BACHELOR of ECONOMICS
International Program

Thammasat University | Thailand

Fixed Income (FN351)

Treasury securities

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Road map/Key ideas

- The Treasury security market
- Treasury securities
  - Treasury bill
  - Treasury bonds and notes
  - Treasury STRIPS
  - Treasury Inflation Protected Securities (TIPS)

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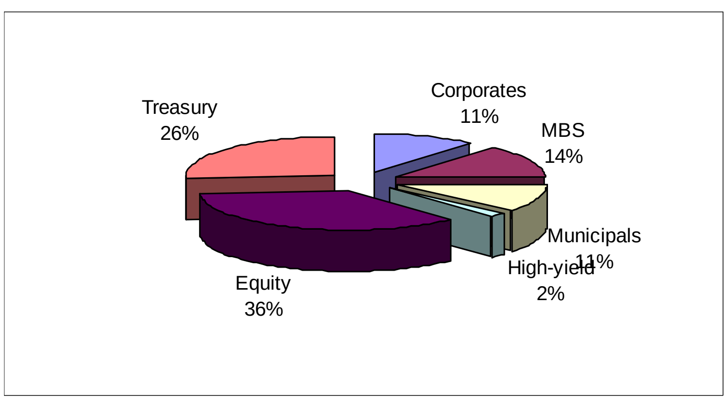
Treasury security markets



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Treasury security markets : Primary market

Year	13-Week	26-Week	52-Week	2-Year	3-Year	4-Year	5-Year	7-Year	10-Year	20-Year	30-Year
	Type of Security										
1985	Weekly	Weekly	Every 4th week	Monthly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly	Quarterly
1986										None (1/15/86)	
1987											
1988											
1989											
1990						None (12/31/90)					
1991							Monthly (1/31/91)				
1992											
1993								None (4/15/93)			Semiannually (8/16/93)
1994											
1995											
1996									6×/yr (7/15/96)		3×/yr (8/15/96)
1997									Quarterly (8/15/97)		
1998					None (5/15/98)		Quarterly (8/17/98)				
1999											Semiannually[1]

Source: *Treasury Bulletin.*

Note: Date indicates when a security was first issued under a new schedule or, if discontinued, when a security was last issued.

[1]In August 1999, the Treasury announced that it would discontinue the November auction and issue 30-year bonds in February and August only. All securities are sold by single-price (Dutch) auction procedure.

- For information on auction schedule go to:

  http://www.publicdebt.treas.gov/of/ofaucrt.htm

Treasury security markets : Primary market

- Buyers:
  - Primary dealer: buy sell for own account or for customer
  - Regular dealers: buy sell for own account
- Auction market:

  competitive bids

  non-competitive bids

Treasury security markets : Primary market

- Example: total amount auction 100M; 5M non-competitive bids

yield	amount bid for	received
3%	10M	10M
3.1%	50M	50M
3.12%	50M	35M (stop yield)

- Single price auction: all get the stop yield
- Multiple price auction: dealers get their own bid yield. Non-competitive bids get the average
- Secondary market is a dealer market or over the counter market

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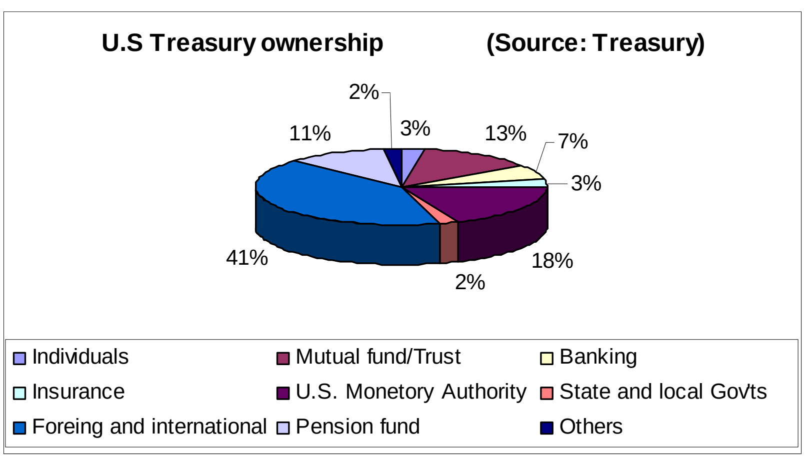
Treasury security markets



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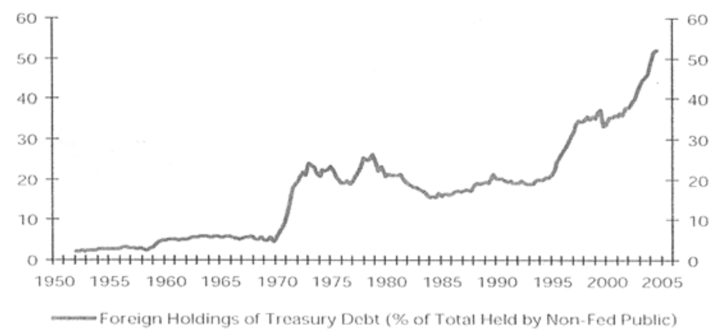
Treasury security markets

