B12. MUTUAL FUNDS

FINANCIAL MARKETS AND INSTITUTIONS

A.A. 2022/23

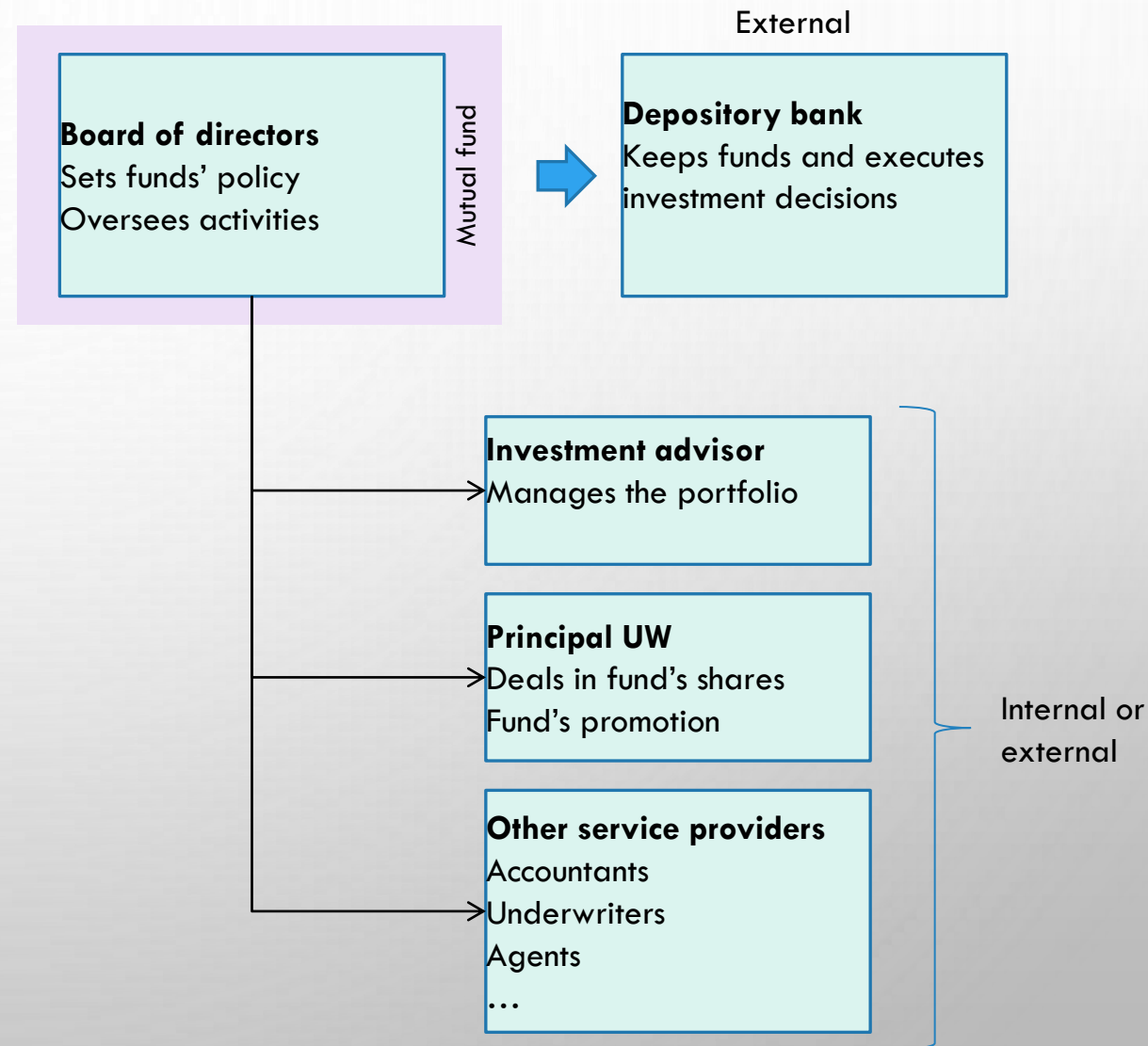PROF. ALBERTO DREASSI – ADREASSI@UNITS.IT

TOPICS

- WHY MUTUAL FUNDS? HOW?

- PERFORMANCE MEASURES

- TYPES OF MUTUAL FUNDS

- COSTS

DATA: ICI (2022-2023)

WHY MUTUAL FUNDS

Impressive **exponential growth** in few decades linked with their competitive advantage (2021: 130.000+ funds, 70+ trn USD in AUM):
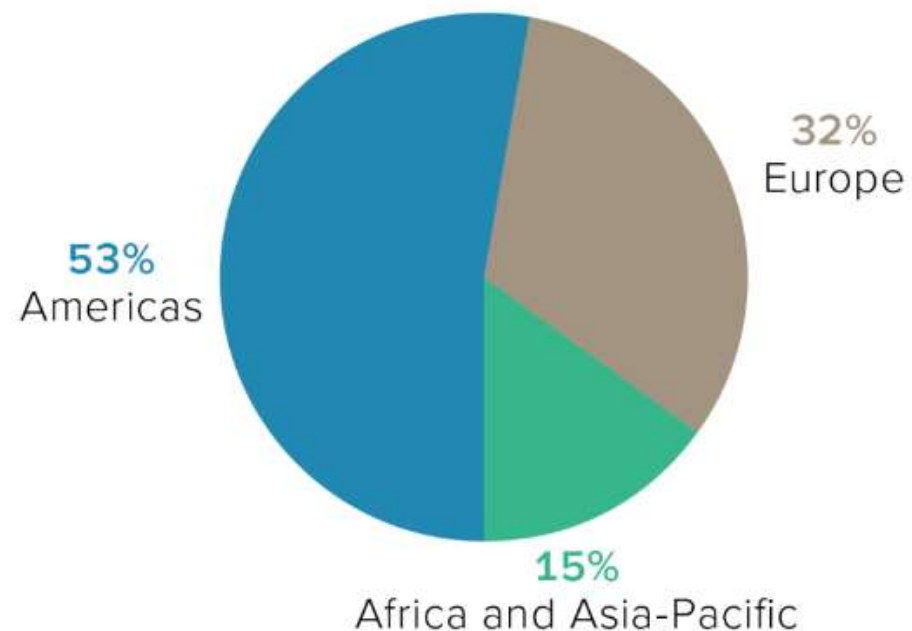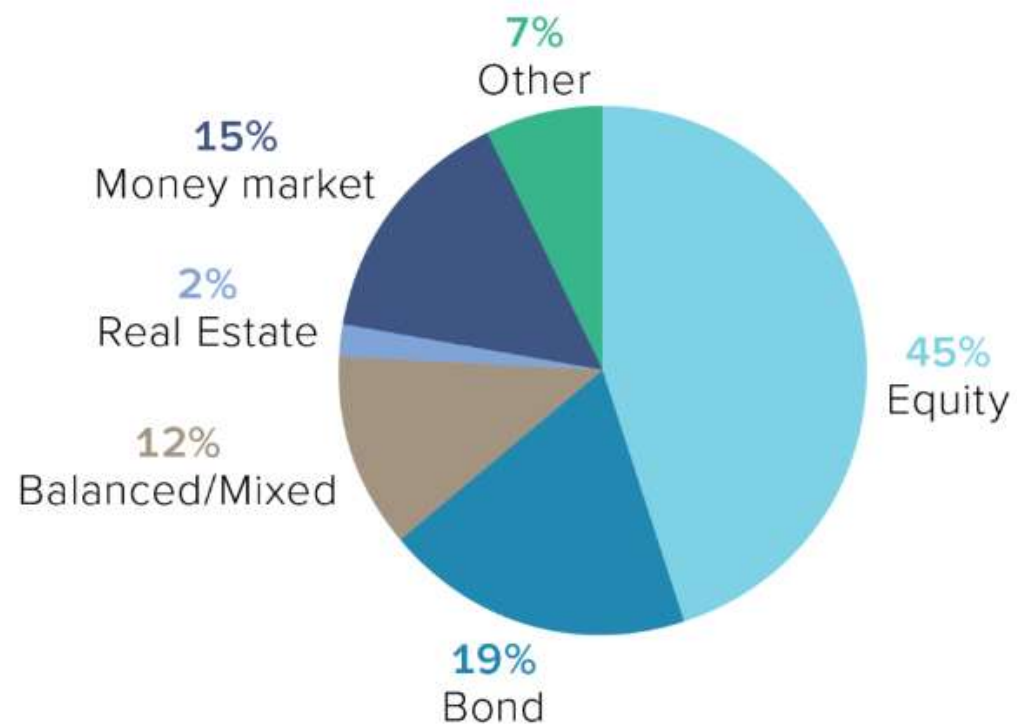
- **liquidity** of investments: holdings represented by shares, mostly aiming at capital gains (several "distributing" funds exist)

