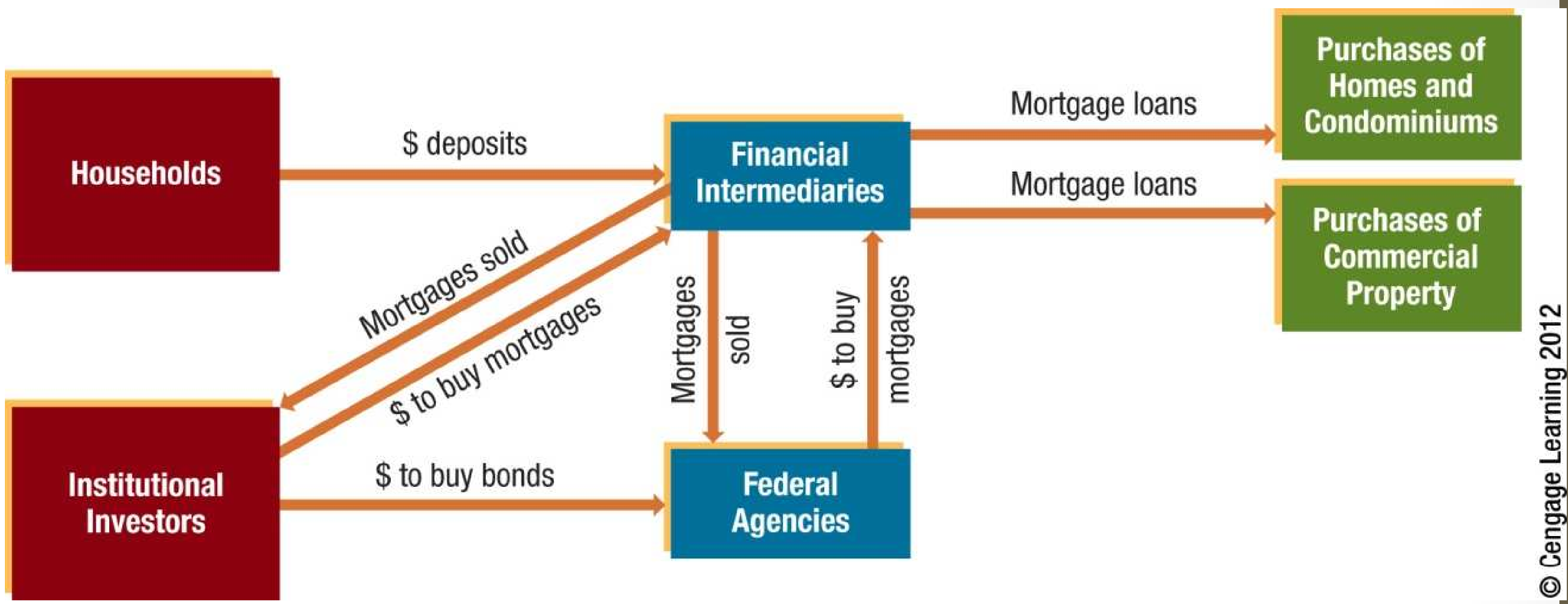
Mortgage Markets

Mortgage

- Used for finance real estate purchases
  - Saving institutions, mortgage companies, commercial banks
- Primary market
- Secondary market
- For needs of long-term funds to purchase real estate
- For creditors lending long-term funds for real estate purchase

Background on Mortgage

- Debt created to finance investment in real estate
  - Secured by property
- Saving institutions and mortgage companies and commerical banks
  - Intermediaries
  - Rating of applicants
- Mortgage contract
  - Martgage rate and maturity and collateral


Households
$ deposits
Financial Intermediaries
Mortgage loans
Purchases of Homes and Condominiums
Mortgage loans
Purchases of Commercial Property
Mortgages sold
$ to buy mortgages
Mortgages sold
$ to buy mortgages
Institutional Investors
$ to buy bonds
Federal Agencies
© Cengage Learning 2012

TYPE OF FINANCIAL INSTITUTION	INSTITUTION PARTICIPATION IN MORTGAGE MARKETS
Commercial banks and savings institutions	• Originate and service commercial and residential mortgages and maintain mortgages within their investment portfolios. • Bundle packages of mortgages and sell mortgage-backed securities representing the packages of mortgages. • Purchase mortgage-based securities.
Credit unions and finance companies	• Originate mortgages and maintain mortgages within their investment portfolios.
Mortgage companies	• Originate mortgages and sell them in the secondary market.
Mutual funds	• May sell shares and use the proceeds to construct portfolios of mortgage-backed securities.
Securities firms	• Bundle packages of mortgages and sell mortgage-backed securities representing the packages of mortgages. • Offer instruments to help institutional investors in mortgages hedge against interest rate risk.
Insurance companies	• Commonly purchase mortgages or mortgage-backed securities in the secondary market.

