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Front Office Trading: I Want to See the Positions!

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Every serious nuclear accident involves operator error, so you want to eliminate the operator altogether. Gladwell, M. (2008).

Introduction

J.P. Morgan Chase & Co. Chairman and Chief Executive Officer James Dimon faced many crucial decisions based on the revelation during his April 30, 2012 conference with associates about certain out-of-control trading positions. The apparently unmonitored trading positions, entered into by a successful trader, Bruno Iksil, often referred to as the "London Whale" or "Caveman," had backfired. "I want to see the positions!" Dimon barked, throwing down the papers, according to attendees. "Now! I want to see everything!" To make matters much worse, the loss positions, initially estimated at $2 billion, could not be settled without significantly increasing the loss amount. The Wall Street Journal reported that once Dimon had the trade details in front of him "He couldn't breathe." By December 2012 the loss positions had increased to $6 billion.

One of the most important decisions Mr. Dimon faced was how to disclose and characterize the unmonitored loss positions to the bank's shareholders, banking regulators, and the media. Mr. Dimon was considered to be the star leader on Wall Street. J.P. Morgan Chase & Co. (JP Morgan) had survived the most challenging period since the Great Depression, seemingly without serious damage such as had been suffered by the global banking industry. Mr. Dimon's personal reputation and the reputation of JP Morgan were on the line. Use of the word "fraud" in his disclosures and characterization of Mr. Iskil's trading position was tantamount to admitting that he, Mr. Dimon, had been hoodwinked by one of his own employees.

During the previous five years the financial media had been replete with stories of staggering bank losses arising from activities of unmonitored, "rogue" traders. The JP Morgan situation differed from all of the others discussed in this case study in that neither fraud nor unauthorized trading was specifically mentioned. All of the other "rogue" traders were charged with and convicted of criminal fraud. Most of these cases involved banks domiciled outside the United States. JP Morgan was the invincible and venerable bank of Wall Street. Furthermore, Mr. Iksil

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worked in JP Morgan's Chief Investment Office (CIO). Ironically, this was the arm of the bank that was supposed to make investments that balanced out the risks being taken by the rest of the bank on its loans to companies and individuals often referred to as value at risk (VAR) (Armitage,2012). The CIO was not formally part of JP Morgan's normal trading operations. However, CIO trading operations were intended to be monitored by the internal controls over trading.

The next section summarizes the case content that is directly relevant to the analysis of Mr. Dimon's disclosure and characterization of Mr. Iksil's trading loss positions.

Summary of Case Contents

"Front office" refers to where JP Morgan's securities trades were initiated and "back office" refers to where front office activities were controlled and monitored. This case presents a brief explanation of trading activities, the environment in which trading occurred, and an introduction to two factors that further complicate bank trading. Figure 1 summarizes several bank trading loss situations that had been reported since 1995. Figures 2 through4 depict three internal control flow charts. A brief narrative of their application to front office trading and back office monitoring and control operations of banks is included in the case Appendix. The internal control procedures in those flow charts are typical for trading procedures that are expected to be followed for trade initiation, approvals, monitoring and settlement, along with the identification and resolution of any detected irregularities. In addition to the summary information in Figure 1, some of the salient characteristics of each of the trading frauds are briefly discussed.

The next section summarizes the key characteristics of several high-profile trading loss situations in banks, including segregation of duties issues or internal control breakdowns. Common themes were found throughout each of the situations presented in Figure 1. The most commonly cited themes were internal control failures and inadequate segregation of duties. Three types of controls existed in each situation: internal controls, regulatory controls, and external audit controls.

Figure 1 – Summary of Trading Loss Situation Characteristics

Firm	Type	Key Person	How it was executed	Loss	Year	Location	Disposition of Case
Daiwa Bank	Bank	Toshihide Iguchi	Inadequate segregation of duties allowed employee to trade illegally & hide trades	New York Branch lost over $1 billion over 11 years	1995	US Branch of Japanese Bank	Convicted 4 years
Barings Bank	Bank	Nick Leeson	Unauthorized speculative trading	£827 million (US$1.4 billion)	1995	Singapore	Convicted 6 ½ years
Société Générale	Bank	Jerome Kerviel	Used knowledge of back office controls to skirt the system	€6 billion	2008	France	Appeal French Supreme Court

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UBS	Bank	Kweku Adoboli	Avoided bilateral confirmation process, supervisor controls not operating effectively, etc.	£1.3billion	2010	United Kingdom	Convicted 7 years
J.P. Morgan Chase	Bank	Bruno Iksil	Possible violation of the Volcker Rule, & positions not monitored by internal controls	More than $2 billion initially & $6 billion estimated at this time	2012	United States Based	Federal Investigators building a case but no charges have yet been filed