- **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**

External

Board of directors
Sets funds' policy
Oversees activities

Mutual fund

Depository bank
Keeps funds and executes investment decisions

Investment advisor
Manages the portfolio

Principal UW
Deals in fund's shares
Fund's promotion

Other service providers
Accountants
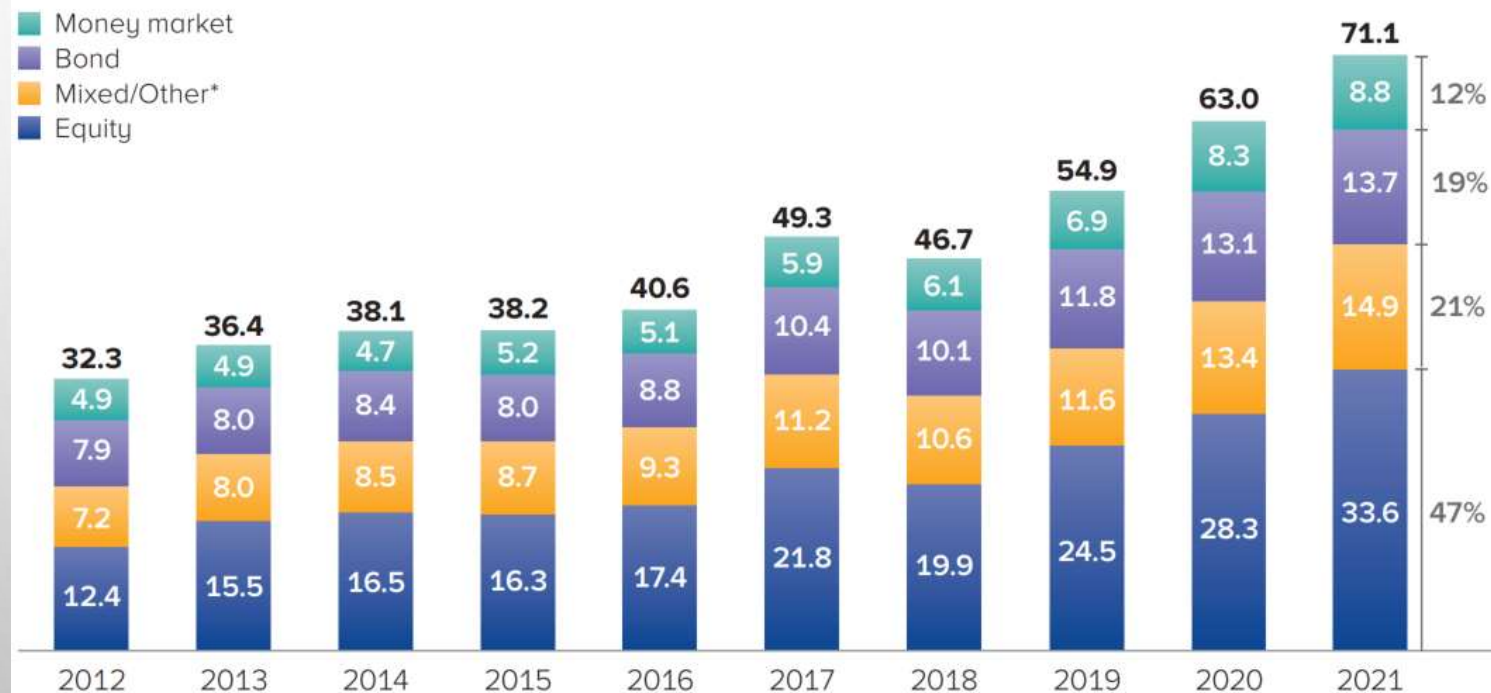Underwriters
Agents
…

Internal or external

HOW MUTUAL FUNDS

HOW MUTUAL FUNDS

Total Net Assets of Worldwide Regulated Open-End Funds Rose to $71.1 Trillion in 2021
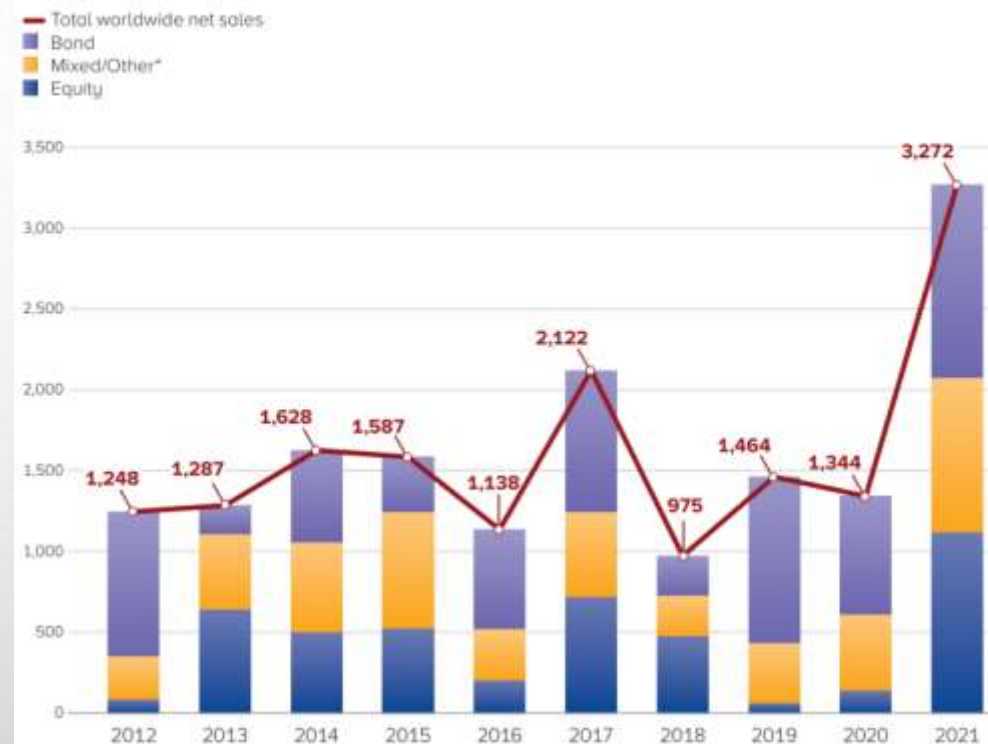
Trillions of US dollars by type of fund, year-end

Legend:
- Money market
- Bond
- Mixed/Other*
- Equity

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Total	32.3	36.4	38.1	38.2	40.6	49.3	46.7	54.9	63.0	71.1
Money market	4.9	4.9	4.7	5.2	5.1	5.9	6.1	6.9	8.3	8.8 (12%)
Bond	7.9	8.0	8.4	8.0	8.8	10.4	10.1	11.8	13.1	13.7 (19%)
Mixed/Other*	7.2	8.0	8.5	8.7	9.3	11.2	10.6	11.6	13.4	14.9 (21%)
Equity	12.4	15.5	16.5	16.3	17.4	21.8	19.9	24.5	28.3	33.6 (47%)

Total number of worldwide regulated open-end funds

93,833	97,377	101,100	106,060	110,120	113,227	118,271	122,551	125,703	131,808

Worldwide Net Sales of Regulated Open-End Long-Term Funds Increased Across All Asset Classes in 2021

Billions of US dollars by type of fund, annual

Legend:
- Total worldwide net sales
- Bond
- Mixed/Other*
- Equity

Total worldwide net sales:

| 2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
1,248	1,287	1,628	1,587	1,138	2,122	975	1,464	1,344	3,272

HOW MUTUAL FUNDS

The United States Has the Largest Share of Total Net Assets of Worldwide Regulated Open-End Funds
Trillions of US dollars by region, year-end