Criteria Used to measure Creditworthiness

- Reflect the rospective borrower´s to repay loan
  - Level of equity invested by borrower
  - Borrower´s income level
  - Borrower´s credit history

Classifications of Mortgages

- Prime versus Subprime Mortgages
- Insured versus Conventional Mortgages

Insured vs. Conventional Mortgages

- Federal and private insurance guarantees repayment in the event of borrower default
- Limits on amounts, borrower requirements
- Borrower pays insurance premiums
- Federal insurers include Federal Housing Administration and Veterans Administration

Types of Residential Mortgages

- Fixed-rate mortgages
- Adjustable-rate mortgages
- Graduated-payment mortgages
- Second martgages
- Shared-appreciation mortgages

Fixed Rate vs. Adjustable Mortgages

- Fixed rate loans have a constant, unchanging rate
  - Interest rate risk can hurt lender rate of return
    - If interest rates rise in the market, lender's cost of funds increases
    - No matching increase in fixed-rate mortgage return
  - Borrowers lock in their cost and have to refinance to benefit from lower market rates

Fixed-Rate vs. Adjustable Mortgages

- Fixed monthly payment includes
    - Interest owed first
    - Balance to principal
- Interest on the declining principal balance
- Calculating monthly payment
    - Principal borrowed = PV
    - Number of months to maturity = years $\times$ 12 = N
    - Rate/12 = I
    - Calculate PMT

Example – geometric sequence

Calculate the monthly payment for a \$330,000 home. The new owner has made a \$70,000 down payment and plans to finance over 30 years at the current fixed rate of 7%.

\$330,000 – \$70,000 = \$260,000 PV (original investment of the financial institution)

30 x 12 = 360 N; 7/12 = I; Calculate PMT

\$330,000 – \$70,000 = \$260,000 PV (original investment of the financial institution)

$30 \times 12 = 360$ N; 7/12 = I; Calculate PMT

PMT = \$1,729.79

98) Download | 99) Scenario Analysis | Mortgage Payment Calculator

Payment Options

Enter 2 of the next 3 fields

Loan Amount	100000.00
Interest Rate	5.052
Payment	540.00
Payment Freq	Monthly
Years/Months	30 / 0
Starting	05/03/16
Points	0.000

Prepayment Options

Scheduled Prepayments

Amount	
Frequency	Monthly
Starting	06/03/16

Add Additional Prepayments

Payments

10) Table | 11) Chart

Annualized Information

	Payment				Cumulative		Outstanding Amounts	
	Date	Payment	Interest	Principal	Interest	Principal	Interest	Principal
1.	06/03/16	540.00	421.00	119.00	421.00	119.00	93980.49	99881.00
2.	07/03/16	540.00	420.50	119.51	841.50	238.51	93559.99	99761.49
3.	08/03/16	540.00	420.00	120.01	1261.49	358.52	93139.99	99641.48
4.	09/03/16	540.00	419.49	120.51	1680.99	479.03	92720.50	99520.97
5.	10/03/16	540.00	418.98	121.02	2099.97	600.05	92301.52	99399.95
6.	11/03/16	540.00	418.47	121.53	2518.44	721.58	91883.04	99278.42
7.	12/03/16	540.00	417.96	122.04	2936.40	843.62	91465.08	99156.38
8.	01/03/17	540.00	417.45	122.56	3353.85	966.18	91047.63	99033.82
9.	02/03/17	540.00	416.93	123.07	3770.79	1089.25	90630.70	98910.75
10.	03/03/17	540.00	416.41	123.59	4187.20	1212.84	90214.29	98787.16
11.	04/03/17	540.00	415.89	124.11	4603.09	1336.95	89798.39	98663.05
12.	05/03/17	540.00	415.37	124.63	5018.47	1461.58	89383.02	98538.42
13.	06/03/17	540.00	414.85	125.16	5433.31	1586.74	88968.18	98413.26
14.	07/03/17	540.00	414.32	125.68	5847.63	1712.43	88553.86	98287.57
15.	08/03/17	540.00	413.79	126.21	6261.42	1838.64	88140.06	98161.36
16.	09/03/17	540.00	413.26	126.74	6674.68	1965.38	87726.81	98034.62
17.	10/03/17	540.00	412.73	127.28	7087.41	2092.66	87314.08	97907.34
18.	11/03/17	540.00	412.19	127.81	7499.60	2220.48	86901.89	97779.52

Summary Information			Prepayment Effect		
Proceeds	Effective Rate	Total Interest	Interest Saved	Time Saved	Final Payment
100.00k	5.052%	94401.49		29 yr, 7 mo	05/03/2046

