

# DO TRADERS BECOME ROGUES OR DO ROGUES BECOME TRADERS?

## THE OM OF JEROME AND THE KARMA OF KERVIEL

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### CONTENTS

<b>I. ABSTRACT.....</b>	<b>89</b>
<b>II. A JOKE AT FIRST AND ALSO AT LAST .....</b>	<b>89</b>
A. <i>The Jokers are Among Us .....</i>	91
<b>III. HISTORY: A PRODUCT STRUCTURED BY WINNERS .....</b>	<b>93</b>
A. <i>Rogues and Traders as Entertainers and Educators .....</i>	94
B. <i>A Popularity Contest.....</i>	94
<b>IV. ROGUE ONE (ALONE?) ON DELTAONE .....</b>	<b>95</b>
A. <i>Depart-Mental Drill Down!!! .....</i>	96
B. <i>“e” for Everything, Everyone, Everywhere ... including Evolution, Education and Ethics .....</i>	97
C. <i>Confessions of The Control Agents.....</i>	99
D. <i>A Slow Walk On A Tight Rope .....</i>	101
E. <i>The Glass Castle Called Basel .....</i>	102
F. <i>Cooke Ratios and the Way the Cookie Crumbles .....</i>	102
G. <i>Paying Billions with Less Than a Million.....</i>	103
H. <i>Sick Lesson from Nick Leeson .....</i>	104
<b>V. ROGUE TRADING GUIDE FOR DUMMIES .....</b>	<b>105</b>
<b>VI. MATHEMATICALLY SOPHISTICATED MODELS OR MERELY SUPERIOR MORALS? .....</b>	<b>108</b>
<b>VII. SOME SLEEPING AIDS (REFERENCES) .....</b>	<b>115</b>
<b>VIII. SOME MORE SLEEPING AIDS (APPENDIX OF FIGURES).....</b>	<b>126</b>

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## I. ABSTRACT

We present a study of Jerome Kerviel, a trader at Société Générale, and how he racked up positions far exceeding his authorized risk limits resulting in a spectacular loss and in the process becoming the perpetrator of the biggest rogue trading scandal, thus far, in recorded history. We focus on many aspects of the financial markets and attempt to provide an appropriate context to the proceedings by considering some historical matters and furnishing an alternate definition for a rogue trader. With the goal of highlighting policy relevant insights, we look at the organization structure, trading profits, risk management, regulation, ethics and the many conflicts that arise therein with some focus on Kerviel and his immediate environment. We provide a simple guide for the budding rogue trader that could also be helpful for the aspiring control agent. We conclude by delving deeper into the ethical issues regarding rogue trading and provide possible ways to mitigate, if not resolve, the many moral dilemmas that arise in business, life and elsewhere.

We consider many conundrums related to: the question of size of financial firms, organization behavior, designing social systems, ethics, enhancing human welfare, excessive reliance on mathematics, the role played by auditors, better comprehension of history, evolution and the need for universal education. We have strived to ensure that the manuscript is written in a style such that it can be read by almost anyone, with or without a strong business background. Some of the topics we discuss are: A Joke at First and Also at Last; History: A Product Structured by Winners; Rogue One on Delta One; Depart-Mental Drill Down; Confessions of The Control Agents; A Slow Walk On A Tight Rope; The Glass Castle Called Basel; “e” for Everything, Everyone, Everywhere including Evolution, Education and Ethics; Sick Lesson from Nick Leeson; Rogue Trading Guide for Dummies; Mathematically Sophisticated Models or Merely Superior Mora.

## II. A JOKE AT FIRST AND ALSO AT LAST

On January 24, 2008, Société Générale (SG) declared a “[l]oss of EUR 4.9 billion (US \$7.2 billion) on position of EUR 50 Billion (US \$73.26 billion)”<sup>1</sup>. This was the largest rogue trading scandal, thus far, in recorded history.<sup>2</sup> One of the biggest scandals in the financial markets and the

<sup>1</sup> A few additional sources have been used to get a good understanding of Jerome Kerviel and the trading losses he brought about (Weiss 2008; Canac & Dykman 2011; Gilligan 2011; Rafeld, Fritz-Morgenthal & Posch 2017)

<sup>2</sup> The following are some references and links related to the list of rogue trading scandals in (Figure 1): Orlando Joseph Jett (born 1958) is an American former securities trader, known for his role in the Kidder Peabody trading loss in 1994. At the time of the loss it was the largest trading fraud in history (Egan & Kaeter 1994; Freedman & Burke 1998; Werhane 1998; CEO MAGSylvia Nasar, *Kidder Scandal Tied to Failure of Supervision*, N.Y. TIMES, Aug. 5, 1994, <https://www.nytimes.com/1994/08/05/us/behind-kidder-scandal-overview-kidder-scandal-tied-failure-supervision.html>); Nick Leeson (Section 4.8) Toshihide Iguchi (born 1951) was an Executive Vice President and U.S. Government Bond trader at Daiwa Bank’s New York Branch, who was responsible for \$1.1 billion in unauthorized trading losses accumulated over a period of 12 years beginning in 1983 (Walker 1995; Kane & DeTrask 1999; Weston 2005;

Katie Holliday, *I’m not a criminal: Daiwa rogue trader who lost \$1billion*, CNBC, Apr. 29, 2014, <https://www.cnbc.com/2014/04/29/im-not-a-criminal-daiwa-rogue-trader-who-lost-1-billion.html>; The Serious Fraud Office (SFO) has charged Peter Young, the former Morgan Grenfell fund manager, with conspiracy to defraud and offenses under the 1986 Financial Services Act. Although Peter Young was found guilty on all charges, the judge promptly voided the verdict due to reasons of insanity. (Leith 2002; Ramage 2005; Peter Young Charged, The Independent Link; How Did Rogue Trader Peter Young Become Infamous?, Investopedia Link; How to lose a billion?, NYU Stern Link); Yasuo Hamanaka (born 1950) was the chief copper trader at Sumitomo Corporation, one

largest ever Ponzi scheme<sup>3</sup> happened when Bernard Madoff “made off” with \$64.8 billion dollars of investor funds.<sup>4</sup> There have been other spectacular trading scandals, though they have not been labeled as rogue trading incidents since there was no suspicion of fraudulent activity<sup>5, 6</sup>.

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of the largest trading companies in Japan. He was known as "Mr. Copper" because of his aggressive trading style, and as "Mr. Five Percent" because that is how much of the world's yearly supply he controlled. On June 13, 1996, Sumitomo Corporation reported a loss of US\$1.8 billion in unauthorized copper trading by Hamanaka on the London Metal Exchange. In September 1996, Sumitomo disclosed that the company's financial losses were much higher at \$2.6 billion (285 billion yen) (Nasi 1996; Kozinn 2000; Weston 2003; *Futures black as copper boss shows his mettle*, THE IRISH TIMES, June 15, 1996, <https://www.irishtimes.com/business/futures-black-as-copper-boss-shows-his-mettle-1.58775>.; John Rusnak is a former currency trader at Allfirst bank, then part of Allied Irish Banks Group, in Baltimore, Maryland, United States. On January 17, 2003 he was sentenced to 7½ years in prison for hiding US\$691 million in losses at the bank in 2002, after bad bets snowballed in one of the largest ever cases of bank fraud (Burke 2004; Butler 2009; Wexler 2010; Erik Portanger et al., *Allied Irish Banks Say a Rogue Trader Lost \$750 Million in Unauthorized Deals*, WALL ST. J., Feb. 7, 2002.

Former senior National Australia Bank trader Luke Duffy has been sentenced to at least 16 months jail for his part in an alleged \$360 million unauthorized trading scandal (Ford & Sundmacher 2004; Dellaportas, Cooper & Braica 2007; Wexler 2010; NAB rogue trader jailed, Sydney Morning Herald Link); Chen Jiulin (born October 20, 1961) is the former Managing Director and CEO of China Aviation Oil (Singapore) Corporation Ltd (CAO). During his leadership CAO's net asset worth increased from US\$176,000 to US\$150,000,000, an increase of 85,200%. In 2004 CAO suffered huge losses due to oil future trading. Chen Jiulin was forced to leave the company and was arrested by the Singapore police. In March 2006, the Singapore court sentenced Chen Jiulin to four years and three months imprisonment (Wexler 2010; Hornuf & Haas 2014; *Lessons from History's Worst CEOs*, CEO MAG., July 18, 2018, <https://www.theceomagazine.com/business/management-leadership/lessons-from-historys-worst-ceos/>; Former Goldman Sachs Group Inc trader Matthew Taylor was sentenced Friday to serve nine months in prison and pay \$118 million in restitution to his former employer after he pleaded guilty to pursuing an unauthorized \$8.3 billion futures trade in 2007 (Becker, ... & Watt 2013; Goldman rogue trader gets Prison, Reuters Link); Kweku Adoboli (born 1980) is a Ghanaian born investment manager and former stock trader. He was convicted of illegally trading away US\$2 billion (GB£1.3 billion) as a trader for Swiss investment bank UBS. While at the bank he primarily worked on UBS' Global Synthetic Equities Trading team in London where he engaged in what would later be known as the 2011 UBS rogue trader scandal (Scholten & Ellemers 2016; Rafeld, Fritz-Morgenthal & Posch 2017a; b; Rocchi & Thunder 2017; Paul Clarke, *Ex-UBS rogue trader Adoboli seeks \$6m for Ghana bond venture*, FIN. NEWS, Jan. 22, 2020, <https://www.fnlonon.com/articles/ex-ubs-rogue-trader-adoboli-seeks-6m-for-ghana-bond-venture-report-20200122>.

<sup>3</sup> A Ponzi scheme (also a Ponzi game) is a form of fraud that lures investors and pays profits to earlier investors with funds from more recent investors. The scheme leads victims to believe that profits are coming from product sales or other means, and they remain unaware that other investors are the source of funds. The scheme is named after Charles Ponzi, who became notorious for using the technique in the 1920s. Greg Iacurci, *Ponzi Schemes, Other Investment Fraud on Rise During Pandemic, SEC Says*, CNBC, Dec. 15, 2020, <https://www.cnn.com/2020/12/15/ponzi-schemes-other-investment-fraud-on-rise-amid-pandemic-sec-says.html>.

<sup>4</sup> Bernard Lawrence Madoff (born April 29, 1938) is an American former market maker, investment advisor and financier who is currently serving a federal prison sentence for offenses related to a massive Ponzi scheme. Prosecutors estimated the fraud to be worth \$64.8 billion based on the amounts in the accounts of Madoff's 4,800 clients as of November 30, 2008. Martha Graybow, *Madoff Mysteries Remain as He Nears Guilty Plea*, REUTERS, Mar. 11, 2009, <https://www.reuters.com/article/topNews/idUSTRE52A5JK20090311?pageNumber=2&virtualBrandChannel=0&sp=true>.

<sup>5</sup> Long-Term Capital Management L.P. (LTCM) was a hedge fund management firm based in Greenwich, Connecticut that used absolute-return trading strategies combined with high financial leverage. LTCM was founded in 1994 by John W. Meriwether, the former vice-chairman and head of bond trading at Salomon Brothers. Members of LTCM's board of directors included Myron S. Scholes and Robert C. Merton, who shared the 1997 Nobel Memorial Prize in Economic Sciences for a "new method to determine the value of derivatives". Ron Rimkus, *Long-Term Capital Management*, FINANCIAL SCANDALS, Scoundrels & Crises (Apr. 18, 2016), <https://www.econcrises.org/2016/04/18/long-term-capital-management/>.

<sup>6</sup> Brian Hunter (born 1974) is a Canadian former natural gas trader for the now closed Amaranth Advisors hedge fund.

This loss by one trader, Jerome Kerviel, wiped out almost an entire year's profits by all other employees at SG.<sup>7</sup> Nicolas Rutsaert, an analyst for European banks at Dexia in Brussels said, "[a]t first, this seemed like a Joke . . . SG was a leader in derivatives and was considered one of the best risk managers in the world."<sup>8</sup> While funny now, Kerviel's conduct gets more hilarious as other events happen

We attempt to provide an appropriate context to the proceedings. Section (3) considers some historical matters, definitions and the main question we wish to answer. Section (4) is about organizational structure, trading, risk management, profits, regulation and the many conflicts that arise therein with some focus on Kerviel and his surroundings. Section (5) provides a simple guide for the budding rogue trader that could also be helpful for the aspiring control agent. Section (6) delves deeper into the ethical issues regarding rogue trading and concludes by providing possible ways to mitigate, if not resolve, the many moral dilemmas that arise in business, life and everywhere else. We have tried to ensure that the bulk of the narrative within the main body of the paper is mostly self-contained so that it can be easily followed by a wider audience. But for those wishing to have more details and a deeper comprehension we have provided a rich set of End-notes that supplement the central arguments and provide explanations for terms that might not be easily understood by someone not intimately familiar with the workings of the financial industry and other professional areas.

Though the paper has numerous policy relevant insights, it is written in a style such that it can be read by almost anyone, with or without a strong business background. We consider many conundrums related to: the question of size of financial firms, organization behavior, designing social systems, ethics, enhancing human welfare, excessive reliance on mathematics, the role played by auditors, better comprehension of history, evolution and the need for universal education. Some of the topics we discuss are: A Joke at First and Also at Last; History: A Product Structured by Winners; Rogue One on Delta One; Depart-Mental Drill Down; Confessions of The Control Agents; A Slow Walk On A Tight Rope; The Glass Castle Called Basel; "e" for Everything, Everyone, Everywhere . . . including Evolution, Education and Ethics; Sick Lesson from Nick Leeson; Rogue Trading Guide for Dummies; Mathematically Sophisticated Models or Merely Superior Morals?

All of this is funny only if our goal is to have a good time; if this is not our intention we need to consider what else would be a better option in the face of such incidents? As we proceed further, let us remind ourselves that a good joke gets funnier as it unfolds.

### A. *The Jokers are Among Us*

French President, Nicolas Sarkozy, called for the resignation of SG CEO and Chairman, Daniel Bouton<sup>9</sup>. Monsieur Sarkozy was furious to have been kept in the dark<sup>10</sup>. This makes us

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Amaranth had over \$9 billion in assets but collapsed in 2006 after Hunter's gamble on natural gas futures market went bad. Leah M. Goodman, *The 'Rogue Trader' Who Got Away with It*, NEWSWEEK, Sept. 17, 2014.

<sup>7</sup> Jérôme Kerviel (born 11 January 1977) is a French trader who was convicted and imprisoned for the 2008 Société Générale trading loss for breach of trust, forgery and unauthorized use of the bank's computers, resulting in losses valued at euro 4.9 billion. Nicola Clark, *Rogue Trader at Société Générale Gets 3 Years*, N.Y. TIMES, Oct. 5, 2010.

<sup>8</sup> The events surrounding this incident are covered by the popular press and include statements by many of the parties involved. Rogue trader blamed for \$7.3B loss 5 Billion Euro fraud drains off capital at SocGen.

