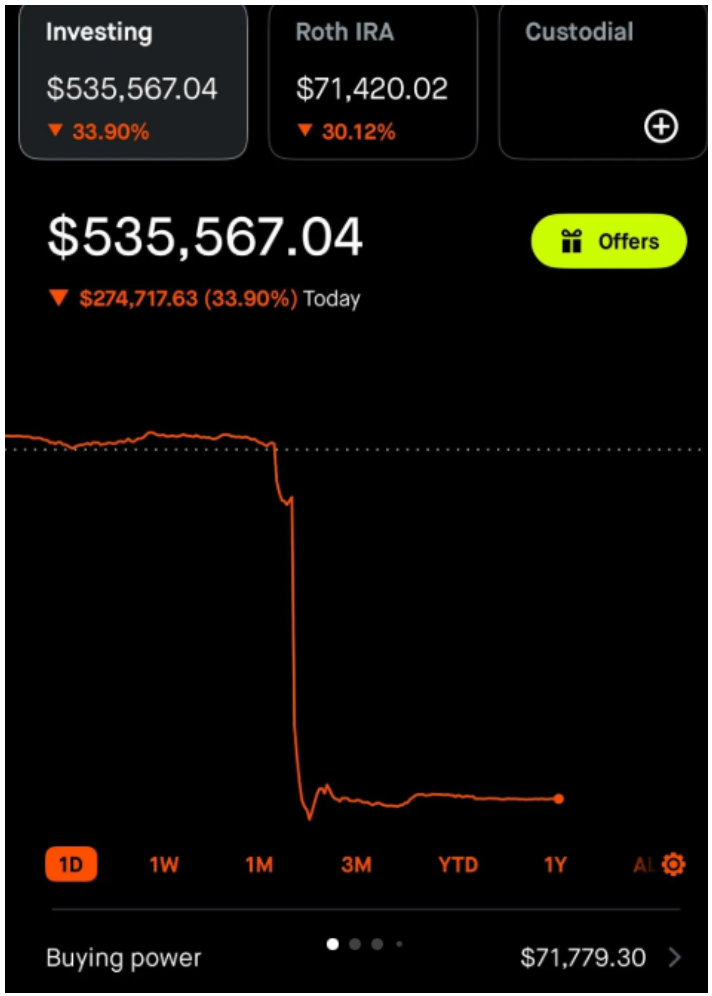
How to Not Lose Money

Measuring Risk-Adjusted Performance in Mutual Funds

Patricio Ortiz

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This is not a personalized investment plan; I am not contracted by you; not registered in China for financial planning.

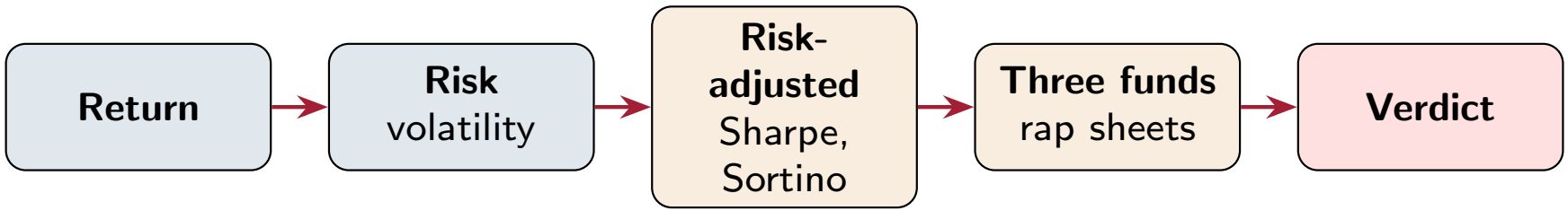
):


Investing
$535,567.04
▼ 33.90%
Roth IRA
$71,420.02
▼ 30.12%
Custodial
$535,567.04
Offers
▼ $274,717.63 (33.90%) Today
1D
1W
1M
3M
YTD
1Y
Buying power
$71,779.30

The question

Picking the fund that went up the most ignores *how* it went up.

Goal
- (i) **Return:** average excess return over T-bills, $\bar{R} - r_f$
- (ii) **Risk:** volatility of returns, total σ vs. downside σ_{down}
- (iii) **Risk-adjusted return:** return per unit of risk (Sharpe, Sortino)



What is a return?

Return in month t:

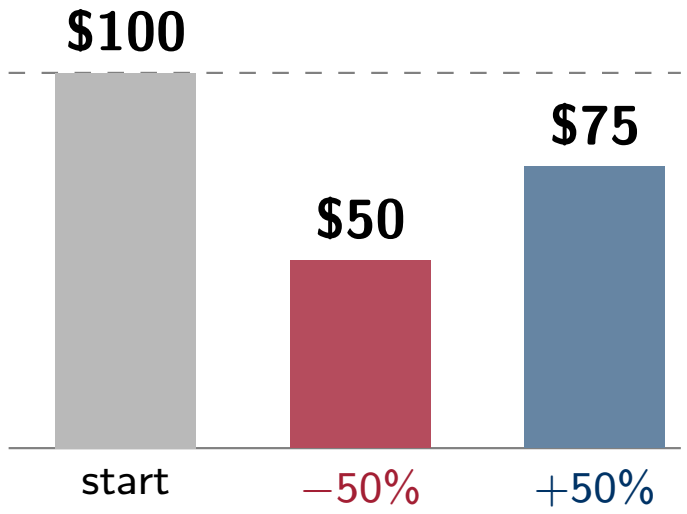
$$R_t = \frac{P_t - P_{t-1}}{P_{t-1}}$$

P_t: fund price at the end of month t, with dividends reinvested.

