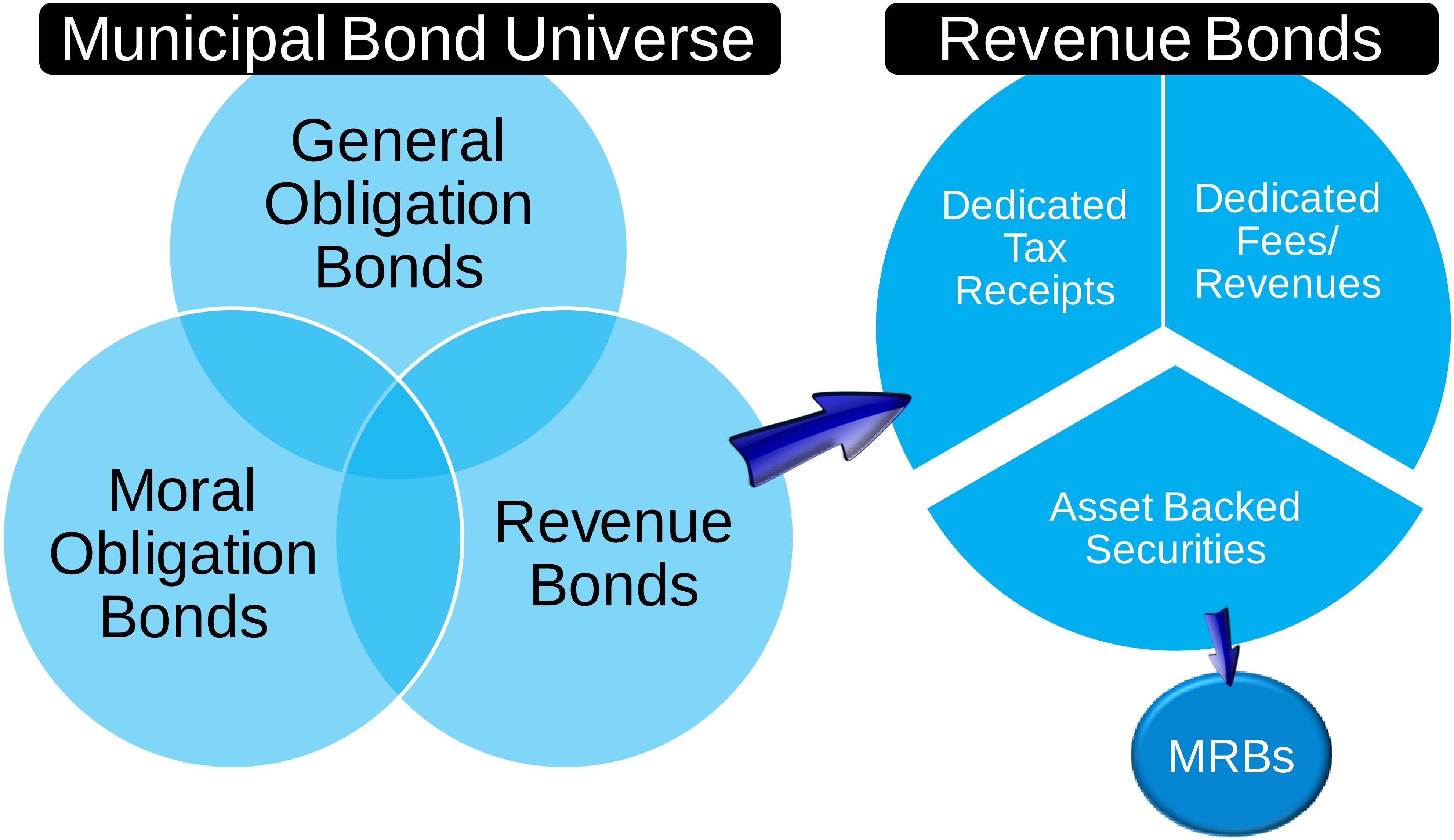
MRB Structuring 101

Basic Elements of
Mortgage Revenue Bond
Structuring

What are Mortgage Revenue Bonds?



MRBs are Asset Backed Securities

Bonds will be repaid from the receipts from the associated assets
So the bond structure should generally match the loans
(or at least have the ability to…)

There is more to consider than simply generating sufficient bond proceeds at the lowest possible cost.

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MRBs are Asset Backed Securities

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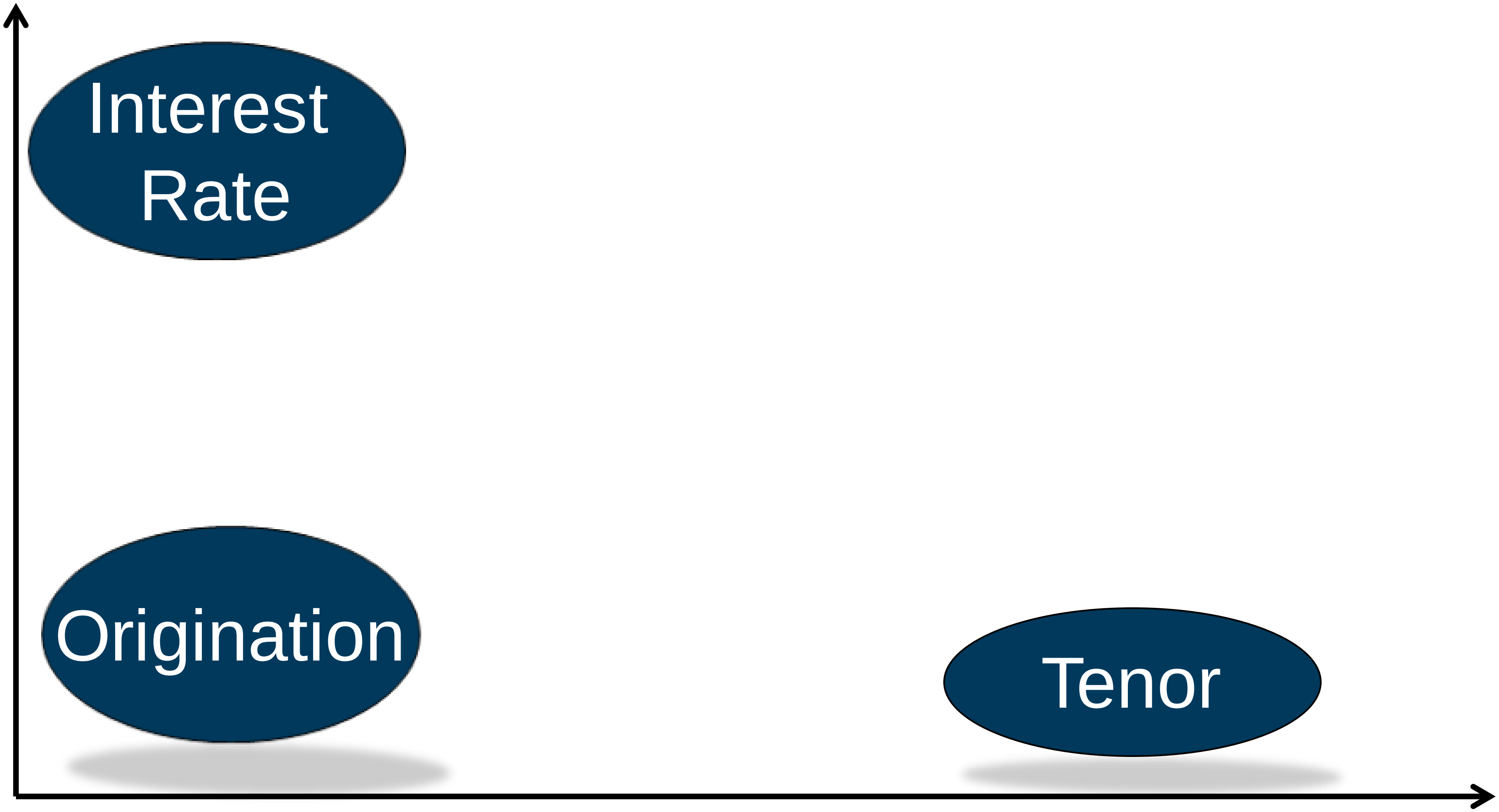

