

# **HOW PSYCHOLOGICAL PITFALLS GENERATED THE GLOBAL FINANCIAL CRISIS**

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## **Abstract**

The root cause of the financial crisis that erupted in 2008 is psychological. In the events which led up to the crisis, heuristics, biases, and framing effects strongly influenced the judgments and decisions of financial firms, rating agencies, elected officials, government regulators, and institutional investors. Among the many lessons to be learned from the crisis is the importance of focusing on the behavioral aspects of business process. Examples involving UBS, Merrill Lynch, Citigroup, Standard & Poor's, and the SEC illustrate this point. The examples provide support for a position arguing behavioral finance needs to be much better integrated into business school education. The extent of process failure prior to the crisis suggests when it comes to integrative education, behavioral corporate finance is especially germane.

## 1. Introduction

The root cause of the global financial crisis that began in September 2008 is psychological, not fundamental. Phenomena such as risk seeking in the domain of losses, excessive optimism, and confirmation bias were the driving factors behind the crisis, not fundamental factors such as rising oil prices, terrorist acts, or disruptive changes in weather.

In this paper I use a series of specific cases to describe how psychological phenomena impacted judgments and decisions at various points along the supply chain for financial products, particularly home mortgages. Certainly the rapid rise in U.S. housing prices was pivotal. Consider some history. From 1997 to 2006 U.S. home prices rose about 85 percent adjusted for inflation, making it the biggest national housing boom in U.S. history. The rate of increase was five times the historical rate of 1.4 percent a year. Because of extrapolation bias, also known as “hot hand fallacy,” the sentiment of many people had been that housing prices would continue to increase by about 10 percent a year. This belief supported a dramatic increase in the volume of subprime mortgages, especially mortgages with no documentation and little or no down payment required.

Housing prices peaked in December 2006 and then declined by 30 percent over the twenty-six months. During the decline, many new homeowners found that the value of their mortgages exceeded the value of their homes. Some in this situation chose to default on their mortgages. Some homeowners had taken out adjustable rate mortgages with low initial rates that after a period of time would reset to rates that were much higher. These homeowners were planning on refinancing before rates reset. However, once housing prices began to decline, they found that they did not qualify for refinancing. Many were unable to afford the higher rates and had to default.

The mortgage product supply chain began with mortgage initiation by financial institutions such as Indy Mac, Countrywide, and Washington Mutual. It continued with firms such as Fannie Mae and Freddie Mac who purchased and securitized mortgages, and with investment banks such as Lehman Brothers, Merrill Lynch, Citigroup, and UBS, who created and sold collateralized debt obligations based on mortgage backed securities. The supply chain also included financial firms such as American International Group (AIG), who insured against the risk of default by selling credit default swaps. The risks of

both the products and financial firms were rated by rating agencies, such as Moody's and Standard and Poor's. At the end of the supply chain were end investors, such as pension funds and municipal governments, who ultimately held the claims to cash flows generated by the mortgages. Along the way, the supply chain was subject to regulation by various bodies such as the Securities and Exchange Commission (SEC), The Board of Governors of the Federal Reserve, the Federal Reserve Bank of New York, the Office of Thrift Supervision.

Two related issues permeated the supply chain: an asset pricing bubble in the housing market and behavior inconsistent with the predictions of the Akerlof "lemons" model. The effect of the asset pricing bubble was that most participants in the supply chain failed to recognize its existence, underestimated the probability of mortgage default, and traded assets that were mispriced. The lemons model predicts the collapse of trade, resulting for example in a credit freeze, as rational agents who perceive themselves to be at an information disadvantage assume the worst when forming their expectations. Despite the opaqueness of securitized asset pools, collateralized debt obligations, and credit default swaps, with their attendant information asymmetries, the mortgage trade did not collapse but thrived. Undue trust on the part of end investors, in combination with reliance on the judgments by rating agencies, played critical roles.

To help fix ideas, I present four specific cases to highlight the psychological dimension of the crisis at various points along the supply chain. The cases feature: (1) UBS, a financial firm; (2) Standard and Poor's (S&P), a ratings firm; (3) the investment committee for the town of Narvik, Norway, an institutional investor; and (4) the Securities and Exchange Commission (SEC), a regulatory agency. I use these cases to make two points.

First, a common thread links the psychological phenomena that affected the judgments and decisions of the various participants along the supply chain. In this respect, a relatively small set of psychological elements were especially germane to the creation of the crisis.

