Portfolio Choice

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Part 1. General Introduction

1.1 Basic Concepts

1.2 Financial Securities

1.3 Securities Markets

1.4 Mutual Funds and Other Investment Companies

1.1 Basic Concepts

Real Assets vs Financial Assets

- Essential nature of investment
  - Reduced current consumption
  - In return for future benefits
- Real Assets
  - Assets used to produce goods and services
  - Land, Buildings, Equipment
- Financial Assets
  - Claims on real assets

Balance Sheet – U.S. Households, 2007

Assets	$ Billion	% Total	Liabilities and Net Worth	$ Billion	% Total
Real assets					
Real estate	$22,874	32.9%	Mortgages	$10,070	14.5%
Consumer durables	3,966	5.7	Consumer credit	2,413	3.5
Other	247	0.4	Bank and other loans	222	0.3
Total real assets	$27,086	38.9%	Security credit	310	0.4
			Other	418	0.6
			Total liabilities	$13,432	19.3%
Financial assets					
Deposits	$ 6,629	9.5%			
Life insurance reserves	1,174	1.7			
Pension reserves	12,188	17.5			
Corporate equity	5,391	7.7			
Equity in noncorp. business	7,553	10.9			
Mutual fund shares	5,123	7.4			
Debt securities	3,160	4.5			
Other	1,305	1.9			
Total financial assets	42,522	61.1	*Net worth*	56,176	80.7
Total	$69,608	100.0%		$69,608	100.0%

Source: BKM (2009)

A Taxonomy of Financial Assets

- Debt
  - Money market instruments
  - Capital market instruments

- Common stock
- Preferred stock
- Derivative securities

Financial Markets

- Dissemination of Financial Information
- Timing of Consumption and Investment
- Allocation of Risk:
  - Stock vs. Bond
- Separation of Ownership and Management
  - Agency Issues

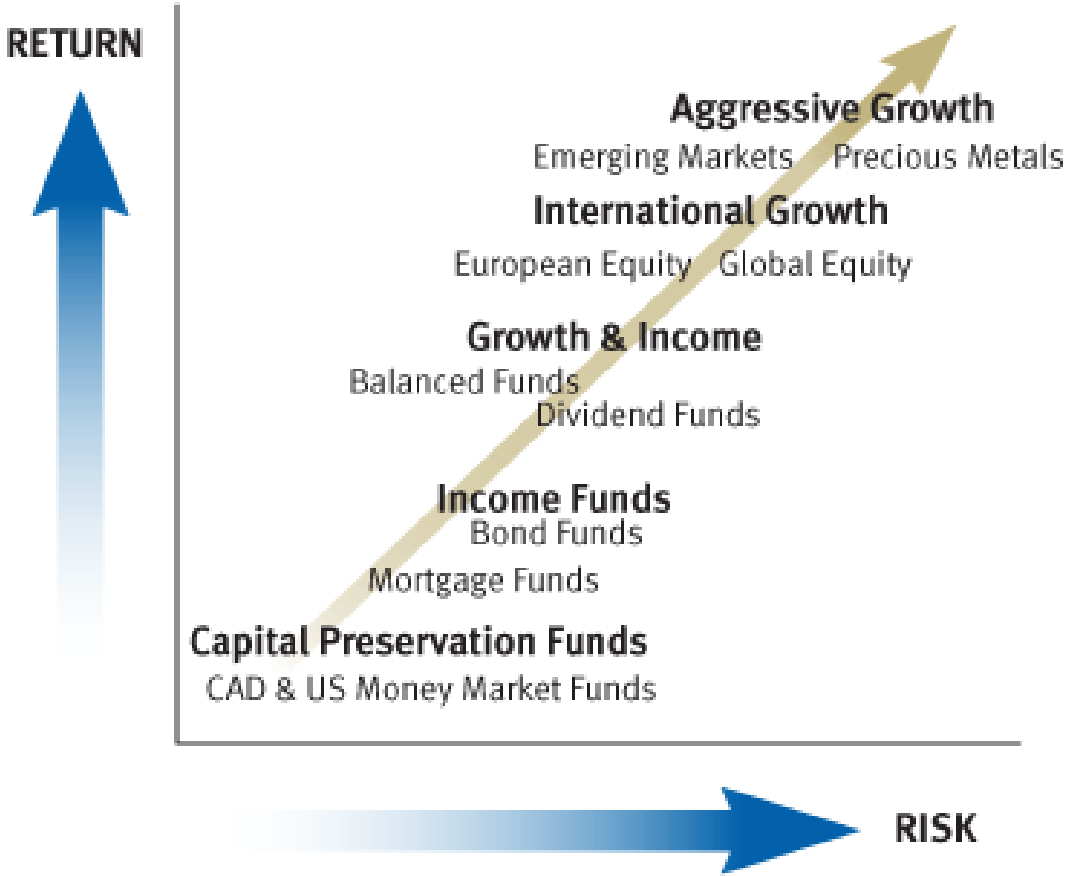
Asset Allocation Process

- Top-down vs Bottom-up
- Choice of different markets vs individual security selection
- 2 steps in the asset allocation process:
  1) Strategic Allocation (Risk/Return)
  2) Tactical Allocation (adjustments based on short-term anticipations):
     - Step 1: forecast asset returns by asset classes
     - Step 2: build portfolios based on forecasts (i.e., turn signals into bets)
     - Step 3: conduct out-of-sample performance tests

The Risk Return Trade-off

- Assets with higher expected returns have greater risk
- What role does diversification play
  - Systematic risk
  - Unsystematic (Idiosyncratic) risk
- How should one measure risk
  - Efficient Frontier
  - Efficient Frontier with Risk-Free Asset
  - Tobin's Separation Theorem

Returns and risk



Source: RBC

Efficient Markets Theory vs Behavioral Finance

- Should be neither underpriced nor overpriced securities
- Security price should reflect all information available to investors
- EMT $\Rightarrow$ No free lunch
- BUT arbitrage is risky and limited

Active vs Passive Management

Active Management

- Finding undervalued securities
- Timing the market (try!!)

Passive Management

- No attempt to find undervalued securities
- No attempt to time
- Holding an efficient portfolio

Players

- Business Firms – net borrowers
- Households – net savers
- Governments – can be both borrowers and savers
- Financial Intermediaries
  - Banks
  - Investment companies
  - Insurance companies
  - Credit unions
- Investment Bankers

Key Trends: Globalization

- Managing foreign exchange
- Diversification to improve performance
- New instruments and vehicles
- Information and analysis improves

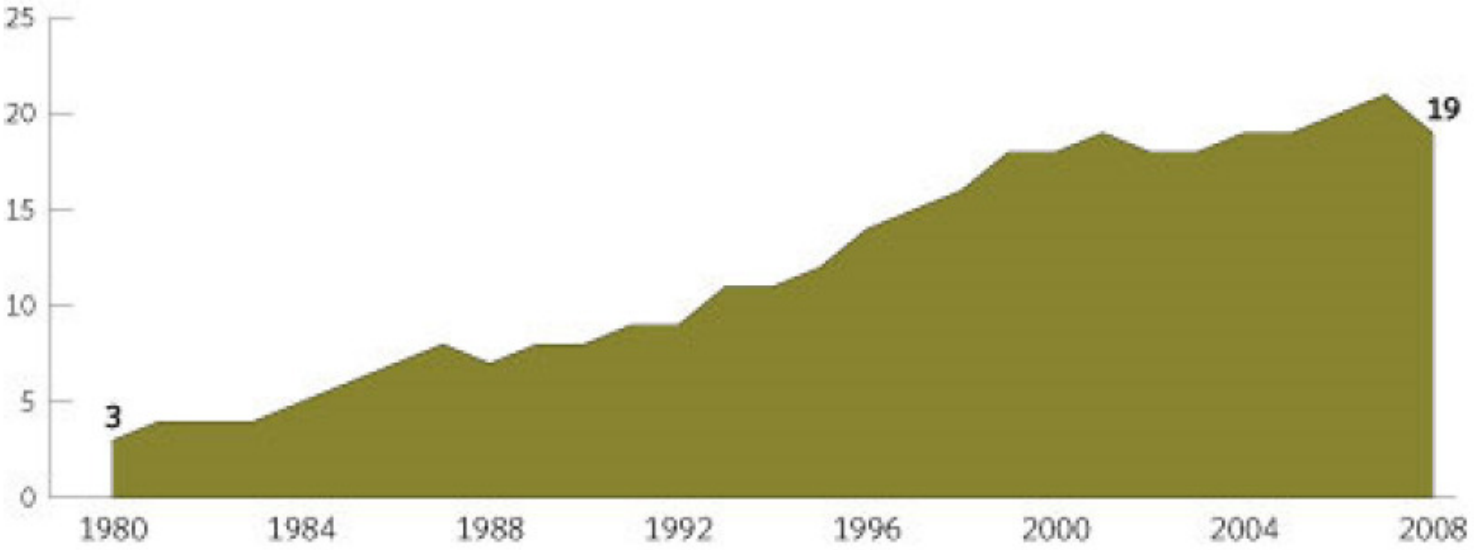
Key Trends: Fund Industry Growth

- Mutual Funds
- Exchange-traded Funds
- Closed-end Funds
- Unit Investment Trust Sponsors

Fund Industry Growth

SHARE OF HOUSEHOLD FINANCIAL ASSETS HELD IN INVESTMENT COMPANIES

Percentage, year-end, 1980–2008



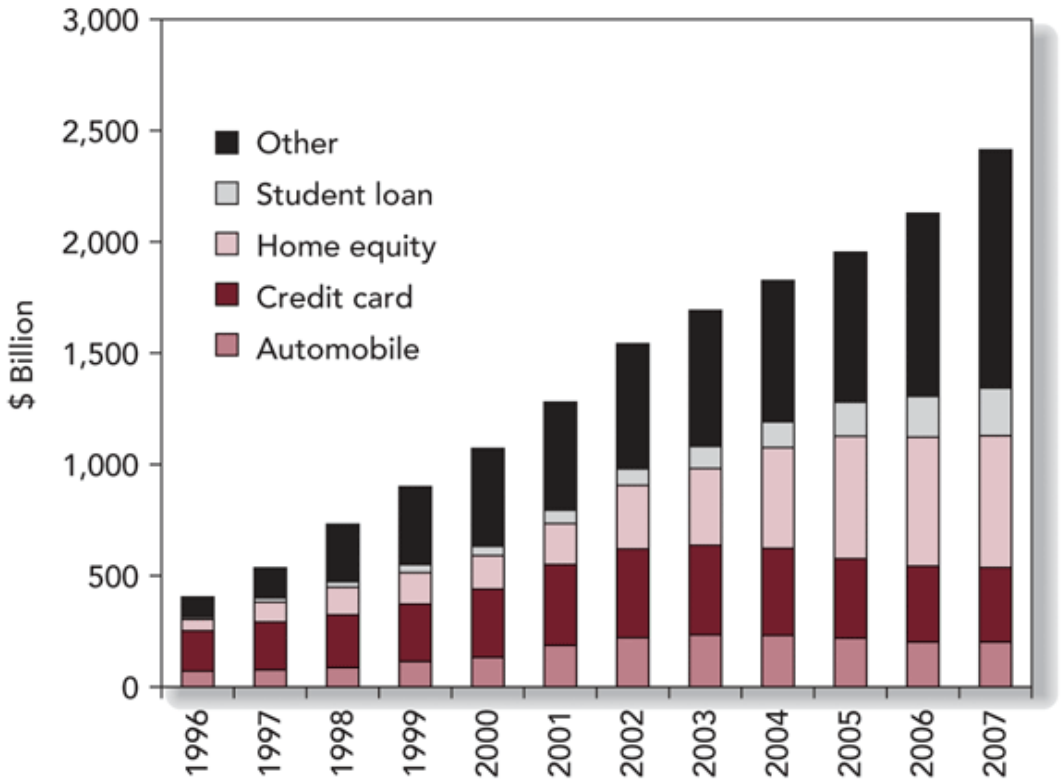
Source: Investment Company Institute (ICI).

Key Trends: Securitization

- Offers opportunities for investors and originators
- Changes in financial institutions and regulation
- Improvement in information capabilities
- Credit enhancement and its role

Securitization

Asset Backed Securities Outstanding



Source: BKM (2009)

Key Trends: Financial Engineering

- Bundling and unbundling of securities
- Design structured security to satisfy market demand
- Apply theoretical finance and computer modeling skills to make pricing, hedging, trading and portfolio management decisions.

Financial Engineering

- Examples:
  - Futures Option, Swaption, Spread Option
  - Convertible bond, Callable bond, Index bond, Floater
  - CMO, IO, PO
  - CDO, Credit swap, Credit linked bond
  - ABS, Lease, Real option

Measuring Returns

- Arithmetic rate of return

  $R_t = (P_t - P_{t-1})/P_{t-1}$ $\quad\quad$ $R_t = (P_t - P_{t-1} + D_t)/P_{t-1}$

- Continuous compounded rate of return

  $R_t = \ln(P_t/P_{t-1})$

  – Get similar results, especially for small price changes

  – However, log price relative

    - Can add them up,
    - Symmetric (important for FX)

An example:

- Assume 3 period horizon. Let
  - $P_0 = 100$
  - $P_1 = 110$
  - $P_2 = 100$
- Then :
  - Logarithmic:

    $R_1 = \ln(110/100) = 0.095$ and $R_2 = \ln(100/110) = -0.095$
  - Arithmetic :

    $R_1 = (110-100)/100 = 0.1$ and $R_2 = (100-110)/110 = -0.091$

Holding Period Returns

$$H_{t+1} = (P_{t+1} - P_t)/P_t + D_{t+1}/P_t$$

$$1+H_{t+1} = (P_{t+1} + D_{t+1})/P_t$$

$$Y = A(1+H_{t+1}^{(1)})(1+H_{t+2}^{(1)}) \ldots (1+H_{t+n}^{(1)})$$

Continuously compounded returns

One period $h_{t+1} = \ln(P_{t+1}/P_t) = p_{t+1} - p_t$

N periods $h_{t+n} = p_{t+n} - p_t = h_t + h_{t+1} + \ldots + h_{t+n}$

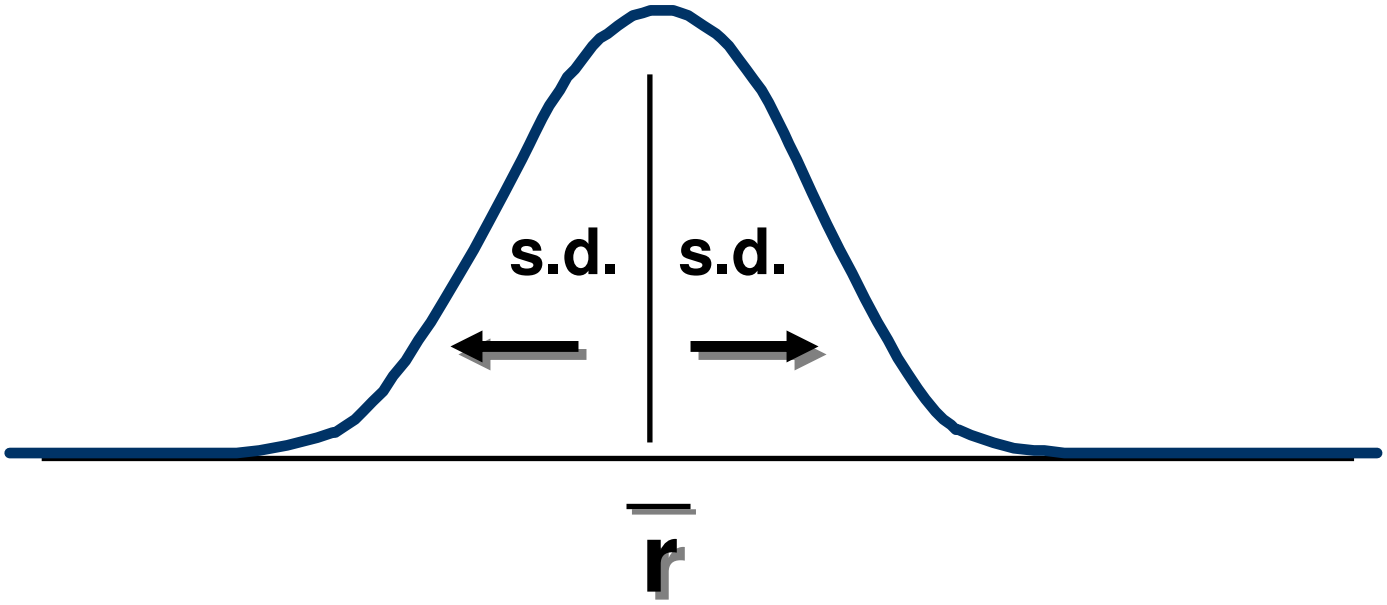
where $p_t = \ln(P_t)$

Scenario Analysis and Probability Distributions

1) Mean: most likely value
2) Variance or standard deviation : dispersion
3) Skewness : asymmetry
4) Kurtosis : extreme observations

