Instructor's Manual

To Accompany

Financial Trading and Investing

2nd Edition

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Introduction

Financial Trading and Investing seeks to provide a broad overview to trading and investing, much as any standard investments text. However, the focus of this textbook is on trading, trading institutions, markets and the institutions that participate in, facilitate and regulate trading activities. The book is intended to serve as a primary textbook for a university course focusing on trading. Most, but not all students in a trading course will already have had some exposure to introductory finance or investments courses. The book should also be useful in a number of other courses, including those dealing with general investments, securities law and classes based on student managed funds.

The textbook has a number of pedagogical features. First, each chapter provides exercises to which detailed solutions are offered at the end of the text. There are a number of appendices, both to chapters and at the end of the text that are intended to review basic mathematics, statics and finance topics. Because terminology is often a hurdle for prospective traders without significant investments backgrounds, there is an extensive glossary in the back of the text. In addition, Academic Press has provided an instructor's website (for appropriately registered instructors only) and a companion site (www. elsevierdirect.com/companions/ 9780123918802) for both student and instructor access. This instructor's manual is offered as part of the instructor's website for the text.

The instructor's site ancillary materials, which includes this manual, has a number of features, many of which are in this manual. First, this manual discusses use of this book in a trading or investments course, along with proposed chapter sequences. The manual includes introductions to a number of trading simulations and experiments. Each chapter in introduced in this manual, along with learning objectives and teaching notes. Additional discussions of simulation and experiments is provided here as well, along with their integration with concepts presented in the textbook chapters. Although each chapter in the text has solved exercises for students, the manual includes additional questions and problems that can be used for in-class discussions and/or quizzes. Detailed solutions are provided for these exercises. The instructor's website offers a full set of PowerPoint slides for each chapter. A number of chapters offer additional rhetorical questions for classroom discussion. Together, the PowerPoint slides and computation-oriented spreadsheets should be very useful in the delivery of lectures to students. Furthermore, the companion site provides access to a number of Excel spreadsheets that should complement materials in the text.

I welcome your comments and suggestions regarding Financial Trading and Investing, this instructor's manual and additional online ancillary materials. Some of your suggestions I will be able to act on immediately, others may need to await a new edition or printing of the text. I can be contacted by e-mail at jteall@jteall.com or by using contact information available on my web page at http://www.jteall.com.

Proposed Course Sequences and Syllabi

While coverage in my own trading course is sequenced by the ordering of the chapters, the text is designed to be very flexible. Most chapters in this text can be presented without significant reliance on preceding chapters. For example, many instructors would prefer their class readings in behavioral finance (Chapter 10) and market efficiency (Chapter 11) to take place early in their courses. Practically any ordering of chapters is possible, though Chapter 1 is the most logical starting point and readers unfamiliar with Black-Scholes should familiarize themselves with the Appendix to Chapter 6 before proceeding to the remainder of Chapter 6 and to Chapter 8. In addition, readers might feel more comfortable reading Chapter 3 before 12. In general, the text is organized as follows:

1. Chapters 1 through 5: Introduction to trading, trading mechanisms, regulation and markets
2. Chapters 6 through 9: Risk, arbitrage, hedging, risk management and performance evaluation
3. Chapters 10 through 12: Behavioral aspects of trading and investing, market efficiency and market failure

Many instructors will probably want to present their courses following the sequence of the text as I do. My own trading courses tend to be a mix of undergraduate (20%) and graduate (50% financial engineering, 20% MBA and 10% engineering and sciences) students. All have backgrounds in calculus and statistics. Approximately 2/3rds have prior coursework in finance; most of the remainder are engineering students with solid quantitative backgrounds. But, again, the text is designed to be very flexible to allow for a number of other organizational preferences. For example, some instructors might prefer to organize their course by security type, perhaps after starting with some very general material. In this case, some variation of the following, and substantially different, course outline structure might be appropriate:

1. Introduction to Securities Trading, Markets, Efficiency and Arbitrage
   Chapter 1
   Chapter 10
   Chapter 11
   Chapter 6 (Excluding discussion of Implied Volatility)
2. Bonds and Fixed Income
   Section 2.8
   Sections 7.1 to 7.4
3. Equities and Stock Markets
   Sections 2.1 to 2.7
   Section 2.9
   Chapter 4 (Consider covering Chapter 12 along with Chapter 4)
   Chapter 5 (Might be too theoretical for some students)