Second, the psychological errors and biases underlying the financial crisis can largely be traced to specific organizational processes. These processes involve the setting of standards, planning, incentives, and sharing of information. Shefrin (2008a)

emphasizes that these processes are the major loci of behavioral biases within organizations.<sup>1</sup>

The four specific cases which are the focus of this paper are intended to be representative. For example, UBS is hardly unique among investment banks, as the fates of Lehman Brothers, Merrill Lynch, and Bear Stearns illustrate. Indeed, in April 2009, *The Washington Post* reported that banks relied on intuition instead of quantitative models to assess their exposure to a severe downturn in the economy. This statement was based on interviews with staff at the Federal Reserve Bank of New York and the Government Accountability Office. Similar statements have been made about AIG. The insurance firm sold approximately \$450 billion of credit default swaps, and required a government bailout of \$182 billion to stay solvent after being unable to post collateral when its credit rating was reduced.

At present, business education and training places far too little emphasis on understanding, identifying, and addressing psychological distortions in judgments and decisions. An important lesson from the financial crisis is that in the future, finance professionals need to be better prepared in dealing psychological challenges. The list of financial professionals includes analysts, investment managers, corporate managers, government regulators, and institutional investors.

The remainder of the paper proceeds as follows. Section 2 reviews some basic insights from the psychology of risk taking. Sections 3 through 6 present the four cases. Section 7 contains concluding comments.

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<sup>1</sup> I recommend that business school programs modify their curricula so that behavioral issues are integrated into regular course offerings. In Shefrin (2008a) I suggest that finance courses be restructured to teach students how psychological impediments routinely prevent managers from putting into practice techniques that lie at the core of traditional business education. Integration would be enhanced if behavioral corporate finance were to be taught in conjunction with traditional corporate finance. Beyond this, I suggest that business schools provide structured education for building effective, integrated organizational processes focused on standards, planning, incentives, and the sharing of information. I also recommend that courses in investment and asset pricing courses be revamped to include a major behavioral component, along the lines described in Shefrin (2008b). Such a component would include a behavioral framework for the pricing of derivatives, an issue of considerable importance in respect to the 2008 financial crisis.

## 2. Psychology of Risk Taking

There are many concepts involved in the psychology of risk. Examples include aversion to a sure loss, excessive optimism, overconfidence, extrapolation bias, confirmation bias, conservatism, the affect heuristic, and groupthink. Excessive optimism leads people to look at the world through glasses that are rose-colored. Overconfidence leads people to be too sure of their opinions, a tendency which frequently results in their underestimating risks. Extrapolation bias leads people to forecast that recent changes will continue into the future. Confirmation bias leads people to overweight information which confirms their prior views, and to underweight information which disconfirms those views. Conservatism is the tendency to overweight base rate information relative to singular (or new) information. The affect heuristic refers to the making of judgments based on having positive or negative feelings rather than underlying fundamentals. Groupthink leads people in groups to act as if they value conformity over quality when making decisions.

Aversion to a sure loss occurs in several of the cases discussed below. To illustrate the concept, consider a psychological choice problem from Tversky and Kahneman (1986).

Imagine that you face the following pair of concurrent choice tasks. First examine the decision tasks. Then indicate your choices in the knowledge that you will later learn the outcome of your choices simultaneously.

Choice task 1: Choose between

A. a sure \$2,400

B. 75% chance of \$0  
25% chance of \$10,000

Choice task 2: Choose between

C. a sure \$7,500 loss

- D. 75% chance of losing \$10,000  
25% chance of losing \$0

The most frequent response pattern for these choices is that most people choose the sure gain A over the risky alternative B, and most choose the risky alternative D over the sure loss C. This experiment has several implications.

1. Gains and losses are the psychological carriers of value, not final asset position.
2. When only gains are involved, most people are averse to risk.
3. If only losses are involved and there is a chance to avoid a sure loss, most people are risk seeking, a phenomenon known as *aversion to a sure loss*.
4. If you were to compare how A&D combine to how B&C combine, you would discover that B&C is the better combination. Effectively facing B&C is equivalent to facing A&D but receiving an extra \$100 on top. Because most people do not work out the combination, the decision frame is opaque rather than transparent, and the lack of transparency induces them to make an inferior choice.

Next turn to the four cases, beginning with the Swiss bank UBS.

### **3. UBS**

At the end of 2007, UBS announced that it would write off \$18 billion of failed investments relating to subprime housing market in the U.S. In April 2008, the writeoffs increased to \$37 billion, and then rose above \$50 billion. In October 2008, the Swiss central bank announced its intention to take \$60 billion of toxic assets off UBS's balance sheet, and to inject \$6 billion of equity capital.