Excess return: what you earn above a risk-free asset

$$R_t - r_f$$

r_f: 3-month U.S. Treasury bill rate.



Losses hurt more than gains help: after -50%, you need $+100\%$ to get back to \$100.

What is risk?

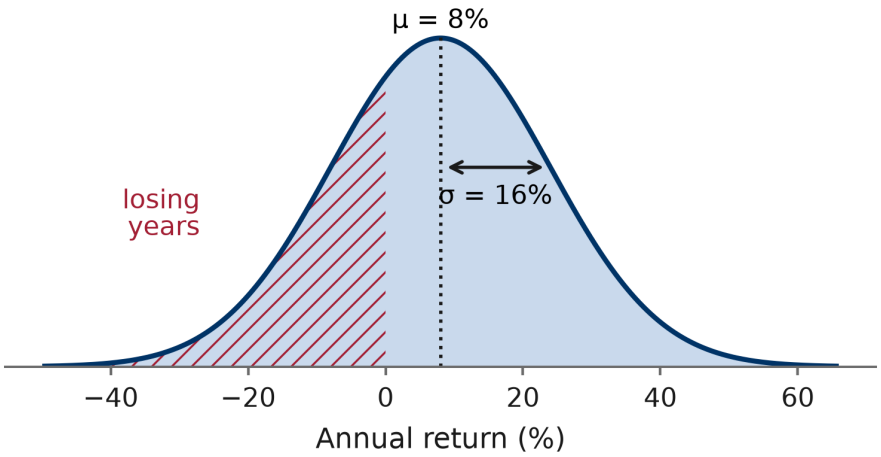
Risk is the uncertainty of the return R, measured by its variance:

$$\mathrm{Var}(R) \;=\; \mathbb{E}\Big[\big(R - \mathbb{E}[R]\big)^2\Big]$$

For our purposes we call risk *volatility*: assuming normally distributed returns, the standard deviation, or square root of the variance, of returns:

$$\sigma \;=\; \sqrt{\frac{1}{T-1}\sum_{t=1}^{T}\big(R_t - \bar{R}\big)^2}$$

R_t: return in month t; $\bar{R}$: average monthly return; T: number of months; annual σ = monthly $\sigma \times \sqrt{12}$



