# Discussion: Reaching for Duration

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# What is this paper about?

- Treasury futures market has grown
  - \$500B (2010) → \$ 2 trillion (2023)
- **Who is long** Treasury futures?
  - CFTC aggregate data: **Asset managers** (\$1 trillion)
- What kind of asset managers?
  - **Mutual funds** (\$579 billion)
  - **N-Port** data allows studying individual funds (new!)
- Why?
  - Futures help funds **match duration** of benchmark
  - Adds 0.8 years to duration of futures holders
- Why not just buy bonds similar to the benchmark?
  - Active funds want to buy MBSs and other higher-yielding securities, but those have lower duration
    → Bring duration back up using Treasury futures

# In this discussion

- Lots of results and tables (23, plus 13 in Appendix) → I cannot do justice!

- The main **results** for me
  + Suggestions on sharpening methodology
  - Futures help close duration gap
  - Futures related to (1) MBS strategies, and (2) variation in MBS expected returns

- Remaining **questions** (3) and **puzzles** (2)
  - Short positions?
  - Supply vs demand?
  - Fund performance?
  - Systemic risks?
  - Alternative title?
  - (Smaller comments)

# Result 1: Futures bridge gap to benchmark duration (holdings-based measures)

| **Table 11** | |
|---|---|
| | ***Duration (2023):*** |
| *Index funds* | 6.08 |
| *Non-futures holders* | 5.83 |
| *Futures holders (**cash only**)* | **5.28** |
| *Futures holders (**incl futures**)* | **6.08** |

# Similar evidence for duration calculated using returns

| | Average duration | Difference from index | Standard error | Average absolute tracking error | Share within 1-year of index |
|---|---|---|---|---|---|
| | | | *Full sample* | | |
| No futures | 4.51 | −0.64 | 0.009 | 13.06 | 87.27 |
| Low futures | 4.72 | −0.43 | 0.014 | 8.48 | 95.24 |
| Medium futures | 4.77 | −0.38 | 0.013 | 10.8 | 90.91 |
| High futures | 4.86 | −0.29 | 0.01 | 7.18 | 95.65 |

- Duration for Index is 5.15
  - Most **active** funds have **lower duration** than **index**
  - But **high futures users get closer**!

**Concerns?**

- Duration estimated from **returns** regressions:
  - Funds **smoothing** returns (e.g., Choi et al, 2022) → Possible **downward bias** in regression
  - **Futures** are more **liquid** → Less downward bias for high futures group

# Result 2: Futures and mortgage-backed securities (MBS)

**Prospectus evidence:**

- Treasury futures is related to fund strategies discussing Mortgage-backed securities

Table 18

| | All futures users | |
|---|---|---|
| Rank | Word | $\chi^2$ |
| 1 | mortgage | 239.97 |
| 2 | backed | 183.06 |
| 3 | debt | 137.58 |
| 4 | duration | 114.27 |
| 5 | fixed | 104.15 |

# Result 3: Higher MBS expected return → More futures

Table 15: Impact of MBS on Aggregate Asset Managers' Long Futures

| | Model I | Model II |
|---|---|---|
| **MBS returns** | | |
| TBA OAS | 23.14*** | 12.62** |
| | (8.45) | (5.63) |
| Dollar Roll Spec | −61.30 | −28.07 |
| | (45.24) | (19.97) |
| TBA OAS (MA) | | |
| Dollar Roll Spec (MA) | | |
| **MBS sensitivities** | | |
| TBA Duration | | −2.17*** |
| | | (0.59) |
| TBA Convexity | | −3.37*** |
| | | (0.83) |
| **Controls** | | |
| Roll effect | −0.03*** | −0.03*** |
| | (0.00) | (0.00) |
| Month indicators | X | X |
| $R^2$ | 0.33 | 0.79 |

