FINANCIAL MARKETS AND INSTITUTIONS
A.Y. 2024/25
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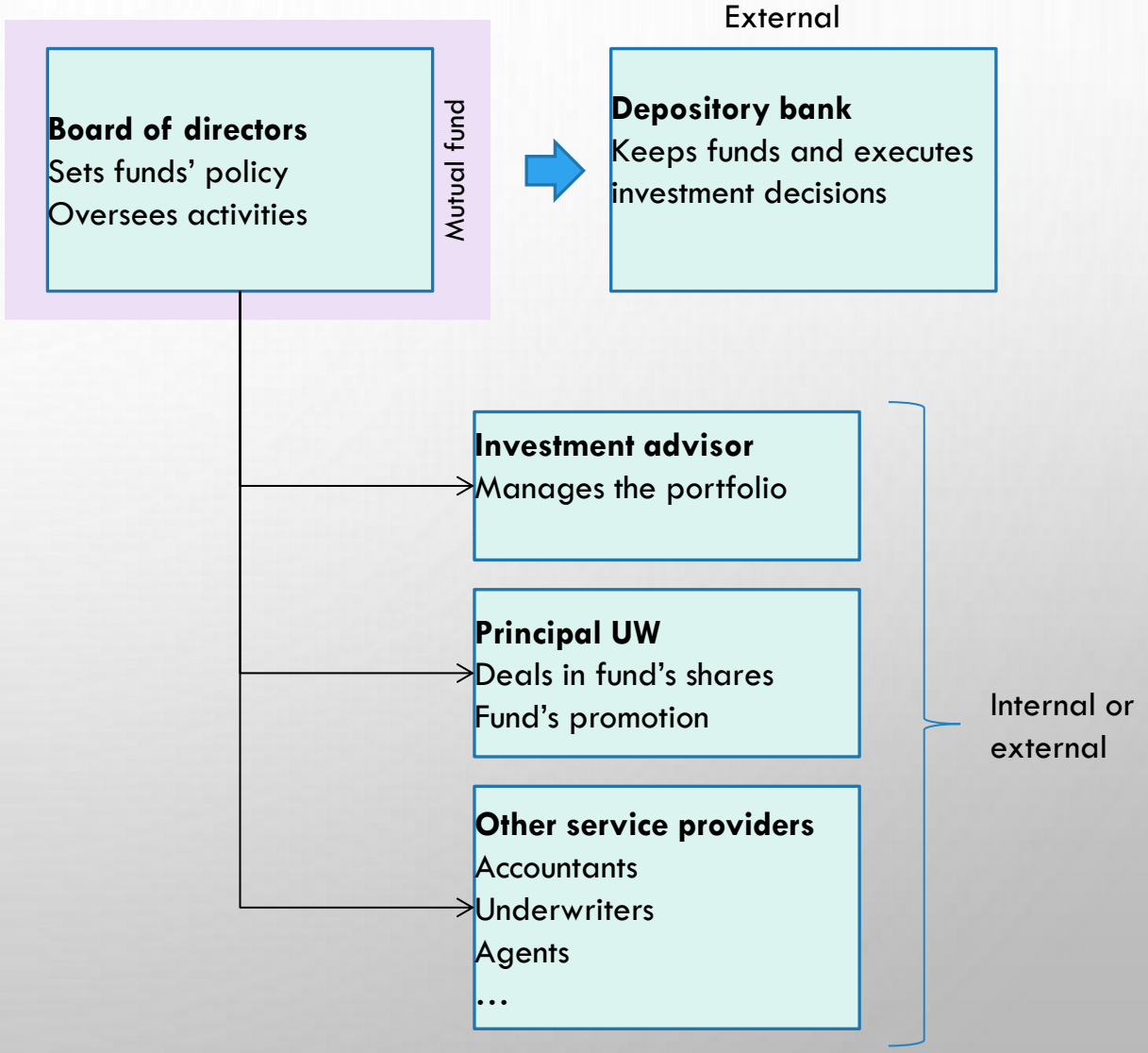
B12. MUTUAL FUNDS

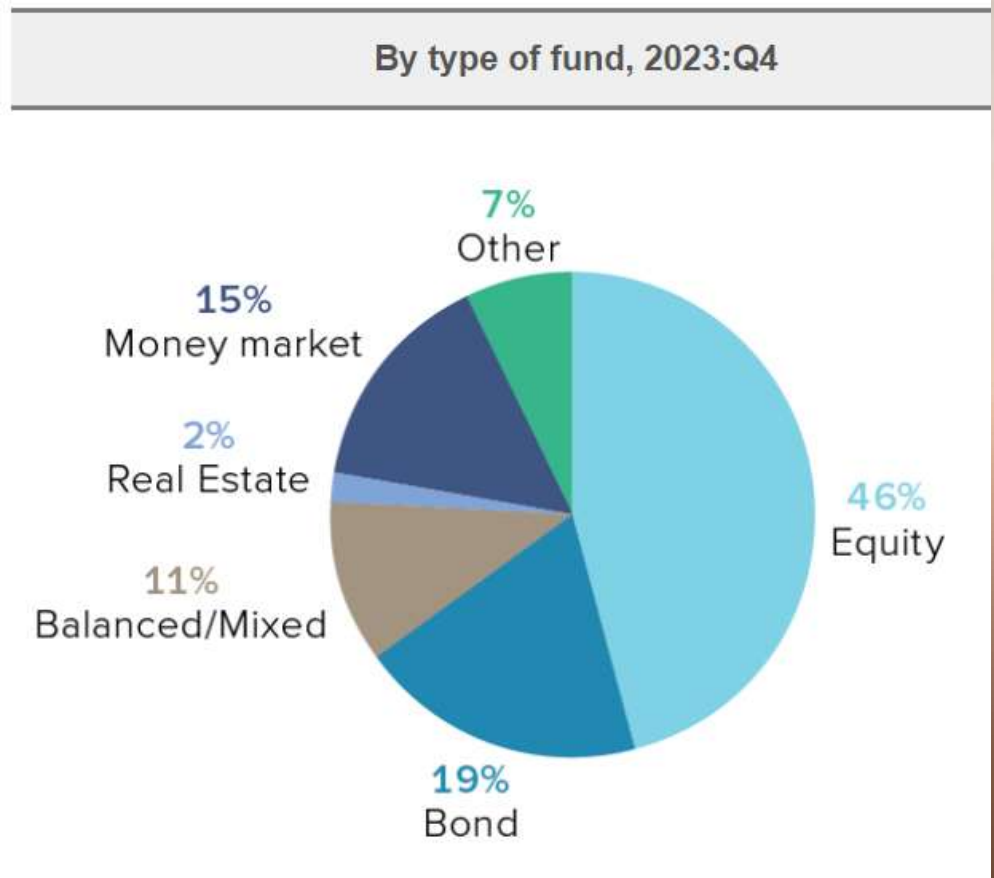
- WHY MUTUAL FUNDS? HOW? VARIATIONS?
- PERFORMANCE MEASURES
- COSTS

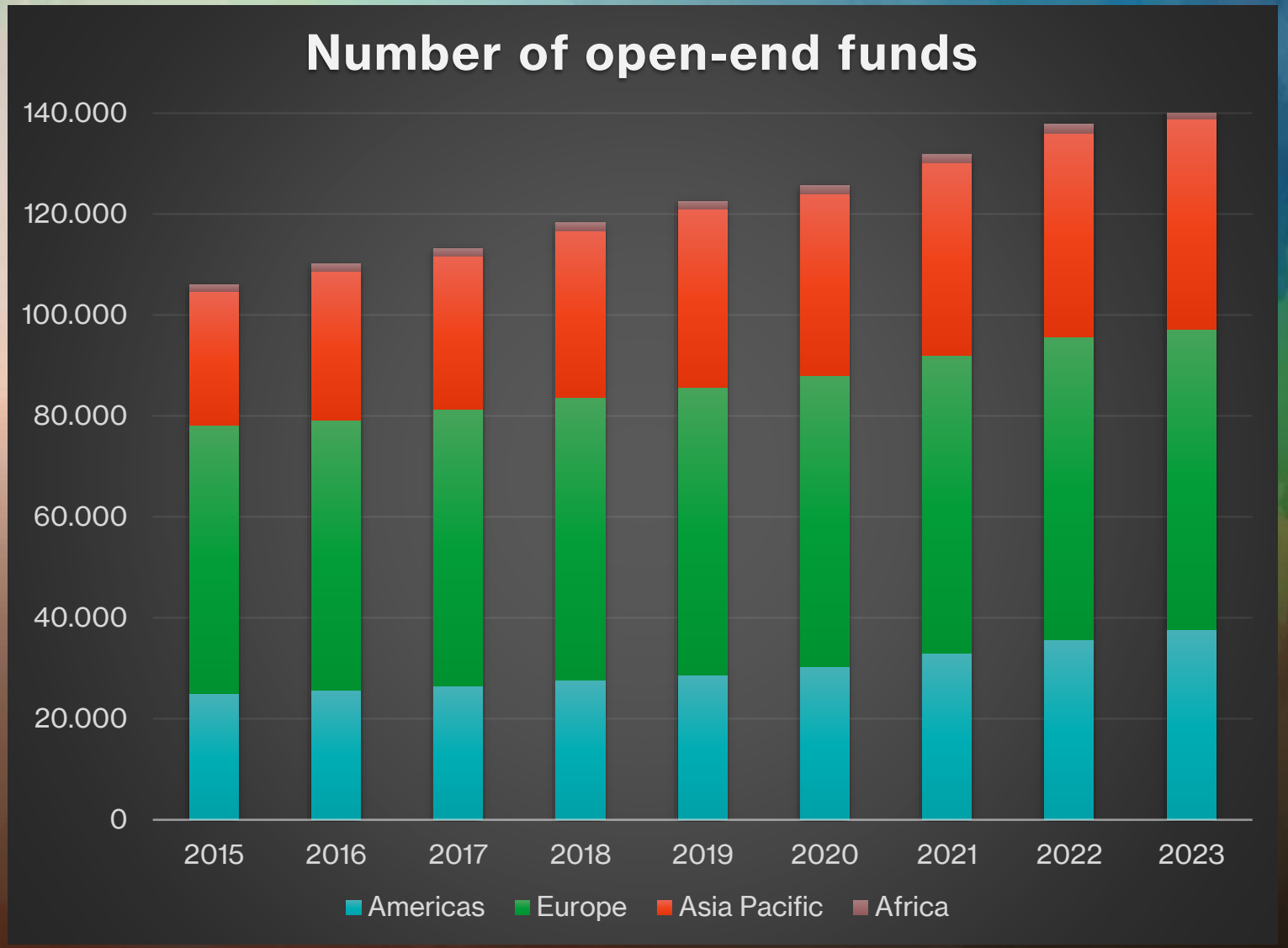
WHY MUTUAL FUNDS

Impressive **exponential growth** in few decades linked with their competitive advantage (2023: 140.000+ funds, 70 trn USD in AUM):