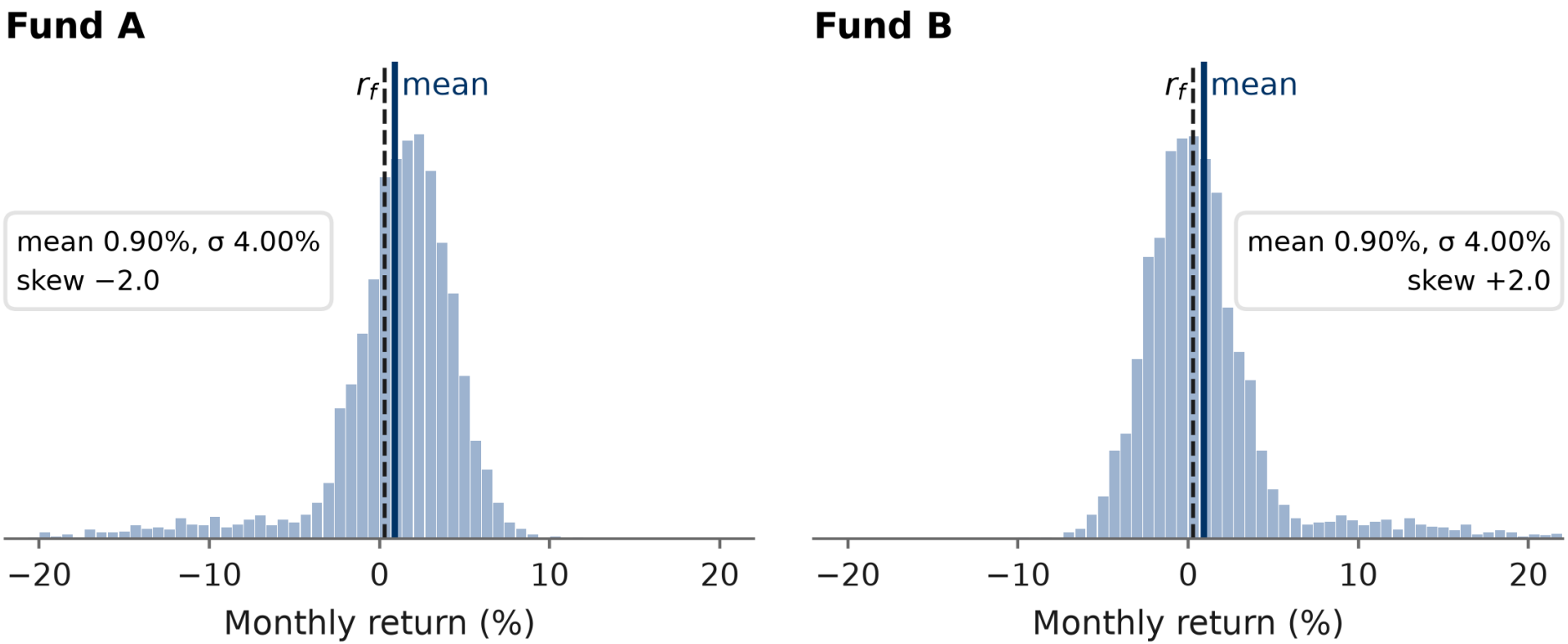
Sharpe and Sortino ratios

$$\text{Sharpe} = \frac{\bar{R} - r_f}{\sigma} \qquad \text{Sortino} = \frac{\bar{R} - r_f}{\sigma_{\text{down}}}$$

$$\sigma_{\text{down}} = \sqrt{\frac{1}{T} \sum_{\text{bad months}} \left(R_{\text{bad}} - r_f\right)^2}$$

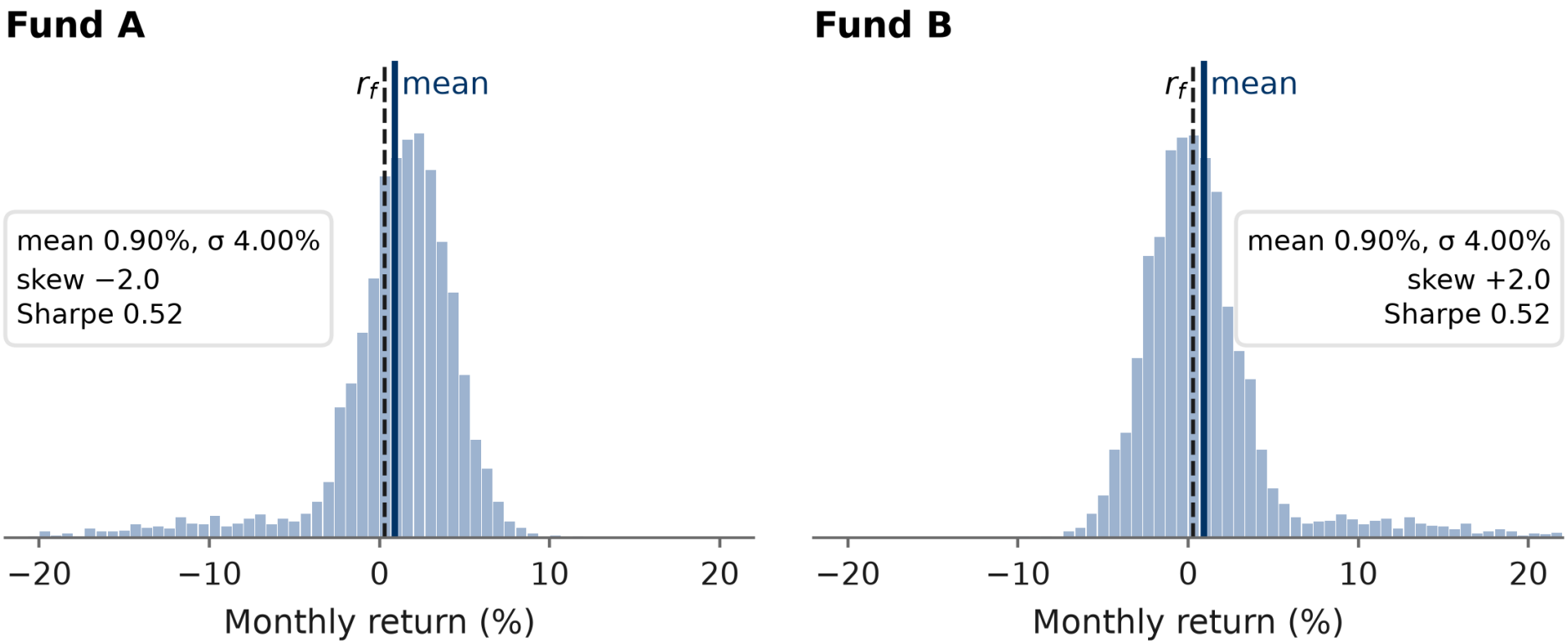
- $\bar{R} - r_f$: average excess return, the reward for taking risk.
- σ: volatility of *all* months, good surprises and bad.
- σ_{down}: volatility of the *bad* months only, where R_{bad} are the months with $R_t < r_f$.
- Both measure return per unit of risk: higher is better.