4. Derivatives
   Appendix 6.A.2
   Discussions of Implied Volatility in Chapter 6
   Appendix 6.A.3
   Chapter 8 (Consider covering Sections 8.5 and 8.6 with Exchange Markets)
5. Exchange and Exchange Markets
   Section 2.10
   Sections 7.5 to 7.7
   Sections 8.5 and 8.6 (If not covered earlier)
6. Institutions and Institutional Investment
   Chapter 3
   Chapter 9
   Sections 5.1 to 5.4 (Optional)

Instructors preferring that their course be organized by security type might consider organizing their syllabi in a manner similar to the organizational scheme presented above. In addition, many instructors will want their courses to include some type of simulation or experiential component. This is discussed in the next section of this manual.

Trading Simulations

Trading simulations, virtual trading and in-class experiments are a wonderful way to supplement and reinforce the student's learning experience. Many trading courses implement a software or internet-based trading simulation such as FTS, Interactive Brokers' IB Student Trading Lab or TraderEx. Some simulations focus on the investment decision, some on the trading (e.g., day trading or HFT) decision. Some simulations accommodate both. In addition, there are many laboratory-type experiments. This book was designed for use as a primary text in these learning environments, though the book can still be used as a stand-alone text. Actually, integration of simulation packages into the trading course has played a key role in the development of the book, and close to a third of class time on my own course is dedicated to simulations. Each of the chapter discussions that follow will suggest exercises from a number of such simulations and experiments.

I find it useful to use trading simulations for both in-class and out-of-class exercises. In many respects, the in-class exercises are most useful. I want students to have a feel for trading in a fast-paced environment, where they can compete against both keyboard and algo taders. Students enjoy these exercises and the associated competitions. In-class simulations such as FTS, TraderEx and RIT are designed for classroom use. These packages allow the classroom instructor to maintain markets and for students to connect and interact with that market and each other under controlled conditions through their own computers. These markets can play out in as little as a few minutes and provide students with a realistic feel for fast-paced trading. They also enjoy the competition. In addition, some of these simulations provide students opportunities to create their own spreadsheet- or VBA-based algos, providing an array of learning opportunities, challenges and risks for all participants in the markets.

Table 1: **Securities Trading Simulations (Paid Subscription Normally Required)[1]**

Package Name	Sponsor	URL
FTS	Financial Trading System	http://www.ftsmodules.com/
TraderEx	TraderEx, LLC	http://www.etraderex.net/index.jsp
RIT	Rotman School of Business	http://rit.rotman.utoronto.ca/software.asp
Tradingsim	NASDAQ	https://tradingsim.com/
OTIS	Wharton Business School	https://otis.wharton.upenn.edu/otis/
Stock Trak	Stocktrak	http://www.stocktrak.com/
Mock Trading	MockTrading	http://www.mocktrading.com/
RapidSP	RapidSP	http://www.brenexa.com/
IB Student Trading Lab	Interactive Brokers	https://www.interactivebrokers.com/edu/en/main.php

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[1] Some of these packages require annual subscription fees for as much as $20,000 (most packages cost much less or are even free) and are specifically designed for classroom use. Other packages are very modestly priced and/or offer lifetime memberships to individuals. In addition, several of these packages will offer free trials or continuing free access to some of their features.

I have used FTS for many different courses, and will make more frequent references to it in this manual than to other simulation packages. It is among the most widely-used university business school trading simulation packages, is obtained on a paid subscription basis and is among the more expensive simulators. Be certain to purchase and test the software well before the start of the teaching term, and install the necessary software on the instructor's computer in the trading lab (classroom) and on student computers. Students can also download and install the simulation on their own computers. This allows them to trade from their own computers either in the classroom or from home.

I often use the FTS Interactive Markets system for in-class trading and students use the Real-Time simulation to complete assignments outside of the classroom. While FTS provides its own platforms for trading, the software can accommodate student-initiated program and algo trading through a spreadsheet platform and student-developed VBA-initiated trading. Many of the various FTS trading cases also allow the instructor to make a variety of adjustments to the markets, including how prices are displayed, short-selling restrictions, etc. I will discuss FTS applications throughout this manual.

