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The Key to Risk Management: Management

by
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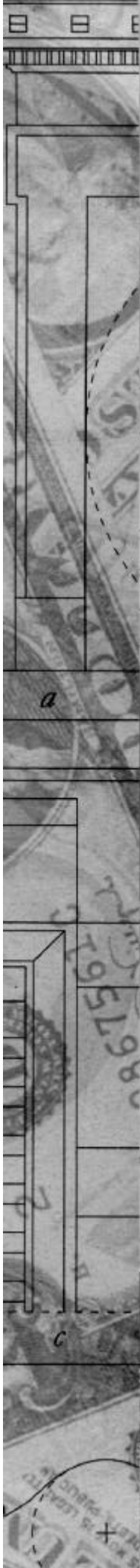

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The Key to Risk Management: Management

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Abstract: The Barings, Daiwa Bank and Sumitomo Corp. financial debacles in the mid-1990s suggest that management failures rather than misfortune, errors, or complexity are a major source of the risk of financial debacles. These errors are systematic and are a concommittant of the structure of trading and of human nature. Risk management systems must take these facts into account.

1 Introduction

"Why is it that so many of the important things are also the most boring?"
(Ashleigh Brilliant)

One dark, wet night, a policeman came upon a man crawling on hands and knees near a street lamp. The policeman asked the man what he was doing. The man, clearly inebriated, explained that he had lost his keys and was attempting to find them. The policeman, willing to help, asked where the man had lost the keys. The man pointed some way down the street, into the shadows. When the policeman asked, "Well then why are you looking for them here?" the man replied, "Because the light is better here."

The academic finance profession has taken a similar approach to the problem of risk management. In general, the academic literature has paid its attention to market risk and credit risk. The profession has ignored operational risk, a catchall term that includes *inter alia*, problems with information systems, operational problems, breaches in internal control, fraud, or unforeseen catastrophes. Market and credit risk lend themselves to interesting econometric and theoretical work. Operational risk is not theoretically interesting; it consists of unstructured and unsystematic practical problems best dealt with by managers themselves. (The practioner literature has dealt with operational risk, at least occasionally. One typical example is Huntington (1996)).

* I would like to thank Kenneth Koford, Mark Latham, Nikolaj Siggelkow and Danielle Warren for helpful comments on an earlier draft. All flaws remain my responsibility.

The finance literature has addressed some organizational problems under the rubric of the principal agent problem. Kaplan and Strömberg (1999) have a paper that analyzes venture capital contracts in which they have a useful short survey of the literature. However, none of the six types of problems that they describe covers the debacles I examine below. Unlike the situation in the "traditional" theories, initially at least in each of our stories, the acter's[1] incentives were aligned with those of their firms. Later, unlike the situation in the "stealing" theories, cash –flows were observable and verifiable, had the firms chosen to do so.

That said, the academic management literature too has neglected operational risk. There are almost no articles dealing with misbehavior in organizations. One exception is Vardi and Wiener (1996). In their terminology, the three cases I examine below all started as primarily Type O organizational misbehavior, that is, misbehavior where the acter intends to benefit the organization. Of course, all also involved Type S misbehavior, that is misbehavior where the acter intends to benefit himself. Initially the acters hoped that their success on behalf of the firm would advance their careers. Later, the acters attempted to protect their jobs by trying to undo the damage they had done.

What Vardi and Wiener catch that the principal agent literature does not is the role of intent. The principal agent literature abstracts from the difference between intent and outcome and assumes that acters intend and achieve their own benefit.[2] By contrast, the Law is very concerned with both intent and outcome. Attempted murder is a crime. However killing a person may be homicide, manslaughter, or even justifiable. Intent is critical.

In none of the cases below did the acters initially intend to enrich themselves at the expense of the firm. Although all three situations involved fraud, none was an example of an attempt at embezzlement. There is no sign even that the acters engaged in true gambles—trades with a negative expected value but large variance. The acters appear to have entered into trades that were at the very least fair bets but which the acters thought, in triumphs of hope over experience, were bets with a positive expected value.

Unfortunately, the experience of the last few years suggests that it has been operational risk that has been responsible for many of the largest debacles at financial institutions. Although I will not deal with the issue, even many dramatic cases of credit losses were in essence cases of operational risk.

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[1] I have deliberately chosen the term "acter" as one who performs an action, in preference to "actor," one who plays a part in a play. None of the individuals involved was playing a part, other than perhaps that of a successful trader, and the events were no play.

[2] This is similar to, but not identical with, the conspiracist literature. As Pipes (1997) points out, conspiracists assume that what occurred was intended and that the beneficiary intended the result.

