Chapter 17

Futures Markets and Risk Management

17.1 The Futures Contract

Quotes Time & Sales Volume Settlements

Trade Date: 11/22/2010

Globex Futures | Open Outcry Futures

Market Data is delayed at least 10 minutes

View Spread Quotes

Turn Auto-refresh OFF | About this Report

Month	Charts	**Last**	Change	Prior Settle	Open	High	Low	Volume	Hi / Lo Limit	Updated
Jan 2011		81.07	-0.91	81.98	82.15	82.87	80.76	173,792	91.98 71.98	10:57:56 AM CST 11/22/2010
Feb 2011		81.65 a	-0.93	82.58	82.72	83.43 b	81.35	32,349	92.58 72.58	10:57:54 AM CST 11/22/2010
Mar 2011		82.15	-0.92	83.07	83.08	83.91	81.85	13,861	93.07 73.07	10:57:54 AM CST 11/22/2010
Apr 2011		82.58	-0.85	83.43	83.67	84.25	82.30	4,591	93.43 73.43	10:56:31 AM CST 11/22/2010
May 2011		82.89	-0.83	83.72	83.90	84.49	82.75	3,816	93.72 73.72	10:57:48 AM CST 11/22/2010
Jun 2011		83.13	-0.87	84.00	84.10	84.78	82.85	9,911	94.00 74.00	10:57:54 AM CST 11/22/2010
Jul 2011		83.39	-0.85	84.24	84.32	84.32	83.30	1,533	94.24 74.24	10:57:54 AM CST 11/22/2010
Aug 2011		83.67	-0.79	84.46	83.45	83.67	83.45	472	94.46 74.46	10:40:57 AM CST 11/22/2010
Sep 2011		83.81	-0.86	84.67	84.51	84.51	83.56	746	94.67 74.67	10:57:54 AM CST 11/22/2010

Futures and Forwards

- Forward - an agreement calling for a future delivery of an asset at an agreed-upon price
- Futures - similar to forward but has standardized terms and is traded on an exchange.
- Key difference in futures
  - Futures have secondary trading (liquidity)
  - Marked to market
  - Standardized contract terms such as delivery dates, price units, contract size
  - Clearinghouse guarantees performance

Figure 17.2 Profits to Buyers and Sellers of Futures and Options Contracts

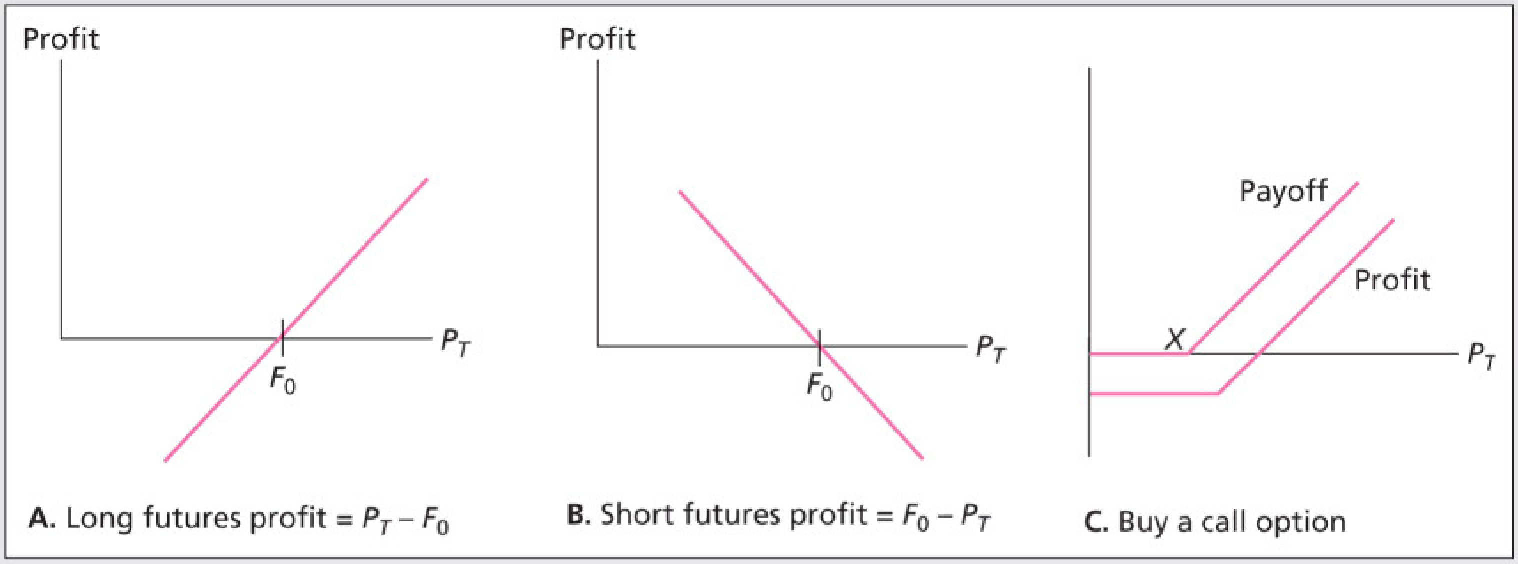


FIGURE 17.2

Profits to buyers and sellers of futures and options contracts

A: Long futures position (buyer) **B:** Short futures position (seller) **C:** Buy call option