StockTrak has a variety of different simulation products, some of which are normally quite inexpensive or even free. The CME Group offers a simulation that provides beginners to trade contracts as speculators or hedgers in the midst of relevant simulated "televised news reports."

Table 2

Free Securities Virtual Trading Simulations

Package Name	Sponsor	URL
VirtualTrade	CBOE	http://www.cboe.com/trading-tools/virtual-trading-tools/virtual-trade
paperMoney	Thinkorswim/ TD Ameritrade	https://www.thinkorswim.com/t/pm-registration.html
IB Student Trading Lab	Interactive Brokers	https://www.interactivebrokers.com/edu/en/main.php
How the Market Works	howthemarket works.com	http://www.howthemarketworks.com
Simulated Trading Game	CME Group	http://www.cmegroup.com/education/simulated-trading-game.html

Table 3

Other Trading Opportunities (Some are free, others allow actual trading)

Package/Site Name	Sponsor	URL
Iowa Electronic Markets	Tippie School of Business	http://tippie.uiowa.edu/iem/
Vecon Lab Experiment	Charles Holt, U. of Virginia	http://veconlab.econ.virginia.edu/admin.htm
Predictit	Victoria University of Wellington	https://www.predictit.org

It might be useful for students to prepare a write-up of their trading exercises to explain their efforts and results during in-class trading sessions. The section below quotes the statement that I give students to prepare their write-up of FTS-based trading cases:

Maintain a log of all in-class FTS trading activity from **two weeks after classes started** to **two weeks before classes ended**. Assume that each of your trading sessions represents a division in a mutual fund or hedge fund for which you serve as CFO. You may exclude those trading sessions as advised by the course instructor. Thus, you should assume that you are the CFO for the financial institution responsible for each of the divisions executing these trades. Prepare a report titled "Management's Discussion of Fund Performance" (MDFP) or "Management's Discussion and Analysis of Fund Performance" for each of these sessions. Be certain to save the results of the relevant trading sessions to submit with your report. Use the Demo case B02 to learn how to save results of trading sessions. Your report for each session need not exceed two single-spaced pages, and may well be quite a bit shorter. This project should be submitted to the course instructor by **the last day of class**.

For students that are interested in preparing spreadsheet-based trading algos, I offer the following FTS-based assignment:

Prepare a spreadsheet-based VBA system that you can use to engage in algorithmic trading on Cases B02, OP1 and RE1 on the FTS Trading simulator. Start with Case B02, which can be used with the FTS Demo version of the case. Once you are satisfied with your progress with this case, the course instructor will help you access details necessary to pursue algorithms for Cases OP1 and RE1. Most successful executions of this program trading system will conduct analyses of quote and execution data and will make use of Excel-based macros to post quotations, submit orders and execute transactions. The program developer should create simple and sensible algorithms for profitable trades and/or reliable hedging techniques as is appropriate. The algorithm should execute transactions based on algo rules and should be structured to avoid costly trading errors.

There are several good approaches to developing algos for Case B02. The first might be a speculative approach. The trader can set bids or enter purchases that execute under specified circumstances or when prices fall beneath certain levels. Similarly, the trader can set offers or enter sell orders that execute under specified circumstances or when prices rise above certain levels. Another approach is the hedging or arbitrage approaches where the trader executes multiple orders when prices between pairs or combinations deviate by more than set amounts. In addition, the trader might wish to use combinations of these two types of strategies.

Students completing this project on a graded basis will submit their spreadsheets for each case, relevant VBA code to be used for trading the Demo Case, along with appropriate documentation. The assignment should also include write-ups of documentation (3 sets, 1 for each case) needed to use the program in conjunction with the relevant cases. This document should also explain all trading strategies on which the algorithms are base. Additional information for this project is available in the "Program

Trading on FTS" and the "FTS Trading Demo" sections of the FTS Simulation page. This project should be submitted to the course instructor by ***.