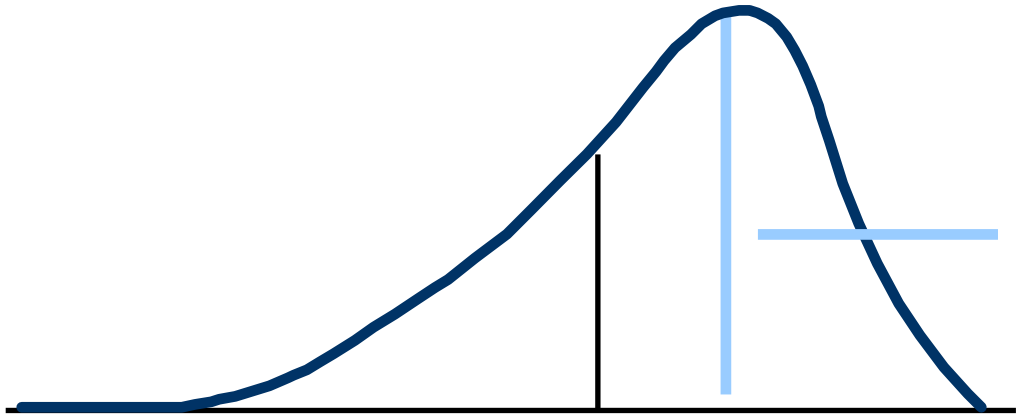
A normal distribution is only described by characteristics 1 and 2

Normal Distribution



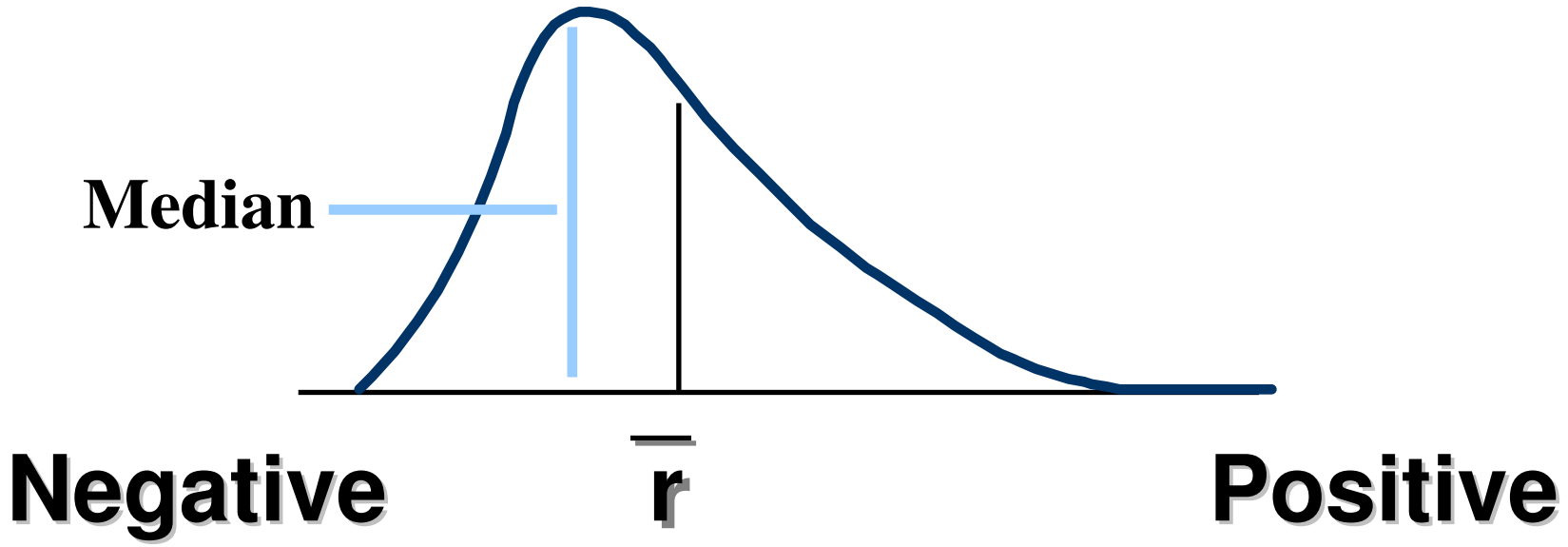
Symmetric distribution

Skewed Distribution: Large Negative Returns Possible

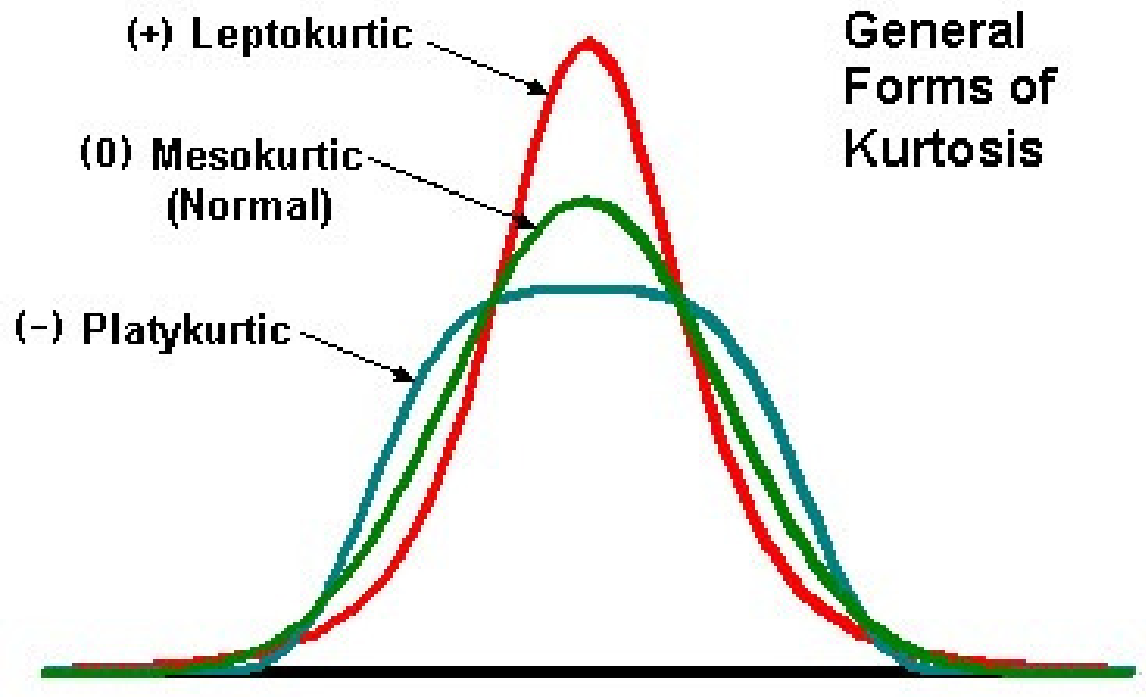


Negative $\bar{r}$ **Positive**

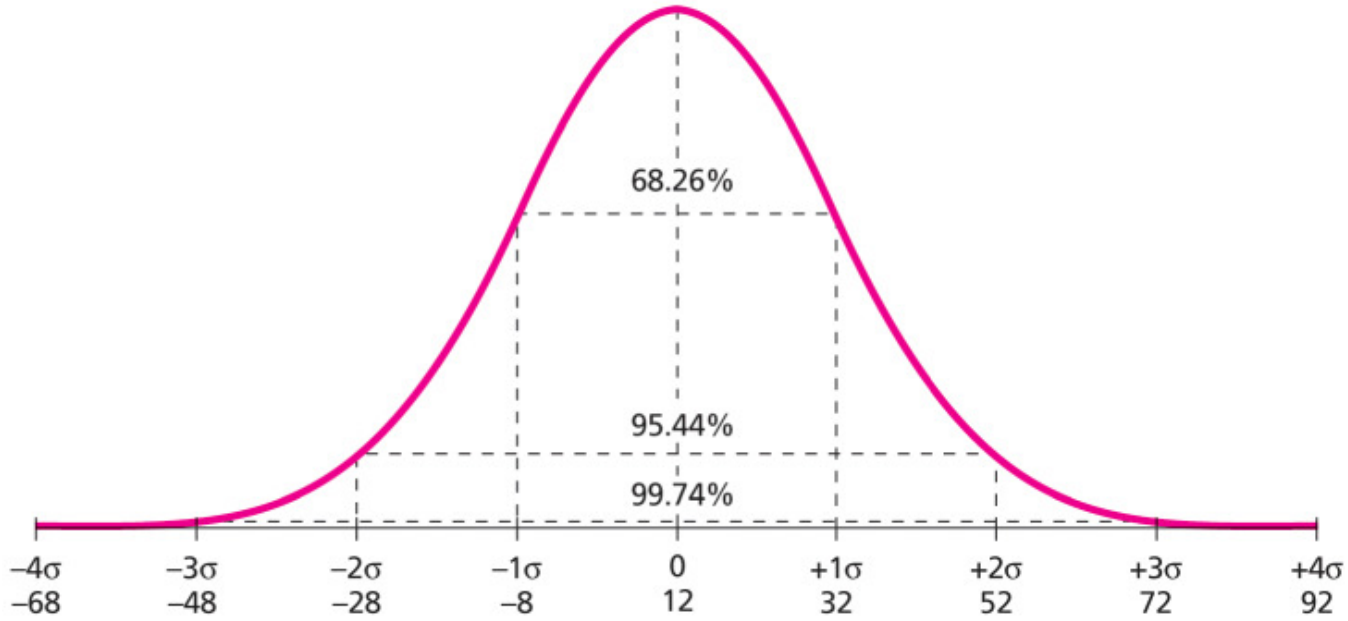
Skewed Distribution: Large Positive Returns Possible



Kurtosis: Positive and Negative Extreme Returns



Normal Distribution with Mean of 12% and St Dev of 20%



Source: BKM(2007)

Measuring Mean: Scenario or Subjective Returns

$$E(r) = \sum_{t=1}^{S} p(s)r(s)$$

$p(s)$ = probability of a state s
$r(s)$ = return if a state s occurs
1 to S states

Numerical Example: Subjective or Scenario Distributions

State	Prob. of State	r_{in} State
1	.1	-.05
2	.2	.05
3	.4	.15
4	.2	.25
5	.1	.35

E(r) = (.1)(-.05) + (.2)(.05)...+ (.1)(.35)

E(r) = .15 or 15%

Measuring Variance or Dispersion of Returns

$$\mathrm{Var}(r) = \sum_{t=1}^{s} p(s)\left[r(s) - E(r)\right]^2$$

$$\mathrm{SD}(r) \equiv \sigma = \sqrt{\mathrm{Var}(r)}$$

Var =[(.1)(-.05-.15)^2+(.2)(.05- .15)^2...+ .1(.35-.15)^2]

Var= .01199

S.D.= [.01199] $^{1/2}$ = .1095 or 10.95%

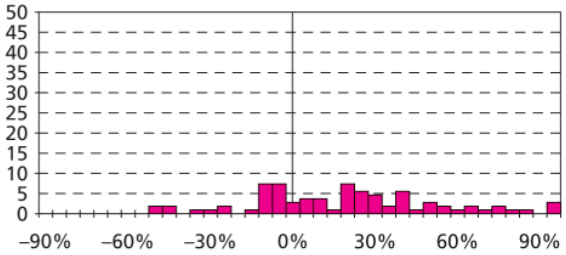
Annual Holding Period Returns

Series	Geom. Mean%	Arith. Mean%	Stan. Dev.%
World Stk	9.80	11.32	18.05
US Lg Stk	10.23	12.19	20.14
US Sm Stk	12.43	18.14	36.93
Wor Bonds	5.80	6.17	9.05
LT Treas.	5.35	5.64	8.06
T-Bills	3.72	3.77	3.11
Inflation	3.04	3.13	4.27

Distributions of Holding Period Returns (1926-2006)

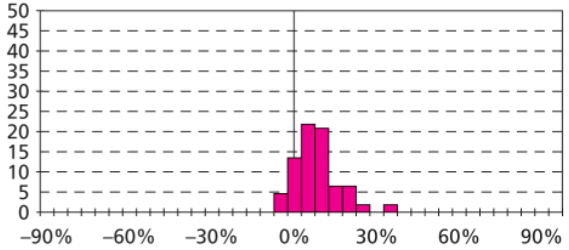
Small stocks

Geometric Mean = 12.43%
Arithmetic Mean = 18.14
Standard Deviation = 36.94



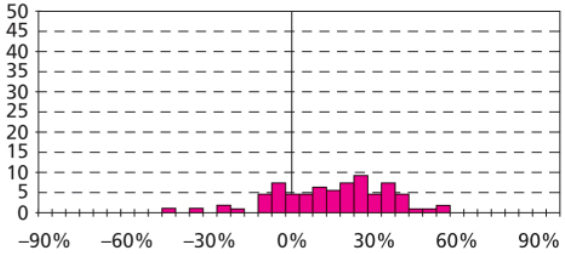
Long-term T-bonds

Geometric Mean = 5.35%
Arithmetic Mean = 5.64
Standard Deviation = 8.06



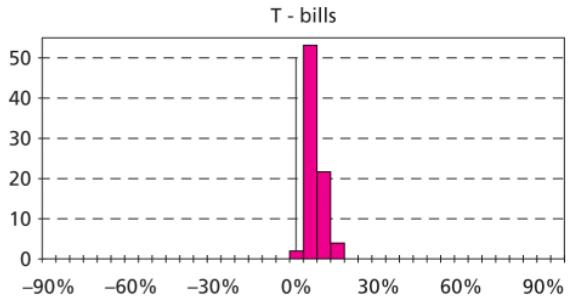
Large stocks

Geometric Mean = 10.23%
Arithmetic Mean = 12.19
Standard Deviation = 20.14



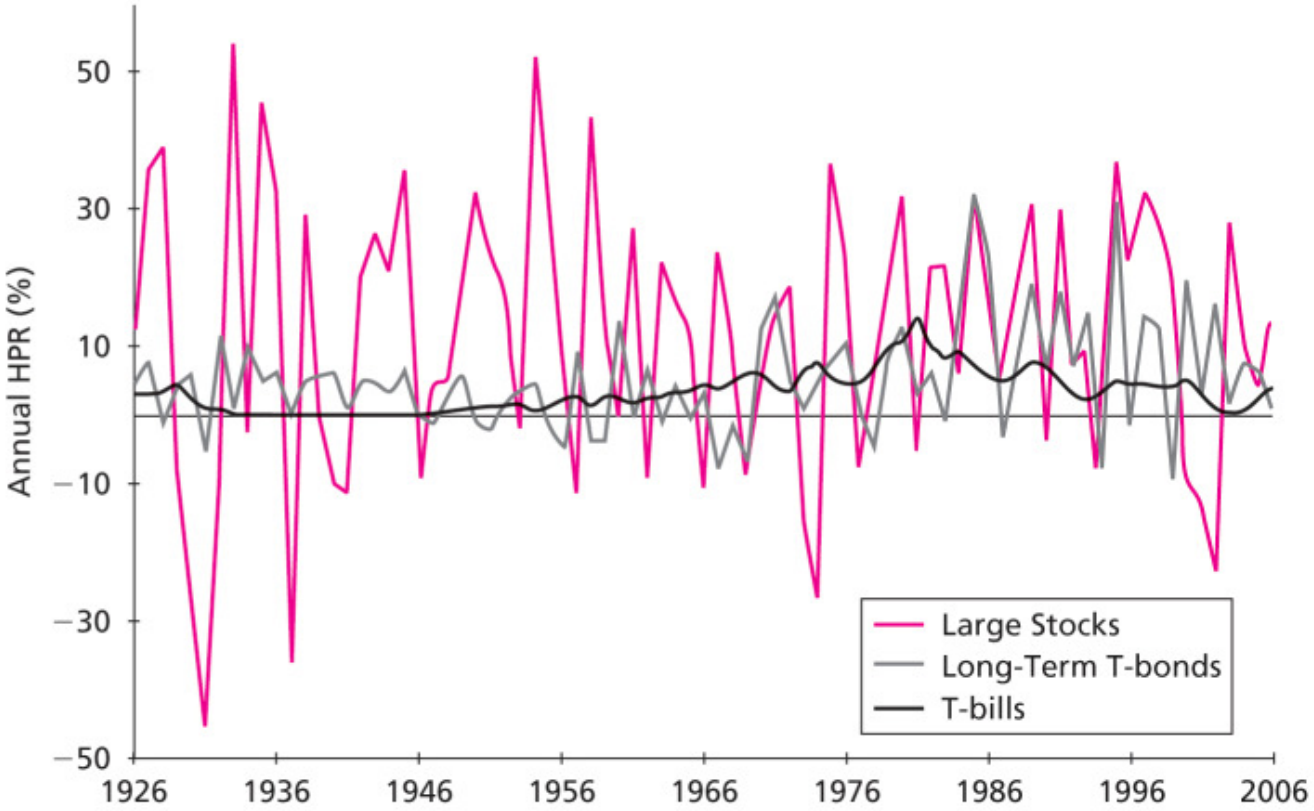
T - bills

Geometric Mean = 3.72%
Arithmetic Mean = 3.77
Standard Deviation = 3.11



Source: BKM

Rates of Return on Stocks, Bonds and T-Bills (1926-2006)



