In Pursuit of Trend-Following Beta: The Promise and Pitfalls of Replication

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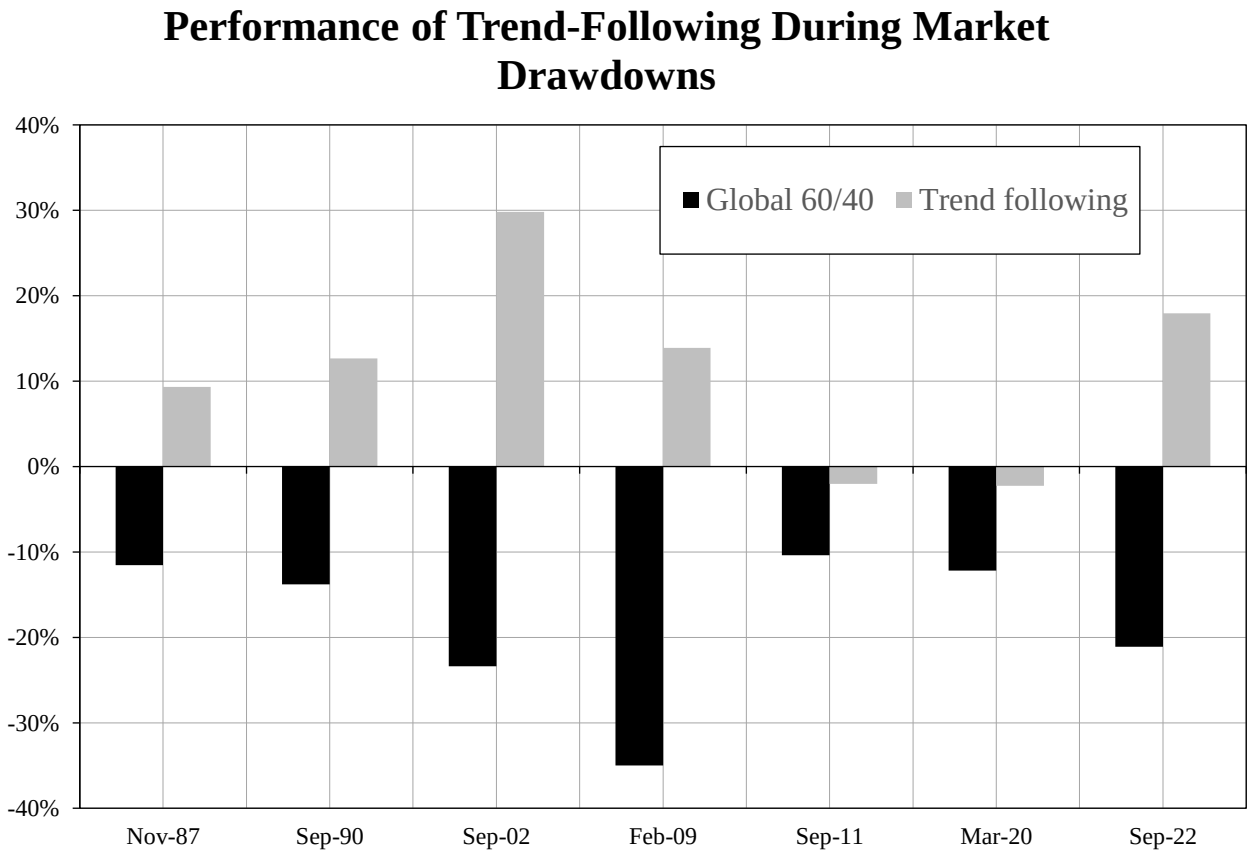
(with Steven Braun and Corey Hoffstein)

The message in a nuthsell

- Trend-following is a nice asset class, but problematic to access due to manager/model risk which is so large that can overwhelm the benefits of allocation
- Model/manager risk can be mitigated through replication of a broad index of TF funds, however…
- Replication introduces its own model risk and gives rise to a trade-off between skill leakage (-) and fee savings (+)
- Replication shortfalls can be addressed through regularization which helps in making TF replication attractive as an active strategy that seeks to generate alpha through fee savings

