

## Appendix A: Patterns of Denial

This appendix highlights certain patterns (in both words and deeds) that recur across most instances of organizational and market meltdown, from the Space Shuttle disasters to the current financial crisis.<sup>40</sup>

**1. Preposterous probabilities.** Feynman’s simple reasoning cited in the introduction makes clear that NASA management’s risk estimates –one thousand times lower than those of their own engineers– made no statistical sense. The housing-related bubble and buildup to the current financial crisis abound in even more extreme statements of confidence –nothing short of probability one. In an August 2007 conference with analysts, Joseph Cassano, head of A.I.G. Financial Services, asserted

“It is hard for us, without being flippant, to even see a scenario within any kind of realm of reason that would see us losing one dollar in any of those transactions...”<sup>41</sup>

As late as 2008, in a meeting with investors,

“Lehman’s chief financial officer, Erin Callan,... exuded confidence... With firms like Citigroup and Merrill raising capital, an investor asked, why wasn’t Lehman following suit? Glaring at her questioner, she said that Lehman didn’t need more money at the time –after all, it had yet to post a loss during the credit crisis. The company had industry veterans in the executive suite who had perfected the science of risk management, she said. “This company’s leadership has been here so long that they know the strengths and weaknesses... We know when we need to be worried, and when we don’t.” (Anderson and Duhig (2008))

Are such statements by top executives only cynical attempts to deceive investors and analysts about the quality of their balance sheet? While there is surely an element of moral hazard, this explanation falls short on several counts. First, absurd claims of zero risk in highly turbulent times are simply not credible, and thus more likely to be read as negative signals about the executive’s grasp of reality than reassurance about fundamentals. In fact, they typically do nothing to bolster a company’s share price, credit rating or prevent a run (see Sorkin (2008) for many examples).

Second, knowingly deceiving investors often leads to criminal prosecution and prison, as well as ruinous civil lawsuits and loss of reputation. A key aspect of self-delusion in such cases involves the expectation of “getting away” with fraud and cover-up, rather than ultimately sharing the fate of predecessors at Drexel Burnham Lambert, Enron, Worldcom, and many others.<sup>42</sup> Even abstracting from legal liability, selective blindness and collective rationalizations

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<sup>40</sup>In what follows, all the quotes concerning NASA come from The Rogers Commission Report (1986) and the Columbia Accident Investigation Board Final Report (2003).

<sup>41</sup>Cited in Morgenson (2008). Not coincidentally, this is the London unit (which he founded) that sank the company after selling over \$500 billion in credit default swaps that could not be covered.

<sup>42</sup>In 2007 alone the FBI made over 400 arrests in subprime-related cases (including top fund managers at Lehman Brothers) and had ongoing criminal investigations into 26 major financial companies including Countrywide

about the unethical nature of an organization's practices are key elements in the process that leads otherwise respectable citizens to take part in those practices (e.g., Sims (1992), Cohan (2002), Tenbrunsel and Messick (2004), Anand et al. (2005), Schrand and Zechman (2008)).

Third, identical claims of zero risk are made in settings where no large financial gain is involved and the downside can be truly catastrophic –as with NASA mission managers and financial regulators. Former FED Chairman Alan Greenspan's certainty that the new risks taken on by financial institutions were “dramatically –I should say, fully hedged” thus turned to “shocked disbelief” when the disaster scenario materialized a few months later.

**2. New paradigms: this time is different, we are smarter and have better tools.** Every case also displays the typical pattern of hubris, based on claims of superior talent or human capital. For A.I.G.'s Joseph Cassano, losses being simply unimaginable,

“The question for us is, where in the capital markets can we gain the best opportunity, the best execution for the business acumen that sits in our shop?”.