Why does the payoff for the call option differ from the long futures position?

Types of Contracts

- Agricultural commodities
- Metals and minerals (including energy contracts)
- Financial futures
  - Interest rate futures
  - Stock index futures
  - Foreign currencies

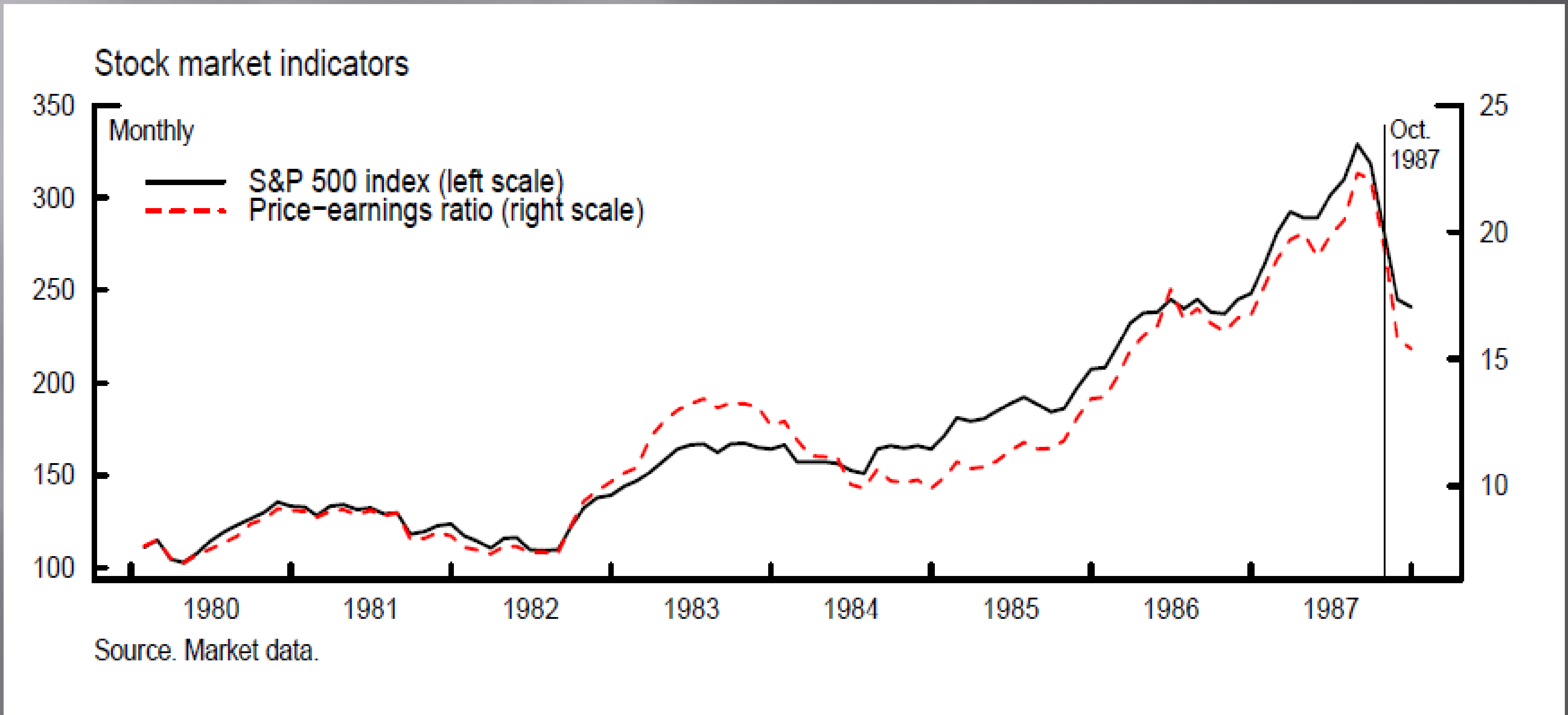
THE 1987 STOCK MARKET CRASH

Discussion Based On:

- Mark Carlson (2007) "A Brief History of the 1987 Stock Market Crash, with a Discussion of the Federal Reserve Response“ FEDS Working Paper No. 2007-13
- "The Myth of The Rational Market" by Justin Fox; Publisher: HarperBusiness, First Printing edition (June 9, 2009)

Background

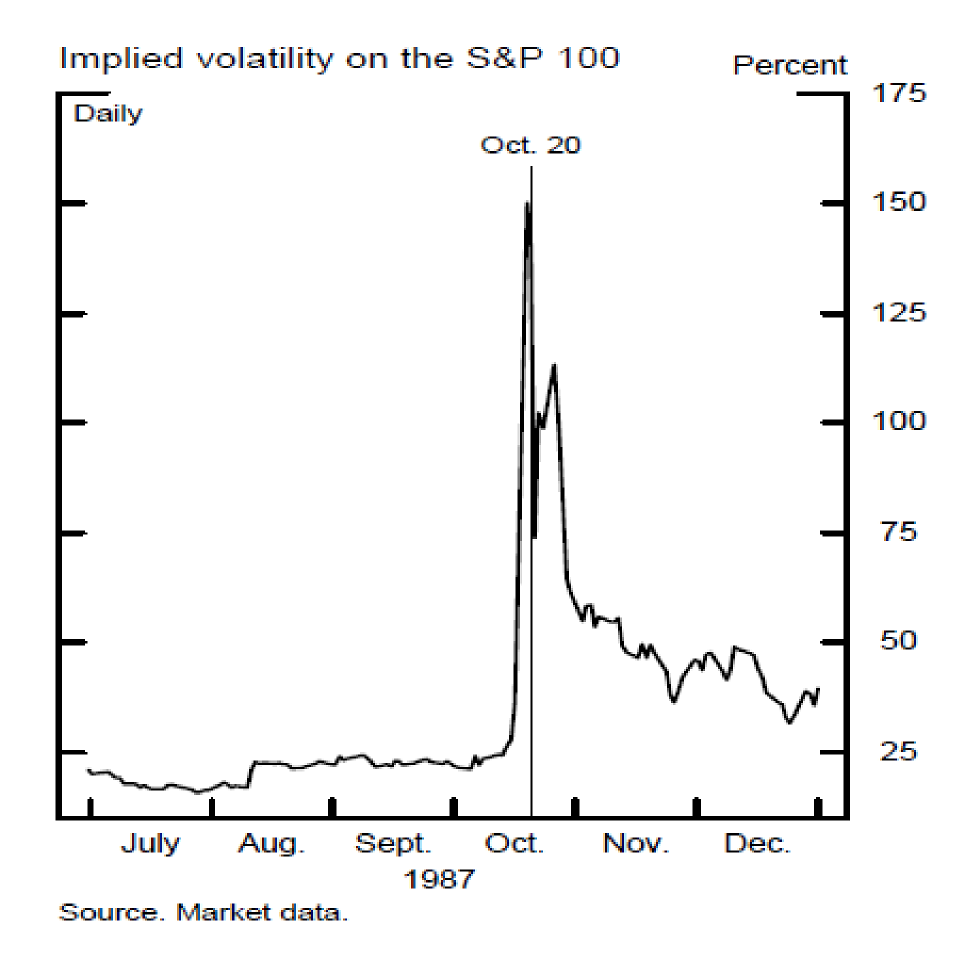
•S&P 500 declined 29%, DJIA declined 23%
•"If price changes are normally distributed the probability of this happening is 10-160
Or once every couple billion billion years, " Mark Rubenstein, UC Berkeley
• Earth is only 170 billion years old, and NYSE was 170 years old at the time.
•Bad Luck??



Background

VIX is the ticker symbol for the Chicago Board Options Exchange Market Volatility Index, a popular measure of the implied volatility of S&P 500 index options.

VIX is referred as the *fear index* or the *fear gauge*, it represents a measure of the market's expectation of stock market volatility over the next 30 day period.



Key Factors

- **Bad news of U.S. macro fundamentals –** trade deficit, expected future inflation, monetary tightening
- **Program Trading –** portfolio insurance & index arbitrage
- **Lack of reliable information –** herd behavior, redemptions, credit crunch

Portfolio Insurance

• Similar to buying a put option, allowing to preserve upside gains but limit downside risk

• Generally implemented in futures markets, because 1) cheaper, and 2) many institutions not authorized to trade in clients' stock

-Buy stock index futures in the rising market
-Sell stock index futures in the falling market

Portfolio Insurance

• Because of costs, ran models periodically & trade in batches

• NYSE's DOT order processing system made It possible for automatic handling or large orders