<sup>9</sup> Sarkozy strongly hinted that he wanted Daniel Bouton, the boss, to quit. Sarkozy v Jerome Kerviel.

<sup>10</sup> France's top banker will be hauled before French MPs this week to explain why he and Société Générale kept the

wonder why he believed he had to be in the light especially when most of high finance and the biggest trades happen in the dark<sup>11, 12</sup>. Perhaps he knew (or merely had a hunch), that everyone else was in the light and felt left out. We are even more curious as to what Monsieur Sarkozy would have done if he had been brought into the light. Also, it remains to be completely pinned down as to who should have been responsible for bringing him into the light.

The Prime Minister, Francois Fillon, somehow sensed that this incident was distinct from the financial market turmoil.<sup>13</sup> Christine Lagarde, Ministry of Finance jumped in with more skipping rope (regulations) to tighten the players<sup>14, 15</sup>. We need to be fair and give others the benefit of doubt. Just because we do not know something does not mean others do not; perhaps some of us might know, “everything about everything”. With so much happening, of course, how could the rest of France stay out of this? The French public known to criticizing financial circles showed support to Kerviel and grieved that “he was a victim of greed . . . of a large, profit-obsessed bank.”<sup>16</sup> If this sounds like echoes of a distant past (French revolution), let us leave it at that.<sup>17</sup> Lastly, was

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French government in the dark for nearly four days about the impending fraud crisis. Nicolas Sarkozy furious at SocGen delay.

<sup>11</sup> In finance, a dark pool (also black pool) is a private forum for trading securities, derivatives, and other financial instruments. Liquidity on these markets is called dark pool liquidity. The bulk of dark pool trades represent large trades by financial institutions that are offered away from public exchanges like the New York Stock Exchange and the NASDAQ, so that such trades remain confidential and outside the purview of the general investing public. GARY SHORTER & RENA S. MILLER, CONG. RESEARCH. SERVS., DARK POOLS IN EQUITY TRADING: POLICY CONCERNS AND RECENT DEVELOPMENTS 1-3 (2014).

<sup>12</sup> A block trade is a permissible, noncompetitive, privately negotiated transaction either at or exceeding an exchange determined minimum threshold quantity of shares, which is executed apart and away from the open outcry or electronic markets. Major broker-dealers often provide “block trading” services—sometimes known as “upstairs trading desks”—to their institutional clients. James F. Gammill, Jr. & Terry A. Marsh, *Trading Activity and Price Behavior in the Stock and Stock Index Futures Markets in October 1987*, 3 J. OF ECON. PERSP. 25, 33 (1988).

<sup>13</sup> Both the governor of the French central bank, Christian Noyer, and the French prime minister, François Fillon, insisted that the Kerviel case had nothing to do with the volatile stock markets around the world, or with the subprime mess. French Trader Is Remembered as Mr. Average.

<sup>14</sup> On February 4th Christine Lagarde, the French finance minister, published her hastily produced report into the affair. Ms Lagarde’s report identified no fewer than eight ways in which SocGen (SG) should have kept a tighter watch, including a more skeptical attitude to “atypical behavior”, such as not taking any holiday. The rogue rebuttal

<sup>15</sup> Any attempt at regulatory change is best exemplified by the story of Sergey Bubka, the Russian pole vault jumper, who broke the world record 35 times. Attempts at regulatory change can be compared to taking the bar higher.

Clearly regulatory efforts in this case are to ensure that no fraud or scandals take place in the financial markets. Sergey Nazarovich Bubka (born 4 December 1963) is a Ukrainian former pole vaulter. He represented the Soviet Union until its dissolution in 1991. Sergey has also beaten his own record 14 times. He was the first pole vaulter to clear 6.0 meters and 6.10 meters. Bubka was twice named Athlete of the Year by Track & Field News and in 2012 was one of 24 athletes inducted as inaugural members of the International Association of Athletics Federations Hall of Fame. Sergey Bubka Press Kit, SURGEYBUBKA.COM, [http://www.sergeybubka.com/frontend/www/uploads/PressKitList/file Biography%20and%20achievements.pdf](http://www.sergeybubka.com/frontend/www/uploads/PressKitList/file%20Biography%20and%20achievements.pdf) (last visited Jan. 18, 2021).

<sup>16</sup> Many French citizens saw the situation differently: Kerviel was the victim of a profit-obsessed bank, which largely existed to extract revenue from the struggling working and middle classes while enriching its top officers and shareholders. The Omen

<sup>17</sup> Historians have pointed to many events and factors that led to the Revolution. Rising social and economic inequality, new political ideas emerging from the Enlightenment, economic mismanagement, environmental factors leading to agricultural failure, unmanageable national debt, and political mismanagement have all been cited as laying the groundwork for the Revolution. Keith Michael Baker, French Political Thought at the Accession of Louis XVI, 50 J. OF MODERN HIST. 279 (1978).

this event a tipping point<sup>18</sup> for the financial crisis or was it just pure coincidence that the largest rouge trading scandal until this point in time happened around the time of the largest financial crisis till date?<sup>19</sup> Are these connections to be discerned beyond our five senses? How badly do we need a sixth or seventh sense?

### III. HISTORY: A PRODUCT STRUCTURED BY WINNERS

History is generally forgotten because “His-Story” is not of great interest to a specific individual. Is it any wonder that Mysteries (My-Stories) are more appealing than Histories (His-Stories)? But, if the message from history books are made applicable to everyday life, it stays relevant. What we can learn from the simple yet perhaps tough lessons from the financial markets are that, if wealth is lost, nothing is lost; if health is lost, something is lost; if character is lost, everything is lost. What we see in scandal after scandal in finance and everywhere else is that we usually end up losing everything for nothing.

To make it a proper historical narrative let us now look at some facts, which we cannot easily remember. Facts can be helpful if we remember that history books are written by the winners and the losers are made to seem like whiners. SG was founded in 1864. It was listed on the French Stock Exchange in 1871. It was nationalized in 1945, and the government sold its interest in SG to the public in July 19, 1987—not too long before another crisis in the financial markets<sup>20, 21</sup>.

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<sup>18</sup> Gladwell defines a tipping point as “the moment of critical mass, the threshold, the boiling point”. The book seeks to explain and describe the “mysterious” sociological changes that mark everyday life. As Gladwell states: “Ideas and products and messages and behaviors spread like viruses do”. MALCOLM GLADWELL, *THE TIPPING POINT: HOW LITTLE THINGS MAKE A BIG DIFFERENCE* 12 (Little, Brown and Company, 2000).

<sup>19</sup> The financial crisis of 2007–2008, also known as the global financial crisis and the 2008 financial crisis, was a severe worldwide economic crisis considered by many economists to have been the most serious financial crisis since the Great Depression of the 1930s, to which it is often compared. Gita Gopinath, *The Great Lockdown: Worst Economic Downturn Since the Great Depression*, INT’L. MONETARY FUND BLOG (Apr. 14, 2020), <https://blogs.imf.org/2020/04/14/the-great-lockdown-worst-economic-downturn-since-the-great-depression/>.

<sup>20</sup> Société Générale S.A. is a French multinational investment bank and financial services company headquartered in Paris, France. More details about its history and expansion can found at this link: *Societe Generale*, Wikipedia Link; see also *Our History*, SOCIETE GENERALE, <https://www.societegenerale.com/en/societe-generale-group/identity/history> (last visited Jan. 18, 2021).

<sup>21</sup> Black Monday on October 19, 1987 was the date when a sudden and largely unexpected stock market crash affected markets around the world. The crash began in Hong Kong and spread west to Europe, hitting the United States after other markets had already sustained significant declines. Black Monday (1987).

### A. *Rogues and Traders as Entertainers and Educators*

Questions & Answers (Q&A) are important, but Definitions & Assumptions (D&A) are, perhaps, more important. If we change the latter, the former might change. The good news is that Q&A and D&A might be in our very DNA, the biological one.<sup>22</sup> We start with one widely accepted definition for a rogue trader. “A rogue trader is an employee authorized to make trades on behalf of their employer [subject to certain conditions] who makes unauthorized trades.”<sup>23</sup>

The unapproved financial transactions can of course turn out to be profitable or cause a loss. Generally, the profits are overlooked, though it is not uncommon for traders to get warnings when such unauthorized trades are made. Though, as is widely acknowledged in the financial markets, the profits take care of themselves, it is the losses that keep us at work for long hours or lead to loss of employment. The other aspect to keep in mind is that when losses happen, the heat is turned up on whoever is causing the losses. It is then said that the trader has turned rogue. This last aspect provides us with an alternate definition of not just rogue traders, but rogues in general.

**Definition 1.** Let us define “Rogues” as those that are not limited by the limits under which they are supposed to operate.

With this new definition, some people might think that “Rogue” means being street-smart. We simply note that being street-smart is considered an education in itself, which allows us to steer away from providing detailed and complex clarifications for what street-smart is. With this alternate meaning for rogues, we hope to cast the Rogue, the central figure or the real hero of the plot, in a more positive light. With this definition, we can view “Rogues and Traders as Entertainers and Educators.” This brings up the most important question of this article, as hinted at in the very title of this paper.

#### **Question 1.** *Do Traders become Rogues? Or Do Rogues become Traders?*

We will attempt to address this question more concretely towards the conclusion (Section 6), but first we portray the specifics of what happened and how they happened.

### B. *A Popularity Contest*

Returning to the historical focus of this section, we consider first whether rogues will be remembered by history. Surely, this is more important than how someone will be remembered by history, which could be distorted in many ways as discussed in the introduction to this section. It

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<sup>22</sup> Deoxyribonucleic acid (DNA) is a molecule composed of two chains that coil around each other to form a double helix carrying the genetic instructions used in the growth, development, functioning, and reproduction of all known living organisms and many viruses. Maybe, DNA hold the lessons from the lives of every ancestor we have ever had. Evolution is constantly coding the information, compressing it and passing forward what is needed to survive better and to thrive building what is essential right into our genes. For information storage in DNA and related applications see, Church, Gao & Kosuri (2012). Gregory A. Wray, Dating branches on the Tree of Life using DNA, 3 Genome Biology 0001.1, (2001).

<sup>23</sup> The term rogue trader is most often applied to financial trading, when professional traders make unapproved financial transactions. This activity is often in the Grey area between civil and criminal transgression, because the perpetrator is a legitimate employee of a company or institution, yet enters into transactions on behalf of their employer without permission. In several cases traders have initially made very large profits for their employers, and bonuses for themselves, from trades in breach of the rules, and it has widely been said that employers turned a blind eye to transgressions due to the profits involved. Christopher Land, Scott Loren & Jorg Metelmann, Rogue Logics: Organization in the Grey Zone, 35 Organizational Studies 233, 239 (2014).

would not be entirely incorrect to state that the more popular someone is, the more they will be remembered. If the popular ones can be deemed celebrities, it still begs a proper definition appropriate for this age of too much information.

**Definition 2.** We define a celebrity as someone who has a Wikipedia page in their name. The longer the page, the more famous the person.

The following examples illustrate: Michael Jackson is a Megastar (223 pages long); Isaac Newton is an Icon (197 pages long); and Jerome Kerviel is somebody Cool (58 pages long).<sup>24</sup> Jerome Kerviel has one of the longer Wikipedia pages among individuals involved in finance and economics, but it is much shorter than the Wikipedia page for someone in the natural sciences and much shorter still than artists. Perhaps, this is another way of telling us that artists are the ones that people resonate with the most. An additional point to be noted, which can seem like an objection voiced by some parties, is that the Wikipedia page can be edited and its contents change over time. But surely, we don't expect popularity to stay the same always, do we?

#### IV. ROGUE ONE (ALONE?) ON DELTA ONE

Rogue One is the name of a popular movie within the Star Wars franchise (Edwards 2017).<sup>25</sup> In this film, there are a group of rebels who are in conflict with an evil empire. As the plot unfolds there arises another group of rebels, within the original group of rebels, who are the main protagonists of the story. These rebels within rebels decide to do all that is needed to stop the evil empire from engaging in certain destructive activities. Referring to Definition (1), tells us that Rogues in movies and elsewhere can sometimes simply be heroes that are prepared to transcend boundaries that might seem restrictive to do what they deem necessary.

In our case study, as many have maintained over the years and many others have pointed out otherwise, there was only one Rogue operating alone on a trading desk called Delta One<sup>26, 27</sup>. To better understand what might have actually transpired we need to delve deeper into "Extremely

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<sup>24</sup> The page counts indicated include all text when we export the Wikipedia web page. As an alternative, we could, of course use the size of the file as well. Though this is sometimes misleading due to presence of pictures and other graphics. Jerome Kerviel, [https://en.wikipedia.org/wiki/J%C3%A9r%C3%B4me\\_Kerviel](https://en.wikipedia.org/wiki/J%C3%A9r%C3%B4me_Kerviel); Isaac Newton, [https://en.wikipedia.org/wiki/Isaac\\_Newton](https://en.wikipedia.org/wiki/Isaac_Newton); Michael Jackson, [https://en.wikipedia.org/wiki/Michael\\_Jackson](https://en.wikipedia.org/wiki/Michael_Jackson).

<sup>25</sup> Rogue One: A Star Wars Story (or simply Rogue One) is a 2016 American epic space-opera film directed by Gareth Edwards. Rogue One follows a group of rebels on a mission to steal the plans for the Death Star, the Galactic Empire's super-weapon, just before the events of A New Hope. Rogue One, STAR WARS, <https://www.starwars.com/films/rogue-one> (last visited Jan 18, 2021).

<sup>26</sup> Delta One products are financial derivatives that have no optionality and as such have a delta of (or very close to) one— meaning that for a given instantaneous move in the price of the underlying asset there is expected to be an identical move in the price of the derivative. Delta one products can sometimes be synthetically assembled by combining options. What is Delta One Trading?, FINANCIAL EDGE TRAINING (Sept. 26, 2019), <https://www.fe.training/free-finance-resources/trading-ideas/what-is-delta-one-trading/>.

<sup>27</sup> In finance, a derivative is a contract that derives its value from the performance of an underlying entity. This underlying entity can be an asset, index, or interest rate, and is often simply called the "underlying." Derivatives can be used for a number of purposes, including insuring against price movements (hedging), increasing exposure to price movements for speculation or getting access to otherwise hard-to-trade assets or markets. Derivatives, OFFICE OF THE CONTROLLER OF CURRENCY, (2021), <https://occ.gov/topics/supervision-and-examination/capital-markets/financial-markets/derivatives/index-derivatives.html>.



Exotic Structured Products, also known as, Business Divisions.”<sup>28, 29, 30</sup>.

