DAY 2 - TUESDAY

What Drives the Return on Bonds?

- Interest rate/yield based on purchase
- Predictability / timing of payments
  - Cash Flow
  - Prepayment risk
  - Call risk
- Credit risk
  - Default risk/creditworthiness of borrower
  - Collateral
- Liquidity /ability to sell in efficient market

Price and Duration

- Investment theory tells us that the value of a fixed-income investment is the sum of all of its cash flows discounted at an interest rate that reflects the inherent investment risk.
- Duration measures the weighted average of the present value of the cash flows to calculate the number of years it takes to recover the cash flows of a bond. Convexity is an even better way to look at duration.

Price and Duration

$$\text{Bond Price} = \underbrace{\sum_{t=1}^{N} \frac{CPN_t}{\{1 + YTM_t\}^t}}_{\text{Coupon Cash Flows}} + \underbrace{\frac{P_n}{\{1 + YTM_n\}^n}}_{\text{Principal Repayment}}$$

Definitions:

CPN = coupon payment

P = principal payment

YTM = yield to maturity

n = number of compounding periods

t = time period

$$\text{Macaulay Duration} = \sum_{t=1}^{n} \frac{(PV)\,(CF_t) \times t}{\text{Market Price of Bond}}$$

Definitions:

$(PV)(CF_t)$ = present value of coupon at period t

t = time to each cash flow (in years)

n = number of periods to maturity

Basic Bond Math

- $1,000 Bond, 3 year maturity, 3 annual payments, 10% coupon, market rate at 7% = what is price and duration?

$$\begin{aligned}
\text{Market Price} &= \$100/(1.07)^1 + \$100/(1.07)^2 \\
&\quad + \$1100/(1.07)^3 \\
&= \$93.46 + \$87.34 + \$897.93 \\
&= \mathbf{\$1{,}078.73}
\end{aligned}$$

$$\begin{aligned}
\text{Macaulay Duration} &= (1 \text{ x } \$93.46 / \$1{,}078.73) \\
&\quad + (2 \text{ x } \$87.34 / \$1{,}078.73) \\
&\quad + (3 \text{ x } \$897.93 / \$1{,}078.73) \\
&= \mathbf{2.7458}
\end{aligned}$$