Source: Prepared by the authors from various published and internet sources

Brief History of Bank Trading Fraud

This section includes key elements of the Daiwa trading fraud and provides a very brief commentary on the Barings Bank, Société Générale and UBS trading frauds. In both the Barings Bank fraud and the JP Morgan situation confusion existed as to supervisory lines of authority over Mr. Leeson and Mr. Iksil, respectively. Each of the trading loss situations likely influenced Mr. Dimon's analysis of the JP Morgan situation. The Barings Bank fraud resulted in the collapse of the bank in 1995. Among many other recommendations that were made after the Barings Bank's collapse due to trading fraud were:

- Limit the power held by a single individual
- Clear accountability paths to trace transactions
- Assurance that all processes and controls are effective

The Daiwa Bank of Japan trading fraud situation is discussed in some detail due to the extensive Congressional investigation that arose from that fraud. The Daiwa trading fraud is relevant because it occurred in a U.S. branch of the Daiwa Bank. The Barings Bank, Société Générale and UBS trading frauds are briefly discussed because of their alarming similarities to the 1995 Daiwa fraud. Many of these trading loss characteristics also appear in the JP Morgan situation, with the exception that the disclosure and characterization of JP Morgan's situation did not mention "fraud." As previously noted the CIO was not part of the bank's normal trading operations even though the CIO was subject to strict internal controls over any of its trading activities. The CIO was responsible for managing VAR, which would not normally include engaging in high risk trading positions.

Daiwa Bank of Japan had operations in the United States. In 1995 Daiwa Bank disclosed that the New York branch lost over $1 billion from the trading activities of a "rogue" trader. This was one of the earliest disclosed instances of bank trading fraud. At the time, the Daiwa Bank fraud attracted much attention including a Congressional investigation and later a separate report on internal control weaknesses in foreign banking operations in the United States. (Case Appendix Figure A-1) The Congressional investigation resulted in sharp criticism of both Daiwa Bank and the Japanese Banking Commission for failure to prevent or to detect the fraud scheme.

A summary of the Congressional report revealed that: "Illegal securities trading activities had occurred at one of its New York branches over an 11-year period. Weaknesses in the branch's

internal controls, including inadequate segregation of duties in trading and electronic funds transfer activities, had enabled an employee to trade illegally and to hide the activities and resulting losses. The Chairman of the Federal Reserve Board said that before the losses were reported, the Federal Reserve had noted, but had not fully appreciated, the seriousness of some of the branch's weaknesses in internal control. One reason for this, according to the Federal Reserve Board Chairman, was that those weaknesses did not appear to be extraordinary in comparison to those found at other U.S. branches and agencies of foreign banking organizations (FBO)." (Underlining added) A summary of the most serious internal control and audit weaknesses of FBO that were found in the aftermath of the Daiwa Bank trading fraud are included in Appendix Figure A-1.

The following passages were extracted from opening comments made by the Chairman of the Banking, Housing and Urban Affairs Committee, Senator D'Amato as part of the Congressional hearings: "The events at Daiwa point to a disturbing picture of illegal conduct, cover up, deception, and inefficiencies. This picture includes collusion and cover up by a foreign bank, its senior managers, and inadequate supervision by its home country supervisors and U.S. regulators. (Underlining added)

On November 27, 1995, Ricki Helfer, Chairwoman of the Federal Deposit Insurance Corporation also testified. The testimony was summarized as follows:

"The problems at Daiwa's New York branch and Daiwa Trust were of three types:

a) The unauthorized activities of traders,
b) The significant deficiencies in internal controls for monitoring compliance with laws and regulations and risks, and
c) The long-term, conscious effort by senior managers to deceive regulators concerning losses stemming from trading activities. Simple fraud was therefore compounded by collusion, which made the detection of various fraudulent acts more difficult to discover."

More recent bank trading frauds seemed to indicate that the problems mentioned above with Daiwa Bank have not been resolved. The Société Générale trading fraud was perpetrated by a trader named Jerome Kerviel. Mr. Kerviel learned all about trading operations while working in the bank's back office control operation. After the disclosure of Mr. Kerviel's fraud scheme in January 2008, the bank issued extensive and detailed documents including the Mission Green Report that explained how Mr. Kerviel conducted the fraud scheme for at least five years and covered his outsized trading positions by creating entirely fictitious trades.

On the occasions when the internal control system generated red flags, either the red flags were ignored or Mr. Kerviel offered explanations to his inexperienced supervisor in terms that the supervisor was afraid to admit he simply could not comprehend. The supervisor took no further action on the red flags. During the investigation into Mr. Kerviel's fraud, and continuing through both his conviction and his subsequent appeals of his conviction, Mr. Kerviel repeatedly stated that his bosses all knew exactly what he was doing at his trading desk and that no one attempted to impede Mr. Kerviel in his outsized trading positions until his overall trading positions turned to a staggering €6 billion in losses.