Sharpe cannot see skew



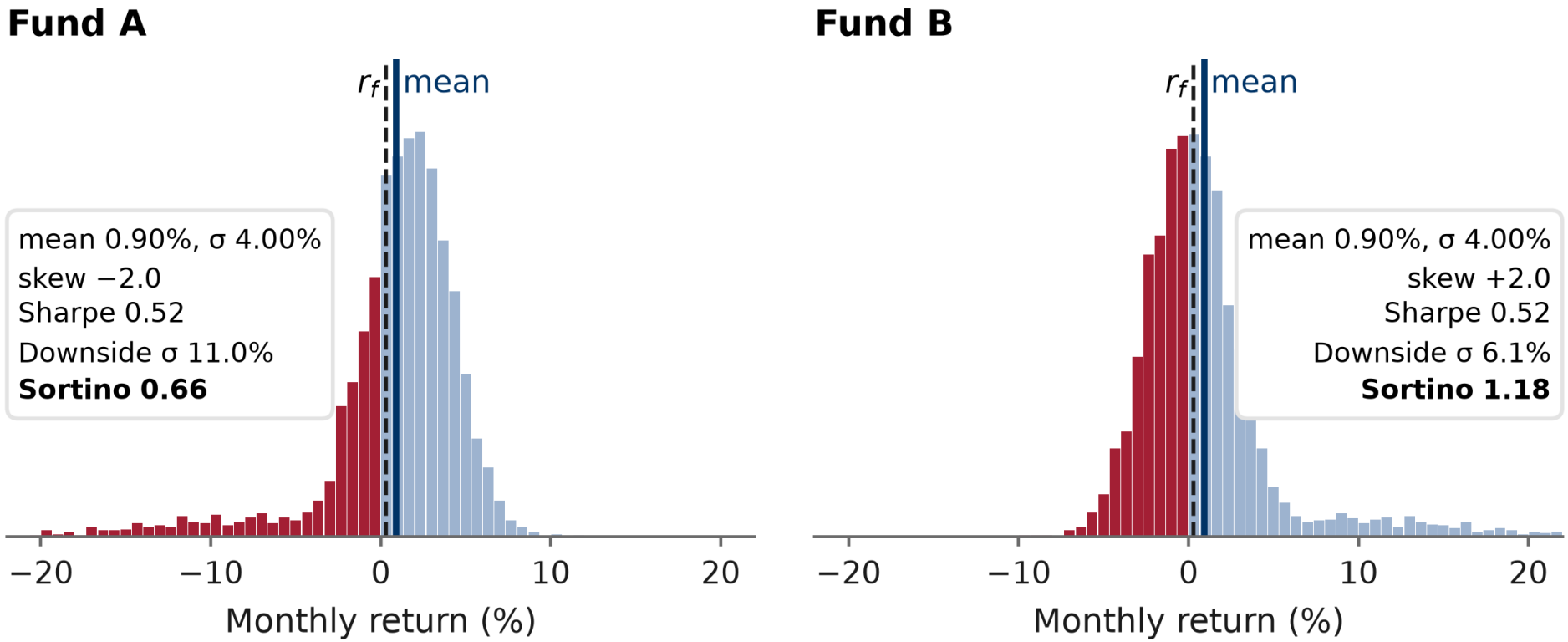
Two funds with the *same* mean and the *same* volatility.

Sharpe cannot see skew



Same mean, same $\sigma \Rightarrow$ same Sharpe ratio (0.52).

Sharpe cannot see skew



Sortino only takes into account the left-tail standard deviation: 11.0% for Fund A vs. 6.1% for Fund B.

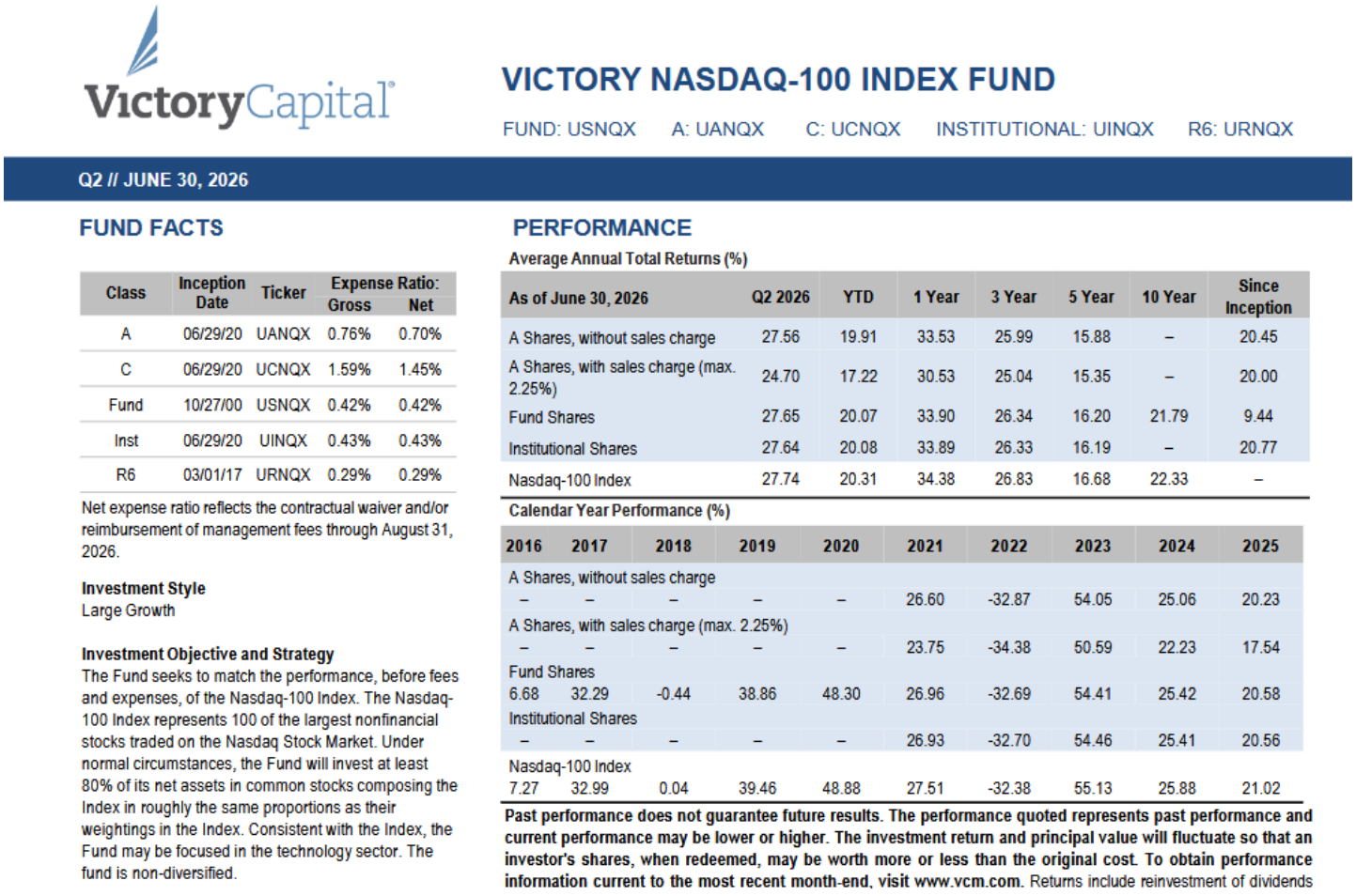
$\Rightarrow$ Fund B Sortino (1.18) $>$ Fund A Sortino (0.66), with identical Sharpe ratios.