Bond value stated at 1.079

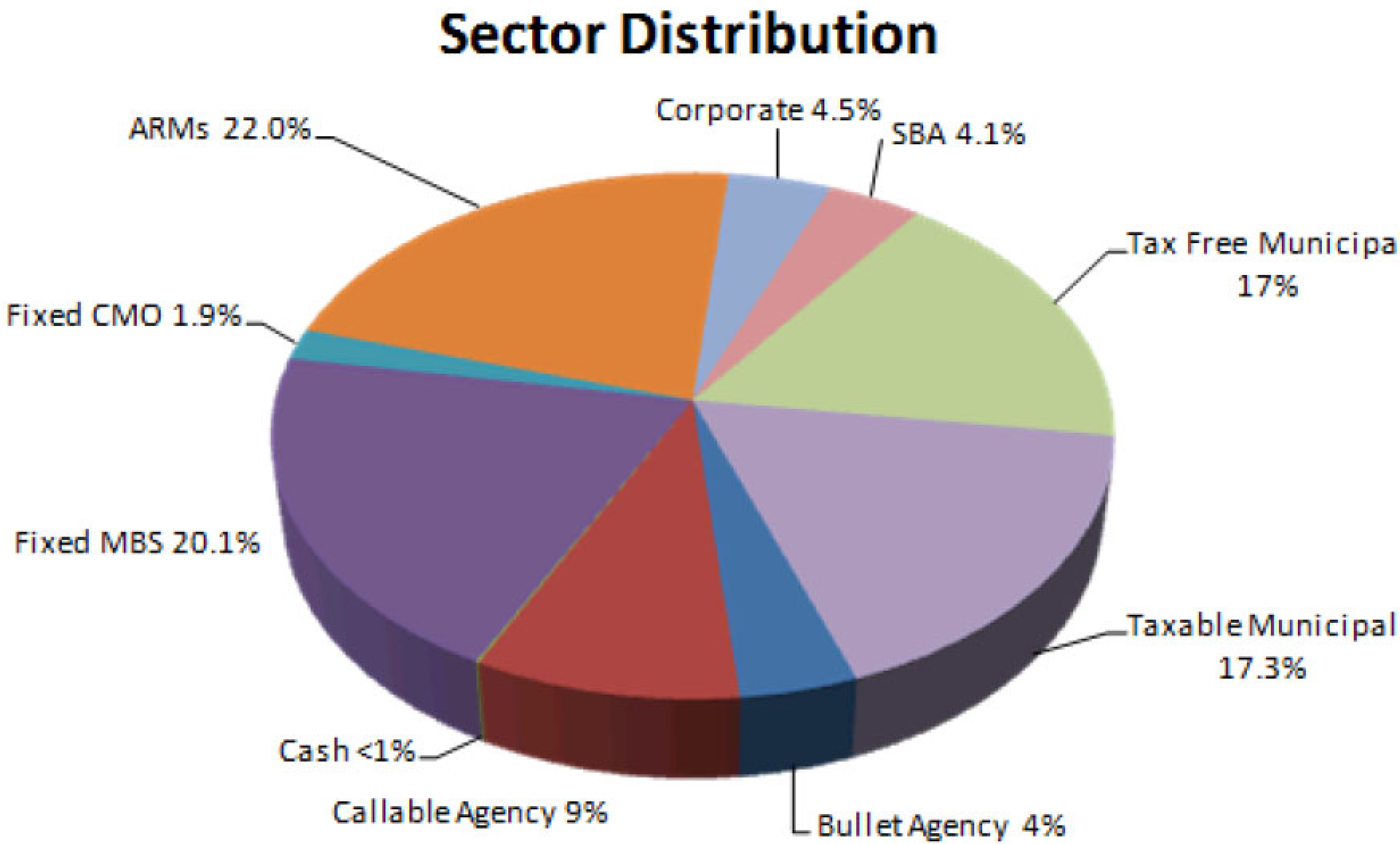
Key Issues - Bonds

- Accounting:
  - Balance Sheet Classification
  - Accounting for purchase discounts and premiums
  - Impairment (OTTI)
- Regulatory
  - Ratings Agencies cannot be relied upon
  - Each bank must underwrite and monitor Municipal and Corporate bonds