In the JP Morgan situation, Mr. Iksil used a similar tactic when questioned by his supervisor about his trading positions. Mr. Iksil had left the bank several months after his loss positions were first disclosed. His supervisor was fired, but no criminal charges were filed against either man, or any other person in the bank.

In the UBS situation, the trader in the fraud, Kweku Adoboli, claimed to have taken many successful outsized trading positions with the bank and his bosses did not seem to mind so long as he made money for the bank, which he did until the devastating March 2011 earthquake in Japan. His outsized positions were linked to the Japanese markets, which immediately tumbled as Japan and the world tried to assess the extent of the earthquake's damages. The duration of Mr. Adoboli's fraud scheme was only three months but resulted in a loss of £1.3 billion. As a side note it was also an earthquake in Japan (Kobe) that caused Mr. Leeson's scheme to unravel at the Barings Bank.

There was no mention in the Congressional investigation of the Daiwa Bank trading fraud that a specific, unexpected event occurred causing the fraud scheme to unravel. Mr. Dimon considered whether there was a triggering event that caused Mr. Iksil's trading positions to tumble into losses. It was reported that Mr. Iksil's job was to make investments that effectively mirrored JP Morgan's loan risks so that, if a bank loan went sour, gains on Mr. Iksil's mirror-image investments would offset the loan losses. It was possible that Mr. Iksil's identity as the initiator of the credit default swaps was compromised. The "dark pools" had not allowed his trades to remain anonymous. It appeared that rival banks and hedge funds then started attacking his trades by taking bets against them (Armitage, 2012). "Dark pools" and credit default swaps are discussed in the next section.

Types of Bank Trades and the Environments in Which They Are Made

The types of trading addressed in this case are affected by the "Volcker Rule", which formed part of the 2010 Dodd Frank Wall Street Reform and Consumer Protection Act. The "Volcker Rule" strictly limited the extent to which banks were permitted to trade on their own account (proprietary trading). The "Volcker Rule" prohibited speculative trading by banks but did permit trades entered for hedging purposes. Unfortunately the phrase "speculative trading" was not clearly defined in the final version of the law. It was not entirely clear whether Mr. Iksil's trades were allowed under the "Volcker Rule." Mr. Dimon repeatedly asserted that the derivative trades, in this instance the sale of credit default swaps, that Mr. Iksil made were entered for the purpose of hedging the bank's loans to its big customers.

Whether for speculative or for hedging purposes, bank trading almost always involves two or more traders who are known to each other, at least by name. Often times, trading involves equity or debt securities, such as stocks or bonds that are actively traded on organized exchanges or over the counter. But trading does not always involve equity or debt securities per se. Trading activities sometimes involved the sale or purchase of derivative contracts. Examples of derivative contracts includes: options, forwards, futures and swaps. Some derivatives are

exchange traded. The fair value of exchange traded derivatives is readily determinable by reference to relevant published market prices.

Most derivatives are not exchange traded. Derivatives are contracts that usually contain a notional amount (for example: number of shares, volume of a commodity, monetary amount of a foreign currency) and an underlying market price per unit of the notional amount (for example: share price, dollars per barrel of oil, exchange rate between Euros and U. S. dollars). The fair value of a derivative is normally determined in reference to the notional amount multiplied by the change in the underlying market price per unit since the inception of the derivative contract. Some derivatives have only a payment requirement from one party to the counterparty of the contract based on whether a sequence of events either occurs or fails to occur. For example: if LIBOR decreases by at least 200 basis points by January 31, 2014, party A will pay party B $100,000. For party A, the fair value of this LIBOR derivative example is either nil or a $100,000 liability.

Other derivative contracts are custom engineered to meet the specific needs of the investor. Custom engineered derivatives may include multiple elements that each individually affects the initial and subsequent fair value of the derivative contract. Determination of the fair value of custom engineered derivatives is often extremely difficult. The sub-prime mortgage market collapse that commenced in 2007 is an excellent example of when custom engineered derivative contracts are so complex that many times the investor has no objective means to determine the contract's fair value. In that instance the investor relies on financial modeling to determine fair value.

Derivatives are often used to hedge identifiable risks but may also be used for pure speculation. Warren Buffett is attributed with stating that: "Derivatives are weapons of mass financial destruction." If one holds a derivative and does not fully understand how the derivative's fair value changes or fails to monitor its changing fair value, huge losses could be incurred in a very short amount of time. This appeared to be what happened in the JP Morgan situation.