For UBS, these writeoffs were the result of having ineffective processes in place that failed to address psychological biases. Notably, biases permeated many of the decisions UBS made in connection with subprime mortgages and financial derivatives. In

Shefrin (2008a) I argue that processes for planning, standards, incentives, and information sharing are the organizational loci for behavioral vulnerabilities. In April 2008, UBS published a report (UBS, 2008) detailing the reasons for its losses. UBS's retrospective review focused on root causes with the view toward improving the organization's processes.

Below is a discussion of the UBS report, viewed through the prism of the four processes emphasized in Shefrin (2008a). I begin with planning.

### **3.1. Planning**

In setting its financial plan for the period 2006 – 2010, UBS aimed for a significant revenue increase, but did not seek to change its risk profile substantially. The firm engaged the services of an external consultant,<sup>2</sup> who compared UBS's past performance to its chief competitors. Notably, UBS's performance trailed those of its competitors. To close the competitive gap, the consultant recommended that UBS increase its investment in subprime mortgage backed securities (MBS) and adjustable rate mortgage products (ARMs).

Although subprime was specifically identified as providing significant revenue growth opportunities, the consultant's review did not consider the implications for UBS's risk capacity. Given that risk and return lie at the heart of finance, and that subprime mortgages feature more default risk than higher rated mortgages, it seems odd that the consulting firm did not address the implications of recommendations for risk? What about UBS itself? How did they respond?

### **3.2. Standards for Risk**

Standards include targets and goals that relate to accounting controls including limits. Here is how UBS reacted to the consulting firm's failure to address the

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<sup>2</sup> UBS relied on McKinsey for consulting services. P Wuffli, who was UBS Investment Bank CEO at the time, had previously been with McKinsey.

implications of its recommendations for risk. UBS did not develop any operational limits that would restrict the firm's overall exposure to subprime loans, securities, and derivatives.

Was this prudent? Did UBS effectively ignore risk for psychological reasons? One possibility is that by virtue of being behind the competition, the appetite of UBS executives increased to the point where they became risk neutral, if not risk seeking. Recall the psychological choice task discussed in section 2. Two of the key findings from the psychology of risk are: (1) people frame decision tasks in terms of gains and losses relative to a reference point; and (2) people have difficulty accepting a sure loss and often choose a risky alternative instead, even if that alternative features a lower expected payoff.

UBS's internal report suggests that the reference point for the company corresponded to the performance of their competitors. In 2005, UBS recognized that of all their investment banking businesses, they faced the widest competitive gap in fixed income. Notably, their position in fixed income had been declining relative to their leading competitors since 2002. Because they were behind the competition, aversion to a sure loss might have induced them to be risk seeking. That might explain why they would not institute limits to their subprime exposure.

Collateralized debt obligations (CDOs) are akin to mutual funds where the funds hold bonds instead of stocks. In addition, the funds' investors hold bonds with varying degrees of priority in the event of default, where investors pay lower prices for riskier tranches. Holders of the equity tranche absorb the first losses stemming from default. If, at some point, the holders of the equity tranche receive zero cash flows from the underlying assets, holders of the next tranche begin to absorb losses. Holders of the senior tranche are the most protected. There might also be a super senior tranche. If the CDO used leverage, meaning they borrowed money to purchase assets for the CDO, then some party would have to stand ready to absorb the losses, once the holders of the senior tranche receive no cash flows. Holders of the super senior tranche stand ready to play this role. Instead of paying to participate in the CDO, they receive payments which are analogous to insurance premiums.

UBS's investment banking unit did hold super senior positions, and they did consider the risk of those positions. Rating agencies such as Moody's and Standard & Poor's rated CDO tranches, a point to which I return below. The investment banking unit's risk management group did use methodologies for Market Risk Control (MRC) and VaR (Value at Risk), but these methodologies relied on the AAA rating of the super senior positions.

In relying solely on risk ratings, the risk management group did no independent analysis. UBS's report explains that in analyzing their mortgage-related positions, the risk management group did not "look through" the CDO structure to assess the risks of the underlying collateral. In other words, UBS did not investigate the underlying fundamentals. They made no attempt to investigate key statistics related to the U.S. housing market such as loan to value ratios, percent of loans that featured 100 percent financing, limited documentation loans, and default rates. Between 2001 and 2006, the following occurred: Combined loan to value rose from 80 percent to 90 percent; the percent of loans that were 100 percent financing climbed from 3 percent to 33 percent; limited documentation loans climbed from 27 percent to 46 percent. These trends are like powder kegs waiting for a match.