Screen saved as C:\Users\387462\Desktop\calc_1.gif

98) Download | 99) Scenario Analysis | Mortgage Payment Calculator

Payment Options

Enter 2 of the next 3 fields

Loan Amount	100000.00
Interest Rate	5.052
Payment	540.00
Payment Freq	Monthly
Years/Months	30 / 0
Starting	05/03/16
Points	0.000

Prepayment Options

Scheduled Prepayments

Amount	
Frequency	Monthly
Starting	06/03/16

Add Additional Prepayments

Payments

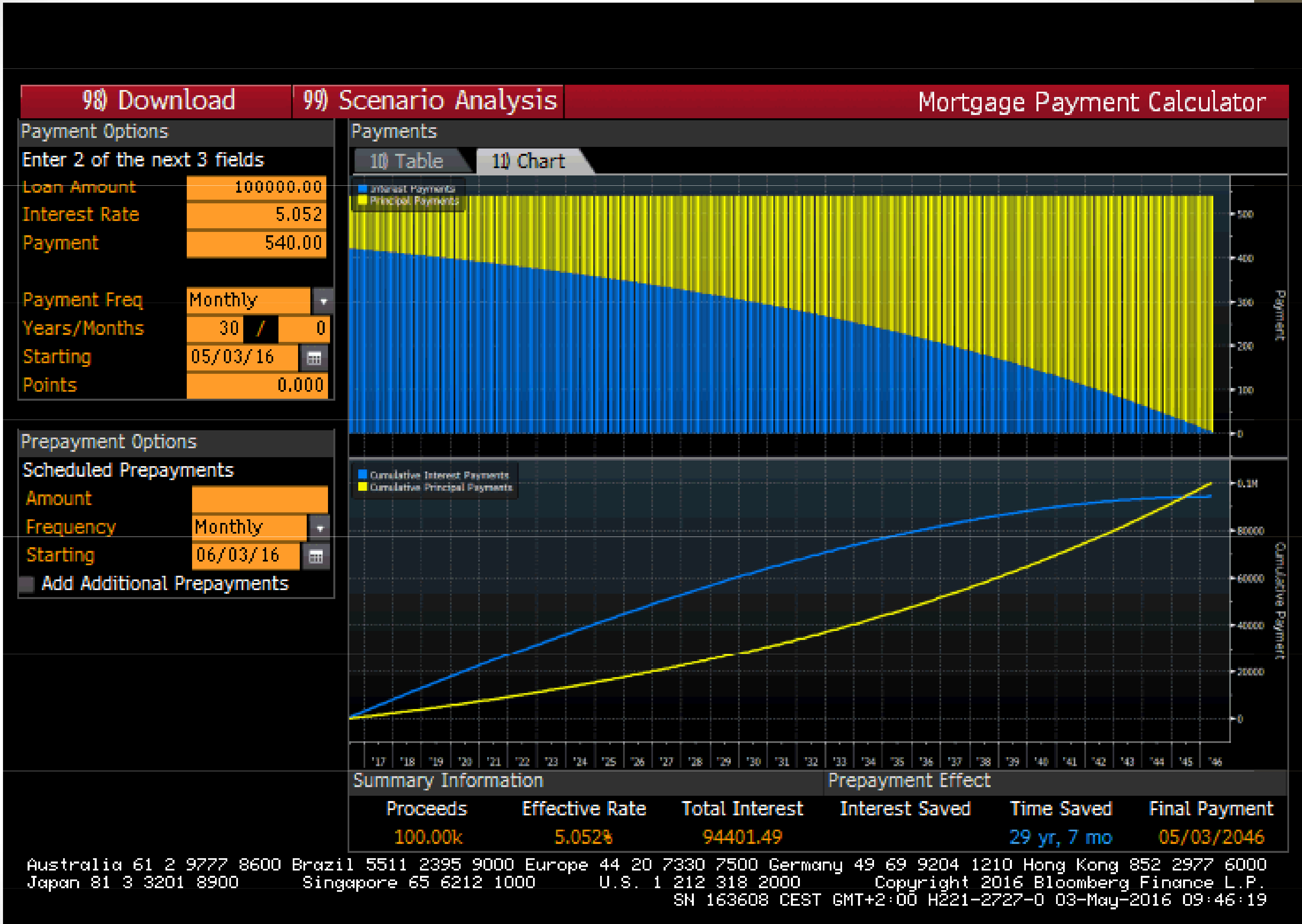
10) Table | 11) Chart

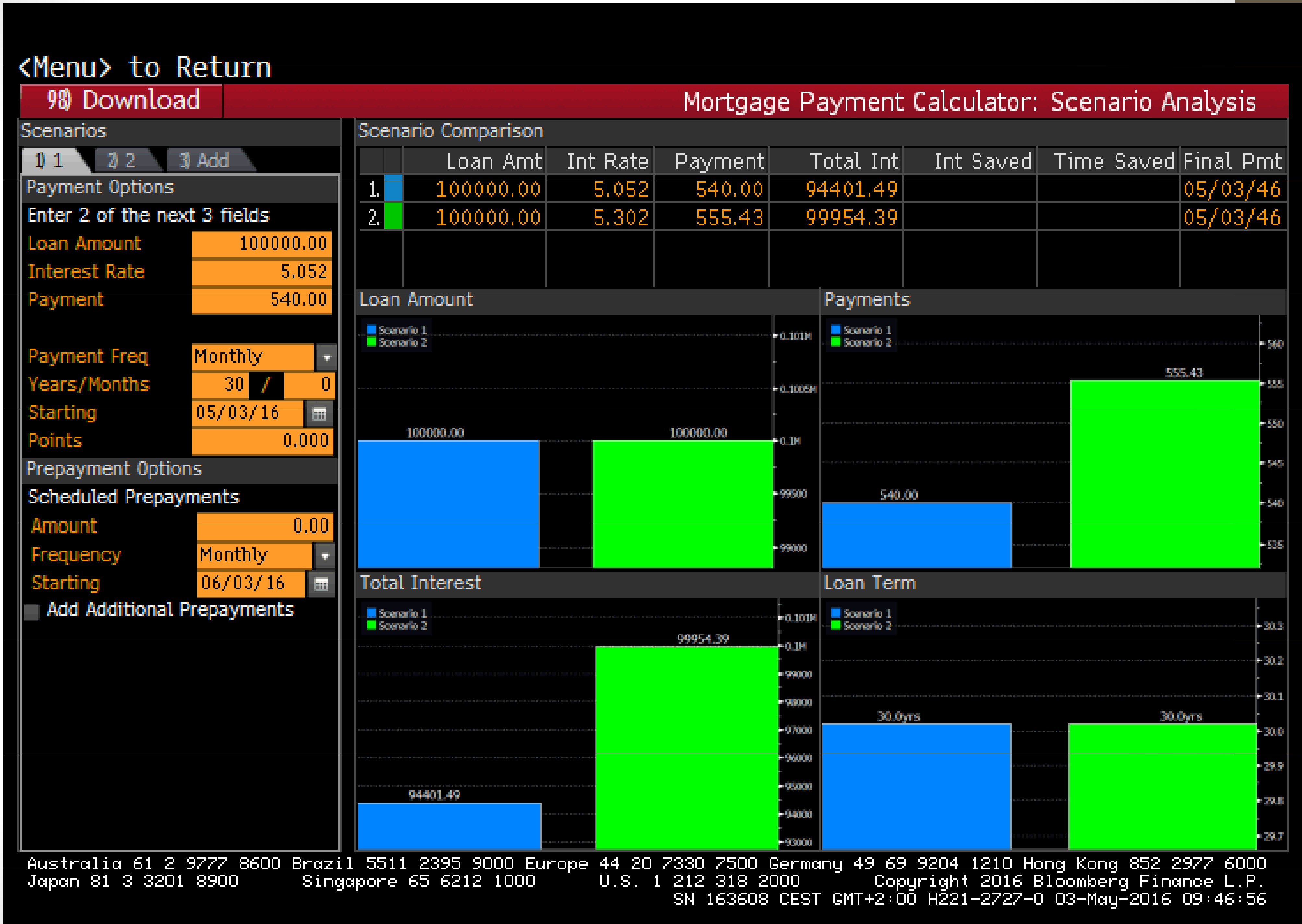
Annualized Information

Payment					Cumulative		Outstanding Amounts	
	Date	Payment	Interest	Principal	Interest	Principal	Interest	Principal
343.	12/03/44	540.00	39.33	500.67	94062.74	91158.68	338.75	8841.32
344.	01/03/45	540.00	37.22	502.78	94099.96	91661.46	301.53	8338.54
345.	02/03/45	540.00	35.11	504.90	94135.06	92166.36	266.42	7833.64
346.	03/03/45	540.00	32.98	507.02	94168.04	92673.39	233.44	7326.61