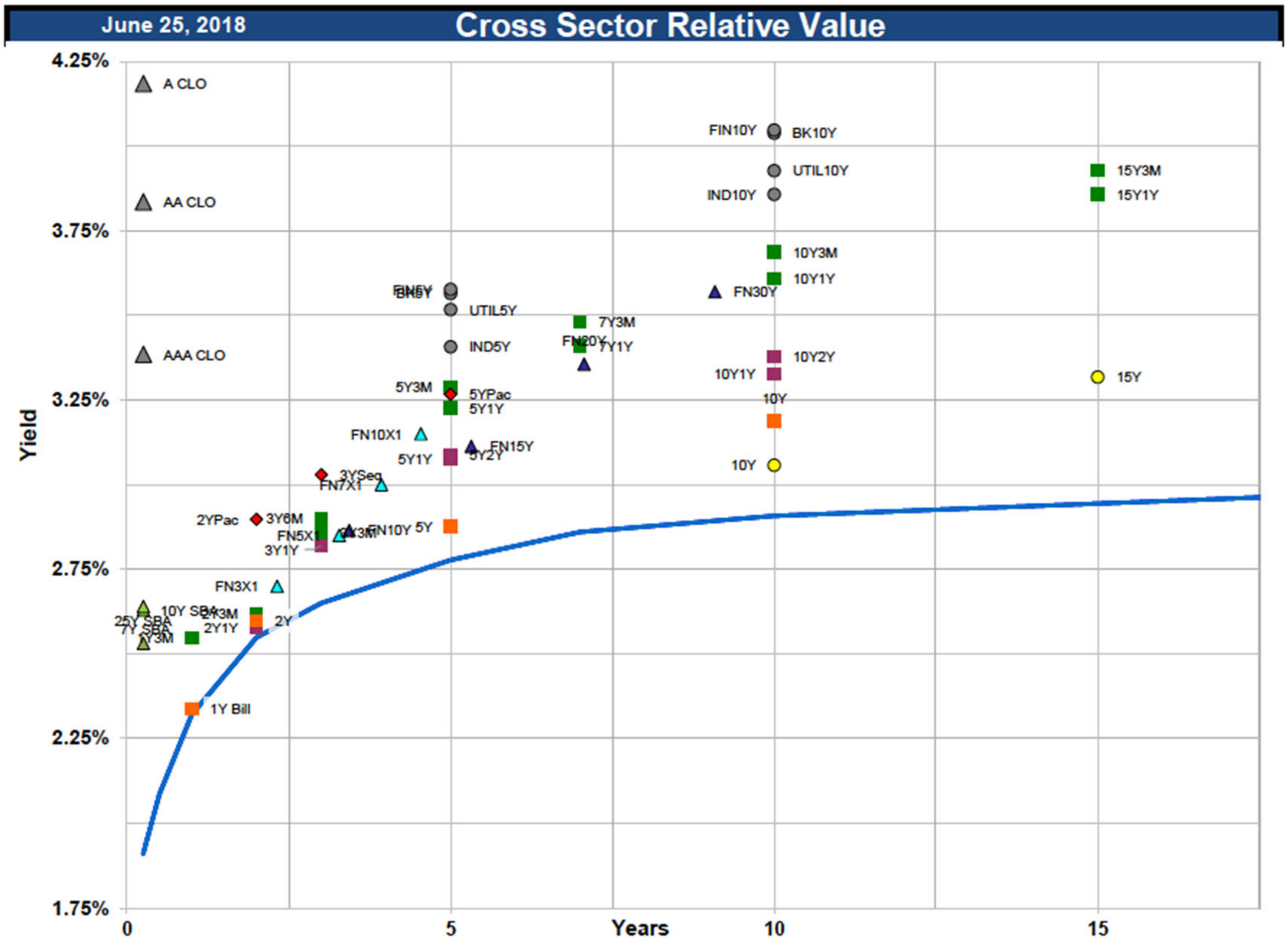
Balance Sheet Classification

- Held to Maturity (HTM)
  - Changes in value do not impact equity or earnings
  - Cannot use for liquidity, i.e. sell while held
- Available for Sale (AFS)
  - Changes in value Impact equity but not earnings
  - ________impact in rising rate environment
  - ________impact in declining rate environment
- Trading
  - Changes in value impact equity via earnings, MTM

