

Selecting the Best Products for Your Investment Goals

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Make it happen®

Topics

- Investment Goals & Current Market Environment
- Advantages & Disadvantages of Fixed Rate Investments
- Common High Credit Quality Instruments
- GSE Status Update
- Agency Bullets & Callables
- How do Callables Work?
- Risk Measures
- Detailed Analysis of Callable Step Ups

Investment Goals and Current Market Environment

Investment Goals

- Safety, Liquidity, Return
- Cash Flows
- Municipal-specific issues related to state and local budgets.

Current Market Environment

- <u>Low Rates</u>: Federal Reserve Open Market Committee "anticipates that economic conditions are likely to warrant exceptionally low levels of the federal funds rate for an extended period".¹
- <u>Higher Future Rates</u>: Market pricing rising rates in the middle of 2010.



¹ FOMC Statement 8/12/09. http://www.federalreserve.gov/newsevents/press/monetary/20090812a.htm

Liquidity of Highest Credit Quality Investment Products

- Safety: Focus on commonly used AAA-rated Investments
- Liquidity: Bid/Offer Spreads Reflect Secondary Market Liquidity
- Investors pay for liquidity in yield, so buy and hold investors may add less liquid products in order to enhance yield.

Secondary Market	Liquidity		
Туре	Description	Yield	Bid/Offer
3mo	Treasury Bills	0.15%	0.5 bp
3mo	Agency Discount Notes		0.5 bp
3yr	Treasury Notes	1.55%	0.5 bp
Зуг	FDIC TLGP	1.83%	7 bp
3yr	Agency Large Bullets	1.90%	5 bp
Зуг	Agency Bullet MTNs	2.10%	12 bp
3/1 1x	Agency Callables* \$250mm	2.00%	12 bp
3/1 1x	Agency Callables* \$250mm	2.00%	17 bp

Source: RBS *The callables will also depend on the coupon, which will determine the duration.

Advantages & Disadvantages of Fixed Rate Investments

Advantages

- Locked in yield provides certain cash inflows that can be used to match cash outflows.
- If interest rates decrease, the secondary market price of a fixed investment will increase.

Disadvantages

- A fixed coupon will not increase when interest rates increase.
- If interest rates increase, the secondary market price of a fixed investment will decrease.

Commonly Used Investment Instruments

FDIC TLGP (Dec 2008 – Oct. 31, 2009)

- Debt is backed by the full faith and credit of the US government.
- \$280.4 bn in term debt and about \$40 bn in CP outstanding at the end of August.
- Issuance has been low over the past several months and is set to end completely October 31.
- Secondary market TLGP trades near agency debt.

Agency Bullets & Callables

- Fannie Mae, Freddie Mac, Federal Home Loan Bank and Federal Farm Credit Bank are the main issuers of agency debt.
- Agency debt is not explicitly backed by the government.
- Active, developed market with \$1.6 trillion in outstandings
- Heavy gross issuance with \$255 bn in bullets and \$355 bn in callables issued through July 2009.

Current GSE Status: Comprehensive Government Support



Agency Support Programs: Capacity and Expiration

GSE Debt & MBS Market Interventions													
\$ Billion	Net Purchases	Limit	Expiration	Tsy Estimates FY2009	Tsy Estimates FY2010								
Fed Agy Debt Purchases	140	200	3/31/10										
Fed Agy MBS Purchases	941	1,250	3/31/10										
Treasury Agy MBS Purchases	176	n/a	12/31/09	249	60								
Treasury GSE Credit Facility	0	n/a	12/31/09	0	0								
Tsy Preferred Stock Purchases	95.6	200*	Until fully funded, paid off or completion of an asset liquidation.	105.9	41.3								

Source: RBS, Fed, Tsy *\$200 bn for each FN & FR. As of 10/19/09.



Outlook for GSE Status

Stability: Maintain Conservatorship

- Congress is likely to avoid structural changes to the GSEs in an effort to avoid disruption in the agency market given the government's increasing reliance on the GSEs.
- In addition, Congress is unlikely to address GSE status this year given its focus on the economy and regulatory reform.

Extend Treasury Support

 Treasury is likely to strengthen and extend support for the GSEs until the housing market stabilizes. Both FNMA and FHLMC outline a grim picture of future profitability, including potential debt funding problems absent an extension in government support beyond yearend.

