THE ANXIOUS INVESTOR

MASTERING THE MENTAL GAME OF INVESTING

SCOTT NATIONS

WILLIAM MORROW
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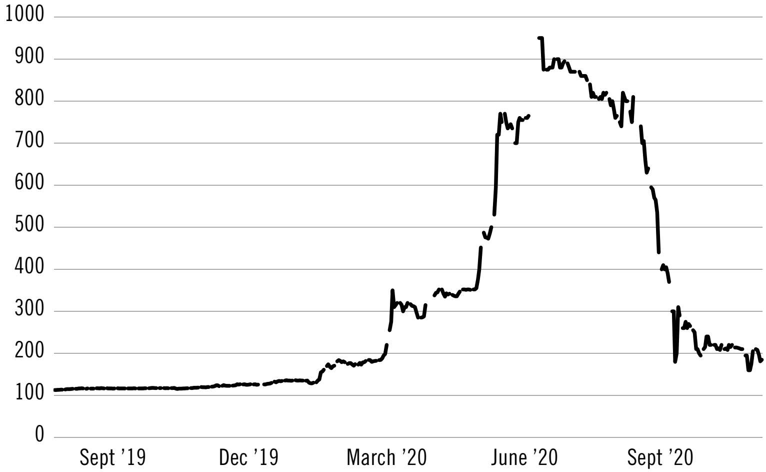
South Sea Company Share Price, August 1719 – December 1720




Yahoo Stock Price, April 1996 - December 2004
Stock Split Adjusted Price
3,000
2,500
2,000
1,500
1,000
500
0
1996
1997
1998
1999
2000
2001
2002
2003
2004

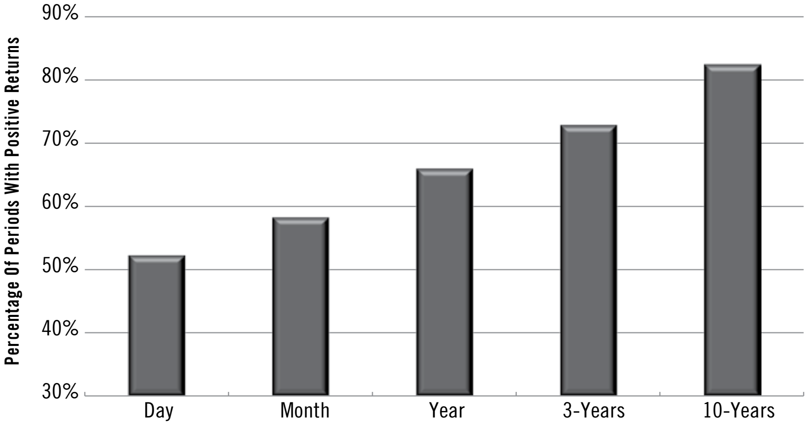
Webvan Stock Price, November 1999 - July 2001

Nasdaq Composite Index, 1995 - 2003

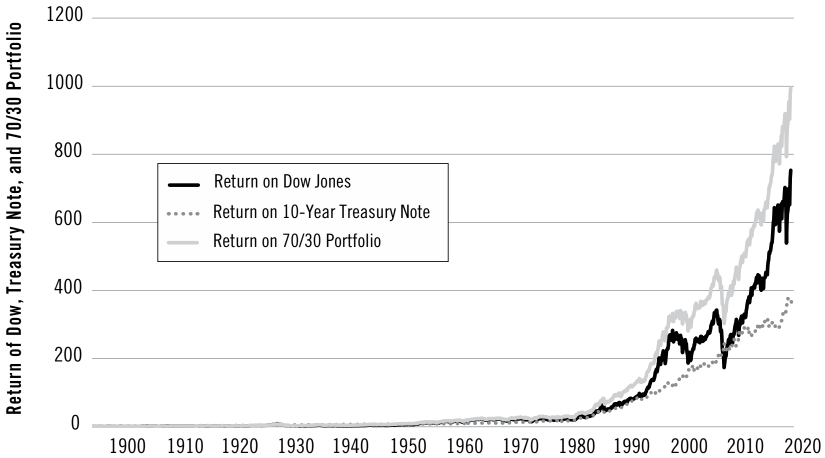
Lehman Brothers Stock Price, 2007 - 2008