Source: BKM

Size-Decile Portfolios

Decile	Geometric Average	Arithmetic Average	Standard Deviation
1 Largest	9.6%	11.4%	19.1%
2	10.9	13.2	21.6
3	11.4	13.8	22.9
4	11.9	14.8	25.2
5	12.0	15.2	26.6
6	12.1	15.6	27.6
7	12.4	16.3	30.0
8	12.5	17.0	32.5
9	12.2	17.5	35.3
10 Smallest	13.8	20.4	40.9
Total Value Weighted Index	10.1%	12.1%	20.2%

Source: BKM(2007)

Real vs. Nominal Rates

Fisher effect: Approximation

nominal rate = real rate + inflation premium

$R = r + i$ or $r = R - i$

Example $r = 3\%$, $i = 6\%$

$R = 9\% = 3\% + 6\%$ or $3\% = 9\% - 6\%$

Real vs. Nominal Rates

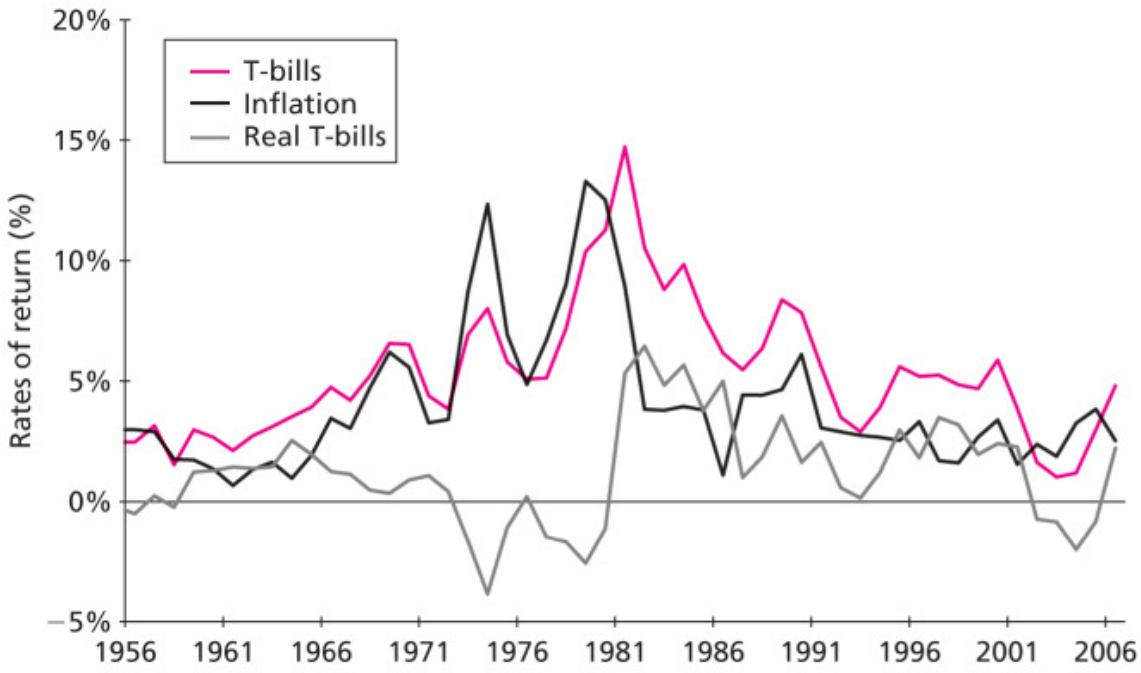
Fisher effect:

$$1+r=\frac{1+R}{1+i} \text{ or:}$$

$$r=\frac{R-i}{1+i}$$

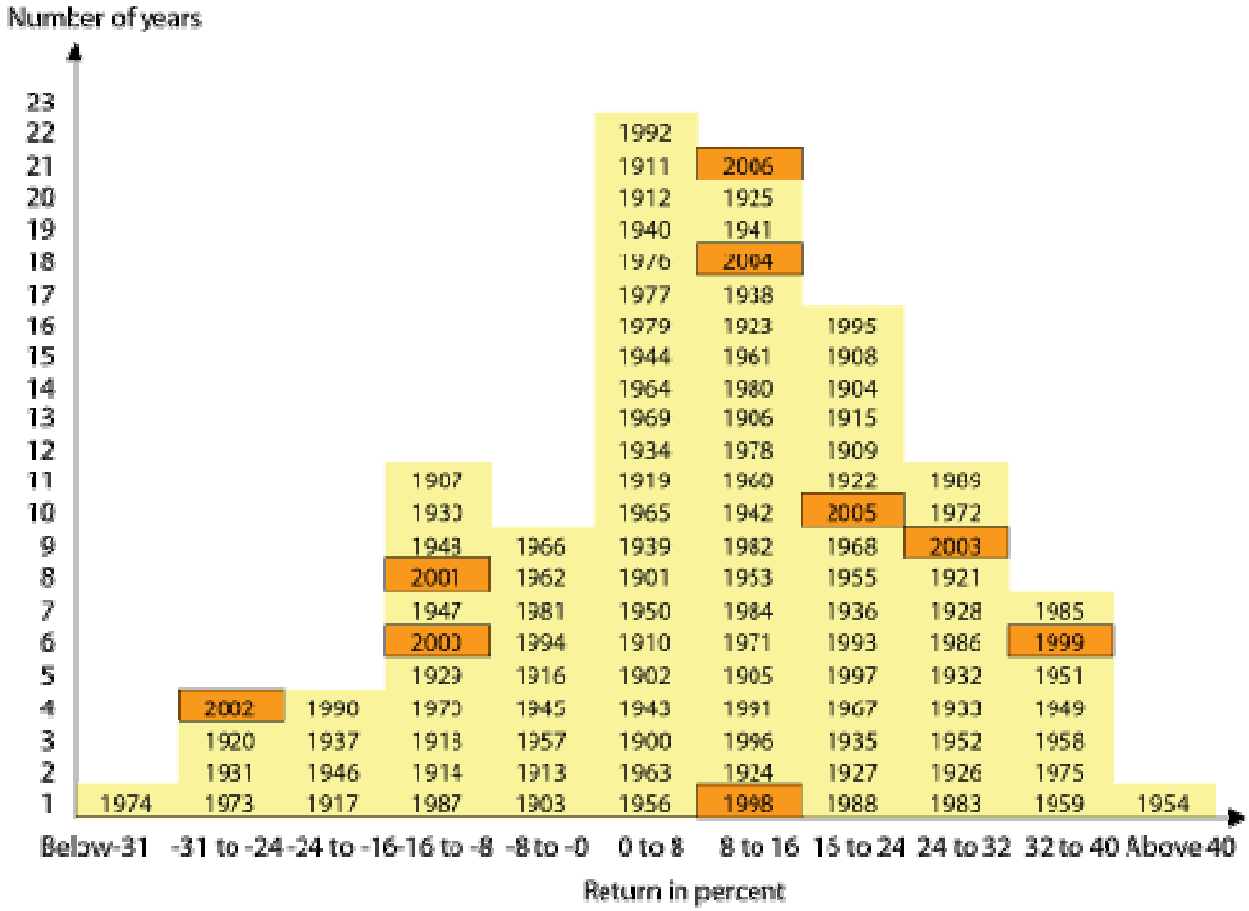
2.83% = (9%-6%) / (1.06)

Interest, Inflation and Real Rates of Return (1926-2006)



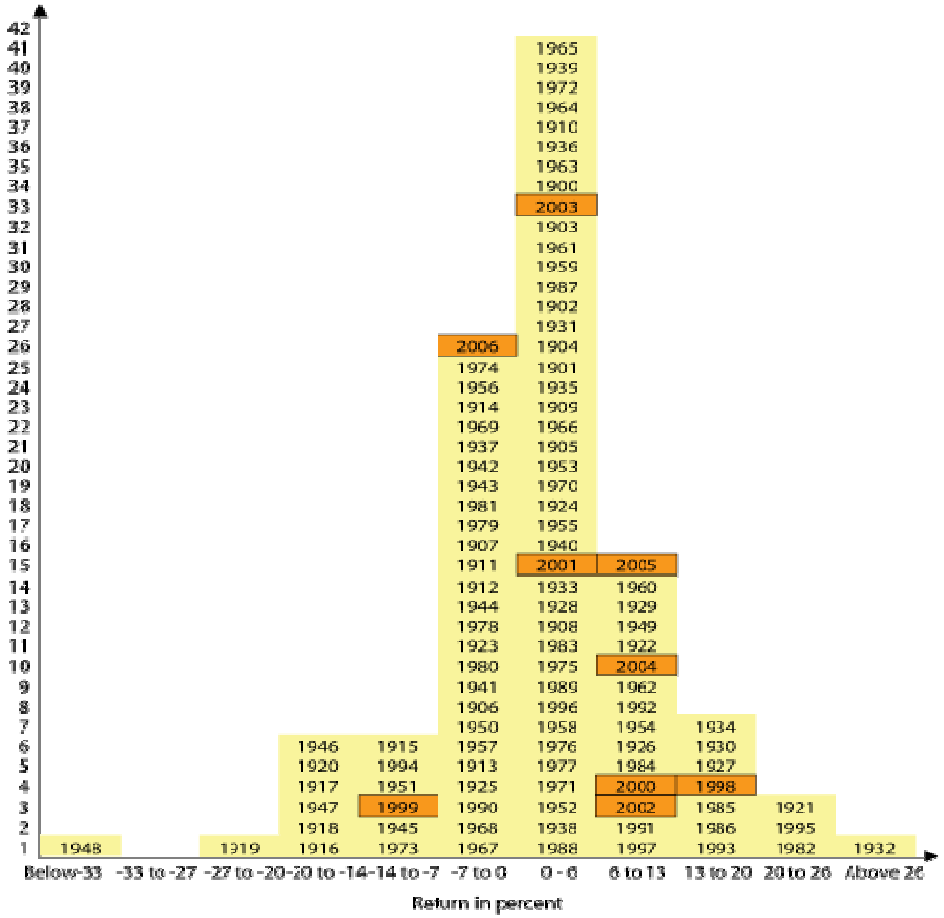
Source: BKM(2007)

Real Returns on an Equity Portfolio



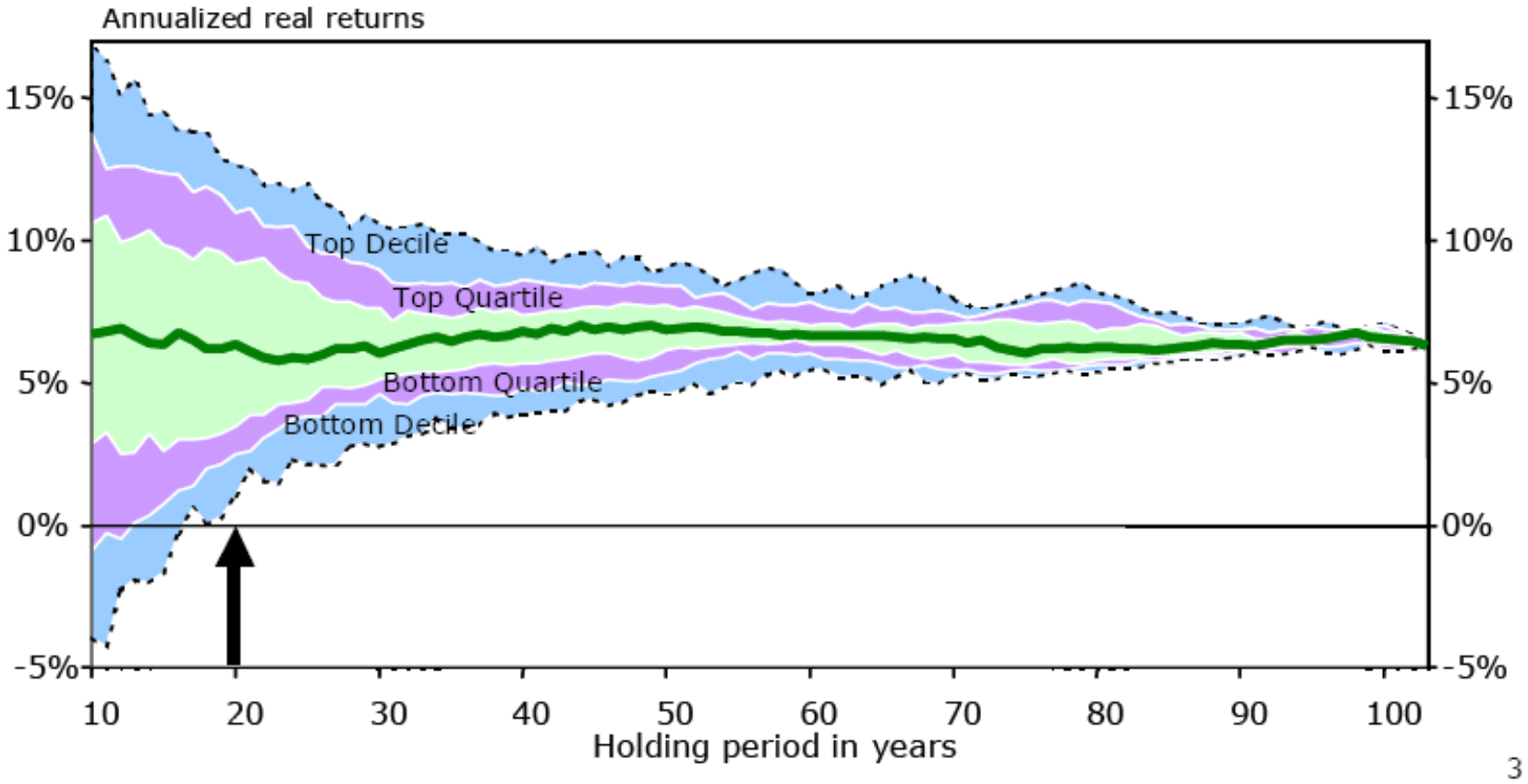
Source: Dimson, Marsh and Staunton (2003), *Triumph of the Optimists*

Real Returns on an Bond Portfolio



Source: Dimson, Marsh and Staunton (2003), *Triumph of the Optimists.*

Annualized Real Returns on US Equities over periods of 10-103 years



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Source: Dimson, Marsh and Staunton(2003), *Triumph of the Optimists.*

1.2 Financial Securities

Road Map

- Money market
- Bond market
- Equity markets
- Indexes
- Derivative markets

1.2.1 The Money Market

Money Market Instruments

- Treasury bills
- Certificates of deposits
- Commercial Paper
- Bankers Acceptances

Money Market Instruments

- Eurodollars
- Repurchase Agreements (RPs) and Reverse RPs
- Brokers' Calls
- Federal Funds
- LIBOR Market

Money Rates (WSJ)