2 Some examples of financial debacles

"First rule of holes: when you're in one, stop digging." (Anon.)

In the discussion below, I will summarize three major debacles: the cases of Barings Brothers (loss: US$1.4bn, resulting in bankruptcy), Daiwa Bank (loss: US$1.1bn), and Sumitomo Corporation (loss: US$2.6bn). The total direct losses to the parent firms in these three cases amounted to US$5.1bn. Losses due to legal consequences probably increased the total by another 25%. However, of all the losses, losses in the form of funds embezzled by the acters probably amount to less than 0.2%. These debacles were not the result of individuals attempting to rob their employers.

2.1 Barings Brothers

Historical background (Kuprianov 1995): The five sons of a Bremen merchant founded the eponymous company in 1762 as a commodities trading house. Their services in helping to finance the Napoleonic wars earned all five knighthoods. Later, the Bank handled French reparations after Waterloo, lent Thomas Jefferson the money to buy Louisiana, acted as financial agents for the US and Imperial Russia, and issued bonds for the Chinese and Japanese governments. Barings came close to bankruptcy in 1890 when its activities in Argentine railway bonds went awry. The Bank of England orchestrated a rescue because of the Bank's importance to the City of London. At the time of the debacle I discus below, the 232 year-old Barings Brothers was the oldest British merchant bank and a pillar of the establishment in the City of London.

The evolution of the debacle[3]: Nick Leeson grew up in a working class family in London and left school at eighteen. His first job was at Coutts & Co., an exclusive bank, where he started in 1985 as a clerk. He then joined Morgan Stanley where he learned to do the recording of the traders' purchases and sales. In 1989, he joined Barings, still as a settlements clerk. In 1992, Barings offered him a position in Singapore where the firm was setting up a futures trading operation.

Within the year, Leeson sat for and passed the exam to qualify to trade on the Singapore International Monetary Exchange (SIMEX). Shortly thereafter the firm promoted him to general manager and head trader, but in a very limited capacity. Originally, his job was to arbitrage differences between futures prices and the cost

[3] I have based this account on numerous press sources including (in no particular order) AsiaMoney, the New York Times, the Sunday Telegraph, the Daily Record, the Washington Post, and the Guardian, as well as the articles in the scholarly journals that I cite in the text.

of the underlying basket (cash-futures arbitrage) by buying or selling futures on SIMEX at the request of the firm's traders in London and Tokyo.[4]

The job grew to include arbitraging discrepancies in prices between the Singapore and Osaka futures contracts. In principle, the business was low risk as he would be buying the cheap contract and almost simultaneously selling the expensive one. Because the firm viewed the transactions as being of low risk, and to save costs, it permitted Leeson both to trade and to record his trades. Also, because the price discrepancies he was arbitraging were small, to make a profit he had to take large positions. This activity developed into outright speculation. That is, Leeson would take an open position where a buy was not matched with a sell or vice-versa.

At some point Leeson created a new computer record, "Account 88888" to conceal losing transactions. He states in his book, Rogue Trader (Leeson 1996), that in July 1992, one of his staffers lost US$30,000 on a single trade; rather than fire the woman, he created the account to hide the loss. However, this is a self-serving memory. The evidence suggests that he had already created and used the account. Leeson quickly developed a practice of openly recording successful trades, and booking losing trades to Account 88888. He further instructed his clerks not to report the account to London and manipulated the accounting records to minimize margin calls from SIMEX and to hide his activities.

As a result of this selective reporting, Leeson's apparent profits grew from about US$2mn in 1992 to about US$14mn in 1993. His bonus was £36K in 1992, £130K in 1993, and was to have been £450K in 1994. Peter Barings, the Chairman, expected to receive £1mn. Despite bragging to the contrary, there is no evidence that Leeson embezzled any funds.

By the end of 1992, Leeson had accumulated a hidden loss of £2mn. In late 1993 his losses increased by £21mn and in 1994 by £185mn. The cumulative loss at the end of 1994 was £208mn. In 1994, Leeson had started to take unauthorized options positions, particularly straddles (a simultaneous sale of a call and a put) on the Tokyo indexes, that earned him premium income that would be free and clear if the index did not move very much before the position expired, but that could result in large losses if the index fell or rose substantially.

Unfortunately, on January 17, 1995, an earthquake struck in Kobe, the Tokyo stockmarket fell sharply, and Leeson's option position sustained losses of about £68mn. Leeson began buying stock index futures in an attempt to support the market. For a while he was semi-successful and his cumulative loss was only £253mn, but then the market started to fall again. He continued to buy more stock index futures and started selling bond index futures and Euroyen futures.