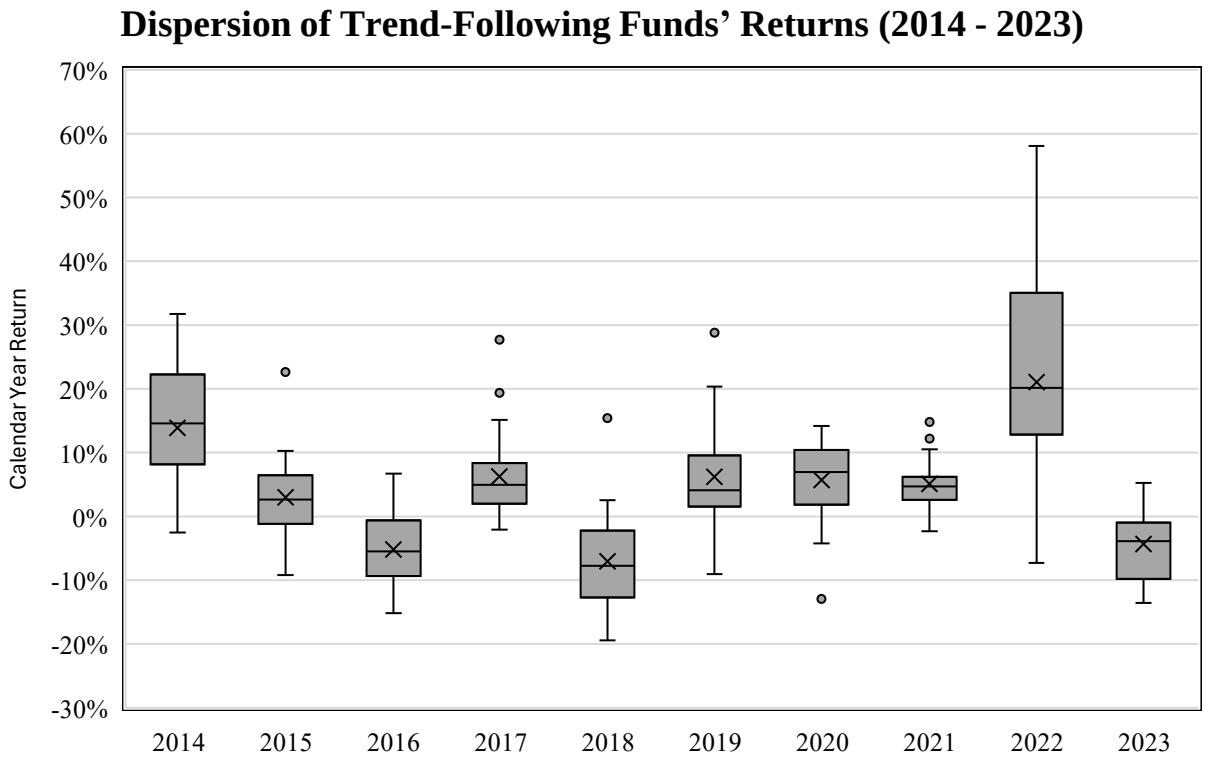
The case for trend-following

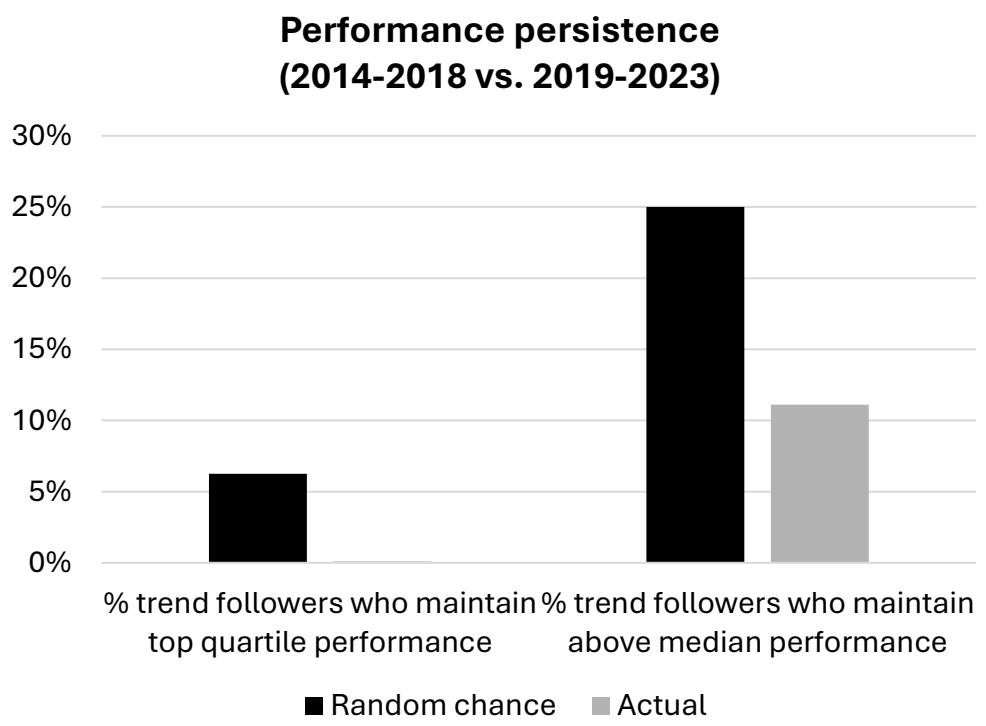
- Strategy monetrizes trends through long/short positions in futures markets
- Relatively large capacity ~$360bn AuM (3x Equity Long-Short HF)
- Historically low correlation to both stocks and bonds
- Positive skeweness → „crisis alpha”