Money Rates

January 4, 2007

International rates

	Latest	Week ago	52-WEEK High	52-WEEK Low
Prime rates				
U.S.	**8.25**	8.25	8.25	7.25
Canada	**6.00**	6.00	6.00	5.00
Euro zone	**3.50**	3.50	3.50	2.25
Japan	**1.625**	1.625	1.625	1.375
Britain	**5.00**	5.00	5.00	4.50
Overnight repurchase				
U.S.	**5.22**	5.19	5.28	4.13
U.K. (BBA)	**5.080**	5.047	5.150	4.100
Euro zone	**3.60**	3.77	3.77	2.26

U.S. government rates

Federal funds				
Effective rate	**5.24**	5.25	5.37	4.21
Treasury bill auction				
4 weeks	**4.760**	4.660	5.170	3.950
13 weeks	**4.930**	4.875	4.990	4.070
26 weeks	**4.900**	4.900	5.110	4.250

Secondary market

Freddie Mac				
30-year mortgage yields				
30 days	**5.92**	6.06	6.71	5.81
60 days	**5.93**	6.07	6.75	5.82
One-year ARM	**3.375**	3.375	3.375	3.375
Fannie Mae				
30-year mortgage yields				
30 days	**6.066**	6.107	6.792	5.913
60 days	**6.089**	6.125	6.821	5.924
Bankers acceptances				
30 days	**5.29**	5.31	5.38	4.35
60 days	**5.30**	5.31	5.43	4.44
90 days	**5.31**	5.31	5.49	4.49

Other short-term rates

	Latest	Week ago	52-WEEK High	52-WEEK Low
Commercial paper				
30 to 60 days	**5.23**	...	...	...
61 to 90 days	**5.22**	...	...	...
91 to 120 days	**5.20**	...	...	...
Dealer commercial paper				
30 days	**5.26**	5.27	5.36	4.32
60 days	**5.26**	5.28	5.41	4.42
90 days	**5.25**	5.30	5.46	4.46
Euro commercial paper				
30 day	**3.58**	3.58	3.62	2.00
Two month	**3.62**	3.62	3.63	2.39
Three month	**3.69**	3.68	3.69	2.45
London interbank offered rate, or Libor				
One month	**5.32000**	5.3256	5.4200	4.4188
Three month	**5.36000**	5.3600	5.5200	4.5500
Euro Libor				
One month	**3.628**	3.634	3.713	2.386
Three month	**3.733**	3.724	3.733	2.488
Euro interbank offered rate (Euribor)				
One month	**3.625**	3.634	3.672	2.384
Three month	**3.734**	3.723	3.734	2.490
Asian dollars				
One month	**5.335**	5.337	5.425	4.418
Three month	**5.363**	5.370	5.525	3.570

	LATEST Offer	LATEST Bid	Week ago	52-WEEK High	52-WEEK Low
Eurodollars (mid rates)					
One month	**5.28**	5.30	5.32	5.39	4.36
Two month	**5.29**	5.31	5.32	5.44	4.45
Three month	**5.30**	5.32	5.34	5.51	4.51

US Components of the Money Market (2006)

	$ Billion
Repurchase agreements	$ 563.0
Small-denomination time deposits*	973.7
Large-denomination time deposits	1,359.4
Eurodollars	430.2
Treasury bills	963.9
Commercial paper	1,829.8
Savings deposits	3,620.5
Money market mutual funds	1,853.6

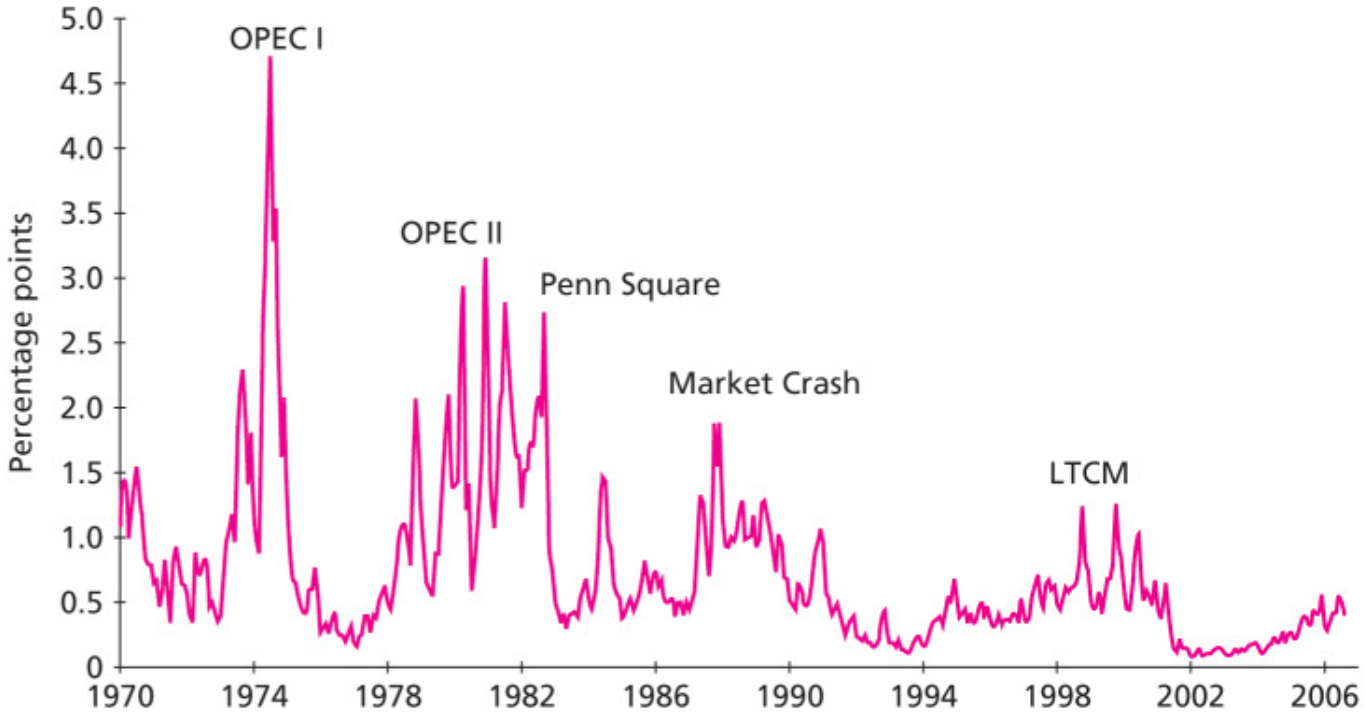
Source: BKM(2007)

Treasury Bills (WSJ)

Treasury Bills

MATURITY	DAYS TO MAT	BID	ASKED	CHG	ASK YLD
Jan 11 07	6	4.50	4.49	–0.11	4.56
Jan 18 07	13	4.57	4.56	–0.09	4.63
Jan 25 07	20	4.61	4.60	–0.01	4.68
Feb 01 07	27	4.70	4.69	–0.06	4.77
Feb 08 07	34	4.70	4.69	+0.01	4.78
Feb 15 07	41	4.73	4.72	–0.08	4.81
Feb 22 07	48	4.79	4.78	–0.04	4.88
Mar 01 07	55	4.83	4.82	–0.02	4.92
Mar 08 07	62	4.86	4.85	+0.01	4.96
Mar 15 07	69	4.85	4.84	–0.01	4.95
Mar 22 07	76	4.88	4.87	–0.02	4.99
Mar 29 07	83	4.88	4.87	–0.02	4.99
Apr 05 07	90	4.91	4.90	–0.01	5.03
Apr 12 07	97	4.90	4.89	–0.01	5.02
Apr 19 07	104	4.90	4.89	–0.01	5.03
Apr 26 07	111	4.90	4.89	–0.01	5.03

Spreads on CDs and Treasury Bills



Source: BKM(2007)

1.2.2 The Bond Market

Bond Market

- Treasury Notes and Bonds
- Federal Agency Debt
- International Bonds
- Inflation-Protected Bonds
- Municipal Bonds
- Corporate Bonds
- Mortgages and Mortgage-Backed Securities

Treasury Notes and Bonds

- Maturities
  - Notes – maturities up to 10 years
  - Bonds – maturities in excess of 10 years
- Par Value - $1,000
- Quotes – percentage of par

Treasury Notes and Bonds (WSJ)

U.S. Government Bonds and Notes

Representative Over-the-Counter quotation based on transactions of $1 million or more.
Treasury bond, note and bill quotes are from midafternoon. Colons in bond and note bid-and-asked quotes represent 32nds; 101:01 means 101 1/32. Net change in 32nds. n-Treasury Note. i-inflation-indexed issue. Treasury bill quotes in hundredths, quoted in terms of a rate of discount. Days to maturity calculated from settlement date. All yields are to maturity and based on the asked quote. For bonds callable prior to maturity, yields are computed to the earliest call date for issues quoted above par and to the maturity date for issues quoted below par.
*-When issued. Daily change expressed in basis points.

RATE	MATURITY MO/YR	BID	ASKED	CHG	ASK YLD
3.375	Jan 07i	99:28	99:29	....	6.72
3.125	Jan 07n	99:27	99:28	....	4.62
2.250	Feb 07n	99:21	99:22	....	4.89
6.250	Feb 07n	100:04	100:05	....	4.73
3.375	Feb 07n	99:23	99:24	....	4.90
3.750	Mar 07n	99:21	99:22	....	4.99
3.875	Feb 13n	96:06	96:07	+8	4.59
3.625	May 13n	94:23	94:24	+8	4.58
1.875	Jul 13i	97:00	97:01	+1	2.37
4.250	Aug 13n	98:00	98:01	+9	4.60
12.000	Aug 13	111:04	111:05	+2	4.71
4.250	Nov 13n	97:29	97:30	+10	4.60
2.000	Jan 14i	97:16	97:17	+1	2.38
4.000	Feb 14n	96:09	96:10	+10	4.61
4.750	May 14n	100:26	100:27	+9	4.61
13.250	May 14	119:02	119:03	+4	4.61
2.000	Jul 14i	97:14	97:15	....	2.37
4.250	Aug 14n	97:21	97:22	+10	4.61
12.500	Aug 14	119:04	119:05	+4	4.62
11.750	Nov 14	118:30	118:31	+6	4.59
4.250	Nov 14n	97:19	97:20	+9	4.61
1.625	Jan 15i	94:18	94:19	+1	2.37

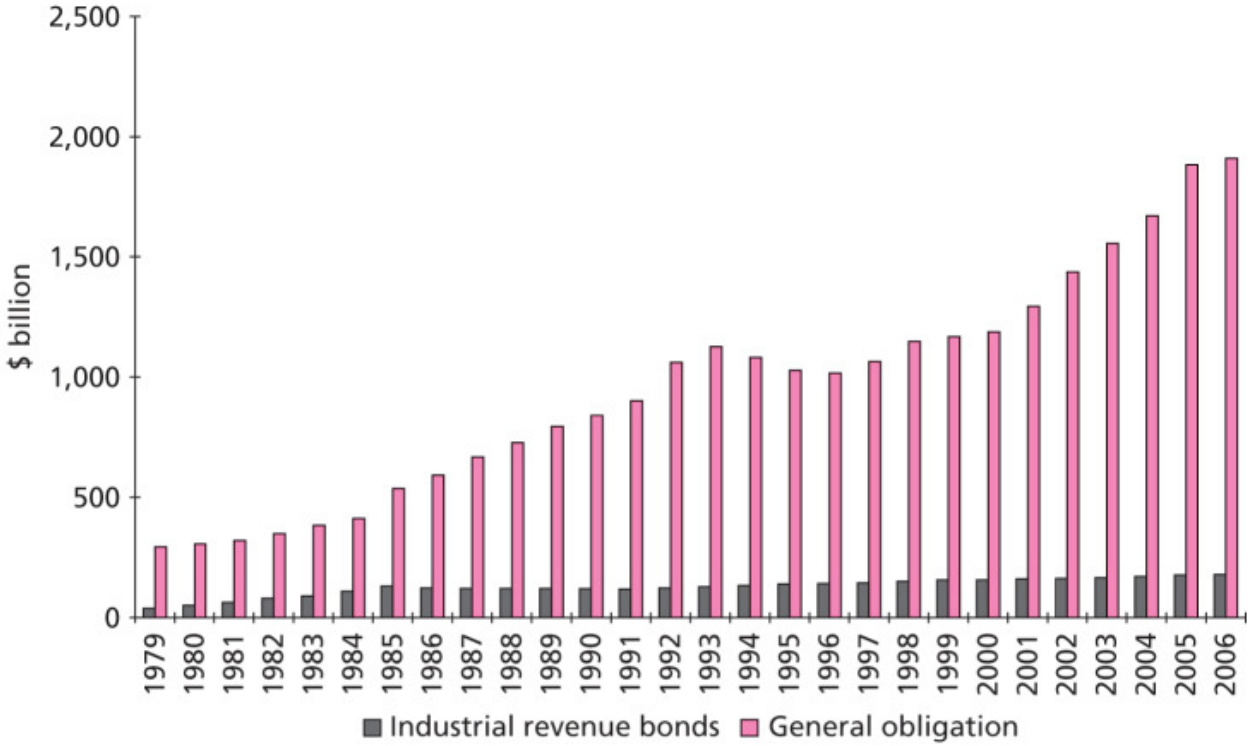
Federal Agency Debt

- Major issuers
  - Federal Home Loan Bank
  - Federal National Mortgage Association
  - Government National Mortgage Association
  - Federal Home Loan Mortgage Corporation

Municipal Bonds

- Issued by state and local governments
- Types
  - General obligation bonds
  - Revenue bonds
    - Industrial revenue bonds
- Maturities – range up to 30 years

Outstanding Tax-exempt Debt



Source: BKM (2007)

Municipal Bond Yields

- Interest income on municipal bonds is not subject to federal and sometimes state and local tax

- To compare yields on taxable securities a Taxable Equivalent Yield is constructed

Corporate Bonds

- Issued by private firms
- Semi-annual interest payments
- Subject to larger default risk than government securities
- Options in corporate bonds
  - Callable
  - Convertible

Investment Grade Bond Listings

ISSUER NAME	SYMBOL	COUPON	MATURITY	RATING MOODY'S/S&P/ FITCH	HIGH	LOW	LAST	CHANGE	YIELD %
Alltel	AT.GO	7.875%	Jul 2032	A2/A–/A	109.079	100.744	103.523	–5.617	7.561
Home Depot	HD.GH	5.400%	Mar 2016	Aa3/A+/A+	100.188	97.375	97.598	–0.232	5.740
Home Depot	HD.GK	5.875%	Dec 2036	Aa3/A+/A+	99.522	98.720	99.355	0.387	5.921
Goldman Sachs GP	GS.WB	5.750%	Oct 2016	Aa3/AA–/AA–	103.184	101.671	101.989	0.166	5.482
Walt Disney	DIS.HX	5.700%	Jul 2011	A3/A–/BBB+	102.131	101.865	102.058	0.158	5.183
R.R.Donnelley & Sons	DNY.GU	4.950%	Apr 2014	Baa2/BBB+/—	92.916	92.196	92.235	–1.115	6.302

Source: BKM(2007)