GSE Debt Supported by Government Regardless of Ultimate Outcome

- Nationalization Scenario: Expect agency debt to be that of a government corporation versus a GSE.
- Privatization Scenario: Expect outstanding debt to wind down under GSE status similar to the SLMA privatization.¹
- Receivership Scenario: Treasury, under the preferred stock purchase program, would fund the net worth deficiency as evidenced by increased government reliance on the GSEs coupled with the \$200 bn preferred stock purchase commitment for each entity.

¹ On 9/30/96, Congress enacted the SLMA Reorganization Act to convert SLMA to a private business with the GSE subsidiary gradually winding down, initially over a 12-year period. The GSE was officially dissolved ahead of schedule at the end of 2004. Basically, the GSE issued debt maturing before the wind down date with remaining debt defeased with cash and Treasuries at dissolution.

Product Types: Agency Bullets

US Agency Bullet Market

- 1. Large Global Deals
 - At least \$3 bn in size
 - Term has mostly been 2yr, 3yr and 5yr
 - FNMA, FHLMC, FHLB issue on monthly calendar
 - Active secondary market trading through Dealers/TradeWeb

2. Medium Term Notes

- Almost half (\$115 bn) of YTD 2009 bullet issuance has been MTNs
- Weighted average maturity is only 1.2 years
- FHLB is the largest MTN issuer (96% of YTD issuance)
- Due to the short term nature of the issuance, many deals are held to maturity by investors.
- Less liquid than the large benchmarks





\$ Billion

LargeDeal Issuance by Sector

RBS

Product Types: Agency Callables

US Agency Callable Market

- <u>Underwriter Matters for Liquidity</u>
 - Dealers typically provide the best secondary market support for deals that they underwrote.
- Liquidity improves with deal size
 - Index Eligible \$250 million: 55% of the outstandings are index eligible
 - Trade Web Eligible \$1 billion: 31% of the outstandings are \$1 billion or larger
- Embedded Optionality Matters
 - One time calls are the easiest to value
 - AOAS screen provides standardized pricing
- <u>GSE Funding Needs Impact Coupons</u>
 - GSEs richen/cheapen funding levels based on issuance needs.
 - The majority of the outstandings are 18 months and longer as the GSEs reduced refunding risk.





How do agency callables work?

• The purchaser of a callable agency is long a bullet position and short an option position.

Callable	Bullet	Call Option
Bond Price	Price	- Price

- The issuer will call the bond when the coupon of a new bond is lower than the coupon rate they are paying on the outstanding issue.
- The investor is compensated for selling the call option in the form of incremental yield pickup over bullets.

Agency Callable Bond Terminology



Callable Frequency

- European: One Time
- Bermuda: Semiannual or Quarterly
- Canary: Combination of Bermudan and European
- American: Continuous

Risk Measures

Duration

- Measures the approximate price impact for a change in interest rates.
 - For example, the price of a bond with a duration of 3 will fall by approximately 3% when interest rates increase by a 100 bp.
 - <u>Effective duration</u> takes into account that expected cash flows will fluctuate as interest rates change.

Negative Convexity

- Measures the rate of change of duration as bond prices change.
 - When interest rates fall, the price of a negatively convex bond will rise by less than that of a positively convex bond.
 - When interest rates rise, the price of a negatively convex bond will fall by more than that of a positively convex bond.

Callable Agencies: Negative Convexity

- When <u>rates rise</u>, the <u>probability of call decreases</u>, extending the duration of a callable bond. The bullet duration does not change. A bond with a longer duration decreases in price by more than a shorter duration bond.
- When <u>rates decrease</u>, the <u>probability of call increases</u>, which shortens the duration of a callable bond. When interest rates fall, the bond gets called at par, capping the price appreciation, whereas the bullet would participate in the rally with pricing rising above par.



Impact of Negative Convexity

	3 NC 1yr (1x)	Similar Duration Bullet
Price	100	100.71
Effective Duration	2.58	2.58
Effective Convexity	-0.28	0.08
- 100 bp Change in Rates %Change in Price	+1.94%	+2.63%
+100 bp Change in % Change in Price	-2.69%	-2.55%
Impact of negative convexity	When rates rise, the price falls by <u>more</u> than implied by duration. When rates fall, the price increases by <u>less</u> than implied by duration.	When rates rise, the price falls by <u>less</u> than implied by duration. When rates fall, the price increases by <u>more</u> than implied by duration.

Data as of 8/26/09. New issue 3/1 1x coupon is 2.05 and similar duration bullet is FNMA 1.875 4/12.

Probability of Call: Europeans vs. Bermudans

• European callables roll into the bullet curve increasing the probability of call versus Bermudans.