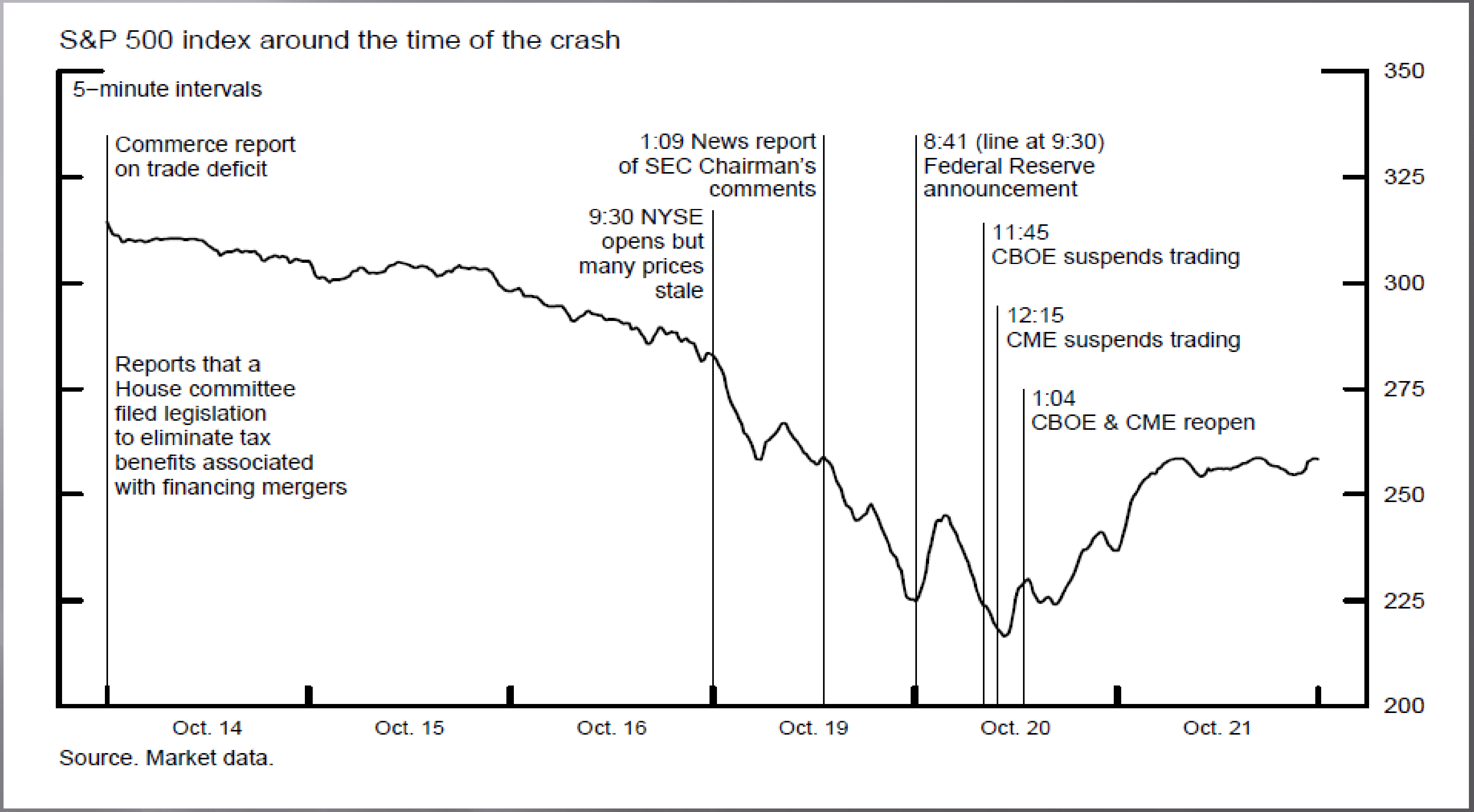
• Fund managers had incentive to avoid embarrassing *unique* losses, so willing to give up some potential gains to get insurance
-Recall *relative performance considerations*
Rajan (2005)

Index Arbitrage

- Make profit by exploiting discrepancies between the value of stock in an index and the value of stock index futures contracts

- If value of stocks higher than value of futures contracts then buy futures and sell stocks in the cash market knowing that prices would have to converge at the time of futures' expiration

Timeline of the Crash



Timeline of the Crash

Wednesday – Thursday (Oct. 14, 15 1987):

Trade deficit → dollar decline

→ higher inflation → expect FED to raise rates

→lower futures stock returns

Friday, Oct 16 1987:

Price declines eliminated many ATM options, investors begin to sell futures to hedge instead.