S&P 500 Index, 2006 - 2010

The Percentage of Profitable Periods Increases as the Timeframe Gets Longer



Diversification is Key: Dow Jones, 100-Year Treasure, and a 70/30 Portfolio

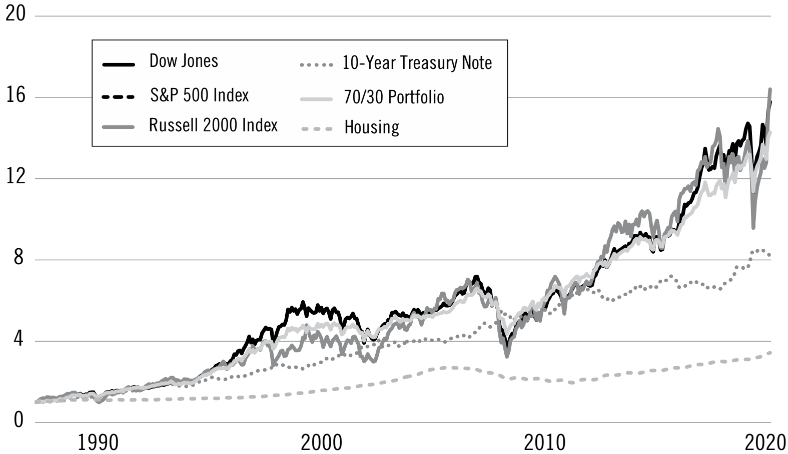


A Checklist for Better Investing

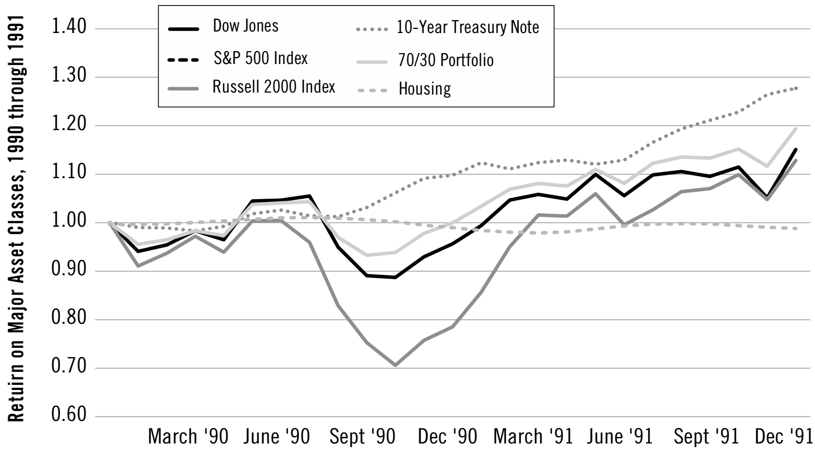
	Dow Jones Industrial AVerage	S&P 500 Index	Russell 2000 Index	10-Year Treasury Notes	70%Dow Jones, 30% Treasury Notes	Housing Prices
Compound Annual Return Since 1988	8.7%	8.6%	8.8%	6.6%	8.4%	3.8%
Annualized Risk	14.4%	14.5%	19.1%	6.1%	9.9%	2.2%
Average Annual Sharpe Ratio	.76	.87	.59	.68	.88	.81

Note: Sharpe Ratio is a measure of risk-adjusted return. It measures how much return is generated for each unit of risk. Thus, higher is better.

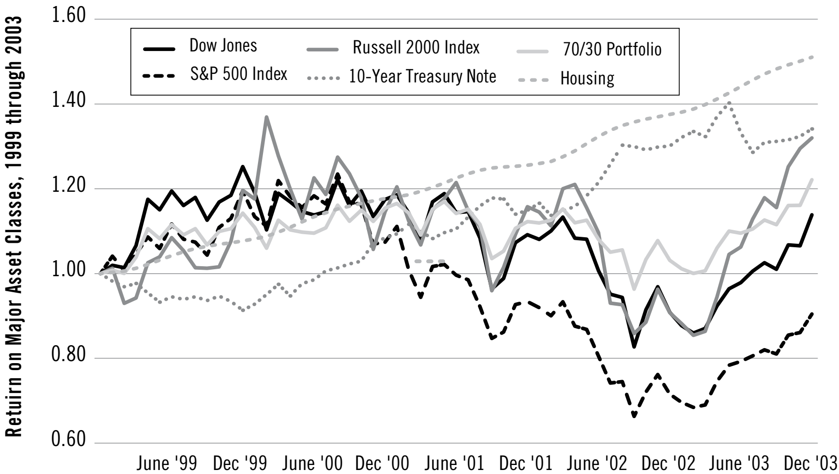
Major Asset Classes, 1998 - 2020



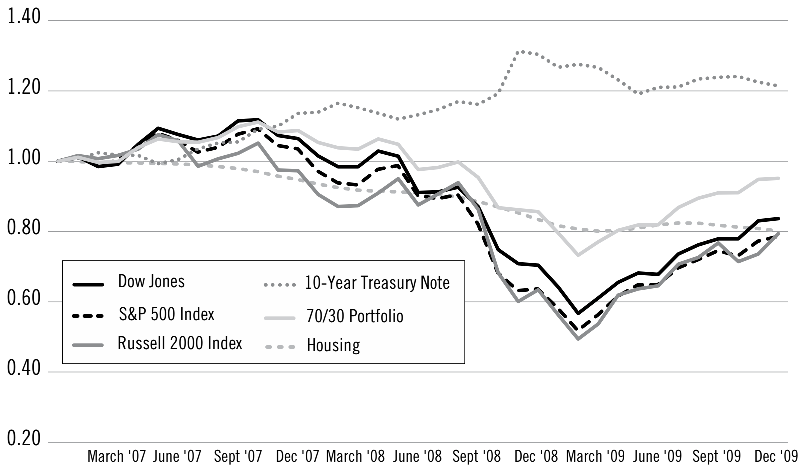
Major Asset Classes, November 1990 - 1991