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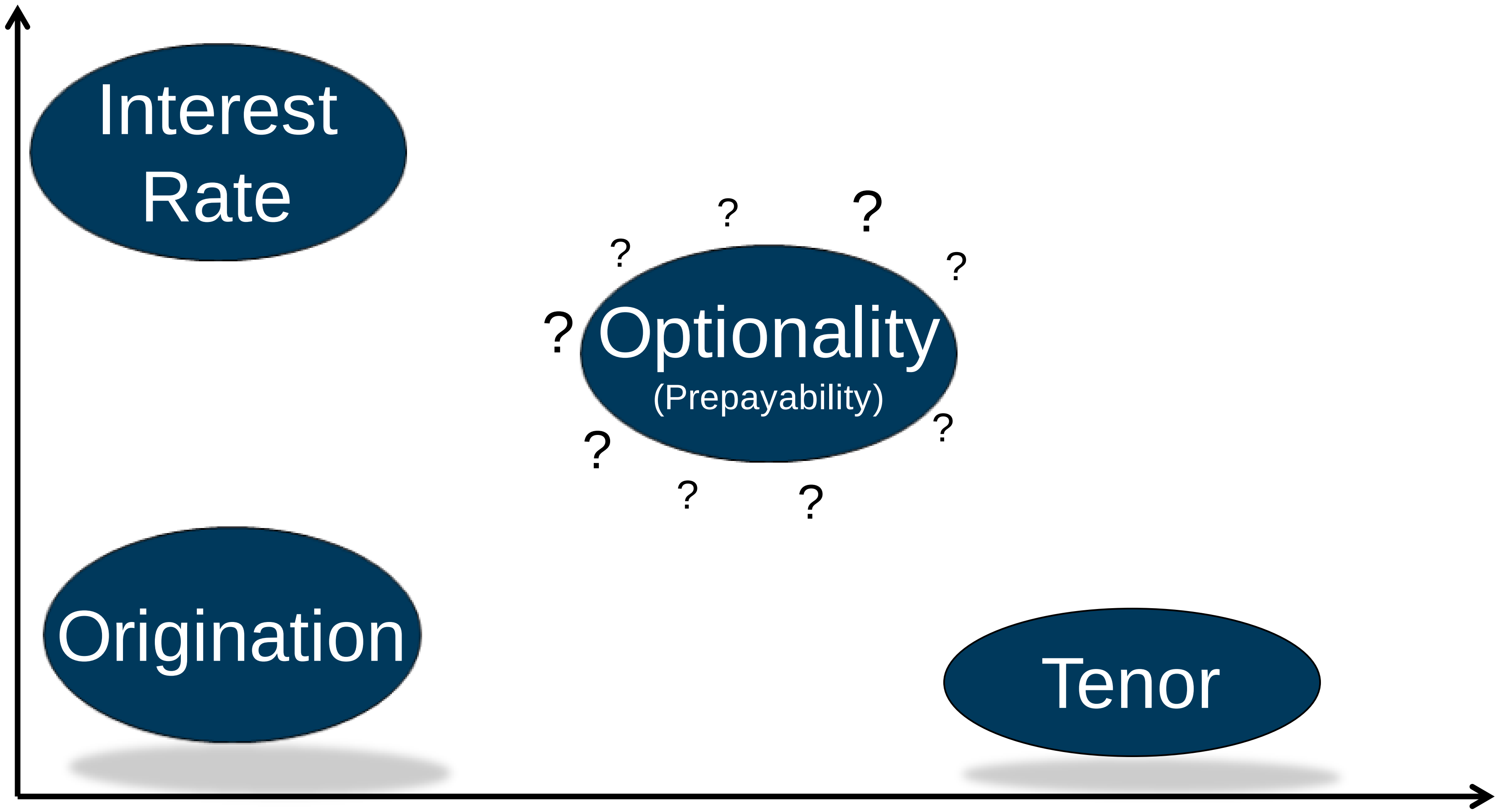


Aligning Debt Financing with Assets

Let's start with the ROOT terms, although there are other factors to consider…

Rate

- Generally, financing cost should be slightly lower than mortgage rate

Origination

- Loan should be co-originated with financing, to the extent practicable

Optionality

- US fixed rate mortgages typically have unlimited optionality: can prepay/default/refi **at any time**