When a securities trade is made both parties to the trade presumably understand the variables that affect the fair value of the trade. Each party is confident that the counter party will settle in accordance with the trade agreement. For those trades that are executed on the floor of organized exchanges, trading activities are also monitored by regulators and other traders. At least two additional factors have changed the nature of trading activities. The two additional factors are the concept of "dark pools" and high-frequency trading (HFT). JP Morgan's trading operations used both "dark pools" and HFT. JP Morgan could have considered both factors more closely and as a result could have had a different outcome arising from Mr. Iksil's trading positions. "Dark pools" and HFT are complex topics. "Dark pools" are electronic markets set up to avoid alerting the broader market to a big trade in a security. If faster-moving traders discovered that a major purchase was in the works, they could move the market against the initiating trader and raise the price, making the trade more expensive or more profitable.

Banks such as Deutsche Bank, Morgan Stanley and UBS, have always allowed clients to trade privately and away from public stock exchanges, by matching client orders with orders from

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their own proprietary trading desks (front offices). These so-called "dark pools" are popular among banks and their big clients, because they can avoid both stock exchange fees and the potential cost of 'market impact' - whereby a big purchase or sale in an otherwise transparent market alerts traders to an opportunity to make money by forcing the price up or down.

The regulatory reforms on "dark pools" are only at the proposal stage (underlining added), and the banks are hopeful that they can still convince lawmakers to soften their line and allow "dark pools" to maintain some level of opacity" (Jeffs, 2012).

"A type of trading that is similar to HFT, but fundamentally different is algorithmic trading. Algorithmic trading is defined as ""the use of computer algorithms to automatically make trading decisions, submit orders, and manage those orders after submission." Algorithmic and HFT are similar in that they both use automatic computer generated decision making technology. However, they differ in that algorithmic trading may have holding periods that are minutes, days, weeks, or longer, whereas high frequency traders by definition hold their position for a very short horizon. HFT traders usually try to close the trading day in a neutral position" (Brogaard, 2010).

Mr. Iksil worked in the CIO. The trading that occurred in CIO was ostensibly aimed at neutralizing the risk of loss from bank loans and other bank financial assets. The trading positions created by Mr. Iksil were created by selling specialized derivatives known as credit default swaps.

One of the issues that Mr. Dimon had to consider was whether the credit default swaps were based on the bank's assets or whether the swaps were based on a wider market situation that was not a specific risk of the bank. In the former case the swaps could be considered hedging contracts that would minimize loan losses arising from the bank's loan portfolio. In the latter case the swaps would appear to be purely speculative investments because there was no direct link between the bank's specific loan loss risks and the credit default swaps. Under the "Volcker Rule" such speculative investments by a bank, trading on its own proprietary account, would not be permitted. In either case, given that the CIO is charged with managing the bank's value at risk, Mr. Iksil's credit default swap positions appeared to be well beyond the amounts that one would expect to find in a value at risk environment. At this time, the bank has not indicated that fraud was the cause of the trading losses.

Each trading scheme addressed in the case, was affected to various degrees by the types of trades mentioned above. It was unclear whether Mr. Iksil' trades fell within the restrictions of the "Volker Rule." However, it appeared that JP Morgan was the victim of not fully appreciating the risks associated with Mr. Iksil's derivative trades. Mr. Dimon likely took this into consideration prior to his disclosure and characterization of Mr. Iksil's losses.

Segregation of Duties in Front Office and Back Office Operations

One of the recurring themes of the "rogue trader" schemes is failed internal controls. The Federal Reserve System's Trading and Capital-Markets Activities Manual (the Manual) provides

significant guidance on the importance of the most basic internal controls: segregation of duties. Certain duties and functions must be carried out by personnel that are not also assigned to conflicting responsibilities. Within the front office trading and the back office monitoring and control functions the Manual identifies several incompatible activities. The activities must be conducted by separate persons. Mr. Dimon noted no unauthorized trading in his disclosure, however, red flags may have existed. The relevant section extracts from the Manual appear below:

Section 2050.3 Front Office – Segregation of Duties

1. Ensure that all transactions are promptly recorded by the trader after the deal has been completed.
2. Ensure that the financial institution has established satisfactory controls over trade input.
3. Confirm that a segregation of duties exists for the revaluation of the portfolio, reconciliation of traders' positions and profits, and the confirmation of trades.

Section 2050.4 Front Office – Segregation of Duties

1. Is there adequate segregation of duties between the front and the back office?

Section 2060.3 Back Office – Segregation of Duties

1. Ensure that the process of executing trades is separate from that of confirming, reconciling, revaluing, or clearing these transactions or controlling the disbursement of funds, securities, or other payments, such as margins, commissions, and fees.
2. Ensure that individuals initiating transactions do not confirm trades, revalue positions, approve or make general-ledger entries, or resolve disputed trades.