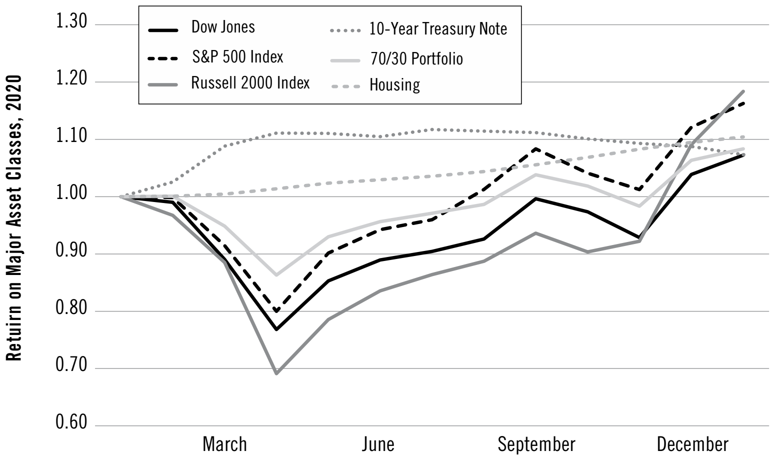
Major Asset Classes, 1999 - 2003



Major Asset Classes, 2007 - 2009



Major Asset Classes, 2020



Closing levels for the Dow Jones Industrial Average and S&P 500 index are from S&P/Dow Jones. Closing levels for Nasdaq indexes are from Nasdaq, Inc. Most prices for individual stocks, particularly for defunct stocks, are from the Center for Research in Security Prices (CRSP) at the University of Chicago. Data for other asset classes comes from a variety of sources, including Yale University. Macroeconomic data including unemployment data and the Fed Funds rate are generally from the St. Louis Federal Reserves's FRED database.

So much has been written about what we call the Great Recession that an author has an embarrassment of riches. Less has been written about the internet bubble and even less about the South Sea Company bubble but there is plenty about each of them for the interested reader.

PREFACE

The story of Younkers Department Store and its role in World War II bond drives is told in "First the War, Then the Future:

Younkers Department Store and the Projection of a Civic Image during World War II" which appeared in *The Annals of Iowa*, volume 73, Winter 2014.

The estimate for the cost of World War II comes from the Congressional Research Service, "Costs of Major U.S. Wars" by Stephen Daggett, Specialist in Defense Policy and Budgets, June 29, 2010.

SOUTH SEA BUBBLE

Isaac Newton has been the subject of several biographies and much is known about his life even if the questions about his name continue among a small circle of researchers. One such biography is *Never Rest*, *A Biography of Isaac Newton* by Richard Westfall. It contains a number of contemporaneous images of Isaac.

Much has been written about the South Sea Company bubble. One of the first to describe it was Charles Mackay in his seminal *Memoirs of Extraordinary Popular Delusions and The Madness of Crowds*, which was published in 1841. Famed economist John Kenneth Galbraith also wrote about it in his work *A Short History of Financial Euphoria*. Dale, Johnson, and Tang wrote more specifically about the subscription schemes in "Financial Markets Can Go Mad: Evidence of Irrational Behavior During the South Sea Bubble," which appeared in the *Economic History Review*, LVIII, 2, (2005), pp. 233–271. The British National Archives also has a substantial amount of information regarding the bubble. Professor Andrew Odlyzko is the final word in all aspects of the subscription agreements and Isaac Newton's participation. He's written extensively about both and shared his insights and understanding of the specifics, including the *Flying Post* article, with the author via email. Historical prices for South Sea shares came from a variety of sources including the Yale School of Management, International Center for Finance, South Sea Bubble 1720 Project.

The Old Testament mention of distributing land according to a random drawing is found in Numbers, 26:55. The history of lottery loans and other lotteries as a means of raising capital for the public weal is discussed in "Lottery Loans in the Eighteenth Century" by Francois R. Velde, the Federal Reserve Bank of Chicago, February 1, 2017.

While the term "animal spirits" had been used previously in other contexts, one of its first uses in the context of economics was by John Maynard Keynes in his 1936 book, *The General Theory of Employment, Interest, and Money.*

Much has been written about sensation seeking among investors. The papers which address this phenomenon among hedge fund managers include "Sensation-Seeking Hedge Funds" by Brown, Lu, Ray, and Teo from September 2018. The paper that analyzes Finnish drivers is titled "Sensation Seeking, Overconfidence, and Trading Activity" by Grinblatt and Keloharju from March 2009. Both were published in *The Journal of Finance*.

The story of lotteries in Taiwan is told in the *Handbook of the Economics of Finance*, chapter 22, "The Behavior of Individual Investors" by Barber and Odean and in *Taiwan Review*, "Lotto Fever," May 1, 2002.

The quote from Keynes regarding "gambling instinct" is in his work *The General Theory of Employment, Interest, and Money* in the chapter "The State of Long-Term Expectation."

Information regarding London's public coffee houses as financial centers in 1720 comes from a variety of sources including "Coffee Houses, the Press and Misinformation," Princeton University Press, which is the source of the quote regarding "most companies trading in joynt-stocks."

The story of the South Sea bubble is told ably in *Devil Take the Hindmost—A History of Financial Speculation* by Edward Chancellor, and he describes details of the subscription campaigns on page 67. Andrew Odlyzko provides the definitive details of Newton's activity in a variety of publications including "Newton's Financial Misadventures in the South Sea Bubble," which was published on November 13, 2017, as well as "Isaac Newton and the Perils of the Financial South Sea," which appeared in *Physics Today*, July 1, 2020.