Tenor

- US fixed-rate mortgages are typically 30 years

Failing to Align Debt Financing with Assets…

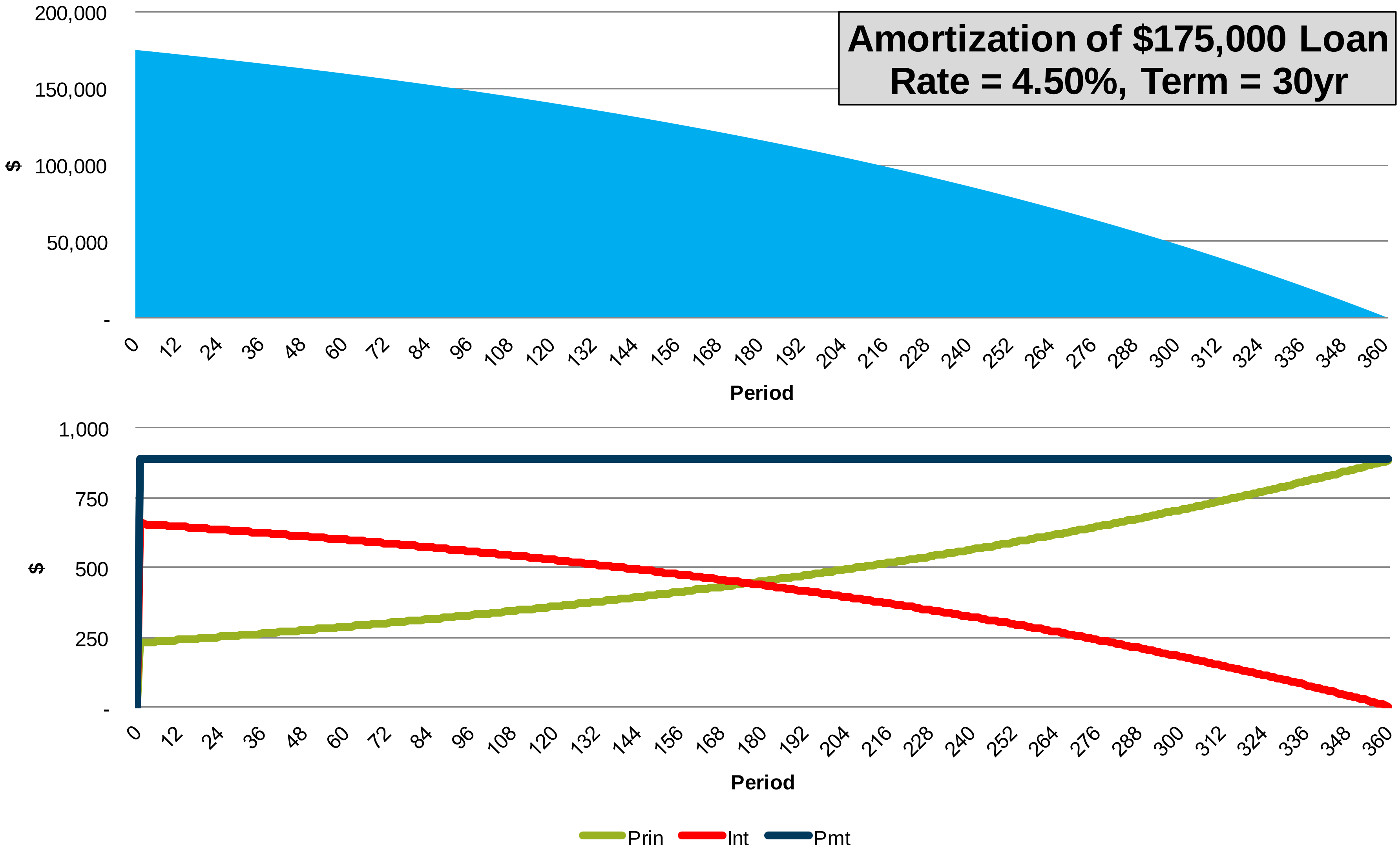
Failing to match the ROOT terms of the financing with the asset could prove disastrous, without sufficient external resources or contingency plans/options

	Low Loan Rate (or High Bond Cost)	Delayed Loan Origination	Insufficient Bond Optionality	Accelerated Term
Cash Flow Impact	Negative carry financing may damage liquidity and parity.	Negative carry period may damage liquidity and parity.	Holding cash while paying bond debt service = negative carry	Loan receipts may be insufficient to pay debt service.
Economic Impact	The financing consumes other issuer resources.	Negative carry consumes issuer resources.	In a low rate environment, negative carry consumes issuer resources.	Scheduled debt service paid from other issuer resources.

Negative Carry: Erosion of capital that occurs when investment reinvest earns less than the cost of funds.

Starting Point: Matching Asset Receipts (Singe Family)

We begin by assuming the mortgages will amortize naturally, without prepayment (Rachael said so)



Matching Asset Receipts in Multi Family

Multi-Family financing also must match mortgages, but multi-family mortgage behavior is different…

Construction Financing → Conversion → **Permanent Financing**

Construction Financing
- Anticipated Drawdown Schedule
- Interest Only Period
- Construction Paydown Window

Permanent Financing
- Issuer’s Prepay Lockouts
- LIHTC Compliance Period
- Long Amortizations w Balloons

How do we measure how fast prepayments could come in?

Basic Prepayment Speed Assumptions: The unscheduled principal that is returned

SMM

- ***"Single Month Mortality"***
- ***Prepaid Prin / (Starting Balance – Scheduled Prin)***
- *CPR = 1-(1-SMM)^(T/t)*

CPR

MF &SF

- ***"Constant Prepayment Rate"***
- For any time horizon (1m, 6m, 1yr, etc.)
- Expressed as an annual Rate

PSA

SF Only

- ***"Public Securities Association"*** Standard Prepayment Model
- Newly originated loans are less likely to prepay
- So PSA ramps up from 0% CPR to 6.0% CPR at month 30

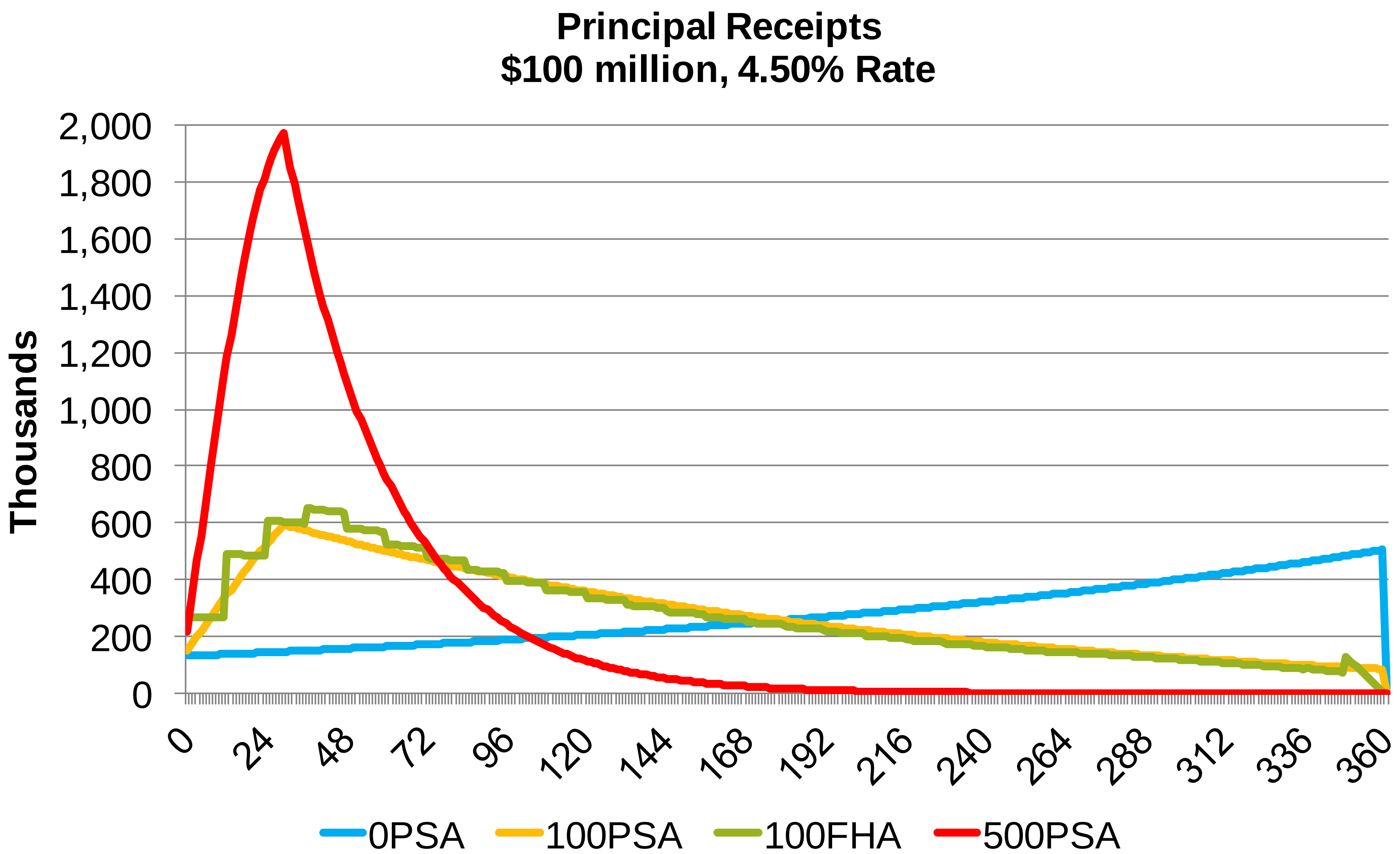
FHA

SF Only

- Decrement Tables for HUD/FHA Mortgage Insurance Program
- Used for Tax Yield Analysis
- …it's because Kathleen said so

