Spreads galore

Fixed income

G-spreads

- Compute a bond's YTM, or its IRR under a specific prepayment/default scenario
- Report vs treasury rate at similar maturity

I-spread

- Same vs swap rate at similar maturity

Asset swap (ASW) Spread

- Buy fixed rate bond plus enter into fixed for LIBOR swap leaving you with:
  1. Pay coupon
  2. Receive LIBOR (or SOFR) + spread
- Par-par ASW contracts also trade distance to par for fixed add-on to spread
- ASW spread should be very near I-spread and very near Z-spread, especially for bonds that trade near par
- In the event of default, breakage fee is computed

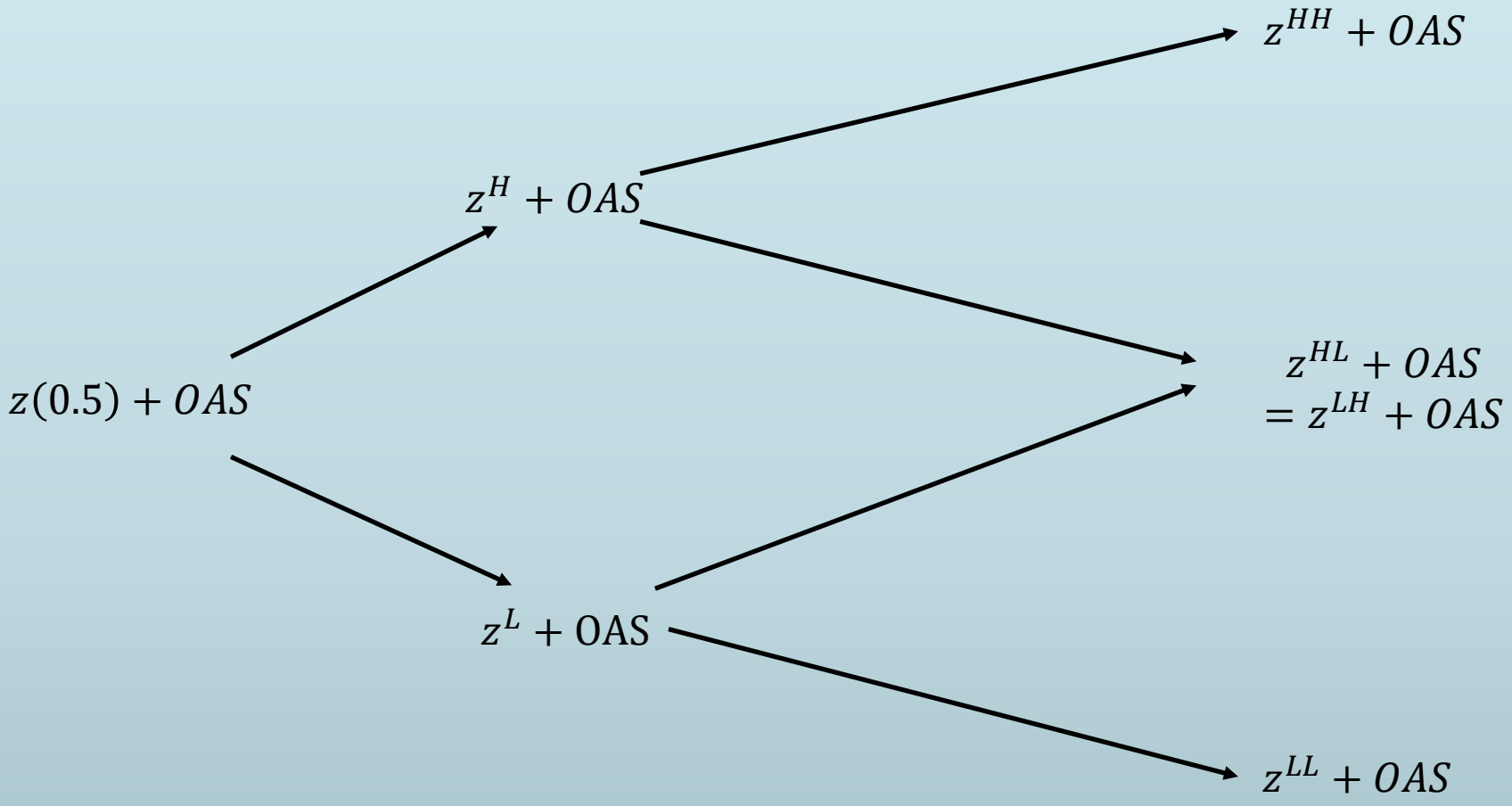
S-spread

- Same as Z-spread except STRIP rates are used instead of spot rates

OAS

- If our IR/P/D model were correct, simulated price ought to equal market price
- It never does, expect for treasuries (why?)
- Most instruments price at a spread over model
- Question: what constant shift of the interest rate model yields the correct price?
- The answer is called the Option-Adjusted-Spread or OAS
- It's a terrible name
- The OAS should be called the measure of our ignorance
- It is nothing but model error, it is certainly not a premium for optionality risk
- Either we work under RNP, or we don't
- Risk-premia are a meaningless notion under RNP
- A useful measure but people in the field and in the industry are totally clueless as to what it really is
- Sad
- <end of rant>

OAS is a level shift in the tree



Fixed-income attribution

- A fixed income portfolio yields a certain return over a certain time period, in excess of some benchmark