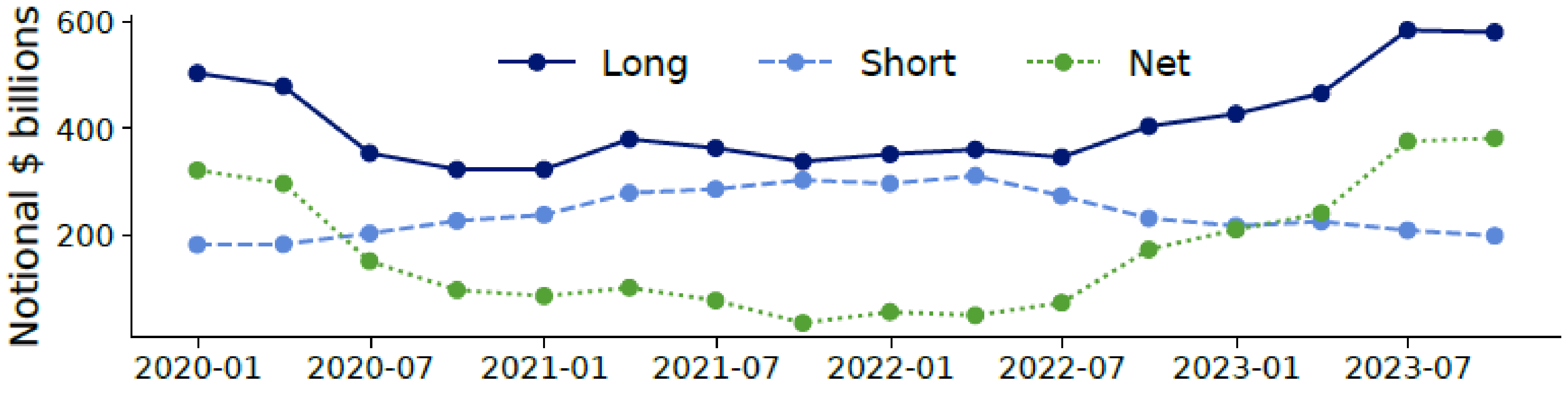
## Questions/Comments:

- **Economic** magnitude?
  - What's 1 s.d. in OAS?
- "**First stage**"?
  - MBS holdings = $\alpha + \beta$ TBA OAS + $\epsilon$
- Additional **controls**:
  - Term spread
  - Credit spread
  - Fund flows (aggregate)
  - Treasury issuance
  - Etc (other reasons funds may buy/sell specific types of assets…)

## Time-series Plot:

- OAS spread, MBS holdings, Treasury futures holdings

# Question 1: What about short positions?



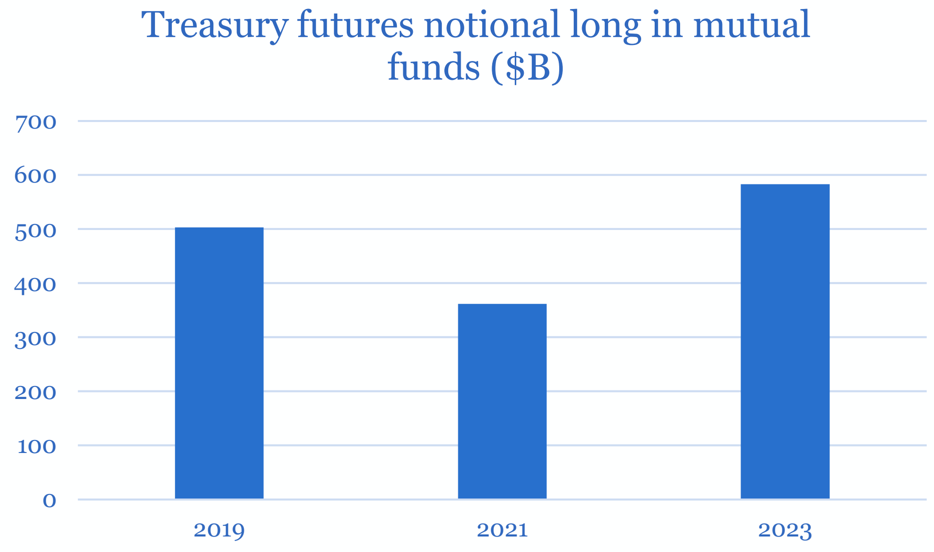

- **Paper** focuses on **long only**
  - But, mutual funds hold **$600B long** and **$200B short** (2023)

- What about a fund's **net position**?
  - **Different maturities** for long vs short?
  - **Same or different funds** holding long and short?
  - **Net effect** on **duration**?