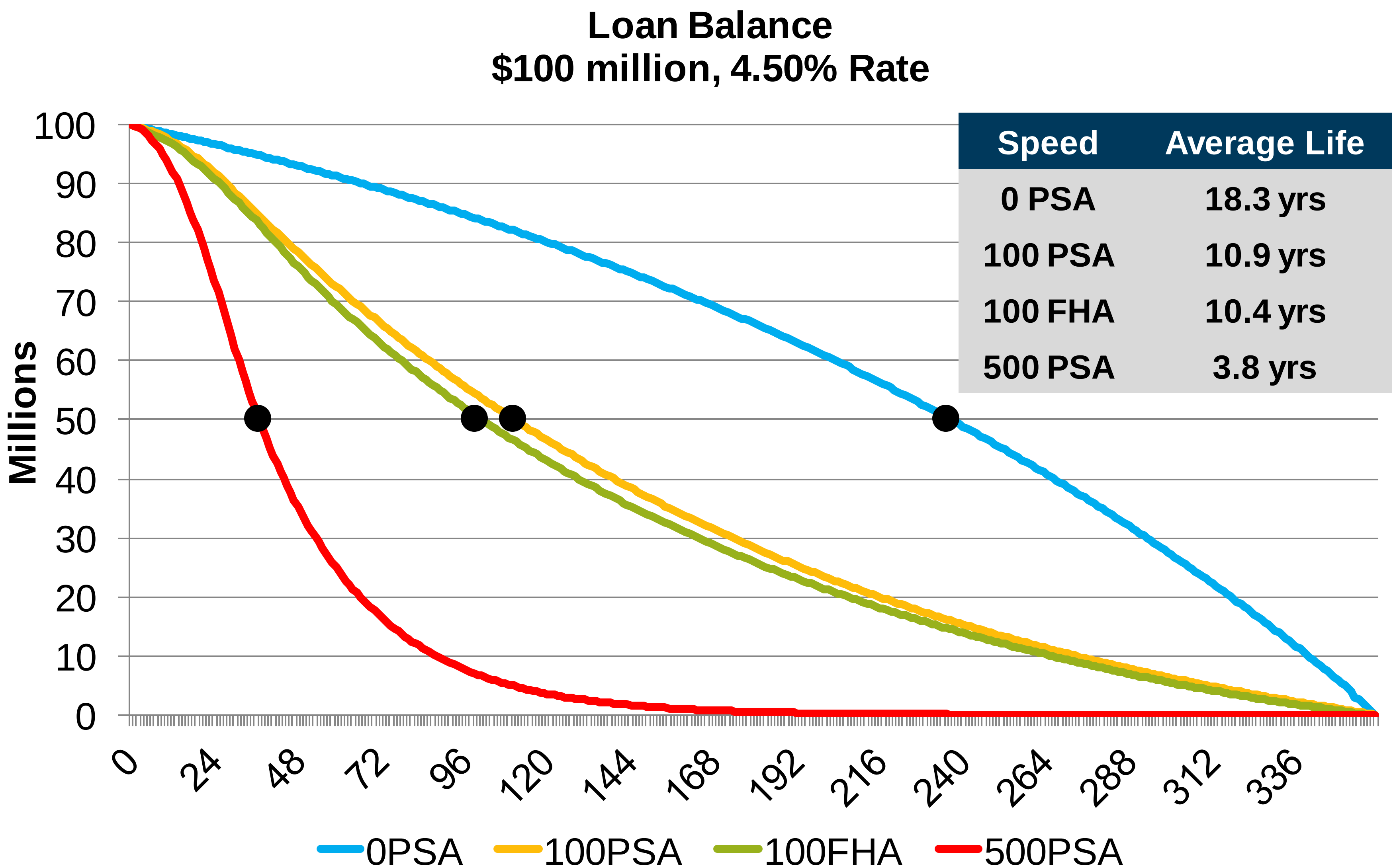
Prepayment Speeds: Mortgage Principal Receipts

Mortgage receipts could come in at very different speeds…



Prepayment Speeds: Mortgage Balance

…which will result in very different average lives



Speed	Average Life
0 PSA	18.3 yrs
100 PSA	10.9 yrs
100 FHA	10.4 yrs
500 PSA	3.8 yrs