Section 2050.4 requires adequate segregation of duties between the front office and back office. The following scenario illustrates how the adequacy of segregation of duties could come into question. Bob commenced employment in the bank's back office with duties involving monitoring and controlling front office trading. Bob learned all that he could about monitoring and controlling trades. Bob's normal career progression is to be promoted to the front office as a trader. There is some question about whether Bob's duties as a front office trader are adequately segregated or independent from the duties of his back office colleagues and friends that he left behind after being promoted.

Front Office Trading Operations and Controls

The non-authoritative flow charts depicted in Figures 2 through 4 cover the key trading sections of the Manual. They also note potential red flags that exist if internal control weaknesses are not addressed. A narrative description of the activities depicted in Figures 2 through4 is included in the case Appendix.

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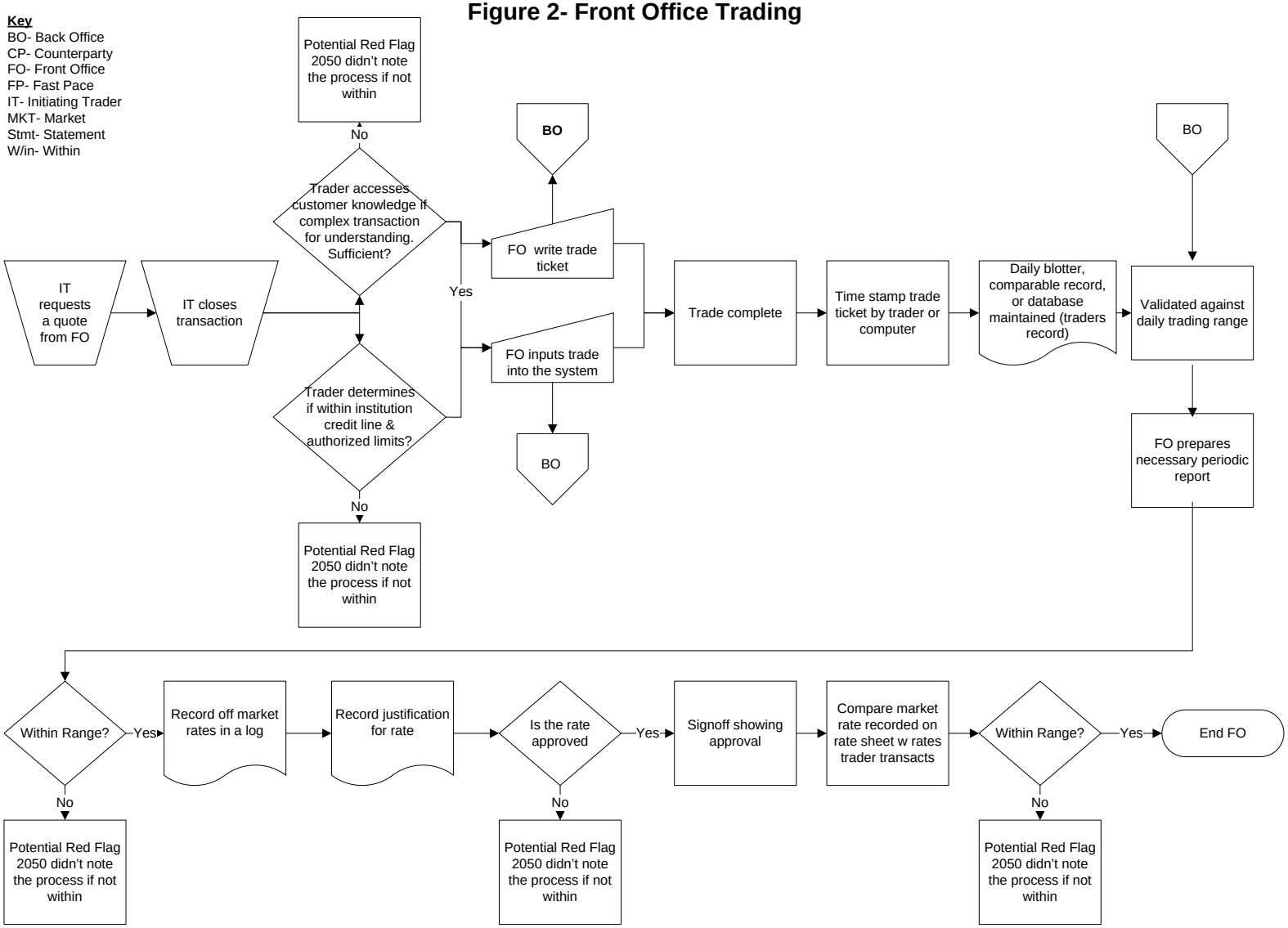
Figure 2- Front Office Trading