- **liquidity** of investments: holdings represented by shares, mostly aiming at capital gains (several "distributing" funds exist)
- **access** to securities sold at large-denominations
- **diversification** also for small amounts
- **affordable** fees: economies of scale on transaction costs
- provision of **expertise**
- cheap and quick **transferability** of funds
- multidimensional **specialization**
- simple **organizational structures**

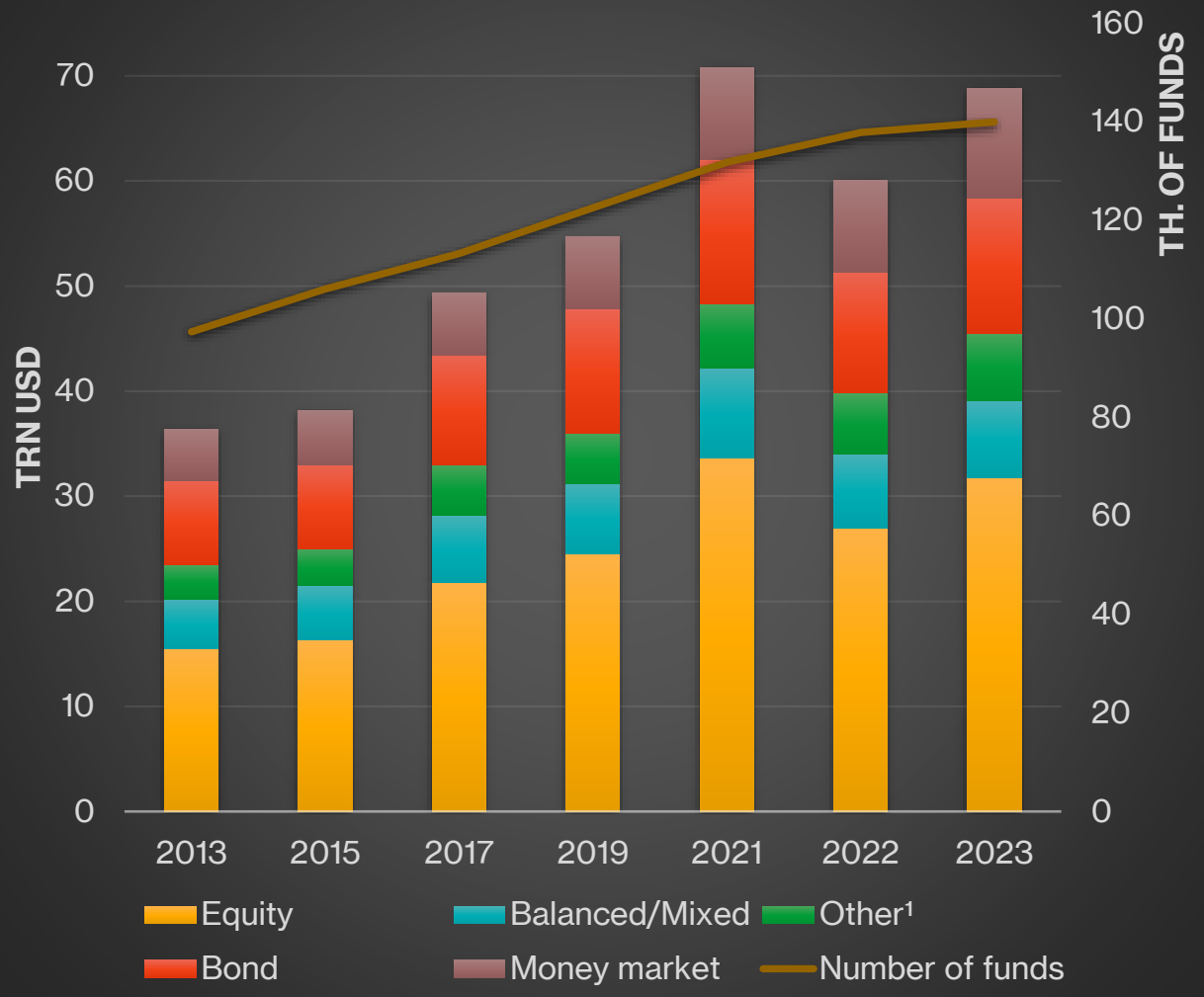




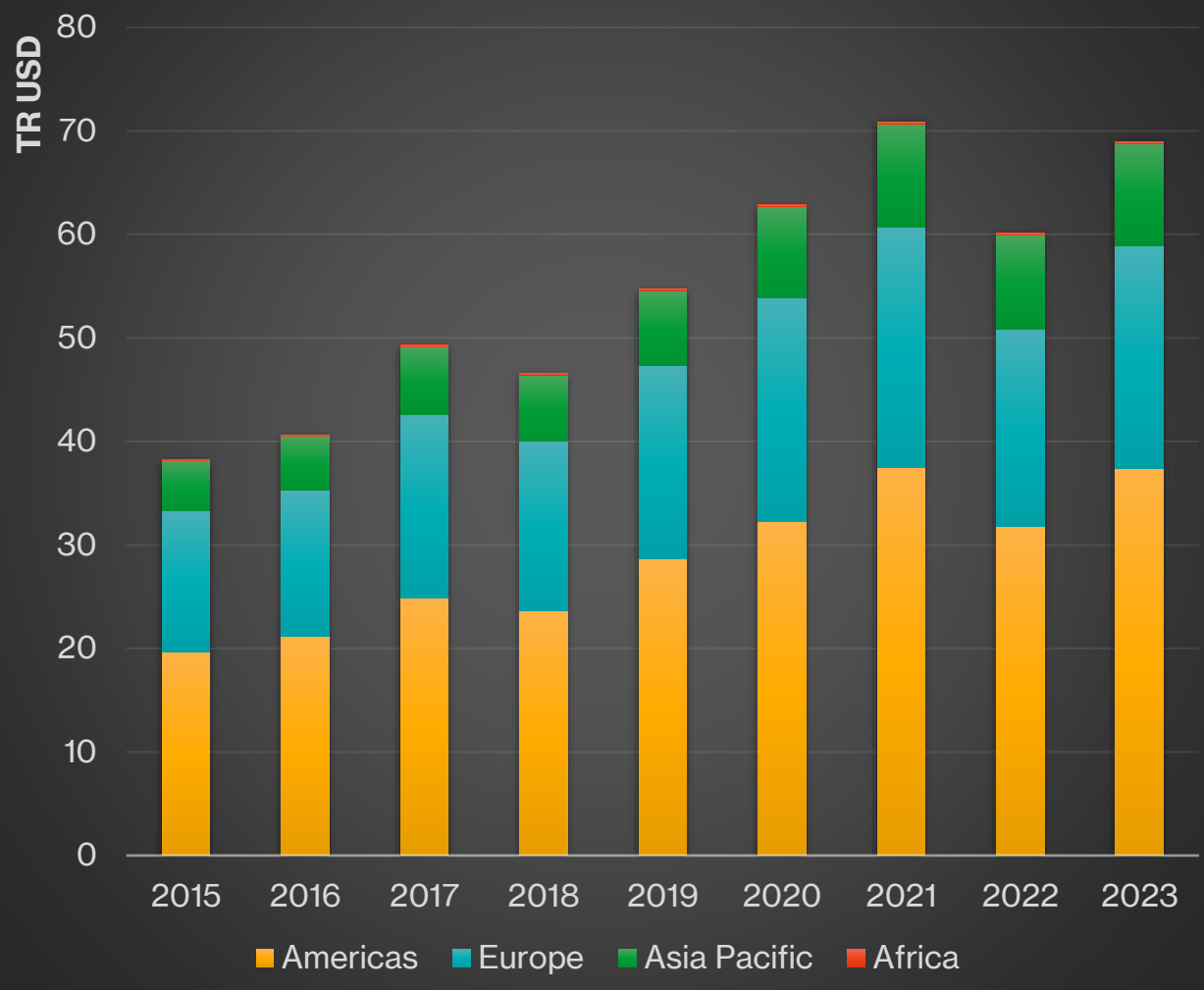


EXAMPLES (ICI)