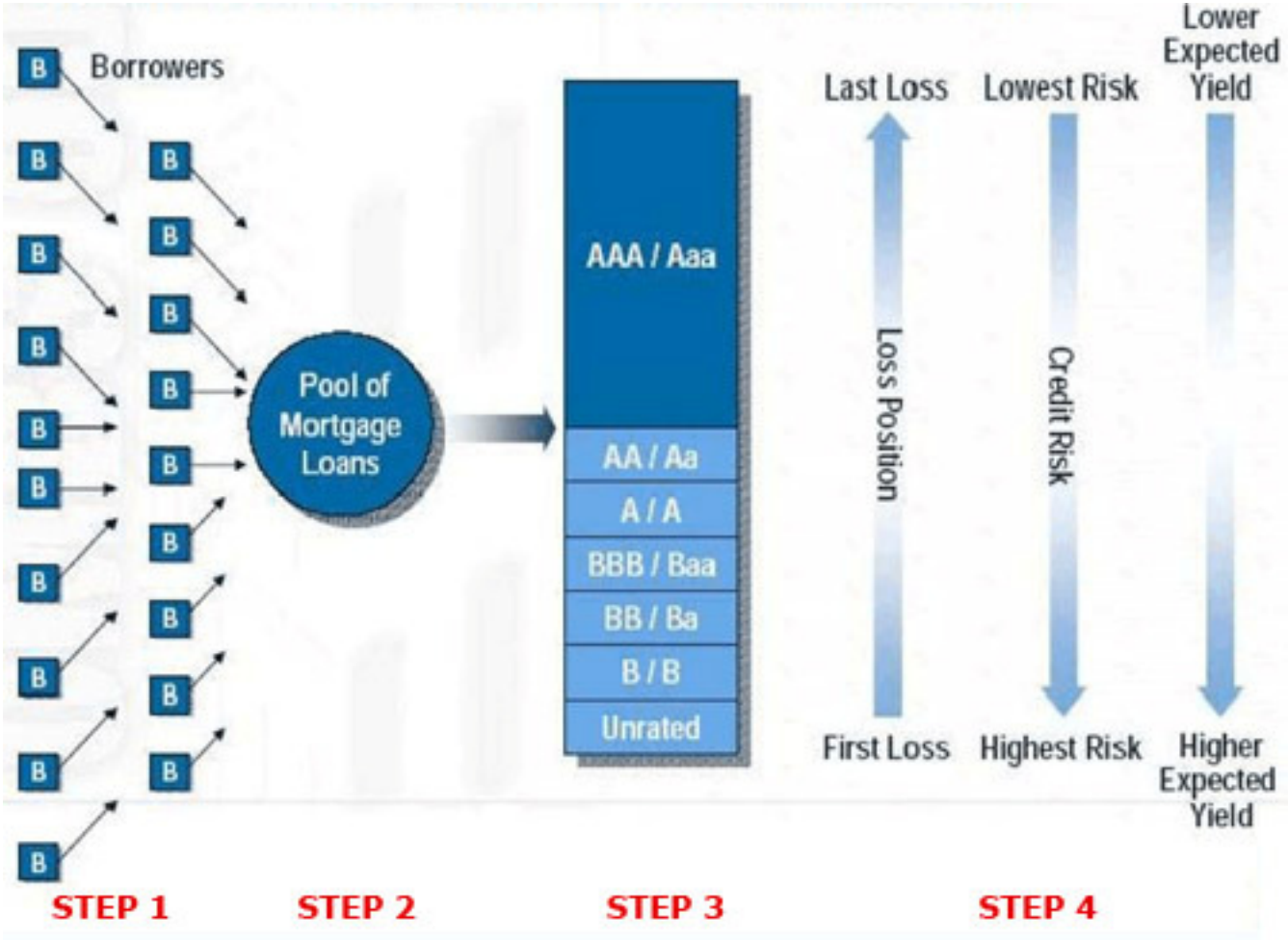
Ratings by agencies

LEADING BOND RATING SERVICES Explanation of corporate/ municipal bond ratings	RATING SERVICE		
	Fitch	*Moody's*	*Standard & Poor's*
Highest quality, "gilt edged" High quality Upper medium grade	AAA AA A	Aaa Aa A	AAA AA A
Medium grade Predominantly speculative Speculative, low grade	BBB BB B	Baa Ba B	BBB BB B
Poor to default Highest speculation Lowest quality, no interest	CCC CC C	Caa Ca C	CCC CC C
In default, in arrears, questionable value	DDD DD D		DDD DD D

Mortgages and Mortgage-backed Securities

- Developed in the 1970s to help liquidity of financial institutions
- Proportional ownership of a pool or a specified obligation secured by a pool
- Market has experienced very high rates of growth

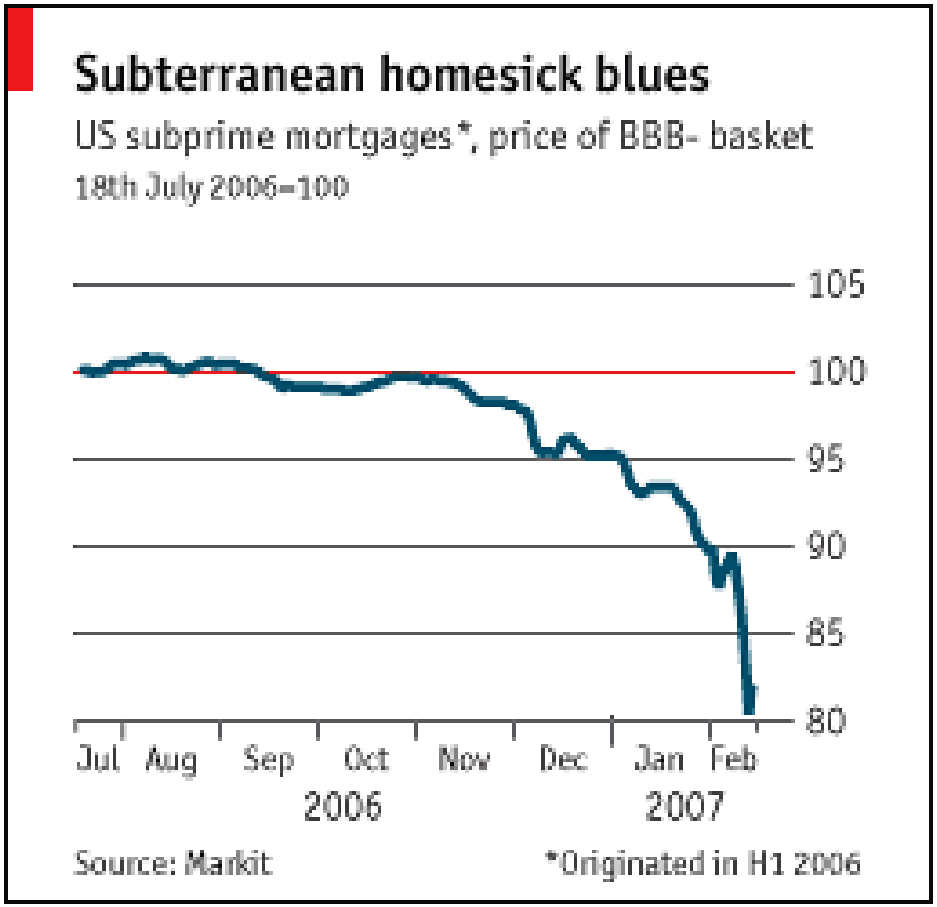
Secondary Mortgage Markets



(2006-2009)


smart
propertysolutions
SOLD
SIMILAR REQUIRE
01424 712555
smartpropertyonline.co.uk
fox &
for sale
Hastings
01424 722177
Just
Prop
FOR S
SOLD
TO LET
Kinzett & Bowler
01424 440700
ashton
TO
Hastings

(…



Source: The Economist

Bond Market: other

- Federal agency debt
  - Government agencies that issue their own securities
- Int'l bonds
  - Eurobond: bond denominated in a currency other than that of the country in which it is issued

Sovereign Debts Ratings

Germany
AAA/Aaa/AAA

France
AAA/Aaa/AAA

Italy
AA-/Aa2/AA

United Kingdom
AAA/Aaa/AAA

Spain
AAA/Aaa/AAA

Belgium
AA+/Aa1/AA

Netherlands
AAA/Aaa/AAA

Sweden
AAA/Aaa/AAA

Denmark
AAA/Aaa/AAA

Austria
AAA/Aaa/AAA

Poland
BBB+/A2/BBB+

Finland
AAA/Aaa/AAA

Greece
A/A1/A

Portugal
AA/Aa2/AA

Czech Republic
A-/A1/A-

Hungary
A-/A1/A-

Ireland
AAA/Aaa/AAA

Slovakia
A-/A2/A-

Slovenia
AA-/Aa3/AA-

Lithuania
A-/A3/A-

Cyprus
A/A2/A+

Luxembourg
AAA/Aaa/AAA

Latvia
A-/A2/A-

Estonia
A/A1/A

Malta
A/A3/A

1.2.3 Equity Securities

Equity Markets

- Common stock
  - Residual claim
  - Limited liability
- Preferred stock
  - Fixed dividends – limited
  - No voting power
  - Priority over common
  - Tax treatment

Stock Market Listings (WSJ)

NAME	SYMBOL	CLOSE	NET CHG	VOLUME	52 WK HIGH	52 WK LOW	DIV	YIELD	P/E	YTD% CHG
Gencorp	GY	13.59	–0.29	491,300	20.75	12.02	....	....	dd	–3.1
Genentech	DNA	83.68	–0.35	3,986,300	94.46	75.58	....	....	49	3.1
General Cable	BGC	42.67	–1.11	679,700	45.41	20.3	....	....	23	–2.4
General Dynamics	GD	74.59	0.17	1,497,300	77.98	56.68	0.92	1.2	16	0.3
General Electric	GE	37.56	–0.19	26,907,700	38.49	32.06	1.12	3	23	0.9
General Gwth Prop	GGP	51.51	–0.8	1,308,200	56.14	41.92	1.8	3.5	215	–1.4
General Maritime	GMR	34.56	–0.83	597,400	40.64	30.34	4.8	13.9	5	–1.8
General Mills	GIS	56.97	–0.42	1,355,600	59.23	47.05	1.48	2.6	18	–1.1
General Motors	GM	30.24	0.6	10,477,600	36.56	19	1	3.3	dd	–1.6
Genesco Inc	GCO	36.75	–0.9	127,900	43.72	25.5	....	....	15	–1.5
Genesee & Wyoming	GWR	25.86	–0.5	364,500	36.75	21	....	....	9	–1.4
Genesis Lease	GLS	23.6	0.1	298,500	24.4	23	....	....	....	0.4
Genuine Parts co.	GPC	46.86	–0.51	384,400	48.34	40	1.35	2.9	17	–1.2
Genworth Financial	GNW	33.79	–0.32	1,414,900	36.47	31	0.36	1.1	13	–1.2
Geo Group Inc	GEO	37.57	–1.53	157,500	40.3	14.69	....	....	35	0.1
Georgia Gulf	GGC	18.69	–0.38	479,000	34.65	18.36	0.32	1.7	6	–3.2
Gerber Scientific	GRB	12.32	–0.07	243,200	16.8	9	....	....	27	–1.9
Gerdau Ameristeel	GNA	8.59	–0.04	446,200	11.02	5.85	0.08	0.9	7	–3.7
Gerdau S.A. Ads	GGB	15.57	–0.56	1,729,100	18.16	11.27	0.58	3.7	....	–2.7

1.2.4 Stock and Bond Market Indexes

Stock Market Indexes

- There are several indexes worldwide such as:
  - Dow Jones Industrial Average (DJIA)
  - Nikkei Average
- Offer ways of comparing performance of managers
- Base of derivatives

Factors for Construction of Stock Indexes

- Representative?
- Broad or narrow?
- How is it weighted?
  - Price weighted (DJIA)
  - Market weighted (S&P 500, NASDAQ)
  - Equal (Value Line Index)

Data to Construct Stock Price Indexes

Stock	Initial Price	Final Price	Shares (millions)	Initial Value of Outstanding Stock ($ million)	Final Value of Outstanding Stock ($ million)
ABC	$ 25	$30	20	$500	$600
XYZ	100	90	1	100	90
Total				$600	$690

Source: BKM (2007)

DJIA
Price-Weighted Average

Initial value = $25 + $100 = $125

Final value = $30 + $ 90 = $120

Percentage change in portfolio value =

Initial index value = (25 + 100)/2 = 62.5

Final index value = (30 + 90)/2 = 60

Percentage change =

-2.5/62.5 = -.04 = -4%

DJIA
Price weighted average (cont'd)

- An average computed by adding the prices of the stocks and dividing by a "divisor".

- What happens if there is a split?
  - The averaging procedure is adjusted (i.e. the divisor changes to leave the index unaffected)

Price weighted average (splits)

Stock	Initial Price	Final Price	Shares (millions)	Initial value	Final value
ABC	$25	$30	20	$500	$600
XYZ	$100	$90	1	$100	$90
Total				$600	$690

$50 $50 $45 $45 2

- Initial Value = ($25 + $50)/d = $62.5 ⇨ **d=1.2**
- Final Value = ($30 + $45)/d = $60
- Percentage change = -2.5/62.5 = -4%

Dow Jones (example of price weighted)

DOW JONES INDUS. AVG MEMBERS

COMPANY	PRICE	CHANGE	%CHANGE	VOLUME	Time
3M CO	74.62	-0.27	-0.36	4,387,820	09/18
ALCOA INC	14.06	0.01	0.07	34,764,215	09/18
AMERICAN EXPRESS	34.77	-0.23	-0.66	17,531,052	09/18
AT&T INC	27.05	0.68	2.58	49,501,454	09/18
BANK OF AMERICA	17.63	0.02	0.11	160,550,331	09/18
BOEING CO	53.02	0.14	0.26	6,532,987	09/18
CATERPILLAR INC	53.42	-0.47	-0.87	12,398,936	09/18
CHEVRON CORP	72.64	0.67	0.93	16,090,219	09/18
CISCO SYSTEMS	23.40	0.01	0.03	53,797,478	09/18
COCA-COLA CO	53.76	0.34	0.64	62,086,901	09/18
DU PONT (EI)	33.74	0.05	0.15	7,122,667	09/18
EXXON MOBIL CORP	69.99	0.15	0.21	43,252,811	09/18
GENERAL ELECTRIC	16.50	-0.16	-0.96	123,024,011	09/18
HEWLETT-PACKARD	46.15	0.44	0.96	19,919,296	09/18
HOME DEPOT INC	28.23	0.31	1.11	15,769,271	09/18
IBM	122.11	0.23	0.19	9,936,586	09/18
INTEL CORP	19.56	0.15	0.77	53,493,793	09/18
JOHNSON&JOHNSON	60.78	0.01	0.02	14,463,515	09/18
JPMORGAN CHASE	44.95	-0.01	-0.02	39,498,505	09/18
KRAFT FOODS INC	26.73	0.21	0.79	12,899,280	09/18
MCDONALDS CORP	57.00	0.54	0.96	14,365,773	09/18
MERCK & CO	31.88	-0.13	-0.41	20,305,222	09/18
MICROSOFT CORP	25.26	-0.04	-0.16	68,016,403	09/18
PFIZER INC	16.51	0.19	1.16	67,078,819	09/18
PROCTER & GAMBLE	57.32	1.79	3.22	25,881,065	09/18
TRAVELERS COS IN	47.37	-0.33	-0.69	9,687,533	09/18
UNITED TECH CORP	62.82	0.30	0.48	6,836,979	09/18
VERIZON COMMUNIC	29.59	0.08	0.27	45,457,905	09/18
WAL-MART STORES	50.11	0.15	0.30	33,446,801	09/18
WALT DISNEY CO	28.44	-0.02	-0.07	14,104,726	09/18

DOW JONES INDUS. AVG SNAPSHOT

1 YEAR

VALUE	9,820.20
CHANGE	36.28
% CHANGE	0.37
TIME	09/18
TOTAL MEMBERS	30
UP	21
DOWN	9
UNCHANGED	0

INDEX PROFILE

The Dow Jones Industrial Average is a price-weighted average of 30 blue-chip stocks that are generally the leaders in their industry. It has been a widely followed indicator of the stock market since October 1, 1928. See DIA US Equity <GO> for the tradeable equivalent.

Source: Dow Jones, Bloomberg.