MRB Bond Products

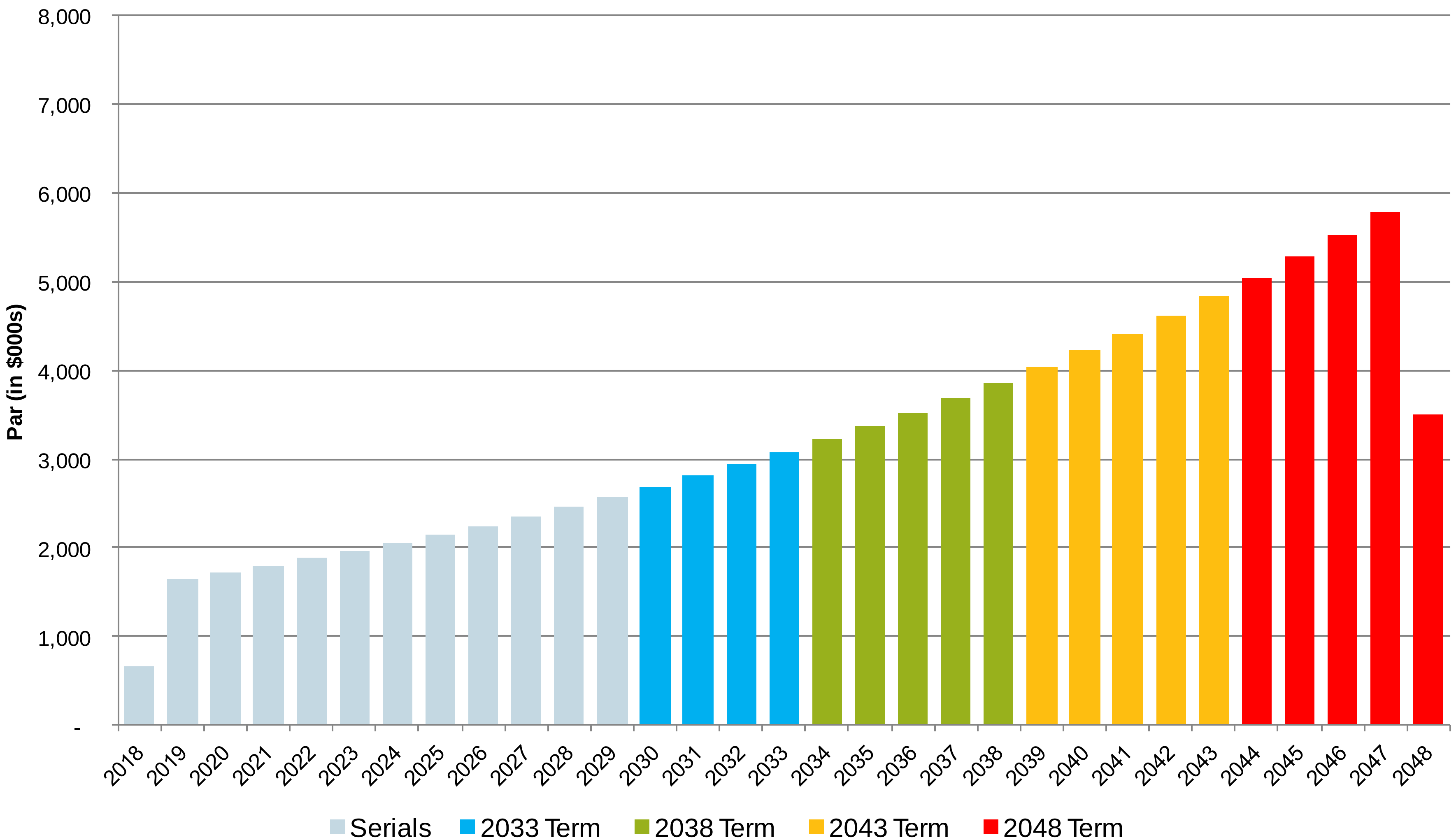
There are a number of frequently used fixed-rate bond types in the MRB space

Bond Type	Description
Serial Bond	Individual maturity, no sinking funds (usually first 8-12 years)
Term Bond	Single maturity with scheduled sinking funds (may be mandatory)
Bullet	Jargon for single serial bond with no amortization or sinking funds
PAC	"Planned Amortization Class" bond has redemption schedule which is typically much faster than the nominal amortization
Super-Sinker	a.k.a. "Turbo" bond, which will be redeemed from designated source without restriction until fully retired
Lockout	Bond which cannot be redeemed until certain pre-defined conditions are satisfied (i.e. no other bonds remaining)
COB	"Convertible Option Bond" often a temporary issuance with long maturity and short tender provision until remarketing or refunding into a permanent structure
Put Bond	Long maturity bond sold with much earlier mandatory "put" option, requiring the bond to be called or refunded prior to the put

"Vanilla" Structure at 0 PSA

The basic MRB structure mirrors the natural amortization of the asset

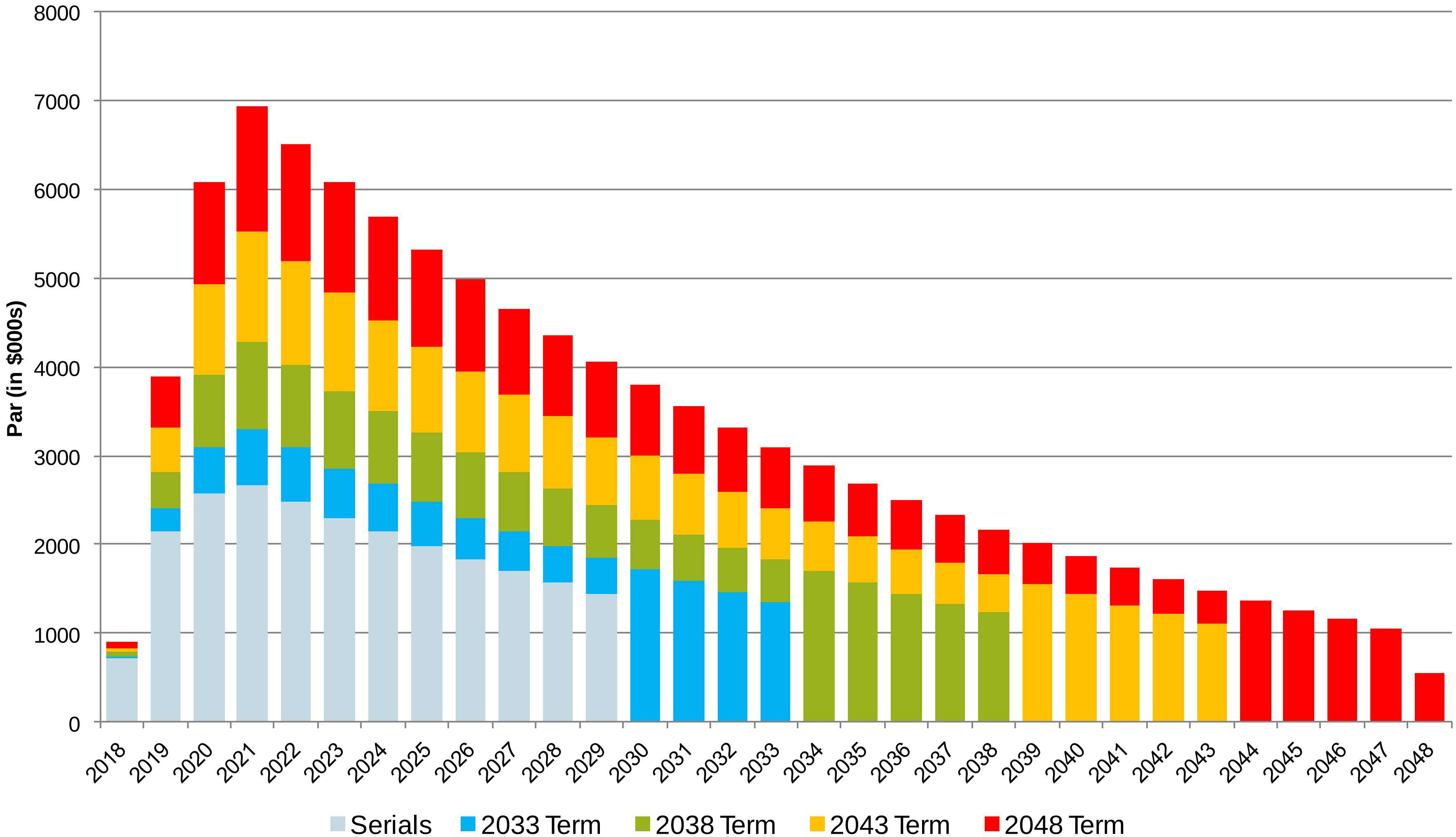
Structure Amortization at 0 PSA (Nominal Structure)



"Vanilla" Structure at 100 PSA

At 100 PSA prepayments are directed to make proportional "pro-rata" redemptions across the structure

Structure Amortization at 100 PSA



Call Pro Rata at 100% FHA = Tax Bond Yield

Redemptions made semiannually, pro-rata, using Housing Bond software

PERMISSIBLE TAX YIELD	
TE Single-Family	TE Multi-Family
1.125%	1.500%

Prepay Speed	Bond Yield	Mortgage Yield	Spread
0 PSA	3.589%	4.510%	0.921%
100 PSA	3.542%	4.495%	0.953%
100 FHA	3.539%	4.493%	0.954%
500 PSA	3.451%	4.435%	0.984%

Tax Yield!