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[4] SIMEX had lower margin requirements than did the Osaka Securities Exchange though both offered futures contracts on the Nikkei 225 stock index and 10-year Japanese government bonds. Leeson and Barings were also dealing on the Tokyo International Futures Exchange and the Tokyo Stock Exchange.

As the size of his position grew and his losses mounted, Leeson faced massive margin calls. He applied to London for the funds using various pretexts and nonsensical justifications. London sent him a total of £742mn in several tranches and a senior manager flew out to reassure SIMEX that Barings was aware of Leeson's activities and would support him.

As Barings started to check the accounts, discrepancies appeared. On February 23 Leeson disappeared with his wife. Eventually, Barings acknowledged that total losses amounted to £927mn (including liquidation costs), a sum more than double the firm's capital of £440mn. On February 26, the Bank of England put Barings into administration. Eventually ING Bank (Internationale Nederlanden Groep) bought the bank for £1, plus an infusion of £660mn to recapitalize the firm.

Leeson was arrested in Frankfurt and extradited to Singapore. He received a jail sentence of 6½ years. While in prison he developed colon cancer and he was released after serving 4½ years.

2.2 Daiwa Bank

Historical background (Tamaki 1995): Nomura Tokushichi Co. began in Osaka in 1872 and by 1904 was firmly established in the modern securities business. In 1918, after a re-organization, the Nomura Co. established the Osaka Nomura Bank, which it separated from the securities business in 1925. Later, as in connection with other post-war reforms, the US Occupation forced the Nomura Bank to change its name to Daiwa Bank. Before and during the Second World War, the Nomura Bank was one of the eight giant zaibatsu banks.

The evolution of the debacle[5]: Iguchi Toshihide[6] was a dedicated employee at Daiwa Bank's New York branch. He had come to the US after failing to qualify to enter a Japanese university. He earned a Batchelor's Degree in Psychology from Southwest Missouri State University in 1975, and then worked briefly as a car salesman until his father pulled strings to get him a job at Daiwa. The bank offered him the job of a clerk in the securities deposit department because there was a vacancy there and he joined the bank in 1976.

Relatively soon, Daiwa promoted him to bond trader on the basis of his knowledge of securities, while still permitting him to retain his duties as clerk. First he would trade; then he would record his trades. Unusually, he recorded his trades manually on paper, not in a computer. In 1979 he became an executive vice president and head of government bond trading in New York, where he answered only to himself. Iguchi appeared to be a trustworthy employee whose commitment to Daiwa and his responsibilities led him never to take more than a two- or three-

[5] I have based the account on numerous press sources including the New York Times, Japan Economic Newswire, The Economist, Business Week, and the Financial Times.
[6] All Japanese names are in the Japanese order, surname first.

day vacation. He was valuable to the Bank as his trading activities accounted for an apparent average of US$4 million in profits year after year.

Because Daiwa had hired Iguchi in the U.S., it treated him as a long-term *local* hire. Had Daiwa hired him in Japan and seconded him to New York, he would have been subject to the rotation policy applicable to all Japanese managerial employees and would have returned to Japan within three to five years. His long stay in his position, together with the rotation of the other Japanese managers, ensured that he had an expertise in the US government bond market that no one else in the bank could match.

Unfortunately, in 1984 he made an error in forecasting the direction interest rates would take and made a US$50-200,000 loss (accounts differ). This amount was of no significance *per se* to Daiwa, which had assets of around US$200bn, however the loss embarrassed Iguchi and he attempted to conceal it. The result was that Iguchi ended up spending the bulk of his career as a trader concealing the original loss while making ever more losses until the amount reached approximately US$1.1bn.

To conceal his losses, Iguchi would simply raid Daiwa's customer accounts. He would sell the bonds in the accounts, and then forge documents to make it appear as if the customers had authorized the sale. As far as customers knew, they still had bonds in custody at Daiwa; as far as Daiwa knew, the customers had sold the bonds and received the proceeds.

Daiwa's own audits failed to reveal the problem. Bankers Trust New York was the custodian of the bonds but although Daiwa's internal auditors had checked out their own New York branch several times since 1984, they never crossed-checked Daiwa's records of its bond holdings with Bankers Trust's records. The external auditors for the parent bank, Showa Ota (part of Ernst & Young) apparently did not examine the NY branch. An inspection in 1989, by the NY State banking authorities, accompanied by a Fed examiner, detected nothing. Two cursory inspections, one in 1992 by examiners of the NY Fed and one in 1994 by visiting auditors from Japan's Ministry of Finance (MOF) did not detect the fraud. The US examiners did order Daiwa to end Iguchi's dual capacity as head of trading and as head of settlement. Iguchi apparently then chose to give up the better-paid and more prestigious position of head of trading but to retain the position of head of settlements. This enabled him to continue to conceal his losses.