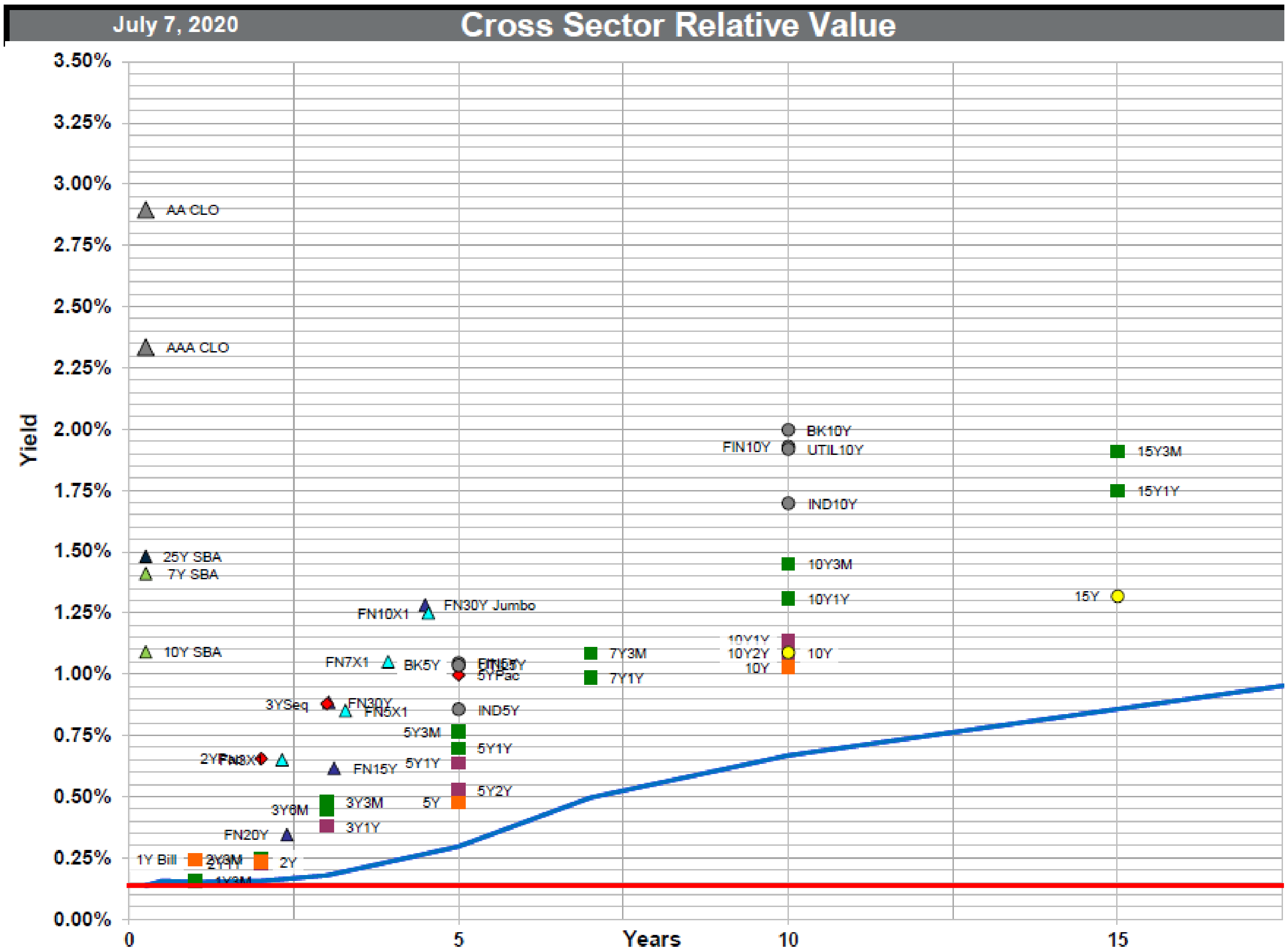
Sample Bank Portfolio



Investment Options – 2 Years Ago



Investment Options to Yield Curve



Investment Options - July 7, 2020

AGENCY		Spread	YTM	Maturity
BERMUDA	1Y3M	0	0.15%	1
	2Y3M	9	0.24%	2
	3Y3M	30	0.49%	3
	3Y6M	27	0.46%	3
	5Y3M	47	0.77%	5
	5Y1Y	40	0.70%	5
	7Y3M	59	1.11%	7
	7Y1Y	49	1.01%	7
	10Y3M	78	1.45%	10
	10Y1Y	64	1.31%	10
	15Y3M	124	1.91%	15
	15Y1Y	108	1.75%	15
EUROPEAN	2Y1Y	7	0.22%	2
	3Y1Y	20	0.39%	3
	5Y1Y	34	0.64%	5
	5Y2Y	23	0.53%	5
	10Y1Y	47	1.14%	10
	10Y2Y	42	1.09%	10
BULLETS	1Y Bill	8.9	0.24%	1
	2Y	8	0.23%	2
	5Y	18	0.48%	5
	10Y	36	1.03%	10
CORPORATES[4]		**Spread**	**YTM**	**Maturity**
Industrials	IND5Y	56	0.86%	5
	IND10Y	103	1.70%	10
Banks	BK5Y	74	1.04%	5
	BK10Y	133	2.00%	10
Financials	FIN5Y	75	1.05%	5
	FIN10Y	126	1.93%	10
Utilities	UTIL5Y	74	1.04%	5
	UTIL10Y	125	1.92%	10

SBAs	BEEM	BEY	Eff Dur	
7Y SBA	184	1.41%	0.25	
10Y SBA	216	1.09%	0.25	
25Y SBA	177	1.48%	0.25	
MBS Pass-Thrus[1]	**Spread**	**YTM**	**Avg. Life**	**Coupon**
FN15Y	43	0.62%	3.11	2.0
FN20Y	18	0.34%	2.40	2.5
FN30Y	70	0.88%	3.03	3.0
FN30Y Jumbo	101	1.28%	4.49	2.0
CMOs[1]	**Spread**	**YTM**	**Avg. Life**	
2YPac	50	0.65%	2.00	
5YPac	70	1.00%	5.00	
3YSeq	70	0.88%	3.00	
MBS ARMs[2]	**Z-Spread**	**YTM**	**Eff. Dur**	
FN3X1	45	0.65%	2.32	
FN5X1	60	0.85%	3.28	
FN7X1	70	1.05%	3.93	
FN10X1	80	1.25%	4.54	
CLOs	**DM**	**BEY**	**Eff. Dur**	
AAA CLO	179	2.09%	0.25	
AA CLO	232	2.62%	0.25	
A CLO	291	3.21%	0.25	
BBB CLO	455	4.85%	0.25	
MUNIs-BQs[3]	**Spread**	**YTM**	**Maturity**	
10Y	42	1.09%	10	
15Y	65	1.32%	15	

[1]Pass-Thrus & CMOs Maturity = Avg. Life
[2]ARMs Maturity = Eff. Duration
[3]MUNIs = AAA rated
[4]Corporates = A rated

Decisions during BankExec

```
============= Purchase Securities =================
   Security               Amount          Maturity in
     Type               (Par,Mil)           Quarters

     -- --                -- --             -- -- --

     -- --                -- --             -- -- --

     -- --                -- --             -- -- --

     -- --                -- --             -- -- --

     -- --                -- --             -- -- --

     -- --                -- --             -- -- --
BL: Bills,   BD: Bonds,   AG: Agencies,
SV, SF: Variable, Fixed Rate Swaps,
TE: Bank qualified Tax-Exempt bonds.
      $5 million available,
      60 quarters maturity at  4.68%.
      Taxable-equivalent yield is  7.07%.
   Note:  Maximum bill maturity is 4 quarters.
```