### A. *Depart-Mental Drill Down!!!*

Most of the large financial firms are divided into three important departments each with numerous compartments. While reminding ourselves that divisions are usually created for ease of governance and sometimes to appease the politics of power brokers,<sup>31</sup> we note that within SG the three main entities were: Retail Banking and Financial Services; Global Investment Management Services; and Corporate and Investment Banking (“SGCIB”). There were three more sub-departments within SGCIB: Global Equities and Derivatives Solutions (“GEDS”); Fixed Income, Currency and Commodities (“FICC”); and Capital Raising and Financing. Such an organizational structure tells us that when we perform a depart-mental drill down, large companies are somewhat like a not so small, Matryoshka doll.<sup>32</sup>

Within any business, executives from different divisions rise to the top of the management hierarchy or dominate senior level positions at different times depending on how much their departments have contributed to the total profits of the firm. Traders had come to rule the roost around the time of the financial crisis. Trading divisions had become the engines of success with traders being lauded for their ability to anticipate and execute profitable trades. In 2007, the Equity

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<sup>28</sup> A structured product, also known as a market-linked investment, is a pre-packaged structured finance investment strategy based on a single security, a basket of securities, options, indices, commodities, debt issuance or foreign currencies, and to a lesser extent, derivatives. Katrina Lamb, An Introduction to Structured Products, INVESTOPEDIA, (Jan. 12, 2020), [https://www.investopedia.com/articles/optioninvestor/07/structured\\_products.asp](https://www.investopedia.com/articles/optioninvestor/07/structured_products.asp).

<sup>29</sup> An exotic derivative, in finance, is a derivative which is more complex than commonly traded "vanilla" products. This complexity usually relates to determination of the derivative payoff. The category may also include derivatives with a non-standard subject matter (i.e., underlying), developed for a particular client or a particular market. The term "exotic derivative" has no precisely defined meaning, being a colloquialism that reflects how common a particular derivative is in the marketplace. As such, certain derivative instruments have been considered exotic when first conceived of and sold, but lost this status when they were traded with significant enough volume. *Exotic Derivatives*, FINANCIAL ADVISORY, (2021), <https://www.financialadvisory.com/dictionary/term/exotic-derivatives/>.

<sup>30</sup> In finance, an exotic option is an option which has features making it more complex than commonly traded vanilla options. Like the more general exotic derivatives they may have several triggers relating to determination of payoff. An exotic option may also include non-standard underlying instrument, developed for a particular client or for a particular market. Exotic options are more complex than options that trade on an exchange, and are generally traded over the counter (OTC). *Exotic Options*, CORPORATE FINANCE INSTITUTION (2021), <https://corporatefinanceinstitute.com/resources/knowledge/trading-investing/exotic-options/>.

<sup>31</sup> An Investment bank is a financial services company or corporate division that engages in advisory-based financial transactions on behalf of individuals, corporations, and governments. Such a bank might assist in raising financial capital by underwriting or acting as the client's agent in the issuance of securities. An investment bank may also assist companies involved in mergers and acquisitions (M&A) and provide ancillary services such as market making, trading of derivatives and equity securities, and FICC services (fixed income instruments, currencies, and commodities). Most investment banks maintain prime brokerage and asset management departments in conjunction with their investment research businesses. See Sean Ross, *How Do Investment Banks Help the Economy?*, INVESTOPEDIA (Jan. 8, 2021), <https://www.investopedia.com/ask/answers/032515/how-do-investment-banks-help-economy.asp>.

<sup>32</sup> Matryoshka dolls, also known as Babushka Dolls, Russian Tea dolls, stacking dolls, or Russian dolls, are the set of wooden dolls of decreasing size placed one inside another. See Mary Stillwell, *What You Ought to Know About Russian Nesting Dolls*, Nesting Dolls (Mar. 15, 2018), <https://nestingdolls.co/blogs/posts/russian-nesting-dolls-what-you-ought-to-know>.

Derivatives SGED trading division accounted for twenty percent of the entire bank profits.<sup>33</sup> It was widely hailed by wall street analysts that “SGED are probably the best, quantitatively and qualitatively, in the world.” The SGED division had made profits in every quarter since 1993, and between 2003 and 2006, had only thirteen days with losses of more than EUR five million. It is to be noted that SG has invested significantly in improving its technology and infrastructure, the result of which was its reputation in having a sophisticated risk management process. In 2006, there were fifty-nine profit centers within this division and all of them profitable and none contributed more than ten percent of revenues.<sup>34</sup>

Achieving such stable and diverse source of revenues is an amazing feat. If this sounds like a money machine, we need to bring ourselves down to Earth since money machines generally exist only for central banks. SG also hired many individuals with quantitative training from the prestigious Grandes Ecoles,<sup>35</sup> which is known for imparting rigorous education in mathematics and financial principles. 385 of the 1,365 employees in GEDS worked in arbitrage and volatility trading and Jerome Kerviel was one of them.

### *B. “e” for Everything, Everyone, Everywhere ... including Evolution, Education and Ethics*

“e”, is commonly known in mathematics and finance as the exponential constant.<sup>36</sup> Arguably, it is the second most important number after zero.<sup>37, 38</sup> The exponential is commonly

<sup>33</sup> Profit in the derivatives unit mounted as swiftly as one of the graphs in their elegant mathematical models. A French style of capitalism is now stained, New York Times, January 2008

<sup>34</sup> Merrill Lynch estimates that SocGen has 59 separate profit centers in equity derivatives, offering products linked to everything from European hedge funds to U.S. equity volatility to Asian equity indexes. Every one of those centers is profitable, and none accounts for more than 10 percent of overall revenues, according to Merrill. “The diversity and resilience of its revenues should not be underestimated.” SocGen may be smaller than most of its rivals, but it outshines them in profit margins. Deutsche Bank had nearly three times as much investment banking revenue last year, E15.9 billion, but its pretax profits were E4.3 billion, only 72 percent larger than SocGen’s E2.5 billion. Barclays Capital’s revenues were 9 percent greater, at E6.2 billion, but its pretax profits were 27 percent lower at E1.84 billion. The French bank’s core equity derivatives business is anything but volatile, executives insist. Pardon my French, Institutional Investor, April 2006.

<sup>35</sup> The grandes écoles (literally in French “High Schools”) of France are higher education establishments that are outside the main framework of the French public university system. Grandes écoles are highly selective, elite, and prestigious institutions; their graduates have dominated upper levels of the private and public sectors of French society for decades. Barsoux JL & Lawrence P, The making of a French manager, HARVARD BUSINESS REVIEW (June 30, 1991) <https://europemc.org/article/med/10112921>.

<sup>36</sup> The number e is a mathematical constant that is the base of the natural logarithm: the unique number whose natural logarithm is equal to one. It is approximately equal to 2.718281828, and is the limit of  $1 + \frac{1}{n}$  as n approaches infinity, that is as  $n \rightarrow \infty$ , an expression that arises in the study of compound interest; hence e is found in many mathematical models used in financial theory. The pattern that repeats itself twice towards the beginning, 1828, is the birth year of Leo Tolstoy, something that individuals familiar with Russian culture and having a fondness for mathematics are likely to be aware of. It can also be calculated as the sum of the infinite series, e, Mathematical Constant, [https://en.wikipedia.org/wiki/E\\_\(mathematical\\_constant\)](https://en.wikipedia.org/wiki/E_(mathematical_constant)); James Chen, *Exponential Growth*, Investopedia (April 2, 2020) <https://www.investopedia.com/terms/e/exponential-growth.asp>.

<sup>37</sup> In mathematics, an exponential function is a function of the form,  $f(x) = ab^x$ , where b is a positive real number, and in which the argument x occurs as an exponent. The real exponential function,  $e^x$  {exp :  $\mathbb{R} \rightarrow \mathbb{R}$ } can be characterized in a variety of equivalent ways. Most commonly, it is defined by the following power series, See Exponential Function, Wikipedia Link. As in the real case, the exponential function can be defined on the complex plane in several equivalent forms. Exponential Function, [https://en.wikipedia.org/wiki/Exponential\\_function](https://en.wikipedia.org/wiki/Exponential_function).

<sup>38</sup> The importance of the exponential function in mathematics and the sciences stems mainly from its definition as the

used to indicate variables that rapidly go up or increase exponentially. It could also denote change in the other way or a decrease.<sup>39, 40</sup> In finance, it is used for the compounding and discounting of money due to interest rates, a concept studied under the banner of time value of money.<sup>41</sup> Derivatives in finance have a namesake, and are best understood using derivatives, which is a fundamental tool of mathematical calculus.<sup>42, 43</sup> If the derivative of one variable with respect to another is one, they change at the same rate. Also, the exponential function is the unique function which is equal to its derivative. "e" shows up in many others areas of life as well.<sup>44</sup>

It is tempting to conclude that *e* stands for Everything, Everyone, Everywhere, including Evolution, Education and Ethics given how prevalent it is. The importance of evolution for all life and its perpetuity is not a matter up for debate. To connect evolution with ethics we suggest that one goal of all evolution would be to reach a state where ethics are no longer a primary concern. A highly-evolved being would not be bothered about ethical issues and would have no hesitation making decisions that are unencumbered by ethics. In other words, he would immediately know what is the right thing and how to do the right thing without getting drawn into the ethical implications of the situations. Education is meant to accelerate or to be a catalyst for Evolution.

Kerviel started working for SG in 2000 in the middle office. His supervisors noted that he excelled at using information technology and was efficient. Within two years, he moved to the front

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unique function which is equal to its derivative and is equal to 1 when  $x = 0$ . That is,  $d/e^x = e^x$  and  $e^0 = 1 \cdot dx$ , See Duane Q. Nykamp, The Exponential Function, MATH INSIGHT (Jan. 14, 2021), [https://mathinsight.org/exponential\\_function](https://mathinsight.org/exponential_function).

<sup>39</sup> Exponential growth is exhibited when the rate of change—the change per instant or unit of time—of the value of amathematical function is proportional to the function's current value, resulting in its value at any time being an exponential function of time, i.e., a function in which the time value is the exponent. See James Chen, Exponential Growth, INVESTOPEDIA (Apr. 2, 2020), [https://www.investopedia.com/terms/e/exponential-growth.asp#:~:text=Exponential%20growth%20is%20a%20pattern,curve%20of%20an%20exponential%20function.&text=The%20population%20is%20growing%20to,case%20\(i.e.%2C%20exponentially\);](https://www.investopedia.com/terms/e/exponential-growth.asp#:~:text=Exponential%20growth%20is%20a%20pattern,curve%20of%20an%20exponential%20function.&text=The%20population%20is%20growing%20to,case%20(i.e.%2C%20exponentially);) Exponential Growth, Mathworld Link. The exponential function  $x(t) = x(0)e^{kt}$ ,  $k > 0$ , satisfies the linear differential equation:  $dx/dt = kx$ , saying that the change per instant of time of  $x$  at time  $t$  is proportional to the value of  $x(t)$ , and  $x(t)$  has the initial value  $x(0)$ . In the above differential equation, if  $k < 0$ , then the quantity experiences exponential decay.

<sup>40</sup> A quantity is subject to exponential decay if it decreases at a rate proportional to its current value. See Duane Q. Nykamp, The Exponential Function, MATH INSIGHT (Jan. 14, 2021), [https://mathinsight.org/exponential\\_function](https://mathinsight.org/exponential_function); Exponential Decay, Mathworld Link. Symbolically, this process can be expressed by the following differential equation, where  $N$  is the quantity and  $\lambda$  (lambda) is a positive rate called the exponential decay constant:  $dN/dt = -\lambda N$ . The solution to this equation is:  $N(t) = N_0 e^{-\lambda t}$  where  $N(t)$  is the quantity at time  $t$ , and  $N_0 = N(0)$  is the initial quantity, i.e. the quantity at time  $t = 0$ .

<sup>41</sup> Compound interest is the addition of interest to the principal sum of a loan or deposit, or in other words, interest on interest. Compound Interest, Wikipedia Link; ; Jason Fernando, *Compound Interest*, INVESTOPEDIA (Jan 13, 2021), [https://www.investopedia.com/terms/c/compoundinterest.asp#:~:text=Compound%20interest%20\(or%20compoundi](https://www.investopedia.com/terms/c/compoundinterest.asp#:~:text=Compound%20interest%20(or%20compoundi) ng%20interest,accumulated%20interest%20from%20previous%20periods. The present value, PV, at time 0 of a future payment, FV, at time  $t$  can be restated in the following way, where  $e$  is the base of the natural logarithm and  $r$  is the continuously compounded rate:  $PV = FV \cdot e^{-rt}$ .

<sup>42</sup> In finance, a derivative is a contract that derives its value from the performance of an underlying entity. This underlying entity can be an asset, index, or interest rate, and is often simply called the "underlying". *Derivatives*, OFF. OF THE COMPTROLLER OF THE CURRENCY, <https://occ.gov/topics/supervision-and-examination/capital-markets/financial-markets/derivatives/index-derivatives.html> (last visited Jan. 15, 2020).

<sup>43</sup> The derivative of a function of a real variable measures the sensitivity to change of the function value (output value) with respect to a change in its argument (input value). The process of finding a derivative is called differentiation. GILBERT STRANG & EDWIN "JED" HERMAN, CALCULUS Volume 1 224 (Rice Univ. ed. 2016).

<sup>44</sup> The following link has a list of topics that are related to exponential functions: List of Exponential Topics, [https://en.wikipedia.org/wiki/List\\_of\\_exponential\\_topics](https://en.wikipedia.org/wiki/List_of_exponential_topics).

office as a trading assistant to assist other senior traders—this essentially involves answering phones and maintaining records for senior traders. A trading assistants other duties may include getting traders coffee, breakfast and running other such errands. As any apprentice would admit, it is a rite of passage and a good way to learn the ropes from an experienced individual on how to manage the risk of derivative trades. Around 2005, Kerviel became part of the Delta One Listed Products (“DLP”) trading desk on the back of a budding reputation as someone that could design complicated derivative trading strategies. He then received a warrant to turbo-charge his career. Essentially, he started trading a specialized product called turbo warrant, a kind of stock option with a knock-out barrier feature.<sup>45</sup>

Soon, his contribution to the profits of the desk seemingly sky rocketed displaying an almost exponential increase. At one point, around 59 percent of DLP profits and 27 percent of all Delta One Trading were due to Kerviel’s positions. As we explore how he was able to generate such high profits and became known among his colleagues as a “cash machine,” let us remind ourselves again that cash machines (more formally referred to in monetary policy circles under the banner of quantitative easing)<sup>46</sup> exist only for central banks. We also need to note that listed products are traded on an exchange and generally do not generate huge commissions, fees, spreads and hence profits.

### *C. Confessions of The Control Agents*

Financial trading firms have elaborate structures of people assigned to monitor and support the activities of trading desks. Most of the support functions are handled by operations teams in terms of booking trades, ensuring they are cleared on the exchanges or settlement houses and the reporting into the technology infrastructure is done correctly and on time. The monitoring roles can be broadly viewed as: controllers, compliance officers and risk managers, while keeping in mind that there are significant overlaps in the day to day tasks and responsibilities of these groups of individuals. Risk managers focus on obtaining numeric measures indicating the extent of risk or the potential for loss due to trading activities. Controllers focus on ensuring that trades are booked correctly, that the counterparties are valid organizations, and that the Profits and Losses, (P&L) and related accounting is accurate and reported correctly. Compliance officers ensure compliance with current and expected regulatory guidelines.