Finally, unable to take the pressure, Iguchi confessed his errors in a letter to the President of Daiwa Bank on 24 July 1996. Aware that they had failed to supervise him properly, Iguchi's superiors made a further critical error of judgment: they dithered. After two weeks Daiwa *informally* notified MOF. MOF ultimately had to explain to the Fed why it had not instructed Daiwa to notify the Fed immediately. Instead, MOF kept quiet while Daiwa debated internally what to do. Finally, in early September, Daiwa formally notified the Ministry and the Fed. In November 1995, Daiwa Bank was indicted in the US on charges of conspiring to hide the trading losses. The bank agreed to close its U.S. operations (the Federal Reserve

revoked Daiwa's U.S. banking license) and pay $340 million, the largest criminal fine ever.

Eventually Iguchi himself went to jail for four years and was fined US$2mn. It also turned out that he had embezzled $500,000 for his personal use, an amount equal to some 0.045% of the total loss (not including the fine).

2.3 Sumitomo Corporation

Historical background (Noguchi 1979): Sumitomo Masatomo founded the Sumitomo merchant house in Kyoto in the 16th Century. The firm took up smelting silver and copper after Sumitomo Masatomo learned the techniques from Western traders in 1591. By the third generation, the house had expanded into banking after opening a money-changing store in Osaka. Sumitomo rose to prominence when Sumitomo Tomoyoshi discovered the Beshi copper mines in 1690. Later, Sumitomos also managed the Tokugawa's Tachikawa copper mines.

The evolution of the debacle[7]: In his heyday, Hamanaka Yasuo had the nickname "Mr. 5%", reflective of the share of the world copper market that he supposedly controlled on behalf of his employer, Sumitomo Corporation. He also had the nickname "The Hammer," a play on his name and on his ability to hammer the market. Sumitomo Corporation was proud of his stature in the markets and even featured his photo on the cover of one of its annual reports.

Hamanaka joined Sumitomo Corporation in 1970 and in 1975 the company assigned him to the copper section of the non-ferrous metals division. In the late 1970s, the company sent him to London for a short period to learn the London Metal Exchange business through working as a clerk in tin and nickel. Thereafter he returned to Japan where he remained. Unusually for a management-track employee, he stayed in the copper section for the remainder of his career, rather than rotating to other parts of the firm. By 1983 he was selling 10,000 tons of copper per year.

In 1984 he joined with Shimizu Saburo, the then head of the copper trading team, in making unauthorized speculative futures transactions to try to sustain the section's profitability. Unfortunately they were not successful and to conceal their losses and protect their jobs, they entered into off-the-books deals.

In 1987, Shimizu quit and Hamanaka took over the section. The losses at that point had climbed to about US$58mn. Losses continued to swell as Hamanaka began carrying huge positions on the London Metal Exchange (LME), despite drawing a warning from the Exchange over the volume of his trading. He next started dealing with Merrill Lynch. Merrill Lynch advanced him US$150mn,

[7] I have based the account on numerous press sources including Reuters, Agence France Presse, Business Wire, the LA Times, Japan Economic Newswire, AP, Purchasing Magazine, and The Daily Telegraph.

which enabled Hamanaka to make a payment elsewhere of US$100mn and which led him to trade more via Merrill.

In 1990, Hamanaka began borrowing money against Sumitomo's copper stocks to fund his trading positions. He also began carrying out fictitious options trades to create an impression of trading success in management's eyes and thus to garner further independence from oversight.

In 1991, Hamanaka asked a US metals broker in London to issue a backdated invoice for fictitious trades, reportedly worth about US$350mn. The broker notified the LME, which notified Sumitomo. Sumitomo replied that Hamanaka had merely needed the invoice for tax reasons.

In 1993, Hamanaka started dealing through Credit Lyonnais Rouse as his losses continued to mount following a plunge in copper prices. He borrowed US$100mn from ING Bank on the strength of forged signatures of senior managers. Sumitomo began an internal investigation that appears not to have lead to any immediate action. To raise funds, Hamanaka engaged in an unauthorized sale of put options to Morgan Guaranty Trust, but lost US$393mn on the options.

In 1994, Hamanaka engaged in a further unauthorized sale of puts and calls via Morgan to raise US$150mn. This deal lost him US$253mn. To cover the loss, Hamanaka had Sumitomo Hong Kong borrow US$350mn from seven banks (including Sumitomo Bank). Later he arranged for Sumitomo Hong Kong to borrow again, this time about US$420mn, to pay Morgan.