- Asia-Pacific
- Europe
- United States
- Rest of the world
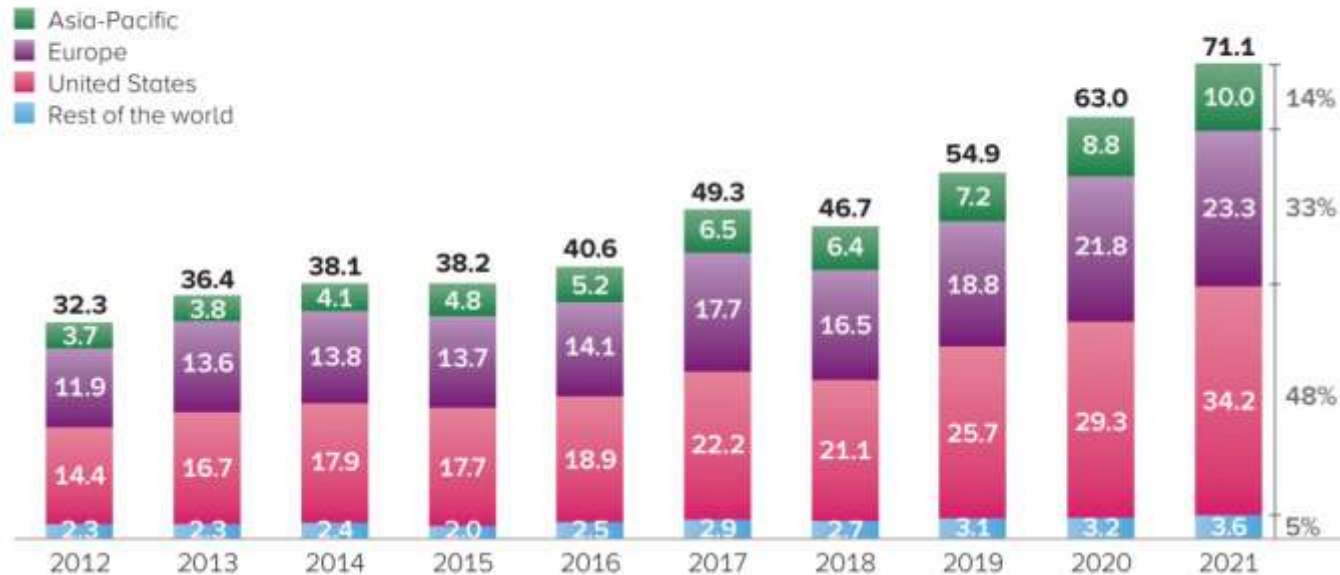
Net Sales of Regulated Open-End Long-Term Funds Surged in 2021
Billions of US dollars by region, annual

- Total worldwide net sales
- Asia-Pacific
- Europe
- United States
- Rest of the world
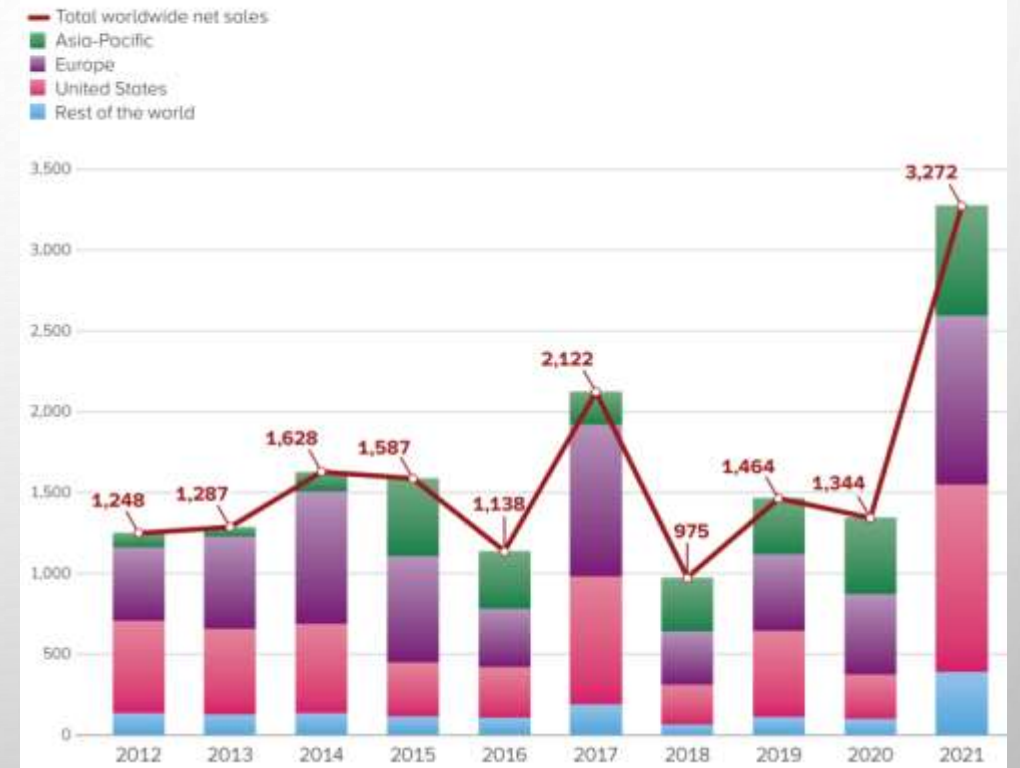
HOW MUTUAL FUNDS

Worldwide Net Sales of Regulated Open-End Funds by Region
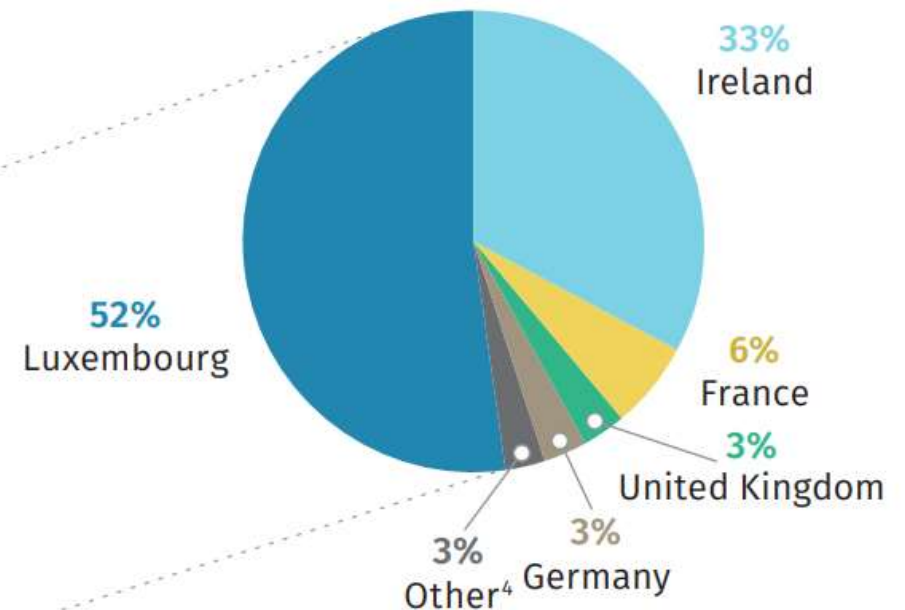Billions of US dollars
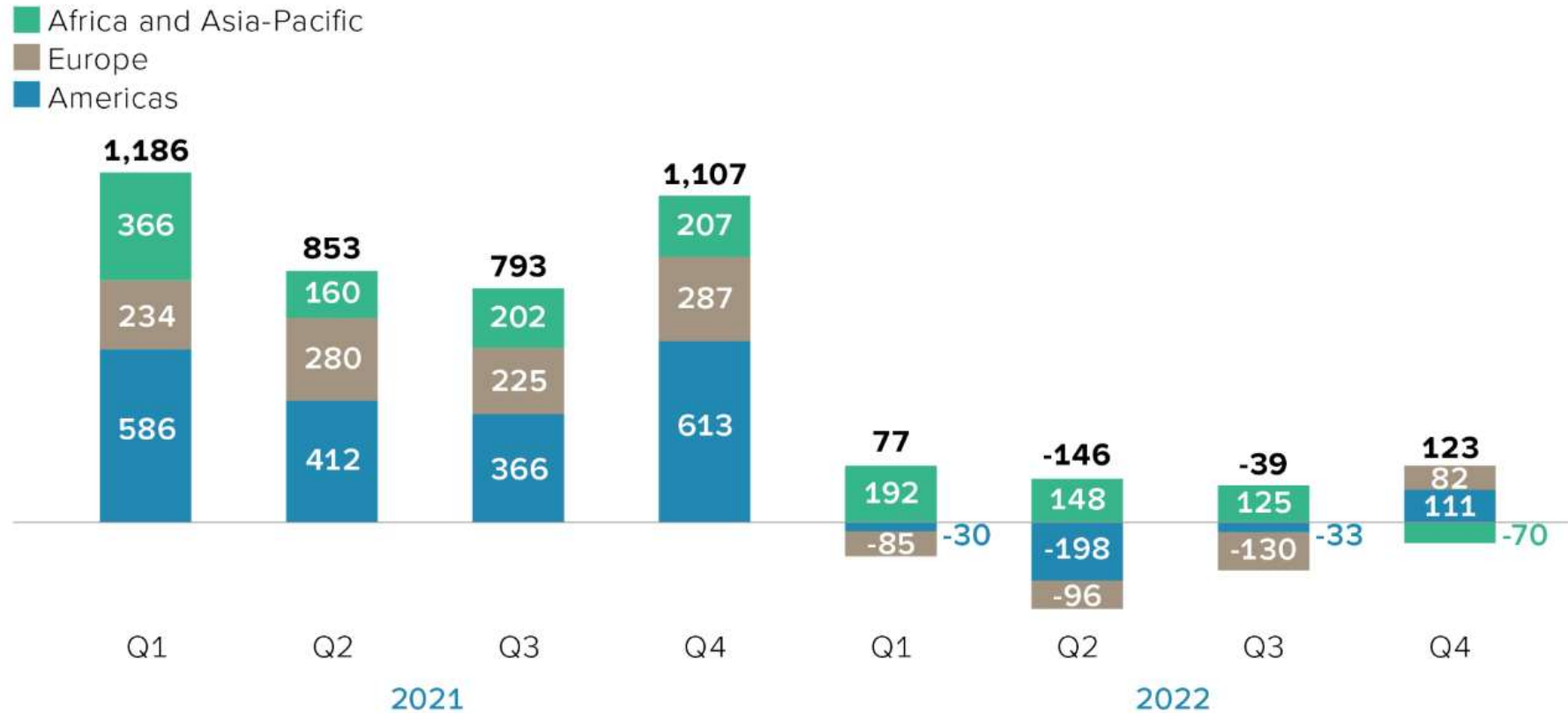
HOW MUTUAL FUNDS (EUROPE)

