ask ourselves, why is that? And the answer is that we're not smart enough as people. We just cannot see events that far in advance.»* [xliv]

Following scholars like Weick and Perrow it may not so much be the failing intellectual capacity of Greenspan and his team, as well as the human tendency to only perceive, process and store information that fits our mental models. As Robert Shiller (2008:24) argued, 'the subprime mortgages were launched with a woeful failure to understand real estate risk'. It was 'speculative enthusiasm', not rational understanding and calculation, driving the market, leading to an immense but irrational bubble. Moreover, Shiller continues, we do not see that bubbles are a social creation coming out of our unexamined belief in "new era stories".

With the benefit of hindsight Greenspan remarked that the "consequent surge in global demand for U.S. subprime securities by banks, hedge, and pension funds supported by unrealistically positive rating designations by credit agencies was, in my judgment, the core of the problem. Demand became so aggressive that too many securitizers and lenders believed they were able to create and sell mortgage backed securities so quickly that they

never put their shareholders' capital at risk and hence did not have the incentive to evaluate the credit quality of what they were selling. Pressures on lenders to supply more 'paper' collapsed subprime underwriting standards from 2005 forward. Uncritical acceptance of credit ratings by purchasers of these toxic assets has led to huge losses. It was the failure to properly price such risky assets that precipitated the crisis."[xlv] In other words, most buyers, including most investment specialists, not only did not fully understand the risks involved in buying potentially toxic derivatives, they lacked the willingness and the necessary competences to critically assess the risks involved in these very complex financial products. This was not so much caused by a lack of intelligence, but merely by the unquestionable faith in the high priests of finance and the circle of financial sorcerers. Part of the creation of complexity was, therefore, the concerted and deliberate ignoring of risk by bankers, investment consultants, (institutional) portfolio managers, rating agencies, government officials, oversight boards, and so forth.

3) Myopia

As Lydenberg (2011) argues it is not only the complexity of the market or the products that contributed to the breakdown of the existing financial system, but also the ignorance of that complexity by myopic financial professionals. That in itself added to the complexity, because the human factor came to be a very unreliable element in the system. Modern Portfolio Theory, Lydenberg argues, ignores the real world outside the theory – the world in which the outcomes and impact of the theory materialize. Investing is not simply about returning the highest buck to the risk-taker but also about creating value for society in which investors operate and intervene. Modern Portfolio Theory and Modern Portfolio Theorists ignore the impact of the MPT-thesis on the community that allows it to act in the first place. Investors have a 'license to operate', granted by the community, to participate in the creation of wealth, not in the destruction of it. By deliberately ignoring this impact and failing to do the reality check, theory and theorists contribute to complexity – not in a financial sense but certainly in a social sense. The crisis invoked the participation of governments, supervisory authorities, and laymen to counteract the consequences of the investment crisis.

6. CONCLUSION

In the aftermath of the crisis lessons have been learned. Not only has the focus on risk management more or less exploded, also the American Congress has adopted on July 14, 2010 the Wall Street Reform Bill. The bill at least partly reverses the 1999 Gramm-Leach-Bliley Act that – in turn – reversed the 1933 Glass-Steagall Act. Following the new bill, banks will have to spin-off some derivative trades to a subsidiary so that they are not in the same pot as federally insured deposits. They will not be allowed to trade in some of the most risky derivatives. However, banks can still trade some swaps to legitimately hedge risk. Most swaps would have to be cleared and traded on exchanges. In addition, and relevant for this article, a Financial Stability Oversight Council was created. The council will focus on identifying, monitoring and addressing systemic risks posed by large, complex financial firms as well as products and activities that spread risk across firms. It will make recommendations to regulators for increasingly stringent rules on companies that grow large and complex enough to pose a threat to the financial stability of the United States[xlvi]. Whether the bill will prove to be effective in curtailing risk in an increasingly complex and tightly coupled financial sector remains to be seen. At least some

buffers, barriers, and circuit-breakers have been introduced in the system that might help to prevent things getting out of hand. Whether it will be enough to revert the 'natural' inclinations of bankers, financial consultants, investment managers, rating agencies, government officials, oversight boards, consumers and other relevant players in the financial arena to only focus on short term gain and believe in 'new era stories' is still questionable. The first signs of what may ultimately end up in the next high-tech, social network, exuberance, are already looming on the horizon – suggesting that it still is all about bucks. The rest remains conversation.