Source: Non-authoritative flow chart prepared by the case authors based on the United States Federal Reserve System Trading and Capital-Markets Activities Manual Section 2050 Operations and Systems Risk (Front-Office Operations) Examination Procedures

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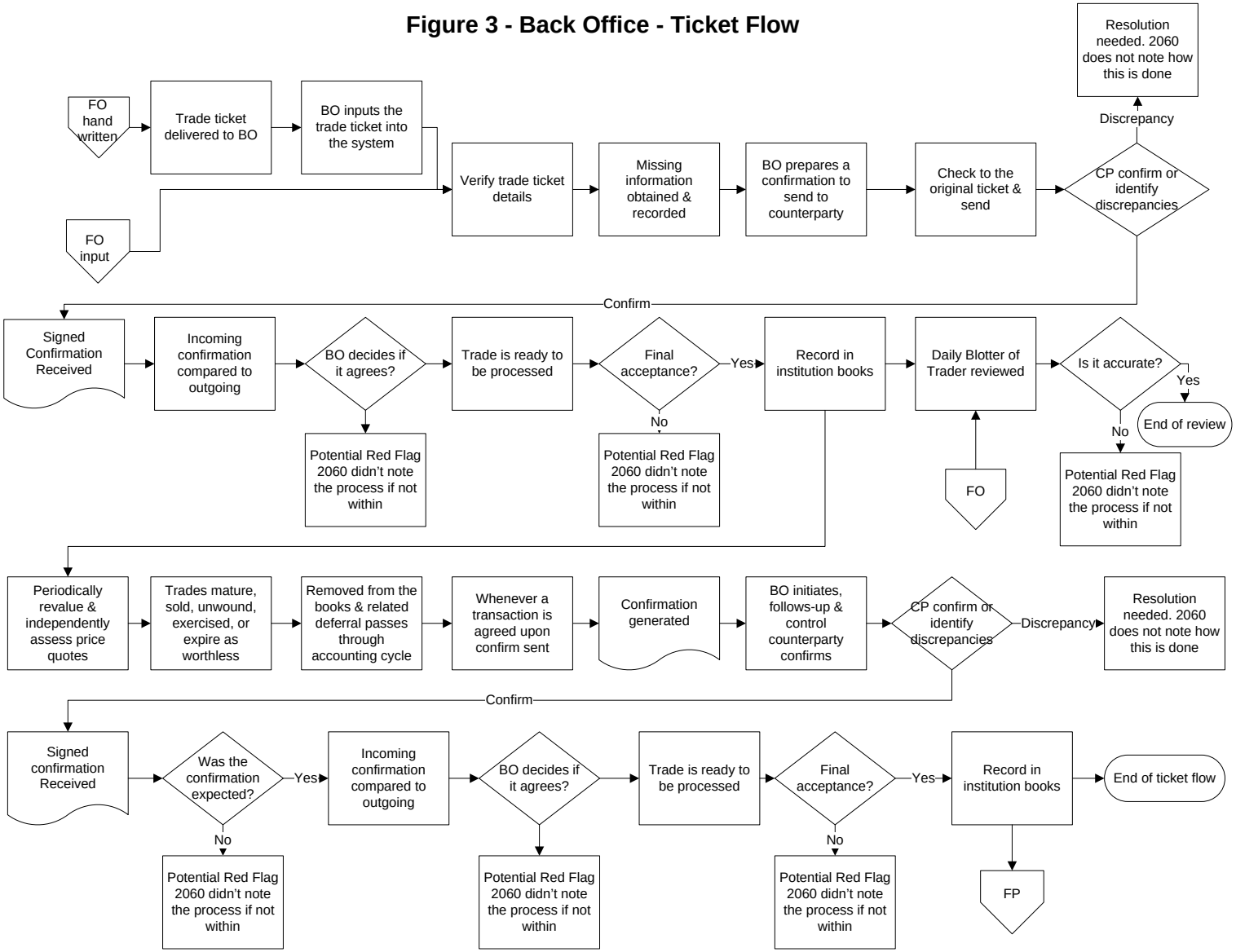
Figure 3 - Back Office - Ticket Flow



Source: Non-authoritative flow chart prepared by the case authors based on the United States Federal Reserve System Trading and Capital-Markets Activities Manual Section 2060 Operations and Systems Risk (Back-Office Operations) Examination Procedures