# Question 2: Supply vs Demand of futures

- **U-shaped** pattern of futures use

- Supply or demand?
  - **Story** in paper is about **demand** from mutual funds
  - Alternative? **Hedge funds** temporarily **stepping away** and not taking the short end



# Question 3: Economic magnitude of substitution?

| Panel A: IID Funds | Treasuries (cash) | MBS | Corporate Debt | Other ABS | Cash |
|---|---|---|---|---|---|
| Treasury futures to assets | −0.125*** | 0.047*** | 0.008 | 0.040*** | 0.014 |
| | (0.015) | (0.013) | (0.009) | (0.008) | (0.014) |
| Fund fixed effect | X | X | X | X | X |
| Time fixed effect | X | X | X | X | X |
| $R^2$ | 0.811 | 0.867 | 0.858 | 0.873 | 0.65 |
| Observations | 4,402 | 4,402 | 4,402 | 4,402 | 4,402 |

- Better to **flip X/Y** variables?
  - ➢ Better sense of magnitude if increases in MBS holdings cause funds to hold treasury futures
  - ➢ Start thinking about instrument for MBS holdings

# Puzzle 1: High futures funds don't outperform

| | Return relative to Aggregate Index | | | | Duration |
|---|---|---|---|---|---|
| | Average excess | Beta | Alpha | Std. Dev | component |
| No futures | 0.28 | 0.88 | 0.32 | 0.45 | 0.37 |
| Low futures | 0.34 | 0.93 | 0.38 | 0.45 | 0.39 |
| Medium futures | 0.46 | 0.94 | 0.49 | 0.47 | 0.39 |
| High futures | 0.34 | 0.96 | 0.36 | 0.47 | 0.40 |

Table 16: **Performance of intermediate investment-grade debt funds by futures use.** The table shows statistics on the performance of IID funds grouped into no long Treasury futures use, and low medium and high Treasury futures use. Statistics include excess return relative to the aggregate index, the beta of the fund relative to the aggregate index, the alpha of the fund relative to the aggregate index, the standard deviation of the funds' return, and the component of that standard deviation due to duration according to a simple linear regression.

**Puzzle:**

- Shouldn't high futures funds do better if taking extra risk in MBS?
- Maybe at least higher raw returns, if not risk-adjusted returns (e.g., Choi and Kronlund, 2018)

**Include more risk factors?**

- Prepayment risk, credit risk, term risk, etc (currently only beta wrt index return)

**After-fee** vs **before-fee** returns?

- High-futures funds are more expensive (Table A.12)

# Puzzle 2: Why use (mostly 2-year) futures to extend duration?

Mostly **2-year** Treasury futures

- Why not go “**longer and less**”?
- Cross-sectional variation?
    - Learn something from funds that focus on short vs long futures? (e.g. different reasons)

Or, why not buy just a little extra **30-year cash treasuries**?

- Higher transaction costs? Lower liquidity?
- Levered position in shorter-duration treasuries have higher risk-adjusted returns? (Frazzini Pedersen 2014)

| | Dec 2019 | Jun 2021 | Jun 2023 |
|---|---|---|---|
| **Total** | | | |
| All asset managers | 888 | 682 | 1087 |
| Mutual funds | 503 | 362 | 583 |
| **2-year** | | | |
| All asset managers | 347 | 166 | 346 |
| Mutual funds | 190 | 122 | 259 |
| **5-year** | | | |
| All asset managers | 221 | 187 | 250 |
| Mutual funds | 172 | 108 | 163 |
| **10-year** | | | |
| All asset managers | 162 | 159 | 252 |
| Mutual funds | 77 | 72 | 92 |
| **10-year Ultra** | | | |
| All asset managers | 31 | 47 | 82 |
| Mutual funds | 16 | 9 | 21 |
| **30-year** | | | |
| All asset managers | 51 | 56 | 69 |
| Mutual funds | 15 | 25 | 17 |

# Alternative title?

**“Reaching for duration”?**

*“funds chasing higher returns on MBS by tilting away from their index but using futures to maintain their duration target.”*

But…

- Funds are **not** taking on **excessive duration** risk; merely match benchmark’s duration
- Underlying **motivation** sounds more like “**reach for yield**”!

Alternative titles?

- *“Hitting duration benchmarks using leverage”*
- Separate paper on reach-for-yield using MBSs?: *“Reaching for yield in disguise”*

# Takeaways on risk?

Should we be **concerned** about this?

- Active funds tilt away from cash Treasuries → Makes sense not to pay managers for holding treasuries!
- Adds a bit of leverage to the system
    - But, what's the **counterfactual**?
    - **No leverage** vs. **Leverage in other way (**e.g., repo, securities lending)
    - Duration from **longer-term corporates**?