347.	04/03/45	540.00	30.85	509.16	94198.89	93182.54	202.60	6817.46
348.	05/03/45	540.00	28.70	511.30	94227.59	93693.85	173.90	6306.15
349.	06/03/45	540.00	26.55	513.46	94254.14	94207.30	147.35	5792.70
350.	07/03/45	540.00	24.39	515.62	94278.53	94722.92	122.96	5277.08
351.	08/03/45	540.00	22.22	517.79	94300.74	95240.71	100.74	4759.29
352.	09/03/45	540.00	20.04	519.97	94320.78	95760.67	80.71	4239.33
353.	10/03/45	540.00	17.85	522.16	94338.63	96282.83	62.86	3717.17
354.	11/03/45	540.00	15.65	524.35	94354.28	96807.19	47.21	3192.81
355.	12/03/45	540.00	13.44	526.56	94367.72	97333.75	33.77	2666.25
356.	01/03/46	540.00	11.22	528.78	94378.94	97862.53	22.54	2137.47
357.	02/03/46	540.00	9.00	531.01	94387.94	98393.53	13.55	1606.47
358.	03/03/46	540.00	6.76	533.24	94394.70	98926.77	6.78	1073.23
359.	04/03/46	540.00	4.52	535.49	94399.22	99462.26	2.26	537.74
360.	05/03/46	540.00	2.26	537.74	94401.49	100000.00	.00	.00