In addition, traders on each desk are quizzed in an in-depth manner about the trades that are being conducted by desk heads and trading managers who are experienced traders themselves. Along with the products he was authorized to trade, Kerviel started taking

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<sup>45</sup> Turbo warrant (or Callable bull/bear contract) is a kind of stock option. Specifically, it is a barrier option of the Down

and Out type. For comparison, a regular call option will have a positive value at expiry whenever the spot price settles above the strike price. A turbo will have a positive value at expiry when the spot settle above the strike and the spot has never fallen below the strike during the life of the option (if it had done so the option would have crossed the barrier and would have become worthless). James Chen, *Warrant*, INVESTOPEDIA, (Feb. 4, 2020), <https://www.investopedia.com/terms/w/warrant.asp>.

<sup>46</sup> Quantitative easing (QE), also known as large-scale asset purchases, is a monetary policy whereby a central bank buys predetermined amounts of government bonds or other financial assets in order to inject liquidity directly into the economy. A central bank enacts quantitative easing by purchasing, regardless of interest rates, a predetermined quantity of bonds or other financial assets on financial markets from private financial institutions including commercial banks, thus raising the prices of those financial assets and lowering their yield, while simultaneously increasing the money supply. This action increases the negative effect of that event on the insurance sector.

directional bets on many securities. The first instance of such unauthorized activity happened around July 2005 by which time Kerviel had figured out that intraday trades—trades opened and closed within a single day—did not show up as open positions on the bank's daily account reconciliations. His experience in the middle office and his knowledge of the accounting system proved valuable, and he knew how to enter fictitious trades and conceal his trading records. He made decent profits on some of these unauthorized trades. He claimed later that he revealed some of his initial profits to his supervisors who told him things could have just as easily gone the other way; though Kerviel sensed that they were mostly satisfied with the outcome. This indicates that he might have even received mild warnings for some of these positions at times.

As he was taking bigger unapproved positions without the bank batting an eye, he took it as tacit agreement regarding his actions from his supervisors. Also, over a period of time, when his immediate supervisor resigned and a new one took over, who was more trusting, he had sometimes traded positions worth billions of dollars, far in excess of the position limits that he was supposed to adhere to. In July 2005, Kerviel built a short position of about EUR 10 million on Allianz shares, one of the world's largest insurance companies. Clearly, such a directional position was outside his remit of trading turbo warrants. His position received some good fortune in terms of the terrorist bombings in London and he realized large profits due to excess reserves that banks hold. The goal of this policy is to ease financial conditions, increase market liquidity, and facilitate an expansion of private bank lending.

In 2006, Kerviel started increasing his directional bets on equities to about EUR 135 million. He had positions in Allianz and two German companies who specialized in photo-voltaic products. He also traded heavily on futures contracts on the DAX, one of the major German stock indices.<sup>47, 48</sup> By early 2007, as the U.S. subprime crisis was developing, Kerviel was betting that the crisis would spill over to Europe and the major market indices would crash. He took a short position on DAX futures to the tune of around EUR 850 million on January 24, 2007 and kept increasing it to EUR 2.5 billion by the end of February and reaching almost EUR 5.6 billion by the end of March. By July his futures position had reached a peak of around EUR 30 billion. He also had individual stock positions of around EUR 350 million.

To conceal his real trades, he booked many fake offsetting trades. Figure 14 shows his actual earnings on unauthorized positions; Figure 15 shows his official or reported earnings; Figure 16 shows his official or reported earnings versus his actual earnings plotted on the same graph along the same axis to illustrate how disproportionate they were; and Figure 17 gives an estimate of the earnings from the fictitious offsetting index trades. He closed out most of his trades by the end of December 2007 and he later claimed a realized gain of nearly EUR 1.5 billion or \$2.2 billion from this unwinding. Specifically, to offset the gains for 2007 he created eight fictitious

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<sup>47</sup> The DAX (Deutscher Aktienindex, German stock index) is a blue chip stock market index consisting of the 30 major German companies trading on the Frankfurt Stock Exchange. It is the equivalent of the FT 30 and the Dow Jones Industrial Average, and because of its small selection it does not necessarily represent the vitality of the economy as whole. James Chen, *DAX Stock Index*, Investopedia (Apr. 7, 2020), <https://www.dax-indices.com/index-details?isin=DE0008469008>.

<sup>48</sup> In finance, a futures contract (more colloquially, futures) is a standardized forward contract, a legal agreement to buy or sell something at a predetermined price at a specified time in the future, between parties not known to each other. Contracts are negotiated at futures exchanges, which act as a marketplace between buyers and sellers. See *CFTC v. Zelener*, 373 F.3d 861, 864 (7th Cir. 2004).

trades on money losing forward contracts.<sup>49</sup> Though in a few days, between January 2 and 18, 2008 he built up a long position on index futures for a total of EUR 49 billion, before being apprehended.

While all these unauthorized transactions were happening, Kerviel, due to the fear of being discovered, did not take any vacations. He managed to get around the regulation that front-office personnel are required to take two-weeks mandatory vacation every year, which ensured that someone else would take over his accounts, by saying that he was troubled by the recent passing of his father. Given this situation of working without vacations, it is very likely that Kerviel was even dreaming of work and somehow balancing his life, unlike many of us who dream of our lives and try to balance that with work. Kerviel also recorded pairs of fictitious trades that offset each other in terms of the quantities of shares but not prices. For example, on March 1, 2007 he booked a fake trade to purchase 2,266,500 shares of SolarWorld at EUR 63 per share and a sale of the same number of shares at EUR 53 each, hence recording a fictitious loss of around EUR 22.7 million. He would cancel most of these fictitious trades before they could be picked by internal control systems. It is believed that he had made at least 115 transactions of this nature.

For about two years, the controllers received numerous email alerts (at least 93) regarding abnormalities in Kerviel's trading patterns. They merely paid lip service to these alerts. To be fair to them, several hundred emails are received by controllers and operations personnel related to various aspects of different trades.<sup>50</sup> While there are many valid reasons as to why controllers, risk managers and compliance officers cannot fully be expected to completely understand the intricacies of every trade they are monitoring, we highlight a few subtle points about what stands in the way of more precise monitoring in Section 4.4.

#### *D. A Slow Walk On A Tight Rope*

As an aside, it is worth looking at the role of a Risk Manager. If they do their job well, it is hard to know the extent of the risks they have averted. If there is a blow up, such as a huge loss in a portfolio, they have failed at their jobs. The one way they can do their jobs perfectly, is by not letting their traders or portfolio managers take on risky trades. But, then again, they get compensated by the very profits from the P&L of their traders that depends on taking on bigger risks. So really, what risk managers look for is some way to identify portions of the portfolio they are risk managing using some criteria and issue reports saying these are risky trades and hope that if there is a blow up the risky trades are in those outlier reports they had put out earlier. Let us just say their daily work lives might feel like a slow walk on a tight rope.

Another aspect to consider are the motivations for someone to become a trader or a risk

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<sup>49</sup> In finance, a forward contract or simply a forward is a non-standardized contract between two parties to buy or sell an asset at a specified future time at a price agreed on at the time of conclusion of the contract, making it a type of derivative instrument. *See* 11 U.S.C.A. § 25(a) (West 2020).

<sup>50</sup> A study conducted in one of our previous employers about the extent of emails being received by various trading desks showed that on average there would be a minimum of around three hundred emails that were sent to the main group mailing list on a daily basis from clients inquiring about various aspects of their trading positions. In addition, there would be many messages on Bloomberg, internal chat applications and hundreds of automated messages related to their trading positions. Also, there would be emails received as part of being other mailing groups and numerous emails each person received individually. Staying on top of all these sources of information can be a challenge and we were exploring various automated technology solutions for the same.

manager. Any talented individual starting a career in financial services would be keener to become a trader rather than a risk manager. This is because traders are generally compensated more than risk managers. This leads to a bias within and even outside the organization that someone that ends up as a trader is more skilled. Viewing this from the flip side leads to the belief that someone ends up as a risk manager because they could not become a trader or they were bad at performing the role of a trader or even because they lack the necessary skills to make complex decisions involved in deciding which trades to execute. This perception is fueled regularly on trading desks when traders routinely tell risk managers they do not understand certain aspects of trading when asked about why a certain trade was made. Sometimes this can even be via the use of condescending words such as, “you don’t even know such simple things or how did someone make you a risk manager?”

Nobody likes to be told they cannot understand something and certainly not by someone who is deemed to have less knowledge. This bias means that many times risk managers do not challenge traders or try to pursue matters in depth when they fail to comprehend certain things related to trading strategies they are supposed to risk manage. We will see a classic example of this in Section (4.6). We wish to emphasize that there are many excellent risk managers who are passionate and extremely skilled at what they do. The discussion here covers more common observations rather than the exception.

#### *E. The Glass Castle Called Basel*

Basel is a set of risk guidelines.<sup>51</sup> There have been three sets of accords over time, which indicates trial and error or iterations with changes based on outcomes from the previous ones. The one concern is that these rules are getting more complex in each iteration implying that more regulation seems to be the answer. It is important to consider whether this is really the case since more regulation and/or more complex rules are generally easier to break. This makes the guidelines more fragile, which leads us to wonder if the Rules of Basel are like a Glass Castle.

#### *F. Cooke Ratios and the Way the Cookie Crumbles*

On January 2, 2008, new risk guidelines went into effect in Europe as a result of the Basel II accord. The Cooke ratio is a Basel II measure for capital adequacy. This ratio for a counterparty on eight forward contracts entered by Kerviel was abnormally high. Kerviel had entered the name of Baader Bank, a German brokerage, as a counterparty. When asked to name the counterparty in those fictitious trades, Kerviel sent the following email to the control agent: “This materialized the give up of puts made late; I owe money to the counter-party. We’ll re-book it a.s.a.p.” The control agent later confessed that he did not understand Kerviel’s explanation, but did not follow up on it

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<sup>51</sup> The Basel Accords refer to the banking supervision Accords (recommendations on banking regulations)—Basel I, Basel II and Basel III—issued by the Basel Committee on Banking Supervision (BCBS). They are called the Basel Accords as the BCBS maintains its secretariat at the Bank for International Settlements in Basel, Switzerland and the committee normally meets there. The Basel Accords is a set of recommendations for regulations in the banking industry. See James Chen, *Basel Accord*, INVESTOPEDIA, [https://www.investopedia.com/terms/b/basel\\_accord.asp#:~:text=The%20Basel%20Accords%20are%20three%20series%20of%20banking%20regulations%20set,was%20agreed%20in%20November%202010](https://www.investopedia.com/terms/b/basel_accord.asp#:~:text=The%20Basel%20Accords%20are%20three%20series%20of%20banking%20regulations%20set,was%20agreed%20in%20November%202010) (last updated July 22, 2019).

either.<sup>52</sup> We have asked many individuals to explain what they understand by the explanation Kerviel provided and most people say that it is something related to the trades he was doing. No one had previously said that the sentence makes no sense, which is the most likely conclusion.

After this incident, there was greater scrutiny on Kerviel's actions. Compliance officers checked the data regarding the forward trades more closely and called for a meeting with Kerviel. Kerviel admitted that he made a mistake with respect to the identity of the counterparty. He said it was Deutsche bank and forwarded two emails, which were forged, to substantiate his explanation. However, a control agent eventually decided to contact Deutsche Bank, which found no record of those transactions.

### *G. Paying Billions with Less Than a Million*

Sensing that the discrepancies were much larger than what they seemed, the auditors escalated the matter internally to the highest levels of management. Kerviel was asked to cut short a weekend getaway and return to the office. There were many senior officials who questioned him wanting to know the exact details of his trading strategies. Kerviel still tried to mislead them by initially stating that he had found an angel for speculators called the martingale strategy<sup>53, 54</sup>. Repeated inquiries and further investigation by the bank officials and auditors revealed that there were unhedged long futures positions worth about EUR fifty billion. Kerviel was asked not to return to work, not to speak to anyone regarding this matter and to stay at home. He was formally charged on January 28, 2008 with abuse of confidence and illegal access to computers.

His trial began on June 8, 2010. On October 5, 2010, he was found guilty and sentenced to five years imprisonment with two years suspended. If it seemed like a joke at first, the courtroom must be filled with a sense of humor since he was told to fully restore the \$6.7 billion which was lost. He also faced a permanent ban from working in financial services. Caroline Guillaumin, a spokeswoman for Société Générale, stated that the restitution was "symbolic," and that the bank had no expectation that the sum would be paid. Olivier Metzner, Kerviel's lawyer, described the sentence as "extraordinary" and said that Kerviel would appeal. Kerviel's sentence was suspended until his appeal was completed. On 24 October 2012, a Paris appeals court upheld the October 2010 sentence to three years in prison with another two suspended, and ordered Kerviel to reimburse EUR 4.9 billion to Société Générale for its loss—even though his largest bonus was well short of that. In March 2014, a French high court upheld Kerviel's prison sentence but ruled he would not

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<sup>52</sup> When asked for an explanation, Kerviel replied, "This materialized the give up of puts made late; I owe money to the counter-party. We'll re-book it a.s.a.p." According to SocGen's internal report, the risk-control officer later admitted that he did not understand this explanation. On January 9th, Kerviel annulled the contracts and was told that the problem had been resolved. The Omen

<sup>53</sup> A martingale is any of a class of betting strategies that originated from and were popular in 18th century France. The simplest of these strategies was designed for a game in which the gambler wins the stake if a coin comes up heads and loses it if the coin comes up tails. The strategy had the gambler double the bet after every loss, so that the first win would recover all previous losses plus win a profit equal to the original stake. The martingale strategy has been applied to roulette as well, as the probability of hitting either red or black is close to 50%. Since a gambler with infinite wealth will, almost surely, eventually flip heads, the martingale betting strategy was seen as a sure thing by those who advocated it. Nigel E. Turner, Doubling vs. Constant Bets as Strategies for Gambling, 14 J. GAMBLING STUD., 413, 414 (1998).