Chapter 1

Chapter Learning Objectives:
After completing this chapter, the reader should be able to:

- *Describe algorithmic trading, crossing networks and dark liquidity pools*
- *Compare and contrast bargaining and various types of auction market formats*
- *Understand the process of placing quotations, routing, execution, confirmation, clearance and settlement*
- *Be familiar with day trading, data and information acquisition, trading platforms*
- *Identify and characterize different types of securities, traders, dealers, brokers and markets.*
- *Discuss market microstructure, including orders, quotations, latency, liquidity, depth and order precedence rules*
- *Discuss the importance of the financial sector and trading to the U.S. and world economies, and debate the merits of and difficulties associated with the emphasis or the financial sector and trading on the U.S. and other economies*

Teaching Notes:
Some students, particularly at the undergraduate level, might find the discussion on common value auctions a bit theoretical. However, I find that this topic is useful for introducing the Winner's Curse problem, and do choose to introduce this case to undergraduate students. A lecturer illustration marketing a handful of cash with denominations mostly hidden might serve as a useful demonstration. Nonetheless, some instructors may prefer to gloss over this material in their introductory courses. Many students will find the day-trading material at the end of the chapter particularly useful and somewhat motivational. It is very likely that this material will need to be updated by the instructor at the start of every semester; financial markets continue to rapidly evolve.

One film, the comedy *Trading Places* (1983), stands out among films concerning financial trading. While, for the most part, the film is downright silly, it includes dramatic and even somewhat realistic depictions of a number of important concepts crucial to traders. It might be worth looking online to list how others have listed some of the parallels between the film and actual trading floors. Some observers have suggested that the film was inspired by a real-life social experiment of trading partners William Eckhardt and Richard Dennis, who sought to learn whether successful trading could be taught.

Simulation Exercises:
If you plan to use a trading simulation of some sort for your course, it would be useful to start early to obtain appropriate software, register and obtain sign-in credentials for the instructor and students enrolled in the course. When I use FTS, I approach the vendor for sign-in credentials and our in-house computer technicians about testing the software about two weeks before the start of the course. It is not essential to start trading simulations during the first or second weeks of classes, but it is useful to be prepared, and students will enjoy the simulations.

Veconlab (http://veconlab.econ.virginia.edu/admin.htm) offers the user a free collection of exercises and simulations that work well with several of the chapters in this book. It is necessary to register to use the simulations, but the process is simple and free. Registering prior to the start of the teaching term is advisable, though not absolutely necessary. Veconlab has a number of simulations and experiments that are relevant to this chapter. For example, the site provides an online experiment depicting the common value auction (http://veconlab.econ.virginia.edu/cv/cv.php), with an emphasis on the effects of the Winner's Curse. A variety of other auction games are offered at http://veconlab.econ.virginia.edu/auctions.php.

I am assuming that Chapter 1 will be the first to be presented in courses using this textbook. In this case, users of the FTS simulation package might wish to consider introducing FTS Interactive Market Case B01. This is the simplest of all of the interactive trading cases, where students trade a zero coupon and a coupon bond over three periods. They learn how to keyboard quotes and other keyboard instructions onto a trading platform, and enjoy the process of either losing money or taking advantage of their disadvantaged trading counterparties.

The beginning of the course might also be a good time for FTS users to introduce Interactive Market Case B02. At this point, the instructor might not want to focus on the hedging and arbitrage implications of the case, but merely introduce the case to students as an opportunity to practice keyboarding aspects of using a trading platform. Case B02 has a number of particularly useful features. First, the case available as a demo case for instructors and students who do not subscribe to the FTS Trading simulation software. Thus, anyone can use the demo anytime. Instructors not subscribed to a paid simulation software might wish to use this demo case anyway. Second, students do not need to connect to a market set up by the instructor; the market runs 24 hours a day, 7 days a week, and students are free to trade the case continuously with a trading crowd consisting of students and other users from around the world. No sign-in credentials are necessary. This means that students can practice their keyboarding and trading skills anytime that they wish. In addition, the case is a particularly useful one for students to create and test their own algos with, as they don't need to rely on instructors to run the markets. Instructions for using this demo case are as follows:

1. First, connect online to http://www.ftsnet.com .
2. If you have not used FTS on your computer before, you must complete a one-time installation of the FTS System Manager.. Directions for doing so are on the web page in Step 1 above.
3. Launch the FTS Trader with the Launch FTSSystemManager icon on your desktop.
4. Select the Application to Run: FTS Trader Version 8.0 (Price Discovery Cases, e.g., B01, RE01, etc.)
5. Click the button for Run Selected Application
6. On the new dialog box, "Click to Demo." Don't worry about any of the other blanks in the box.
7. You can now join traders , including those at other institutions for trading Case B02.