In this article I have argued that the financial world in general – and investment professionals in particular – could have learned from Normal Accident Theory and the theory on High Reliability Organizations by perceiving the financial community as one integrated system and not simply the sum of independent parts. The major characters in and around the financial industry – ranging from the government to bankers and from the Fed to financial advisors and investors – would have been wise to analyze their community more thoroughly in system terms then they actually did. They were living in a dream world, in a social construction, instead of in the real world. By introducing a reality check they probably would not have detected Bernstein's hungry mountain lion before crossing the bridge. Nevertheless, they likely would have been more prepared for and focused on potential dangers. The financial crisis was a case of negligence, foolishness and unwillingness to look beyond the immediate (theoretical) present to the looming dangers in the real world outside of finance. And for those, as Lewis makes clear, who were warned by the modern Cassandras of their time and knew what was coming, they felt no obligation to be cautious. They simply had no skin in the game. Instead, they were gambling with other people's money both in their financial portfolios as well as in 'real world portfolios'.

After the fact many scholars, including Markowitz, focused on uncertainties in the financial sector. And of course he was right – with the benefit of hindsight – when he echoes Nassim Taleb and argues that it "is precisely at the point where the assumptions break down that financial models, pushed to their limits, lead to disastrous consequences" (Markowitz, 2009:4). The resulting tragedy falls upon the non-believers, as it certainly did, and on those who were intended to be the beneficiaries of their investment decisions. As a consequence, it would be fair to demand from investors a real world check that goes much further than what is currently happening under the heading of (socially) responsible investing. Good governance and responsible investing need to be extended to (societal) risk management. Part of this risk management needs to be the assessment of the nature of the impact of investments on society. So far, no bill or reform act requires investors to improve their economic, social and environmental impact assessment. It is time to call for drastic change, since the consequences for the current and the next generations are too serious to ignore. In the words of Hawley (2011): we clearly need to rethink what it means to be 'sophisticated investors'. In this respect I clearly sympathize with the report *From Transparency to Performance* by the Initiative for Responsible Investing of Harvard's Kennedy School of Government (Lydenberg, Rogers, and Wood, 2010) that calls for mandatory reporting on key performance non-financial indicators.

This article deals with an analysis of the financial crisis from the viewpoint of a theory of complex systems. Changing the current system by improving social checks and balances is necessary since the prevailing system caused – and still causes – major ethical stress. As Richard Nielsen (2010) argues there are at least five types of ethics issues that are structurally related to the finance capitalism that we know: harm to others, leverage proportionality and prudence, moral hazard, transparency and social control and regulation. What does this mean for the individual working in the financial industry – from top management to investment professional?

To what extent do individual financial professionals carry a responsibility within a complex system to protect the true interests of the ultimate beneficiaries? In the end it is not the system but the (trans)actions of individual financial 'professionals' that caused the pain and suffering of the beneficiaries. Continued research into the (moral) responsibilities of financial professionals is required to come to a better understanding of how to prevent a major financial crisis like the 2008 crisis from happening again.

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Endnotes

[i] The title refers to a wonderful phrase by Gordon Gekko in Wall Street which points to the heart of the matter in the financial sector.

[ii] Prof. Dr. Harry Hummels is professor of Ethics, Organizations and Society at Maastricht University in The Netherlands and fellow of the European Center for Corporate Engagement. In addition professor Hummels is managing director of SNS Impact Investing – a position he shares with his friend and colleague Theo Brouwers. This article is a result of a number of fascinating discussions with Steve Lydenberg CFA, CIO of Domini Social Investments and initiator of the *Initiative of Responsible Investing* at Kennedy School of Government at Harvard University. The author likes to thank Steve Lydenberg, Jim Hawley and Rob Bauer for constructive comments on previous drafts of this article.