The problem with trend-following: manager/model risk

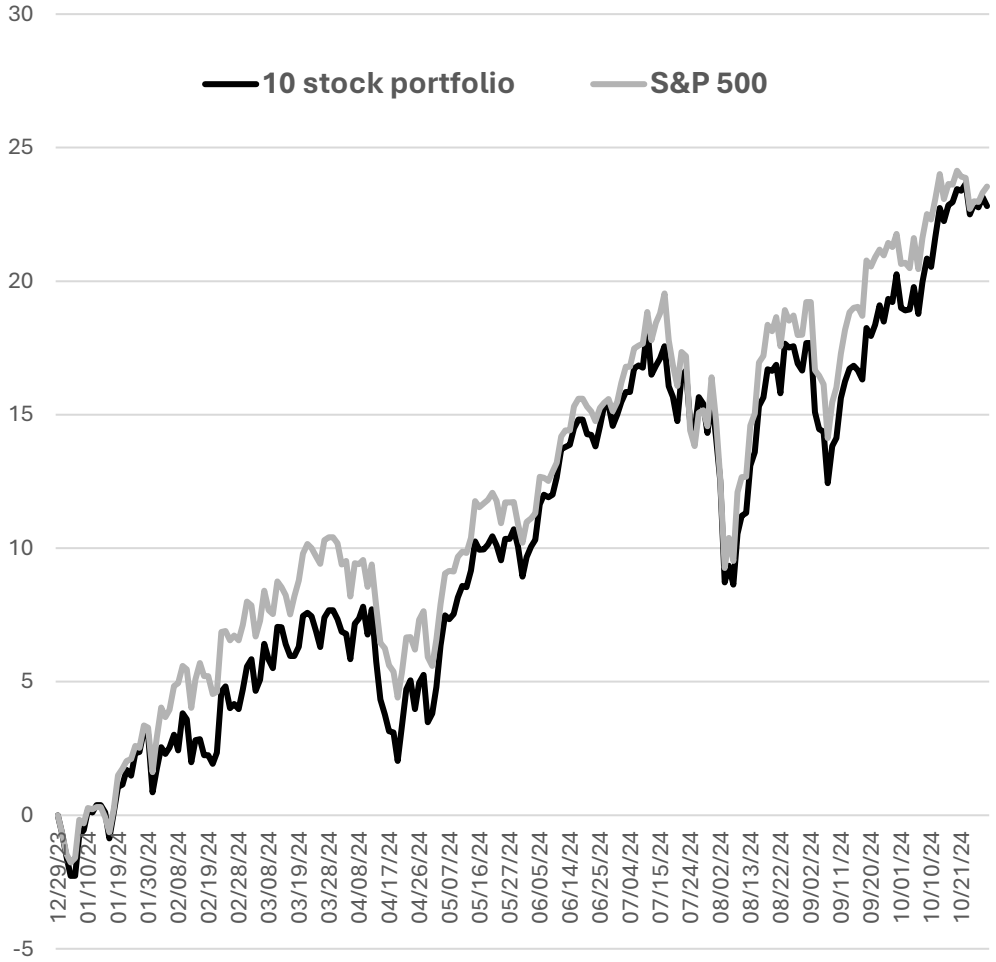
- Benefits of allocating to TF strategies typically demonstrated using one of the broad industry indices (BTOP50, SocGen Trend)
- Gaining exposure requiers either developing a strategy oneself or delegating it to an external manager → in both cases actual performance will differ markedly from the index