Cross-Border Funds Represent Two-Thirds of Total UCITS Net Assets

Total UCITS net assets in trillions of euros,[1] year-end

Single country funds[2]
Cross-border funds[3]

Percentage of total cross-border fund net assets at year-end 2021 by domicile

33% Ireland
6% France
3% United Kingdom
3% Germany
3% Other[4]
52% Luxembourg

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

- Tracking error
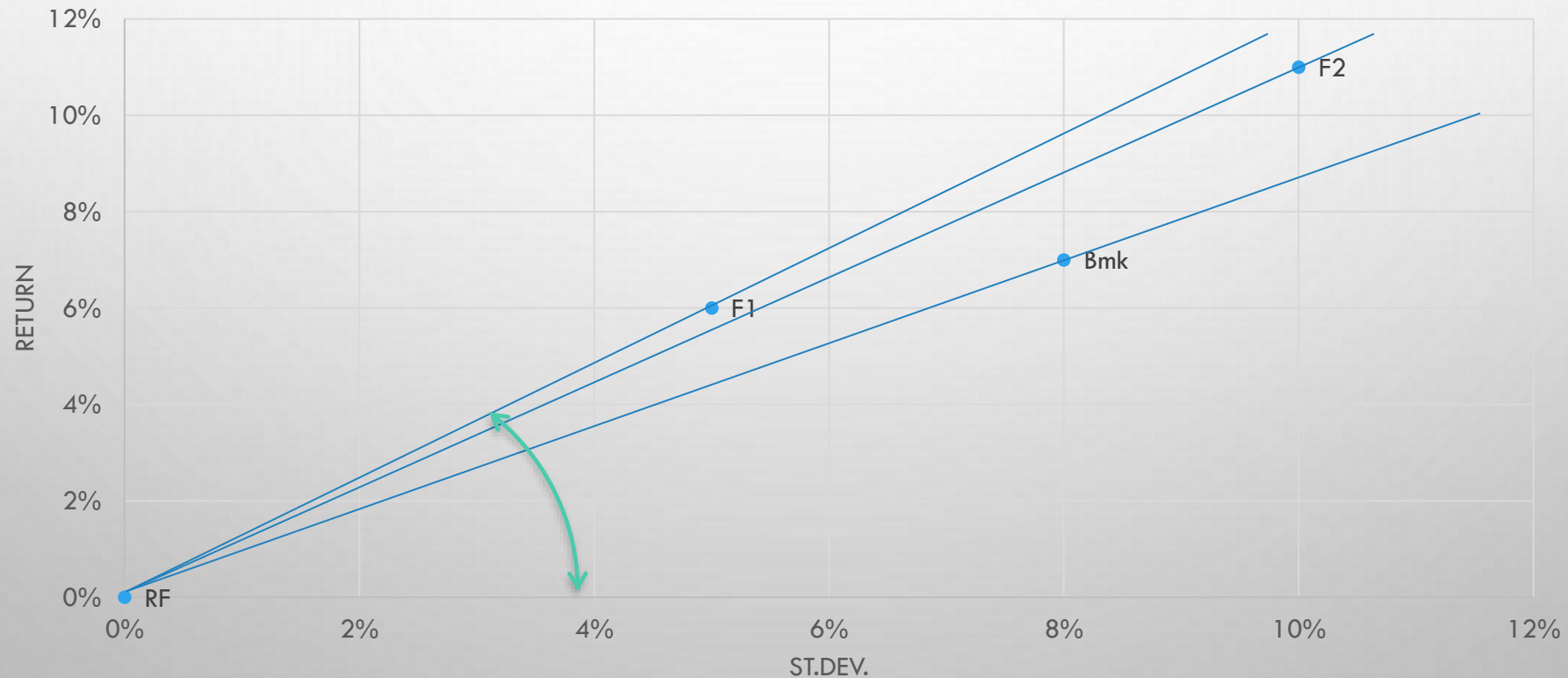
$$TE = \sigma_{r_p - r_B}$$

St. dev. of differences in returns from benchmark

PERFORMANCE

SHARPE RATIO (similar to Traynor)