AgencyBermCallableCurvevs.Euro&Bullet

AOAS Screen Provides Valuable Information: 3nc1y(1x)



Callable Agency Step Up Coupons

- When rates are expected to rise, investors seek coupon rates that increase.
- Step up structures provide bearish protection as the probability of call increases when the coupon steps up, especially if the backend of the bond is a bullet.
- In this case, the bond is expected to be called and the proceeds can be reinvested in the higher interest rate environment.
- If its not called, the higher coupon rate helps to offset the impact of rising rates.
- One way of thinking of step ups is insurance to increase the probability of call through the higher back end coupons. The cost of this insurance is accepting a lower coupon upfront.

Callable Agency Step Up Analysis

- 1. Determine if Bearish Protection is Needed.
 - Fed talk calls for continued period of low rates.
 - Market pricing in Fed tightening in mid-2010
 - Agency forward curve is pricing in a 150 bp increase in 2yr rates one year from now and 270 bp increase two years from now. Bear Flattener as seen below.
 - What do you think?
- 2. How does the increased coupon impact the probability of call?
- 3. Determine the cost of bearish protection by comparing the coupon of step up structure to:
 - Fixed Coupon Alternative
 - Discount Note Alternative to the expected call date
 - Short Callable Alternative to the expected call date.

Rate Increased Projected by Forward Curves in 1yr & 2yrs



¾ RBS

Example: Compare 2 Step Up Structures with Fixed Cpn

- <u>3/1 1x:</u> Bond is callable one time one year from now. If not called, it becomes a 2yr bullet with a 2.05% coupon.
- <u>3/1y (1x) Step Up</u>: Bond is callable one time one year from now. If the bond is not called at this time, the coupon increases from 1.00% to 3.25% and the remaining structure is a 2yr agency bullet. The high second coupon increases the probability of call and makes the structure look like a 1yr agency bullet alternative.
- <u>3/1y Annual Step/Call</u>: Bond is callable in 1yr and 2yrs. If the bond is not called, the coupon increases from 1.00% to 2.25% on the first call date and 3.25% on the second call date. If the bond is not called on the second call date, the bond turns into a 1yr agency bullet.

Callable Step Up Analysis

Structure	Coupon/Yld
3nc1y 1x Step Up (call)	1.00, 3.25
3nc1y Annual Step Up (call)	1.00, 2.25, 3.2
3nc1y (1x) Fixed	2.05

Source: RBS as of 8/27/09



Determine the Probability of Call

- Compare the coupon rates with the remaining structure at each call date combined with the increase in rates projected by the forward curve.
- The 1x step is no longer callable after a year, so it's stepped up rate of 3.50% must be compared with a 1yr bullet rate 1yr forward, which is 2.73%. Therefore, the 1x step is 52 bp In the money to be called at the 1yr point in time. This compares with the fixed coupon, which is 68 bp OUT of the money. The YTC is 1%, which picks up 42 bp versus the 1yr bullet (0.58%).
- The annual step, annual call is out of the money at both call dates versus the higher rates projected by the forwards. The increasing coupon rates are expected to be realized into the higher rates. The YTM of the annual step up is 11.7 bp higher than the fixed coupon and 22.5 bp higher than the 3yr bullet.

Structure	Coupon/YId	2yr Rate 1yr Forward	1yr Rate 2yrs Forward	Probablity of Call in 1yr	Probablity of Call in 2yrs
3nc1y 1x Step Up (call)	1.00, 3.25	2.73		-0.52	
3nc1y Annual Step Up (call)	1.00, 2.25, 3.25	2.73	3.60	0.48	0.35
3nc1y (1x) Fixed	2.05	2.73		0.68	
1yr agency bullet	0.58				
1nc3m (Q)	0.65				
3r agency bullet	1.85				
				Source: R	3Sasof 8/27/09

Callable Step Up Analysis

Determine the Cost of Bearish Protection

- Let's assume that you agree with market expectations and want to explore bearish protection. How much does it cost?
- Both Steps give 105 bp to the fixed coupon alternative in the first year. The annual step YTC in the second year also gives 42.5 bp in the second year. This is the cost of the higher future coupons.
- The 1x step has a higher step up coupon, which results in a higher probability of call.
- When do you lose? When rates fall and all of the bonds get called. In this case, you did not need the bear protection.