→price discrepancy between value of stock index in the futures market and value of stocks on NYSE

→Index arbitrageurs move in

→Downward pressure on NYSE itself

Timeline of the Crash

Stage Set for MONDAY

• Portfolio insurers left with “overhang”

• Mutual funds experienced redemptions and need to sell more shares

• Aggressive institutions ready to pre-empt portfolio insurance sales and mutual fund redemptions by selling first.

Timeline of the Crash

"Black Monday," Oct. 19, 1987

- Huge imbalances in the number or sell relative to buy orders
- At first, many specialist did not reopen for trading, so values of many indexes did not decline
- But prices continue declining in futures markets, exacerbating the gap
- Index arbitrageurs continue to enter market sell orders
- When stocks opened prices "gapped down"
- DJIA, S&P 500, Wilshire 5000 decline 18 to 23%

State of Panic/Confusion

Order imbalances make maintaining orderly market difficult

Investors don’t know whether limit orders have been executed or new orders need to be placed

Bid-ask spreads widen

The Market Response

Tuesday Oct. 20, 1987

Regulators attempt to "delink" futures and cash markets

• NYSE restricts the use of DOT

• CBOE suspends trading of many stock index derivative (11:45am)

• CME follows suit at 12:15pm

Corporations announce buybacks to supports demand for their stocks

FED publicly indicates determination to support market liquidity

The Market Response

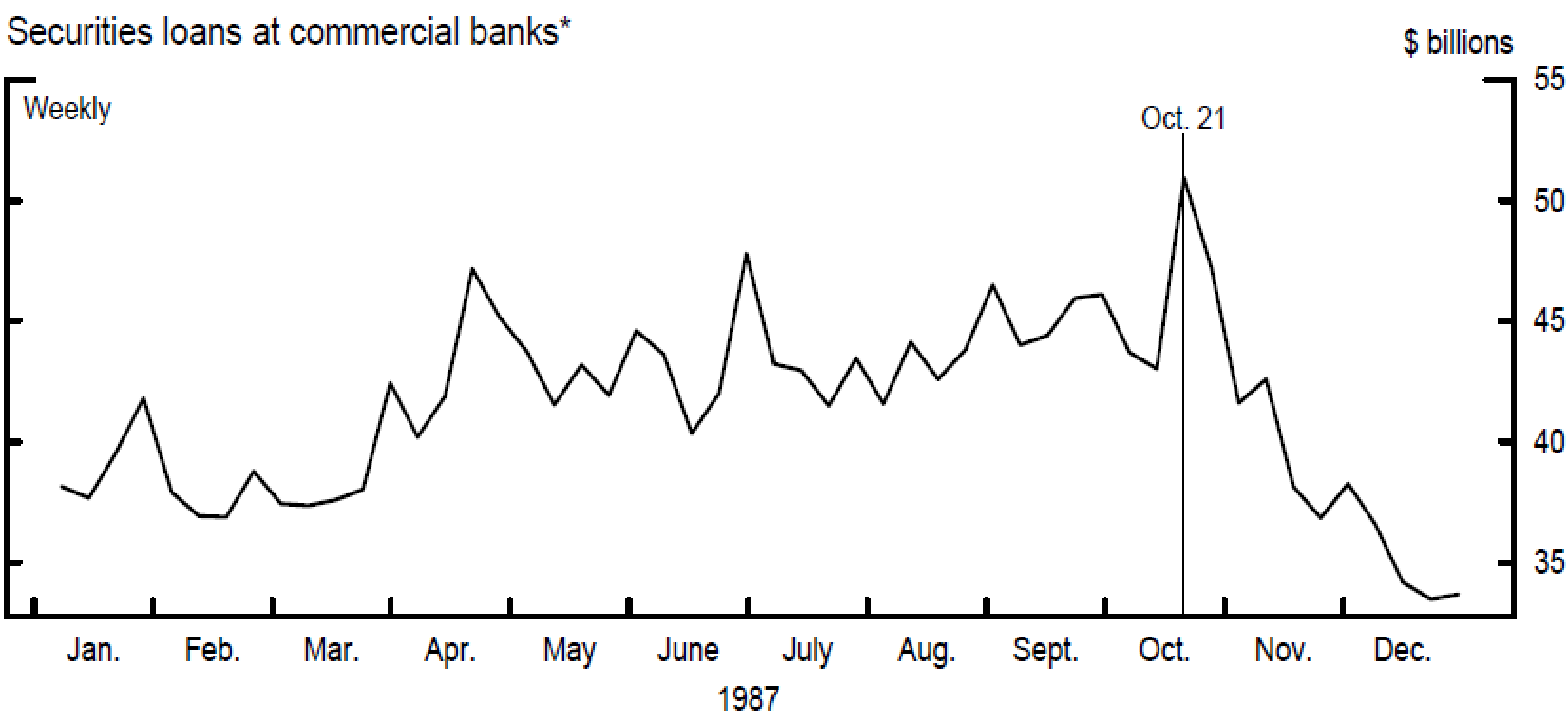
FED applies pressure on banks

John S. Reed, the chairman of Citicorp, has been quoted as saying that his bank's lending to securities firms soared to $1.4 billion on Oct. 20, from a more normal level of $200 million to $400 million, after he received a telephone call from E. Gerald Corrigan, president of the New York Federal Reserve Bank. (Sterngold 1987)