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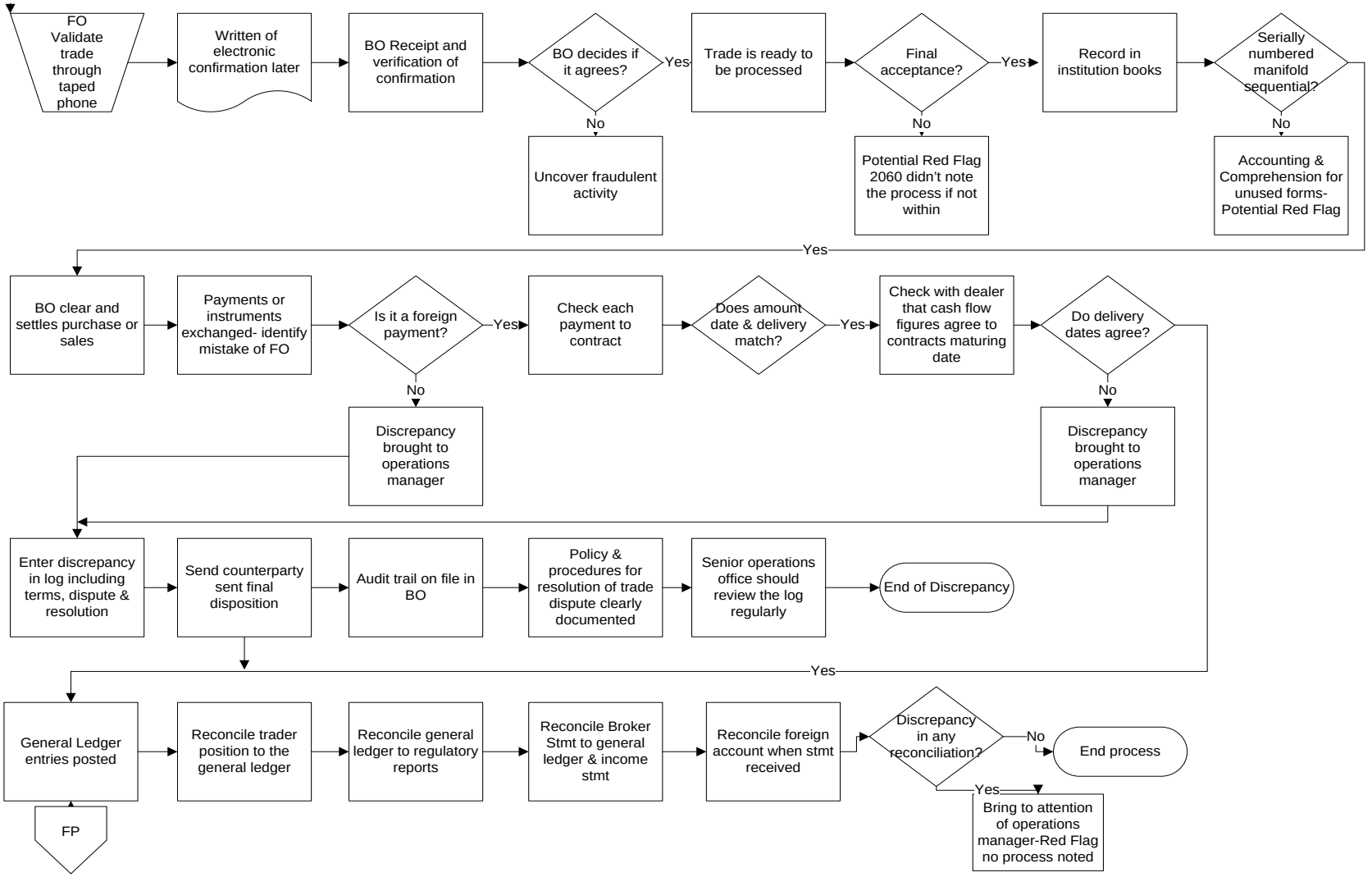
Figure 4 – Back Office Fast Paced Trading



Source: Non-authoritative flow chart prepared by the case authors based on the United States Federal Reserve System Trading and Capital-Markets Activities Manual Section 2060 Operations and Systems Risk (Back-Office Operations) Examination Procedures

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Conclusion

It would be easy to understand why James Dimon reportedly had trouble breathing when he learned the extent to which a single trader, Bruno Iksil, had exposed JP Morgan to losses most recently estimated at $6 billion. Mr. Dimon could see the trading problem simply by reviewing papers in a brief conference on April 30, 2012. In that frantic few moments, Mr. Dimon no doubt envisaged the impact this trading disaster would have on his career and his reputation, to say nothing of the disaster's impact on the reputation of the revered JP Morgan. Questions raced through his aching head: Why were Iksil's trading positions not being monitored? Which of the internal controls most likely failed? Were there possibly unauthorized control overrides? Where would breakdowns have occurred in the trading process? Who knew about Iksil's outsized trading positions and when did they know?