The case for replication

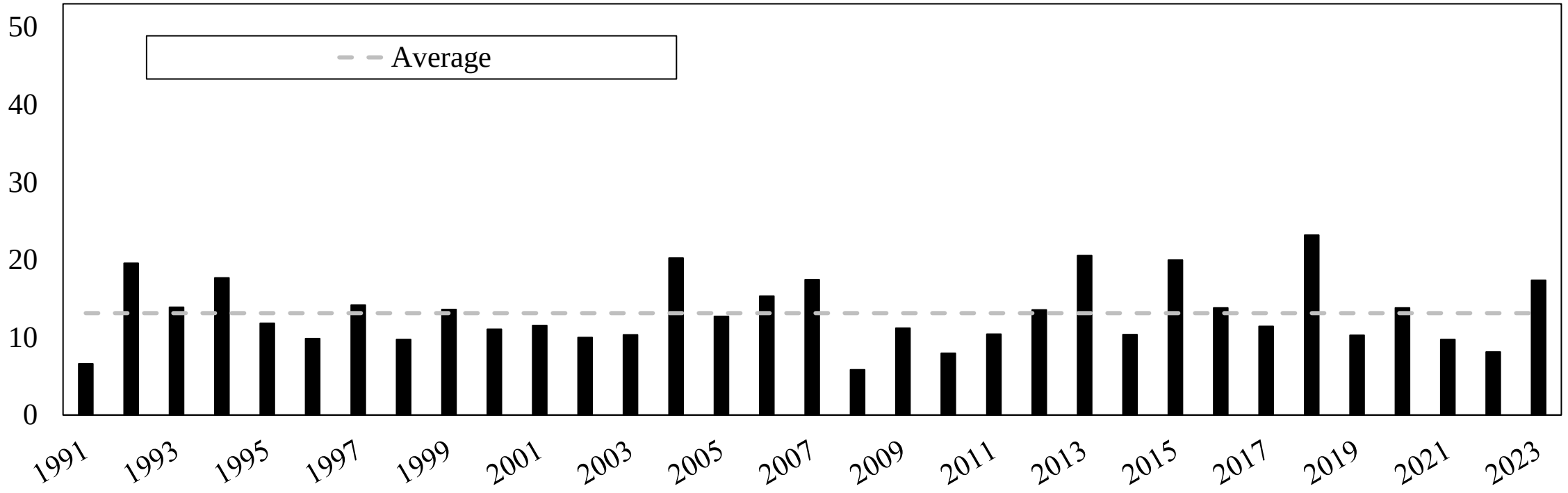
- Replication – find a basket of securities/factors that closely match the performance of a target index
- Works well for equity indices…
- If we could deploy it for TF index, could diverisfy model **and** manager risk
- But is replication of TF funds even feasible given large heterogeneity of trend models?



How many factors explain TF performance?

- Generate 50 TF strategies („managers”)
  - Same trend signal: $s_T = 2N\left(\sqrt{T}\frac{\overline{r_T}}{\sigma_T}\right) - 1 \in [-1,1]$
  - 12 different lookbacks T=20, 40,…, 240 days
  - Random universe selection (15-53 futures markets)
  - Risk parity weights, rebalanced daily
  - Random portfolio vol target 10-15%
  - TX costs modeled as in Hurst et. al (2017)
  - HF-style 2&20 fees
  - Sample runs 1991-2013
- Create Virtual Fund of Funds (VFOF) as equally weighted allocation to the 50 generic strategies
- Attribute VFOF performance to independent risk factors via PCA

Effective number of independent VFOF risk factors (1991-2023)