The contenders

Fund	Ticker	Benchmark	Holdings	Expense ratio
Vanguard 500 Index	VFIAX	S&P 500	∼500	0.04%
Vanguard Information Technology Index	VITAX	MSCI US IMI Info Tech 25/50	∼320	0.09%
Victory Nasdaq-100 Index	USNQX	Nasdaq-100	∼100	0.42%

- Monthly returns, Oct 2021–Sep 2026 (60 months).
- Risk-free rate r_f: 3-month U.S. Treasury bill.

What the fund company shows you



VictoryCapital

VICTORY NASDAQ-100 INDEX FUND

FUND: USNQX A: UANQX C: UCNQX INSTITUTIONAL: UINQX R6: URNQX

Q2 // JUNE 30, 2026

FUND FACTS

Class	Inception Date	Ticker	Expense Ratio: Gross	Net
A	06/29/20	UANQX	0.76%	0.70%
C	06/29/20	UCNQX	1.59%	1.45%
Fund	10/27/00	USNQX	0.42%	0.42%
Inst	06/29/20	UINQX	0.43%	0.43%
R6	03/01/17	URNQX	0.29%	0.29%

Net expense ratio reflects the contractual waiver and/or reimbursement of management fees through August 31, 2026.

Investment Style
Large Growth

Investment Objective and Strategy
The Fund seeks to match the performance, before fees and expenses, of the Nasdaq-100 Index. The Nasdaq-100 Index represents 100 of the largest nonfinancial stocks traded on the Nasdaq Stock Market. Under normal circumstances, the Fund will invest at least 80% of its net assets in common stocks composing the Index in roughly the same proportions as their weightings in the Index. Consistent with the Index, the Fund may be focused in the technology sector. The fund is non-diversified.

PERFORMANCE

Average Annual Total Returns (%)

As of June 30, 2026	Q2 2026	YTD	1 Year	3 Year	5 Year	10 Year	Since Inception
A Shares, without sales charge	27.56	19.91	33.53	25.99	15.88	–	20.45
A Shares, with sales charge (max. 2.25%)	24.70	17.22	30.53	25.04	15.35	–	20.00
Fund Shares	27.65	20.07	33.90	26.34	16.20	21.79	9.44
Institutional Shares	27.64	20.08	33.89	26.33	16.19	–	20.77
Nasdaq-100 Index	27.74	20.31	34.38	26.83	16.68	22.33	–

Calendar Year Performance (%)

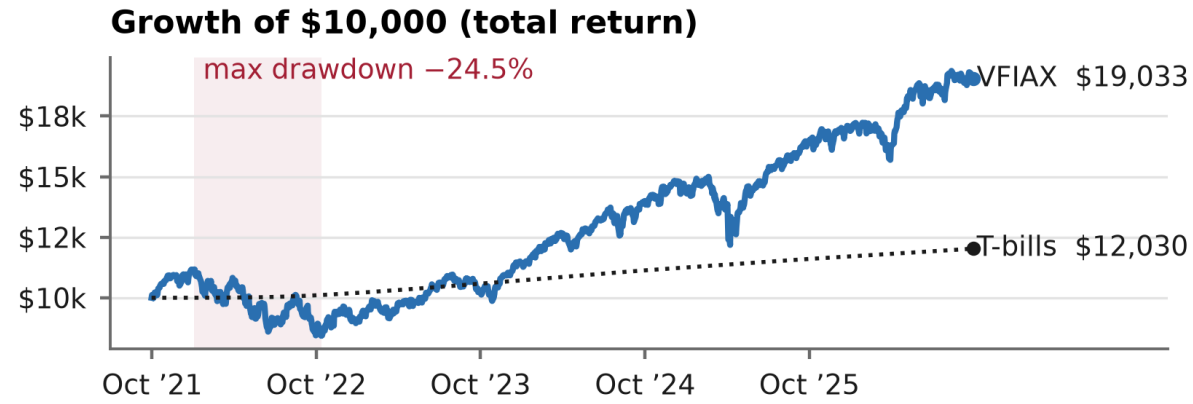
2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
A Shares, without sales charge									
–	–	–	–	–	26.60	-32.87	54.05	25.06	20.23
A Shares, with sales charge (max. 2.25%)									
–	–	–	–	–	23.75	-34.38	50.59	22.23	17.54
Fund Shares									
6.68	32.29	-0.44	38.86	48.30	26.96	-32.69	54.41	25.42	20.58
Institutional Shares									
–	–	–	–	–	26.93	-32.70	54.46	25.41	20.56
Nasdaq-100 Index									
7.27	32.99	0.04	39.46	48.88	27.51	-32.38	55.13	25.88	21.02