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
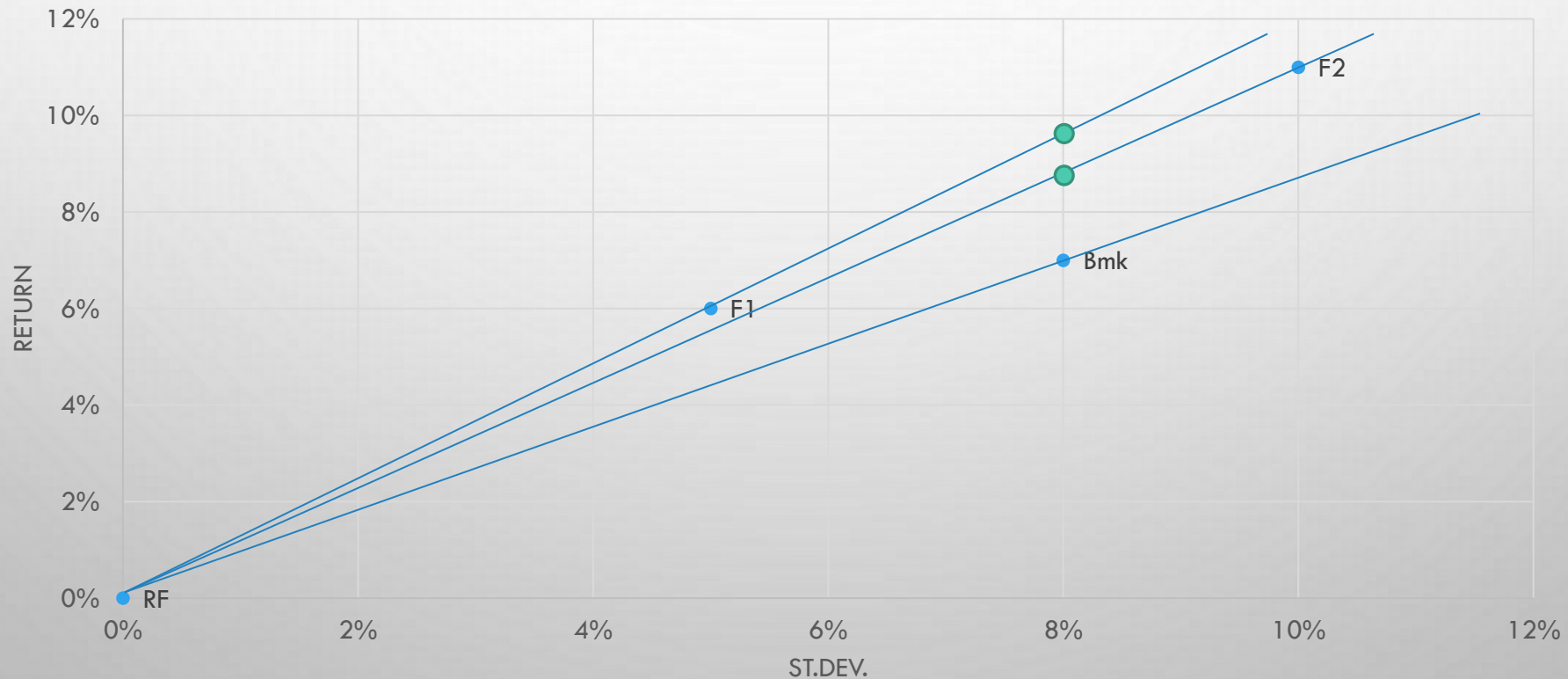- *Risk free*:   return 0%,   st.dev. 0%

STRUTTURA DEL MERCATO
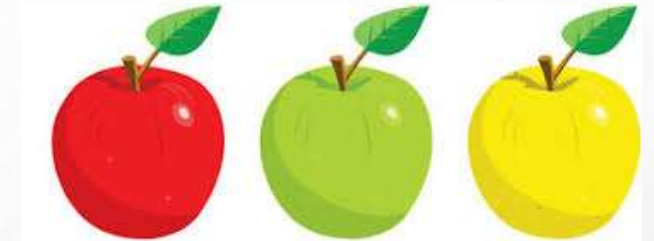
MODIGLIANI RAP

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%

TYPES

Based on the liquidity structure:

- **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

F.I: in 2016 Germany had 3,500 close-end and 6,000 open-end funds, with 83 and 1,800 bln € of AUM respectively

TYPES

Main investment 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
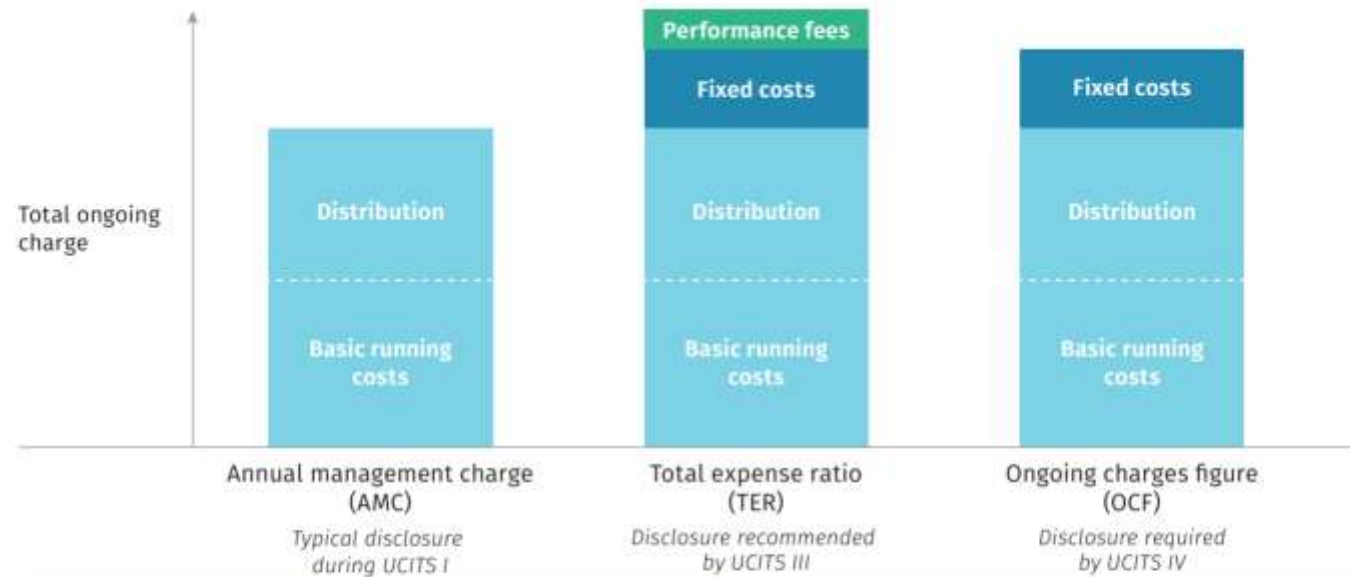
COSTS

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**

- …

Elements of Ongoing Charges Incurred for Investing in UCITS

Total ongoing charge

Annual management charge (AMC)
Typical disclosure during UCITS I
- Distribution
- Basic running costs

Total expense ratio (TER)
Disclosure recommended by UCITS III
- Performance fees
- Fixed costs
- Distribution
- Basic running costs

Ongoing charges figure (OCF)
Disclosure required by UCITS IV
- Fixed costs
- Distribution
- Basic running costs

Descriptions of costs

Basic running costs. Fees that include staff salaries, research costs, and other similar essential operating costs.

Distribution. Fees paid by the fund to the distributor for its services, sometimes referred to as *trailer fees* or *retrocessions*. Some EU countries prohibit such fees for new/existing subscriptions.

Fixed costs. Fees relatively fixed in euro terms—includes fees such as administrator fees, depositary fees, audit fees, transfer agent fees, legal fees, and regulatory fees.

Performance fees. Fees related to fund performance that are explicitly *included* in the TER, but explicitly *excluded* from the OCF.
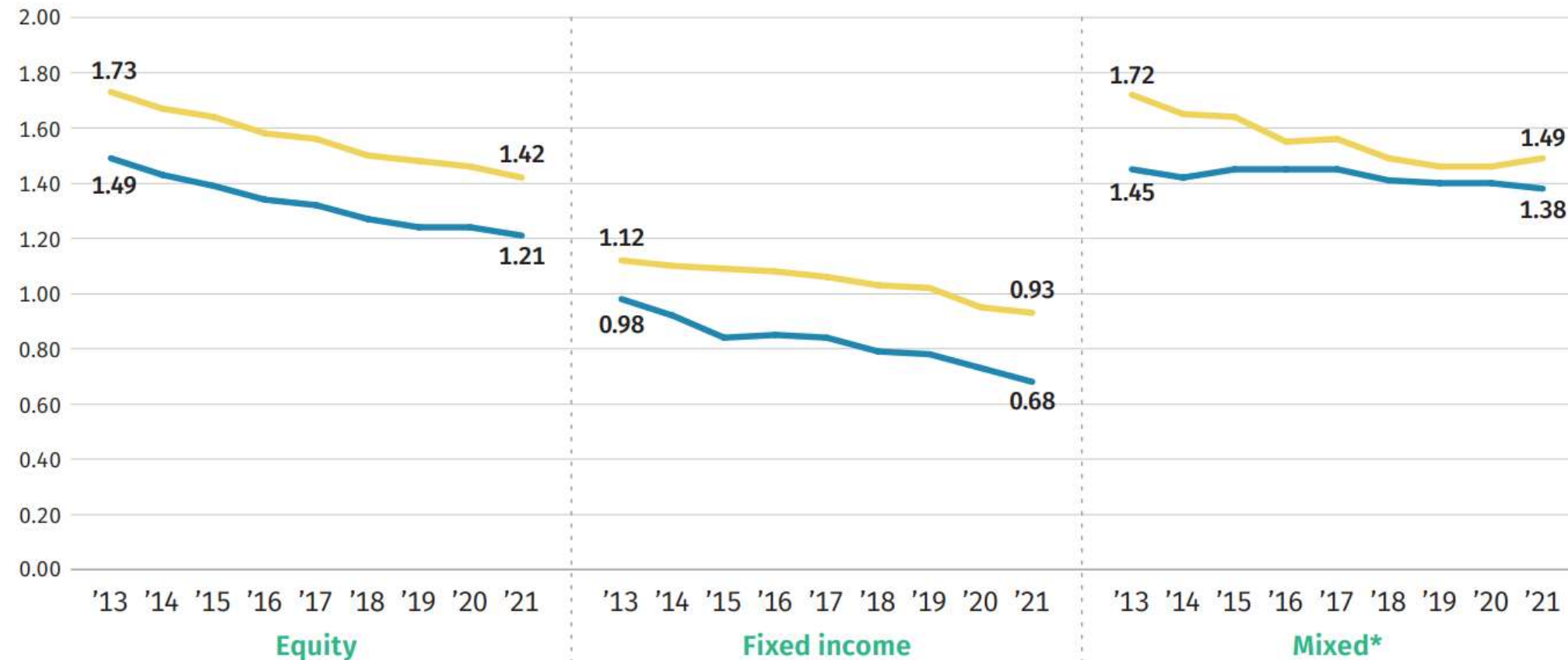
COSTS (GLOBAL)