What Feynman termed “fantastic faith in the machinery” is also often vested in computer models and statistical data. Subprime lenders and the banks purchasing the derived CDO's could thus rely on “a wealth of information we didn't have before” (Countrywide), fed to sophisticated computer programs:

“It's like having a secret sauce; everyone had their own best formulas,” says Edward N. Jones, CEO of ARC Systems, which sold [underwriting and risk-pricing] technology to HSBC... and many of their rivals.” (BusinessWeek (2007))

Closely related is the argument that previous rules of accounting, risk management or economics no longer apply, due to some radical shift in fundamentals. Shiller (2005) documents how such “new era thinking”, variously linked to railroads, electricity, internet, demography or deregulation, was involved in nearly all historical episodes of financial bubbles and manias. Section 3 mentioned its latest incarnation –private equity as “a different investment technique... [that] adds real value.” One can also see it at work in government:

“The [senior White House] aide said that guys like me were “in what we call the reality-based community,” which he defined as people who “believe that solutions emerge from your judicious study of discernible reality.” I nodded and murmured something about enlightenment principles and empiricism. He cut me off. “That's not the way the world really works anymore,” he continued.” We're an empire now, and when we act, we create our own reality. And while you're studying that reality – judiciously, as you will – we'll act again, creating other new realities, which you can study too, and that's how things will sort out.” (Suskind (2004))

**3. Escalation, failure to diversify, divest or hedge.** Wishful beliefs show up not only in words but also in deeds. Enron's CEO Ken Lay resisted selling his shares throughout the long

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Financial, A.I.G., Lehman Brothers, Fannie Mae and Freddie Mac. These companies and their top executives (e.g., most of those cited in this appendix) are also being sued by several State attorney generals, in addition to countless shareholders groups, investors and borrowers.

downfall, pledging other assets to meet collateral requirements, even buying stock back later on and ending up ruined well before his legal troubles began (Eichenwald (2005), Pearlstein (2006)). The company’s employees, whose pension portfolios had on average 58% in Enron stock, could have moved out at nearly any point, but most never did (Samuelson (2001)). At Bears Stearns, 30% of the stock was held until the last day by employees –with presumably easy access to diversification and hedging instruments– who thus lost their capital together with their job. CEO James Cayne alone owned an unusually high 6% and went from billionaire to small millionaire in the process (spending most of the intervening months away playing golf and bridge). The pattern is similar at Lehman Brothers and other financial institutions.

Without looking to such extremes, Malmendier and Tate (2005, 2008) document many CEO’s tendency to delay exercising their stock options and how this measure of overconfidence is a predictor of overinvestment. Studying individual investors, finally, Karlsson, Loewenstein and Seppi (2006) find that many more go online to check the value of their portfolios on days when the market is up than when it is down.

Some of the most interesting evidence comes from cases in which an official inquiry or trial was conducted following a public- or private-sector disaster. Extensive records of meeting notes, memos, emails and sworn depositions reveal how key participants behaved, in particular with respect to information.

**4. Information avoidance, repainting red flags green and overriding alarms.** The most literal case of willful blindness occurred after the Columbia mission sustained a large foam strike to its wing’s thermal shield:

“At every juncture of [the mission], the Shuttle Program’s structure and processes, and therefore the managers in charge, resisted new information. Early in the mission, it became clear that the Program was not going to authorize imaging of [damage to] the Orbiter because, in the Program’s opinion, images were not needed. Overwhelming evidence indicates that Program leaders decided the foam strike was merely a maintenance problem long before any analysis had begun.”

Similar “head-in the sand” behavior was extensively documented at the Securities and Exchange Commission, even before its decade-long ignorance of Bernard Madoff’s giant Ponzi scheme was revealed. The Inspector General’s Report (S.E.C. (2008)) thus states:

“The audit found that [the Division of] Trading and Markets became aware of numerous potential red flags prior to Bear Stearns’ collapse, regarding its concentration of mortgage securities, high leverage, shortcomings of risk management in mortgage-backed securities and lack of compliance with the spirit of Basel II standards, but did not take actions to limit these risk factors.”