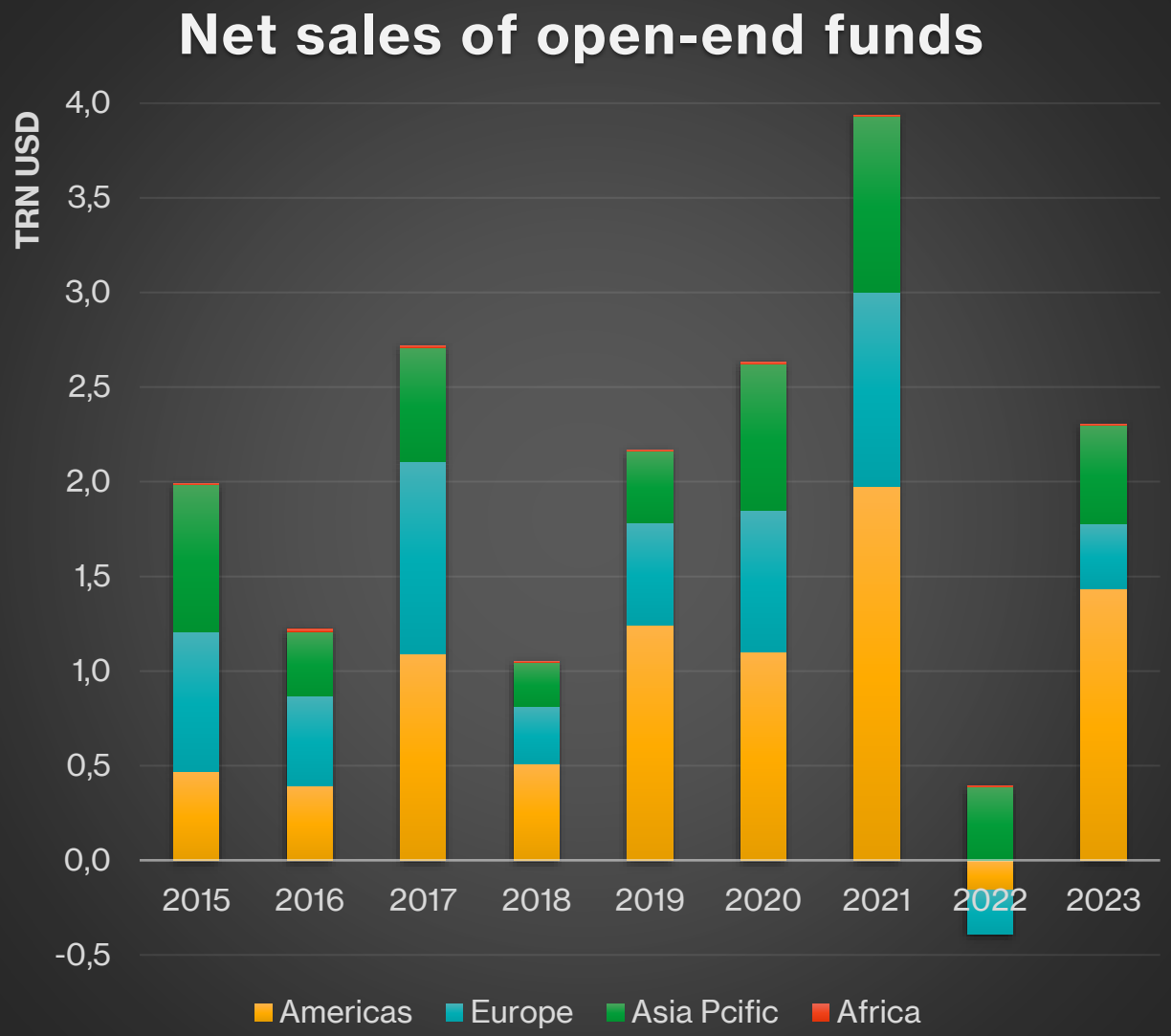
Net assets open-end funds and no.

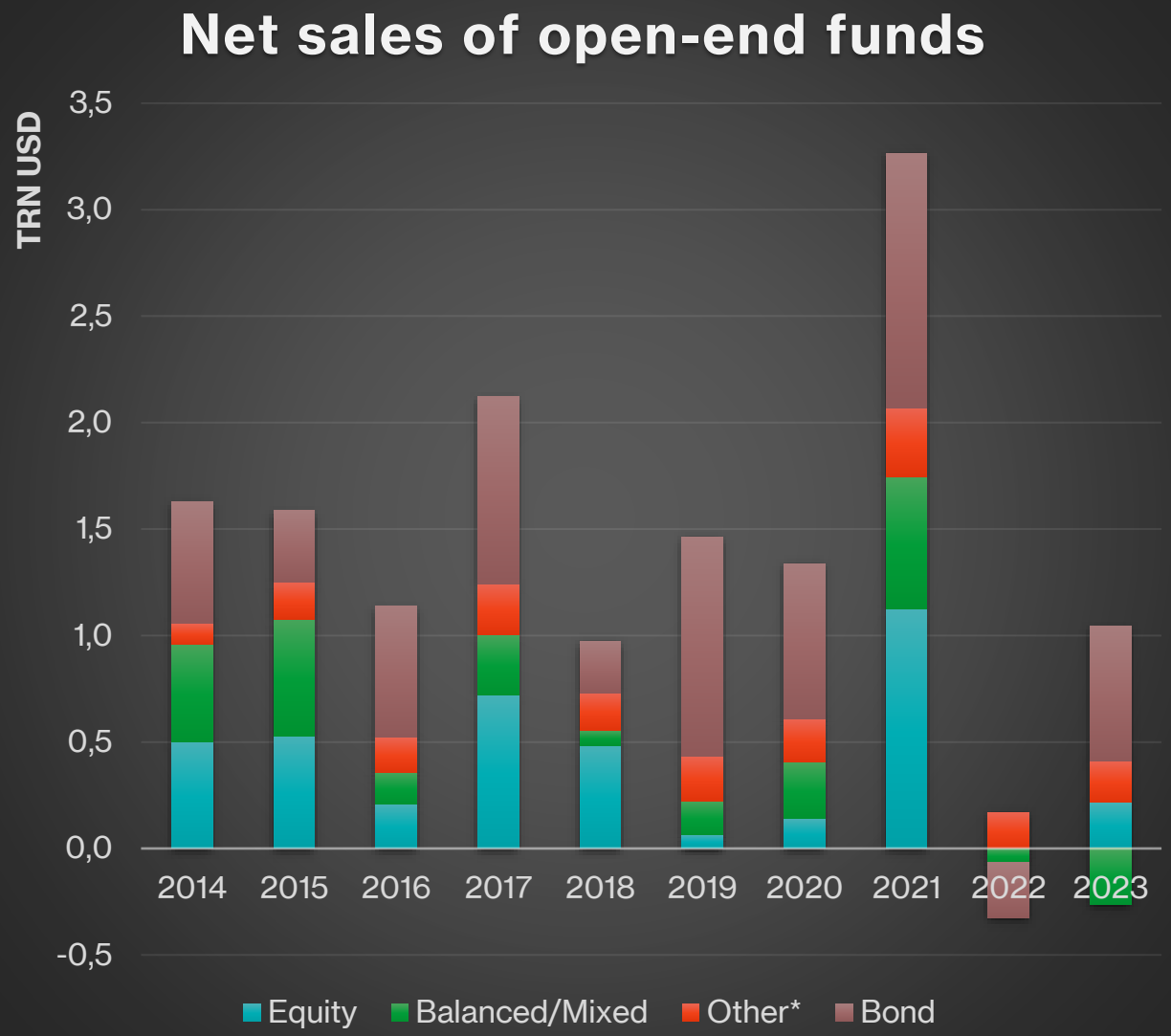


AUM of open-end funds

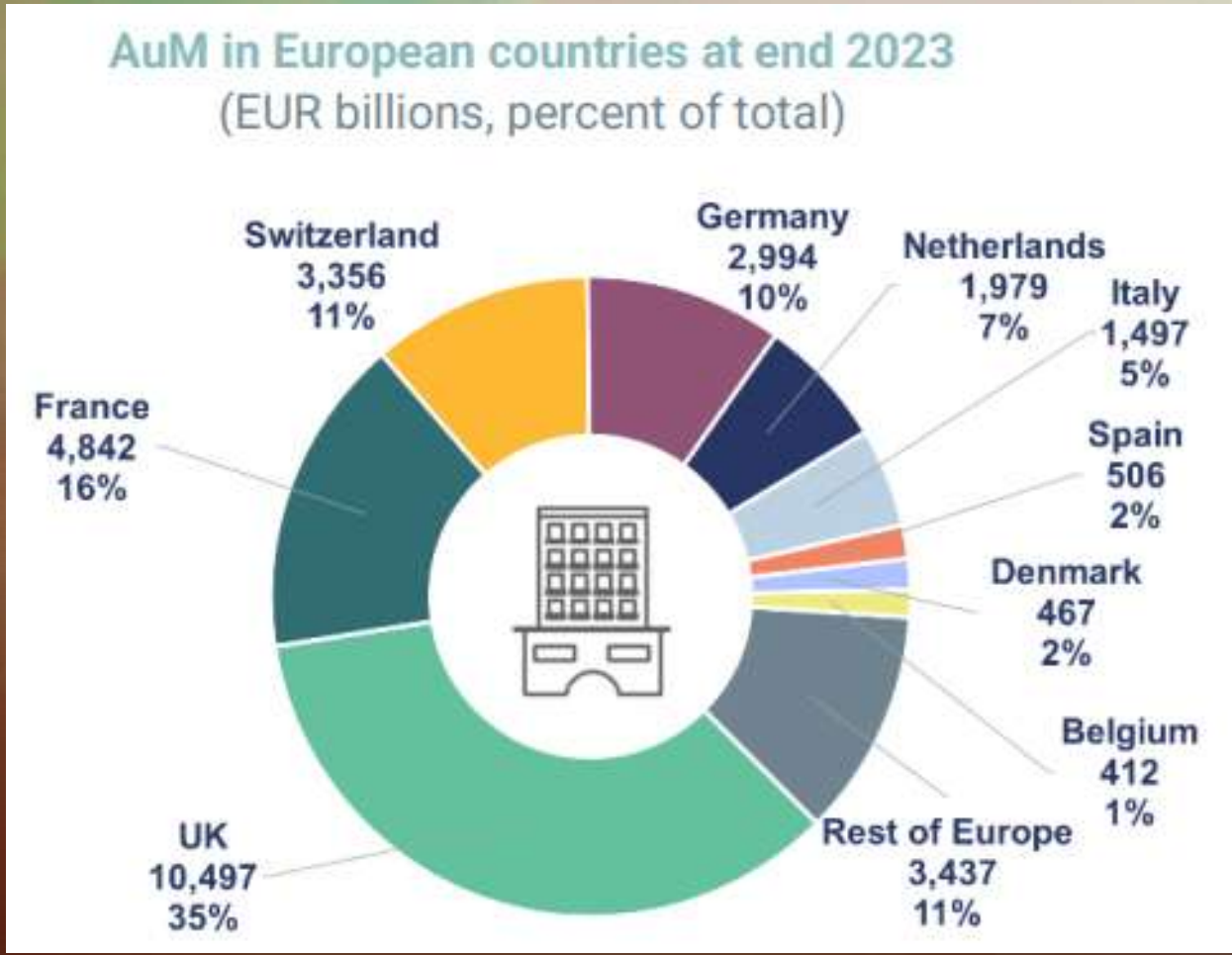


EXAMPLES (ICI)