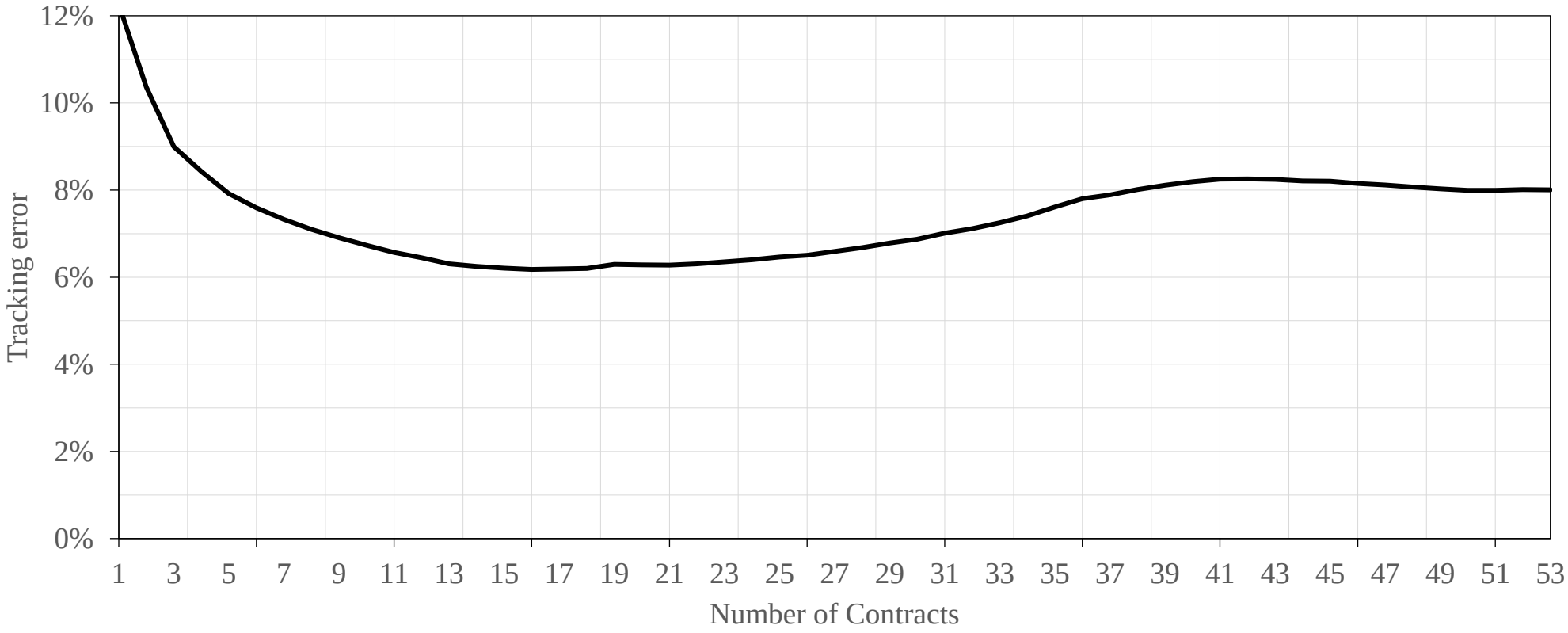


Effective number of factors = exponential of the Shannon entropy of the normalized absolute factor return contributions

Bottom line: replication of VFOF returns using a handful of contracts *should* be possible