- Even assuming we can lend at 4.50%
- and using a AAA new issuance "scale"
- we cannot reach full spread (1.125%) with a *vanilla* structure

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Lowering Bond Yield

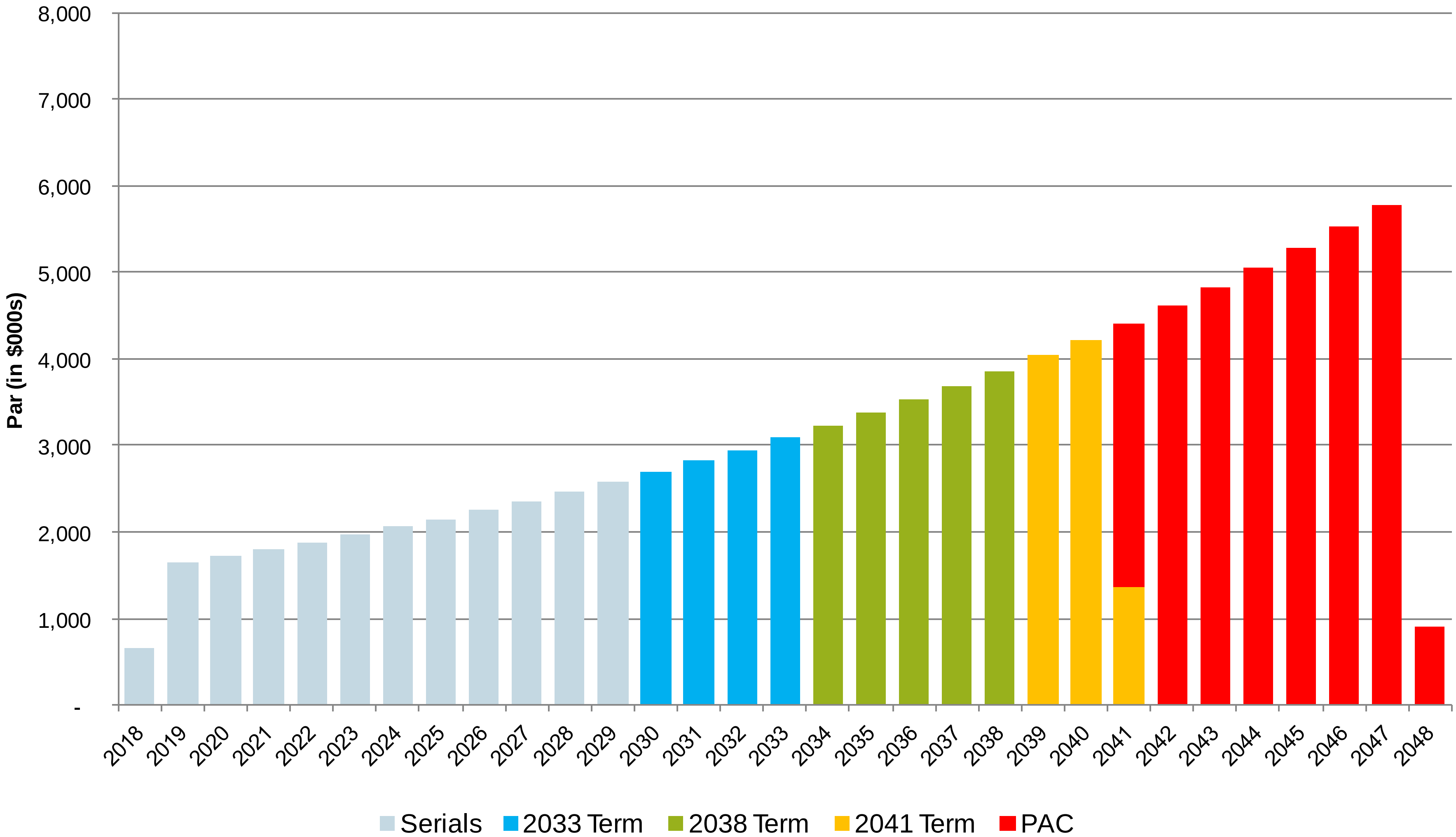
Common tools to achieve lower cost of funds

	Accelerate Principal	PAC Bonds (Planned Amortization Class)	Floating-Rate Debt	Synthetic Fixed-Rate Debt
Strategy	Move down the yield curve by accelerating principal.	Pre-defined mortgage receipts will call a specific bond first.	In the current environment floating-rate *can* cost much less than fixed.	Fixed-payer interest rate swaps *can* cost much less than fixed-rate debt.
Advantage	0 PSA is very rare, so 15-50 PSA may be manageable.	Many buyers (at present), can displace expensive, long tenor debt.	Floating-rate debt can be long-dated, replacing longer tenor fixed debt.	In longer tenors, swaps *can* reduce costs dramatically.
Challenge (Not exhaustive)	Issuer resources may be needed to pay scheduled principal if prepays low.	Dedicates loan receipts, limits recycling and cross-call, yield kick if prepays low.	Rate risk, Rating Agency Cash Flows, and associated risks (e.g. liquidity renewal risk).	Swaps must have sufficient optionality to manage in 'extreme' prepay scenarios.

Back-Loaded PAC Structure at 0 PSA

The basic MRB structure mirrors the asset, but with a PAC replacing the last term bond

Structure Amortization at 0 PSA (Nominal Structure)