Instead, as reported in Labaton (2008), “the commission assigned [only] seven people to examine [the major investment banks] –which last year controlled... combined assets of \$4 trillion. Since March 2007, the office has not had a director. And as of last month, the office had not completed a single inspection since it was reshuffled by Mr. Cox [the SEC chairman] more than a year and a half ago.”

Similarly, at the FED...

“Edward M. Gramlich, a Federal Reserve governor... warned nearly seven years ago that a fast-growing new breed of lenders was luring many people into risky mortgages they could not afford. But when Mr. Gramlich privately urged Fed examiners to investigate mortgage lenders affiliated with national banks, he was rebuffed by Alan Greenspan... Mr. Greenspan and other Fed officials repeatedly dismissed warnings about a speculative bubble in housing prices... The Fed was hardly alone in not pressing to clean up the mortgage industry. When states like Georgia and North Carolina started to pass tougher laws against abusive lending practices, the Office of the Comptroller of the Currency successfully prohibited them from investigating local subsidiaries of nationally chartered banks.” (Morgenson and Fabrikant (2007))

... and the Treasury:

“In 1997, the Commodity Futures Trading Commission,... led by a lawyer named Brooksley E. Born... was concerned that unfettered, opaque trading could “threaten our regulated markets or, indeed, our economy without any federal agency knowing about it,” she said in Congressional testimony. She called for greater disclosure of trades and reserves to cushion against losses. Ms. Born’s views incited fierce opposition from Mr. Greenspan and Robert E. Rubin, the Treasury secretary then. Treasury lawyers concluded that merely discussing new rules threatened the derivatives market... In the fall of 1998, the hedge fund Long Term Capital Management nearly collapsed, dragged down by disastrous bets on, among other things, derivatives. Despite that event, Congress froze the Commission’s regulatory authority for six months. The following year, Ms. Born departed. In November 1999, senior regulators—including Mr. Greenspan and Mr. Rubin—recommended that Congress permanently strip the C.F.T.C. of regulatory authority over derivatives.” (Goodman (2008))

To avoid having to override alarms systems, it is sometimes simplest to turn them off from the start:

“The Commission was surprised to realize after many hours of testimony that NASA’s safety staff was never mentioned... No one thought to invite a safety representative or a reliability and quality assurance engineer to the [prelaunch] January 27, 1986, teleconference between Marshall [Space Center] and Thiokol. Similarly, there was no representative of safety on the Mission Management Team that made key decisions during the countdown on January 28, 1986. The Commission is concerned about the symptoms that it sees.”

Similarly, at Fannie Mae:

“Between 2005 and 2007, the company’s acquisitions of mortgages with down payments of less than 10% almost tripled... For two years, Mr. Mudd operated without a permanent chief risk officer to guard against unhealthy hazards. When Enrico Dallavecchia was hired for that position in 2006, he told Mr. Mudd that the company should be charging more to handle risky loans. In the following months to come, Mr. Dallavecchia warned that some markets were becoming overheated and argued that a housing bubble had formed... But many of the warnings were rebuffed... Mr. Dallavecchia was among those whom Mr. Mudd forced out of the company during a reorganization in August.” (Duhig (2008))

The cavalier misuse of computerized models and simulations beyond their intended purposes is also mirrored between the engineering and financial worlds. Thus,

“Even though [Columbia’s] debris strike was 400 times larger than the objects [the computer program] Crater is designed to model, neither Johnson engineers nor Program managers appealed for assistance from the more experienced Huntington Beach engineers, who might have cautioned against using Crater so far outside its validated limits. Nor did safety personnel provide any additional oversight.”

In the subprime-credit boom,

“Some trading desks [at major banks] took the most arcane security, made of slices of mortgages, and entered it into the computer if it were a simple bond with a set interest rate and duration... But once the mortgage market started to deteriorate, the computers were not able to identify all the parts of the portfolio that might be hurt.” (Hansell, 2008)

### **5. Normalization of deviance, changing standards and rationales.**

How do organizations react when what was not supposed to happen does, with increasing frequency and severity?