<sup>54</sup> More generally, in probability theory, a martingale is a sequence of random variables (i.e., a stochastic process) for which, at a particular time, the conditional expectation of the next value in the sequence, given all prior values, is equal to the present value. Yuan Shih Chow & Henry Teicher 239 Probability Theory: Independence, Interchangeability, Martingales (Stephen Feinberg et al. eds., 3rd ed. 1997).



have to repay EUR 4.9 billion.<sup>55</sup>

### *H. Sick Lesson from Nick Leeson*

Nick Leeson, another trader, caused United Kingdom's oldest merchant bank, Barings, and one of the oldest banks in the world to go bankrupt<sup>56, 57, 58</sup>. On February 26, 1995, when Barings bank declared bankruptcy, it came as a big surprise and shock to everyone and especially to the financial industry. Nick Leeson, one of the bank's traders in Singapore had lost \$1.4 billion on derivatives trading while the bank's reported capital was only about \$600 million. The loss came principally from a long position in the Nikkei 225 futures of notional value around \$7 billion on the Osaka and Singapore Exchanges.<sup>59</sup> What Nick Leeson's employers believed was that he was arbitraging the Nikkei 225 futures contracts on two different exchanges, the Singapore International Monetary Exchange (SIMEX) and the Osaka Stock Exchange (OSE), by buying the same futures at a low price in one exchange and selling simultaneously at a higher price on the other exchange.<sup>60</sup> Such a trading strategy has little to no risk exposure as the long position offsets the short position and hence from the official view point of Barings London, Nick Leeson was presumably fully hedged.

A key similarity with Kerviel's case was that due to the rapid expansion of Barings settlements, Nick quickly found himself in charge of both the front and back office. He was responsible for trading on the futures market and he was also in charge of booking and reporting the various trades. This meant that Nick Leeson would be the only one to check and to know if the records matched the actual trades. It is conventional practice that a different person is meant to be doing the back-office accounting, to detect any misconduct in the deals. However, this was not the case at Barings, which meant that Nick Leeson had the power to cover his tracks in case there were

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<sup>55</sup> In answer to the rumors that Kerviel had fled Paris following the discovery of the unauthorized trading, on 24 January 2008

Kerviel's lawyer denied that he attempted to disappear and said he remained in Paris to face the accusations. Also on 24 January 2008, Société Générale filed a lawsuit against "a 31-year-old person" for creating fraudulent documents, using forged documents and making attacks on an automated system, according to Clarisse Grillon, a spokeswoman for the Nanterre prosecutor. Gilligan, George & Jérôme Kerviel. The 'Rogue Trader' of Société Générale: Bad Luck, Bad Apple, Bad Tree or Bad Orchard? 32, 12 THE COMPANY LAWYER, 355, 355.

<sup>56</sup> Barings Bank was a British merchant bank based in London, and the world's second oldest merchant bank (after Berenberg Bank). Ian Greener, *Nick Leeson and the Collapse of Barings Bank: Socio-Technical Networks and the 'Rogue Trader'*, 13 ORGANIZATION 421, 425 (2006).

<sup>57</sup> Nicholas William "Nick" Leeson (born 25 February 1967) is a former English derivatives broker famous for bringing down Barings Bank, the United Kingdom's oldest merchant bank, into bankruptcy. Andrew D. Brown, *Making sense of the collapse of Barings Bank*, 58 HUMAN RELATIONS 1579, 1579 (2005).

<sup>58</sup> *Rogue Trader* is a 1999 British biographical drama film written and directed by James Dearden and starring Ewan McGregor and Anna Friel. The film centers in the life of former derivatives broker Nick Leeson and the 1995 collapse of Barings Bank. It was based on Leeson's 1996 book *Rogue Trader: How I Brought Down Barings Bank and Shook the Financial World*. *Rogue Trader* (Granada Film Productions and Newmarket Capital Group 1999).

<sup>59</sup> The Nikkei 225, more commonly called the Nikkei, the Nikkei index, or the Nikkei Stock Average, is a stock market index for the Tokyo Stock Exchange (TSE). Oliver Dale, *What is the Nikkei 225? Complete Beginners Guide*, MoneyCheck, (March, 15, 2019). <https://moneycheck.com/what-is-the-nikkei-225/>.

<sup>60</sup> In economics and finance, arbitrage is the practice of taking advantage of a price difference between two or more markets: striking a combination of matching deals that capitalize upon the imbalance, the profit being the difference between the market prices at which the unit is traded. James Chen, *Arbitrage*, Investopedia, (Feb. 1, 2020), <https://www.investopedia.com/terms/a/arbitrage.asp>.

substantial losses.

Barings London thought that Leeson's long futures position on the OSE, which was publicly known since the exchange reports such positions each week, was matched by a short position of the same notional value on the SIMEX. This implied being short twice as many contracts since a SIMEX contracts has a notional value of half as that of one OSE contracts. Nick Leeson was in fact long the same amount on the SIMEX exchange and this was completely contrary to what the senior managers at Barings were thinking. Nick Leeson had managed to hide his real position in a secret account, which was known as an error account and had the famous number of 88888. On January 17, 1995, the Kobe earthquake sent the Asian financial markets, and with that Leeson's investments, into a tailspin. As the value of the futures contracts started falling, the exchanges started issuing massive margin calls on the long positions. Despite urgent transfer of funds from Barings Tokyo and London to Barings Singapore in January and February to cover the margin calls on SIMEX, the continued decline in the value of the positions and the extent of the margin calls made Barings bankrupt.

## V. ROGUE TRADING GUIDE FOR DUMMIES

Let us imagine that we are in scenario where we are on the trading desk of a large financial firm, struggling to make profits by finding good trading strategies. If it seems like all else has failed, we have nothing to worry since we have the following guide to become a rogue trader and bring in lots of cash. Surely, this guide will also be useful to train good auditors who can watch out for the below signs.

- Covering up is crucial. This requirement is the most important of all the guidelines since if we are unable to cover our tracks thoroughly, whatever will do will be eventually found out. As discussed earlier, an understanding of how the middle office works is extremely valuable. In particular, knowing how trades are recorded, how they can be amended or moved to different accounts and canceled is useful. Given the number of transactions that a decent sized bank will see on a daily basis, there will be error accounts where trades that cannot be reconciled will be moved till they can be settled or sorted out. It is important to know who is taking care of the error accounts and if possible learn how to designate certain accounts as error accounts or create new error accounts for our own use. The good news is that there will be a lot of electronic information, noise and footprints. Initially, as we start our rogue journey, we can hide things without too much worries for a while and any trail we leave will be lost in too much information. But given the amount of electronic records, it is hard to wipe all traces of our actions and to remain unnoticed for a long time. It is important to keep moving our trades and records so that auditors will go around in circles. Mastery of this element will ensure survival for a long time and will make the difference between a great rogue and a decent one. Clearly, the longer we can cover our tracks the better, or at the very least, we need to remain clear and eliminate all our trails until we can find alternate employment or leave the country with enough money to find a paradise where there are no extradition treaties with our home country. If you have not done your time in the middle office, there are ways in which you can make up for it. Ask someone in the middle office to explain to you how things work, dangle the "soon you can be a trader" carrot in front of him. Remember someone in the middle office is stuck in a tedious job with long hours and would welcome the opportunity to be a part of the front office glamour.
- Fictitious trades will keep us within trading limits and far away from the risk managers. All

the trades we execute will show up in risk reports and financial firms are keen to ensure that most positions are hedged. What this also means is that profits from one trade will be balanced by the profits from other trades. If we venture down the rogue track, we do not want to bother with trades that make pennies. We are after the real money. This means taking directional bets and not hedging all our trades. So, we need to book fake trades that hedge the risk from some of our real trades. Many times, it is also useful to book trades with different prices but with the same quantity. This can show up as a profit or a loss and can reduce the risk we are holding. While losses will bring tons of attention, profits can cause lots of surveillance as well.

- Create a “Technical/Unknown” counterparty. All trades we do need someone on the other side who takes the opposing position. If we are booking fictitious trades, we need to assign some counterparty for those. These days, there is increased due diligence regarding counterparties in all financial institutions since there are many concerns about money laundering and funding for terrorist organizations and arms dealers. Since the due diligence can take many days, book new counterparties but make sure before they go into due diligence you change them. Kerviel was undone by this particular facet of rogue trading. It would be beneficial to have friends at other financial institutions with whom you trade sometimes so if they get questioned, they will say you have done trades with them before. Why stop there, see if you can bring them into the action. What one rogue can do, two can do better and a dozen can excel at misleading anyone investigating the matter. Create a network early on and unknown counterparties while essential for loners, known friends who are rogues working as a team means greater chances of evasion. This of course means ensuring that none of them turns on you. Everyone needs to be equally involved.
- All models are wrong, but some are useful. In our case, it does not matter if the model is right or wrong. We will leave that debate for the quants, mathematicians and philosophers. For our purposes, the more complicated the model the more useful it will be. Every day we need to mark the positions in our trading book with the latest price point for the corresponding securities. This is known as marking the book. We can mark the book using market prices for instruments that are regularly traded. For illiquid instruments, we need to use a model price. But, the main thing we are trying to do is that we are trying to mark using whatever source so that the risk managers will believe the price is valid. We need to understand that this is the essential goal of marking the books. If the models are complex, there is less understanding and more leeway in terms of which model parameters we can tweak and hence the price we can use. When questioned about this, we can say that we are correcting modeling bias or we are making a provision for model errors.
- Unlocked computers of other traders or other personnel on the trading floor are like gold mines. But if we need to educate someone on some of the potential uses of unlocked computers towards rogue trader status, perhaps it is time to rethink if rogue trading is meant for that someone. Suffice is to say, unlocked computers can be used for to create lots of mischief and mayhem such as booking trades from different user accounts, and sending emails to controllers or senior managers to mislead or confuse them. If you find unlocked computers of senior managers and you play your cards right, it might even be possible for you to take the throne for yourself.
- Forge emails to clear up any inquiries from controllers or better still provide clarifications using forged emails before any questions arise related to fictitious trades or counterparties. Forging an email does not need a certificate in computer engineering. All that is necessary is

the header from one email copied onto another one so that wrong information can be made to seem like a legitimate email forward or reply. For the more sophisticated rogue, figuring out more technical details about how email headers are created and the protocols used can be priceless to evade discovery.

- For the serious rogue trader, vacations are an annoying distraction. Not to mention there could be unwanted and unwelcome visitors that will probe and get their dirty paws all over your trades. Find ways in which you can postpone vacations till your job is done. Making up sob stories about dead family members that haunt your memories when you are away from work. And when you run out of close family members, remember the dead aunt that raised you and made you the person you are up. Send mild clues that you might be a jumper.<sup>61</sup> Such passive threats that you might one day succumb to the pressures of trading and all the stress created by wrong suspicions will unnerve any trading manager and he is likely to cover for you with controllers. No one wants a dead subordinate and no one wants to spend months answering questions about how they might have caused someone in their team to commit suicide and the cruel and terrifying methods they used to improve employee productivity.
- Ernst and Young have re-branded themselves as EY, perhaps because it was becoming well-known that they were too Earnest and certainly not Young.<sup>62</sup> If you have some influence in who gets hired to do your external audit, make sure it is EY. Even if you have no direct powers in deciding who your external auditor will be, sing praises about EY and the wonderful work ethic they follow. You might just be pleasantly surprised that EY will be the one to check if you are cooking your books. Chances are they won't find a thing wrong with your trading books. Do not worry, they are on your side because you are paying them. This issue of potential conflicts of interest between a client and its auditor is a topic that has spawned many papers and will be material for many more papers and books.
- Bury compliance, risk managers, controllers and auditors in emails and ask them for information that you don't really need but is hard for them to obtain. Say that you need all this information to ensure you stay within risk limits and to understand the full extent of scenarios that can potentially cause losses. If you have assigned them a lot of hard tasks and follow up regularly asking for updates and more information, they will be less likely to show up to ask you something since they will be worried about providing you updates. Remind them who is the rainmaker and emphasize that their inputs are crucial to ensure that the trading profits are sustained. In addition to asking for information send them updates, alerts and

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<sup>61</sup> The phone calls from the bank persisted, and Kerviel replied to one, in a text message, "I don't know if I'm going to come back or throw myself under a train." How serious was he? When he sent the message, he was just outside the bank headquarters, far from a railroad track. But bank officials were alarmed that he might be suicidal, and not without reason: the previous summer, a SocGen trader had jumped off a bridge, reportedly after unauthorized trading losses were uncovered. So, when Kerviel called to say that he was in the lobby, the bank dispatched a physician to evaluate his mental state. After concluding that he was stable, the doctor took him to a conference center on the sixth floor. The Omen.

<sup>62</sup> Ernst & Young (doing business as EY) is a multinational professional services firm headquartered in London, England, United Kingdom. Along with Deloitte, KPMG and PricewaterhouseCoopers (PwC), EY is considered one of the Big Four accounting firms. The firm dates back to 1849 with the founding of Harding & Pulein in England. The current firm was formed by a merger of Ernst & Whinney and Arthur Young & Co. in 1989. It was known as Ernst & Young until 2013 when it underwent a re-branding to EY. Jeff Swystun, *Ewww & Why?: The Ernst & Young Rebranding*, Business 2 Community, (July 21, 2013).

<https://www.business2community.com/branding/ewww-why-the-ernst-young-rebranding-0559411#:~:text=The%20Ernst%20&%20Young%20Rebranding%20Jeff%20Swystun%20July,provided%20some%20really%20weak%20rationale%20for%20the%20change>.

reminders about many aspects of your trading desk. Almost everyone in big business these days and especially in big banks is struggling with too much information, add more noise to the already noisy and chaotic environment. It is also helpful if you can benefit from the efforts of the many academics that are creating lots of papers. Universities that fund all this research are secretly concerned that not much of it is being used and that there is not enough of an audience for all this work. Get to know some academics and send some of their long and technical articles to the auditors to read, you will win some friends that will be pleased with material they can add to their resume about how applied their research is and friends in such circles will lend you more credibility. Suggest to the controllers that these research papers are crucial to understanding the business, the products, their risk management and the regulatory implications. When you see them, quiz them about the material you have sent them. The papers will not only create an amazing impression of you as someone who has a strong foundation and has a sound knowledge of the products, but most importantly if someone owes you many answers, they are unlikely to come up with questions for you.

- Despite all these precautions, there will always be a controller or two brave enough to venture close to you. Tell those controllers, who are hard to shake off and keep showing up, that you are working with someone else in their group and prefer it that way because the other person understands these things better and is a team player who is easier to work with. No one wants to be branded as abrasive and hard to work with, especially these days when all the business world is prioritizing teamwork and communication. Promotions, bonuses, entire careers, and sometimes even your very job, hinges on being seen as someone who can take one for the team. In spite of all that you have said and done, if someone persists in pestering you, tell them that they do not have a clue how these complex positions work and you do not have the time to give them a risk management certification or a beginner financial products course.
- Hire a few disabled assistants who can keep their silence and will not hear or realize most things happening around them. This might even get you some badges for helping the disabled. Every company wants to do more for causes that help the less fortunate and employees that show that they care by willing to work with such people will be prized. Even if they are not really disabled, but if they play the part of the assistant that is mute and hearing impaired it can be a valuable asset. If things go really south, you also have some suckers to blame for the mistakes for which you are being held responsible. To put it more subtly, it is priceless having an internal accomplice who could be the clueless criminal.

## VI. MATHEMATICALLY SOPHISTICATED MODELS OR MERELY SUPERIOR MORALS?

With the above background, let us now attempt to answer the most important question related to this case by considering a few related questions. We try to weave in varying points of view since a difference of opinion is what makes horses race, markets trade, and life interesting.