Funding – Liability Side of Balance Sheet

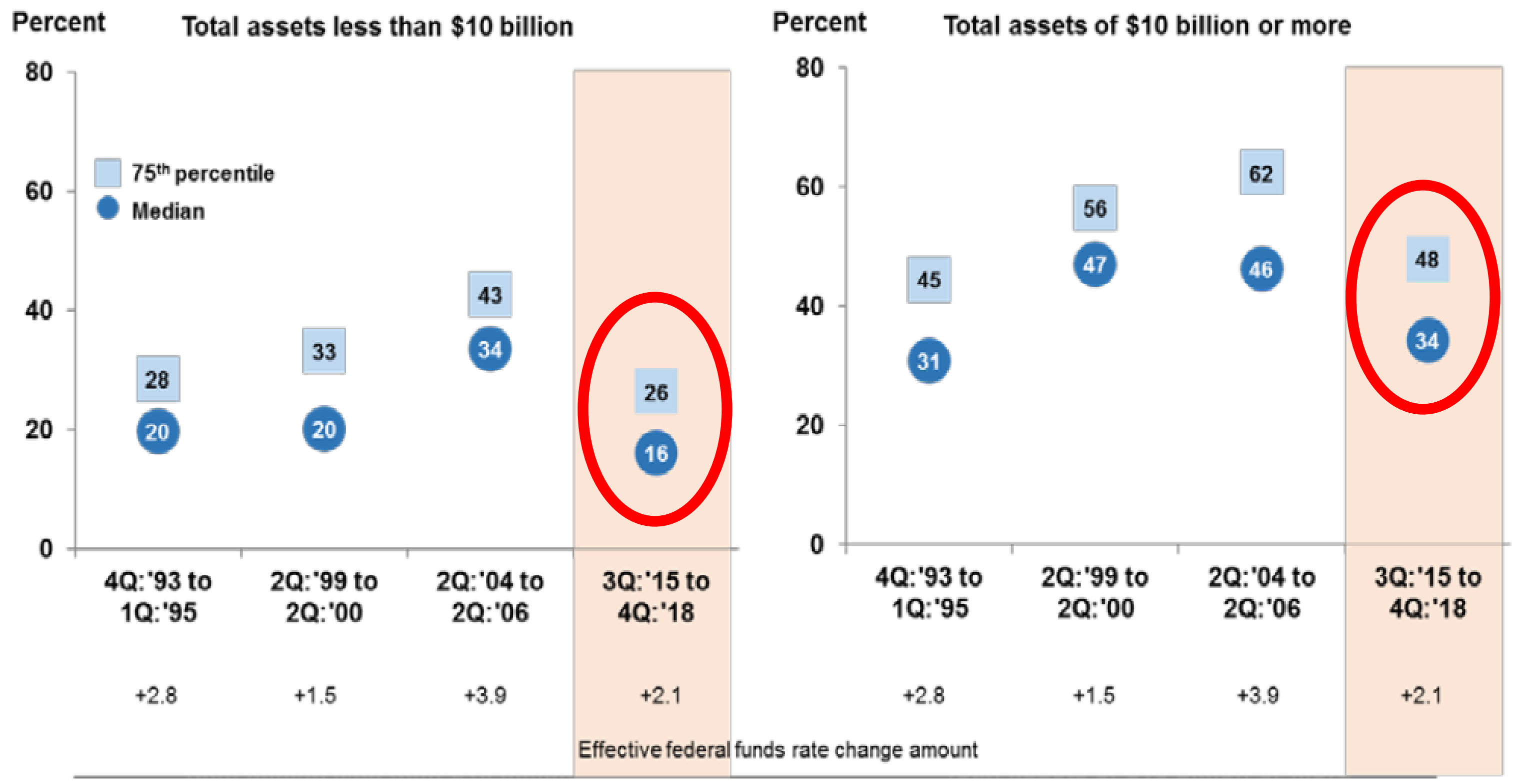
- Sources of Cash
- Deposits
  - Demand deposits
  - NOW/Interest Checking accounts
  - Money Market Accounts
  - Time Deposits/CDs
  - CDARS/Brokered Deposits
- Fed Funds Purchased
- Repurchase Agreements
- Federal Home Loan Bank Advances
- Federal Reserve Discount Window borrowing
- Other forms of debt/hybrid capital securities

	For Quarters Ending			
	12/31/21	9/30/21	6/30/21	3/31/21
Assets				
Cash Items	49.695	49.616	49.108	46.083
Fed Funds Sold	8.911	55.247	103.423	104.537
Securities	24.687	24.751	24.793	34.823
Loans (Net)	680.210	646.999	628.500	591.517
Business	223.808	199.523	185.278	175.458
Real Estate	323.338	318.948	320.786	304.970
Consumer	139.934	135.063	128.785	117.064
Other	0	0	0	0
Loan Loss Reserve	-6.871	-6.535	-6.348	-5.975
Premises	15.504	15.492	15.484	15.479
Other Assets	40.048	40.397	41.369	39.980
Total Assets	819.054	832.502	862.677	832.420
Liabilities and Equity				
Total Deposits	719.843	734.188	763.936	734.556
Checking Accounts	233.925	227.735	215.481	200.037
Savings Accounts	246.924	270.451	304.883	291.049
Time Accounts	238.994	236.002	243.572	243.469
Certificates of Deposit	0	0	0	0
Borrowed Funds	0	0	0	0
Repurchase Agreements	0	0	0	0
Fed Funds Purchased	0	0	0	0
FHLB Borrowing	0	0	0	0
Other Liabilities	33.748	34.405	35.828	34.314
Capital Notes	0	0	0	0
Owners Equity	65.463	63.908	62.913	63.550
Total Liab & Equity	819.054	832.502	862.677	832.420
Ratios (%)				
Net Liquid Assets / Assets	1.09	6.64	11.99	13.76
Loans / Deposits	94.49	88.12	82.27	80.53
Non-Performing Loans / Loans	.61	.64	.67	.80
Charge-offs / Average Loans	.28	.36	.55	.64
Earning Asset / Total Assets	87.15	87.33	87.72	87.80
Core Deposits / Total Assets	87.89	88.19	88.55	88.24
Int Bear Liab / Total Assets	79.24	79.65	80.28	79.59
Borrowed Funds / Total Assets	0	0	0	0
Fed Funds Purch / Tot Capital	0	0	0	0
Owners Equity / Total Assets	7.99	7.68	7.29	7.63