In 1995, the US Commodities Futures Trading Commission (CFTC) and the Securities Investment Board (SIB) in Britain launched investigations into unusual fluctuations in copper prices. Sumitomo reports that it cooperated and submitted all materials that the investigators requested.

In March 1996, Sumitomo discovered that a statement from a foreign bank did not match the records in its Treasury Department. The bank had credited Sumitomo with funds from an unknown transaction. In early May, Sumitomo relieved Hamanaka of his trading duties; in early June Hamanaka confessed everything. In November Sumitomo announced that it had lost US$2bn in unauthorized trading in the six months to end-September. Total losses apparently were on the order of US$2.6bn.

In November 1996, Hamanaka was charged in Tokyo with forgery and fraud. In March 1997, he was found guilty of four counts of having forged the signatures of his bosses to keep secret his off-the-books trading and of having swindled Sumitomo Hong Kong of US$770mn, and received a jail sentence of 8 years. In a separate action, Sumitomo filed a civil suit accusing Hamanaka and his erstwhile boss, Shimizu Saburo, of having embezzled about US$7mn. This would amount to about 0.27% of the total losses.

In 1998, Sumitomo Corporation paid a fine of US$150mn in the US and US$8mn in the UK to settle charges by the CFTC and SIB that it had manipulated copper prices. In connection with charges that it had aided Sumitomo in its illegal

activities, Merrill Lynch agreed to pay a fine of US$15mn in the US and US$10mn in the UK. Neither firm admitted or denied any wrongdoing.

In June 1999, Sumitomo Corporation filed suit against Chase Manhattan Bank (in the US) and UBS A.G. (in Tokyo), for about US$760mn. The suit charges that the banks provided Hamanaka loans disguised as "copper swap transactions" to enable him to continue his illicit trading activities.

In July 1999, Sumitomo Corporation filed suit against Credit Lyonnais Rouse (in London) for about US$300mn. The suit alleges that Credit Lyonnais dishonestly assisted Hamanaka and/or procured a breach of his employment contract.

In August 1999, Sumitomo Corporation filed suit against Morgan Guaranty Trust (in New York) for about US$735mn in compensatory damages, as well as punitive damages, and treble the amount of compensatory damages under the federal civil RICO statute. The suit charges that Morgan knew or should have known that Hamanaka lacked the authority to engage in the transactions that it arranged with him. The suit alleges that Morgan engaged in a usurious loan of US$535mn, disguised as a complex copper derivatives transaction, to support his illicit trading. When the derivatives matured, Hamanaka was forced to pay US$1.2bn, for an effective interest rate of 150%. The suit further alleges that Morgan took its pledge of confidentiality to Hamanaka to a ridiculous and unlawful extreme, by actively assisting him in keeping his transactions hidden not only from the outside world, but also from his superiors at Sumitomo. Keith Murphy, the Morgan Managing Director associated with the Hamanaka transactions and named in the suit, resigned in the wake of the scandal. Morgan has stated that it will contest the suit, which it described as being without merit.

3 Conceptualizing debacles and their prevention

"Once is happenstance. Twice is coincidence. Three times is enemy action."
(Winston Churchill)

The point of the above quote from Winston Churchill is that at some point we must acknowledge that financial debacles are not random events but rather may be the outcome of systematic influences. However, the systematic influences are managerial, not financial.

First, none of the debacles I have discussed above was the result of financial risk in the sense that what occurred was simply a "100-year flood," i.e., a rare draw from the extreme tail of a known distribution of possible outcomes. Furthermore, Grammatikos *et al*., (1986) found that for a "representative [U.S.] bank," the risk of ruin from foreign currency activities was approximately zero when they judged it in comparison with the capital available to cushion such risks.

Second, as Tickell (1996) points out with respect to Barings, the problem was not a melodramatic case of hubris and of an upstart flying too high. Their firms permitted Leeson, Iguchi and Hamanaka to continue to trade not because they actually had demonstrated trading ability but because they had created an impression of ability by hiding their incompetence. Lastly, Kuprianov (1995) makes clear, also with respect to Barings, that the problem was not a complex derivatives strategy some of whose ramifications no one understood. Both in the case of Barings and the other two firms above, derivatives were only the instruments that the traders used to implement rather simple bets. In each case the essence of the problem was unauthorized trading that the culprit undertook to enhance his firm's profitability, and therefore his own career and pay.