Alerted by calls about the developing credit crisis from Mr. Phelan [Chairman of the NYSE] and others, the Fed leaned heavily on the big New York banks to meet Wall Street's soaring demand for credit. Mr. Corrigan and key aides personally telephoned top bankers to get the message across...The banks were told to keep an eye on the big picture—the global financial system on which all their business ultimately depends. A senior New York banker says the Fed's message was, 'We're here. Whatever you need, we'll give you.' (Stewart and Hertzberg 1987)

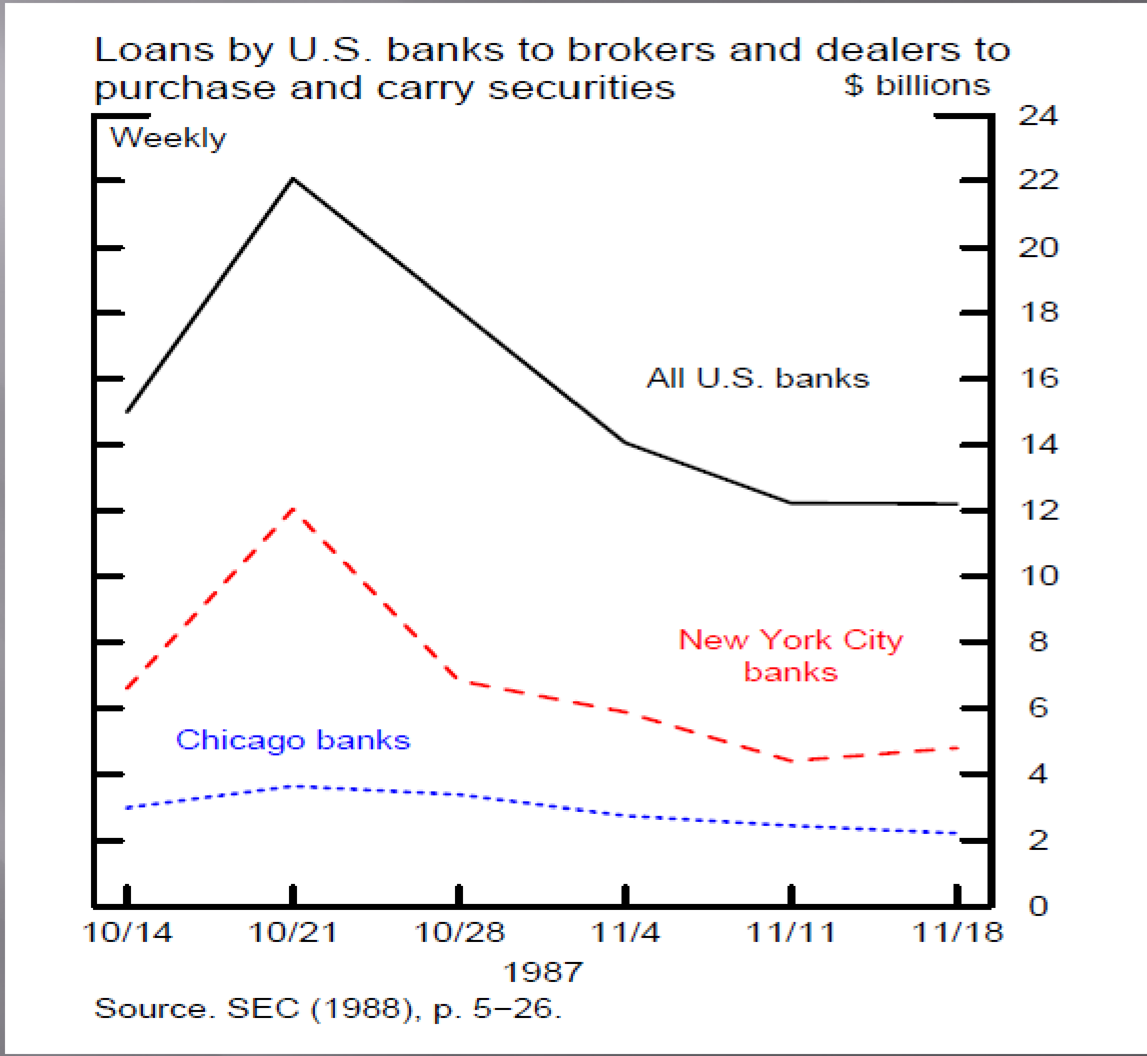
The Market Response

Banks extend credit to institutional investors to help meet margin calls



*Reverse RPs with brokers and dealers and loans to purchase and carry securities. Seasonally adjusted.
Source. Federal Reserve H.8 statistical release.