What's the **source** of any **risk**?

- Not necessarily the levered Treasury positions themselves… low credit risk, and duration risk not higher than index
- Because of mutual funds' **MBS positions**?
    - Yes, but wouldn't funds reach for yield even if Treasury futures didn't exist?
- Or, from hedge funds' **short positions** in these futures?
    - If basis shrinks → hedge funds lose money and may offload Treasuries → Fire-sale?

# Small comment 1: Why few observations in difference regression?

| | $\Delta$ Treasury futures duration | | |
|---|---|---|---|
| | (1) | (2) | (3) |
| $\Delta$ Cash duration | $-0.360^{***}$ | $-0.358^{***}$ | $-0.417^{***}$ |
| | (0.059) | (0.059) | (0.065) |
| Fund fixed effect | | X | X |
| Time fixed effect | | | X |
| $R^2$ | 0.070 | 0.100 | 0.149 |
| Observations | 1,051 | 1,051 | 1,051 |

Table 12: **Regression of change in Treasury futures duration on change in cash duration.** The table shows results of quartely regressions of changes in the duration of a fund's Treasury futures position against the duration of the cash portfolio. Results use N-PORT data from December 2019 to September 2023. * indicates significance at the 10% level, ** at the 5% level, and *** at the 1% level.

- Only 1/4 of panel regression
  - Because dropping all time periods involving zero futures?
- What about?

$$\Delta\text{Fund}-\text{level duration tilt from futures } = \alpha + \beta\ \Delta\text{Cash duration} + \epsilon$$

# Small comment 2: Futures users have lower flow-performance sensitivity

| | *Dependent variable:* Percent flows | | |
|---|---|---|---|
| | (1) | (2) | (3) |
| Log of total net assets | 0.002*** | 0.003 | 0.003 |
| | (3.592) | (1.23) | (1.231) |
| Quarterly return | 0.528*** | 0.454*** | 0.571*** |
| | (3.453) | (2.949) | (2.979) |
| Quarterly return × Low futures | −0.007 | −0.012 | −0.006 |
| | (−0.105) | (−0.178) | (−0.083) |
| Quarterly return × Medium futures | −0.105 | −0.107 | −0.107 |
| | (−1.586) | (−1.606) | (−1.607) |
| Quarterly return × High futures | −0.093* | −0.091* | −0.099* |
| | (−1.891) | (−1.825) | (−1.944) |
| Sales restriction | | | 0.001 |
| | | | (0.828) |
| Open to investors | | | 0.001 |
| | | | (0.165) |
| Retail fund | | | −0.001 |
| | | | (−0.614) |
| Quarterly return × Sales restriction | | | −0.168*** |
| | | | (−2.971) |
| Quarterly return × Open to investors | | | −0.28** |
| | | | (−2.194) |
| Quarterly return × Retail fund | | | −0.061 |
| | | | (−1.029) |
| Time fixed effects | X | X | X |
| Entity fixed effects | | X | X |
| Observations | 8,288 | 8,288 | 8,288 |
| R-squared | 0.019 | 0.019 | 0.019 |

**Paper's interpretation:**

- Futures users follow index better → Raw returns less informative

**Testable "placebo"?**

- We should not see this relation with excess returns/alpha

**Suggestions:**

- Control for more lags of flows and returns
- Regression only includes surviving funds → bias?

# Small comment 3: “Futures users” are defined ex-post (2023)

→ Somewhat mechanical or unintuitive results

| | Dec 2019 | | Jun 2021 | |
|---|---|---|---|---|
| | Share | Duration | Share | Duration |
| | | 2023 Non-futures holders | | |
| U.S. Treasuries | 19.25 | 8.71 | 18.08 | 8.18 |
| Agency MBS | 32.58 | 3.38 | 27.04 | 4.3 |
| Private-label MBS | 6.45 | 2.4 | 4.65 | 3.22 |
| Corporate debt | 22.76 | 6.64 | 28.44 | 7.86 |
| CDO | 0.68 | 0.09 | 1.46 | 0.14 |
| Other ABS | 6.92 | 1.67 | 5.85 | 2.18 |
| Other | 11.36 | 6.51 | 14.48 | 7.02 |
| Total duration | | | | |
| Cash only | | 5.35 | | 6.05 |
| Cash + Futures | | 5.50 | | 6.17 |