Summary Information | **Prepayment Effect**

Proceeds	Effective Rate	Total Interest	Interest Saved	Time Saved	Final Payment
100.00k	5.052%	94401.49		29 yr, 7 mo	05/03/2046

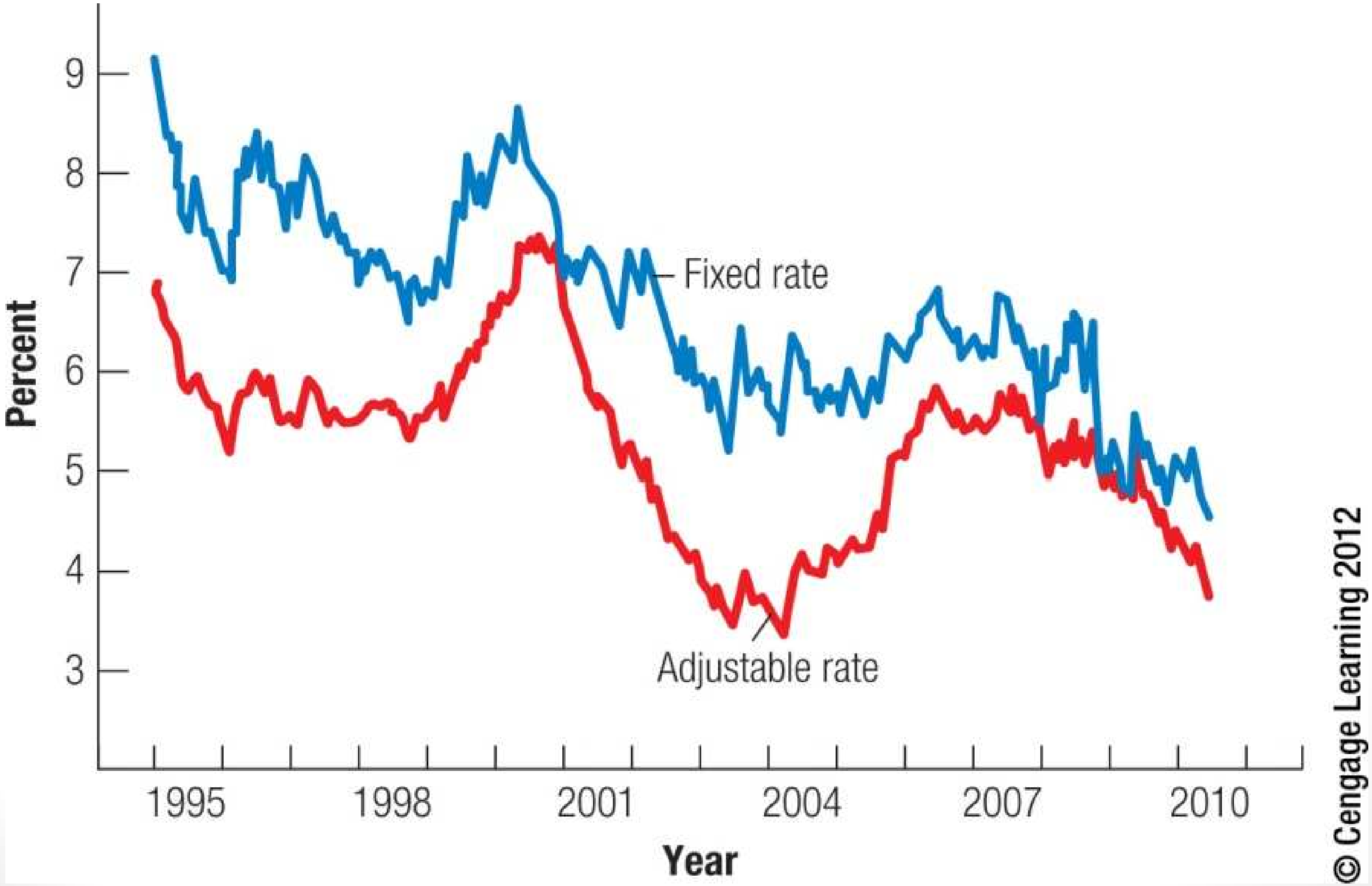

98) Download
99) Scenario Analysis
Mortgage Payment Calculator
Payment Options
Enter 2 of the next 3 fields
Loan Amount 100000.00
Interest Rate 5.052
Payment 540.00
Payment Freq Monthly
Years/Months 30 / 0
Starting 05/03/16
Points 0.000
Prepayment Options
Scheduled Prepayments
Amount
Frequency Monthly
Starting 06/03/16
Add Additional Prepayments
Payments
10) Table
11) Chart
Interest Payments
Principal Payments
Payment
Cumulative Interest Payments
Cumulative Principal Payments
Cumulative Payment
Summary Information
Prepayment Effect
Proceeds 100.00k
Effective Rate 5.052%
Total Interest 94401.49
Interest Saved
Time Saved 29 yr, 7 mo
Final Payment 05/03/2046
Australia 61 2 9777 8600 Brazil 5511 2395 9000 Europe 44 20 7330 7500 Germany 49 69 9204 1210 Hong Kong 852 2977 6000
Japan 81 3 3201 8900 Singapore 65 6212 1000 U.S. 1 212 318 2000 Copyright 2016 Bloomberg Finance L.P.
SN 163608 CEST GMT+2:00 H221-2727-0 03-May-2016 09:46:19


<Menu> to Return
98) Download
Mortgage Payment Calculator: Scenario Analysis
Scenarios
1) 1
2) 2
3) Add
Payment Options
Enter 2 of the next 3 fields
Loan Amount 100000.00
Interest Rate 5.052
Payment 540.00
Payment Freq Monthly
Years/Months 30 / 0
Starting 05/03/16
Points 0.000
Prepayment Options
Scheduled Prepayments
Amount 0.00
Frequency Monthly
Starting 06/03/16
Add Additional Prepayments
Scenario Comparison
Loan Amt Int Rate Payment Total Int Int Saved Time Saved Final Pmt
1. 100000.00 5.052 540.00 94401.49 05/03/46
2. 100000.00 5.302 555.43 99954.39 05/03/46
Loan Amount
100000.00
100000.00
Payments
555.43
540.00
Total Interest
99954.39
94401.49
Loan Term
30.0yrs
30.0yrs
Australia 61 2 9777 8600 Brazil 5511 2395 9000 Europe 44 20 7330 7500 Germany 49 69 9204 1210 Hong Kong 852 2977 6000