*A. What would you do if you find yourself in situations similar to those faced by Jerome Kerviel?*

- i. If you believe that no one is watching, would you build up positions outside your authorized limits?

We need to understand the environment in which traders operate. They are under tremendous pressure to generate profits. The lives of traders can be epitomized by the adrenaline-charged

behavior of race car drivers<sup>63</sup> and fighter pilots in the early era of jet engines.<sup>64</sup>

Many a time, corporate success in most spheres of the business realm simply boils comes down to kicking the asses you can and kissing the asses you have to. Trading is freedom from having to follow this unwritten rule of the modern business conglomerate. A trader's profits provide a more objective view of his efforts and contribution. In addition to the thrill of the trade, this promise of independence from kowtowing to others, partly explains the allure of making a living as a trader. A good sequel to the book "Men are from Mars and Women are from Venus" from celebrated author John Gray would be, "Sales/Trades people are from Saturn and Product Managers are from Pluto." What this highlights is that depending on what identity we assume, our views change and conflicts are natural when there are different perspectives.

Any trader, good or bad in terms of P&L, will lose money at some point. This can be summarized in terms of what life throws at all of us. There are days we get paid; there are days we get laid; and there are days we get laid off . . . that is life. The financial speculators that adorn magazine front pages have obtained winning gambles before losers. George Soros has suffered from many Gorge Soros (bad bets),<sup>65</sup> but he is remembered most vividly as the man who broke the Bank of England. This suggests that lady luck might not have smiled favorably at the right time upon many a rogue.

Surely, there are many differences in terms of the authorized trades that speculators on the buy side and traders, such as Kerviel, on the sell side are permitted.<sup>66, 67</sup> But, their fundamental

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<sup>63</sup> Rush is a 2013 biographical sports film centered on the Hunt–Lauda rivalry between two Formula One drivers, the British James Hunt and the Austrian Niki Lauda during the 1976 Formula 1 motor-racing season. Rush (Exclusive Media Group 2013).

<sup>64</sup> The Right Stuff is a 1979 book by Tom Wolfe about the pilots engaged in U.S. postwar research with experimental rocket-powered, high-speed aircraft as well as documenting the stories of the first Project Mercury astronauts selected for the NASA space program. The Right Stuff is based on extensive research by Wolfe, who interviewed test pilots, the astronauts and their wives, among others. Wolfe wrote that the book was inspired by the desire to find out why the astronauts accepted the danger of space flight. He recounts the enormous risks that test pilots were already taking, and the mental and physical characteristics—the titular "right stuff"—required for and reinforced by their jobs. Tom Wolfe, *The Right Stuff* (Farrar, Straus and Giroux 1979).

<sup>65</sup> George Soros, (born Schwartz György; August 12, 1930) is a Hungarian-American investor and philanthropist. Soros is known as "The Man Who Broke the Bank of England" because of his short sale of US\$10 billion worth of pounds sterling, which made him a profit of \$1 billion during the 1992 Black Wednesday UK currency crisis on 16 September, 1992. Andrew Beattie, *How Did George Soros Break the Bank of England?*, Investopedia, (September 18, 2020) <https://www.investopedia.com/ask/answers/08/george-soros-bank-of-england.asp>. After gaining more than 100 percent in 1980, the Quantum fund was down 23 percent the following year, its first ever loss, and Soros was hit by a wave of redemptions that halved his capital from \$400 million to \$200 million. The Quantum Funds lost \$800 million a short while before the October, 1987, stock market crash, betting the wrong way on Japanese stocks (Mallaby 2010). Quantum Funds suffered a \$600 million loss on Feb. 14, 1994 the first full day of trading after trade talks between the United States and Japan collapsed. A \$600 Million Miscalculation, <https://www.nytimes.com/1994/02/26/business/a-600-million-miscalculation.html>.

<sup>66</sup> Buy-side is a term used in investment firms to refer to advising institutions concerned with buying investment services. Private equity funds, mutual funds, life insurance companies, unit trusts, hedge funds, and pension funds are the most common types of buy side entities. In sales and trading, the split between the buy side and sell side should be viewed from the perspective of securities exchange services. The investing community must use those services to trade securities. The "Buy Side" are the buyers of those services; the "Sell Side", also called "prime brokers", are the sellers of those services. Julie Young, *Buy-Side*, INVESTOPEDIA (Nov. 28, 2020), <https://www.investopedia.com/terms/b/buyside.asp>.

<sup>67</sup> Sell side is a term used in the financial services industry. The three main markets for this selling are the stock, bond, and foreign exchange market. It is a general term that indicates a firm that sells investment services to asset

goal of pursuit of profits by combating uncertainty in the financial markets, requires that they have to possess a certain amount of aggressiveness to put on seemingly risky trades. That very aggression can sometimes take one too far across the line.

*B. Would you believe that because no one is telling you anything, someone is watching and implicitly permitting?*

There are cameras everywhere and this means that we are not just being watched but whatever else we do is also being monitored in various ways. Phone conversations are tapped; emails are read and even our internal organs are scanned, many times without our awareness or consent. The day when someone would be reading even our very thoughts and dreams does not seem far off, if it is not already happening. Given this state of affairs, it is proper to live under the assumption that everything we do can be known by everyone. If that is the case, we should only do something that we are okay to admit to everyone.

When we look back many years later at present day human resource practices such as: productivity incentives, time logs, email and chat filters, phone conversation recording, management notifications, performance reviews, evaluations and ratings, these methods of today can be compared and might one day seem like the whipping of slaves in ancient times.

While Point (1a) conveys the message that desperation combined with frustration could lead to unethical behavior, there could be many benefits to having formal corporate ethics programs. It also seems sensible that organizational structures try and weave the ethical dimension into their process, especially in terms of education and development. This can be construed as an open invitation to ramp up our efforts at education aimed at better values from all corners of life since if all of us could clear our doubts ourselves, we would not need universities and Nobel prizes, right?

*C. You have received a bonus of less than EUR one million, how would you pay back a loss of around EUR five billion?*

The one way in which we can come up with EUR five billion starting with a EUR one million is by going about putting on another set of rogue traders or we would need to create another scam or a Ponzi scheme. The courtroom is implicitly suggesting that the accused must perpetrate another crime. If not, the courtroom must be filled with jokers.

This brings up the topic of why people crave astronomical salaries. We could state that we live in a world that requires around 2000 IQ points to consistently make correct decisions.<sup>68</sup> But, the problem is that the best of us has around 200 IQ points. No matter how intelligent one is, the

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management firms, typically referred to as the buy side, or corporate entities. One important note, the sell side and the buy side work hand in hand and each side could not exist without the other. These services encompass a broad range of activities, including broking/dealing, investment banking, advisory functions, and investment research. Adam Barone, *Sell-Side*, INVESTOPEDIA (Jul. 7, 2020), <https://www.investopedia.com/terms/s/sellside.asp>.

<sup>68</sup> Ismail (2014) mentions the following quote from Taleb, “Knowledge gives you a little bit of an edge, but tinkering (trial and error) is the equivalent of 1,000 IQ points. It is tinkering that allowed the industrial revolution”. This means that to match trial and error we need 1000 IQ points. But trial and error could still give the wrong outcomes. We can try and fail many times and still be wrong. So in our paper we make the assumption that we need 2000 IQ points to consistently make the right decisions. The subtle point that arises from this discussion is that: we need 2000 IQ points to be right all the time, but the problem is that the best of us has somewhere around 200 IQ points. Nassim Taleb and Daniel Kahneman discuss Trial and Error / IQ Points, among other things, at the New York Public Library on Feb 5, 2013.

intelligence of the world that we confront around us is many times more. Hence many human actions might seem that they are motivated by stupidity, envy and flashes of brilliance; though the common element we can trace in all these efforts is that they can be viewed as the pursuit of happiness, well-being and a perpetual desire to have more or to breach any boundaries that we encounter. There is no everlasting success. This does not make one short sighted. We do need to have long-term goals. But a goal once reached becomes another milestone and it must point us in the direction of what to do next. This explains our longing to have large bonuses, promotions and the next level of advancement.

If we did not have this eternal craving for more and if we had started living within our means, we would still be living in caves—which may or may not be a bad thing. The question of what is absolutely imperative to lead a good life is a constantly changing one, as luxuries end up becoming necessities. To determine what is intrinsic to well-being, requires acknowledging its subjectivity. While well-being has dependencies on the external environment, the most crucial elements for contentment are internal. Poverty is a state of mind and happiness must come from our hearts. If people start offering more than what is asked, there will be no need for businesses and profit maximization. A small price to pay for perhaps peace on Earth. The parallels between profit maximization and piracy are worth pondering about. If everyone pursues profit maximization, we will only end up as a society of rich pirates. It seems that all the tools of modern business such as economics, finance, marketing, law, accounting, management, organization behavior and such other disciplines are sciences created to give legitimacy to profit maximization or a less crude form of piracy.

*D. What would be your verdict regarding the following vital and broader questions which necessitates that we ponder them more carefully?*

We need to remember this before passing our judgment: there are no good or bad people, just seemingly tough situations and mediocre role models. Most would agree that there is no bad child; but if the good child might later come up with questionable conduct, there must have been bad examples that the good child might have been exposed to. There is strong evidence suggesting that high profile business persons serving as ethical role models can make a difference in developing the proper behavior within an organization, while the reverse also holds true when unethical charismatic leaders take charge.

i. Was SG trying to pick a scapegoat?

Scandals and secrets are like mice, where there is one there are usually many more. But a scapegoat, or the fall guy, is generally a solitary creature. Once someone has been picked to take the blame, the focus shifts on putting the matter to the grave and moving further away from it. Selecting a whipping boy, which has always been a clever ruse given our affinity to history and how less of it we generally incorporate into our lives, will take care of the rest and the topic gets forgotten. Kerviel was the undisputed King of Liars Poker since his deception went unnoticed.<sup>69</sup>

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<sup>69</sup> A game often associated with Wall Street traders who use statistical reasoning and behavioral psychology tactics to gamble. Liar's Poker is fairly similar to the card game "cheat." Players hold random dollar bills with close attention to their own bill serial number and without letting any other players see it. Each player has to guess how often a particular digit appears among all the bills held by all the players. Each guess or bid must be higher in quantity, or equal in quantity but higher in value, than the previous bid. The round ends when all the other players



Despite many speculations regarding whether he was a sole operator and who else on the desk might have been aiding him, he was the only one convicted. Whenever someone stands accused of any criminal charges, a well-known way to reduce your sentence is to provide information about others who might be violating any regulations. The norm in rogue trading scandals seem to be that very few others are shown to be deeply involved in the wrong doings. Clearly, in this case, Kerviel was the master mind behind what happened.

- ii. Is this a question of too big to be good or excellent? Are small partnerships better than large public companies?

When the question of size comes up, we need to acknowledge that: what one person can do, two or more people can do better if the social issues in this situation are handled appropriately. This implies that bigger companies are better and brings to light many the social issues inherent in large firms. Tremendous amount of resources are expended in balancing the power and politics within large organization. Where there are people there will be politics.

The recent financial crisis raised the related question of too big to fail. It has been much talked about that the financial crisis was a credit problem. People need to get credit for what they do, but they should only get as much credit as they deserve. Because, if too many people that do not deserve credit get too much credit, people that really deserve credit will not get any and we will have a crisis on our hands. So, this financial crisis, is no longer just a credit problem. It is about what is fair and it becomes an ethical issue. So, unless we tackle this real credit problem, there will always be issues when someone will get too much monetary or other forms of credit. We can extend this ethical and fairness credit issue and try and explain almost every crisis we have on planet Earth.

As financial firms have moved from being partnerships, where the net worth of the partners was directly tied to the risks the firms could take, to public companies, where much of the capital comes from shareholders, there have been lapses in oversight. When playing with other people's capital, especially when you benefit from the profits and you are not penalized by the losses, there is every incentive to take riskier bets. Hence, it is especially important that when the business risks can be extremely high such as in the trading of financial instruments, it is wiser to curtail the extent of investments and also hold people accountable for the losses.

*E. Do the managers at SG and other large public financial services firms no longer have their skin in the game?*

The previous Point makes it explicit that there has been a trend towards decreasing ownership and lack of accountability. But here we clarify many difference between management and leadership. Management is about making sure things are done. Leadership is about making sure the right things are done. Let us say there will be a team lunch meeting. The manager is the one

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challenge a bid. The objective of the game is to bluff the opponents into believing that your bid does not exceed the combined sum of all of the serial numbers. For example, if the first player bids three 6s, he is predicting there are at least three 6s among all the players including himself (that is, he predicts that within all of the dollar serial numbers held by all players, there are at least three 6s). The next player can bid a higher number (or digit) at that level (or frequency) (three 7s), any number at a higher level (four 5s), or challenge the previous player's bid (this means the previous player's bluff is called). The game continues clockwise around the table until a particular bid is challenged by every other player. If the challenge is correct, and the total number of the digit on all the bills is lower than the bid, the bidder loses. If the challenge is incorrect, the bidder wins. Will Kenton, Lier's Poker, INVESTOPEDIA (Oct. 10, 2019), <https://www.investopedia.com/terms/l/liars-poker.asp>.

to call for the meeting, ensure that people show up and the relevant discussions happen. There is no real need for a leader here. The true leader in this scenario would arise only when there is no food on the lunch menu.

Let us illustrate further with the titles we have in the corporate world. We might report to Executive Directors (ED) or Managing Directors (MD), but we need to remember that who we ultimately report to is the Greatest Of Directors (GOD), our conscience. There is a method to (or a message in) this madness where we have people titled Managing Directors and Vice Presidents, but no Leading Directors and Wise Presidents. This is because leadership and wisdom can come from anyone.

It is widely expected that the corporate executive will be a philosopher king, a concept dating back to Plato, someone wise enough to know what is right, with the authority to enforce it and the self-control to not abuse his power. But, philosophers do not want to be kings and the ones that end up as kings are, let us just say, not philosophers. Smart men fulfill needs and wise men eliminate needs. Smart men solve problems and wise men eliminate problems or ensure that problems do not arise in the first place. Until philosophers kings rule, the best we can do is ensure that the power vested in anyone is not enormous.

#### *F. Is right or wrong easier to determine than legal or illegal?*

Right or wrong has been around for much longer than legal or illegal. It is generally true that our sense of ethics will change with cultures and with time; but the variation in right or wrong will be less so than the differences in legal intricacies. Also, the basic intuition to differentiate right from wrong is more abundant in most of us than the ability to call something legitimate or not. There are principles and then there are rules that dictate many aspects of our lives. The rules or the legality of situations are driven by the principles. The rules are tweaked to ensure that they adhere to certain principles. Hence, the rules can change more easily and generally do change more often than the principles. Living by the rules when the principles are forgotten is a pointless and pathetic existence, which can be the cause of many a caucus; whereas it might be more tolerable if rules are overlooked, when necessary, to uphold principles. Many enthusiastic students arrive at law school enamored about the law's capacity to further social justice. However, soon they are disillusioned once they start perceiving that lawyers wield law without regard for its impact on society.