Callable Step Up Analysis

Structure	Coupon/Yld
3nc1y 1x Step Up (call)	1.00, 3.25
3nc1y Annual Step Up (call)	1.00, 2.25, 3.2
3nc1y (1x) Fixed	2.05
1yr agency bullet	0.58
1nc3m (Q)	0.65
3r agency bullet	1.85

Source: RBS as of 8/27/09

YTC/TM of 3/1yr 1x Alternatives

	3nc1y Fixed	3nc1y 1x Step/Call	3nc1y Annual Step/Call	1x Step vs. Fixed	Annual Step vs. Fixed
YTC Year 1	2.05	1.00	1.00	-1.050	-1.050
YTC Year 2	2.05	2.125	1.625	0.075	-0.425
YTM Year 3	2.05	2.50	2.17	0.450	0.117
					Source: RBS as of 8/27/09

Duration and Convexity Difference

- The duration of the 1x step up is the shortest followed by the annual and then the fixed.
- The negative convexity is similar.

TUNIX
-0.46
-0.46
-0.41
-0.05
-0.04
-0.01

Source: RBS, Yi eldBook

What is the duration at the 12 month horizon?

- 1x step gets called even if rates increase by 200 bp.
- Annual step gets called when rates increase by up to 125 bp.
- Fixed gets when rates increase by up to 75 bp at the 12M horizon.
- Forwards are projecting an 130-150 bp increase in 1yr-2yr rates in 12 months.



Effective Durat	ion at 12	M Horizon
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	-100	-75	-50	-25	0	25	50	75	100	125	150	175	200	225	250	275	300	325	350	375	400
1x Step	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.67	1.93	1.92	1.92	1.92	1.92	1.91	1.91
Annual Step	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.92	1.55	1.61	1.65	1.69	1.72	1.76	1.79	1.82	1.83	1.84
Fixed	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.96	1.95	1.95	1.95	1.95	1.94	1.94	1.94	1.94	1.93	1.93	1.93	1.93
1x Step vs Fixed	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-1.96	-1.95	-1.95	-1.95	-1.95	-0.27	-0.02	-0.02	-0.02	-0.02	-0.02	-0.02	-0.02
Annual Step vs Fixed	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-1.96	-1.95	-1.04	-0.40	-0.34	-0.29	-0.25	-0.22	-0.18	-0.14	-0.12	-0.10	-0.09
1x Step vs Annual Step	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.92	-1.55	-1.61	0.02	0.24	0.20	0.16	0.13	0.10	0.08	0.07

Source: RBS, Yield Book

Source: RBS, Yield Book. 8/31/09. Immediate parallel shift in the yield curve using the term structure of volatility and holding vol constant at the horizon.

Investment Performance: Total Rate of Return



Annualized Total Rate of Return: 12M Horizon

	-100	-75	-50	-25	0	25	50	75	100	125	150	175	200	225	250	275	300	325	350	375	400
1x Step	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.67	0.19	-0.28	-0.76	-1.23	-1.70	-2.17	-2.63
Annual Step	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.94	0.56	0.17	-0.23	-0.65	-1.07	-1.49	-1.93	-2.37	-2.81	-3.26
Fixed	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.04	1.73	1.25	0.77	0.29	-0.19	-0.66	-1.13	-1.60	-2.07	-2.54	-3.01	-3.47	-3.93
1x Step vs Fixed	-1.04	-1.04	-1.04	-1.04	-1.04	-1.04	-1.04	-1.04	-0.73	-0.24	0.24	0.71	1.19	1.33	1.33	1.32	1.32	1.31	1.31	1.30	1.30
Annual Step vs Fixed	-1.04	-1.04	-1.04	-1.04	-1.04	-1.04	-1.04	-1.04	-0.73	-0.24	0.17	0.28	0.36	0.43	0.49	0.54	0.58	0.61	0.64	0.65	0.67
1x Step vs Annual Step	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.44	0.83	0.90	0.84	0.78	0.74	0.70	0.67	0.65	0.63

Source: RBS, Yield Book

Making an Investment Decision

- Step-Ups can be structured in a variety of ways, providing more or less bearish protection.
- In general, the higher the back end coupons, the higher the probability of call, the lower the front end coupon. (The premium received versus short term alternatives will decrease as the probability of the bond being a short term alternative increases.)
- In general, those who expect the Fed to <u>tighten</u> in line with market expectations will be interested in exploring bearish protection.
- Investors who think the <u>Fed is on hold</u>, will not want to pay for bearish protection. Instead, they will prefer fixed coupon callables, which outperform bullets in a rangebound environment.
- Those who expect the economy to remain weak with <u>rates falling further</u> will prefer bullets and longer lockout callables.

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