S&P's Composite 500 Market Value-Weighted Index

- ABC would have five times the weight given to XYZ (500/100)

S&P's Composite 500 Market Value-Weighted Index (cnt'd)

Stock	Initial Price	Final Price	Shares	Initial value	Final value
ABC	$25	$30	20	$500	$600
XYZ	$100	$90	1	$100	$90
Total				$600	$690

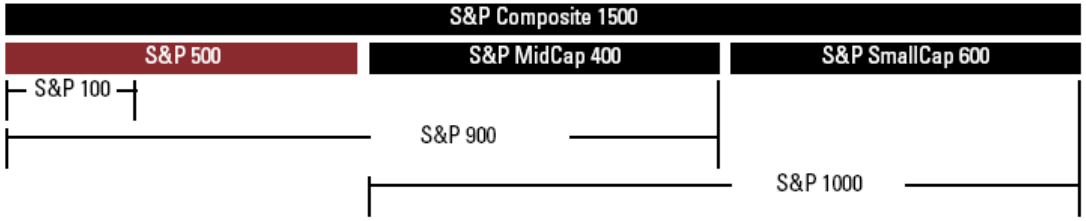
- Initial Value = $500 + $100 = $600
- Final Value = $600 + $90 = $690
- Percentage change = 90/600 = 15%

S&P 500

S&P U.S. Indices

June 30, 2009

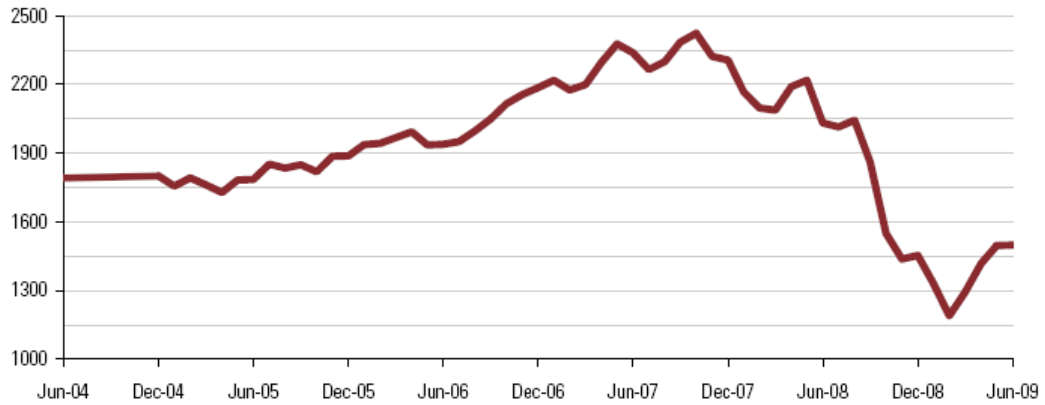
The large cap segment of the U.S. equities market, covering approximately 75% of the U.S. equities market.



Index Performance

Returns	1 Month	0.20%
	3 Month	15.93%
	YTD	3.16%
Annualized	1 Year	-26.21%
Returns	3 Years	-8.22%
	5 Years	-2.24%
	7 Years	0.92%
Annualized	3 Years Std Dev	18.97%
Risk	5 Years Std Dev	15.50%
Sharpe Ratio	3 Years	-0.5098
	5 Years	-0.2604

5 Year Historical Performance



Source: Standard & Poor's

S&P 500 (cnt'd)

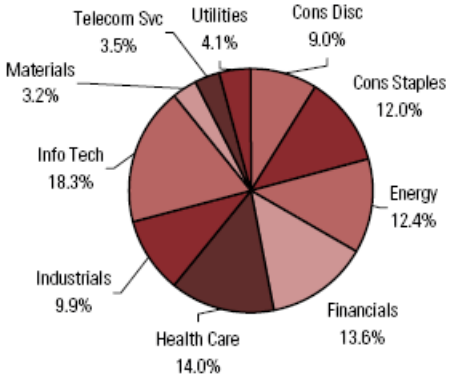
Top 10 Companies By Weight

Country	Company	Float Adjusted Market Cap ($ Million)	Index Weight	Sector Weight	Investable Weight Factor	GICS® Sector
United States	Exxon Mobil Corp	341,140.5	4.24%	34.12%	1.00	Energy
United States	Microsoft Corp	181,929.9	2.26%	12.33%	0.86	Information Technology
United States	Johnson & Johnson	156,516.1	1.95%	13.92%	1.00	Health Care
United States	Procter & Gamble	148,941.3	1.85%	15.46%	1.00	Consumer Staples
United States	AT&T Inc	146,556.0	1.82%	51.48%	1.00	Telecommunication Services
United States	Intl Business Machines Corp	137,980.3	1.72%	9.35%	1.00	Information Technology
United States	JP Morgan Chase & Co	133,068.6	1.65%	12.16%	1.00	Financials
United States	Chevron Corp	132,809.5	1.65%	13.28%	1.00	Energy
United States	Apple Inc.	127,063.2	1.58%	8.61%	1.00	Information Technology
United States	General Electric Co	124,109.8	1.54%	15.65%	1.00	Industrials

Tickers

S&P 500	
BLOOMBERG℠	SPX
Reuters	.SPX
Total Return	
BLOOMBERG℠	SPTR
Reuters	.SPXTR

Sector Breakdown



Index Portfolio Characteristics

Number of Companies	500
Adjusted Market Cap ($ Billion)	8,044.85
Company Size By Market Cap (Adjusted $ Billion):	
Average	16.09
Largest	341.14
Smallest	0.64
Median	6.53
% Weight Largest Company	4.24%
Top 10 Holdings (% Market Cap Share)	20.26%

Source: Standard & Poor's

Equivalent portfolio strategies

- Price weighted index
  - Invest an equal amount in ABC and XYZ
  - Hold the portfolio for one period

- Value weighted index
  - Invest in ABC and XYZ an amount that is proportional to their market capitalization
  - Hold the portfolio for one period

Value Line
Equally Weighted Index

- Places equal weight on each return
- Start with equal dollars in each investment

  ABC increases in value by 20%

  XYZ decreases by 10%

  Need to rebalance to keep equal weights

Equally weighted return

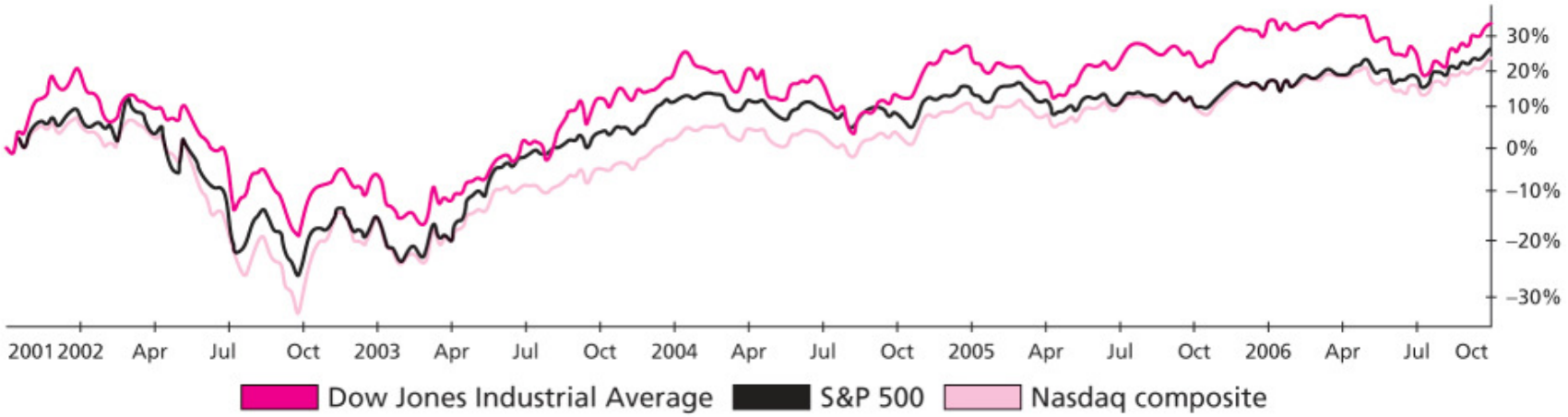
Stock	Initial Price	Final Price	Shares	Initial value	Final value
ABC	$25	$30	20	$500	$600
XYZ	$100	$90	1	$100	$90
Total				$600	$690

- Return on ABC = 5/25 = 20%
- Return on XYZ = -10/100 = -10%
- Average return = (20%-10%)/2 = 5%

Examples of Other US Indexes

- Dow Jones Industrial Average (30 Stocks)
- Standard & Poor's 500 Composite
- NASDAQ Composite
- NYSE Composite
- Wilshire 5000

Comparative Performance of Several Stock Market Indexes



Source: BKM (2007)

Examples of Indexes - International

- Nikkei 225 & Nikkei 300
- Stoxx and Euro Stoxx
- FTSE (Financial Times of London)
- CAC 40, SBF 120, SBF 250
- Region and Country Indexes
  - EAFE “European, Australasia and Far East”
  - Far East
  - United Kingdom

Sample of MSCI Stock Indexes

Regional Indexes	
Developed Markets	**Emerging Markets**
EAFE (Europe, Australia, Far East)	Emerging Markets (EM)
EASEA (EAFE excluding Japan)	EM Asia
Europe	EM Far East
EMU	EM Latin America
Far East	Emerging Markets Free (EMF)
Kokusai (World excluding Japan)	EMF Asia
Nordic Countries	EMF Eastern Europe
North America	EMF Europe
Pacific	EMF Europe & Middle East
The World Index	EMF Far East
G7 countries	EMF Latin America
World excluding U.S.	

Countries	
Developed Markets	**Emerging Markets**
Australia	Argentina
Austria	Brazil
Belgium	Chile
Canada	China
Denmark	Colombia
Finland	Czech Republic
France	Egypt
Germany	Hungary
Greece	India
Hong Kong	Indonesia
Ireland	Israel
Italy	Jordan
Japan	Korea
Netherlands	Malaysia
New Zealand	Mexico
Norway	Morocco
Portugal	Pakistan
Singapore	Peru
Spain	Philippines
Sweden	Poland
Switzerland	Russia
U.K.	South Africa
U.S.	Sri Lanka
	Taiwan
	Thailand
	Turkey
	Venezuela

Source: BKM (2007)

Example of Bond Market Indexes

- Lehman Aggregate Bond Index:
  Government securities, mortgage-backed securities, asset-backed securities and corporate securities
- J.P.Morgan Emerging Markets Bond Index Global ("EMBI Global")
- Merrill Lynch High Yield Master II Index
  High yield corporate bonds

1.2.5 Derivative Markets

Derivative Securities

Options

- Basic Positions
  - Call (Buy)
  - Put (Sell)
- Terms
  - Exercise Price
  - Expiration Date
  - Assets

Futures

- Basic Positions
  - Long (Buy)
  - Short (Sell)
- Terms
  - Delivery Date
  - Assets

1.3 Securities Markets

Roadmap

- Type of markets
  - Primary markets
  - Secondary markets
- Types of Orders
- Trading mechanisms
- US securities markets
- Trading Costs
- Buying on Margin and Short Sales

1.3.1 Type of Markets

Primary vs. Secondary Security Sales

1. Primary
   - New issue – Initial Public Offering (IPO)
   - Key factor: issuer receives the proceeds from the sale

2. Secondary
   - Existing owner sells to another party
   - Issuing firm doesn't receive proceeds and is not directly involved

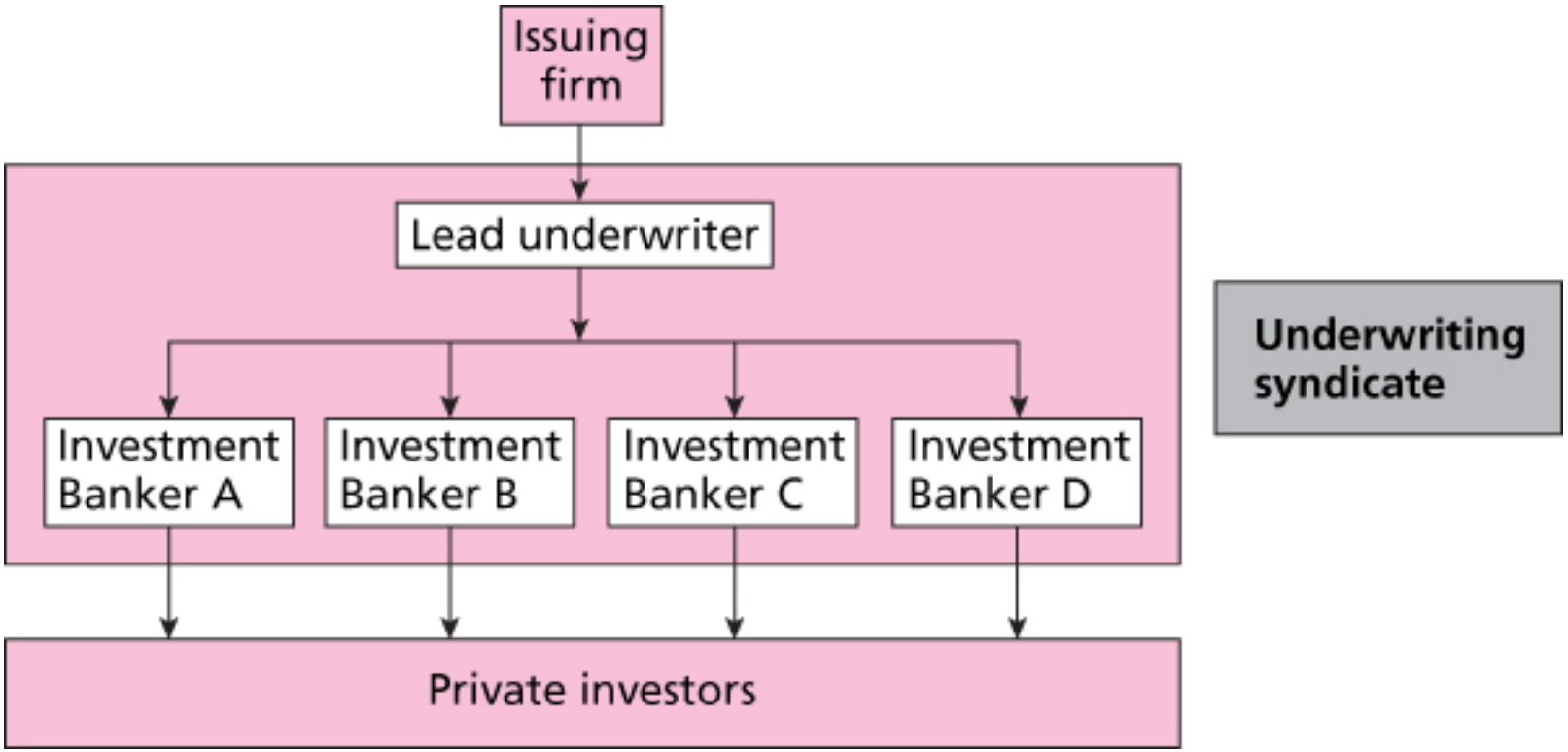
Initial Public Offering (IPO)

1. What is an IPO?

2. Who are the agents in an IPO?

3. What kind of paperwork is involved in an IPO?

The agents in an IPO



Source: BKM (2007)

Investment Banking Arrangements

- Who bears the risk of the IPO?
  - Firm commitment
  - Best Efforts

Paperwork

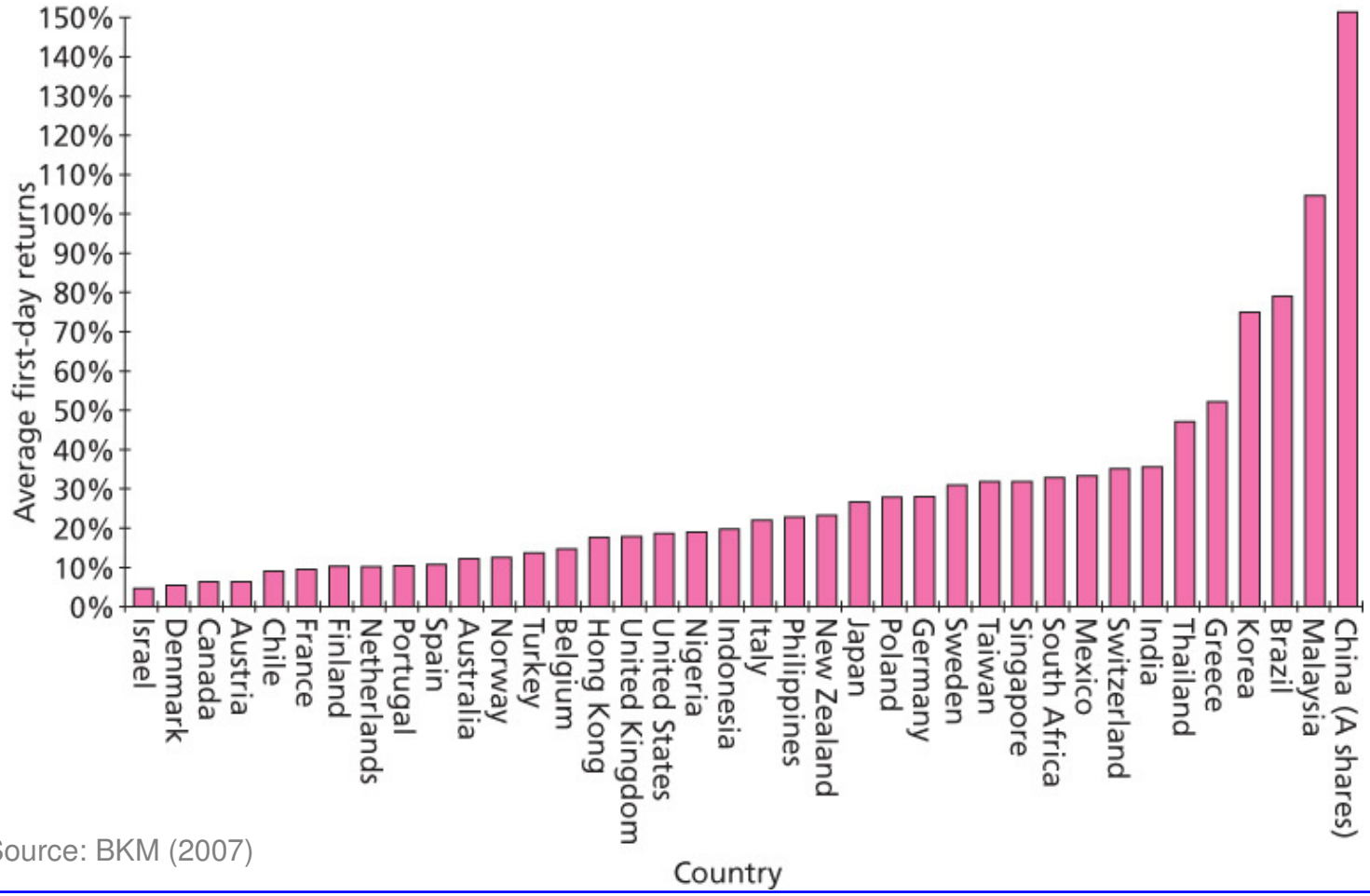
- Preliminary registration with SEC
  - Red herring
- Prospectus
- Shelf Registration: Rule 415