COSTS (EUROPE)

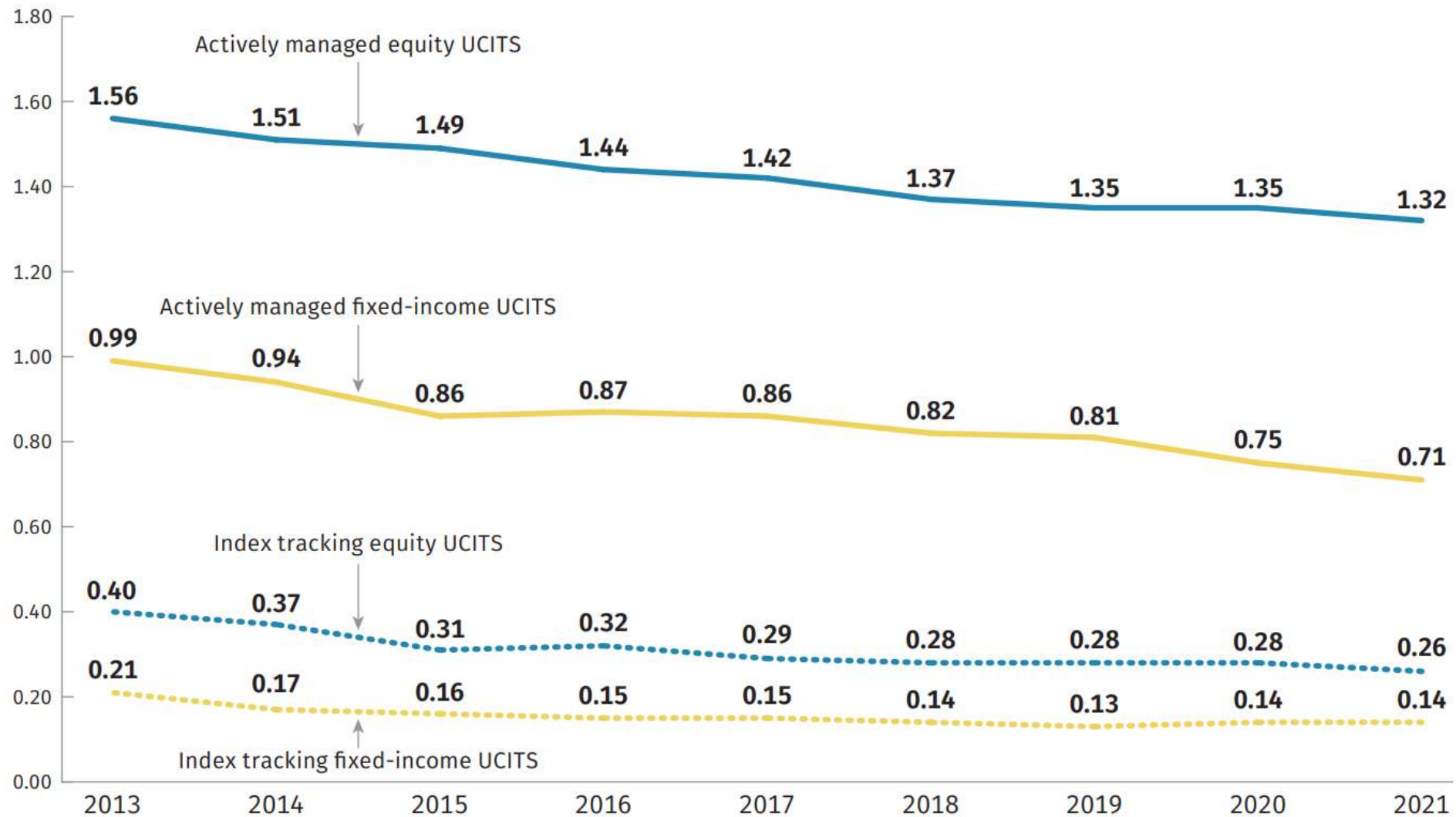**Investors in UCITS Pay Below-Average Ongoing Charges**

Percent

— Simple average ongoing charge
— Asset-weighted average ongoing charge

COSTS (EUROPE)

Ongoing Charges for Actively Managed and Index Tracking UCITS Have Fallen

Percent

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?