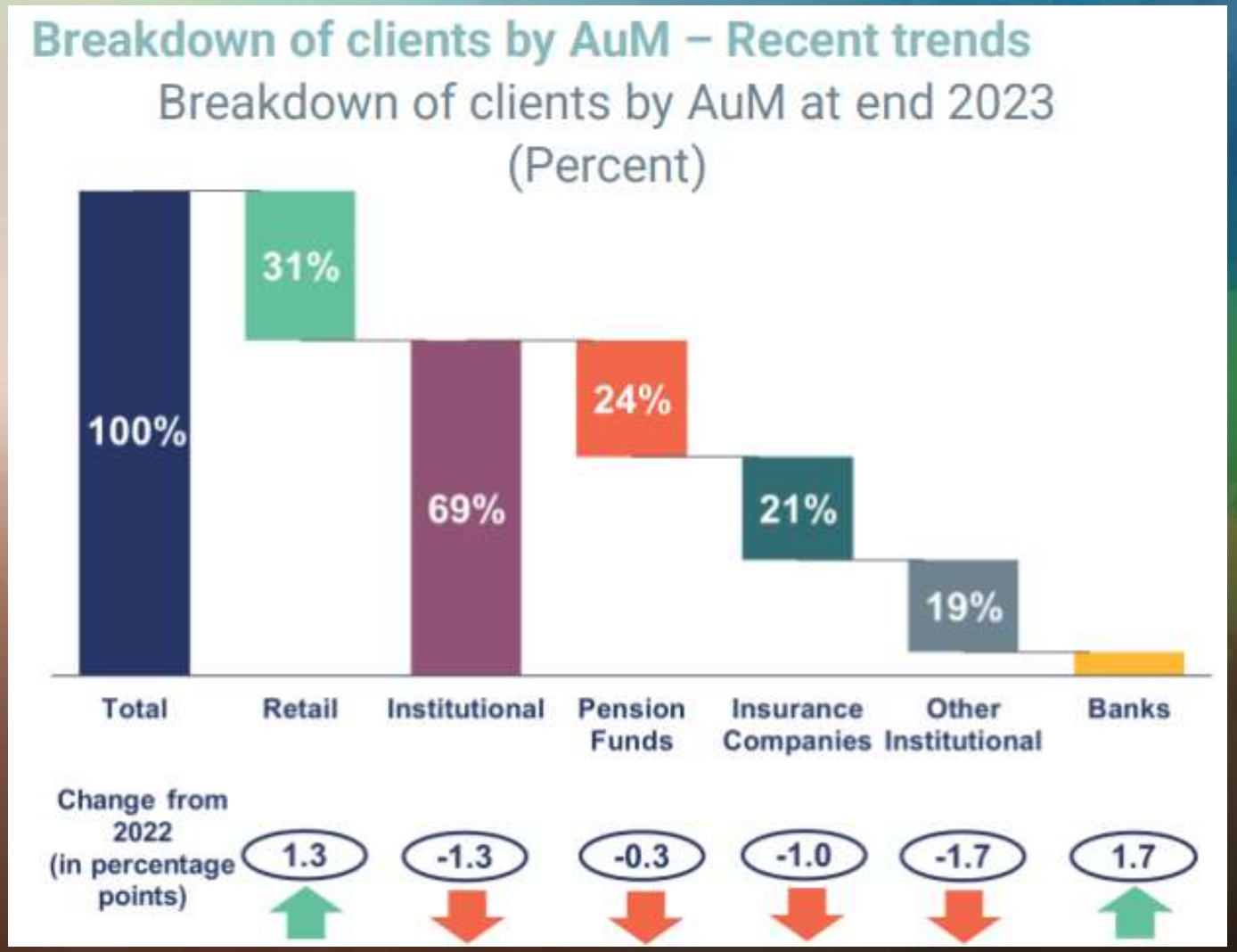




EXAMPLES (ICI)



EXAMPLES (EFAMA)



EXAMPLES (EFAMA)

PERFORMANCE

Main tool for evaluating funds' performance:

- $$\frac{\text{MARKET VALUE OF ASSETS} - \text{LIABILITIES}}{\text{NUMBER OF SHARES}}$$
- represents the current purchase or selling price
- tracks the *generic performance* over time

However other measures exist, since we are also interested in:

- Funds' risks
- Performance of an actual investor
- Funds performance relative to a benchmark
- …

PERFORMANCE

- Sharpe's ratio $SR = \frac{r_P - r_f}{\sigma_P}$
- Modigliani's ratio $M = \frac{r_P - r_f}{\sigma_P} \times \sigma_M$
- Treynor's ratio $Treynor = \frac{r_P - r_f}{\beta_P}$
- Sortino's ratio $Sortino = \frac{r_P - r_f}{DSR}$

Different «risk» measures: absolute and relative st.dev., beta (relative market volatility), *downside risk* (vs minimum acceptable return)

- MWRR $MWRR = R(t_0, T) = \frac{V(T) - V(t_0) - F}{\overline{V}(t_0, T)}$

Actual *performance* based on individual choices: net in/outflows and average invested amounts for each period (proxy)

- TE & TEV $TE = E(r_p - r_B)$ $TEV = \sigma_{r_p - r_B}$

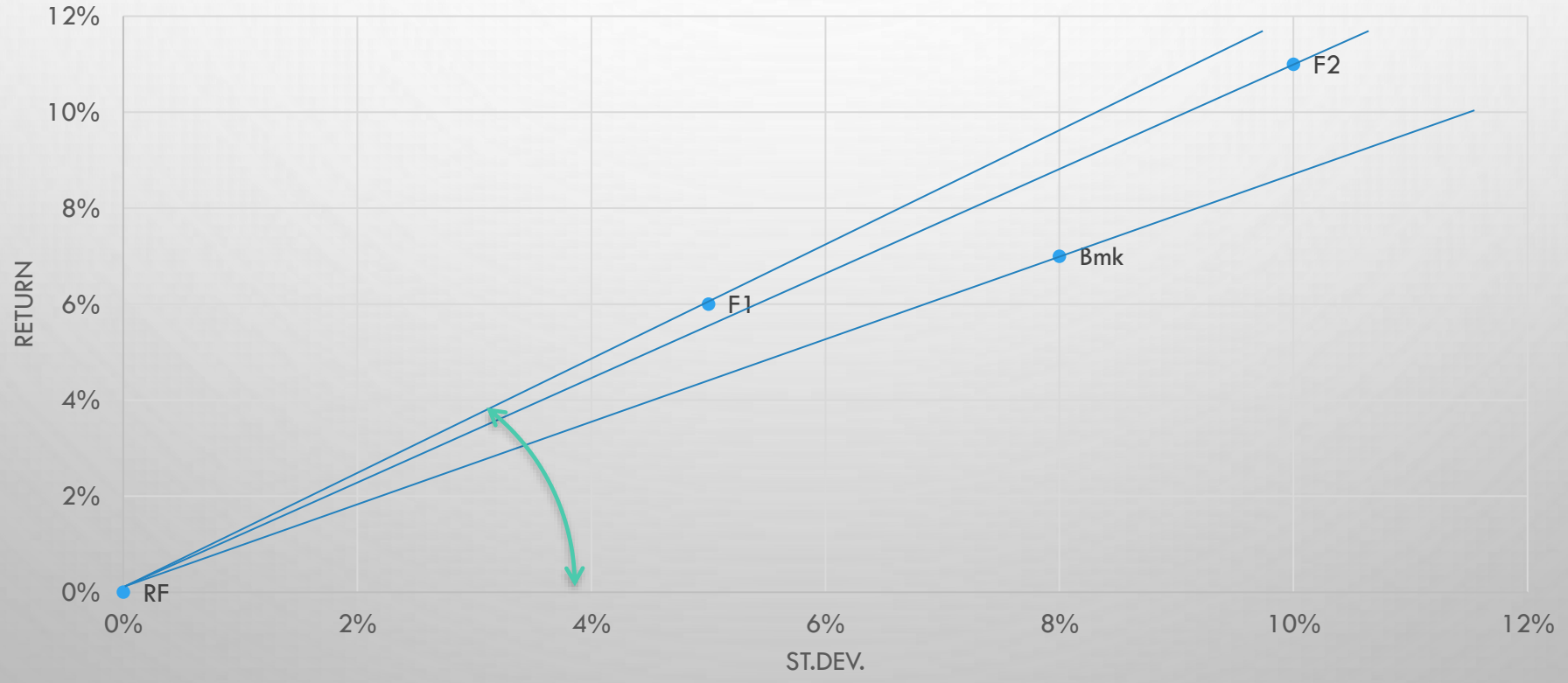
Average differences in returns compared to benchmark, and their volatility → $InformationRatio = \frac{TE}{TEV}$

PERFORMANCE

SHARPE RATIO (similar to Traynor if using Beta)

HP:

- FUND 1: return 6%, st.dev. 5% SR= 1,2
- FUND 2: return 11%, st.dev. 10% SR= 1,1
- *Benchmark*: return 7%, st.dev. 8% SR= 0,88
- *Risk free*: return 0%, st.dev. 0%