Information regarding the disposition effect including brain activity can be found at "The Role of the Striatum in Social Behavior" by Baez-Mendoza and Schultz published in *Frontiers in Neuroscience*, December 10, 2013. Details regarding the lack of a pleasurable spike in brain chemistry if an investor avoids the disposition effect can be found in "The Psychology and Neuroscience of Financial Decision Making" by Frydman and Camerer, which appeared in *Trends in Cognitive Sciences*, September 2016, pp. 661–675. The other study mentioned is "Learning by Trading" by Seru, Shumway, and Stoffman. The study of professional fund managers can be found in "How the Disposition Effect and Momentum Impact Investment

Professionals," which appeared in *The Journal of Investment Consulting*, Volume 8, Number 2, summer 2007. Information regarding investors succumbing to the disposition effect in down markets and the impact it has during subsequent recoveries is available in "The Disposition Effect in Boom and Bust Markets" by Barnard, Loos, and Weber, which was published in February 2021. A discussion of the social aspect of the disposition effect, including the idea that being part of a social network nearly doubles the magnitude of the effect, is found in "Peer Pressure: Social Interaction and the Disposition Effect" by Rawley Heimer of the Federal Reserve Bank of Cleveland.

The study that quantifies the returns of the winners sold versus the losers kept is described in "Are Investors Reluctant to Realize Their Losses" by Terrance Odean, December 1997. Details of the performance of Japanese investors during their bull market from 1984 to 1989 is found in "The Behavior of Japanese Individual Investors During Bull and Bear Markets" by Kim and Nofsinger.

Details for the various South Sea Company subscription schemes are found in "Financial Markets Can Go Mad: Evidence of Irrational Behavior During the South Sea Bubble" by Dale, Johnson, and Tang, 2005, and also from Odlyzko.

The quotes regarding the popularity of the South Sea Company as a topic of conversation come from a variety of sources including Harvard University Library's exhibition "The South Sea Bubble, 1720."

The "Bubble Companies" that were launched to take advantage of the South Sea Company mania are discussed in detail in Carswell's *The South Sea Bubble*, in Mackay's *Memoirs*, and in Chancellor's *Devil Take the Hindmost*. Odlyzko discusses the most egregious in "An Undertaking of Great Advantage, But Nobody to Know What It Is—Bubbles and Gullibility" in *Financial History*, Winter 2020. The quote regarding "credulous investors" is found in "An Historical and Chronological Deduction of the Origin of Commerce," Volume III.

The specifics of Newton's purchases and sales of South Sea shares are found in "Isaac Newton and the Perils of the Financial South Sea" by Odlyzko. The fact that the total market capitalization of the South Sea Company was five times the total GDP of Great Britain is from Odlyzko in an email to the author.

Overconfidence among humans has been studied extensively and it is also a rich subject in the context of trading and investing. One of the first, and most striking, academic studies of overconfidence is the one that describes how so many of us believe we are above-average drivers. That study is "Are We All Less Risky and More Skillful Than Our Fellow Drivers" by Ola Svenson from 1981. One study that focuses on overconfidence as we age is "The Development of the Illusion of Control and Sense of Agency in 7- to 12-Year-Old Children and Adults" by van Elk, Rutjens, and van der Pligt from 2015.

Odean's paper "Do Investors Trade Too Much" describes the sort of overconfidence that leads to overtrading.

The conclusion that meteorologists and handicappers at racetracks are some of the professionals who find their confidence and their actual ability to be in sync, or "well calibrated," comes from "Aspects of Investor Psychology" by Kahneman and Riepe.

Source Notes

The paper that describes Professor Robert Shiller's survey of investors immediately following the 1987 crash is "Investor Behavior in the October 1987 Stock Market Crash: Survey Evidence" and was published by the National Bureau of Economic Research (NBER) as their working paper No. 2446.

Some of the first evidence of the difference between females and males regarding overconfidence and respective approach to investing is "Boys Will Be Boys: Gender, Overconfidence, and Common Stock Investment" by Barber and Odean, *The Quarterly Journal of Economics*, February 2001.

Research regarding the amount of risk taken by investors who have recently lost money comes from "Investor Behavior and Economic Cycles" by Beryl Chang.

The striking research regarding overconfidence in those answering questions on a test of general knowledge and how those who are absolutely certain they got the answer correct yet are wrong 16.9 percent of the time, is from "Knowing with Certainty: The Appropriateness of Extreme Confidence" by Fischoff, Slovic, and Lichtenstein in 1977.

The story of AIG and its enormous losses from credit default swaps has been told several times, including by the author in his previous book, *A History of the United States in Five Crashes.*

Shiller's survey regarding "contagion of interest" including social interaction is "Survey Evidence on Diffusion of Interest Among Institutional Investors" by Shiller and Pound, March 1986.

The story of Paul Samuelson's proposed coin flip bet and how it was rejected is told in "Risk and Uncertainty: A Fallacy of Large Numbers" by Paul Samuelson, 1963.

Many have researched prospect theory and loss aversion. The initial paper regarding prospect theory is by Kahneman and Tversky, "Prospect Theory: An Analysis of Decision Under Risk" which appeared in *Econometrica* in March 1979.

The shift from loss aversion to risk seeking has been the subject of substantial research. Professor Richard Thaler discusses it in chapter 30 of his book *Misbehaving*. Details regarding how bettors at racetracks bet too much on longshots and how they become more risk-seeking at the end of the day is told in "Probability and Utility Estimates for Racetrack Bettors" by Mukhtar Ali in the *Journal of Political Economy* as well as in "Who Buys Lottery Stocks" by Larry Swedroe and in "An Examination of the Empirical Derivatives of the Favorite-Longshot Bias in Racetrack Betting" by Sobel and Raines.