As to defaults, the underfocus on fundamentals in combination with an overfocus on historical default rates, an example of conservatism bias, gave rise to the "risk-free illusion." UBS's CDO desk considered a super senior position to be fully hedged if it was hedged with 2 percent or more of amplified mortgage portfolio (AMPS) protection. This meant that UBS erroneously thought that they had hedged their positions sufficiently, and that the associated VaR was effectively zero.

### **3.3. Information Sharing**

One of the key lessons from the psychological choice task described in section 2 is that people's decisions reflect the manner in which information is presented to them. Information can be presented transparently or opaquely.

Think back to the psychological choice problem described in section 2. Remember that even though facing B&C is superior to facing A&D, most people choose A&D instead of B&C. If the information is described transparently so that most people clearly see that facing B&C is equivalent to facing A&D and receiving an extra \$100 on top, virtually everyone will choose B&C over A&D. However, if the information is presented opaquely, then most people choose the inferior A&D over the superior B&C.

Why does the opaque presentation of the information lead people to make inferior choices? They do so because they evaluate A vs. B and C vs. D separately. Their choices are siloed into what are called mental accounts, a phenomenon known as narrow framing.

The silo point is important. UBS's report criticizes its risk managers for opaquely presenting information about risks to be managed and decisions to be taken. The report explicitly states that risks were siloed within risk functions without risk managers making any attempt to present a holistic picture relating to underlying economic conditions or market fundamentals. When risk managers finally recognized the deteriorating values of their subprime positions, they mistakenly assumed that the problem was restricted to subprime and would not impact the values of their other asset backed security positions.

As a general manner, risk managers did not properly share information with those who needed the information, and the information they did share was overly complex, and often out of date. As examples of what went wrong, risk managers often netted long and short positions, which obscured the manner in which positions were structured, and did not make the inventory of super senior positions clear.

Information sharing takes place as part of the deliberations about which decisions to take. UBS managers exhibited groupthink by not challenging each other in respect to the way their various businesses were developing. UBS's post-mortem analysis singled out the fixed income strategy for not being subject to critical challenge, especially in view of the magnitude of the positions taken.

UBS's risk managers also appeared to exhibit confirmation bias. As the firm began to experience losses on their inventories of mortgage backed securities in the first and second quarters of 2007, the risk management team did not implement additional risk methodologies. Then matters get worse. The CDO desk presented a pessimistic outlook about the subprime markets to the investment banking group's senior management. This

did not confirm the bank's general perspective about subprime investments. Indeed, UBS actually responded by increasing its holdings of mortgage backed securities, with the CDO desk preparing a paper to support the action!

### **3.4. Incentives**

In theory, compensation provides managers with incentives to maximize the value of their firms. Compensation frameworks often rely on a combination of a bonus plan that relates to the short-term and equity-based compensation that relates to the long-term.

In practice, UBS's compensation system was plagued by at least three serious flaws. The first flaw was that UBS's incentive structure did not take risk properly into account. Keep in mind that fundamental value is based on discounted cash flow, where the discount rate reflects risk as well as the time value of money. Higher risk leads to a higher discount rate and therefore to lower discounted cash flows. UBS's compensation structure barely took risk issues into consideration and made little if no adjustment for risk. Therefore, employees had no direct incentive to focus on risk when making decisions, especially decisions about positions involving subprime mortgages and their associated derivatives.

The second flaw concerned undue emphasis on short-term profit and loss (P&L) in overall employee compensation including bonuses, with insufficient attention to the implications of decisions about positions for long-term value. To be sure, the compensation structure featured an equity component. However, the bonus focus dominated. Bonus payments for successful and senior fixed income traders were significant, including those in businesses holding subprime positions. In particular, UBS based bonuses on gross revenue after personnel costs, but did not take formal account of the quality or sustainability of earnings.

The third flaw was that UBS's incentives did not differentiate between returns generated by skill and returns generated by cost advantages. No special arrangements were made for employees in the businesses that held subprime positions.

## **4. Standard & Poor's**

In the previous section, I mentioned that rating agencies assigned triple-A ratings to mortgage-related securities that were quite risky. In turn, many investors purchased these securities under the impression that they were safe, and paid the price when housing prices declined and default rates rose. Financial intermediaries, such as UBS, also paid a steep price when the securities they held in inventory declined in value and became illiquid.