[iii] Bernstein, p.183

[iv] One can argue that economists, bankers, investment advisors and portfolio managers used a *model* that was not comprehensive when dealing with the wider set of consequences of investment decisions. In this article I do not argue with *specific parameters* within the prevailing theories of risk and uncertainty, but with the model as such.

[v] Michael Douglas in his role as Gordon Gekko has shown us that this greed for everything that is valuable in life can have negative consequences if not controlled.

[vi] Quite intriguing in this respect is Bernstein's remark that follows this example: "I have a hunch that Harry Markowitz with his focus on volatility, would have been taken by surprise by that mountain lion. Kenneth Arrow, a man who thinks about risks in many different dimensions and who understands the difference between the quantifiable and the messy, would be more likely to worry that the mountain lion, or some other peril, might be waiting at the other side of the bridge". (Bernstein, 1996, p.260)

[vii] http://www.hud.gov/news/release.cfm?content=pr04-050.cfm. Promoting Affordable housing, particularly for minority groups, was already an important policy objective for the Clinton administration and was carried further by President Bush. With a clear objective of 5.5 million new minority homeowners in the first decade of the new millennium President Bush took the policy to its extreme by persuading – if not pressuring – the financial sector to lower its lending standards, ultimately resulting in so-called NINJA loans: No Income, No Job or Assets. What is remarkable is that this initiative was launched at a moment that the first sign of a bursting housing bubble already appeared on the horizon – later followed by a bursting credit bubble (Posner, 2009).

[viii] New Century Financial was at the time one among many financial institutions in the area of sub-prime lending that found itself in bad weather. HSBC Finance made provisions of over 10 bn USD, while Accredited Home Lenders saw 75 percent wiped off its value in two days due to bad debt. At that same time in March/April 2007 Barclays was still bidding on US subprime lender EquiFirst – even though it lowered its bid from $225 mln to $76 mln – a price fall that reflected growing problems in the US housing and sub-prime market, the bank commented. However, a spokesman added: "We think EquiFirst is positioned for profitable growth." Source: BBC News, 2 April 2007.

[ix] Recently Richard Nielsen (2010) described the financial crisis as a major moral failing of financial professionals.

[x] Quite intriguing is Shiller's quoting of Aaron Sakolski's book *The Great American Land Bubble* who opens his book with the statement: "America, from its inception, was a speculation" (Shiller, p.55).

[xi] In the Netherlands a parliamentary commission issued its report in May 2010 making exactly this point that everyone (bankers, politicians, supervisory authorities, intermediaries, economists and consumers) is to blame for things getting out of hand – not a particularly helpful conclusion if one wants to prevent the next crisis to materialize. A summary of the report is available for downloading: http://www.tweedekamer.nl/images/Credit_Lost_-_summary_of_the_report_118-206545.pdf

[xii] As Posner (2009, p.281) claims: "The successive Federal Reserve chairmanships of Greenspan and Bernanke must be reckoned prime causes of the financial crisis."

[xiii] In a very interesting book – *The Free Market as a Utopia* - Dutch philosopher Hans Achterhuis (2010) argues that Alan Greenspan carries most of the burden for causing the financial crisis. Following the free market ideology of Ayn Rand, Greenspan – as the high priest of capitalism – was not willing to intervene in the economy and impose certain limits to the use of what Warren Buffet already in 2003 called 'financial weapons of mass destruction'. Greenspan, according to Achterhuis, was the Aaron of modern capitalism, allowing the people to worship the mammon. It is a personal tragedy for Greenspan that ultimately the Mammon turned against him and his people.

[xiv] Investment professionals are, among others, the designers of financial products, portfolio managers, relationship managers, sales reps and their managers and directors.

[xv] Posner refers to the relatively mild effect previous crises had on the economy by pumping a lot cheap money into the system.

[xvi] An issue is, of course, that a financial catastrophe may not be the end of the world to those who are well off – like the professionals and managers who the issue – that is certainly not true for the relatively poor. They were hit hard by the aftermath of the crisis and have trouble recovering.