IPO (cont'd)

- Process
  - Road shows
  - Bookbuilding

- Underpricing
  - Post sale returns
  - Cost to the issuing firm

Average Initial Returns for IPOs in Various Countries



Source: BKM (2007)

Private placements

Private placement: sale to a limited number of sophisticated investors not requiring the protection of registration

- Allowed under Rule 144A
- Dominated by institutions
- Very active market for debt securities
- Not active for stock offerings

Types of Secondary Markets

1. Direct search
2. Brokered
3. Dealer
4. Auction

1.3.2 Type of Orders

Types of Orders

Instructions to the brokers on how to complete the order

- Market
- Limit
- Stop loss

Price-Contingent Orders

Action	Condition: Price falls below the limit	Condition: Price rises above the limit
Buy	Limit buy order	Stop-buy order
Sell	Stop-loss order	Limit sell order

Source: BKM (2007)

Limit Order Book for Intel on Archipelago

INTC Intel Corp

arca|ex" INTC Go>>

Bid				Ask			
ID	Price	Size	Time	ID	Price	Size	Time
ARCAEX	26.12	6570	13:42:15	ARCAEX	26.13	25595	13:42:15
INET	26.12	6726	13:42:15	INET	26.13	21076	13:42:13
ARCAEX	26.11	20800	13:42:15	ARCAEX	26.14	18858	13:42:14
INET	26.11	22300	13:42:10	INET	26.14	17758	13:42:14
ARCAEX	26.10	23500	13:42:07	ARCAEX	26.15	20100	13:42:05
INET	26.10	23800	13:42:07	INET	26.15	14800	13:42:10
ARCAEX	26.09	19000	13:42:14	ARCAEX	26.16	10940	13:42:14
INET	26.09	15100	13:42:13	INET	26.16	9800	13:42:14
ARCAEX	26.08	8500	13:42:05	ARCAEX	26.17	8877	13:42:02
INET	26.08	5300	13:42:03	INET	26.17	4800	13:42:10

Connected to Arca Market Data server.

Source: BKM (2007)

1.3.3 Trading Mechanisms

Trading Mechanisms

1. Over the Counter markets

2. Electronic communication networks (ECNs)

3. Specialists markets

1.3.4 US Securities Markets

U.S. Security Markets

- Nasdaq (National Association of Security Dealers Automated Quotation System)
  - Levels of subscribers
    1. Level 1 – inside quotes
    2. Level 2 – receives all quotes but they can't enter quotes
    3. Level 3 – dealers making markets
  - SuperMontage
- Organized Exchanges
  - New York Stock Exchange
  - American Stock Exchange
  - Regionals (e.g. Boston Stock Exchange)

Market Structures in Other Countries

- London - predominately electronic trading
- NYSE Euronext – NYSE + pan-European stock exchange
- Tokyo Stock Exchange

1.3.5 Trading Costs

Trading Costs

- *Commission*: fee paid to broker for making the transaction
- *Spread*: cost of trading with dealer
  - Bid: price dealer will buy from you
  - Ask: price dealer will sell to you
  - Spread: ask - bid
- *Combination*: on some trades both are paid

1.3.6 Buying on Margin and Short Sales

Roadmap

- Buying on margin
- Short Sales

Buying on Margin

- The investor borrows part of the purchase price of the stock from a broker
- Margin: portion of purchase price contributed by the investor

Margin Trading - Initial Conditions

IBM price	$100
# of shares purchased	100
Total stock value	$10,000
Loan from broker	$4,000

Assets		**Liabilities and owner's equity**	
Stock	$10,000	Loan from broker	$4,000
		Equity	$6,000

Margin = Equity/Stock = 6,000/10,000 = **60%**

Stock Margin Trading

- *Maximum margin* is 50% since 1974; you can borrow up to 50% of the stock value
- Set by the Fed
- *Maintenance margin*: minimum amount equity in trading can be before additional funds must be put into the account
- *Margin call*: notification from broker you must put up additional funds

Margin Trading – Maintenance Margin

IBM price	$100 → $70
# of shares purchased	100
Total stock value	$10,000 → $7,000
Loan from broker	$4,000

Assets		Liabilities and owner's equity	
Stock	~~$10,000~~ $7,000	Loan from broker	$4,000
		Equity	~~$6,000~~ $3,000

Margin = 3,000/7,000 = **43% < 50%** = **Maintenance Margin**

Broker issues a Margin Call!

Margin Trading - Margin Call

How far can the stock price fall before a margin call?

IBM price	P
# of shares purchased	100
Total stock value	100P
Loan from broker	$4,000

Assets		Liabilities and owner's equity	
Stock	100P	Loan from broker	$4,000
		Equity	100P-$4,000

Margin = (100P-$4,000)/(100P) = **50%** ⇨ **P=80**

Why buy securities on margin?

- Wish to invest more than what your money would allow.
  - **Greater upside potential**
  - **Greater downside risk**

Why buy on margin? Example

IBM price	$100
# of shares purchased	100
Total stock value	$10,000
Loan from broker	$4,000 (interest rate: 10%)

Change in stock price	End-of-Year Value of shares	Repayment of Principal and interest	Rate of return	Rate of return (if not buying on margin)
30% increase	$13,000	$4,400	43%	30%
No change	$10,000	$4,400	-6.7%	0%
30% decrease	$7,000	$4,400	-57%	-30%

Why buy on margin? Details

Change in stock price	End-of-Year Value of shares	Repayment of Principal and interest	Rate of return	Rate of return (if not buying on margin)
30% increase	$13,000	$4,400	43.3%	30%
No change	$10,000	$4,400	-6.7%	0%
30% decrease	$7,000	$4,400	-56.7%	-30%

(13000-6000-4400)/6000 = 0.433

(10000-6000-4400)/6000 = -0.067

(7000-6000-4400)/6000 = -0.567

Roadmap

1. Buying on margin

2. **Short Sales**

Short Sales

Mechanics

- Borrow stock through a dealer
- Sell it and deposit proceeds and margin in an account
- Closing out the position: buy the stock and return to the party from which it was borrowed

Purpose: to profit from a decline in the price of a stock or security

Short Sale - Initial Conditions

- Example: short sale IBM shares

IBM price	$100
# of share	100
Collateral	$5,000 in T-bills

- Net equity

Sale Proceeds	$10,000
Margin	$5,000
Stock Owed	$10,000

- Initial Margin

$$\text{Initial Margin} = \frac{\text{Sale Proceeds} + \text{Margin} - \text{Stock Owed}}{\text{Stock Owed}}$$

$$= \frac{\$10{,}000 + \$5{,}000 - \$10{,}000}{\$10{,}000} = 50\%$$

Short Sale – Price rises

Stock Price Rises to $110

Sale Proceeds	$10,000
Initial Margin	$5,000
Stock Owed	$11,000

Margin goes down:

$$\text{Margin} = \frac{\text{Sale Proceeds} + \text{Margin} - \text{Stock Owed}}{\text{Stock Owed}}$$

$$= \frac{\$10{,}000 + \$5{,}000 - \$11{,}000}{\$11{,}000} = 36\%$$

Short Sale - Margin Call

- Maintenance margin is 30%.
- How much can the stock price rise before a margin call?

($15,000* - 100P) / (100P) = 30%

P = $115.38

* Initial margin plus sale proceeds

Short sales – other details

- Allowed only when last recorded change in stock price is positive. Prevent speculations.

- Short sellers must also pay the lender any dividends paid during the short sale.

- Short seller cannot invest proceeds from short sale to generate income.

1.4 Mutual Funds and Other Investment Companies

Roadmap

- Investment Companies
- Type of Investment Companies
- Mutual Funds
- Costs of Investing in Mutual Funds
- Exchange-Traded Funds
- Mutual Fund Investment Performance: A First Look

1.4.1 Investment Companies

Investment Companies

- Administration & record keeping
- Diversification & divisibility
- Professional management
- Reduced transaction costs

Investment Companies: Net Asset Value

- Net Asset Value
  - Used as a basis for valuation of investment company shares
  - Selling new shares
  - Redeeming existing shares

Calculation:

$$\frac{\text{Market Value of Assets - Liabilities}}{\text{Shares Outstanding}}$$

1.4.2 Type of Investment Companies

Unit Trusts

- Pools of money fixed for the life of the fund
- Little active management

Managed Investment Companies: Open-End and Closed-End

- Open-End
  - Sold at Net Asset Value (NAV)
  - Changes when new shares are sold or old shares are redeemed
- Closed-End
  - Sold at premium or discount to NAV
  - No change unless new stock is offered

Closed-End Mutual Funds

CLOSED-END FUNDS

FUND	NAV	MKT PRICE	PREM/DISC	52 WEEK RETURN %
Adams Express Company (ADX)	15.96	13.85	–13.22	13.84
Advent/Clay Enhcd G & I (LCM)	19.54	19.81	1.38	23.47
Alliance All-Mkt Advantg (AMO)	13.51	14.50	7.33	3.92
BlackRock Div Achvrs (BDV)	16.25	15.16	–6.71	19.34
BlackRock S & P 500 Pr Eq (PEFX)	10.08	9.77	–3.08	6.50
BlackRock Str Div Achvr (BDT)	16.55	15.05	–9.06	17.39
Blue Chip Value Fund (BLU)	5.80	6.03	3.97	4.31
Eaton Vance Tax Div Inc (EVT)	28.91	27.11	–6.23	23.82
Equus II Incorporated (EQS)	11.32	8.41	–25.71	23.24
First Tr Val Line 100 (FVL)	16.43	15.25	–7.18	4.79
Gabelli Div & Inc Tr (GDV)	23.31	20.95	–10.12	23.57
Gabelli Equity Trust (GAB)	9.51	9.79	2.94	27.84
General Amer Investors (GAM)	40.78	37.00	–9.27	11.37
Source Capital (SOR)	65.48	66.07	0.90	–5.40
SunAmerica Foc Alpha Gr (FGF)	22.90	20.17	–11.92	20.52
Tri-Continental Corp (TY)	25.91	22.75	–12.20	15.68
Zweig Fund (ZF)	5.97	5.82	–2.51	21.76

Other Investment Organizations

- Commingled funds
- REITs
- Hedge Funds

1.4.3 Mutual Funds

Investment Policies

- Described in the prospectus
- Management companies manage a family of mutual funds. Some examples include:
  - Fidelity
  - Vanguard
  - Putnam
  - Dreyfus

Types of Mutual Funds

- Money Market
- Equity
- Specialized Sector
- Bond

Types of Mutual Funds

- Balanced Funds
- Asset Allocation and Flexible
- Indexed
- International

Mutual Funds by Investment Classification

	Assets ($ billion)	Percent of Total Assets	Number of Funds
Equity funds			
Capital appreciation focus	$ 2,701.0	25.9%	3,070
World/international	1314.1	12.6	915
Total return	1896.5	18.2	785
Total equity funds	$ 5,911.6	56.8%	4,770
Bond funds			
Corporate	$ 272.2	2.6%	289
High yield	156.2	1.5	207
World	59.4	0.6	113
Government	193.0	1.9	309
Strategic income	448.6	4.3	364
Single-state municipal	154.9	1.5	481
National municipal	210.0	2.0	230
Total bond funds	$ 1,494.4	14.4%	1,993
Hybrid (bond/stock) funds	$ 653.1	6.3%	508
Money market funds			
Taxable	$ 1,988.1	19.1%	576
Tax-exempt	366.4	3.5	273
Total money market fund	$ 2354.5	22.6%	849
Total	$10,413.6	100.0%	8,120

Note: Column sums subject to rounding error.

Source: Investment Company Institute, *2007 Investment Company Fact Book*. Copyright © 2007 by the Investment Company Institute.

Source: BKM (2007)

How Funds Are Sold

- Directly marketed
- Sales force distributed
- Revenue sharing on sales force distributed
  - Potential conflicts of interest
  - It must be disclosed to the investor
- Financial supermarkets

1.4.4 Costs of Investing in Mutual Funds

Fee Structure

- Fee Structure
  - Front-end load
  - Back-end load
- Operating expenses
- 12 b-1 charges
  - distribution costs paid by the fund
  - Alternative to a load
- Fees and performance

Example of Loads by Classes

	Class A	Class B	Class C	Class T
Front-end load	0–5.75%[a]	0	0	0–4.50%[a]
Back-end load	0	0–4%[b]	0–1%[b]	0
12b-1 fees[c]	.25%	1.0	1.0	.50%
Expense ratio	1.16%	1.35%	1.17%	1.27%

Ntes:

[a]Depending on size of investment

[b]Depending on years until holdings are sold

[c]Including service fee of .25%

Source: BKM (2007)

Fees and Mutual Fund Returns

$$\text{Rate of return} = \frac{NAV_1 - NAV_0 + \text{Income and capital gain distributions}}{NAV_0}$$

Fees and Mutual Fund Returns: An Example

Initial NAV = $20

Income distributions of $.15

Capital gain distributions of $.05

Ending NAV = $20.10:

$$\text{Rate of Return} = \frac{\$20.10 - \$20.00 + \$.15 + \$.05}{\$20.00} = 1.5\%$$

Impacts of Costs on Investment Performance

	Cumulative Proceeds (all dividends reinvested)		
	Fund A	Fund B	Fund C
Initial investment*	$10,000	$10,000	$ 9,200
5 years	17,234	16,474	15,502
10 years	29,699	27,141	26,123
15 years	51,183	44,713	44,018
20 years	88,206	73,662	74,173

*After front-end load, if any.

Notes:

1. Fund A is no-load with .5% expense ratio.
2. Fund B is no-load with 1.5% total expense ratio.
3. Fund C has an 8% load on purchases and a 1% expense ratio.
4. Gross return on all funds is 12% per year before expenses.