Deposit Beta by Cycle

Beta = Change relative to another factor

Figure 14: Interest Rate Cycle, Interest-Bearing Deposit Beta



Source: Integrated Banking Information System (OCC)

Note: Includes national banks only because of data limitations. Data are merger-adjusted for institutions in continuous operation in each time period. Deposit beta is the change in funding cost divided by the change in the effective federal funds rate.

A Note on Liquidity

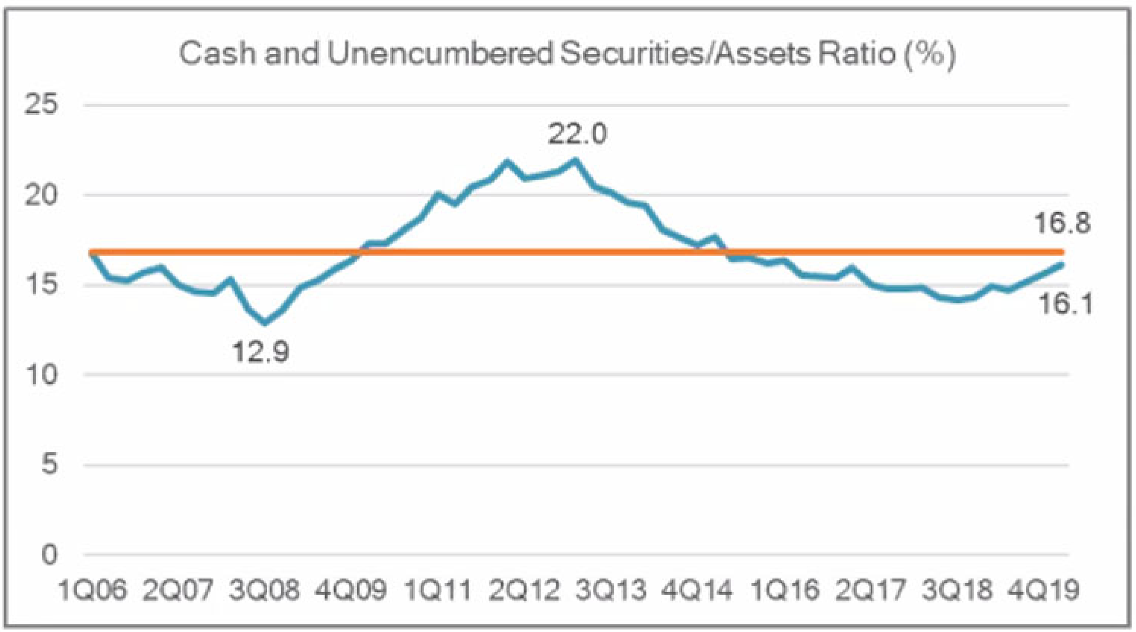
- What is liquidity?
- Sources (+) and Uses (-) of Cash
- Types of Liquidity
  - Balance Sheet-based liquidity
  - Liability-based liquidity
- Can I have too much or too little liquidity
  - What is impacted if I have too much?
  - Stress tests help understand what would happen in a crisis scenario vs. baseline
- Can a lack of liquidity cause a bank to fail?
- BankeExec Tip – Funds Borrowed > Capital

A Note on Liquidity

Excess Liquidity, How Much is Enough?

What's the Right Amount of Cash and Unencumbered Securities?