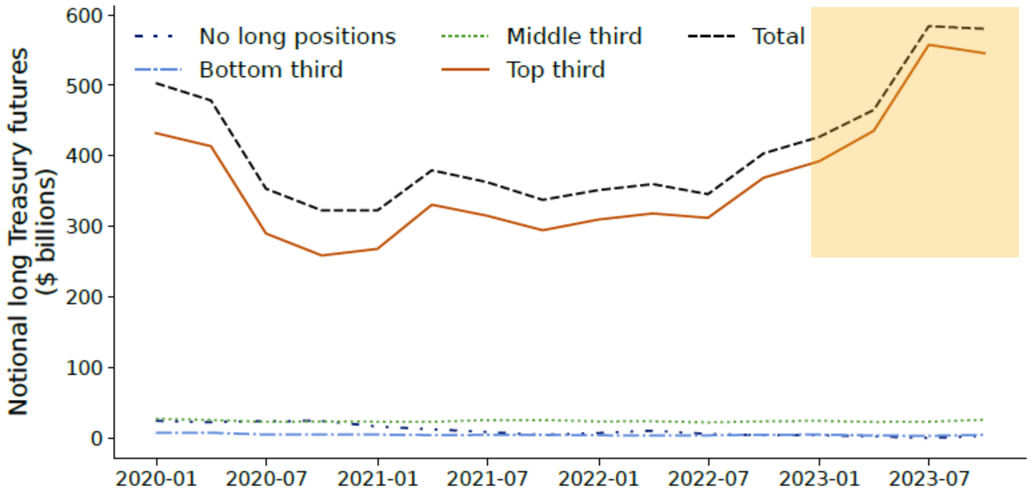



Figure 6: **Total long Treasury futures holdings over time by holdings as of June 2023:** The figure shows total holdings of futures by mutual funds for funds with different holdings as of June 2023, in particular split into no futures holdings in June 2023, and then the bottom, middle and top thirds of positive long futures holdings in June 2023.

# Small comment 4: How widespread?

- Most "heavy user" funds within **one family →** **Generalizability?**
- **Clustering** s.e. in regressions?

| | | Long futures positions | | | | | |
|---|---|---|---|---|---|---|---|
| | | *$ billions* | | | *% assets* | | |
| **Fund name** | **Net assets** | Jun 2023 | Jun 2021 | Dec 2019 | Jun 2023 | Jun 2021 | Dec 2019 |
| American Balanced | 202 | 34 | 7 | 17 | 16 | 3 | 10 |
| Bond Fund of America* | 75 | 31 | 9 | 18 | 41 | 13 | 38 |
| American Funds Strategic Bond* | 17 | 28 | 0 | 0 | 158 | 0 | 27 |
| Metropolitan West Total Return Bond* | 62 | 23 | 2 | 12 | 37 | 2 | 15 |
| Lord Abbett Short Duration Income | 46 | 22 | 21 | 5 | 47 | 35 | 9 |
| Western Asset Core Plus Bond* | 24 | 17 | 13 | 29 | 72 | 31 | 94 |
| Intermediate Bond Fund of America | 24 | 17 | 2 | 7 | 71 | 9 | 33 |
| U.S. Government Securities | 19 | 14 | 0 | 7 | 74 | 2 | 46 |
| American Funds Inflation Linked Bond | 13 | 11 | 1 | 1 | 84 | 9 | 27 |
| PGIM Total Return Bond* | 40 | 8 | 18 | 28 | 21 | 30 | 57 |

Table 4: **Top 10 holders of long notional Treasury futures in June 2023:** The table shows the total assets, notional amount of Treasury futures at the end of December 2019, June 2021, and share of Treasury futures in total net assets for the top 10 holders as of June 2023. Stars denote funds classified as having an intermediate investment grade debt objective by Lipper.

# Conclusion

- **New data** (N-PORT) on **mutual funds' futures positions**
    - Very nice!
    - I learned a lot
- Shows mutual funds **increase duration** using futures – helps them **match** the benchmark duration
    - Story **makes sense**!
    - **Contribution?** Choi et al. (2023) make similar arguments that transaction costs and closing gaps to peers motivates derivatives use
- **New: Related** to incentives to **reach for yield in MBS**

- **Recommendation**: Consolidate evidence / split into two papers?
    - Too many results → Less emphasis on most important findings
- **Identification**?
    - Natural experiment-type "shocks" to fund's duration or incentive to invest in MBS?
    - E.g., from maturing bonds or early calls