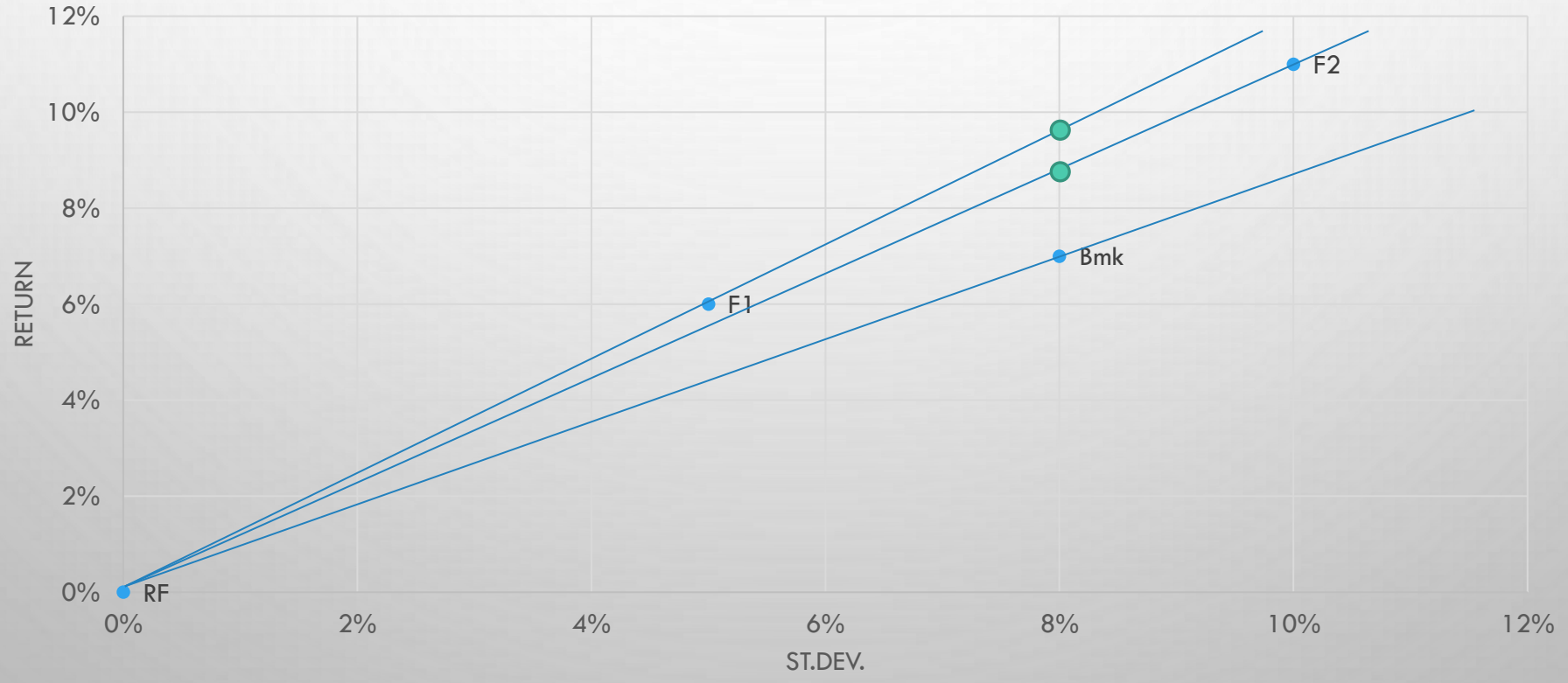


PERFORMANCE

MODIGLIANI RAP

HP:

- FUND 1: return 6%, st.dev. 5% RAP = 0,096
- FUND 2: return 11%, st.dev. 10% RAP = 0,088
- *Benchmark*: return 7%, st.dev. 8%
- *Risk free*: return 0%, st.dev. 0%



PERFORMANCE

MWRR

At years' end we buy 100 shares in a mutual fund, for 100 EUR each. We withdraw 2.000 on 1st March (price is 110) and buy 3.000 more on 1st September (price is 105). At 31/12/2025 price is 115. Effective return (compound interest, 365 day calendar)?

	Period 1	Period 2	Period 3
Start	1/1/2025	1/3/2025	1/9/2025
Investment (start)	0	11.000	8.610
N. of shares (start)	0	100	82
Flows	10.000	-1.980	+2.940
N. of shares (end)	100	82	110
Market value (end)	11.000	8.610	12.650
Days	59	184	122
Annualized return	80,33%	-8,82%	+31,28%
End	1/3/2025	1/9/2025	31/12/2025

$$R_i = \left(\frac{End\_value}{Start\_value - Flows}\right)^{\frac{365}{Days_i}} - 1$$

The YTM of these CF is a 18,19% annual return

PROXY:

1. Periodic performance:

$$VALUE_{END} - VALUE_{START} - CONTRIBUTIONS + WITHDRAWALS$$

12.650-10.000+1.980-2.940=**1.690**

2. Average holding:

$$VALUE_{START} \times \frac{days}{total} + CONTRIBUTIONS \times \frac{days}{total} - WITHDRAWALS \times \frac{days}{total}$$

10.000-1.980x306/365+2.940x122/365=**9.322,74**

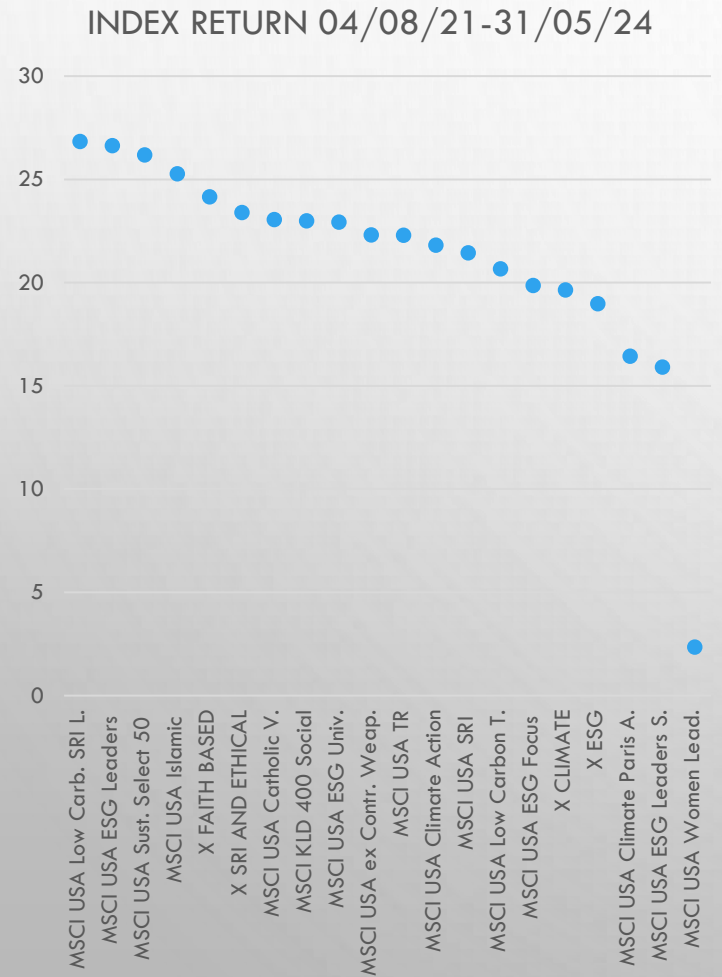
3. MWRR: 1.690/9.322,74=18,13%

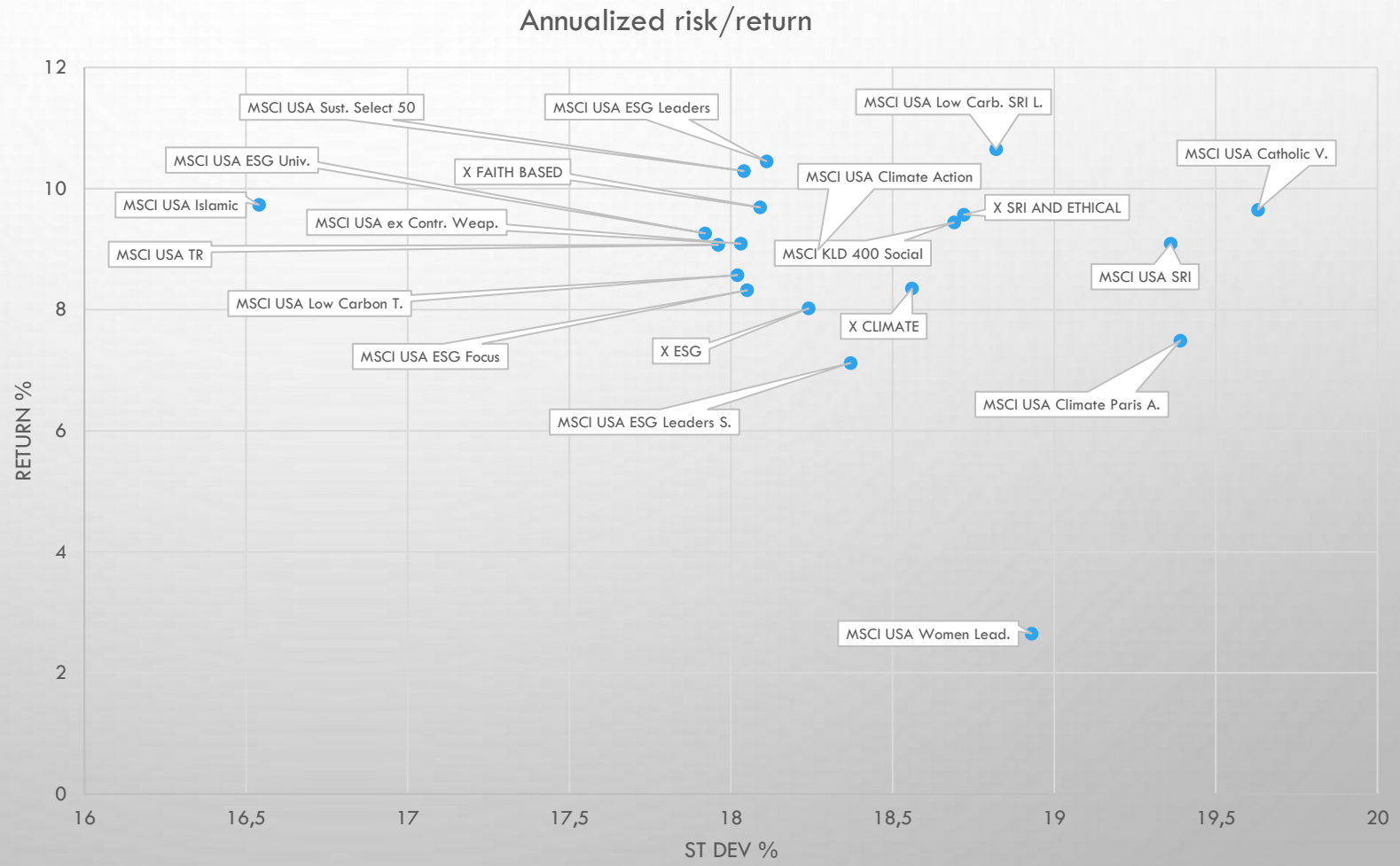
PERFORMANCE

Returns, risk/return performance

One example from my research

Bolognesi E., Dreassi A., Migliavacca M., Paltrinieri A. (2024). Mapping sustainable investing: Exploring ambiguities and consistencies among sustainable indices, *Journal of Environmental Management* **367**, *https://doi.org/10.1016/j.jenvman.2024.122081*