The quotes regarding the panic as South Sea shares collapsed come from Applebee's *Original Weekly Journal*, October 1, 1720.

Notes regarding regret, including that it is stronger for decisions that result in action then for decision that don't generate action, come from "Investor Psychology and Asset Pricing" by David Hirschler, page 12. The idea that some litigants will choose to settle in order to avoid regret rather than merely reduce or eliminate risk is from "Better Settle Than Sorry: The Regret Aversion Theory of Litigation Behavior" by Chris Guthrie, Associate Professor Law, University of Missouri.

An interesting analysis of status quo bias is found in "Status Quo Bias in Decision Making" by Samuelson and Zeckhauser, 1988. The story of the "New Coke" debacle is told on the Coca-Cola Company's website, www.Coca-ColaCompany.com, under the Company History tab.

Information regarding the correlation between the weather in New York City and returns for the stocks listed on the New York Stock Exchange can be found at "Good Day Sunshine: Stock Returns and the Weather" by Hirschliefer and Shumway, 2003. Data regarding sales of lottery tickets in Ohio in the days following a victory by the Ohio State University football team can be found in "The Role of Potential Loss in the Influence of Affect on Risk-Taking Behavior" by Arkes, Herren, and Isen.

DOT-COM BUBBLE

While some has been written about the South Sea bubble, that is dwarfed by what has been written about the internet bubble and collapse. One general work that is worthwhile is *dot.con, How America Lost Its Mind and Money in the Internet Era* by John Cassidy.

Details of the NEI Webworld scam are included in several *Los Angeles Tim*es articles including one by Walter Hamilton that appeared on December 16, 1999. CNN also covered the scam and its fallout. The story of how indictments for the Webworld pump-and-dump were "good" news for the stock can be found in the *Wall Street Journal*, December 17, 1999, as reported by Rebecca Buckman.

The story of the creation of the internet has been told many times. The role Tim Berners-Lee played is described by the World Wide Web Foundation at https://webfoundation.org/about/vision/history-of-the-web/. Development of the Mosaic web browser, Marc Andreessen's move to Silicon Valley, and the creation of Netscape is told by Cassidy and in Jim Clark's autobiography, *Netscape Time*. The *New York Times* story extoling the virtues of the first browsers appeared on December 8, 1993. Information regarding Yahoo, AOL, eBay, and other early web-based businesses is found in various sources including eBay's own website.

John D. Rockefeller and Standard Oil are covered by Ron Chernow in his book *Titan: The Life of John D. Rockefeller, Sr.*

The concept of phantastic (sic) stocks and how investors are "transported," is explained in papers coauthored by professors David Tuckett and Richard Taffler. Those papers include: "Phantastic Objects and the Financial Market's Sense of Reality: A Psychoanalytic Contribution to the Understanding of Stock Market Instability" which was published in the *International Journal of Psychoanalysis* in 2008, and "A Psychoanalytic Interpretation of Dot.com Stock Valuations" which was published in March 2005. This second work is the one which specifically says "investors became caught up emotionally with the [internet bubble] drama." Professor Tuckett was also generous in sharing his insight with the author via email. The concept of transportation is specifically discussed in "The Role of Transportation in the Persuasiveness of Public Narratives" by Melanie C. Green and Timothy C. Brock, which was published in the *Journal of Personality and Social Psychology*, 2000, Vol. 79, No. 5, pp. 701–721.

Information regarding the word "mindshare" is from the Google Ngram of "Mindshare" as of May 2021. The quote regarding valuation not being a helpful tool is from a *New York Times* interview of Henry Blodget regarding Internet Capital

Group. The story was written by Gretchen Morgenson and appeared on March 18, 2001.

Details regarding AOL's acquisition of Netscape in November 1998 are available from a variety of media outlets including Bloomberg, the *Wall Street Journal*, and CNN.

Information regarding early internet companies is available from many outlets. Information regarding the agreement between Kozmo.com and Starbucks was included in a story describing the transaction in the *Wall Street Journal* on February 14, 2000 which was written by George Anders. The quote from the Kozmo executive regarding retailing through the internet is from the documentary movie *E-Dreams*, at 1:09:31.

Details about Pets.com are widely available, including in a Bloomberg article dated March 5, 2000, by Arlene Weintraub. Information regarding the sock puppet mascot is available from *AdWeek*, December 11, 2000. Superbowl commercials for nascent dot-com companies which ultimately failed are available to view on YouTube.

The phenomena of recency bias is explained in a number of papers including "The Behavior of Individual Investors," which appears in the *Handbook of the Economics of Finance*, chapter 22. The literature regarding "Home Bias" and the tendency for investors to inappropriately invest in companies in the industry in which they are employed, or in companies headquartered near their home, is summarized by Hersh Shefrin on page 26 in "Behavioralizing Finance" which appeared in *Foundations and Trends in Finance*, Vol. 4, Nos. 1–2, 2009.

Availability bias is discussed in "Availability: A Heuristic for Judging Frequency and Probability" by Amos Tversky and

Daniel Kahneman which appeared in *Cognitive Psychology*, 1973, 4, pp. 207–232.

Cause of death data is from the Centers for Disease Control.