[xvii] Many portfolio managers believed their risk was perfectly controlled, says Nobel Prize winner Myron Scholes, "but they needed to know what everyone else was doing, to see the aggregate picture." It turned out that everyone was doing very similar things. So when their Value At Risk models started telling them to sell, they all did—driving prices down further and triggering further model-driven selling. (The Economist, *Efficiency and Beyond*, 16 July 2009)

[xviii] Jim Hawley (2011) argues it was in particular poor governance by the CEOs and CIOs of large financial institutions and the owners of those institutions – large institutional investors – that was instrumental in causing the crisis. The governance discussion was limited to the level of the firm. Both portfolio risk and systemic risk in the entire financial sector were left outside the reflection and debate on governance. In Hawley's own words: "there has been a black hole in theory and practice regarding governance actions and engagement by end asset owners (e.g. CalPERS) and asset managers". In other words, large institutional investors have not done their homework as

universal owners of the (financial) companies they invest in. They not only have a responsibility to challenge (financial) companies that perform poorly but also firms with "hyperperformance" – highlighting the impact of hyperperformance on market risk. An interesting example Hawley mentions in this respect is Citigroup's former CEO Chuck Prince's saying that "while the music is playing, you have to dance". The market was holding individual companies in what now can be seen as a *deadly embrace*.

[xix] Alan Greenspan has focused attention on this issue of negative tail risk both before (Parliamentary Committee Inquiry Financial System, 2010:54) and after the crisis (Greenspan, 2010:8).

[xx] This famous notion is coming from John Rawls' Theory of Justice. Where it might be justified to abstain from the details of a practice in Rawls' theory to end up with a social arrangement that is just for everyone, in the case of Modern Portfolio Theory it is not. The veil of ignorance in this case is clearly a disqualification of the both theorists and practitioners to look beyond the narrowly defined and abstract definition of reality.

[xxi] Perrow (1999) defines a catastrophic accident in the context of risky technologies as "one that kills some number of first-party victims (operators), over 100 second-party victims (people associated with the system but with no control over it), and large numbers of third-party (innocent bystanders) and fourth-party victims (unborn generations)". Since serious accidents in a financial or telecom environment highly impacts the interests of the stakeholders but usually do not lead to fatalities the definition likely transforms in a social or socio-technical environment into: 'one that seriously affects a small number of primary stakeholders, a growing number of secondary stakeholders and even larger numbers of tertiary or quaternary stakeholders'.

[xxii] A high-reliability organization is an organization where major errors in their regular processes have a potential for creating catastrophic consequences. Examples, according to Roberts (1990:160), of hazardous, high-reliability organizations that (need to) engage in nearly error free operations are the US air traffic control, some power distribution grids, aircraft carriers and submarines and *international banking*. Increasingly, as Pool has argued, (socio-technical) systems like computer and telecom networks, genetic engineering, and *financial networks*, carry in it characteristics of hazardous, high-reliability organizations. Pool (1997:276) points out that "[o]ur ability to manage a technology, rather than our ability to conceive and build it, may become the limiting factor in many cases".

[xxiii] Roberts (1989) points out that Perrow has not elaborated the concepts of *complexity* and *tight coupling* in a way that they have become operational. He often uses storytelling to make his point clear. Therefore, it will be difficult to actually measure both concepts.

[xxiv] The obvious exception is Chernobyl.

[xxv] A reason could be that the redundant system is having a maintenance check up. A redundancy may proof irrelevant if, for instance, an aircraft flies into a cloud of volcanic ashes damaging all of its engines. Having a spare engine if one falters is not very helpful when all engines malfunction.

[xxvi] Even the wording of financial professionals is softening the severity of the catastrophe. They talk about a crisis, a turning point. At best they speak of a financial crash that brought the system to a halt. They don't use words like 'catastrophe' or 'disaster' that particularly focus on the consequences of the event (Dombrowsky, 1995:242).

[xxvii] It is only in the aftermath of the crisis that the analysis gradually shifts toward controlling the system risks as become clear. A clear example is provided by the report of the Dutch commission (2010) that investigated the financial crisis and its impact.

[xxviii] I am using the word 'catastrophe' in a wider sense than Perrow does. He calls a catastrophe "an accident that kills more than 100 people with one blow" (1999:357). Since the effects of the financial crisis were disastrous or catastrophic to countless individuals and groups globally, negatively impacting their (quality of) life, the latest financial crisis deserves to be called a catastrophe.