PERFORMANCE

TE/TEV/IR/SR

One example from my research

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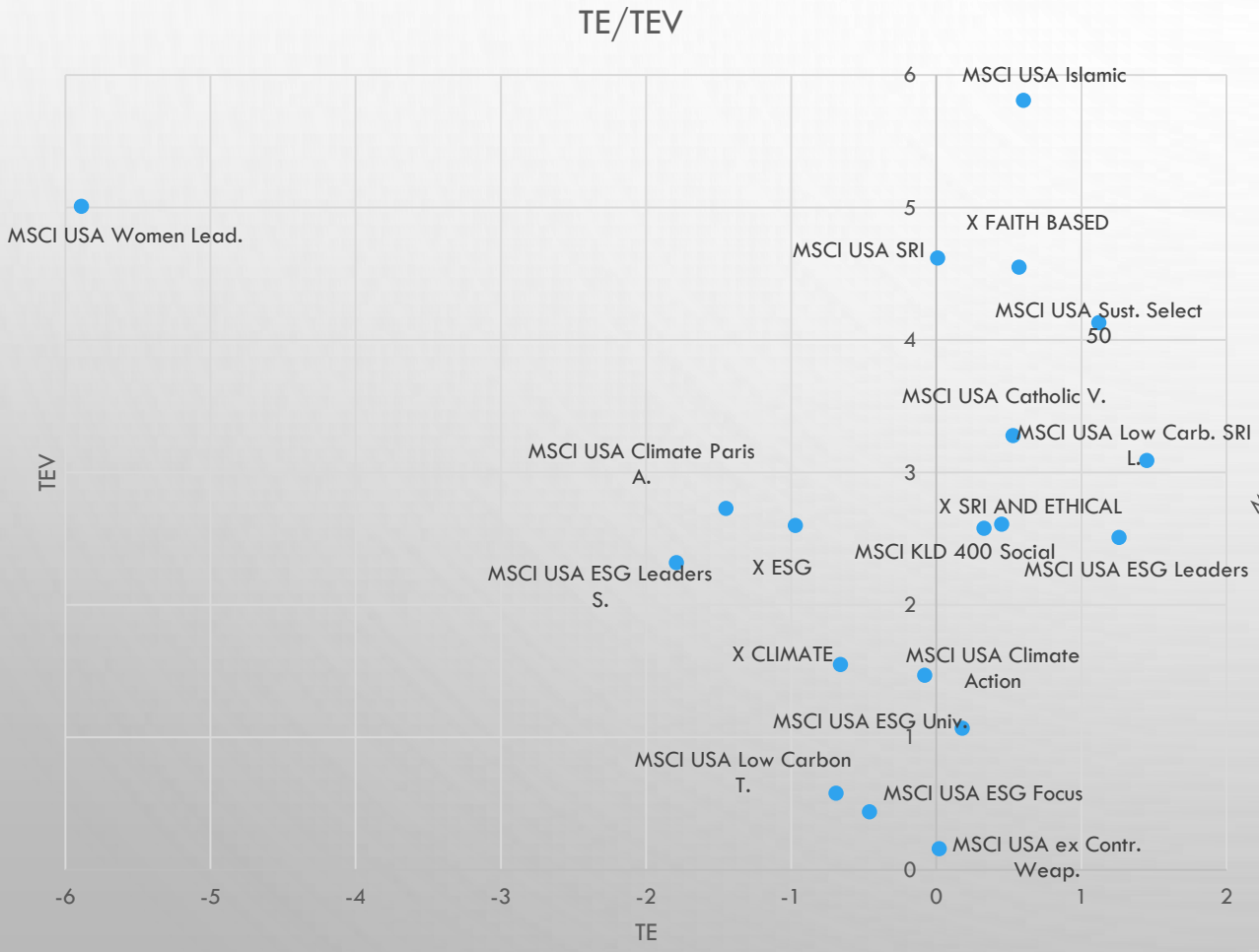


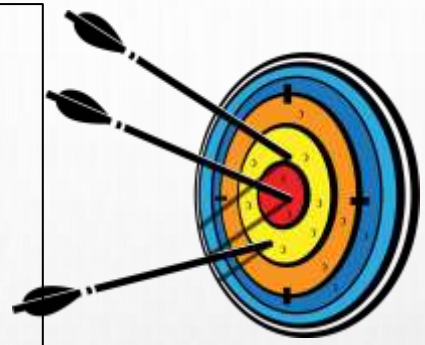
TYPES

Based on liquidity:

- **close-end**:
  - mutual funds' shares are fixed in number at the initial offering
  - withdrawals and new investments are (typically) not possible: only finding somebody willing to exit/enter
  - concentration in few specific asset classes (f.i. real estate, art, startups, …)
- **open-end**:
  - largest group
  - new investors can get new shares, buy-back/liquidation option
  - the fund has a variable number of shares

Based on target:

- **equity** funds: aiming at current income (dividends), capital gains or a combination (i.e. total return funds)
- **bond** funds: government, corporate, currency, maturity, …
- **money market** funds: short-term, versatile and cheap
- **hybrid** funds: stocks and bonds together
- **index** funds: passive management (f.i. ETFs, ETCs, …)
- **hedge** funds: seeking pricing anomalies from predicted paths, often unregulated and/or offshore, longer term to cope with higher risk, frequent use of leverage