In this section, I discuss the psychological issues that affected the judgments and decisions by rating agencies. In terms of process, planning, standards, incentives,<sup>3</sup> and information sharing were all germane, as were agency issues.

### **4.1. Standards and Planning at S&P**

Consider some background. In August 2004, ratings firm Moody's unveiled a new credit-rating model that enabled securities firms to increase their sales of top-rated subprime mortgage-backed bonds. The new model eliminated a non-diversification penalty that was present in the prior model, a penalty which applied to concentrated mortgage risk. According to Douglas Lucas, head of CDO research at UBS Securities LLC in New York, Moody's was pressured to make the change. He is quoted by Bloomberg (Smith, 2008) as having stated: "I know people lobbied Moody's to accommodate more concentrated residential mortgage risk in CDOs, and Moody's obliged." Interestingly, Lucas had been an analyst at Moody's, and claims to have invented the diversity score in the late 1980s.

Notably, Moody's competitor Standard & Poor's (S&P) revised its own methods one week after Moody's did so. I suggest that in important ways, the situation at S&P shared common traits with the situation at UBS. Both UBS and S&P found themselves

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<sup>3</sup> The discussion focuses on three of the four processes. Financial incentives appear not to be as germane as the other three.

behind their respective industry leaders, and perceived themselves psychologically to be in the domain of losses. As a result, both firms made choices that moved them in the direction of risk seeking behavior.

*The Wall Street Journal* reports that in August 2004, S&P commercial mortgage analyst Gale Scott wrote to colleagues with the following message: “We are meeting with your group this week to discuss adjusting criteria for rating CDO’s of real-estate assets . . . because of the ongoing threat of losing deals.” See Lucchetti (2008b). Richard Gugliada, a former S&P executive who oversaw collateralized-debt obligations from the late 1990s until 2005, replied to Ms. Scott's email, saying: “OK with me to revise criteria.” See Smith (2008). Commercial-mortgage rating criteria were changed after several meetings. According to an S&P report that Scott co-wrote in May 2008, the change in criteria directly preceded “aggressive underwriting and lower credit support” in the market for commercial mortgage-backed securities from 2005 to 2007. The report went on to say that this led to growing delinquencies, defaults and losses.

Consider Standard & Poor’s against the backdrop of its parent organization McGraw-Hill. According to reports that appeared in *The Wall Street Journal*, CEO and Chair Harold McGraw established unrealistic profit goals for his organization. See Lucchetti (2008a). I suggest that these goals induced risk-seeking behavior in the rating of mortgage related products. *The Wall Street Journal* reported that because McGraw-Hill had been suffering in other areas, it exerted pressure for S&P to expand 15 percent to 20 percent a year. In this respect, McGraw-Hill’s financial-services unit, which includes S&P, generated 75 percent of operating profit at McGraw-Hill in 2007, up from 42 percent in 2000. In 2007, the ratings business generated a third of revenue at McGraw-Hill.

Goal setting is the basis for establishing standards and planning is where goals are folded into strategy. S&P’s efforts to achieve its goals focused on increasing its revenues from rating mortgage related products while keeping its costs down. In regard to the latter, Richard Gugliada told *Bloomberg* that he was given tough budget targets.

According to Lucchetti (2008a), the combination of high revenue goals and low cost goals led understaffed analysts to underestimate the risks of mortgage related products.

Consider how the risks played out over time. Before the collapse in housing prices, S&P and Moody's earned approximately three times more from grading CDOs than from grading corporate bonds. However, once housing prices began to decline and homeowners began to default, raters eventually downgraded most of the AAA-rated CDO bonds that had been issued in the prior three years. On July 10, 2008 Moody's reduced its ratings on \$5.2 billion in subprime-backed CDOs. The same day, S&P said it was considering reductions on \$12 billion of residential mortgage-backed securities. By August 2007, Moody's had downgraded 90 percent of all asset-backed CDO investments issued in 2006 and 2007, including 85 percent of the debt originally rated Aaa. S&P reduced 84 percent of the CDO tranches it had rated, including 76 percent of all those rated AAA.<sup>4</sup>

## **4.2. Information Sharing**

Former employees at S&P provide insights into the nature of how information was shared about rating CDOs. Kai Gilkes is a former S&P quantitative analyst in London. The following comments in Smith (2008) recreate the tenor of the discussion about the sharing of information and points of view.