This implies that lawyers are extremely intelligent people with perhaps a misguided or foolish sense of purpose, which at times makes them more dangerous to society when compared to foolish people with or without a sense of purpose. The discussion in Point (1c) suggests that everyone is an idiot, though here we make a relative comparison. This is simply because lawyers are more empowered with their education, their license to practice, their representation of the law and their intelligence. Lawyers are accused of living in their world of fancy frameworks and legal precedents. But then again, if you are not living in your own world, you are living in somebody else's world.

Ethics can be understood as doing the right thing so that it increases human well-being, which may be at odds to many conventional rules or guidelines. Ethical issues arise and are exacerbated when erroneous decisions are justified by subsequent atrocious actions. This can be understood as consciously performing wrongful deeds to defend the earlier blunder. This is mostly because the focus shifts to proving someone correct or wrong rather than on deciding what is correct or wrong. That is the emphasis rests on showing who is right rather than on discerning what is right. The

solution to such issues is greater disclosure of information and repeated interactions among the participants. It is prudent to aim for complete transparency unless it is established that such a state can be harmful. Hence, we need to design social systems that minimize complexity and establish an ambience where repeated games can be played with public transparency, so that guileful practices are curtailed.

Art, science and love can transcend the boundaries of region, religion, race and language, but, so can hatred, violence and weapons. If we are to make the right choices, perhaps it is education which will lead to faster evolution and better ethics as discussed in Section 4.2. As we go about creating knowledge by trying to understand the world better and disseminating this knowledge, which we can term education, we might just end up understanding one another better, perhaps, becoming more tolerant in the process, an unintended yet very welcome consequence. This must make us wonder whether the true purpose of all knowledge, creation and education might be to make us more tolerant. We need everyone to be educated so they can make their choices independently or we can just educate a few people who can tell others what to do or decide for them. This suggests that universal education is one way to ensure that we do not put too much power in someone's hands.

*G. What do we need more of: Mathematically Sophisticated Models or Merely Superior Morals?*

Thankfully the models used in the financial industry are not as sophisticated as the models that come to the minds of most people when they hear the word model. Perhaps, the financial models are not even the models that most people wish to work with. Despite the relative simplicity of the models used in finance and admitting the fact that there is long way to go before models can determine morals, we need to question the over-dependence on very complex mathematical models for decision making in financial services.

As models get more complex the assumptions behind the models stand upon shakier ground. Assumption is the mother of all "duck-ups." Here we define a duck-up as a beautiful mistake that teaches us how to make something better. Models are filled with assumptions and morals are hindered by suspicions. Another fundamental objection to greater morals might stem from the very intrinsic selfish behavior of organisms to ensure survival of oneself. The one way around these obstacles is trial and error and trust, which happens with evolution and education.

Our present attempts at moral education will run into a wall unless we can address the issue of trust. There will always be distrust when we see ourselves as separate and distinct from the others around us. Education, which is empowerment, must start by imparting everyone a cosmic identity. What this means is that each person must view himself as an extension of the universe around him. As an example, if every human being were to view trees as an extension of their lungs or their breathing apparatus, no one would have to be drilled on the finer points of protecting trees. To illustrate this further, on the flip side, if someone is getting trained to become a nuclear scientist and associates themselves with a nation, a terrorist organization or with any limited group of people, they would have fewer qualms regarding the use of their training to possibly obliterate the group they deem themselves not to belong to.

Hence, if we associate ourselves with our nation or our religion or our business or our university, we will make decisions to benefit the restricted identity we have chosen and our ethics will be aligned towards that parochial goal. This means that we might be willing to compromise on our ideals to benefit what we consider to be who we are or what is closer to us and even possibly act to the detriment of or sacrifice what we deem to be further away from us. The way around this

is a belief that we are deeply connected to everything around us, which will obliterate the artificial boundaries we have erected all around us. Our ever-present longing to have more taken to the extreme or asymptotically, can become a belief that everything in the universe is a part of us, or that we are a part of everything. Such an attitude can be inculcated by first transferring to everyone a limitless identity and then beginning the rest of their schooling or any form of formal or informal training that molds the person and develops their abilities. When this happens, we will trust others just as much or just as little as we would trust ourselves. Also, our well-being or the well-being of all of existence will be identical from our perspective, which is the key to superior morals. A research agenda with an objective of finding efficient techniques that can transcend bounded identities will prove to be highly fruitful.

As we wait for the perfect solution it is worth meditating upon what superior beings would do when faced with an intriguing situation such as the one we are in. Surely, it is sheer arrogance, possibly bordering stupidity, to think that we can change the world that has existed for a very long time in our blink of a lifetime. But we offer the following hope and solace. While it is a hard ask to change the world we are in, it might not be that cumbersome to create a new one. It is said that the universe is but the Brahma's (creator's) dream.

Research can help us understand this world and maybe decipher the key to unencumbered ethics. Sleep can help us create our own world, where we can lay down the ethical framework we deem perfect. We just need to be mindful that the rosiest and well intentioned dreams can have unintended consequences and turn to nightmares. When dreams become nightmares, perhaps due to bad ethics, it is time for a new universe. Suffice it to say, we might just as well conclude that the rogue must have been created long before he became a trader.

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<sup>70</sup> Yoga is a group of physical, mental, and spiritual practices which originated in ancient India. The Sanskrit noun yoga is derived from the root yuj "to attach, join, harness, yoke". The word yoga is cognate with English "yoke". The ultimate goal of Yoga is the raising and expansion of consciousness from oneself to being coextensive with everyone and everything. See Marlynn Wei, MD, JD, *Yoga for better sleep*, HARVARD HEALTH BLOG (Dec. 4, 2015, 9:00 AM), <https://www.health.harvard.edu/blog/8753-201512048753>.

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## VIII. SOME MORE SLEEPING AIDS (APPENDIX OF FIGURES)

<b>Partial Chronological List of Spectacular Rogue Trading Scandals</b>				
<b>Year</b>	<b>Name</b>	<b>Institution</b>	<b>Loss</b>	<b>Sanctions</b>
1994	Joseph Jett	Kidder, Peabody & Co	\$74.6 million	Lifetime ban from securities trading
1995	Nick Leeson	Barings Bank	£827 million	Jail 6.5 years
1995	Toshihide Iguchi	Resona Holdings	\$1.1 billion	Jail 4 years
1996	Peter Young	Deutsche Morgan Grenfell	\$280 million	\$3 million fine and damages
1996	Yasuo Hamanaka	Sumitomo Corporation	\$2.6 billion	Jail 8 years
2002	John Rusnak	Allied Irish Banks	\$691 million	Jail 7.5 years
2004	Luke Duffy	National Australia Bank	AUD\$360 million	Jail 10 months
2005	Chen Jiulin	China Aviation Oil	\$550 million	Jail 51 months
2007	Matthew Taylor	Goldman Sachs	\$118 million	Jail 9 months
2008	Jerome Jerviel	Societe Generale	\$6.9 billion	Jail 5 years with partial suspension
2011	Kweku Adoboli	UBS	\$2.3 billion	Jail 7 years
<b>Partial Chronological List of Prominent Losses (P&amp;L Hits) in the Financial Markets</b>				
1998	Scholes, Merton	Long Term Capital Management	\$4 billion	None
2006	Brian Hunter	Amaranth Advisors	\$6.6 billion	None
<b>Largest Ponzi Scheme in World History</b>				
2008	Bernard Madoff	Bernard L. Madoff Investment Securities	\$64.8 billion	Jail 150 years

Figure 1: List of Rouge Trading Scandals &amp; Financial Market Losses

Selected Financial Data for SocGen, 2003-07					
GROUP CONSOLIDATED FIGURES	2007	2006	2005	2004	2003
<b>Results (in millions of euros)</b>					
Net banking income	21,923	22,417	19,166	16,390	15,637
Operating income(excluding loss From Kerviel's trading)	6,713	8,035	6,562	4,760	3,843
Operating income(including loss From Kerviel's trading)	1,802				
Net income before minority interest	1,604	5,785	4,916	3,623	2,755
Net income before minority interest	947	5,221	4,402	3,281	2,492
French Retail Banking	1,375	1,344	1,059	942	878
Financial Services	686	471	386	258	214
Global Investment Management & Services	600	52	1,453	376	285
Corporate and Investment Banking	652	577	460	385	290
Corporate Centre and other	(2,221)	2,340	1,841	1,453	1,052
	(145)	(32)	203	(133)	(227)
<b>Activity (in billions of euros)</b>					
Total assets and liabilities	1,072	957	835	601	539
Customer loans	305	264	227	208	178
Customer deposits	270	267	223	213	160
Assets under management	435	422	386	315	284
<b>Equity (in billions of euros)</b>	27	29	23	18	17
Group shareholders' equity	31	33	27	21	21
Total consolidated equity					
<b>Average headcount (thousands)</b>	130	115	100	93	90
Source: Societe Generale Group. (n.d.). Document de Référence 2008. Document de Référence 2008. Retrieved from <a href="https://www.societegenerale.com/sites/default/files/03 Mars 2008 Document de référence 2008.pdf">https://www.societegenerale.com/sites/default/files/03 Mars 2008 Document de référence 2008.pdf</a>					

Figure 2: Societe Generale Selected Financial Statements from 2003 to 2007



### Key Financial Data for Societe Generale - Prior to Kerviel's Trading

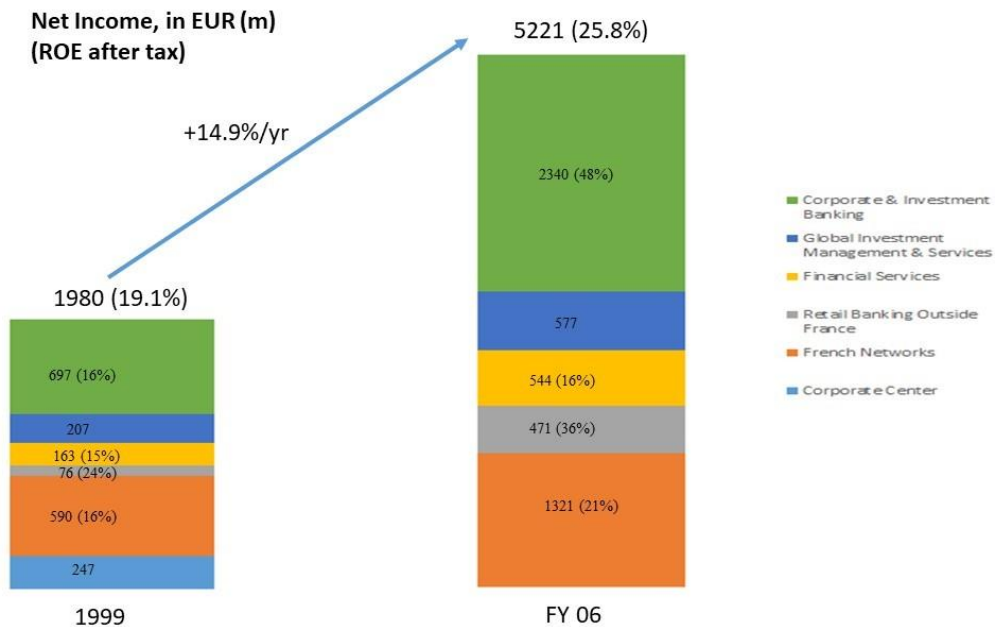


Figure 3: Societe Generale Selected Financial Statements, Income Comparison of 1999 with 2006

Length of Wikipedia Page for Celebrities in Finance, Science and Arts				
Field		Name	No. of Page	No. of Word
Finance	1	Warren Buffett	148	25402
	2	Robert Merton	84	15662
	3	Jérôme Kerviel	49	8287
	4	George Soros	156	29250
Science	5	Nikola Tesla	186	34370
	6	Isaac Newton	181	43188
	7	Albert Einstein	207	43930
	8	Marie Curie	135	28339
Arts	9	Ludwig Van Beethoven	116	23594
	10	Leonardo Da Vinci	160	40876
	11	Elvis Persley	237	63822
	12	Michael Jackson	226	59436