Affect is discussed in a number of academic papers including "Affect, Media and Earthquakes: Determinants of Crash Beliefs from Investor Surveys" by Goetzmann, Kim, and Shiller, which was published December 8, 2017, as well as "Affect, Generalization, and the Perception of Risk" by Johnson and Tversky, 1983. Risk as feelings is examined in "Risk as Feelings" by Loewenstein, Hsee, Weber, and Welch, which appeared in the *Psychological Bulletin*, 2001, Vol. 127, No. 2, pp. 267–286.

The story of the Palm Pilot and 3Com's spinoff of Palm is told in the *New York Times*, September 14, 1999, and the *Wall Street Journal*, March 3, 2000.

ComputerLiteracy.com's name change is described by the *Wall Street Journal* in an article titled "Overhaul" by Peter Loftus, which appeared on November 22, 1999. Price data for New York Bagel Exchange is from Refinitiv via their Datastream service. Information regarding the broader trend in dot-com–related name changes is from "A Rose.Com by Any Other Name" from Cooper, Dimitrov, and Rau, September 17, 2000.

Details regarding second-tier IPOs during the last days of the internet bubble are from a variety of sources including the *Wall Street Journal* and the *New York Times*.

Information regarding adoption of the internet and AOL's market share is from Pew Research and www.NTIA.doc.gov.

Data quantifying revenue and earnings for Amazon and Yahoo come from those company's annual reports.

Judge Jackson's ruling that Microsoft had abused its monopoly power is available on the U.S. Justice Department website. Other information regarding the case is available from the *New York Times*, *Wired Magazine*, CNET.com, and Bloomberg.

A number of biases are described in "Judgement under Uncertainty: Heuristics and Biases" by Tversky and Kahneman which appeared in the journal *Science*, New Series, Vol. 185, No. 4157, on September 27, 1974. Anchoring and the question regarding the percentage of countries in the United Nations that are from Africa is discussed on page 1,128. Contemporary data regarding the proportion of UN nations from Africa is from the United Nations website, UN.org.

Tversky and Kahneman's seminal paper describing Prospect Theory is "Prospect Theory: An Analysis of Decision Under Risk" and it first appeared in *Econometrica*, Volume 47, Number 2, March 1979.

The story of internet-related name changes made to avoid being associated with the internet bust is told in "Managerial Actions in Response to a Market Downturn: Valuation Effects of Name Changes in the dot.com Decline" by Cooper, Khorana, Osobov, Patel, and Rau. Professor Cooper was the source of the list of companies cited in the two studies.

THE GREAT RECESSION

Details for the Lehman Brothers bankruptcy filing are available from a number of outlets including the *Wall Street Journal*, MarketWatch, and CNN. Some details are from the actual filing, which is: U.S. Bankruptcy Court, Southern District of New York, Bankruptcy Petition #: 08-13555-scc.

Information regarding the G.I. Bill can be found at Defense .gov. Details of the history of the U.S. mortgage market and homeownership can be found in *A History of the United States in Five Crashes* by the author. They can also be found at huduser.gov and in the St. Louis Federal Reserve's FRED database.

Housing prices cited are based on the S&P CoreLogic Case/Shiller Home Price Indices. Details regarding the size of the mortgage-backed security market, HSBC, New Century Financial, Bear Stearns, and other topics come from a variety of sources including a *Wall Street Journal* article dated February 8, 2007 by Carrick Mollenkamp, a *New York Times* article dated April 2, 2007, CNN, and another *Wall Street Journal* Article dated July 17, 2007.

The story of bundled and tranched mortgages has been told several times including in *A History of the United States in Five Crashes.* Growth in the size of the mortgage-backed securities market is available from Statista.com and the World Bank.

Details of the Bear Stearns hedge funds, Merrill Lynch's involvement, and the funds' collapse has been told in the financial press including in the *Wall Street Journal.* Information regarding Merrill Lynch comes from a variety of sources including the company and the *New York Times*, October 30, 2007. The article regarding Countrywide Financial seeing trouble ahead is from the *Wall Street Journal*, July 25, 2007. The story of Bear Stearns's co-president's note to clients and subsequent resignation is told in the *Wall Street Journal*, August 6, 2007.

Source Notes

Information regarding the litany of bad news in September and October 2007 comes from a variety of sources including the *Wall Street Journal*, the Wharton School, and the St. Louis Federal Reserve. Information regarding Goldman Sachs and the amount of "Level 3" assets it owned is from Sec.gov, the company, and the *Wall Street Journal*, October 10, 2007. The story regarding the percentage of securities that are traded in arms-length transactions on exchanges appeared in the *Wall Street Journal*, October 12, 2007 and was written by Susan Pulliam, Randall Smith, and Michael Siconolfi.

Citigroup's overconfidence regarding the safety of its mortgage-backed security holdings is told in a *New York Times* article that appeared on November 22, 2008, and was reported by Eric Dash and Julie Creswell. The story of Northern Rock's failure is told in several outlets including BBC.com. AIG's potential involvement in a rescue of Northern Rock is told by the BBC and *Wall Street Journal* in an article published October 13, 2007. Other details regarding the failure of AIG, including some of the obscene quotes regarding the depth of their trouble, come from a variety of sources including *All the Devils Are Here* by Bethany McLean and Joe Nocera. Details regarding AIG's reckless selling of credit default swaps and general inanity are provided in a number of outlets including "What Went Wrong at AIG" published by Northwestern University's Kellogg School of Management.