“ ‘Look, I know you're not comfortable with such and such assumption, but apparently Moody's are even lower, and, if that's the only thing that is standing between rating this deal and not rating this deal, are we really hung up on that assumption?’ You don't have infinite data. Nothing is perfect. So the line in the sand shifts and shifts, and can shift quite a bit.”

Gilkes' remark about shifting sands needs to be understood in the context of group process. The behavioral decision literature emphasizes that groups mitigate the biases of their members when the tasks feature clear correct solutions, which everyone can confirm once the solution has been presented. However, for judgmental tasks, where there is no clear, correct solution, groups actually exacerbate the biases of their members.

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<sup>4</sup> Still, in the last week of August 2007, Moody's assigned Aaa grades for at least \$12.7 billion of new CDOs, which would be downgraded within six months.

Gilkes “shifting sands” remark effectively points to the judgmental character of the ratings decision.

Additional insight about the sharing of information and exchange of viewpoints came from Richard Gugliada, who told *Bloomberg* that when a proposal to tighten S&P’s criteria was raised, the co-director of CDO ratings, David Teshler, responded: “Don’t kill the golden goose.”

Was groupthink an issue here? In retrospect, Gugliada stated that competition with Moody’s amounted to a “market-share war where criteria were relaxed.” “I knew it was wrong at the time. It was either that or skip the business. That wasn’t my mandate. My mandate was to find a way. Find the way.” See Smith (2008).

To be sure, analysts at S&P were not oblivious to the possibility of a housing bubble. In 2005, S&P staff did predict that the housing market was in a bubble which might lead housing prices to decline by 30 percent at some stage. However, at some stage could mean next month or ten years hence. With bubbles, the timing for when they burst is highly uncertain. The report was discussed internally, including its implications for ratings, but the discussion did not alter the rating methodology.

S&P tells investors that their ratings are but one piece of information about securities, and that ratings are not a perfect substitute for being diligent about acquiring additional information to assess security risk. S&P’s protocol was to accept the documentation as presented, and issue a rating conditional on the information. Their practice was not to verify that documentation. If they rated a security based on limited documentation mortgages, they did not seek to verify whether or not the information was correct. However, as noted below, investors tended to treat AAA ratings on mortgage related securities as unconditional ratings.

To be sure, some of the analysts engaged in rating CDOs were highly skeptical of their assignments, and shared this information with colleagues. Lucchetti (2008b) reports that one S&P analytical staffer emailed another saying that a mortgage or structured-finance deal was “ridiculous” and that “we should not be rating it.” The other S&P staffer replied that “we rate every deal,” adding that “it could be structured by cows and we would rate it.” An analytical manager in the CDO group at S&P told a senior analytical manager in a separate email that “rating agencies continue to create” an “even bigger

monster -- the CDO market. Let's hope we are all wealthy and retired by the time this house of cards falters. ;O)"

## **5. Narvik**

At the end of the supply chain for financial products are the investors who purchased and held the complex securities at the heart of the story.

Narvik, Norway, population 17,000, is a community located above the Arctic Circle. The town was featured in a February 2009 CNBC documentary entitled "House of Cards" which explained the financial crisis. The program noted that Narvik had been losing population and its tax base. To address the issue, its local council invested \$200 million in a series of complex securities including CDOs. The purchase of the CDOs was part of a larger strategy in which the town took out a loan, using as collateral future revenues from its hydroelectric plant, and invested the proceeds in complex securities, with the intent of capturing the spread. It ended up losing \$35million, roughly a quarter of its annual budget.

There are a number of psychological features that tie the situation in Narvik to the discussion in previous sections. First, given the decline in population and tax revenues, the council members in Narvik quite plausibly perceived themselves to be operating in the domain of losses. They were owners of cash flows derived from their hydroelectric plant, but swapped these for what they hoped would be higher cash flows from US mortgages and municipal bond payments.

Second, the council insists that the securities they purchased were represented to them as very safe, triple A. This is an example of the affect heuristic, a fancy term for gut instinct, in that triple A status generated positive emotions that were central to their decision.

Third, the mayor of Narvik, Karen Kuvaas insists that the council members were not naïve. In this respect, she might be overconfident as she also admits to not having read the prospectus before signing off on the deal, and not being aware that in the event

some of the securities declined in value, Narvik would have to post payments. Her statement reflects the affect heuristic as well.