Second, the problem was probably not due to a failure of early warning systems. I would argue that it is not unambiguously clear that the damage could have been limited. In all three cases there were hints at some earlier stage of possible problems, hints that the firms or outside regulators did not pursue. However, one cannot make too much of this. The folk saying "Hindsight is 20-20" is apropos. Heuer (1978) has an accessible article on hindsight analysis and cites research showing that ex post assessments of ex ante probabilities exhibit a strong upward bias. That is, an event that has happened appears much more obviously likely than it did at the time. In practice, usually signals turn out to be false positives. Launching full-scale investigations each time someone detects a hint of an anomaly would cripple a firm.

Third, the problem was preventable. Hogan (1997) is absolutely correct in identifying a failure of governance both within the firm and on the part of the regulators as the source of the debacle at Barings. I would maintain the same is true in the cases of Daiwa Bank and Sumitomo Corporation. In all three cases the debacle was the result of *unauthorized* trading. However, as Huntington (1996) points out, for this to occur, two things must come together. First, circumstances within the firm must exist or have been created that permit the fraud. Second, people within the firm must allow the fraud to happen. We will return to these points in a moment.

Huntington argues that three managerial trends have increased the scope for fraud in firms: matrix management, decentralization and the encouragement of managerial entrepreneurialism. Of these, decentralization and the encouragement of entrepreneurialism are the most relevant to our three cases. Together these have the effect of giving managers the authority and the incentive to seek out profit opportunities.

In the cases of Barings, Daiwa Bank, and Sumitomo Corp, the trading function was tailor-made for problems. Because in all three companies, trading was relatively remote from the firms' main activities, the firms decentralized authority to trade to specialist managers. Furthermore, the accounts of Tickell and Hogan make clear that Barings in particular was trying to become more aggressive and more daring. In the other two, the daring was tolerated if not actively promoted. It is not an accident that in all three cases the problem was with the manager of the

operation, not his subordinate. The discretionary authority was at that level, not a lower level. If I may paraphrase a saying of the late Chairman Mao Tse Tung, in companies, “Political power grows from the barrel of profits.”

Trading is an area where classic hierarchical or bureaucratic management is particularly inappropriate. When Zaheer (1992) studied foreign exchange dealing rooms in New York and Tokyo, she found that differences between Japanese and Western firms in their internal organization affected risk-taking behavior and profit. All the Japanese trading rooms followed a bureaucratic-clan control structure while Western firms followed a market control structure. The bureaucratic-clan firms tended to hire at entry level, had low bonuses relative to base salary and used positions limits extensively to control trading positions. The market control firms hired experienced traders, had large bonuses relative to salary and used few or no position limits.

The market control trading rooms produced higher profits per trader although the positions were no larger on average than in bureaucratic clan trading rooms. Zaheer reports that professionalism, measured by a trader's commitment to a career in trading rather than a career in banking, was unrelated to risk-taking but positively related to profit performance. The bureaucratic clan system is consistent with a generalist personnel system; the market control system is consistent with a specialist personnel system. Of the two approaches or administrative technologies, the market control system appears to produce better performance, but depends critically on the enforcement of safety rules for control.

Unfortunately, as Dörner (1997), in his book on system failure points out, breaking safety rules frequently pays off. Safety rules constrain behavior in ways and to levels that are generally well below crisis stage. By ignoring the rules, the acter gains an increased freedom of action that generally yields an improved immediate result, with no immediate adverse consequences. Permitting the same individual both to trade and to record the trades permitted two relatively small operations, Daiwa NY and Barings Singapore, to save the costs of a skilled settlements clerk who would have had relatively little to do.

Fourth, what made the situation worse is that trading as a function is particularly prone to the problem that in an earlier work (Tschoegl 1995) I referred to with the metaphor of Odysseus and the Sirens' song. Homer’s Odyssey has one of the earliest examples of solutions to the problem of management becoming enraptured with a course of action and becoming blind to the course’s disastrous consequences. Odysseus’ solution was to have his crew bind him to the mast and to put wax in their ears. These measures freed him to hear the song and enjoy it but left him unable to steer his vessel towards the Sirens and rocks they sat upon. If Odysseus had not plugged his crew’s ears with wax, all would have enjoyed the Sirens’ song and all would have been well until the last moment when the boat smashed upon the rocks. In our context, the Sirens’ song of dramatic profits was so alluring that it led managers to bask in the music and to suspend their critical faculties. This is Huntington’s point that fraud occurs when managers let it occur.