- Focus on Cash and Unencumbered Securities-to-Assets Ratio
- Low of 12.9% in 3Q08, High of 22.0% in 1Q13
- Average over the time period of 16.8%



Managing Liquidity

	Beginning Balance	First Day Activity	Funds for Quarter Provided	Funds for Quarter Used	Ending Balance
Securities (Book Value)	25.0	0			25.0
Loans (Net)	647.0	-8.9		42.1	680.2
Other Assets	105.5		.3		105.2
Repos	0	0			0
Corporate CDs	0	0			0
FHLB Borrowing	0	0			0
Customer Deposits	734.2			14.3	719.8
Other Liabilities	34.4			.7	33.7
Capital Notes	0	0			0
Owner's Equity	63.9	0	1.6		65.5
Net Position:	-55.0	-8.9	1.8	57.1	-8.6
Funds Positions					
Fed Funds Sold	55.2	63.7			8.9
Fed Funds Borrowed	0	0			0

Managing Liquidity

	Beginning Balance	Deposits: New	Deposits: Matured	Deposits: With-drawals	Accrued Interest	Net Service Charges and Fees	Ending Balance
Business Checking	71.094	2.915		2.936		.251	70.823
Individual Checking	156.641	15.545		8.371	.135	.846	163.102
Individual Savings	270.451	10.303		34.875	1.144	.099	246.924
Time Accounts							
Variable Rate	15.920	0	4.605	0	.163		11.478
Fixed Rate	220.082	14.507	9.869	0	2.797		227.517
Total	734.188	43.270	14.475	46.182	4.239	1.197	719.843

=== Time Accounts Maturities ===

	Next Quarter	Quarter Two	Quarter Three	Quarter Four	Over 1 Year	Total
Variable Rate	0	0	0	0	11.5	11.5
Fixed Rate	33.2	32.3	19.9	28.5	113.7	227.5
Total	33.2	32.3	19.9	28.5	125.1	239.0

Treasury Management (Non-customer funding)

Source	Decision Amount	Current Quarter: Available Amount	Available Rate (%)	Current Maturing	Current Balance	Prior Quarter: Decision Amount	Avail. Amount	Avail. Rate (%)		Matured
Fed Funds Borrwd			6.13	0				4.83		0
Repos	-- -- --	10	5.75	0		0	10	4.63		0
CDs				0						0
1 Quarter	-- -- --	58	6.46		0	0	57	5.27		
2 Quarter	-- -- --	43	6.33		0	0	43	5.43		
3 Quarter	-- -- --	14	6.26		0	0	14	5.54		
4 Quarter	-- -- --	29	6.22			0	29	5.62		
			Maturity						Maturity Decision	
FHLB Borrowing	-- -- --	130	-- --	0	0	0	119			0

--- Capital Notes and Common Stock ---

Decision Amount	Issue	3 - 5 Million	6 - 10 Million	12 - 16 Million	Prior Quarter: Decision Amount	Price or Rate
-- --	Capital Notes Interest Rate	6.19	6.18	6.20	0	
-- --	Common Stock Price Per Share	19.14	19.25	19.30	0	

==== Dividends and Forecast Earnings ====

Dividends per Share: -- --.-- -- .14

Earnings per Share, Forecast: (Current Quarter: .69) -- --.-- -- .45

Capital Management

- Can you have too much?
  - Why do banks raise dividends/buyback stock
- How do you measure if have enough?
  - Stress tests/CCAR-DFAST scenarios
- Book Value = Capital/# shares outstanding
- Management decisions
  - Right mix of capital?
  - What is right dividend strategy?
  - Should I buy back shares or issue shares?

Capital Management

Bank	Price/Share Q4/21	Price/Share Q3/21	Pcnt Chng	Ratios P/E	Ratios Mkt/Book	Earnings Qtr	Earnings YTD	Earnings per Share Fcast	Earnings per Share Actual	Earnings per Share YTD	Dividends Qtr	Dividends YTD	Dividends Yield	Credit Rating
1	20.07	16.29	23.2	20.1	.92	1.46	2.95	.39	.49	1.00	.12	.70	2.4	A
2	17.24	16.33	5.6	50.8	.80	.47	1.01	.15	.16	.34	0	.45	0	B
3	20.37	17.59	15.8	16.3	.92	2.03	3.70	.45	.69	1.25	.14	.61	2.7	A
4	24.45	19.30	26.7	11.9	1.07	3.02	6.11	.86	1.02	2.06	.17	.71	2.8	A

Bank	Owners Equity and Capital Ratios					Capital Issues				
	Shares Outstanding	Book Value	Capital Notes / Equity + Capital Notes %	Equity / Total Assets %	Capital / Risk Assets %	Capital Notes Amount	Capital Notes Rate	Common Stock Issue Price	Common Stock Shares	Common Stock Total
1	2,960,625	21.89	0	7.68	10.50					
2	2,960,625	21.43	0	8.95	12.12					
3	2,960,625	22.11	0	7.99	10.61					
4	2,960,625	22.94	0	7.00	9.50					

Leveraging Balance Sheet to Drive Profitability

How does the Balance Sheet drive the income statement and the growth of capital?