Additional information on using the FTS system and FTS Case B02 is available on my own website at http://homepages.rpi.edu/~tealj2/fts.htm, though subscribers will want to use the FTS web materials.

FTS Case RE1 can be a useful case to work through at the beginning of a course because it focuses on the key issue of price discovery in a marketplace. It is reasonably simple, though not as simple as FTS Case B01. Nonetheless, I prefer to use FTS Case RE1 with Chapter 11, though FTS also provides Cases RE2 through RE5 that work nicely with Chapter 11.

Some students will really enjoy participating in the Iowa Electronics Market http://tippie.uiowa.edu/iem/. While the market involves investment of actual money, investment amounts are usually very small, and students can enjoy an actual investment experience, and sometimes even be able to arbitrage and hedge their investments. Election years are particularly fun periods to discuss this market in the trading classroom.

There are a number of games described online that pertain to auction markets, double auction markets, etc. One of the simplest is the "Pit Market" game described on several sites, including http://www.economicsnetwork.ac.uk/handbook/experiments/case2. These games tend to be quite simple and effective demonstrations of the price discovery process.

Additional Exercises, Discussion Exercises and Exam Questions

1. Consider an auction example with two bidders, where each of whom have the opportunity to bid on some random amount of cash between zero and \$10, such that $E[V] = \$5$. Each bidder has equal access to information. Suppose that each of the two bidders will obtain a noisy signal, s_1 and $s_2 \in (0, 10)$ concerning the value of the bundle of cash such that the mean of the signal amounts equal the value of the bundle: $(s_1 + s_2)/2 = V$. Suppose that Bidder 1's signal is $s_1 = 7$. What is the optimal bid for Bidder 1?

2. How does the U.S. Internal Revenue Service (I.R.S.) define a day trader?

Solutions

1. Bidder 1's estimate of the value of the bundle is $E[V_1 \mid s_1 = 7] = (\$7 + \$5)/2 = \$6$. If Bidder 1 is risk neutral, \$6 is the value that he attributes to the bundle. However, because of the Winner's Curse problem, if Bidder 1 wins the auction by bidding \$6, this will mean that the other bidder received a lower value signal than Bidder 1, indicating that \$7, the signal received by Bidder 1 certainly exceeded the bundle value. Thus, winning the auction is a negative signal (ex-post) as to the value of the bundle. If Bidder 1 wins the auction by bidding \$6, he will have overbid and will suffer from the Winner's Curse. This means that, from the perspective of Bidder 1 if he wins, the distribution of bundle value must range from 0 to 7 rather than from 0 to 10. Thus, the anticipated mean signal values received by other bidders should be \$3.5. Thus, based on this information, Bidder 1 should revise his bid for the bundle to $[B_1 \mid s_1 = 7] = (\$7 + \$3.5)/2 = \$5.25$.

2. The IRS defines day traders to be those who have all of the following three characteristics: 1) Traders maintain substantial trading activity. The trader buys and sells frequently (10-20 daily trades should be sufficient) and trading is a primary source of income for the trader. 2) The trader's trading activity is sustained on a regular and continued (one year minimum) basis and 3) The trader seeks to profit from short-term stock price fluctuations rather than dividends, capital appreciation and interest. Note that this definition differs from that of the SEC definition of a pattern day trader.

Chapter 2

Chapter Learning Objectives:
After completing this chapter, the reader should be able to:

- *List and describe the major securities markets*
- *Calculate exchange rates in spot and forward markets*
- *Report on quotation, inter-market and clearing and settlement systems*
- *Compare the growing importance of the ATS relative to exchange markets*
- *Discuss structure and history of the NYSE*
- *Characterize OTC Markets and Alternative Trading Systems*
- *Define broker internalization, slippage, crossing networks and their associated problems*
- *Discuss markets for options, fixed income, money and currency*

Teaching Notes:
     A major challenge to the material in Chapter 2 is staying abreast of rapidly-changing market developments. Exchange and ATS web sites will be helpful in this respect as will the web site for the World Federation of Exchanges. Most of the major investments textbooks cannot keep up with the rapid pace of market changes in a timely fashion, especially given their long publication cycles.
     The film *Floored* (2009) by the trader James Allen Smith might be of interest to students. This documentary concerns the decline of the Chicago Trading Pits and traders' responses and efforts to adapt to electronic trading.