- What accounts for that excess return?
- Key question and, unfortunately, no universal way of doing this, it varies a lot from shop to shop

Brick-by-brick

- Consider an investment universe made of sectors $i = 1,2, \ldots n$
- Denote by $\bar{\alpha}_i$ and $\bar{r}_i$ the weights and returns from each sectors while α_i and r_i are the same from your portfolio
- Portfolio return is $r = \sum_i^n \alpha_i r_i$ while the benchmark return is $\bar{r} = \sum_i^n \bar{\alpha}_i \bar{r}_i$
- It follows that $r - \bar{r}$ is the sum of three terms:

$$\sum_{i=1}^{n} \bar{\alpha}_i (r_i - \bar{r}_i)$$

$$+ \sum_{i=1}^{n} (\alpha_i - \bar{\alpha}_i) \bar{r}_i$$

$$+ \sum_{i=1}^{n} (\alpha_i - \bar{\alpha}_i)(r_i - \bar{r}_i)$$

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$$\sum_{i=1}^{n} \bar{\alpha}_i (r_i - \bar{r}_i) \qquad \text{(selection)}$$

$$+ \sum_{i=1}^{n} (\alpha_i - \bar{\alpha}_i) \bar{r}_i \qquad \text{(allocation)}$$

$$+ \sum_{i=1}^{n} (\alpha_i - \bar{\alpha}_i)(r_i - \bar{r}_i) \qquad \text{(interaction)}$$

Insufficient for fixed income

- My return in fixed income is affected by, inter alia,
  1. Carry
  2. Price changes caused by term structure (roll down)
  3. Price changes caused by yield curve movements (duration)
  4. Price changes caused by changes in the yield curve shape (convexity)
  5. Price change caused by spread changes
  6. Plus standard allocation and selection

- We need to break that all down

Breaking it down (1)

- Most fundamentally:

$$Total\ return = \frac{Income}{P} + \frac{\Delta P}{P}$$

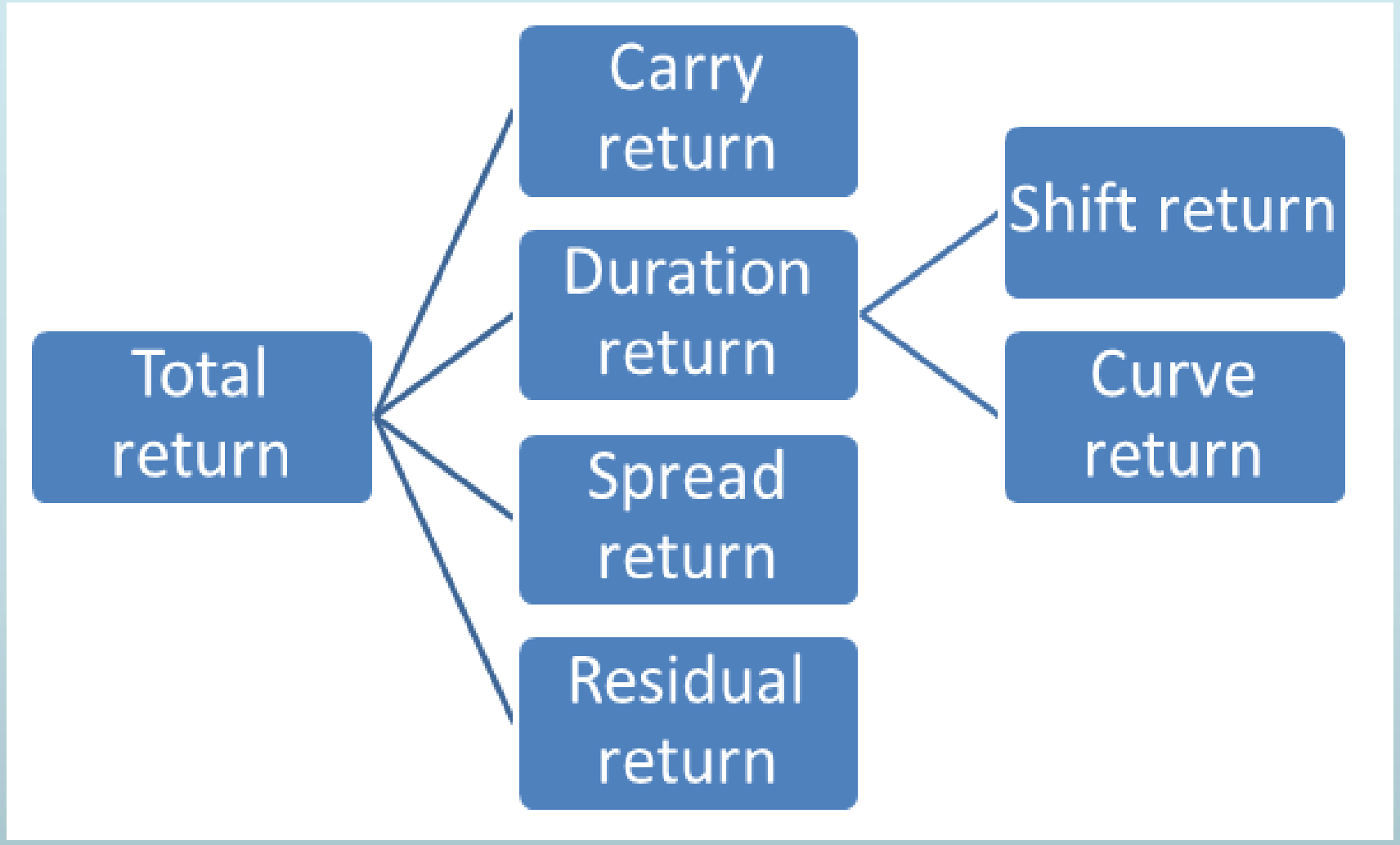
- So the first thing any attribution should do is remove the first piece, a.k.a *carry*

- Carry is positive for long portfolios (ex sovereign?), but may be negative for any portfolio involving short position

Breaking it down (2)

- The second piece $\frac{\Delta P}{P}$, we've seen before
- One common component of this are movements in the yield curve: *shifts, twists, and butterflies*
- So step 2 is to remove the effect of that on all portfolio components
- What is left of $\frac{\Delta P}{P}$ must come from spread, either average spreads over treasury or security-specific spread compression or widening

Campisi/Duration attribution



Example

Portfolio	Index	Difference	Shift	Twist	Allocation	Selection
2.23%	**2.07%**	**0.16%**	**-0.05%**	**0.05%**	**-0.12%**	**0.28%**
				GOV:	0.01%	0.00%
				MBS:	0.00%	0.02%
				CORP:	0.01%	0.16%
				HY:	-0.13%	0.11%

Portfolio	Weight	Duration	Total Return	Shift Return	Twist Return	Excess Return
	100.00%	**3.90**	**2.23%**	**2.00%**	**-0.28%**	**0.50%**
GOV	20.00%	5.05	2.37%	2.59%	-0.50%	0.27%
MBS	40.00%	1.60	1.04%	0.82%	-0.07%	0.30%
CORP	30.00%	6.02	3.64%	3.09%	-0.47%	1.03%
HY	10.00%	4.45	2.46%	2.28%	-0.05%	0.22%

Index	Weight	Duration	Total Return	Shift Return	Twist Return	Excess Return
	100.00%	**4.00**	**2.07%**	**2.05%**	**-0.32%**	**0.34%**
GOV	38.25%	5.12	2.41%	2.63%	-0.51%	0.30%
MBS	35.58%	1.63	1.04%	0.84%	-0.04%	0.25%
CORP	26.17%	5.60	2.95%	2.87%	-0.43%	0.51%
HY	0.00%	4.70	1.40%	2.41%	-0.09%	-0.92%

- Cut and pasted from http://www.frongello.com/support/works/fixedincomesydney.pdf