[xxix] The LTCM case, of course, shows that there are exceptions to the rule. Roberts and Bea (2001) also refer to the demise of Barings due to the (not officially authorized) behavior of Nick Leeson. This case is, however, of a completely different nature and not comparable to what caused the current crisis.

[xxx] A high-reliability organization is an organization where major errors in their regular processes have a potential for creating catastrophic consequences. Examples, according to Roberts (1990:160), of hazardous, high-reliability organizations that (need to) engage in nearly error free operations are the US air traffic control, some power distribution grids, aircraft carriers and submarines and *international banking*. Increasingly, as Pool has argued, (socio-technical) systems like computer and telecom networks, genetic engineering, and *financial networks*, carry in it characteristics of hazardous, high-reliability organizations. Pool (1997:276) points out that "[o]ur ability to manage a technology, rather than our ability to conceive and build it, may become the limiting factor in many cases".

[xxxi] Many books and articles have been written – and are still written and published – to explain what happened in the wake of the crisis and what led to it. For this article I have made use of a wide variety of academic articles as well as (polemic) books. I kindly refer to the reference list.

[xxxii] According to Gerardi, et al, (2008: Table 2) the number is even higher and exceeds 25%.

[xxxiii] NINJAs is an abbreviation of No Income, No Jobs, no Assets.

[xxxiv] Gerardi at al. (2008:5) argue that the 'payment shock' after the first 2 or 3 years passed was not in itself a reason for default and the increase in foreclosures. Previous research from the authors shows that "the overwhelming majority of defaults on subprime ARMs occur long before the first reset".

[xxxv] Gerardi (2008:27) quotes Citi analysts writing "The subprime borrower today has a monthly income above the national median and a long tenure in his job and profession. (…) Past credit problems are the main reason why the subprime borrower is ineligible for a prime loan". Citi analysts continued by pointing out that credit quality – as measured by the FICO scores – of the borrower had improved between 2000 and 2005.

[xxxvi] See also Adelson and Jacob, 2008:15

[xxxvii] Goodhart (2008:341) considers this equity part to be 'toxic waste'.

[xxxviii] Some writers, like Lewis (2010), at least suggest that the agencies might not have been objective as one expects from the agencies, because the originators of the securities paid them. However, as Goodhart (2008:339) rebuts, there is no "reliable evidence" that the agencies, depending so much on their reputation for honesty and straight dealing, would have been more than favorable towards the originators in assessing their products.

[xxxix] The index already gave a declining outlook since Q2 in 2006, becoming negative at the end of Q3 (source: Gerardi, 2008: Figure 13). As of Q3 the index would fall sharply leading to a decline in home prices of more than 30 percent at the end of Q1 2008.

[xl] Even in 2008, in the midst of the financial crisis, Greenspan regretted the disappearance of the market in subprime mortgages (Greenspan 2008:4). Home and small business ownership is a vital commitment to a community and, therefore, ways should be found to reestablish a more sustainable subprime mortgage market.

[xli] Ultimately, even Greenspan, talking about a 'once-in-a century credit tsunami', had to admit to the American Congress on 23 October 2008 that he had been wrong.

[xlii] Warren Buffett was also very explicit about the interdependencies that are a result of massive trading in derivates: "Large amounts of risk, particularly credit risk, have become concentrated in the hands of relatively few derivatives dealers, who in addition trade extensively with one other. The troubles of one could quickly infect the others." (Buffett, 2003:14)

[xliii] In his Berkshire Hathaway Annual Report 2002 Buffett warned for negative impact financial derivatives could have. He called them 'time bombs, both for the parties that deal in them and the economic system" (Buffett, 2003:13).

[xliv] http://www.pbs.org/newshour/bb/business/july-dec08/crisishearing_10-23.html

[xlv] http://clipsandcomment.com/wp-content/uploads/2008/10/greenspan-testimony-20081023.pdf

[xlvi] http://banking.senate.gov/public/_files/FinancialReformSummaryAsFiled.pdf