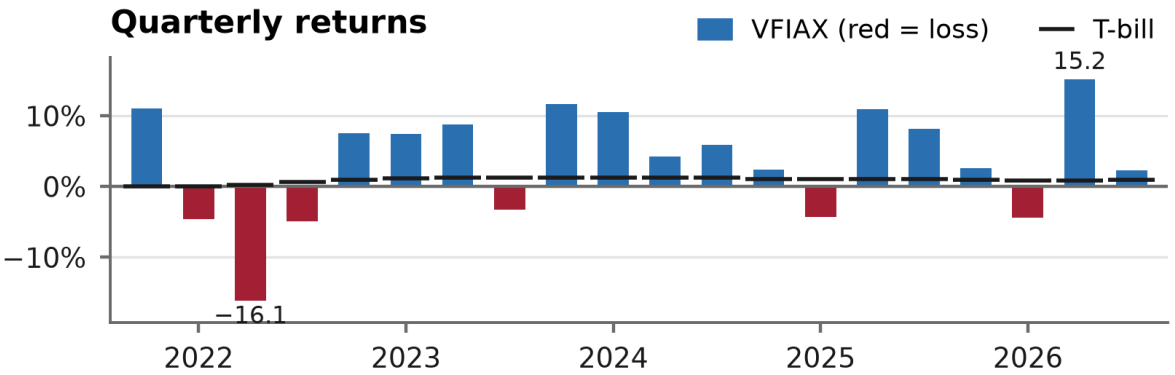
Past performance does not guarantee future results. The performance quoted represents past performance and current performance may be lower or higher. The investment return and principal value will fluctuate so that an investor's shares, when redeemed, may be worth more or less than the original cost. To obtain performance information current to the most recent month-end, visit www.vcm.com. Returns include reinvestment of dividends

Quarterly fact sheet, Victory Nasdaq-100 Index Fund (USNQX).

Fund 1: Vanguard 500 Index (VFIAX)

- Passive S&P 500 index fund (500 largest U.S. companies); expense ratio 0.04%.