VFOF replication: best-case scenario

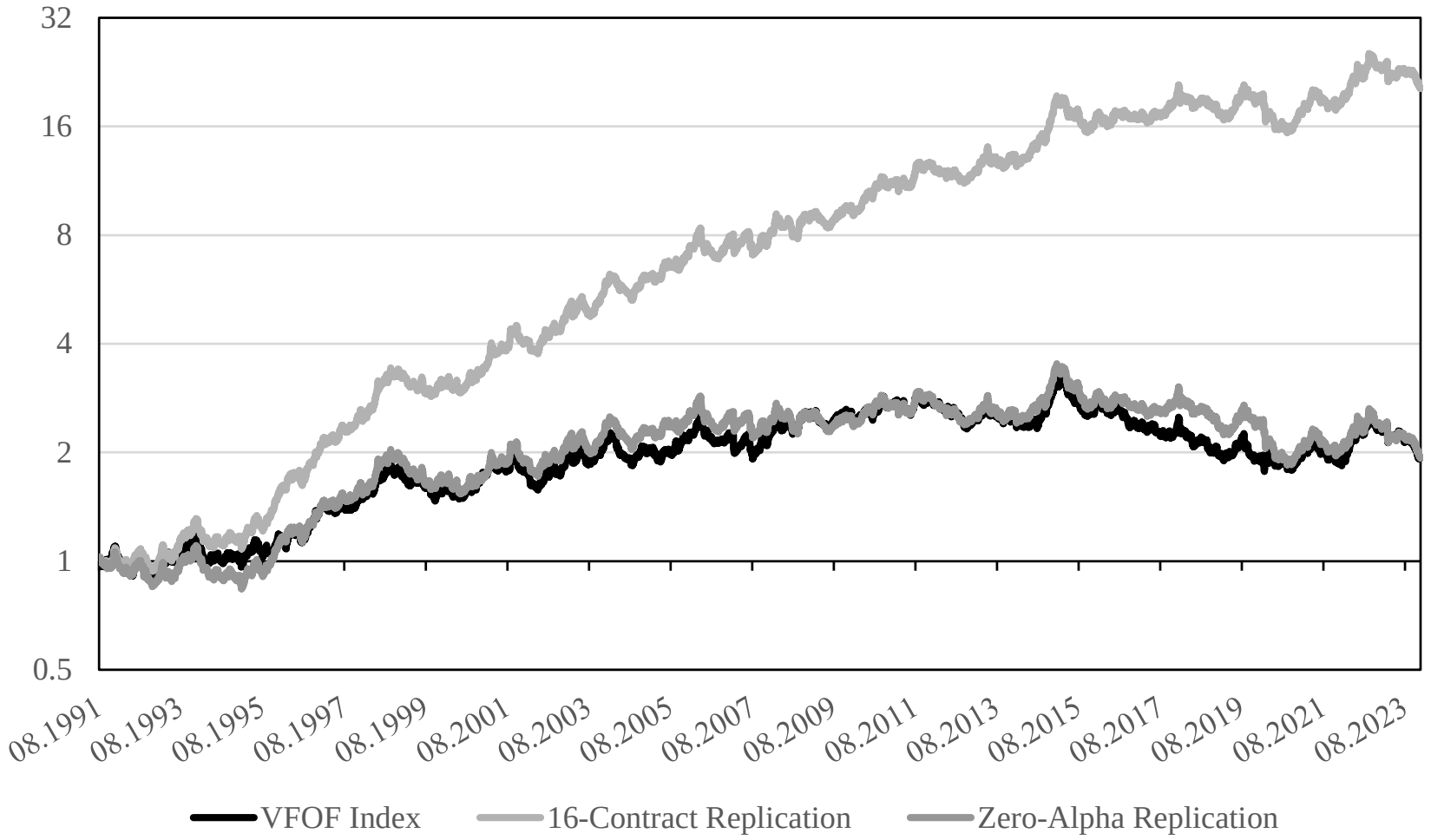
- OLS top-down approach
- Leave-one-out algorithm: starting from the full set of contracts (n=53), test removing one contract at a time discarding the worst performing futures (i.e. one whose removal leads to the lowest tracking error deterioration)



Replication introduces its own model risk, but offers the promise of „fee alpha”

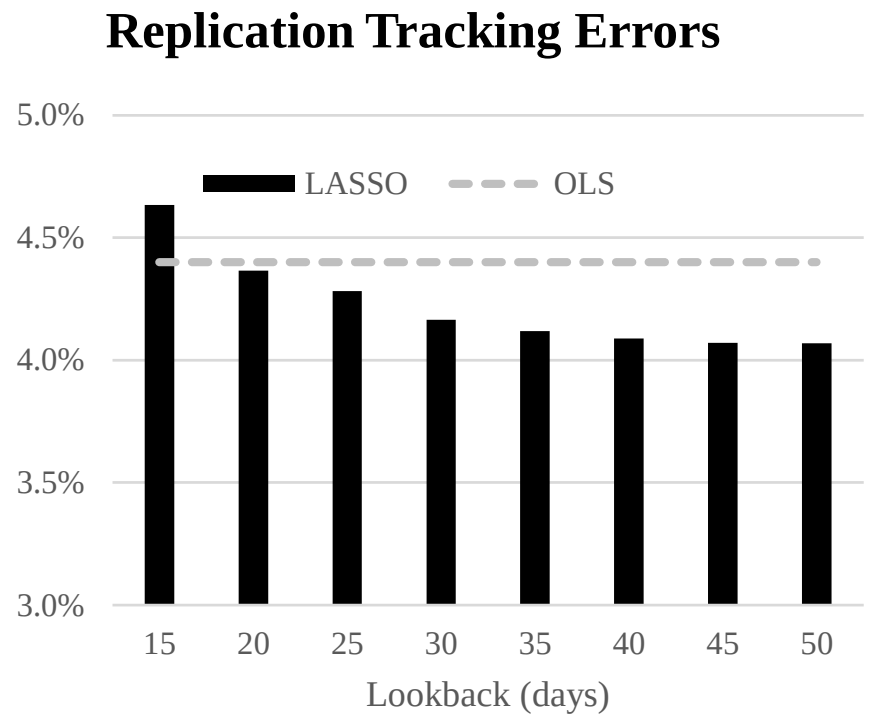
- VFOF in-sample costs:
  - 200 bps manager fees
  - 110bps performance fees
  - 275bps unnetted transaction costs
- Replication TE ~ 600 bps
- Replication ex ante IR ~ 0.9
- In-sample alpha ~ 700 bp