We find many examples in both corporate and political governance of mechanisms that are the equivalent of binding oneself to the mast. We see crude, rigid rules such as limits on banks' authority to lend more than a percentage of their capital to a particular borrower, or in the political realm, limits on a President's right to succeed himself. Under the economists' usual assumption of rational actors, these rules are an anomaly. Of course, rules may improve on judgment when we do not have the information necessary for judgment; this is Milton Friedman's argument for rule-based monetary policy. However, the problem of the Sirens' song is subtler. It is not that we do not have the information we need for discretion to be better than rules. Rather, we recognize that we may find ourselves in situations like those facing the unfortunate mariners in Homeric Greece. We can become enraptured, ignore what we otherwise would know and destroy ourselves. So, like Odysseus, we bind ourselves to the mast; the firm imposes rules that prevent managers from giving even a trader with an apparently "hot-hand" a free hand.

This recognition that our actions are not always rational offends against the central assumption of modern economics, that acters are rational utility maximizers. This is a powerful assumption and one that leads to useful theories. However, it is an assumption about aggregate or normal behavior. The cases I described do not represent normal behavior in the sense of that we observe them occurring frequently. While not unheard of, debacles are arguably still rare.

If I may pursue the metaphor of the Sirens' Song a little further, it is interesting to note that Odysseus' solution had two parts. He imposed arrangements so that he could hear but not steer, and the crew could steer but not hear. Odysseus made sure that those who imposed the constraints, i.e., tied him to the mast, and who could therefore untie him, were not subject to the same influences as he was. In our context of the management of firms, it is important that those who ultimately impose the rules not be responsive to the same influences as those to whom the rules apply.

Now let me switch to a less literary and perhaps slightly more formal model. The following simple model from Koford and Tschoegl (1999) takes as its base a Gibrat model (Gibrat 1931; Sutton 1997) of the growth of the firm. The model assumes that the growth of the firm's assets is a random walk with drift:

$$\ln A_{t+1} = \mu + \ln A_t + \varepsilon_t$$

where $\ln A_t$ is the natural logarithm of the assets at time *t*, μ is the expected growth of the assets, and ε_t is the firm's overall luck. Luck depends on many factors and is equally likely to be good or bad. The model therefore takes luck as having a Normal distribution with mean (0) and variance (σ^2). On average the firm's assets grow as the managers pick projects with positive expected profitability. However, luck may bring growth that is above or below expectations. If the firm's luck is bad enough, assets may decline. Furthermore, the firm can increase its assets by borrowing. This gives rise to a third parameter of interest: Δ_t —the amount by which the firm's assets exceed its liabilities.

The probability that the firm will go bankrupt depends on μ, σ^2 and Δ. That is, the firm is insolvent when liabilities exceed assets ($\Delta_t < 0$). The firm's expected first passage time to the point of insolvency increases with μ and Δ_t, and decreases with σ^2. The more profitable the firm, the less likely it is that it will go bankrupt within any given period. Equally, the less risky the firm, the less likely that it will go bankrupt. Lastly, the less levered the firm, the less likely it is that it will go bankrupt.

Managers care most about μ, and relatively little about σ^2 and Δ_t. The managers' salary, responsibility and perquisites increase in μ, and there are compelling reasons for why this should be so. Furthermore, when the managers' compensation depends in large part on bonuses, as they did, for example at Barings, then the manager will welcome a large σ^2. Bonuses are a call option on profits and the value of the call increases with σ^2. Interestingly, it is not clear in our three cases that the senior managers who failed to prevent the debacles suffered financial or career harm despite their culpability for their passivity.

One of the roles of the governance system is to compensate for managers' asymmetric concern. The principal losers in our dramas were the shareholders of Barings, Daiwa, and Sumitomo; they should have the most interest in effective monitoring of managers. Hogan discusses the particular problems with Baring's governance growing out of the firm's ownership with non-voting shares in the hands of the Barings Foundation (UK-registered charity) and the voting shares in the hands of senior management. The Japanese firms too were subject to governance problems which I discuss more fully in Tschoegl (1995). Walter (1992) has characterized the Japanese system as an ultra-insider system in which control rests in the hands of firms linked to each other by cross-holdings of shares. There is no market for control—obviating such a market is one of the purposes of the cross-holdings—so the only remedy left to outside shareholders is exit, to use Hirschman's (1979) powerful and evocative terminology.

Even in less extreme situations than those of Barings or major Japanese firms, current governance systems are subject to a critical weakness. Dispersed shareholders face a large free-rider problem in taking action individually. The board of directors is supposed to act in the owner's collective interest, but there are likewise agency problems in the relationship between owners and directors. Latham (1998) has an innovative proposal that aims at increasing director loyalty to shareholders.[8] The essence of the proposal is the development of firms that would be in the business of competing with each other to propose slates of Boards of Directors that shareholders then could choose among. However, the firms do not exist and the scheme is not yet in place at any firm.