Simulation Exercises:
     I do not use trading simulations with this chapter, but other instructors might prefer to. For users of the FTS system (and certain other simulators as well), an instructor might consider taking a case that is familiar to students (e.g., Interactive Market Case B01) and vary the parameters of the game. That is, parameters might be changed to simulate varying market structures.

Additional Exercises, Discussion Exercises and Exam Questions
1. Describe why a critic of the former specialist systems at major exchanges might argue that the specialist system put the specialist in a position involving a conflict of interest?

2. What is the function of the Depository Trust Corporation?

3. A call market differs from a continuous market in that it allows for securities auctions to occur at specific times during a trading day or only after a sufficient backlog of orders has accumulated. A call system exists where a security is traded only once or a few times a day based on orders for a security being accumulated until the market is called for execution of transactions. Trades executed in the same market are at the same price. Either a written or verbal

call trading system may be used. Exchanges may allow for continuous trading for after call market trading. If there is an imbalance in a verbal call system, the clerk continues to cry out prices until it appears that the market will clear. A continuous market allows securities to trade continuously throughout the day. The purpose of the continuous market is to provide for continuous liquidity for the security. Under what circumstances might you expect a call system to be more practical than a continuous market?

4. What were the provisions of the so-called Buttonwood Agreement?

5. Several of the U.S. options exchanges have implemented technological systems intended to enable options market members and other exchange members to trade from home or off-exchange floors. What are some of these systems?

6. What is SIAC? What are its functions?

7. Over many years, major statistical rating agencies (credit rating firms) such as Moody's, Standard&Poors and Fitch have built solid reputations for providing reliable assessments of corporate, municipal and other issuers or bonds and other obligations to the general public. These reputations have been damaged by the 2007-09 financial crisis. What are the primary accusations have been leveled at credit rating agencies that have damaged their reputations?

Solutions
1. The specialist might have been able to profit by neglecting his duty to maintain an orderly, liquid and continuous market. He profited by trading his own account but is expected to uphold his exchange responsibility.

2. The primary function of the Depository Trust Corporation is to simplify the paperwork and record keeping associated with stock ownership and transfer. It holds stock certificates of member firms, registering them in member names and maintaining computerized records of ownership. Ownership transfers are accomplished with book entries.

3. The call market may provide for better price discovery when markets are illiquid, when there are few participants in the market or when securities are traded infrequently.

4. The Buttonwood Agreement provided for the formation of what was to become the New York Stock Exchange. It fixed brokerage commissions among its signatories and prohibited off-board trading (i.e., traders and brokers were to trade only with each other).

5. Several exchanges are providing for Remote Market Makers (RMM's) and electronic-Primary Market Makers (e-PPM's) such as the Philadelphia Exchange PHLX XL and Remote Competing Specialist System and the Pacific Exchange PCX Plus that allows for both floor-based and remote market makers. These systems facilitate trading by off-floor investors and enhance liquidity by expanding the membership of market makers. These systems offer market makers direct access to the trading floor, enabling them to participate in the provision of market liquidity

and subjecting them to the same market-enhancing responsibilities without requiring their physical presence.

6. The primary facility for clearing for the NYSE and Nasdaq is the Securities Industry Automated Corporation (SIAC), which maintains the computer systems for clearing. This means that SIAC clears transactions for the NYSE and Nasdaq was established the NYSE. The National Securities Clearing Corporation (NSCC, a division of the Depository Trust and Clearing Corporation, described below) is the successor to the combined clearing corporations of NYSE, AMEX and NASD. NSCC serves as the clearing agent for these markets as well as for many bond markets.

7. Major criticisms of credit rating agencies have included the following:
    a. Many rating agencies are paid by the firms that issue debt instruments, creating potential conflicts of interest.
    b. Rating services have provided consulting services to issuing firms, advising them on strategies to improve their ratings.
    c. Credit agencies have been accused of strong-arming clients and potential clients. For example, Moody's published an "unsolicited" rating of Hannover Re, a German re-insurance firm. It sent a letter to Hannover indicating that "it looked forward to the day Hannover would be willing to pay." Hannover management refused payment, perhaps based on its paid use of two competing ratings agencies for its debt. Moody's continued to rate Hannover debt, which continued to pay. Over time, Moody's cut Hannover ratings to junk status, despite high ratings given by other agencies.
    d. Rating agencies have missed major bond crises.