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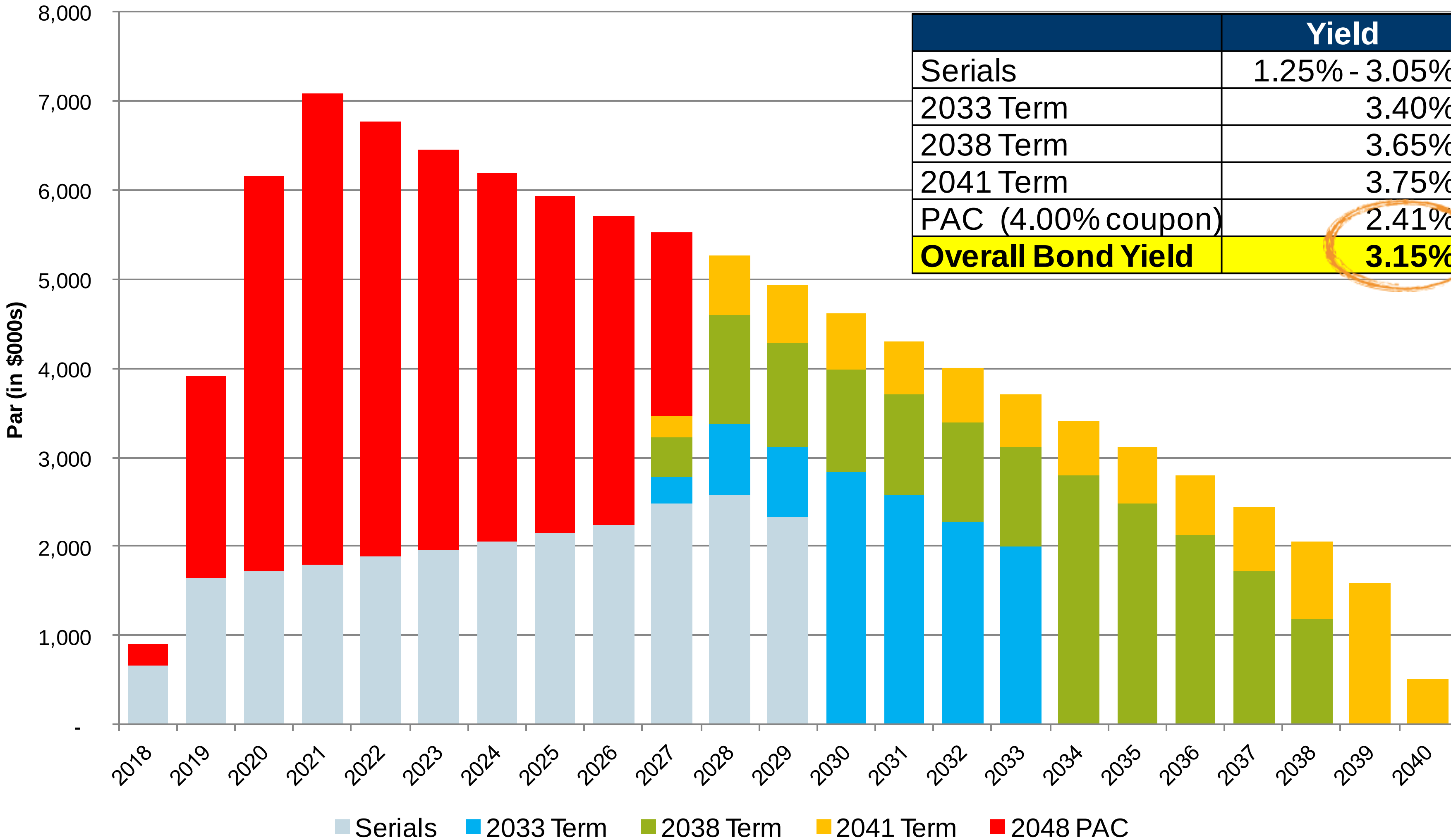
Back-Loaded PAC Structure at 100 PSA

At 100 PSA prepayments are directed to redeem the PAC first

Structure Amortization at 100 PSA

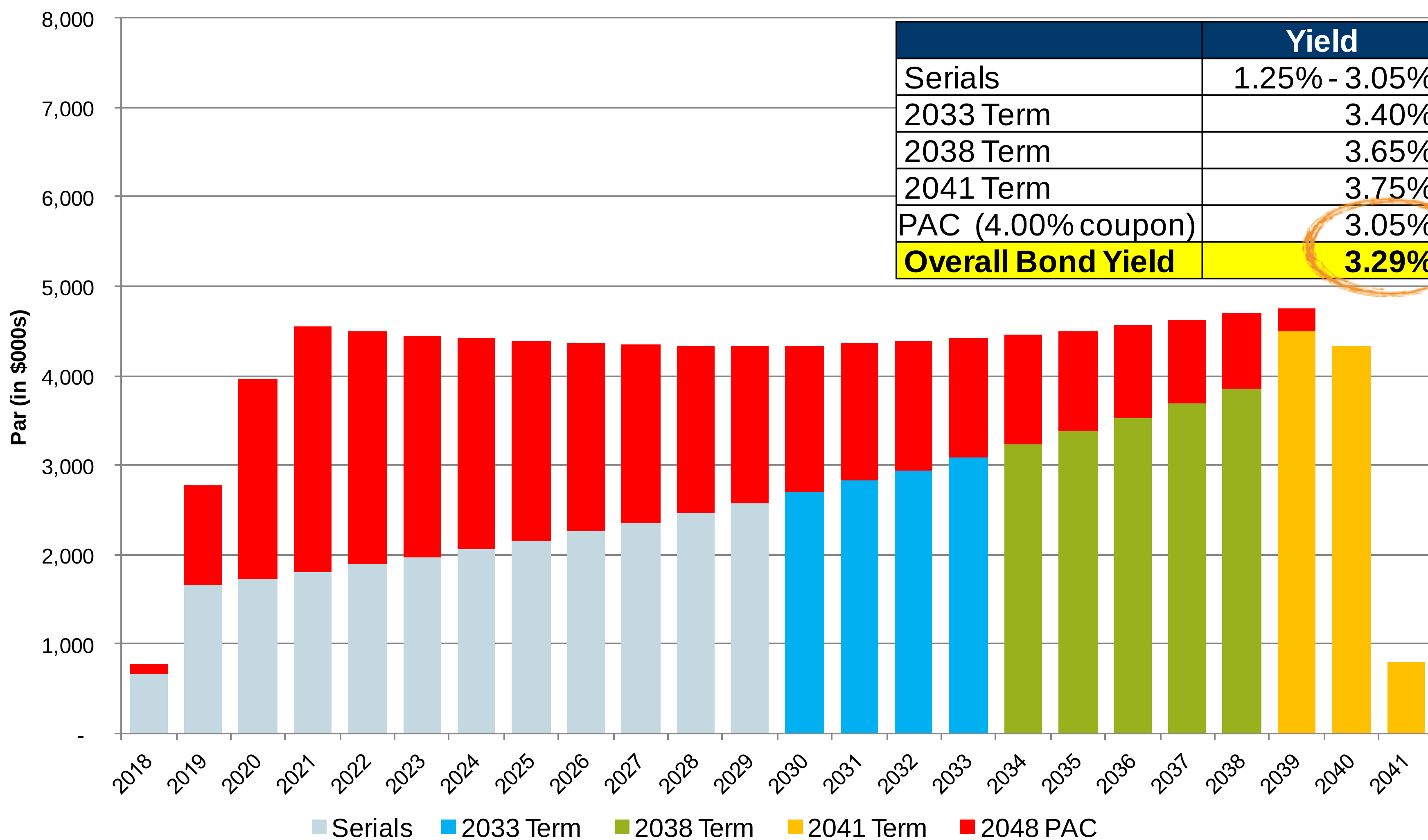


	Yield
Serials	1.25% - 3.05%
2033 Term	3.40%
2038 Term	3.65%
2041 Term	3.75%
PAC (4.00% coupon)	2.41%
Overall Bond Yield	**3.15%**

Back-Loaded PAC Structure at 50 PSA

At 50 PSA, if the Issuer doesn't allocate additional resources to redeem the PAC the yield "kicks"

Structure Amortization at 50 PSA



	Yield
Serials	1.25% - 3.05%
2033 Term	3.40%
2038 Term	3.65%
2041 Term	3.75%
PAC (4.00% coupon)	3.05%
Overall Bond Yield	**3.29%**

MRBs are Usually Issued at a Price of Par…

But the vast majority of fixed-rate municipal bonds issued today are PREMIUM BONDS