Appendix

Narrative Description of the Activities Depicted in Figures 2-4

Figure 2 is based on Section 2050 of the Manual. Figures 3 and 4 are based on Section 2060 of the Manual. These Figures are useful in identifying weaknesses in bank trading operations. (The Manual refers to both weaknesses and deficiencies in internal controls. The requirements to search for weaknesses and deficiencies in internal controls differ between the Manual and the requirements of an external audit conducted under U. S. auditing standards. The Manual requires a search for both weaknesses and deficiencies in internal controls.)

Front office trades followed the processes illustrated in Figure 2. Front office traders executed customer orders, took positions, and managed the institution's market risks. This was separate from the back office, which completed the trades initiated by the front office. First, the initiating trader (IT) contacted the front office (FO) for a quote. Once the IT determined the most favorable rate they closed on the transaction. Then the front office trader determined if the trade fell within the institution's credit lines and trading limits and if the initiating trader had sufficient understanding of the trade's risks to make the trade. If the answer to either determination was no, a potential red flag was raised. In that case the trade should not continue. However, if the answer was yes, then the FO wrote a ticket and inputted the trade and sent both to the back office (BO) in Figure 3.

The next step for the front office trader was to complete the trade, time stamp the ticket or have the computer do so. Time stamping the ticket allowed for comparison of the rate recorded on the rate sheet and the trade rate. Next the FO trader recorded the trade in his daily blotter and validated against the daily trading range. The BO checks appear in Figure 3. Following this, the FO prepared the necessary periodic reports and then determined if they were in the acceptable range. If they were not within the acceptable range, a potential red flag was raised. If they were within the acceptable range, then any off market rates were recorded in the log book with justification for the rate used. Off market rates required approval; if no approval was shown another potential red flag was raised. Once the approval of the rate was noted the next step was to compare the market rate to that recorded on the rate sheet, which the FO used to complete the

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transaction. If it was within the range, then the process was complete. However, if it was not within the acceptable range, this was a potential red flag. Red flags were opportunities for noncompliance with internal control and potentially indicated opportunities for fraudulent or other unauthorized trading.

Figure 3 & 4 are flow charts like Figure 2. Figures 3 & 4 illustrate key controls over trading. The flow charts take the reader through the steps of back office monitoring and control, including fast paced trading. They also note potential red flags in each process. As with Figure 2, the potential red flags could become internal control weaknesses if not properly addressed.

Figure A-1 - Internal Control Weaknesses U.S. Supervisors Identified as Among the Most Serious Reported in Foreign Banking Organization (FBO) Branches in the United States, Rated Fair, Marginal, or Unsatisfactory During January 1993 to June 1996

Internal control weaknesses supervisors identified as among the most serious	Number of FBO branches	Percentage of FBO branches rated fair or lower
Inadequate segregation of duties in trading and/or EFT activities	72	28%
Lack of dual control and independent verification in trading and/or EFT activities	53	21
Lack of security and access restrictions in EFTs	57	22
Employee(s) in sensitive positions were not absent for a minimum number of consecutive days	56	22
Inadequate safekeeping and/or documentation in trading activities	39	15
Inadequate security and access restrictions for accounting system software	16	6
Note: We reviewed the examination reports for all FBO branches and assigned a composite AIM or ROCA rating of three, four, or five from January 1993 to June 1996 as well as FBO branches with higher composite ratings that had ratings of three, four, or five in components that are heavily affected by internal control and audit weaknesses. The percentage of FBO branches whose examination reports we reviewed varied from a high of about 30 percent of all FBO branches in 1993 to about 20 percent in 1996. The total number of FBO branches included in our analysis over the 3-1/2 year period was 254.		

Case authors' note: the ROCA rating system was based on a scale of one to five. The acronym, ROCA, consists of: Risk Management, Operational Controls, Evaluating Compliance, and Asset Quality. A rating of 1 indicated the best and a 5 indicated the least effective supervision.
Source: United States. General Accounting Office. Foreign Banks: Internal Control and Audit Weaknesses in U.S. Branches. September 1997.

Comments on Banking Governance

The following points are modified from the source document to conform specifically to bank trading and control operations. The source document was a study on governance of banks as compared with governance of other entities: (Mulbert, 2010)

1. The presence of deposit insurance and prudential regulation, although aimed at compensating for deficits in the monitoring and control of banks, weakened asset monitoring and control. Highly incentive-based remuneration could neutralize management's aversion to take on more risk (underlining added).

2. Banks' balance sheets were notoriously less transparent than those of non-financial firms (underlining added). The quality of bank loans and trading positions was not readily observable.

3. The banking system was prone to contagion, meaning that problems at one bank would quickly spread to other banks (underlining added).

4. A bank holding a portfolio of derivatives and securities with embedded options was subject to sharp changes in its risk-profile even if the bank did not take new positions (underlining added).

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