Furthermore, historical evidence suggests that one cannot rely on disclosure with shareholders (or their representatives) making independent assessments of μ

[8] See also the Corporate Monitoring website at http://www.corpmon.com/publications.htm

and σ. Apparently in some circumstances, a community of opinion or information cascade may form (Bikhchandani *et al*., 1992 and Orléans 1995) which will lead shareholders, together with managers, to overestimate μ and underestimate σ.

For such cases a remedy is to develop parties that have more of a stake in σ^2 and Δ, and less of a stake in μ. For instance, banking regulators have a great concern that the banks that they regulate not go bankrupt. This means that the regulators have relatively little concern with μ, but a much greater concern with σ^2 and Δ. The concern with Δ manifests itself as a requirement for capital adequacy. The concern about σ^2 leads the regulators to enforce a bank's own safety rules. However, it is critical that the regulators act in ways that one might characterize as bureaucratic rather than flexible, i.e., to favor rules over discretion.

As we have discussed, in the cases of Barings and Daiwa, the banks' failed to implement and enforce the necessary safety rules and the regulators also did not catch the problem in time. In the case of Sumitomo, there were no regulators with a vested interest, however, there were banks that lent to Sumitomo. Banks, when acting as creditors, like regulators, have relatively little interest in μ, and relatively more in σ^2 and Δ_t. Unfortunately, Sumitomo was so large relative to the loans that Hamanaka negotiated that the lenders were able successfully to forego careful credit analysis and vetting.

The suits by Sumitomo against the bankers that lent Hamanaka the money seem to assert that the banks involved not only had an obligation to their own shareholders to assure the safety of the loans, but an additional obligation to monitor the legitimacy of the borrower's loan request. I do not know enough about the law to know whether this is a novel legal theory or not. The cases now pending will probably settle whether it is a viable one.

4 Conclusion

"We have met the enemy and he is us!"
(Porkypine in Walt Kelly's comic strip Pogo)

Several articles analyzing the Barings debacle from different perspectives have appeared in the scholarly literature. The Daiwa and Sumitomo debacles have drawn less attention, perhaps because they are newer and perhaps because they are less accessible. Still, I have drawn on all three of these cases to make an essentially simple point about risk management.

Risk management is a management problem. The debacles were not random events and they were not unfortunate draws from a known distribution of outcomes. They were all the result of a failure of governance that grew out of the nature of the activities themselves and out of the nature of human beings. Preventing such debacles in the future will require improvement in governance

mechanisms. The necessary mechanisms must, however, be rooted in an understanding of human nature. The assumption of acters' rationality is analytically a powerful one; that does not mean that it well describes behavior under stress, or when sailing within earshot of Sirens.

Furthermore, the governance mechanisms must be part of a system, part of which resides outside of the firms themselves. To return to the metaphor of Odysseus and to the model again for a moment, the persons responsible for tying Odysseus to the mast must be unable to hear the music; the people who are responsible for restricting σ^2 and Δ must be separate from those responsible for achieving μ.

Finally, I have two conjectures for further research. First, I suspect that it is possible to set up systematic tests for whether or not a trader has ability at position taking. As Merton (1980) pointed out, one can improve one's estimates of the variance of a process (such as a trader's position) by observing more frequently, but not of expected value. Estimating expected value simply requires the passage of time. Still, in earlier work (Tschoegl 1987) I drew on work by Wald (1947) and Brown (1971) to suggest a rationale for stop orders and so-called "psychological barriers" in financial markets. One could use the same methodology to test for traders' ability. If Henriksson and Merton's 1981) work on fund managers is any guide, I suspect that few traders will be able to demonstrate ability that would pass the usual tests of statistical significance. Demonstrating this might lead managers of traders to be more cautious in granting discretion. Furthermore, it would also help managers to determine when a trader was achieving an improbable level of success meriting further investigation.

Second, I suspect that such profits that do accompany position taking are disproportionately due to trading with counterparties that are not constrained by the need to be profitable, i.e., central banks (Szakmary and Mathur 1997), fraudulent institutions such as BCCI, and unauthorized traders such as the ones I have examined above. The extremely limited evidence on the sources of trading profits in foreign exchange trading at banks suggests that most of the profits come not from position taking but from market making (Ammer and Brunner 1997; Lyons 1998). Still there is some profit at the banks, and perhaps even more so among their clients such as hedge funds. This then raises the question of whether improved management among all firms implies a much-reduced role for position taking in financial markets. Alternatively, lessons learned may fade, leading managers to set aside rules whose origins and rationale are lost in time, until a new debacle teaches an old lesson again.

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