“This section [of the report] gives an insider perspective: how NASA defined risk and how those definitions changed over time for both foam debris hits and O-ring erosion. In both cases, engineers and managers conducting risk assessments continually “normalized” the technical deviations they found... Evidence that the design was not performing as expected was reinterpreted as acceptable and non-deviant, which diminished perceptions of risk throughout the agency... Engineers and managers incorporated worsening anomalies into the engineering experience base, which functioned as an elastic waistband, expanding to hold larger deviations from the original design. Anomalies that did not lead to catastrophic failure were treated as a source of valid engineering data that justified further flights... NASA documents show how official classifications of risk were downgraded over time.”

The same pattern of normalizing close calls with disaster shows up as a precursor to corporate scandals and financial meltdowns. Several years before Ken Lay failed to heed V.P. Sherron Watkins’ urgent plea that he and the CAO “sit down and take a good, hard, objective look at what is going to happen to Condor and Raptor [ventures] in 2002 and 2003”, lest the company “implode in a wave of accounting scandals”, he had refused to fire two high-revenue-generating oil traders after learning that they had stolen millions from the company and forged financial documents to hide it. A year later, those very same “rogue” traders used again falsified books to make huge unauthorized bets on oil prices, which went sour and exposed the company to several hundred millions dollars of potential losses (Eichenwald (2005)). In a near repeat scenario, in 2004 AIG Financial Services caused the parent company to be fined \$126 million for helping clients engage in tax and accounting fraud. Yet the same manager (J. Cassano) remained in charge and was even put on the newly formed committee in charge of quality and risk control –until his unit blew up the company four years later.

**6. Reversing the burden of proof.** At the Beech-Nut Corporation in late 1970's, tests by the main food scientist suggested that the apple concentrate from a new (and cheaper) major supplier was probably adulterated. Top management responded by telling scientists that the company would not switch suppliers unless they could absolutely prove that it was. At the same time, they made it more difficult for them to conduct inspections.<sup>43</sup> Similarly, at NASA,

“When managers... denied the team’s request for imagery, the Debris Assessment Team was put in the untenable position of having to prove that a safety-of-flight issue existed without the very images that would permit such a determination... Organizations that deal with high-risk operations must always have a healthy fear of failure – operations must be proved safe, rather than the other way around. NASA inverted this burden of proof...”

Similar reversals of evidentiary standards and shifting rationales were also documented in the decision process leading to the second Iraq war, particularly on the issue of weapons of mass destruction (Hersh (2004), Isikoff and Corn (2007)).

**7. Malleable memories: forgetting the lessons of history.** The commission investigating the Columbia accident was struck by how the same patterns had repeated themselves six years after Challenger:

“The Board found that dangerous aspects of NASA’s 1986 culture, identified by the Rogers Commission, remained unchanged... Despite the constraints that the agency was under, prior to both accidents NASA appeared to be immersed in a culture of invincibility, in stark contradiction to post-accident reality. The Rogers Commission found a NASA blinded by its “Can-Do” attitude... which bolstered administrators’ belief in an achievable launch rate, the belief that they had an operational system, and an unwillingness to listen to outside experts.”

In the financial and regulatory worlds, the lessons of LTCM were also quickly forgotten, as were those of the internet bubble a few years later. Such failures of individual and collective memory are recurrent. They were even pointed out (and then forgotten) by a key observer and participant:

“An infectious greed seemed to grip much of our business community... The trouble, unfortunately, is that the shock of what has happened will keep malfeasance down for a while. But human nature being what it is –and memories fade– it will be back. And it is important that at that time appropriate legislation be in place to inhibit activities that we would perceive to be inappropriate.” (Greenspan (2002))

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<sup>43</sup>The product was later shown to be 100% artificial. Beech-Nut was convicted and paid several million in fines and class-action settlements, while the CEO and the former Vice-President of manufacturing were sentenced to jail (Sims (1992)).