The Market Response



Recall, banks could not fulfill this role in the 2007-08 crisis. Why?

The FED Response

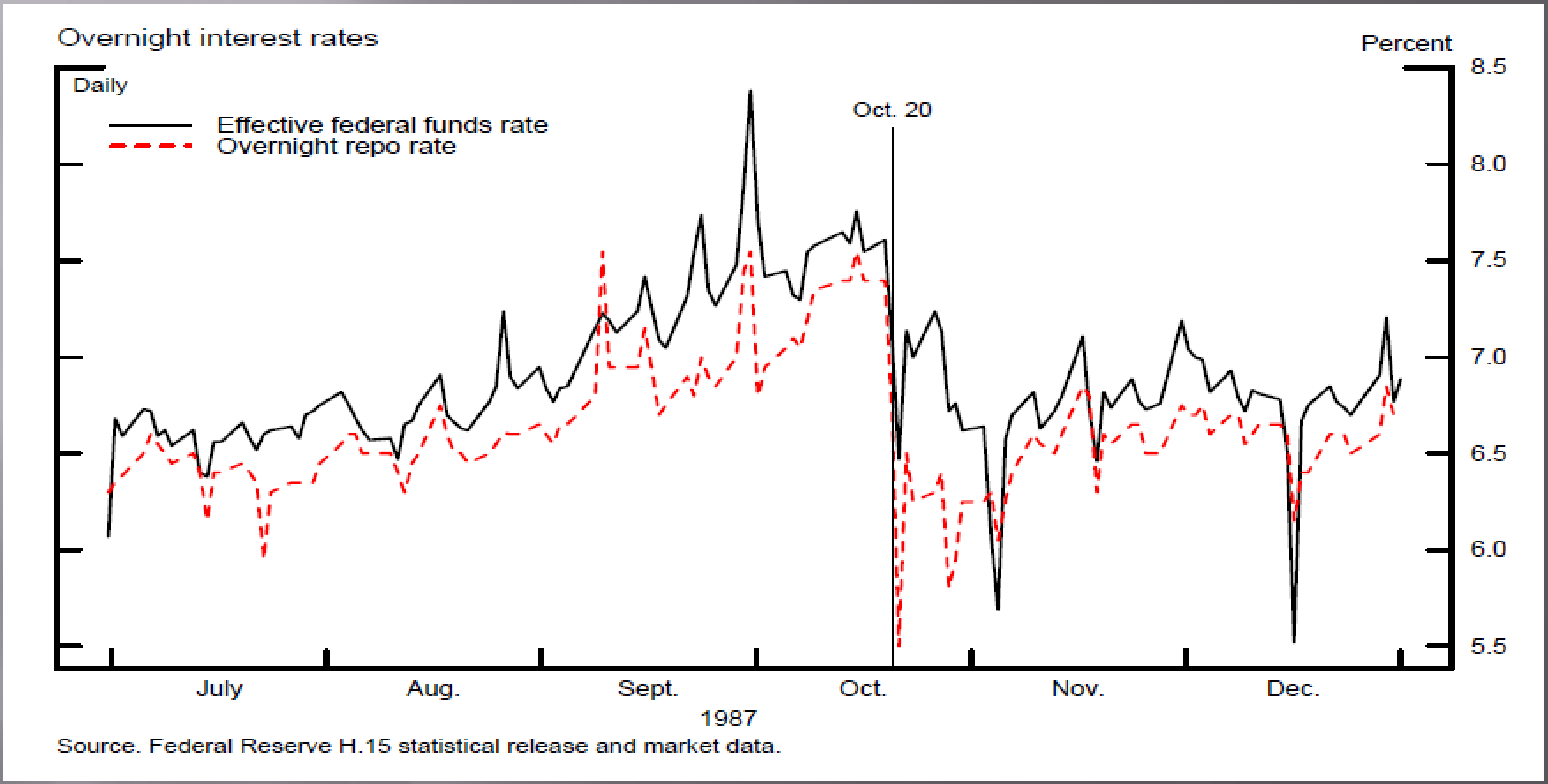
• High profile public actions to support market sentiment

• Open market operations and lowering of the federal Funds rate to support the liquidity of the banking system