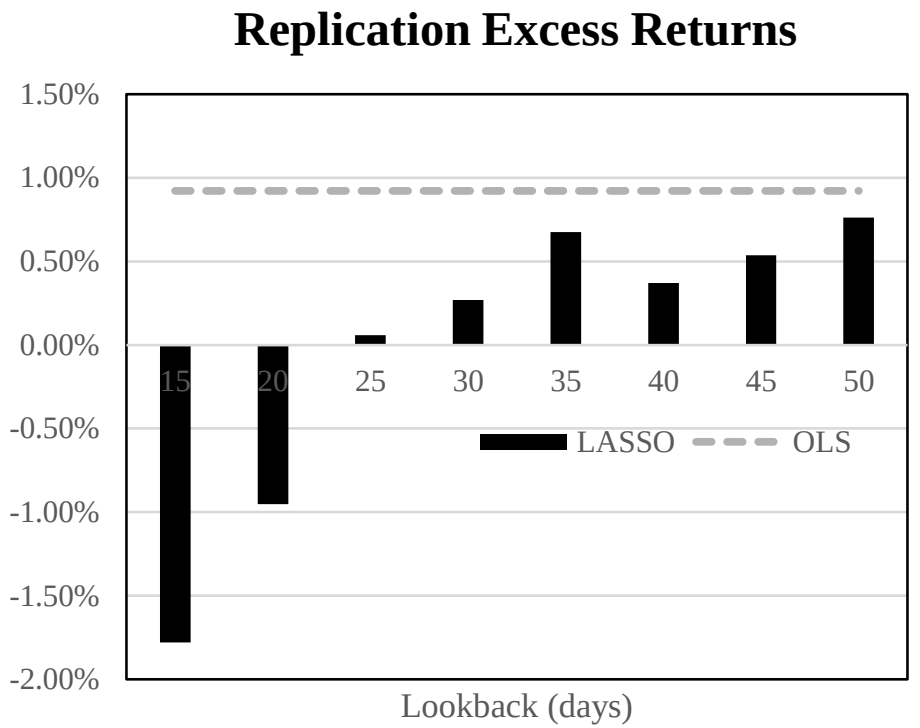
- **<u>But this is a best case scenario</u>**



Replication of live managers: fee alpha vs. skill leakage trade-off

- OLS with a fixed 15-contract universe
- LASSO with 5-fold cross-validation (performed separately for each rolling window)