	Issuer Perspective	Investor Perspective
Premium (Muni Norm)	Generates excess parity, but: •Yield is higher if not called at optional call •Usually added cost for early call	Provides price protection: duration (rate of change in price as market yields change) is slower
Par (MRB Norm)	Maximum flexibility with respect to redemptions from prepays or excess revenues	Maximum exposure to changes in market rates (i.e. increasing market rates results in decreased bond price)
Discount	Added cost for early redemption: bond will be called at par, even though bond generated less proceeds	Attractive to trading firms and firms that will redistribute to retail networks

Planned Amortization Class (PAC) Bond Structuring

Source, Speed, Average Life, Stability, and Coupon (a recursive process…)

- **Step 1: How many mortgage receipts will be dedicated to the PAC?**
  - Source could also be repays + prepays, or could be a segregated mortgage pool
  - Often prepayments only (not repays) from 75% to 100% PSA
- **Step 2: What is the target average life of the PAC?**
  - Often average life of 4-5 years, allows us to price to that point in the yield curve
  - What do investors want?
  - What provides a constant average life for a reasonable PAC band?
- **Step 3: What's the right PAC band?**
  - Avg life doesn't change over range of prepays 75% - 400%, 100% - 500% PSA?
  - What do investors want?
- **Step 4: What Coupon?**
  - 4.00%, 3.50%?
  - What do investors want?
- **Step 5: Build PAC Redemption Table**

Deploying Variable Rate Debt – Variable Rate Demand Bonds

Cost Structure

Remarketing Fee

- Varies in cost
- Typically ≤ 10bps[1]

Liquidity Cost

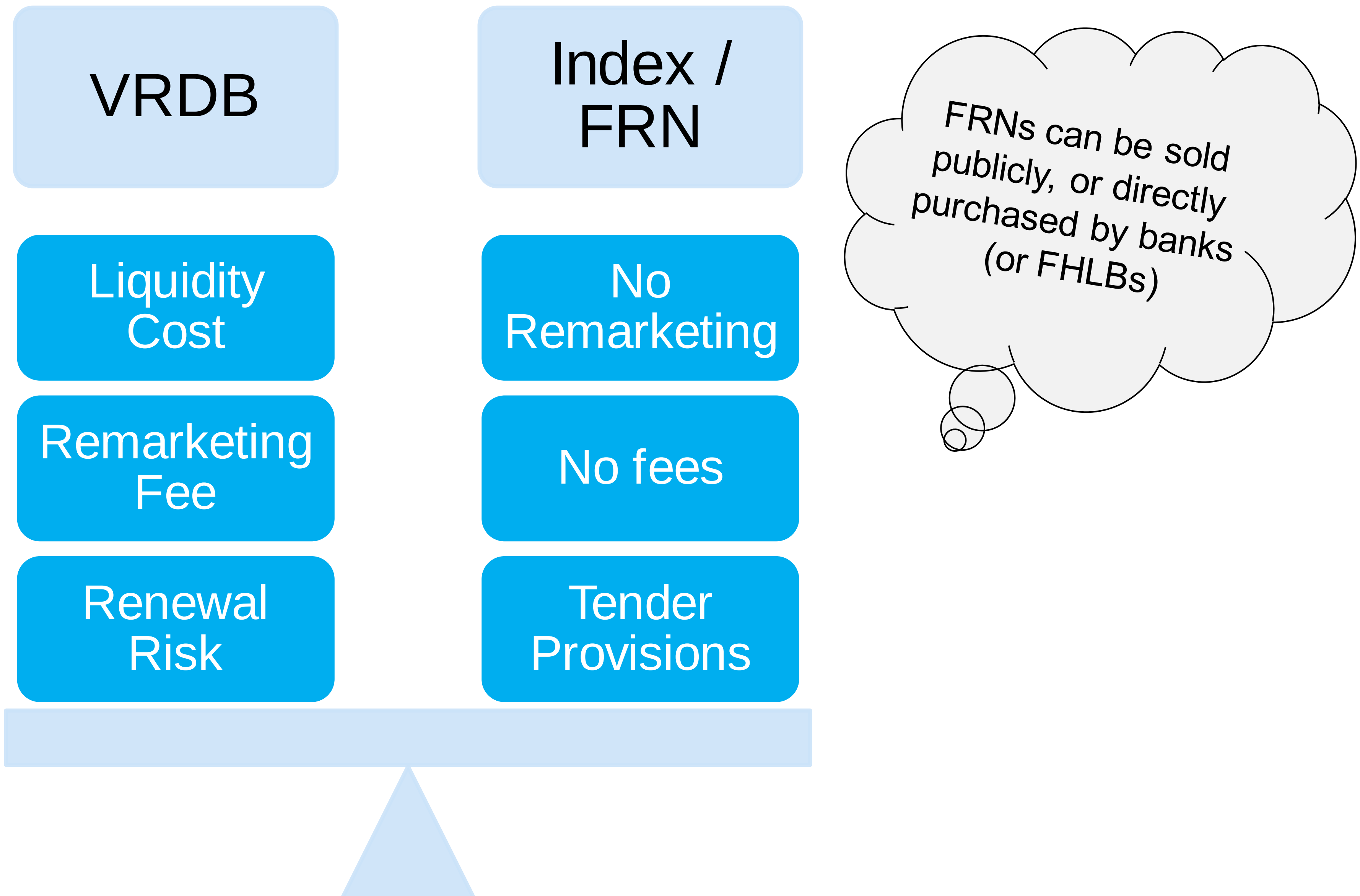
- Standby Bond Purchase Agreement (SBPA)
- Letter of Credit (LOC)
- Term of 2 – 5 years[2]

Remarketed Rate

- Daily, Weekly, Monthly
- Rate is mostly function of liquidity provider and remarketing agent[3]

Notes:
1. *Cost can be higher for specialized products.*
2. *Longer LOC/SBPA terms have been offered in the past.*
3. *The tax status and underlying issuer credit can also have an impact on the remarketed rate.*

Deploying Variable Debt – Index Bonds & Floating Rate Notes



Deploying Variable Rate Debt – Exposure to Rate Risk

Rate Risk vs Hedge Optionality

Naked Variable-Rate ← RISKS → **Full Synthetic Fixed-Rate**

- Asset is fixed-rate, debt is not
- Rating Agency CF Stress may be untenable (up to 12%!)
- *May* match variable-rate investments (natural hedge, to a point)

- Intermediate approach:
  - Short tenor swap (bullet)
  - Amortizing swap
  - Par termination optionality
  - Partial swap

- Basis risk remains
- Reduced optionality: Overhedged if underlying bonds called while swap is still in place
- Swap can be terminated, at a cost

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Plenty more considerations…

Tax restrictions, future expectations/plans, and market conditions also influence structuring

Issuers may plan to use mortgage receipts to make new mortgage in the future (at higher rates?)

Future Recycling

The 10 Year Rule

IRS

After 10 years, all mortgage receipts have to call bonds in series!

May use mortgage receipts to call bonds in other series

Cross-Calling

Market Appetite

Structuring must be able to respond to market demand (or lack thereof)

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