Information regarding financial attention and the "Ostrich Effect" can be found in academic papers including "The Ostrich Effect: Selective Attention to Information" by Karlsson, Loewenstein, and Seppi, published in 2009, and "Financial Attention" by Sicherman, Loewenstein, Seppi, and Utkus, published in 2015. Information regarding attention's impact on individual investors' stock selection is detailed in "All That Glitters: The Effect of Attention and News on the Buying Behavior of Individual and Institutional Investors" by Barber and Odean, 2007. The paper regarding advertising and investor engagement is titled "Advertising, Breadth of Ownership, and Liquidity" by Grullon, Kanatas, and Weston, April 2004. Details of the impact of the timing of earnings announcements and investor attention are included in the *Handbook of the Economics of Finance*, chapter 22, "The Behavior of Individual Investors" by Barber and Odean, page 1559.

Morgan Stanley's results data is courtesy of the company. Information regarding Merrill Lynch's results, write-down, and capital raising efforts at the end of 2007 and beginning of 2008 are told in the *New York Times* including in articles dated December 25, 2007; January 2, 2008; January 15, 2008; January 17, 2008; and January 18, 2008. The sad story of Springfield, Massachusetts's misadventure in mortgage-backed securities is told in the *Wall Street Journal*, January 21, 2008.

The story of herding as it occurred among thieves at the Petrified Forest National Park is told in "Crafting Normative Messages to Protect the Environment," which appeared in *Current Directions in Psychological Science* by Robert B. Cialdini, 2003, and "The Science Behind Why People Follow the Crowd," which appeared in *Psychology Today*, May 24, 2017, and from the National Park Service website, NPS.gov. Herding among Korean investors during the 1997–1998 Asian economic crisis is described in "Foreign Portfolio Investors Before and During a Crisis," NBER No. 6968, p. 9 and table 4. Herding among those who think they are part of a group who are evaluating three-dimensional shapes is described in "Neurobiological Correlates of Social Conformity and Independence During Mental Rotation" by Berns, Chappelow, Zink, Pagnoni, Martin-Skurski, and Richards, 2005.

The fascinating tendency for starlings to "herd" is told in "What Is a Starling Murmuration and Why Do They Form" by the Wildlife Trust for Lancashire, Manchester, and North Merseyside. Hypnotic video is available on NPR.org and other outlets.

The internal debate regarding AIG's write-down is told in *A History of the United States in Five Crashes*. Fed Chair Ben Bernanke's warning about bank failures was reported in the *Wall Street Journal* on March 1, 2008. Details from spring 2008 come from a variety of sources including the *Wall Street Journal*, *New York Times*, and others.

Several academic papers have studied information overload in a number of settings. One of the best in the context of investing is "Asset Allocation and Information Overload: The Influence of Information Display, Asset Choice, and Investor Experience" by Agnew and Szykman, May 2004.

The history of Lehman Brothers is told by several outlets including the Corporate Finance Institute. Merrill Lynch's profligate spending in the summer of 2008 is told by CNBC.com and the *Wall Street Journal*. The June 19, 2008, criminal crackdown on mortgage bankers and real estate developers is discussed in Wharton's timeline of the Great Recession.

Fannie Mae and its history, along with that of the other GSEs, is told in a variety of outlets including Huduser.gov, CNN, the *Wall Street Journal*, and *On the Brink* by Henry M. Paulson, Jr. who was Secretary of the Treasury at the time.

The story of Lehman Brothers's bankruptcy filing and Bank of America's acquisition of Merrill Lynch has been told in many outlets including the *New York Times*, *Wall Street Journal*, *Too Big To Fail* by Andrew Ross Sorkin, and *On the Brink*.

Thomas Bayes's work and use of this theorem is discussed in many outlets. One excellent source is *The Theory That Would Not Die* by Sharon Bertsch McGrayne.

Kahneman and Tversky's paper regarding overreaction is titled "Intuitive Prediction: Biases and Corrective Procedures" and was published in June 1977. Data regarding overreaction to stock splits is from "The Market Reaction to Stock Splits" by Lamoureaux and Poon and from "Volatility Increases Subsequent to Stock Splits: An Empirical Aberration" by Ohlson and Penman. Keynes's quote is from his seminal work *The General Theory of Employment*, *Interest*, *and Money*, page 138.

Mutual fund flow data is from the Investment Company Institute. ETF flow data is from Morningstar's "Morningstar Fund Flows and Investment Trends, Annual Report 2009."

The academic study regarding investor's ignorance regarding their past performance is "Why Inexperienced Investors Do Not Learn: They Do Not Know Their Past Portfolio Performance" by Glaser and Weber, 2007. The study of Finnish investors and the disposition effect is "Learning by Trading" by Seru, Shumway, and Stoffman which appeared in the *Review of Financial Studies*.

The number of Americans who lost their homes to foreclosure during the Great Recession is from the *Los Angeles Times*, September 15, 2018.

CHAPTER 4

Data for the Dow Jones Industrial Average and S&P 500 come from S&P Dow Jones Indices. Data for treasury notes comes from Yale University. Housing price data uses the S&P CoreLogic Case-Shiller National Home Price Index. Calculation of returns and correlations are from the author.

The Benartzi and Thaler paper is "Myopic Loss Aversion and the Equity Premium Puzzle," May 1993, NBER Working Paper No. 4369. Their conclusion that investors focus on one-year returns appears on page 5.

Status quo bias is examined in "Status Quo Bias in Decision Making" by William Samuelson and Richard Zeckhauser, which appeared in the *Journal of Risk and Uncertainty*, Vol. 1, No. 1 (March 1988), pp. 7–59.