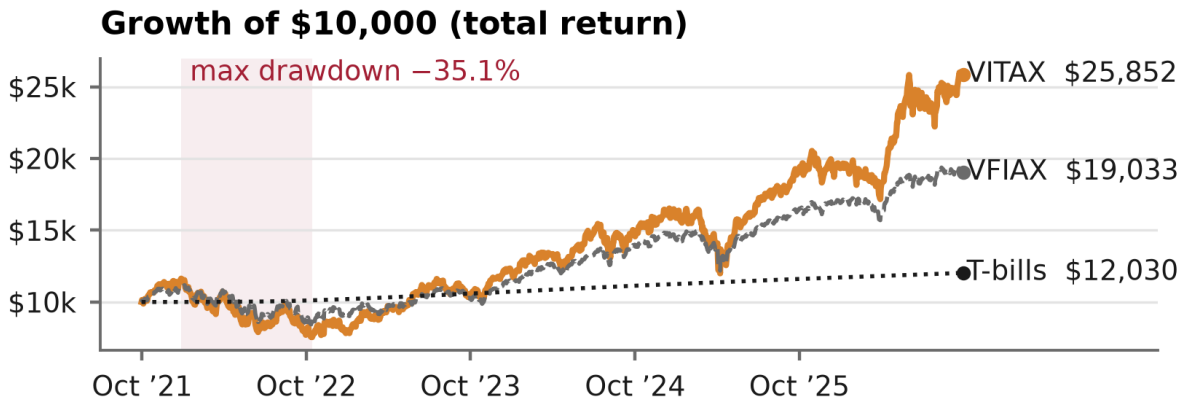


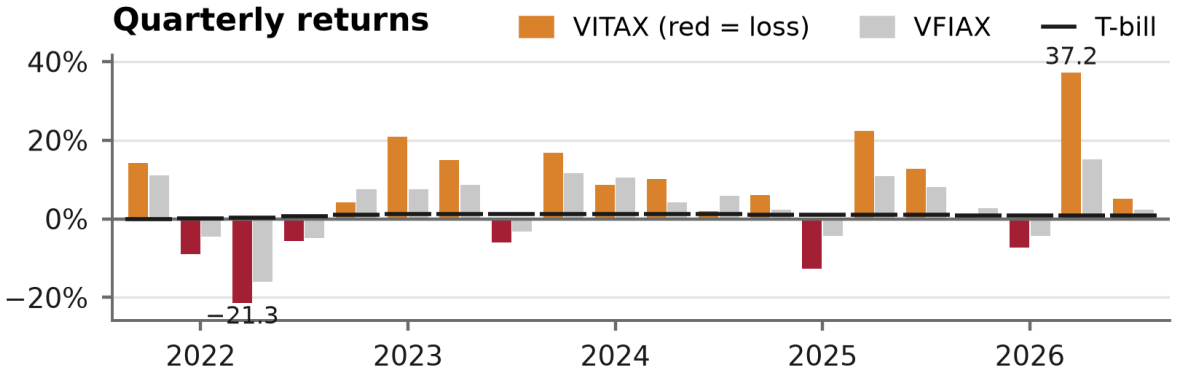
VFIAX · rap sheet

RETURN	
Growth of $10k	**$19,033**
Total return	**+90.3%**
Annualised return	**13.7%**
RISK	
Annualised volatility	**15.6%**
Max drawdown	**−24.5%**
Worst month	**−9.2%**
Worst quarter	**−16.1%**
Skew (daily)	**+0.17**
RISK-ADJUSTED (ann.)	
Sharpe vs T-bill	**0.67**
Sortino vs T-bill	**1.07**
Months > T-bill	**58%**
Expense ratio	**0.04%**

Fund 2: Vanguard Information Technology Index (VITAX)

- Passive U.S. technology index fund (∼320 stocks, led by NVIDIA and Apple); expense ratio 0.09%.



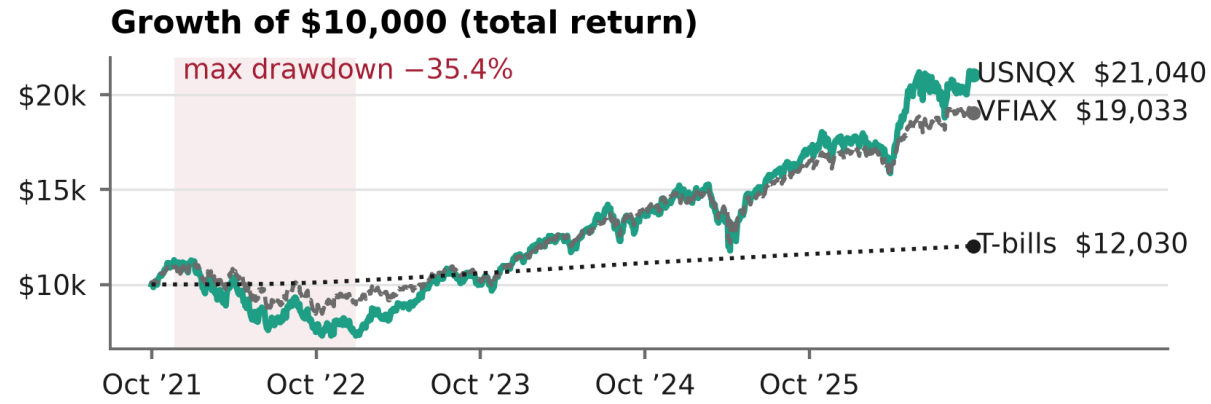


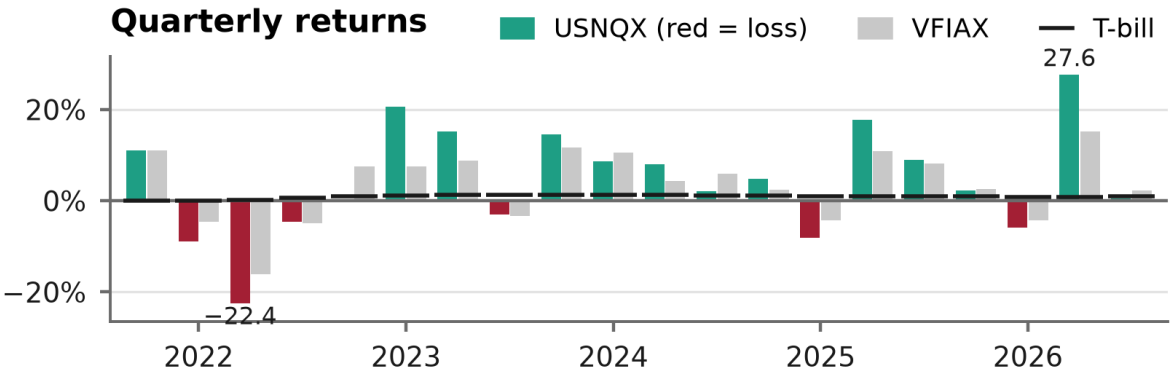
VITAX · rap sheet

RETURN	
Growth of $10k	**$25,852**
Total return	**+158.5%**
Annualised return	**20.9%**
RISK	
Annualised volatility	**23.4%**
Max drawdown	**−35.1%**
Worst month	**−11.8%**
Worst quarter	**−21.3%**
Skew (daily)	**+0.27**
RISK-ADJUSTED (ann.)	
Sharpe vs T-bill	**0.78**
Sortino vs T-bill	**1.38**
Months > T-bill	**57%**
Beta to VFIAX	**1.34**
Expense ratio	**0.09%**

Fund 3: Victory Nasdaq-100 Index (USNQX)

- Passive Nasdaq-100 index fund (100 largest non-financial companies on the Nasdaq); expense ratio 0.42%.