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

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

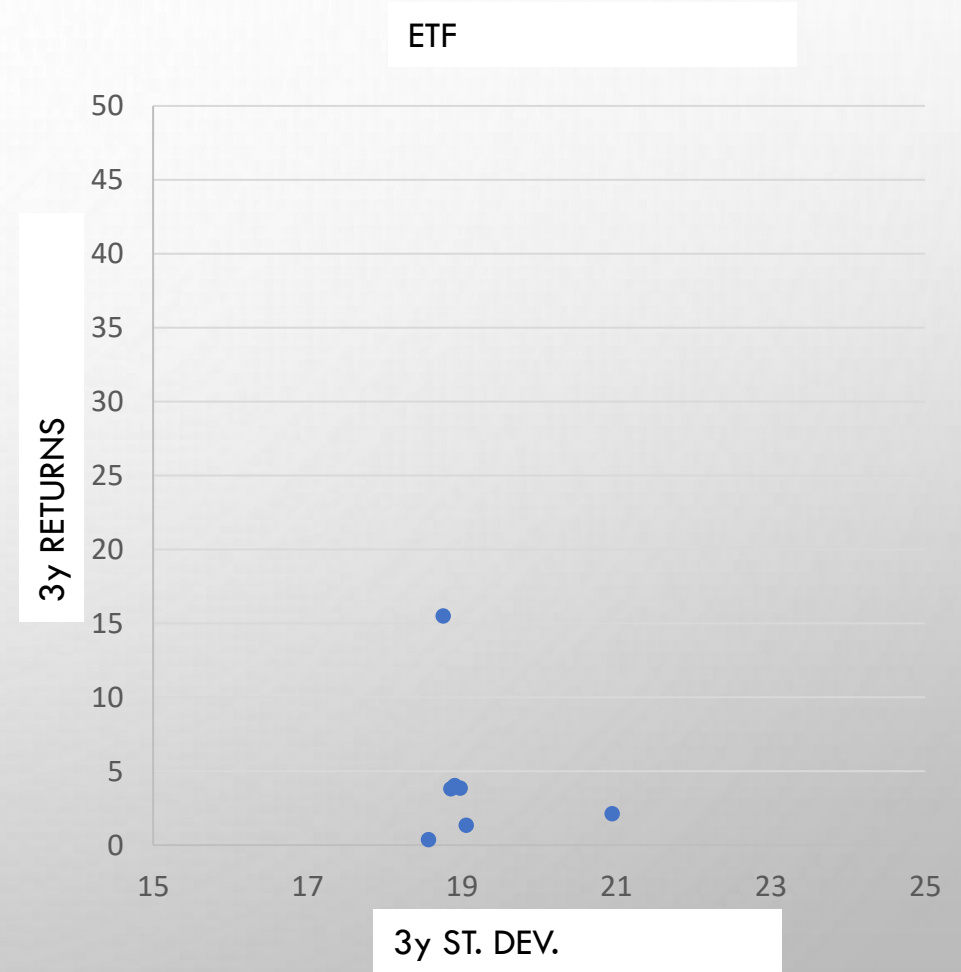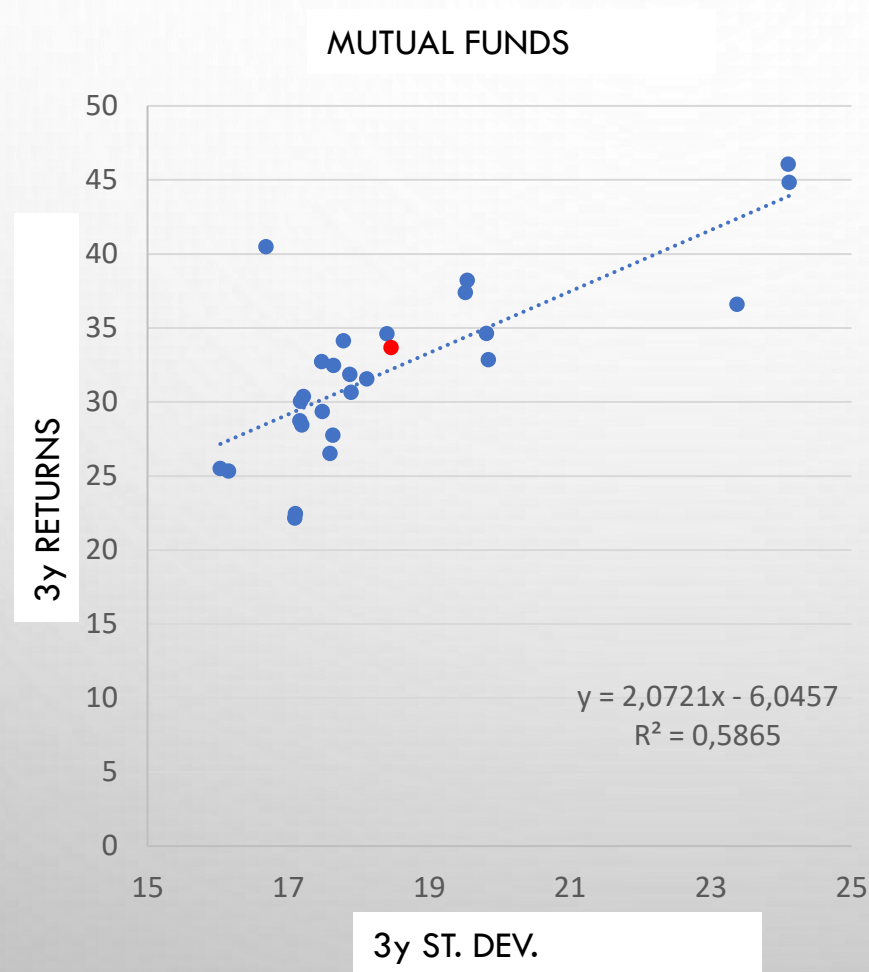|	Fund 1	Fund 2
5 y	1.45	1.46
10 y	2.23	2.23
15 y	3.42	3.40
20 y	5.27	5.19

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

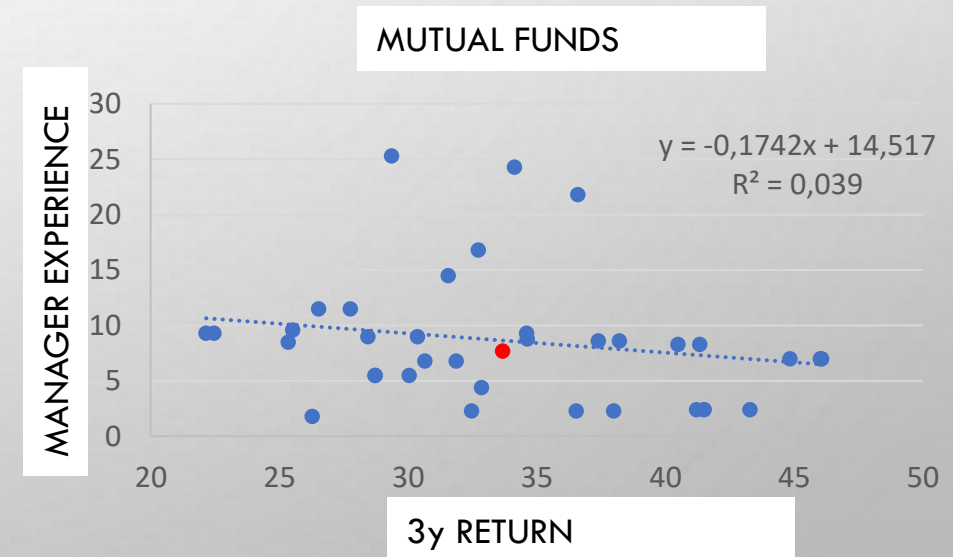$$FV_2 = \prod_{h=1}^{t}(1 + i_h - rf_1) \cdot (1 - ff_2)$$

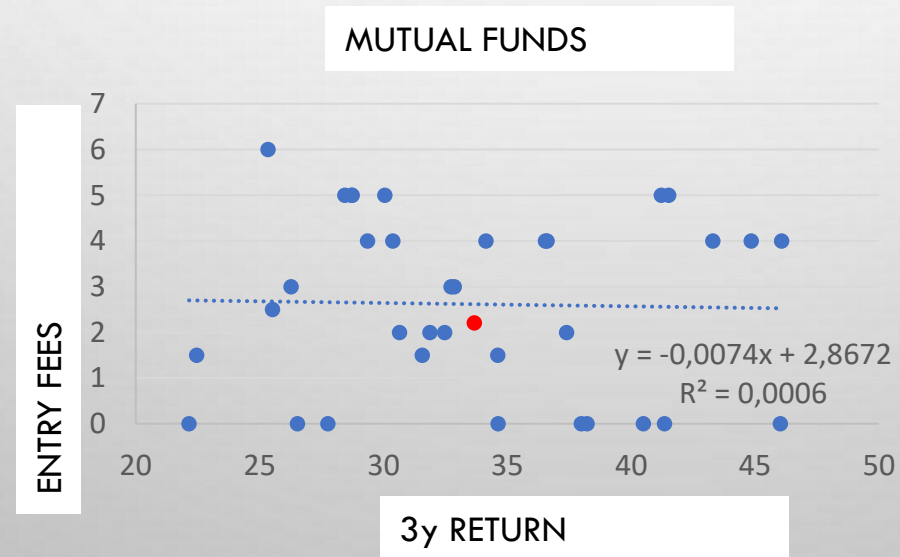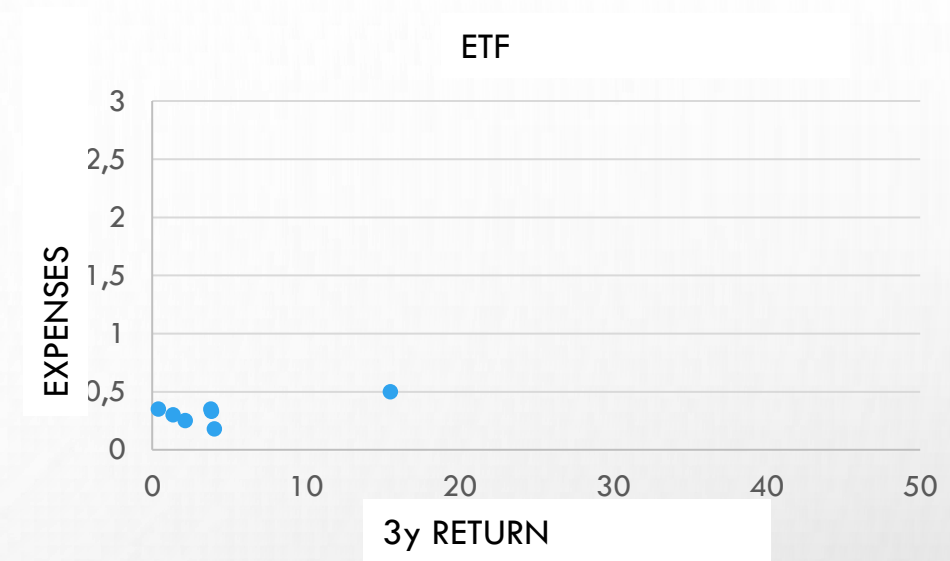|	Fund 1 A	Fund 2 A	Fund1 B	Fund 2 B
5 y	1.20	1.23	1.35	1.38
10 y	1.72	1.76	1.48	1.51
15 y	2.77	2.83	1.89	1.93
20 y	5.00	5.10	2.71	2.77

2. Several websites provide plenty of data on mutual funds (f.i. Morningstar). Consider the following comparison of Italian funds specialised in Italian stocks and dedicated to the retail market (07/2017). Comments?