Japan 81 3 3201 8900 Singapore 65 6212 1000 U.S. 1 212 318 2000 Copyright 2016 Bloomberg Finance L.P.
SN 163608 CEST GMT+2:00 H221-2727-0 03-May-2016 09:46:56

Fixed-Rate vs. Adjustable Mortgages

- Adjustable-rate mortgages
  - Rates and the size of payments can change
    - Maximum allowable fluctuation over year and life of loan
    - Upper and lower boundaries for rate changes
  - Lenders stabilize profits as yields move with cost of funds
  - Uncertainty for borrowers whose mortgage payments can change over time

Comparison of Rates on Newly Originated Fixed-Rate and Adjustable-Rate Mortgages over Time



Mortgage Maturities

- Trend shows increased popularity of 15-year loans
  - Lender has lower interest rate risk if the term or maturity of the loan is lower
  - Borrower saves on interest expense over loan’s life but monthly payments higher

Types of Mortgage

- Graduated-Payment Mortgages (GPMs)
- Growing-Equity Mortgages
- Second Mortgages
- Shared-Appreciation Mortgages
- Baloon Payment Mortgages

Creative Mortgage Financing

- Graduated-payment mortgage (GPM)
  - Small initial payments
  - Payments increase over time then level off
  - Assumes income of borrower grows
- Growing-equity mortgage
  - Like GPM low initial payments
  - Unlike GPM, payments never level off
- Balloon payments
  - Principal not paid until maturity
  - Forces refinancing at maturity

Creative Mortgage Financing

- Second mortgage used in conjunction with first or primary mortgage
  - Shorter maturity typically for 2nd mortgage
  - 1st mortgage paid first if default occurs so 2nd mortgage has a higher rate
- Shared-appreciation mortgage
  - Below market rate but lender shares in home’s price appreciation

Institutional Use of Mortgage Markets

- Mortgage companies
  - Originate and quickly sell loans
  - Do not maintain large portfolios
- Government agencies including Fannie Mae and Freddie Mac
- Brokerage firms
- Investment banks
- Finance companies