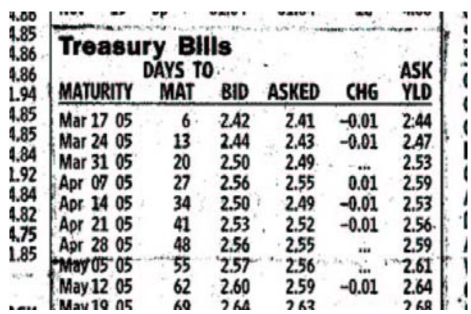
Foreign Holdings of Treasury Debt Pass 50% of the Total



- In the past decade, foreign ownership of Treasury debt has risen from 20% to over 50%
- It had been stable at around 20% from 1970 to 1995

Treasury bills

- Pays par value at maturity
- Matures in less than one year
- Have no coupons
- WSJ quote:



Treasury Bills

MATURITY	DAYS TO MAT	BID	ASKED	CHG	ASK YLD
Mar 17 05	6	2.42	2.41	−0.01	2.44
Mar 24 05	13	2.44	2.43	−0.01	2.47
Mar 31 05	20	2.50	2.49	...	2.53
Apr 07 05	27	2.56	2.55	0.01	2.59
Apr 14 05	34	2.50	2.49	−0.01	2.53
Apr 21 05	41	2.53	2.52	−0.01	2.56
Apr 28 05	48	2.56	2.55	...	2.59
May 05 05	55	2.57	2.56	...	2.61
May 12 05	62	2.60	2.59	−0.01	2.64

- Are quoted in terms of ‘Bank discount yield’

T-bills: Example

Maturity	Days to Mat.	Bid	Asked
May 12 '05	62	2.60	2.59

- Cash flow of a $1000 face value T-bill

$1000

March11 '05 — May 12 '05

- Quote price given bank discount yield, y_d

$$\boxed{B = F * (1 - \frac{t}{360} * y_d)}$$

- Asked price = $B = 1000(1 - 62/360 * 0.0259) = 995.54$

Treasury notes and bonds

- Pay semi-annual coupons
- Are quoted in '$:32nds' and 'bond equivalent yield'
- WSJ quote:

GOVT. BOND & NOTES

RATE	MATURITY MO/YR	BID	ASKED	CHG.	ASKED YLD.
5½	Jul 01n	100:00	100:02	....	1.68
6⅝	Jul 01n	100:00	100:02	– 1	2.76
[illegible]	Aug 01n	100:07	100:09		2.92

- Notes are issued with maturities of 2-10 years
- Bonds are issued with maturities longer than 10 years. US Treasury no longer issues 30-year bonds.
- Some bonds issued before 1984 are <u>callable</u>

Treasury notes and bonds

Rate	Maturity	Bid	Asked	Asked yld.
10 ¾	May 06	111:21	111:25	3.93

- Cash flow $1000 face value

	May05	Nov05	May06
	53.75 ↓	53.75 ↓	1000+53.75 ↓
March 1'05	May05	Nov05	May06

- Asked price = 10*(111+25/32)= $1117.8125

Treasury STRIPS

- Are zero-coupon bonds of maturities > 1 year
- Pays par value at maturity
- Are direct obligations of the US government
- Clear through the Federal Reserve book entry system
- Are standardized and easy to transact → greater liquidity
- WSJ quote:

3.375 Apr 32i 132:10 132:11 –8 1.85

U.S. Treasury Strips

MATURITY		TYPE	BID	ASKED	CHG	ASK YLD
Apr	05	ci	99:24	99:24	...	2.53
May	05	ci	99:17	99:17	...	2.56
May	05	bp	99:17	99:17	...	2.57
May	05	np	99:17	99:17	...	2.57
May	05	np	99:17	99:17	...	2.54
Jul	05	ci	99:04	99:04	...	2.49
Aug	05	ci	98:26	98:26	...	2.76
Aug	05	bp	98:25	98:25	...	2.86
Aug	05	np	98:25	98:25	...	2.83
Oct	05	ci	98:08	98:08	...	2.98
Nov	05	ci	98:00	98:00	...	3.01
Nov	05	np	97:30	97:30	...	3.08

Concept check

You observe a US Treasury strips with face value of $1000 that matures in two years selling today at $900. What concrete information does this give you?