Bank Income Statement

\+ Interest Income

\- <u>Interest Expense</u>

\+ Net Interest Income

\- Provision for loan losses

\+ Non-interest Income

\- <u>Non-interest expense</u>

\+ Pre-tax Income

\- <u>Federal Tax Expense</u>

\+ Net Income/Return of Assets

6 Major
Components

Income Statement

	For Quarters Ending			
	12/31/21	9/30/21	6/30/21	3/31/21
Interest Income	12.644	11.820	11.116	10.305
Loans	11.899	10.688	9.980	9.367
Business	4.346	3.411	2.952	2.633
Real Estate	5.119	5.020	4.942	4.789
Consumer	2.434	2.257	2.086	1.945
Other	0	0	0	0
Securities: Taxable Income	.106	.106	.106	.190
Securities: Tax-exempt Income	.141	.141	.141	.141
Federal Funds Sold	.498	.885	.889	.608
Interest Expense	4.239	4.328	4.595	4.583
Checking Accounts	.135	.128	.121	.112
Savings Accounts	1.144	1.201	1.366	1.320
Time Accounts	2.960	2.999	3.109	3.151
Certificates of Deposit	0	0	0	0
Borrowed Funds	0	0	0	0
FHLB Borrowing	0	0	0	0
Capital Notes	0	0	0	0
Net Interest on Swaps	0	0	0	0
Net Interest Income	8.405	7.492	6.520	5.723
Service Charges & Other Income	2.686	2.585	2.416	1.952
Loan Loss Provision	.791	.753	1.210	.727
Operating Expenses	7.478	7.497	7.818	7.054
Salaries and Benefits	5.419	5.467	5.804	5.035
Advertising - Promotion	.050	.050	.050	.100
Occupancy & Other Op.Expenses	2.009	1.980	1.965	1.919
Operating Earnings	2.823	1.828	-.092	-.107
Gains/Losses on Asset Sales	.284	.047	0	.719
Income Taxes	1.073	.630	-.077	.176
Net Income	2.033	1.245	-.015	.435
Earnings Per Share	.687	.420	-.005	.147
Interest Income/Earning Assets	7.02	6.37	5.98	5.70
Interest Expense/Int-bear Liab	2.59	2.56	2.71	2.80
Spread	4.43	3.82	3.27	2.90
Net Interest Inc/Earning Assets	4.67	4.04	3.51	3.17
Net Interest Inc/Total Assets	4.07	3.54	3.08	2.78
Operating Expense/Total Assets	3.62	3.54	3.69	3.43
Net Non-Int Exp/Total Assets	2.32	2.32	2.55	2.48
Operating Earning/Total Assets	1.37	.86	-.04	-.05
Net Income/Total Assets	.99	.59	-.01	.21
Net Income/Owners Equity	12.43	7.79	-.09	2.74

Income Statement as of 12/31/21 Bank B3 === B02 === Page 3

Net Interest Income

+ Short-term funds sold
+ Investment securities
+ Loan Interest income
+ Loan Fee Income (spread)

– Deposit interest expense

– <u>Other Borrowings/Funds purchased</u>

= NET INTEREST INCOME

Annualize if not an annual number

Net Interest Margin

- The major profit driver for vast majority banks
- Measures the level of net interest income compared to average earning assets
- Asset mix and low cost funding major factors
- A higher number is better
- Calculation:
  - Annualized net interest income / Avg. Earning Assets

Non-Interest Income Sources

+ Deposit Fee Income
+ Treasury/Cash Management Fees
+ ATM/Card/Merchant Services
+ Investment Brokerage/Trust fees
+ Mortgage Loan Origination and Sales
+ Insurance Brokerage/Title Insurance
+ Bank owned life insurance
+ Other___________________________

Non-Interest Expenses

1. Salaries and Commissions
2. Employee Benefits
3. Facilities
4. Equipment and IT Costs
5. Marketing and Advertising
6. Other______________________________

Earnings per share drives stock price

Net income / # shares stock = EPS

EPS x market multiple = Stock Price

What else drives stock price?

Budgeting and Planning

Profit Plan Worksheet

	Results for Qtr Ending 12/31/20	Plan for Quarter Ending 3/31/21
Interest Income	9.264	
Loans	8.445	
Securities: Taxable Income	.246	
Securities: Tax-exempt Income	.256	
Funds Sold	.316	
Interest Expense	4.382	
Checking & Savings Accounts	1.088	
Time Accounts	3.014	
Certificates of Deposit	.281	
Borrowed Funds	0	
FHLB Borrowing	0	
Capital Notes	0	
Net Interest on Swaps	0	
Net Interest Income	4.881	
Service Charges & Other Income	1.992	
Loan Loss Provision	.449	
Operating Expenses	6.651	
Salaries and Benefits	4.684	
Advertising - Promotion	.100	
Occupancy & Other Op. Expenses	1.867	
Operating Earnings	-.226	
Gains/Losses on Asset Sales	0	
Income Taxes	-.162	
Net Income	-.064	
Number of Outstanding Shares	2,000,000	
Earnings Per Share	-.032	