## **6. The SEC**

Consider next how psychological biases affected decisions at the Securities and Exchange Commission (SEC). On April 28, 2004 the SEC, with little fanfare, dramatically raised leverage ratios for the five largest U.S. investment banks. The higher leverage ratios allowed these firms to take expose themselves to much greater risks than was otherwise the case. This section documents the history of the deliberations associated with the SEC's decision. At the time, William Donaldson headed the agency.

### **6.1. Standards: The Net Capital Rule**

Prior to April 2004, leverage limits for investment banks were given by the net capital rule. The net capital rule stipulates a standard in connection with leverage. It was created in 1975 to allow the SEC to oversee broker-dealers, meaning companies that trade securities for customers as well as their own accounts. The rule required that firms value all of their tradable assets at market prices, and then applied a "haircut," or a discount, to account for the assets' market risk.

The net capital rule required that broker dealers limit their debt-to-net capital ratio to 12-to-1, and must issue an early warning if they begin approaching this limit. Because the rule stipulated that broker-dealers stop trading if they exceed it the limit, broker dealers often kept their debt-to-net capital ratios much lower.

Prior to 2004, the SEC had limited authority to oversee investment banks. In 2004, the European Union passed a rule allowing the SEC's European counterpart to manage the risk both of broker dealers and their investment banking holding companies. In response, the SEC instituted a similar, voluntary program for broker dealers with capital of at least \$5 billion, enabling the agency to oversee both the broker dealers and the holding companies. U.S investment banks, anxious to avoid European oversight,

lobbied the SEC for the change. In doing so, they requested that along with the additional oversight they be allowed much higher leverage limits.

This alternative approach, which all five broker-dealers that qualified -- Bear Stearns, Lehman Brothers, Merrill Lynch, Goldman Sachs, and Morgan Stanley -- voluntarily joined, altered the way the SEC measured their capital. Using computerized models, the SEC, under its new Consolidated Supervised Entities (CSE) program, allowed the broker dealers to increase their debt-to-net-capital ratios, sometimes, as in the case of Merrill Lynch, to as high as 40-to-1. It also removed the method for applying haircuts, relying instead on another mathematical model for calculating risk that led to a much smaller discount.

The SEC justified the less stringent capital requirements by arguing it was now able to manage the consolidated entity of the broker dealer and the holding company, which would ensure that it could better manage the risk.

## **6.2. Information Sharing**

Appearing below are excerpts of the transcript from the April 28, 2004 meeting. In the first excerpt, SEC Commissioner (at the time) Harvey Goldschmid directs a question to an SEC staffer. As you read through the excerpt, ask yourself whether the SEC staffer might have been overconfident in the agency's ability to oversee the risk management practices at the five major investment banks.

Harvey Goldschmid: We've talked a lot about this. This is going to be much more complicated -- compliance, inspection, understanding of risk -- than we've ever had to do. Mike, I trust you no end, but I take it you think we can do this.

Group: Laughter.

Mike: Well we've hired Matt Eichler and other folks as well who are skilled in quantitative analysis. They're both PhDs right now. And we've hired other people

as well who are quantitatively skilled. So we're going to continue to develop that staff. And then we have a good accounting staff as well. And then our auditors in New York, as well as in Washington will be useful in this process.

I mean, so we're going to have to depend on the firms, obviously. They're frontline. They're going to have to develop their entire risk framework. We'll be reading that first. And they'll have to explain that to us in a way that makes sense. And then we'll do the examinations of that process. In addition to approving their models and their risk control systems.

It's a large undertaking. I'm not going to try to do it alone.

Group: Laughter.

What do the two instances of group's laughter in this excerpt indicate? Do they suggest an inner sense that the agency staff is overconfident about its ability to do the job with two PhDs, some additional quantitatively oriented personnel, and agency accountants and auditors? In this respect, consider another excerpt involving Goldschmid and Annette Nazareth, who at the time was the Commission's Director of the Division of Market Regulation.

Goldschmid: We've said these are the big guys but that means if anything goes wrong, it's going to be an awfully big mess.

Group: Laughter

Annette Nazareth: Again, we have very broad discretionary ... As we mentioned, we're going to be meeting with these firms on a monthly basis. And hopefully from month to month you don't see wild swings. Among other things, we can require firms to put in additional capital, to keep additional capital against the

risks. We can actually -- the commission has the authority to limit their ability to engage in certain businesses, just as any prudent regulator would. We have hopefully a lot of early warnings and the ability to constrict activity that we think is problematic.

Goldschmid: I think you've been very good at thinking this through carefully and working this through with skill...