Figure 4: Celebrities in Finance, Science and Arts



(a) One



(b) Two

Figure 5: Business Entities and Matryoshka Dolls

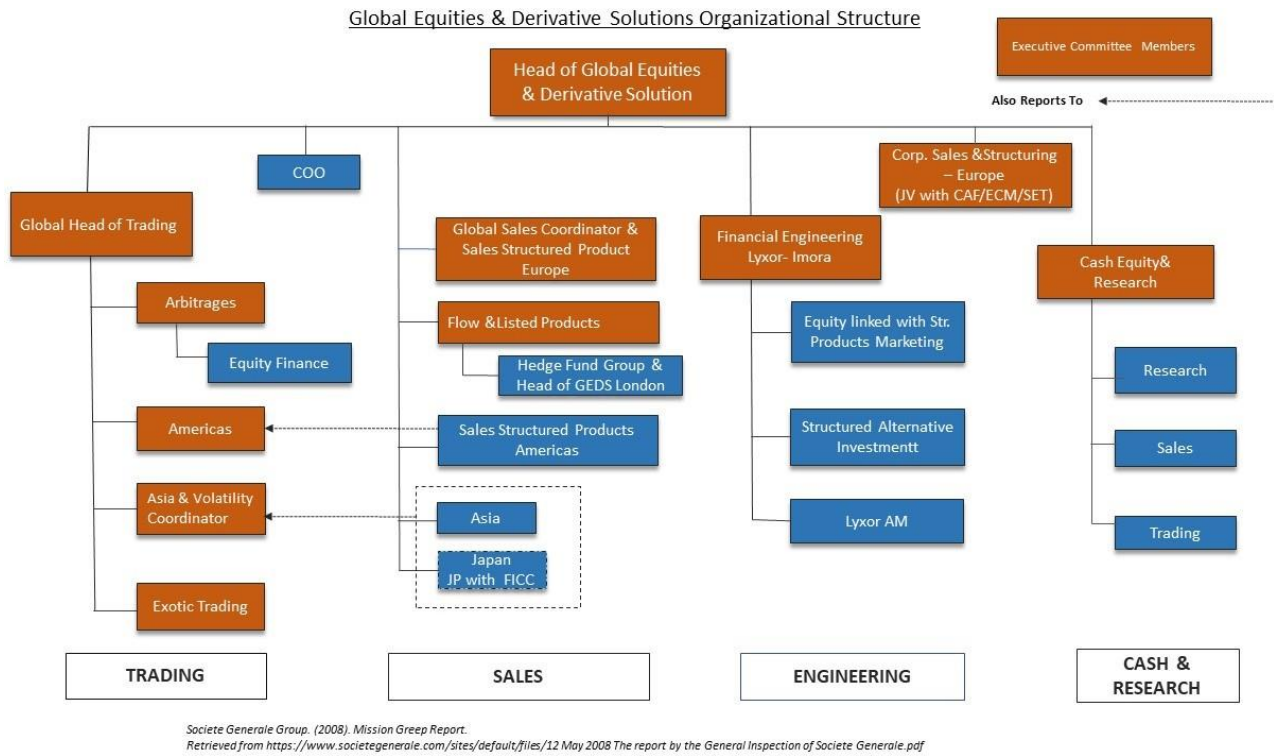
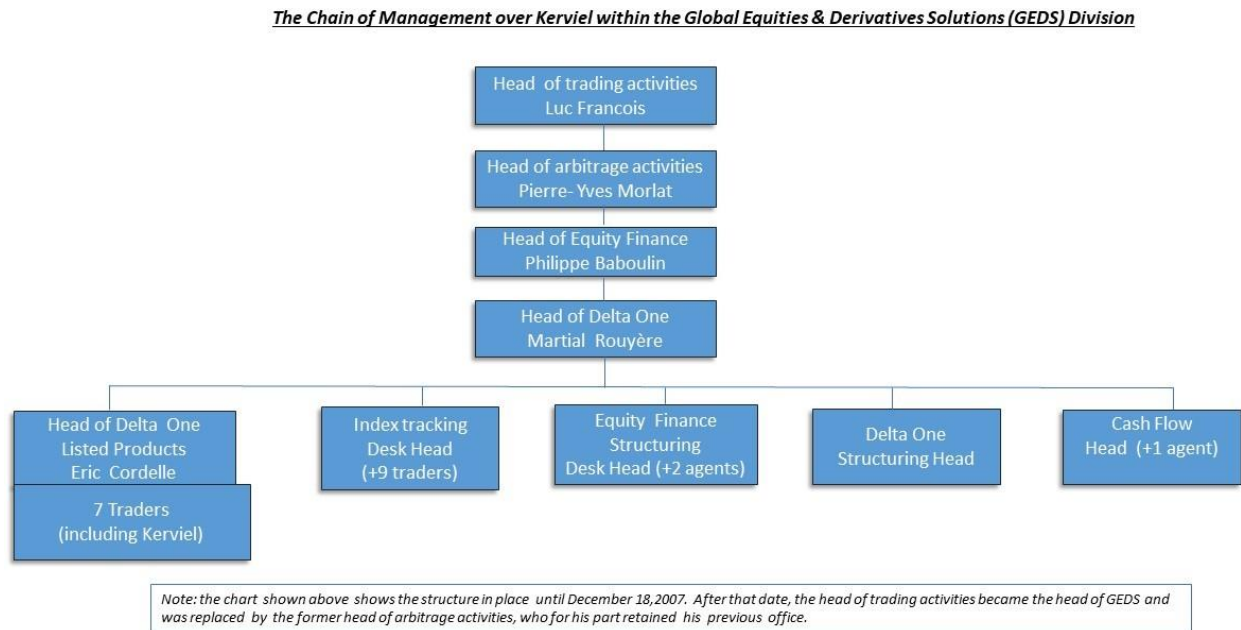


Figure 6: Societe Generale Global Equities &amp; Derivatives Solutions Organizational Structure



Source: Societe Generale Group. (2008). Mission Green Report.  
Retrieved from <https://www.societegenerale.com/sites/default/files/12 May 2008 The report by the General Inspection of Societe Generale.pdf>

Figure 7: Societe Generale Trading Organizational Structure Around Jerome Kerviel



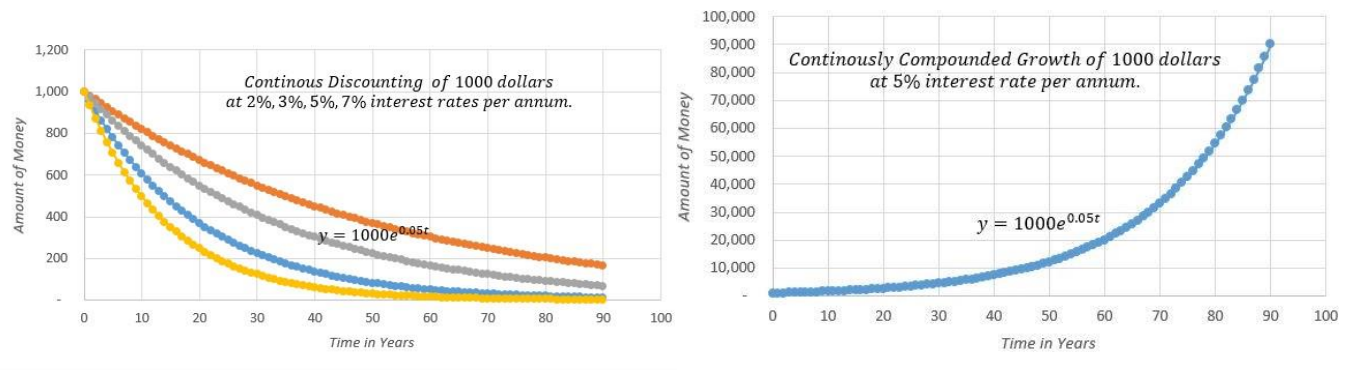


Figure 8: Time Value of Money: Discounting and Compounding

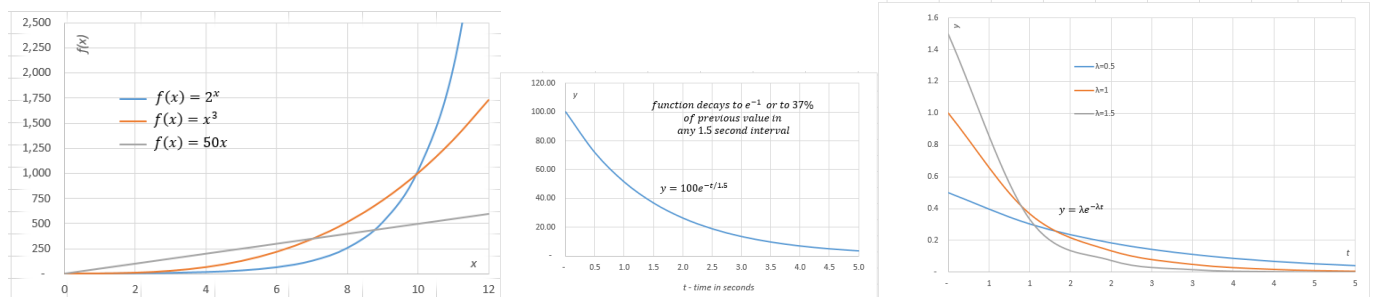


Figure 9: Exponential Growth and Decay

### Turbo Warrants

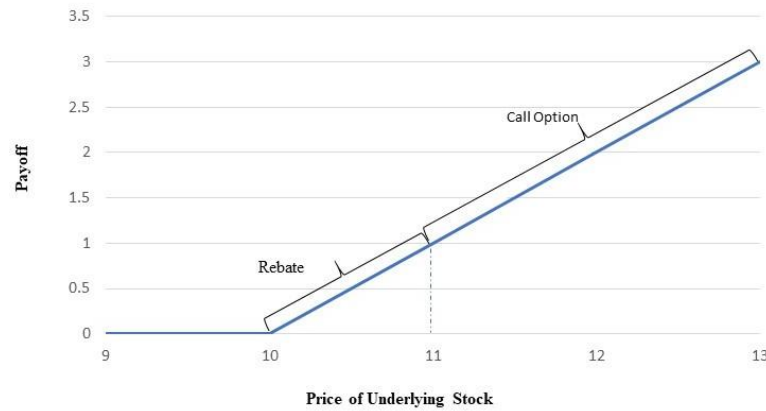
- Principle: SG sells warrants with knock-out options to its clients (principally as call options, *i.e.* purchase / call option offered the client) and hedges by buying the underlying asset in question.
- Strategy: "long turbos" are purchase options ("calls down and out") that can be deactivated if the spot price falls below the barrier, whereas "short turbos" are options to sell ("puts up and out") that can be deactivated if the spot price rises above the barrier. The purchase of the underlying assets is carried out by SG, which allows the client to benefit from a leverage effect (as the client does not purchase the asset).
- Underlying assets: shares (single stock), baskets of shares (more unusual), ETFs (sector and/or geographical exposure), indices, bunds (German state bonds), currency.
- Maturities: no maturity date ("open end turbo"), maturity fixed at the date of issuance of the warrant ("closed end turbo"), one-day maturity.
- In the event of knock-out, SG resells the hedge and give the client the difference between the strike and the corresponding level.

Source: Societe Generale Group. (2008). Mission Green Report.  
Retrieved from [https://www.societegenerale.com/sites/default/files/12\\_May\\_2008\\_The\\_report\\_by\\_the\\_General\\_Inspection\\_of\\_Societe\\_Generale.pdf](https://www.societegenerale.com/sites/default/files/12_May_2008_The_report_by_the_General_Inspection_of_Societe_Generale.pdf)

Figure 10: Fundamentals of Turbo Warrants

### Arbitrage on competitor's turbo warrants

In the context of market's growing volatility, the DPL desk identified competitor's turbo products whose price was no longer adapted to market conditions. Arbitration consists of the purchase on day D of competitor's call turbos and their hedging by the sale of future contracts. If the market opens at D+1 by showing a fall which deactivates the product, SG registers a profit (the trader can in fact re-purchase his hedge with a profit). Example of payoffs associated with a "long turbo" with rebate in the event of knock-out (strike price is set at 10 and knock-out barrier at 11):



Source: "Mission Green Report." Mission Green . Societe Generale Group, May 2008.

Retrieved from [https://www.societegenerale.com/sites/default/files/12 May 2008 The report by the General Inspection of Societe Generale.pdf](https://www.societegenerale.com/sites/default/files/12%20May%202008%20The%20report%20by%20the%20General%20Inspection%20of%20Societe%20Generale.pdf)

Figure 11: Arbitrage on Turbo Warrants

2006 and 2007 Earnings from Delta One Trading		
Earnings from proprietary trading		
EUR millions	2006	2007
Jérôme Kerviel's earnings	0	25
DELTA ONE earnings	24	114
<b>Jérôme Kerviel's weighting</b>	<b>0%</b>	<b>22%</b>
Earnings from client trading		
EUR millions	2006	2007
Jérôme Kerviel's earnings	7	18
DELTA ONE earnings	20	45
<b>Jérôme Kerviel's weighting</b>	<b>35%</b>	<b>40%</b>
Total earnings from trading (i.e minus sales credits)		
EUR millions	2006	2007
Jérôme Kerviel's earnings	7	43
DELTA ONE earnings	44	159
<b>Jérôme Kerviel's weighting</b>	<b>16%</b>	<b>27%</b>

Source : Societe Generale Group . (2008). Mission Green Report. Mission Green Report.  
Retrieved from [https://www.societegenerale.com/sites/default/files/12 May 2008 The report by the General Inspection of Societe Generale.pdf](https://www.societegenerale.com/sites/default/files/12%20May%202008%20The%20report%20by%20the%20General%20Inspection%20of%20Societe%20Generale.pdf)

Figure 12: Earnings from Delta one Trading

Proprietary trading earnings distribution of the 143 arbitrage traders of the equity & derivatives trading division for 2007  
Based on this distribution, Jerome Kerviel with earnings of EUR 25 million generated from proprietary trading during 2007 was the 15th best trader within the division out of a total of 143 traders.

Earnings in EUR million	<0	0-5	5-10	10-15	15-20	20-25	25-30	30-35	>35
Number of Traders	10	76	14	12	9	8	4	4	6

Source : Societe Generale Group . (2008). Mission Green Report. Mission Green Report.  
Retrieved from [https://www.societegenerale.com/sites/default/files/12 May 2008 The report by the General Inspection of Societe Generale.pdf](https://www.societegenerale.com/sites/default/files/12%20May%202008%20The%20report%20by%20the%20General%20Inspection%20of%20Societe%20Generale.pdf)

Figure 13: Delta One Traders Profit Distribution

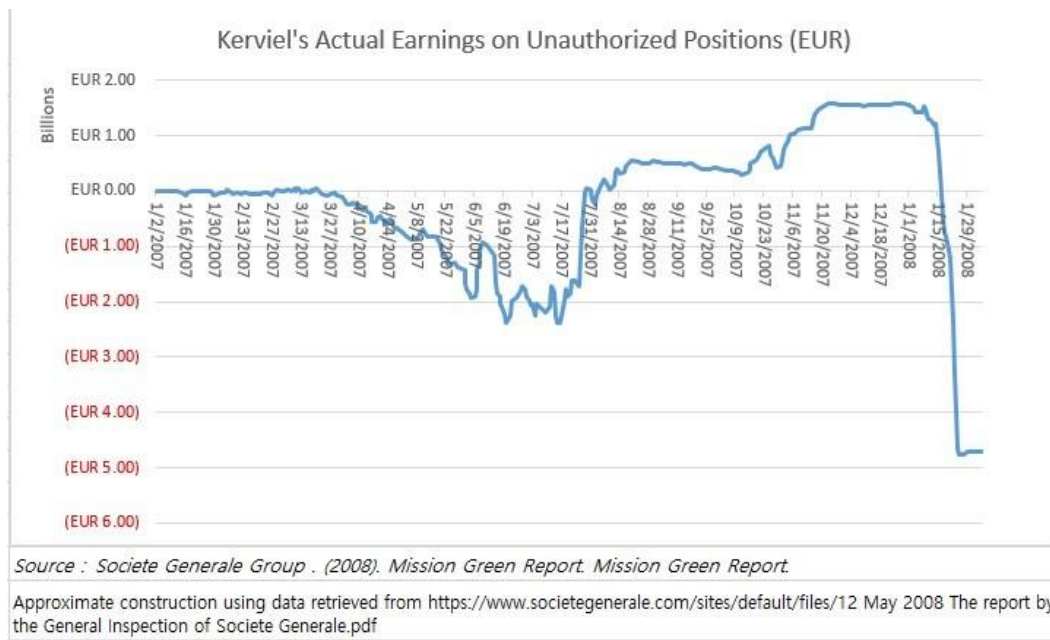


Figure 14: Kerviel's Actual Earnings on Unauthorized Positions



Figure 15: Kerviel's Reported or Official Earnings



Source : Societe Generale Group . (2008). *Mission Green Report. Mission Green Report.*

Approximate construction using data retrieved from [https://www.societegenerale.com/sites/default/files/12 May 2008 The report by the General Inspection of Societe Generale.pdf](https://www.societegenerale.com/sites/default/files/12%20May%202008%20The%20report%20by%20the%20General%20Inspection%20of%20Societe%20Generale.pdf)

Figure 16: Kerviel's Actual versus Reported or Official Earnings



Figure 17: Estimation of Earnings on Kerviel's Offsetting Index Trades