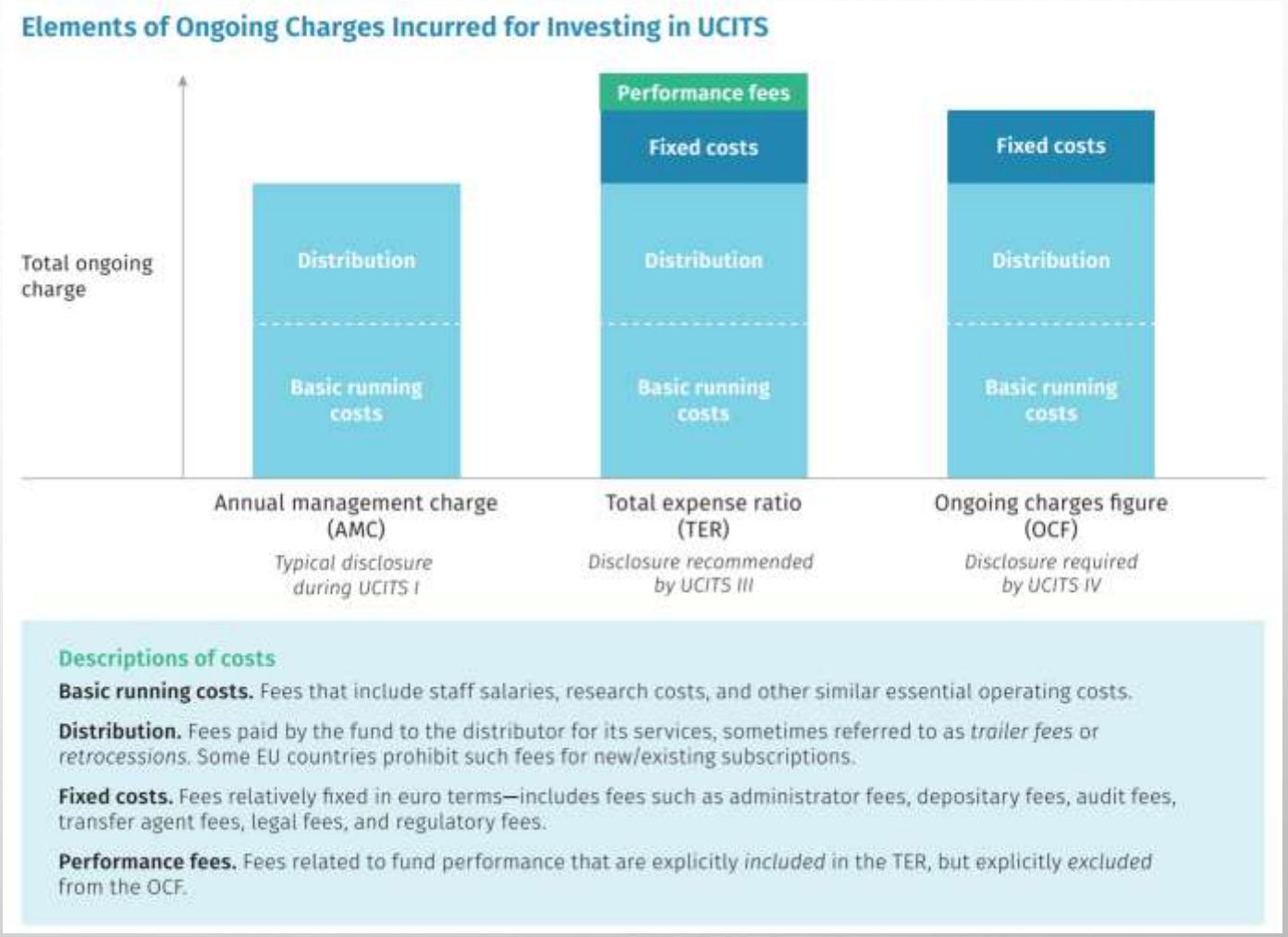
COSTS

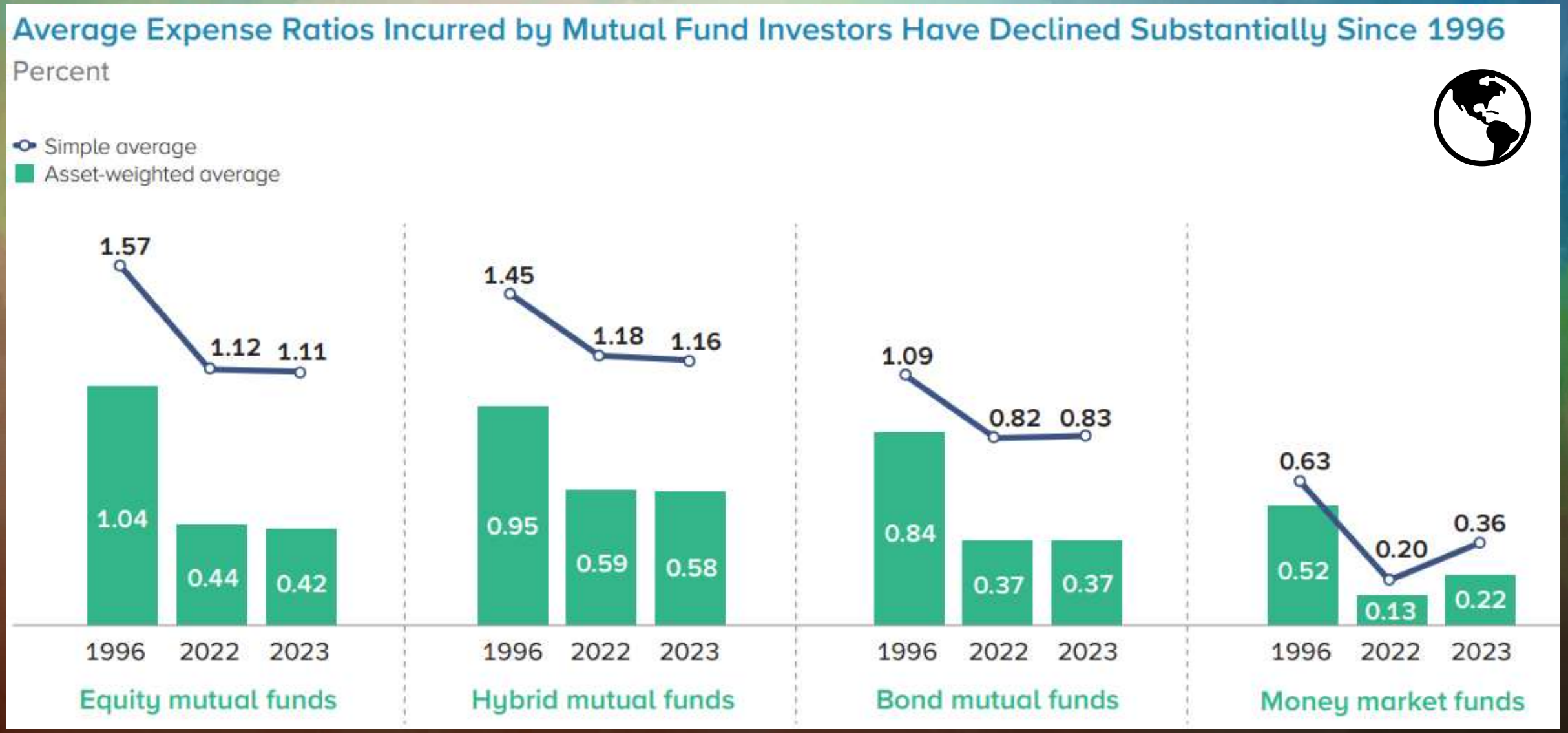
Fee structure:

- **load funds**: commissions are paid to intermediaries up-front reducing the investment
- **deferred load funds**: fees are charged when leaving the fund, usually with declining % (redemption fee)
- **no-load funds**: sold directly with no entry/exit charges (but with ongoing/performance fees)

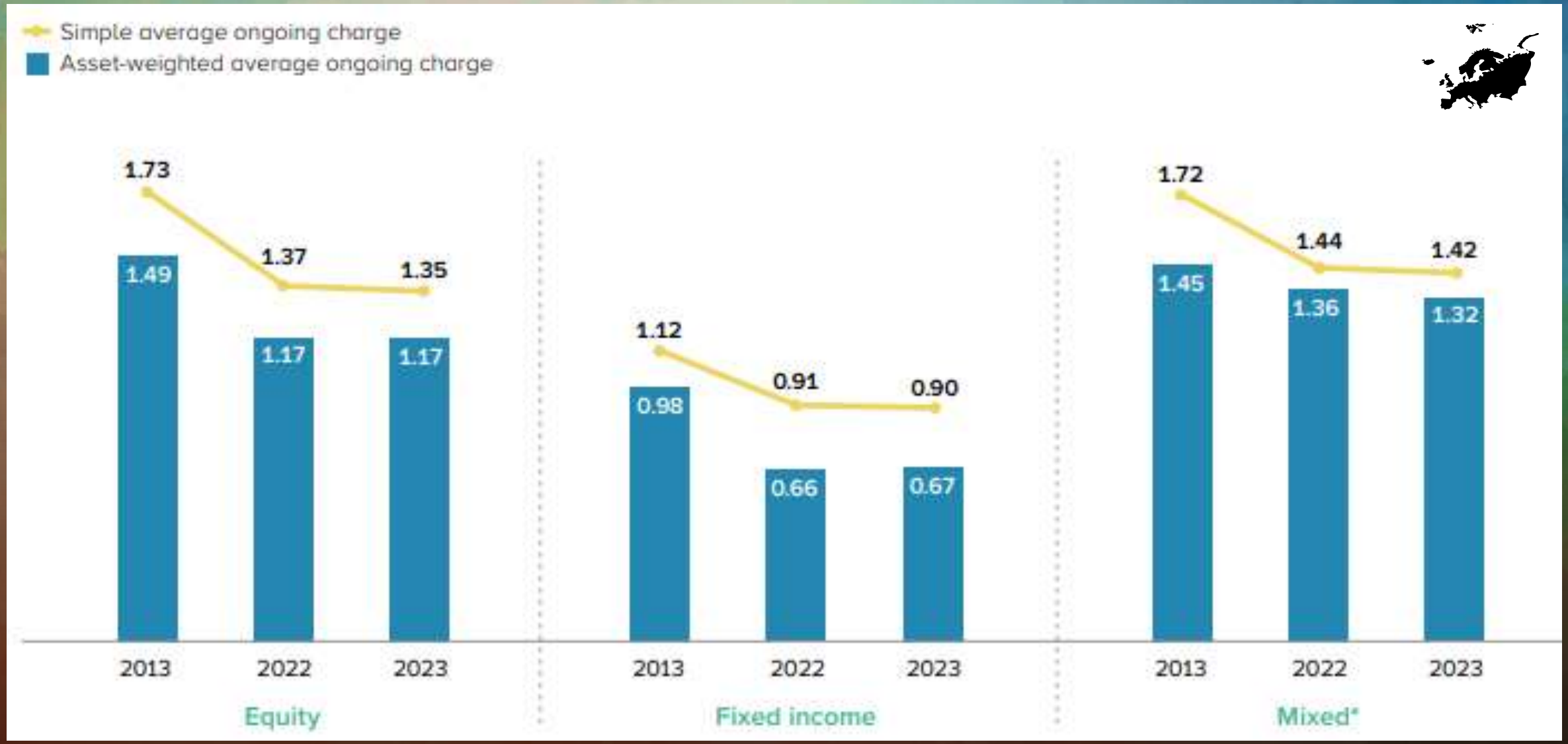
Several other fees:

- costs of **switching**
- **administrative** fees
- income **sharing**
- …

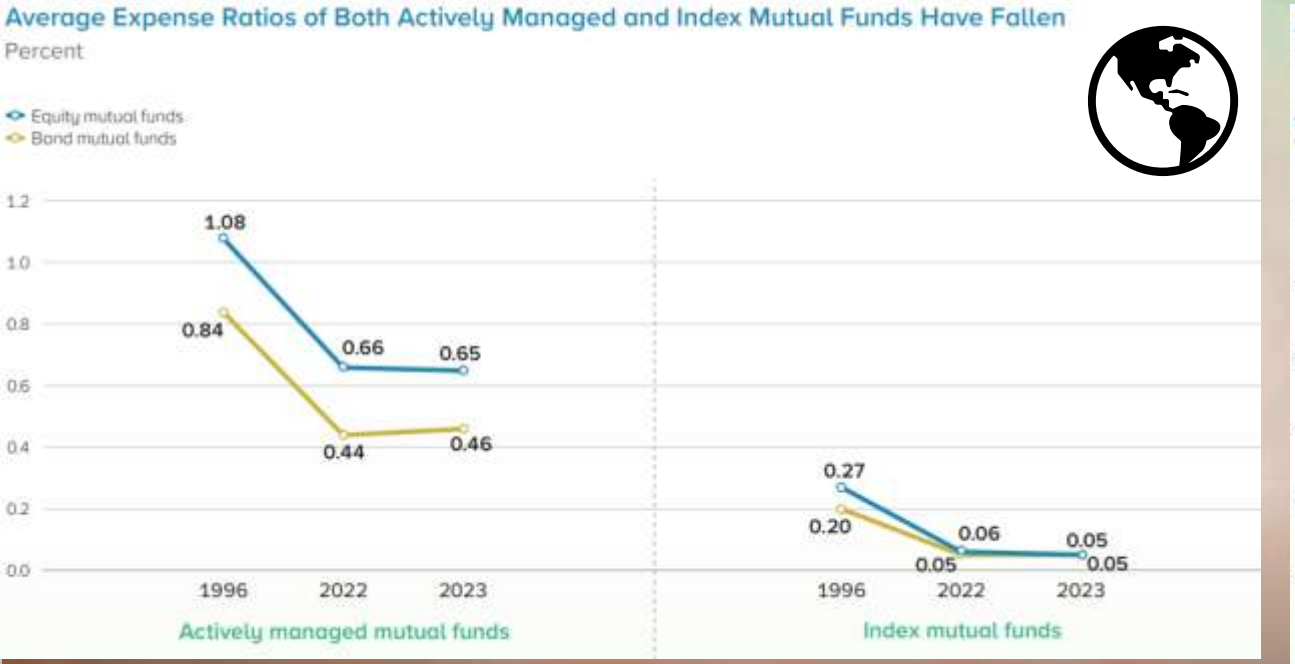


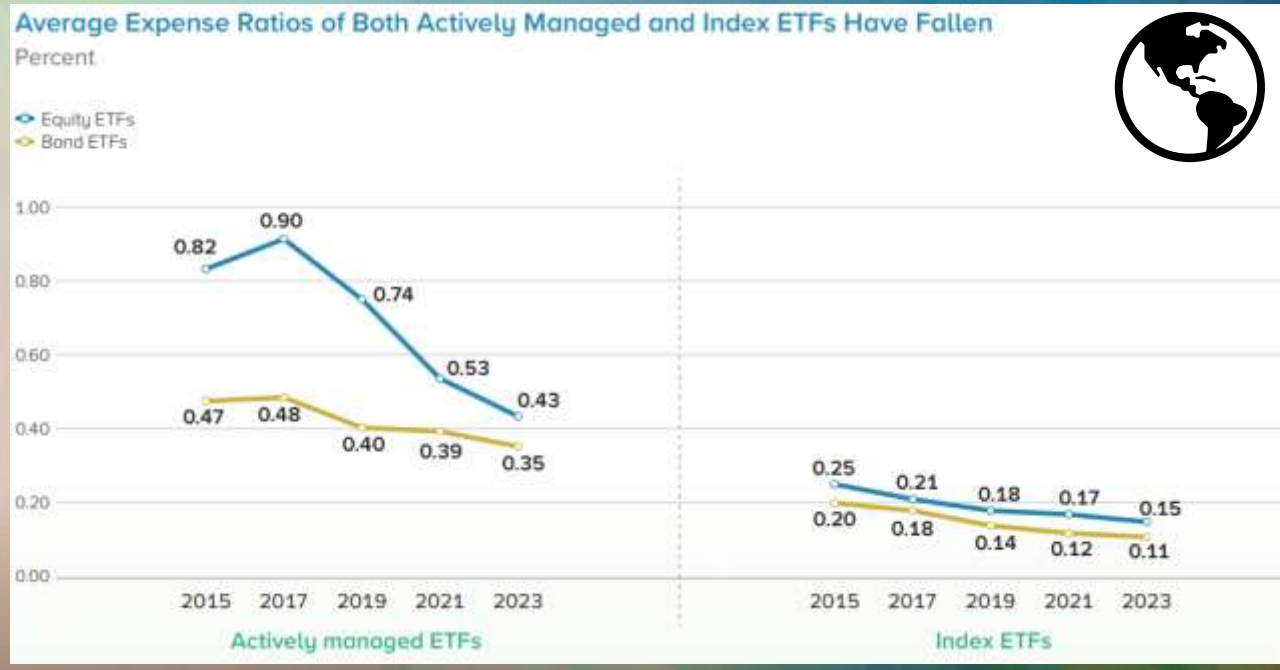


EXAMPLES (ICI)

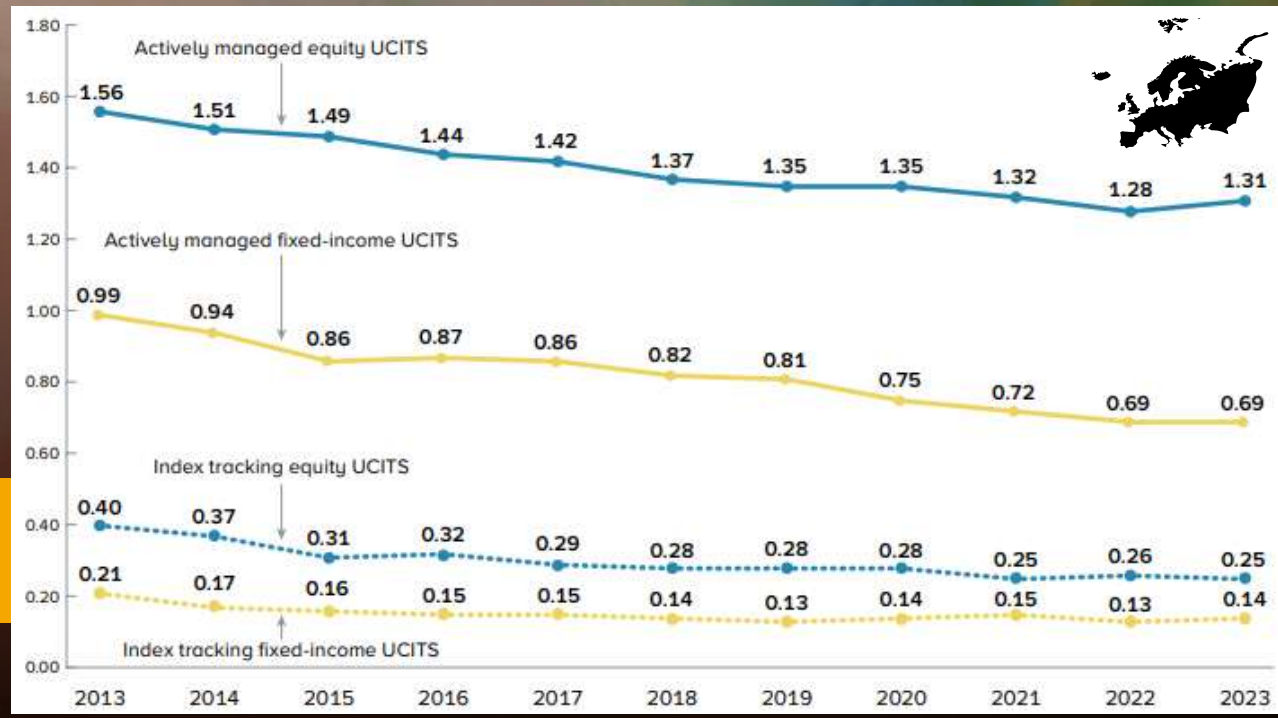


EXAMPLES (ICI - Europe)





EXAMPLES (ICI, ICI Europe)



Active Funds' Success Rate by Category (%)

Source: Morningstar. Data and calculations as of June 30, 2023. *Green/red shading indicates that active funds in this fee quintile had above/below-average success rates

Category	1-Year	3-Year	5-Year	10-Year	15-Year	20-Year	10-Year (Lowest Cost) *	10-Year (Highest Cost)
U.S. Large Blend	50.4	41.1	29.5	9.8	9.3	9.1	16.2	5.6
U.S. Large Value	54.2	39.7	29.5	12.0	5.5	16.1	15.0	8.5
U.S. Large Growth	54.5	32.4	30.8	10.1	2.1	4.9	16.3	6.8
U.S. Mid Blend	48.7	56.9	37.2	14.0	16.7	8.7	27.3	3.8
U.S. Mid Value	64.1	40.7	42.9	9.4	11.7	16.2	5.0	9.1
U.S. Mid Growth	56.1	36.8	63.0	46.1	27.3	—	46.3	35.7
U.S. Small Blend	74.7	57.3	43.3	28.3	19.5	23.4	45.9	27.5
U.S. Small Value	57.3	32.8	39.8	33.0	21.9	23.6	28.6	23.8
U.S. Small Growth	62.3	32.4	57.4	45.8	27.9	19.3	47.2	46.3
Foreign Large Blend	57.6	45.6	33.1	26.0	23.9	17.6	40.6	22.2
Foreign Large Value	75.0	37.5	28.7	38.3	23.7	—	47.1	25.0
Foreign Small-Mid Blend	66.7	27.6	25.8	31.8	53.8	—	40.0	40.0
World Large-Blend	44.1	36.2	24.1	10.0	11.4	—	8.3	8.3
Diversified Emerging Markets	57.1	32.1	36.5	35.2	25.6	—	45.5	27.3
Europe Stock	31.3	31.3	30.4	23.8	40.9	19.6	25.0	40.0
U.S. Real Estate	54.8	38.3	63.1	52.9	30.3	24.1	50.0	42.9
Global Real Estate	84.1	78.4	64.3	51.9	33.3	—	36.4	45.5
Intermediate Core Bond	60.0	65.8	33.9	36.7	22.0	13.1	48.1	20.0
Corporate Bond	40.0	24.5	17.3	41.5	53.6	—	33.3	44.4
High-Yield Bond	56.4	45.2	45.6	28.3	—	—	46.4	6.5

Update (11.03.2025):

- 29.1% of active funds beat passive peers in 2024, but 53.5% in fixed income and between 36.1% (US growth) and 69.4% (US value)
- 14.2% if looking at 10 years, but 26% in fixed income and 3.5% in US large caps (of which, 10.3% for US value)
- «increasingly difficult to justify higher fees»

EXAMPLES (Morningstar)

EXAMPLES

1. Two mutual funds differ for their costs: Fund 1 has a 6% upfront fee and running fees for 1%. Fund 2 has a 4% final fee and running fees for 1.2%. Assuming a return of 10%, which one performs better for the investor in 5, 10, 15 and 20 years? What if the gross return starts at 5% and grows every year by 0.5%? What if the gross return starts at 7.5%, grows every year by 0.5% until it reaches 11%, then a market shock pushes it back to -10% for 1 year, -5% for another year, and then to 5% growing again at a 0.5% pace?

$$FV_1 = (1 - ef_1) \cdot (1 + i - rf_1)^t$$

$$FV_2 = (1 + i - rf_2)^t \cdot (1 - ff_2)$$

	Fund 1	Fund 2
5 y	1.45	1.46
10 y	2.23	2.23
15 y	3.42	3.40
20 y	5.27	5.19

$$FV_1 = (1 - ef_1) \cdot \prod_{h=1}^{t} (1 + i_h - rf_1)$$

$$FV_2 = \prod_{h=1}^{t} (1 + i_h - rf_1) \cdot (1 - ff_2)$$

	Fund 1 A	Fund 2 A	Fund1 B	Fund 2 B
5 y	1.20	1.23	1.35	1.38
10 y	1.72	1.76	1.48	1.51
15 y	2.77	2.83	1.89	1.93
20 y	5.00	5.10	2.71	2.77