Source: BKM (2007)

Trading Scandal with Mutual Funds

- Late trading – allowing some investors to purchase or sell after the market closes
- Market timing – allowing investors to buy or sell on stale net asset values
  - International
- Net effect is to transfer value from other shareholders to privileged traders
  - Reduction in the rate of return of the mutual fund

1.4.5 Exchange-Traded Funds

Exchange Traded Funds

- ETF allow investors to trade index portfolios like shares of stock
- Examples – SPDRs, Diamonds, and WEBS
- Potential advantages
  - Trade continuously
  - Lower taxes
  - Lower costs
- Potential disadvantages

ETFs vs. Mutual Funds

	ETFs	Traditional Mutual Funds
Pricing	Throughout the trading day	Once per day using closing prices for fund net asset value
Short-Selling	Yes — investors can hold long or short positions	No — long positions only
Limit Order	Yes — investors can request their own price to execute any trade, however, there are no execution guarantees	No — the only price available is the net asset value (NAV) per unit
Cost	Low	Varies (low to high)
Portfolio Turnover	Very low (leading to lower taxable distributions)	Varies (low to high)
Ability to leverage	Yes — standard security margin rules apply	Varies by broker/dealer or trust company rules
Disclosure of portfolio holdings	High — holdings disclosed daily for most ETFs	Low — holdings typically disclosed semi-annually

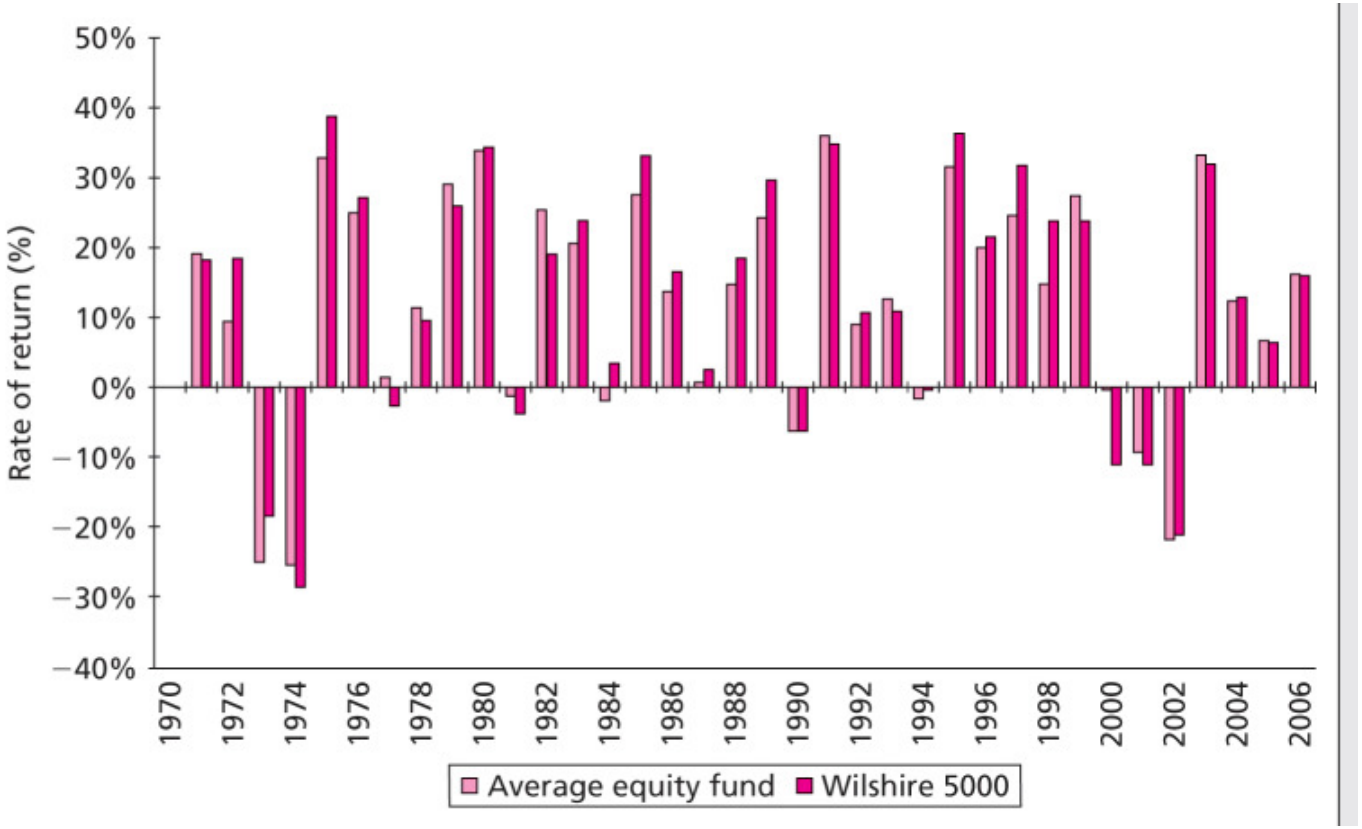
Source: iShares Canadian website

1.4.6 Mutual Fund Investment Performance: A First Look

Mutual Fund Performance

- Evidence shows that average mutual fund performance is generally less than broad market performance
- Evidence suggests that over certain horizons some persistence in positive performance
  - Evidence is not conclusive
  - Some inconsistencies

Diversified Equity Funds Versus Wilshire 5000 Index



Source: BKM (2007)

Consistency of Investment Results

Initial Period Performance	Successive Period Performance: Top Half	Successive Period Performance: Bottom Half
A. Goetzmann and Ibbotson study		
Top half	62.0%	38.0%
Bottom half	36.6%	63.4%
B. Malkiel study, 1970s		
Top half	65.1%	34.9%
Bottom half	35.5%	64.5%
C. Malkiel study, 1980s		
Top half	51.7%	48.3%
Bottom half	47.5%	52.5%

Sources: Panel A: From "Do Winners Repeat?" by William N. Goetzmann and Roger G. Ibbotson, *Journal of Portfolio Management*, Winter 1994, pp. 9–18. Reprinted by permission of Institutional Investor. Panels B and C: From "Returns from Investing in Equity Mutual Funds 1971–1991," by Burton G. Malkiel, *Journal of Finance* 50 (June 1995), pp. 549–72. Reprinted by permission of Blackwell Science, U.K.

Source: BKM (2007)

Statistical Review

Mean:

$$E(X) = \sum_i p_i x_i$$

Variance:

$$\sigma_X^2 = E\Big([X - E(X)]^2\Big) = \sum_i p_i [x_i - E(X)]^2$$

Properties:

(i) $\sigma_a^2 = 0$,

(ii) $\sigma_{aX+bY}^2 = a^2\sigma_X^2 + b^2\sigma_Y^2 + 2ab \cdot \sigma_{XY}^2$, where σ_{XY} is the covariance defined below.

Covariance:

$$\sigma_{XY} = E\Big([X - E(X)][Y - E(Y)]\Big) = \sum_i p_i [x_i - E(X)][y_i - E(Y)]$$

Correlation:

$$\rho_{XY} = \frac{Cov(X,Y)}{\sqrt{Var(X) \cdot Var(Y)}} = \frac{Cov(X,Y)}{\sigma_X \sigma_Y}$$

Example

Table 1: Calculating the mean and variance of a random variable

i	p_i	x_i	$p_i x_i$	$x_i - E(X)$	$[x_i - E(X)]^2$	$p_i[x_i - E(X)]^2$
Bad	0.3	15	$0.3 \cdot 15 = 4.5$	$15 - 20 = -5$	$(-5)^2 = 25$	$0.3 \cdot 25 = 7.5$
Moderate	0.4	20	8	0	0	0
Good	0.3	25	7.5	5	25	7.5

The expected value of X is obtained by adding up the numbers in the fourth column:

$$E(X) = 4.5 + 8 + 7.5 = 20.$$

After filling in the last three columns of the table, the variance is calculated as the sum of the numbers in the last column:

$$\sigma_X^2 = 7.5 + 0 + 7.5 = 15.$$

Example (cnt'd)

Table 1: Calculating the mean and variance of a random variable

i	p_i	x_i	$p_i x_i$	$x_i - E(X)$	$[x_i - E(X)]^2$	$p_i[x_i - E(X)]^2$
Bad	0.3	15	$0.3 \cdot 15 = 4.5$	$15 - 20 = -5$	$(-5)^2 = 25$	$0.3 \cdot 25 = 7.5$
Moderate	0.4	20	8	0	0	0
Good	0.3	25	7.5	5	25	7.5

The expected value of X is obtained by adding up the numbers in the fourth column:

$$E(X) = 4.5 + 8 + 7.5 = 20.$$

After filling in the last three columns of the table, the variance is calculated as the sum of the numbers in the last column:

$$\sigma_X^2 = 7.5 + 0 + 7.5 = 15.$$

The standard deviation is just the square root of the variance:

$$\sigma_X = \sqrt{15} = 3.87.$$

Example (cnt'd)

We can also calculate the covariance between these two random variables, as in the table below (note that we use some of the columns in tables 1 and 2, and only the last column is actually calculated in this table):

Table 3: Calculating the covariance between two random variable

i	p_i	x_i	y_i	$x_i - E(X)$	$y_i - E(Y)$	$p_i[x_i - E(X)][y_i - E(Y)]$
Bad	0.3	15	18	-5	3	$0.3 \cdot (-5) \cdot 3 = -4.5$
Moderate	0.4	20	12	0	-3	0
Good	0.3	25	16	5	1	1.5

The covariance between X and Y is given by the sum of the numbers in the last column:

$$\sigma_{XY} = -4.5 + 0 + 1.5 = -3.$$

Now we can calculate the correlation coefficient:

$$\rho_{XY} = \frac{\sigma_{XY}}{\sigma_X \sigma_Y} = \frac{-3}{3.87 \cdot 2.57} = -0.30.$$

So, the two variables tend to move in opposite directions (they are negatively correlated), but their relation is not that strong.

Example (cnt'd)

Table 2: Calculating the mean and variance of another random variable

i	p_i	y_i	$p_i y_i$	$y_i - E(Y)$	$[y_i - E(Y)]^2$	$p_i[y_i - E(Y)]^2$
Bad	0.3	18	$0.3 \cdot 18 = 5.4$	$18 - 15 = 3$	$3^2 = 9$	$0.3 \cdot 9 = 2.7$
Moderate	0.4	12	4.8	-3	9	3.6
Good	0.3	16	4.8	1	1	0.3

Again, the expected value is given by the sum of the numbers in the fourth column:

$$E(Y) = 5.4 + 4.8 + 4.8 = 15$$

and the variance by the sum of the numbers in the last column:

$$\sigma_Y^2 = 2.7 + 3.6 + 0.3 = 6.6,$$
$$\sigma_Y = \sqrt{6.6} = 2.57.$$

Exercise

Consider 2 stocks A and B characterized by:

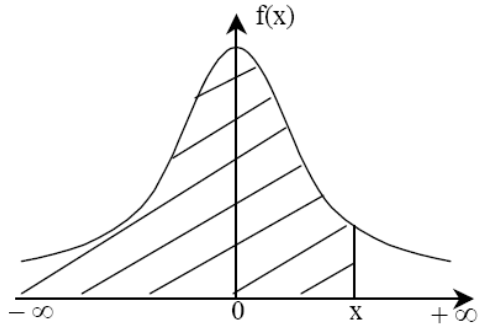
State of Nature	Probability A	Probability B	Returns
Deep Recession	0,03	0,03	3%
Recession	0,22	0	5%
Recovery	0,5	0,94	7%
Growth	0,22	0	9%
Euphoria	0,03	0,03	11%

1) Calculate the Mean, Variance, Standard error, Skewness and Kurtosis of the two asset returns
2) Are returns normal?
3) Calculate the worst expected loss in 97% of the observations
4) Suppose that returns are normally distributed, based on the mean and standard error of returns, answer question 3 once again

$$Sk(\tilde{r}) = E\left[\left(\frac{\tilde{r}-\boldsymbol{\mu}}{\boldsymbol{\sigma}}\right)^3\right] \qquad Ku(\tilde{r}) = E\left[\left(\frac{\tilde{r}-\boldsymbol{\mu}}{\boldsymbol{\sigma}}\right)^4\right]$$

The Gaussian Distribution

(Probability to find a value inferior to X)



$$F(x) = \int_{-\infty}^{x} \frac{1}{\sqrt{2\pi}} e^{-\frac{u^2}{2}} du$$

X	0,00	0,01	0,02	0,03	0,04	0,05	0,06	0,07	0,08	0,09
0,0	0,5000	0,5040	0,5080	0,5120	0,5160	0,5199	0,5239	0,5279	0,5319	0,5359
0,1	0,5398	0,5438	0,5478	0,5517	0,5557	0,5596	0,5636	0,5675	0,5714	0,5753
0,2	0,5793	0,5832	0,5871	0,5910	0,5948	0,5987	0,6026	0,6064	0,6103	0,6141
0,3	0,6179	0,6217	0,6255	0,6293	0,6331	0,6368	0,6406	0,6443	0,6480	0,6517
0,4	0,6554	0,6591	0,6628	0,6664	0,6700	0,6736	0,6772	0,6808	0,6844	0,6879
0,5	0,6915	0,6950	0,6985	0,7019	0,7054	0,7088	0,7123	0,7157	0,7190	0,7224
0,6	0,7257	0,7291	0,7324	0,7357	0,7389	0,7422	0,7454	0,7486	0,7517	0,7549
0,7	0,7580	0,7611	0,7642	0,7673	0,7704	0,7734	0,7764	0,7794	0,7823	0,7852
0,8	0,7881	0,7910	0,7939	0,7967	0,7995	0,8023	0,8051	0,8078	0,8106	0,8133
0,9	0,8159	0,8186	0,8212	0,8238	0,8264	0,8289	0,8315	0,8340	0,8365	0,8389
1,0	0,8413	0,8438	0,8461	0,8485	0,8508	0,8531	0,8554	0,8577	0,8599	0,8621
1,1	0,8643	0,8665	0,8686	0,8708	0,8729	0,8749	0,8770	0,8790	0,8810	0,8830
1,2	0,8849	0,8869	0,8888	0,8907	0,8925	0,8944	0,8962	0,8980	0,8997	0,9015
1,3	0,9032	0,9049	0,9066	0,9082	0,9099	0,9115	0,9131	0,9147	0,9162	0,9177
1,4	0,9192	0,9207	0,9222	0,9236	0,9251	0,9265	0,9279	0,9292	0,9306	0,9319
1,5	0,9332	0,9345	0,9357	0,9370	0,9382	0,9394	0,9406	0,9418	0,9429	0,9441
1,6	0,9452	0,9463	0,9474	0,9484	0,9495	0,9505	0,9515	0,9525	0,9535	0,9545
1,7	0,9554	0,9564	0,9573	0,9582	0,9591	0,9599	0,9608	0,9616	0,9625	0,9633
1,8	0,9641	0,9649	0,9656	0,9664	0,9671	0,9678	0,9686	0,9693	0,9699	0,9706
1,9	0,9713	0,9719	0,9726	0,9732	0,9738	0,9744	0,9750	0,9756	0,9761	0,9767
2,0	0,9772	0,9778	0,9783	0,9788	0,9793	0,9798	0,9803	0,9808	0,9812	0,9817
2,1	0,9821	0,9826	0,9830	0,9834	0,9838	0,9842	0,9846	0,9850	0,9854	0,9857
2,2	0,9861	0,9864	0,9868	0,9871	0,9875	0,9878	0,9881	0,9884	0,9887	0,9890
2,3	0,9893	0,9896	0,9898	0,9901	0,9904	0,9906	0,9909	0,9911	0,9913	0,9916
2,4	0,9918	0,9920	0,9922	0,9925	0,9927	0,9929	0,9931	0,9932	0,9934	0,9936
2,5	0,9938	0,9940	0,9941	0,9943	0,9945	0,9946	0,9948	0,9949	0,9951	0,9952
2,6	0,9953	0,9955	0,9956	0,9957	0,9959	0,9960	0,9961	0,9962	0,9963	0,9964
2,7	0,9965	0,9966	0,9967	0,9968	0,9969	0,9970	0,9971	0,9972	0,9973	0,9974
2,8	0,9974	0,9975	0,9976	0,9977	0,9977	0,9978	0,9979	0,9979	0,9980	0,9981
2,9	0,9981	0,9982	0,9982	0,9983	0,9984	0,9984	0,9985	0,9985	0,9986	0,9986
3,0	0,9987	0,9987	0,9987	0,9988	0,9988	0,9989	0,9989	0,9989	0,9990	0,9990
3,1	0,9990	0,9991	0,9991	0,9991	0,9992	0,9992	0,9992	0,9992	0,9993	0,9993
3,2	0,9993	0,9993	0,9994	0,9994	0,9994	0,9994	0,9994	0,9995	0,9995	0,9995
3,3	0,9995	0,9995	0,9995	0,9996	0,9996	0,9996	0,9996	0,9996	0,9996	0,9997
3,4	0,9997	0,9997	0,9997	0,9997	0,9997	0,9997	0,9997	0,9997	0,9997	0,9998
3,5	0,9998	0,9998	0,9998	0,9998	0,9998	0,9998	0,9998	0,9998	0,9998	0,9998

Thank you for your attention…

See you next week