Activities in the Mortgage Markets

- How the secondary market facilitates mortgage activities
- Selling loans
  - Origination, servicing and funding are separate business activities and may be “unbundled”
  - Secondary market exists for loans
- Securitization
  - Pool and repackage loans for resale
  - Allows resale of loans not easily sold on an individual basis

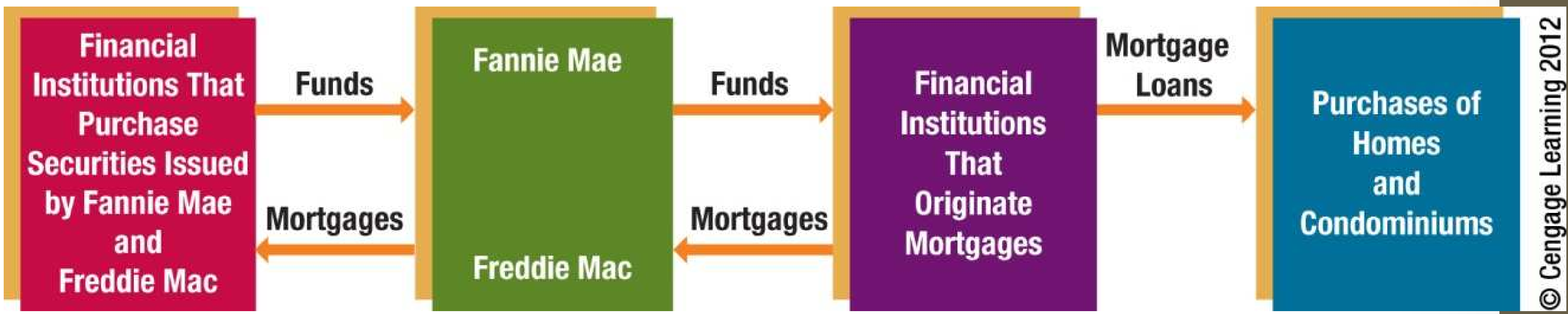
Use of Mortgage-Backed Securities

- Securitization is an alternative to the direct sale of a loan
- Institution can securitize loans to avoid interest rate risk and credit risk while still earning service fees
- Payments passed through to investors can vary over time
- Morgage-backed securities (MBS) or pass-through securities

Types of Mortgage-Backed securities

- Ginnie Mae mortgage-backed securities
- Fannie Mae mortgage-backed securities
- Particiaption certificates
- Collateralized mortgage (debt) obligations (CMOs, CDSs)

The Federal National Mortgage Association (Fannie Mae) The Federal Home Loan Mortgage Association (Freddie Mac) provide liquidity



Use of Mortgage-Backed Securities

- Mortgage-backed securities for small investors
  - In the past, high minimum denominations
  - Unit trusts created to allow small investor participation
  - Mutual funds
- Advantages
  - Can purchase in secondary market without purchasing the need to service loans
  - Insured
  - Liquid

Risk of Mortgage-Backed Securities

1. **Credit risk:** the risk that borrower will make a late payment or will default.

2. **Interest rate risk:** the risk that value of mortgage will fall when interest rates rise.

3. **Prepayment risk:** the risk that the borrower will prepay the mortgage when interest rates fall.

Institutional Use of Mortgage Markets

- Federally related mortgage pools
  - 37% of all mortgages, mostly residential
- Commercial banks
  - Dominate commercial mortgage market
  - Hold 23.3% of all mortgages
- Savings institutions
  - Primarily residential mortgages
  - Hold 10% of all mortgages
- Life insurance companies
  - Commercial mortgages
  - Hold 3% of all mortgages