G) Interest rates will decrease in the future

Y) The present value of one dollar obtained two years from today is 90 cents

R) Inflation will remain the same

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Treasury Inflation Protected Securities (TIPS)

- The accrued principal is adjusted by current CPI
- Example: TIPS with rate 3% per year (1.5% per half year) maturity 11/06 par 1000 issued on 11/04
- Cash flow given CPI at future dates:

Date	Int. CF	CPI (half year)	Accrued Principal
11/04			1000
05/05	15.3	2%	1020.0
11/05	15.53	1.5%	1035.3
05/06	15.76	1.5%	1050.8
11/06	16.07	2%	1071.8

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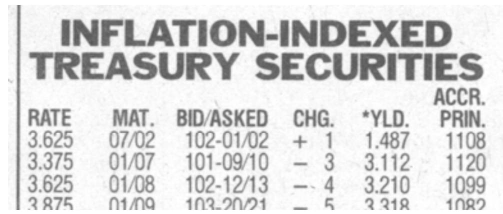
Treasury Inflation Protected Securities (TIPS)

- WSJ quote:



INFLATION-INDEXED TREASURY SECURITIES

RATE	MAT.	BID/ASKED	CHG.	*YLD.	ACCR. PRIN.
3.625	07/02	102-01/02	+ 1	1.487	1108
3.375	01/07	101-09/10	− 3	3.112	1120
3.625	01/08	102-12/13	− 4	3.210	1099
3.875	01/09	103-20/21	− 5	3.318	1082

- Example:

Rate	Mat.	Bid/Asked	yld.	ACCR.PRIN.
3.375	01/07	101-09/10	3.112	1120

- Ask price=10*(101+10/32)= $1013.125
- If next CPI=2% the new accrued principal is 1120*1.02=1142.4

  Cash flow from coupon = (0.03375/2)* 1142.4=19.278

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Treasury Inflation Protected Securities (TIPS)

- TIPS are not exposed to inflation risk
- Example of a 3% rate TIPS

Date	CPI	Price of goods and services	TIPS 3% Principal	CF	Coupon bond 4% principal	CF
		100	1000		1000	
May-05	1	101	1010	15.15	1000	20
Nov-05	3	104.03	1040.3	15.6045	1000	20
May-06	2	106.1106	1061.106	15.91659	1000	20
Nov-06	3	109.2939	1092.939	16.39409	1000	20

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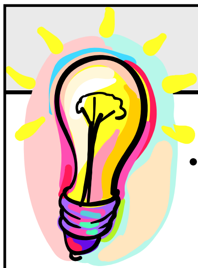

Concept check

- Who is likely to benefit most from investing in TIPS rather than in regular Treasury securities?

  G) Bond mutual funds

  Y) A Savings fund for college

  R) Foreign government holding reserves in dollars

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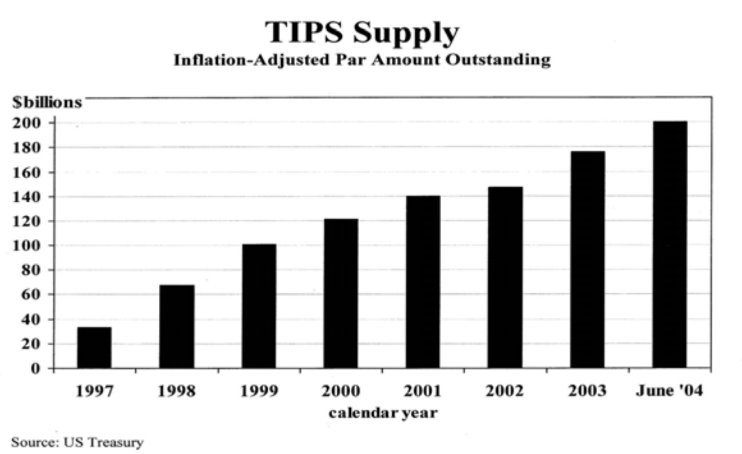
Treasury Inflation Protected Securities (TIPS)



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Treasury Inflation Protected Securities (TIPS)

I/I BOND CORRELATION TO OTHER ASSETS AND INFLATION

Correlation of TIPS (10-Year Duration) to…

Jan. 1970 - Feb. 2004	US CPI	US Equities S&P 500	US Nominal Bonds 10-Year Duration
1 Month	0.18	0.09	0.60
3 Month	0.28	0.02	0.67
1 Year	0.49	-0.21	0.30
3 Year	0.65	-0.54	-0.27
5 Year	0.75	-0.56	-0.28

Source: Bridgewater Associates

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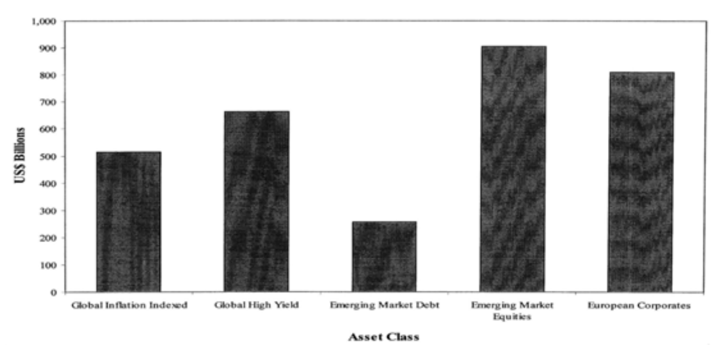
Treasury Inflation Protected Securities (TIPS)

SIZE OF GLOBAL INFLATION-INDEXED BOND MARKET VS. OTHER ASSET CLASSES



Source: Bridgewater Associates

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Summary

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