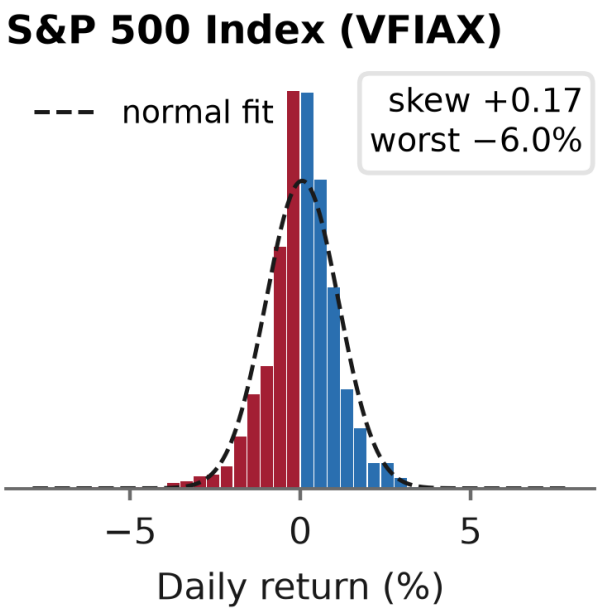


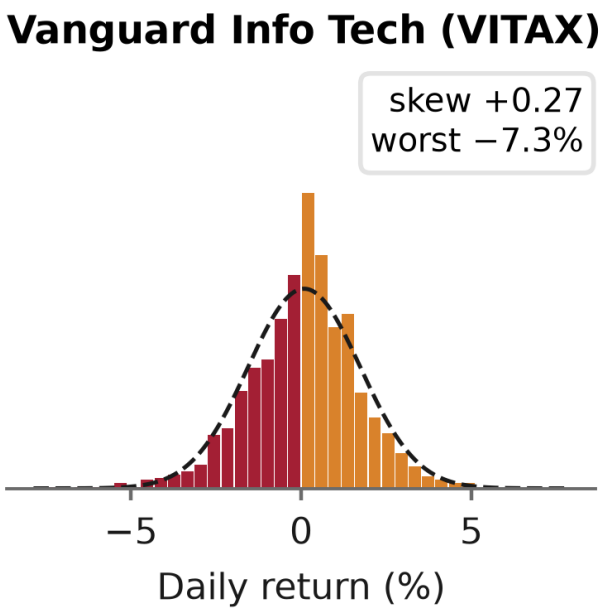


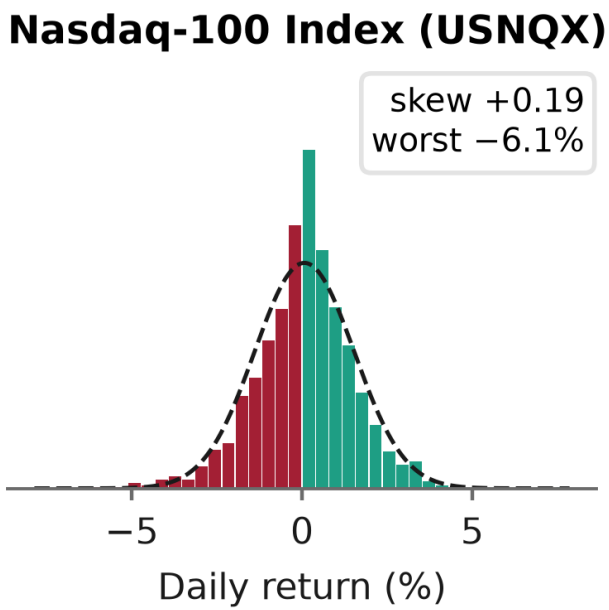
USNQX · rap sheet

RETURN	
Growth of $10k	**$21,040**
Total return	**+110.4%**
Annualised return	**16.0%**
RISK	
Annualised volatility	**20.8%**
Max drawdown	**−35.4%**
Worst month	**−13.4%**
Worst quarter	**−22.4%**
Skew (daily)	**+0.19**
RISK-ADJUSTED (ann.)	
Sharpe vs T-bill	**0.65**
Sortino vs T-bill	**1.04**
Months > T-bill	**62%**
Beta to VFIAX	**1.22**
Expense ratio	**0.42%**

Side by side: daily returns







How to not lose money

	S&P 500 Index VFIAX	Vanguard Info Tech VITAX	Nasdaq-100 Index USNQX
Sharpe ratio			
vs. 3-month T-bill	0.67	**0.78**	0.65
90% CI	[0.03, 1.41]	[0.08, 1.53]	[−0.06, 1.44]
vs. S&P 500 Index	—	0.66	0.33
90% CI		[−0.05, 1.30]	[−0.42, 1.04]
Sortino ratio			
vs. 3-month T-bill	1.07	**1.38**	1.04
90% CI	[0.05, 2.73]	[0.12, 3.38]	[−0.08, 2.87]
vs. S&P 500 Index	—	1.36	0.53
90% CI		[−0.09, 3.27]	[−0.55, 2.14]