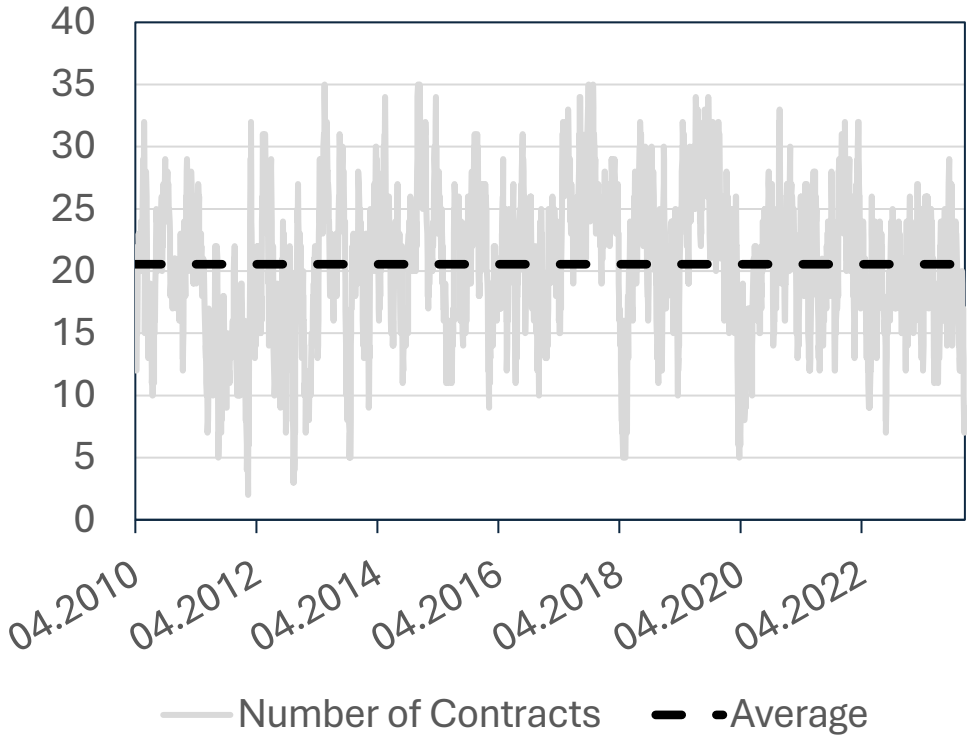


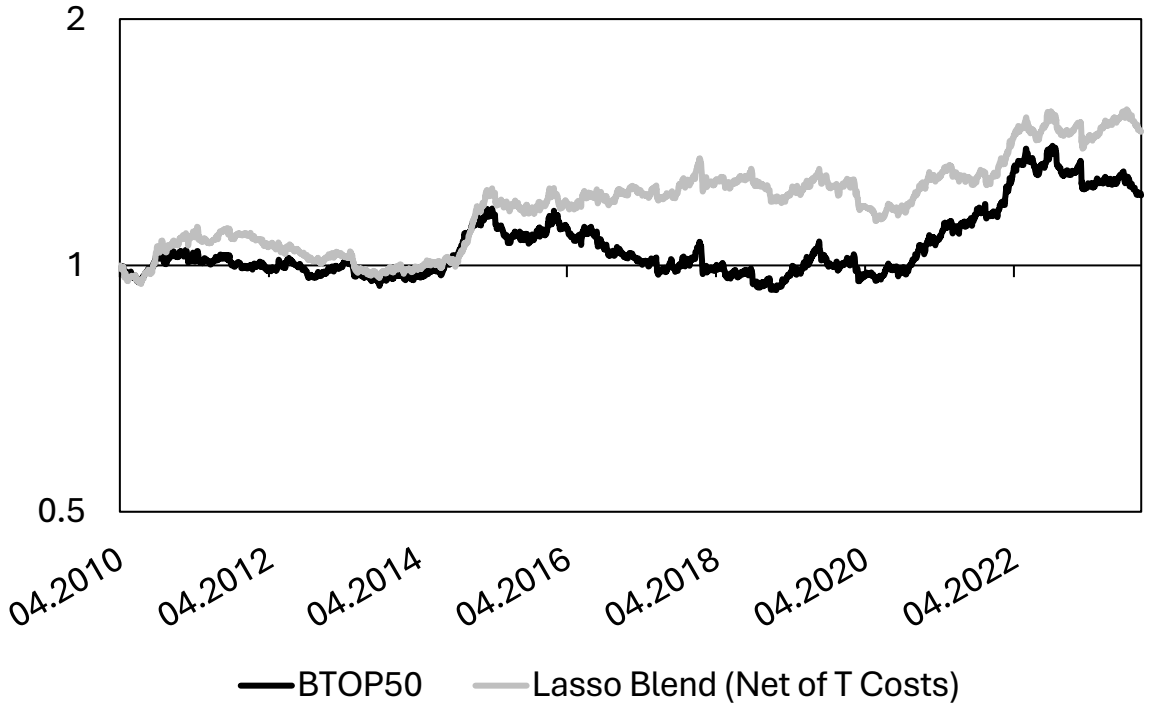
LASSO trades more mkts, and captures more skill but suffers higher tx costs

Replication improvements: 30-50 model blend

- Ability to capture trends of various length
- Reduce noise via model averaging
- Cut costs through trade netting

- Lower TE (<400bp)
- Higher excess return (133 bp)
- Superior IR ~ 0.34





Concluding message

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