Disposition effect is described in "The Disposition to Sell Winners Too Early and Ride Losers Too Long: Theory and Evidence" by Shefrin and Statman, 1985. Professor Odean's paper is "Are Investors Reluctant to Realize Their Losses?" which was published in December 1997.

Overreaction and De Bondt and Thaler's "Winner" and "Loser" portfolios are described in "Does the Stock Market Overreact?" which appeared in *The Journal of Finance*, Vol. XL, No. 3, July 1985.

One excellent analysis of hindsight bias in finance was done in the paper "Hindsight Bias, Risk Perception, and Investment Performance" by Biais and Weber which appeared in *Management Science*, Vol. 55, No. 6, June 2009, pp. 1018–1029.

Overconfidence has been studied extensively, including in the domain of investing and finance. One good example is "Leverage Overconfidence" by Barber, Huang, Ko, and Odean which was published in 2019. It describes the kaleidoscope of ways in which overconfidence leads to poor investment practices and inferior returns.

Details regarding the earthquake and tsunami that destroyed the Fukushima-Daiichi nuclear power plant are from the U.S. Geological Survey at usgs.gov and from other sources. Information regarding the nuclear reactors comes from the World Nuclear Association at World-Nuclear.org. Data regarding radiation in the ocean is from Woods Hole Oceanographic Institution at whoi.edu.

Data regarding deaths from commercial air travel and automobile accidents comes from Airlines for America at Airlines.org and the Insurance Institute for Highway Safety at iihs.org respectively.

The paper that describes availability bias in certain domestic index option markets is "Why Are Put Options So Expensive" by Oleg Bondarenko, which was published in November 2003.

Loss aversion is related to prospect theory and the foundational work in prospect theory appears in Kahneman and Tversky's *Econometrica* paper mentioned earlier. Even earlier work in loss aversion was done by Harry Markowitz, who received the Nobel Prize in economics in 1990. Markowitz's paper is "The Utility of Wealth" and was published in 1952.

A tremendous amount of research into herding has been undertaken. Some is detailed in "Herd Behavior in Financial Markets: A Review" by Bikhchandani and Sharma, which is in the IMF Working Paper published in March 2000. The paper that details herding among Korean investors is "Foreign Portfolio Investors Before and During a Crisis" by Kim and Wei in NBER Working Paper No. 6968. Keynes observation that we are now "anticipating what average opinion expects the average opinion to be" appears in his *General Theory of Employment, Interest, and Money* on page 156. NPR's modern version of the beauty contest is detailed on NPR.org in an article titled "Our Cute Animal Experiment, Explained" which was published on January 11, 2011.

Most of the details regarding overreaction come from "Does the Stock Market Overreact" by De Bondt and Thaler and "Do Security Analysts Overreact?" which is also by De Bondt and Thaler.

The social aspect of investing is a relatively new topic for research but Shiller's 1984 paper is "Stock Prices and Social Dynamics" 1984, p. 457. Information regarding Robert Prechter is from Elliottwave.com and the *Chicago Tribune*, October 23, 1987.

Information regarding "Phantastic Objects" is available in the papers by Tuckett and Taffler previously cited.

Affect's impact on investors is explained in "Affect, Media, and Earthquakes: Determinants of Crash Beliefs From Investor Surveys" by Goetzman, Kim, and Shiller, 2017.

The classic research into anchoring is presented in "Judgement Under Uncertainty: Heuristics and Biases" by Tversky and Kahneman, which appeared in *Science* magazine, No. 185, pp. 1124–1131. Another interesting paper is "Reference-Point Formation and Updating" by Baucells, Weber, and Welfens, which was published in 2011.

Much has been written in the mainstream media about the Nifty 50 stocks from the 1960s. This Nifty 50 should not be confused with the Nifty 50 benchmark of Indian stocks listed on India's National Stock Exchange. Our Nifty 50 is discussed extensively in *Forbes* magazine and by Professors Jeff Fesenmaier and Gary Smith of Pomona College. Stock prices in the discussion of the Nifty 50 are from the Center for Research in Security Prices at the University of Chicago. PE data is from Wharton Research Data Services.

Myopic loss aversion is introduced in the paper "Myopic Loss Aversion and the Equity Premium Puzzle" by Shlomo Benartzi and Richard Thaler, which was published as NBER Working Paper No. 4369 in May 1993. Other important papers include "Can Myopic Loss Aversion Explain the Equity Premium Puzzle? Evidence from a Natural Field Experiment with Professional Traders" by Larson, List, and Metcalfe from September 2016 and "The Effect of Myopia and Loss Aversion on Risk Taking: An Experimental Test" by Thaler, Tversky, Kahneman and Schwartz, which was published in May 1997 in *The Quarterly Journal of Economics.*

Trading data including annual turnover on the New York Stock Exchange comes from the St. Louis Federal Reverse's FRED database. Details of the study that quantifies the harm done by overtrading can be found in "The Behavior of Individual Investors" which is chapter 22 of the *Handbook of the Economics of Finance*. It was written by Barber and Odean in 2013 and the details appear on page 1540.

The paper that Ben Bernanke wrote about mistakes made by the Federal Reserve during the 1930s is titled "Nonmonetary Effects of the Financial Crisis in the Propagation of the Great Depression," which appeared in *The American Economic Review*, Vol. 73, No. 3, June 1983.