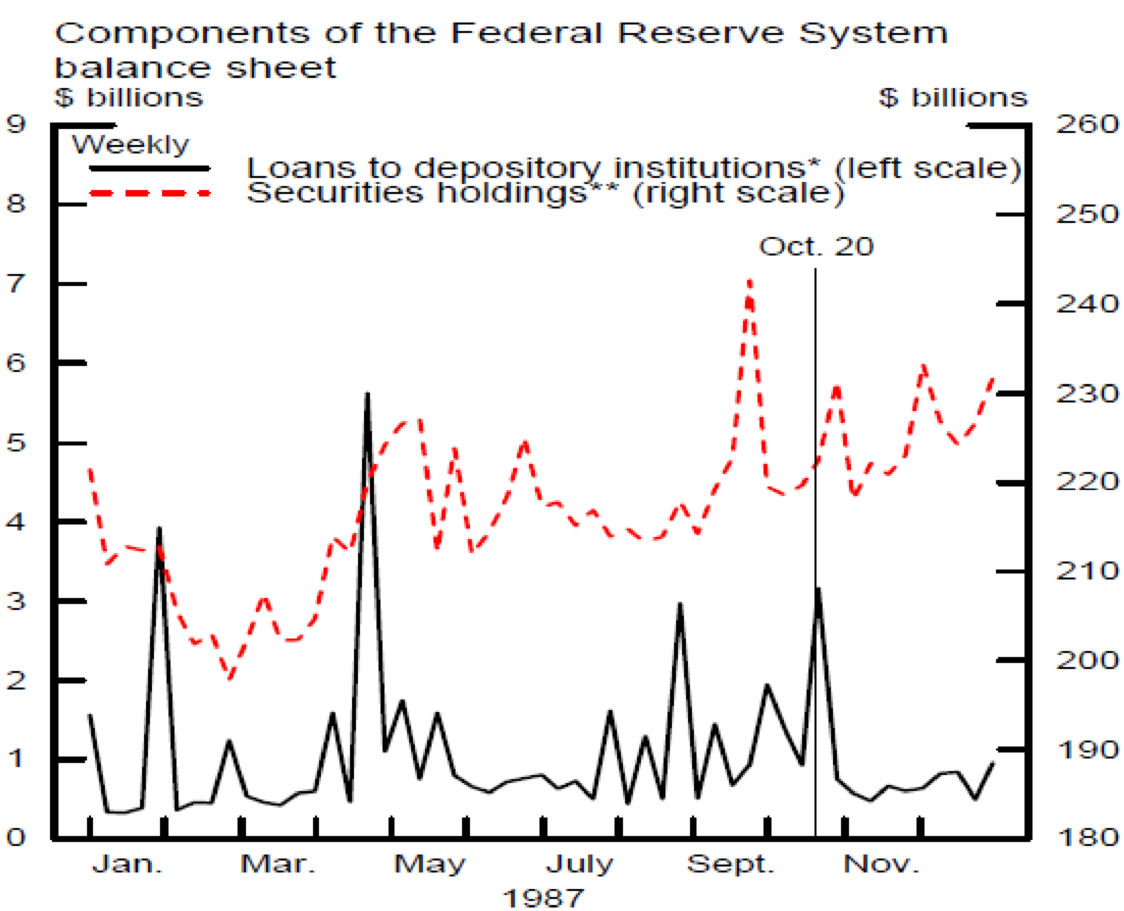
• Liberalizing rules regarding lending of securities

• Direct pressure on market participants, especially banks

The FED Response



The FED Response



*Includes adjustment, extended, and seasonal credit.
**Held outright and held under repurchase agreements.
Source. Federal Reserve H.4.1 statistical release.

Lessons Learned

Revision of "Bell Curve" finance

After Oct. 19 options begin to price in "crash risk" as evident from the *volatility smile*.

New interest in Mandelbrot's ideas: "a trader could simulate countless potential future paths for security prices, exploring the shape and texture of market Volatility in the spirit of Mandelbrot's fractals. "
Fox (2008)

Lessons Not Learned

"While the portfolio insurance proper had been largely discredited in 1987, the market for insuring against the vagaries of the market never went away. Before long, the big banks and investment banks were using options-pricing models to design and price private contracts called over-the-counter derivatives that enabled clients to hedge against (or bet on) financial risks, covering stock market moves and loan defaults."

Fox (2008)

Lessons Not Learned

"In 1998, the chairman of the CFTC, which regulates derivatives exchange such as the CME, pushed for the oversight of burgeoning off-exchange (also known as over-the-counter) derivatives market. She was rebuffed by Greenspan and her fellow Clinton administration financial regulators, and late in 2000 Congress passed – and President Clinton signed – legislation barring regulation of over-the-counter derivatives."

Fox (2008)