EXAMPLES

MUTUAL FUNDS

$y = 2,0721x - 6,0457$
$R^2 = 0,5865$

3y RETURNS

3y ST. DEV.

ETF

3y RETURNS

3y ST. DEV.

EXAMPLES

MUTUAL FUNDS

$y = -0,0269x + 2,7376$
$R^2 = 0,1165$

EXPENSES

3y RETURN

ETF

EXPENSES

3y RETURN

MUTUAL FUNDS

$y = -0,0074x + 2,8672$
$R^2 = 0,0006$

ENTRY FEES

3y RETURN

MUTUAL FUNDS

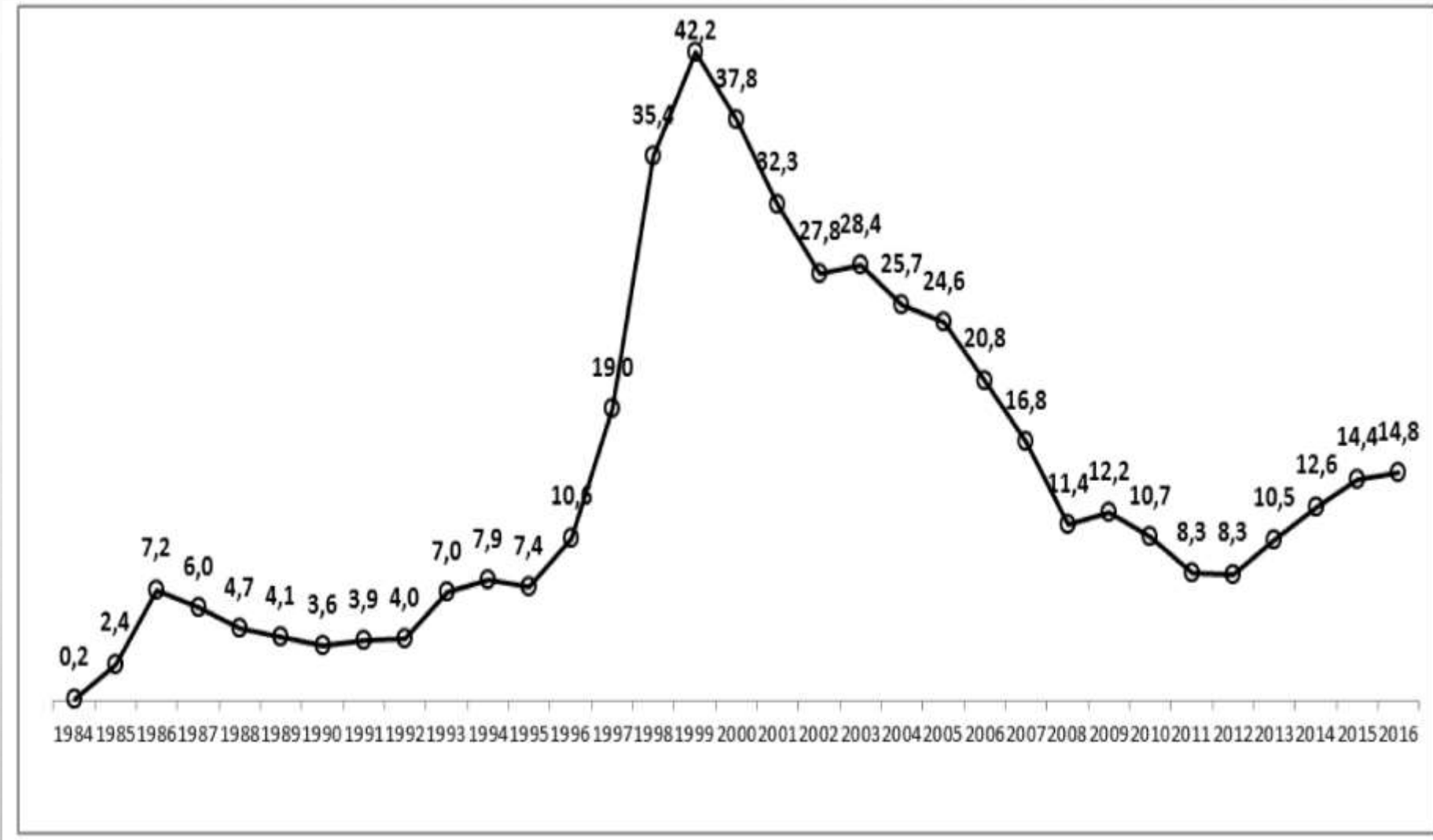$y = -0,1742x + 14,517$
$R^2 = 0,039$

MANAGER EXPERIENCE

3y RETURN
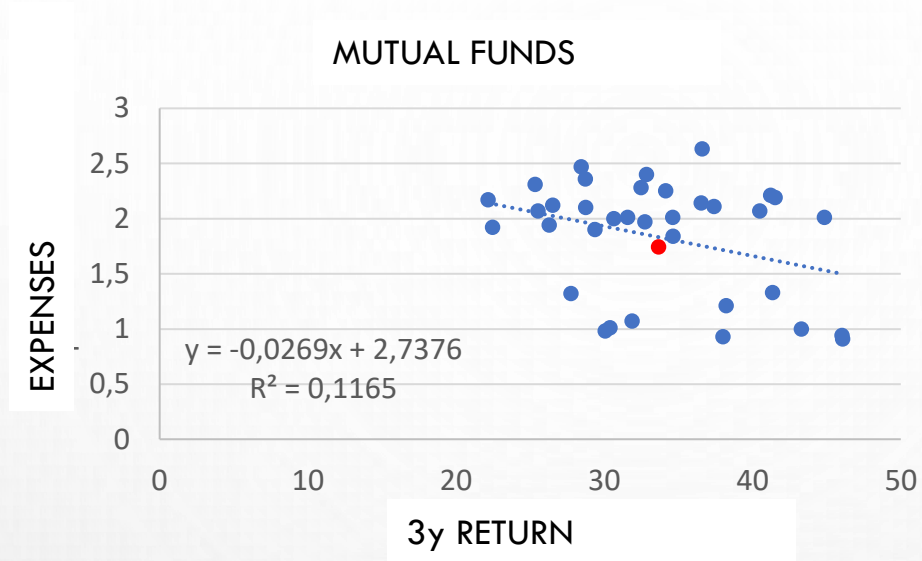
EXAMPLES

3. Italian mutual funds AUM as % of GDP. Comments?

4. Passive or active?

EXAMPLES

10 year selected global fund performance data (as of December 2015)

Region and risky asset	Active managers	Benchmark	Difference
France equity	4.0%	4.7%	(0.8%)
Germany equity	6.6%	7.4%	(0.8%)
Italy equity	0.0%	(0.9%)	0.9%
Spain equity	2.6%	2.9%	(0.3%)
Netherland equity	3.1%	7.2%	(4.1%)
U.S. equity	5.8%	7.4%	(1.6%)
U.S. real estate	5.4%	7.3%	(1.9%)
U.S. long-term government bonds	3.8%	6.7%	(2.9%)
U.S. short-term government bonds	2.2%	2.5%	(0.3%)
U.S. MBS	3.9%	4.6%	(0.7%)
Emerging markets bonds	4.4%	6.7%	(2.3%)

Global ETF AUM and their percentage to mutual funds' AUM

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
ETF AUM (US$ trillion)	0.6	0.8	0.7	1.1	1.4	1.5	1.9	2.3	2.7	2.9
ETF AUM as a percentage of mutual fund AUM	3.0%	3.5%	4.2%	5.2%	6.1%	6.5%	7.4%	8.1%	9.0%	9.8%