Notice the nervous laughter again. The deliberations to establish the CSE, a sea change in the regulatory framework, lasted less than an hour. The vote by the Commission was unanimous. There was very little in the way of probing for weakness in such a far reaching proposal. Overconfidence was high. Confirmation bias was high. This is the kind of setting in which groupthink thrives.

There was but one criticism in the SEC's record, and it was not part of the deliberations in April 2004. One Leonard D. Bole, who earned a master's degree in business administration at the University of Chicago, and wrote computer programs that financial institutions use to meet capital requirements, wrote to the commission on January 22, 2004. See Labaton (2008).

Bole was concerned with overconfidence on the part of the investment banks in respect to their risk management models. In his letter, he wrote: "Has the trading environment changed sufficiently since 1997, when the current requirements were enacted, that the commission is confident that current requirements in examples such as these can be disregarded?" He reminded the SEC that similar computer standards had failed to protect Long-Term Capital Management from collapsing in 1998, as well as investors who thought they were protected from the stock market crash of October 1987. Bole received no response from the SEC to his letter.

### **6.3. Planning and Budgeting**

It is difficult to know whether the SEC would have been up to the task of overseeing the risk profiles of the five major investment banks. This was because the SEC devoted very few resources to the task. When Christopher Cox was appointed to head the SEC in 2005, the CSE was a low priority. The commission assigned just seven people to examine the parent companies — which in 2007 controlled financial empires with combined assets of more than \$4 trillion. Since March 2007, the office did not have a director. As of September 2008, the office had not completed a single inspection.

In February 2009 Linda Thomsen, the director of enforcement at the SEC, resigned under pressure. It was under her watch that Wall Street investment banks took disastrous risk management decisions and the Bernard Madoff Ponzi scheme went undetected. Despite the CSE program, the collapse of Bear Stearns came as a real surprise. In describing her resignation, the press noted that she should not have to bear the entire blame for these failures, noting that SEC chairman Christopher Cox set the tone for weak regulatory oversight, including public criticism of SEC staff.

Goldschmid and Donaldson left the commission in 2005. In an October 2008 interview with *The New York Times*, Goldschmid reflected: “In retrospect, the tragedy is that the 2004 rule making gave us the ability to get information that would have been critical to sensible monitoring, and yet the SEC didn’t oversee well enough.” See Labaton (2008).

## **7. Concluding Remarks**

The list of psychological phenomena that are central to the global financial crisis is reasonably short. The key elements include aversion to a sure loss, extrapolation bias, overconfidence, confirmation bias, groupthink, the affect heuristic, and narrow framing. These biases were prevalent along the entire supply chain of mortgage-based financial products, impacting homeowners, mortgage originators, investment banks, rating agencies, regulators, and investors.

Extrapolation bias was a key driver of the housing bubble. This trait, in combination with aversion to a sure loss, were central drivers of the behavior exhibited by investment banks such as UBS, Merrill Lynch, and Citigroup, and rating agencies such as Standard & Poor's. Notably, the loci for psychological vulnerabilities within organizations can be traced to key processes for planning, standards, incentives, and information sharing. This statement holds, not just for the investment banks and rating agencies, but for regulatory bodies and institutional investors as well.

The application of behavioral corporate finance and behavioral asset pricing theory emphasized by Shefrin (2008a, 2008b) is not widespread. Few organizations have places systematic procedures in place to address behavioral biases. As a rule, financial firms do not use quantitative asset pricing models built around sentiment. Looking back, behavioral corporate finance and behavioral asset pricing principles were front and center in the creation of the financial crisis. Looking ahead, financial agents would be well advised to learn how to make use of the behavioral approach both to corporate finance and to asset pricing.

Consider the comments of Alan Greenspan, who chaired the Federal Reserve during the key years in which the seeds of the crisis were sown. In May 2005 Greenspan testified before Congress that some local housing markets exhibited "froth." He pointed to the use of riskier financing by some homeowners, and suggested that the price increases in those local markets was unsustainable. However, he concluded that there was no national housing bubble, and that the economy was not at risk.

In 2008 he testified before the House of Representatives Committee on Oversight and Government Reform, stating: "this crisis, however, has turned out to be much broader than anything I could have imagined ... Those of us who have looked to the self-interest of lending institutions to protect shareholder's equity -- myself especially -- are in a state of shocked disbelief." See Felsenthal (2008).

Greenspan's comments underscore the importance of paying much more attention to the lessons offered by both behavioral corporate finance and the behavioral approach to asset pricing.

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