Valuation of Mortgages

- Market price of mortgages is present value of cash flows

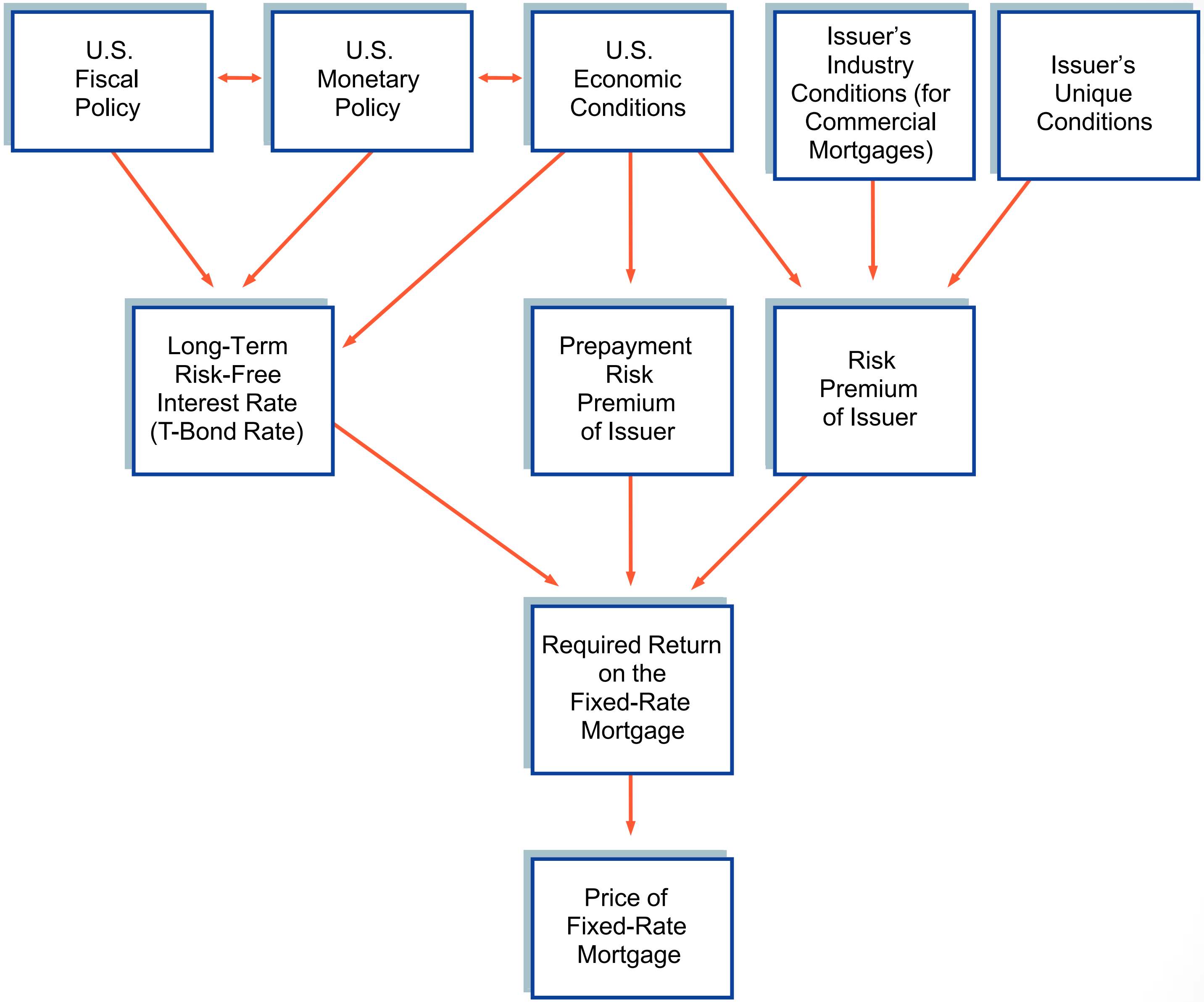
$$P_M = \sum_{t=1}^{n} \frac{C + \text{PRIN}}{(1+k)^t}$$

Valuation of Mortgages

- Periodic payment commonly includes payment of interest and principal
- Required rate of return determined by risk-free rate, credit risk and liquidity
- Risk-free interest rate components and relationship
  - + inflationary expectations
  - + economic growth
  - – change in the money supply
  - + budget deficit

Valuation of Mortgages

- Economic growth affects the risk premium
  - Strong growth improves borrowers’ income and cash flows and reduces default risk
  - Weak growth has the opposite affect
- Potential changes in mortgage prices monitored by reviewing inflation, economic growth, deficits, housing, and other predictor economic statistics


U.S. Fiscal Policy
U.S. Monetary Policy
U.S. Economic Conditions
Issuer's Industry Conditions (for Commercial Mortgages)
Issuer's Unique Conditions
Long-Term Risk-Free Interest Rate (T-Bond Rate)
Prepayment Risk Premium of Issuer
Risk Premium of Issuer
Required Return on the Fixed-Rate Mortgage
Price of Fixed-Rate Mortgage

Risk from Investing in Mortgages

- **Interest rate risk**
- Present value of cash flows or value of mortgage changes as interest rate changes
- Long-term fixed-rate mortgages financed by short-term funds results in risks
- To limit exposure to interest rate risk
  - Sell mortgage shortly after origination (but rate may change in that short period of time)
  - Make adjustable rate mortgages

Risk from Investing in Mortgages

- **Prepayment risk**
  - Borrowers refinance if rates drop by paying off higher rate loan and financing at a new, lower rate
  - Investor receives payoff but has to invest at the new, lower interest rate
  - Manage the risk with ARMs or by selling loans

Risk from Investing in Mortgages

- **Credit risk** can range from default to late payments
- Factors that affect default
  - Level of borrower equity
    - Loan-to-value ratio often used
    - Higher use of debt, more defaults
  - Borrowers income level
  - Borrower credit history
- Lenders try to limit exposure to credit risk