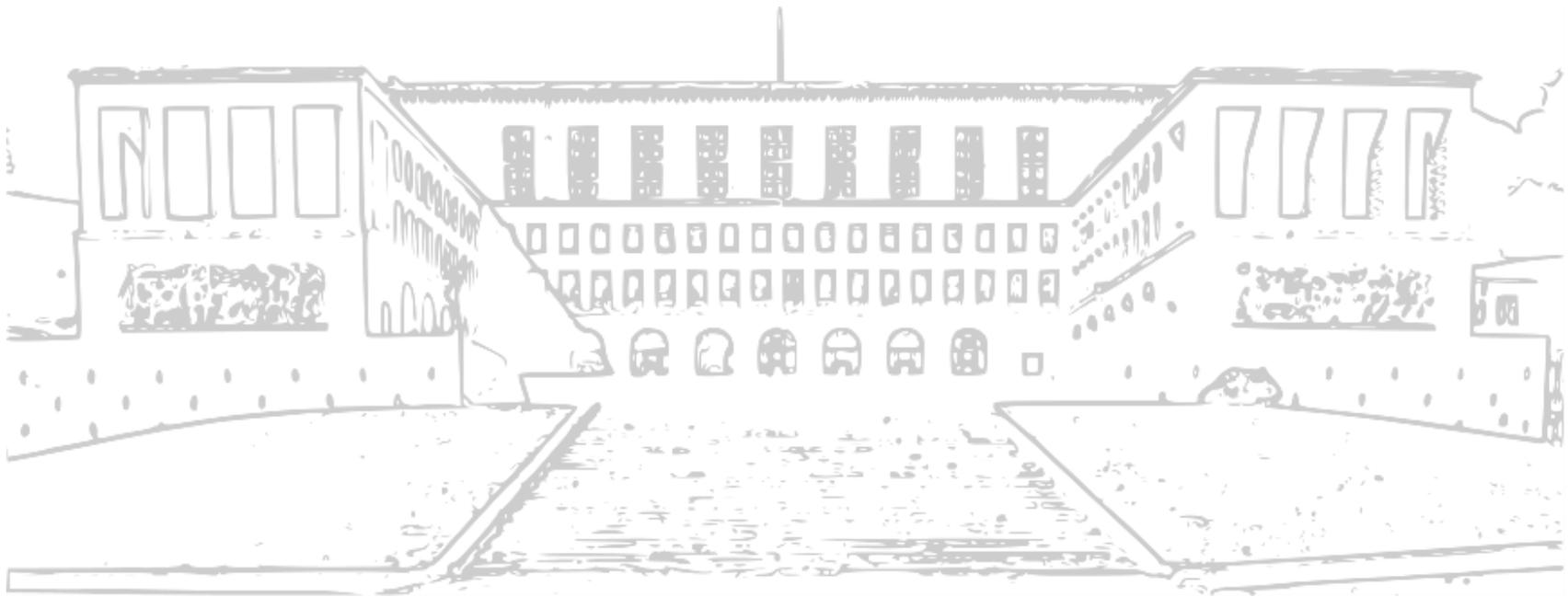


FINANCIAL MARKETS AND INSTITUTIONS

MUTUAL FUNDS

A.Y. 2019/2020

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DEAMS
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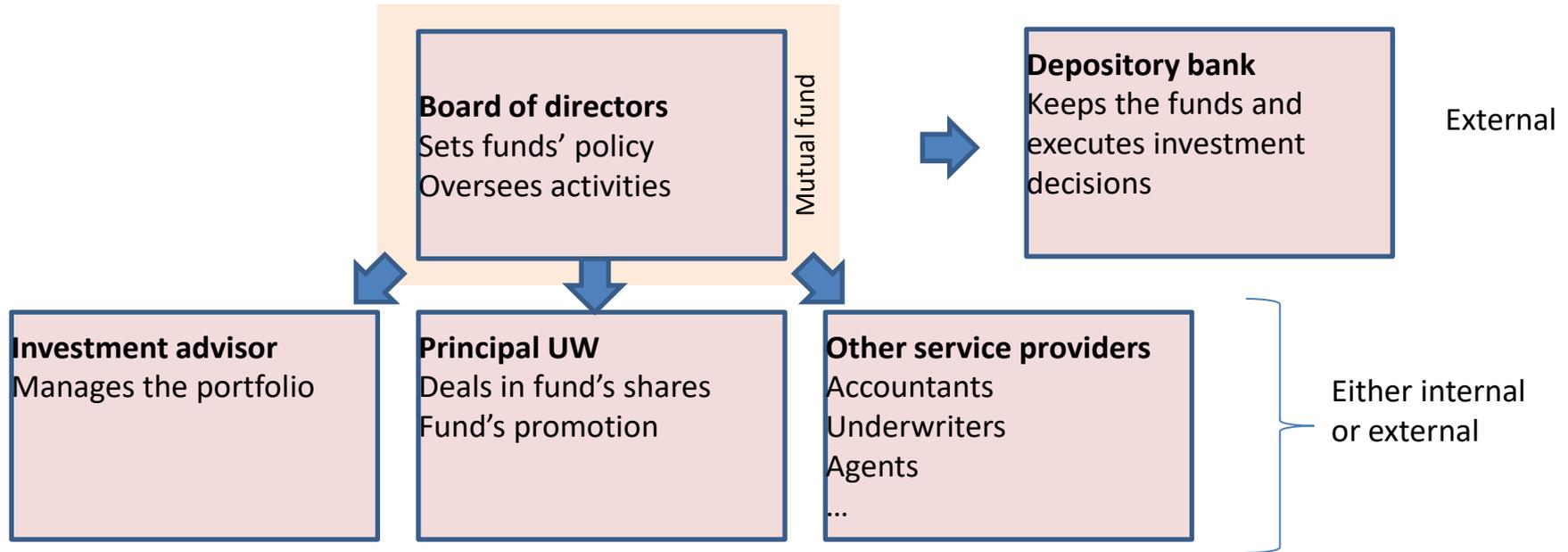
AGENDA



- Rationale of mutual funds
- Performance measures: NAV
- Types of mutual funds

HOW MUTUAL FUNDS?

Recurring structure



Otherwise, like investing in stocks:

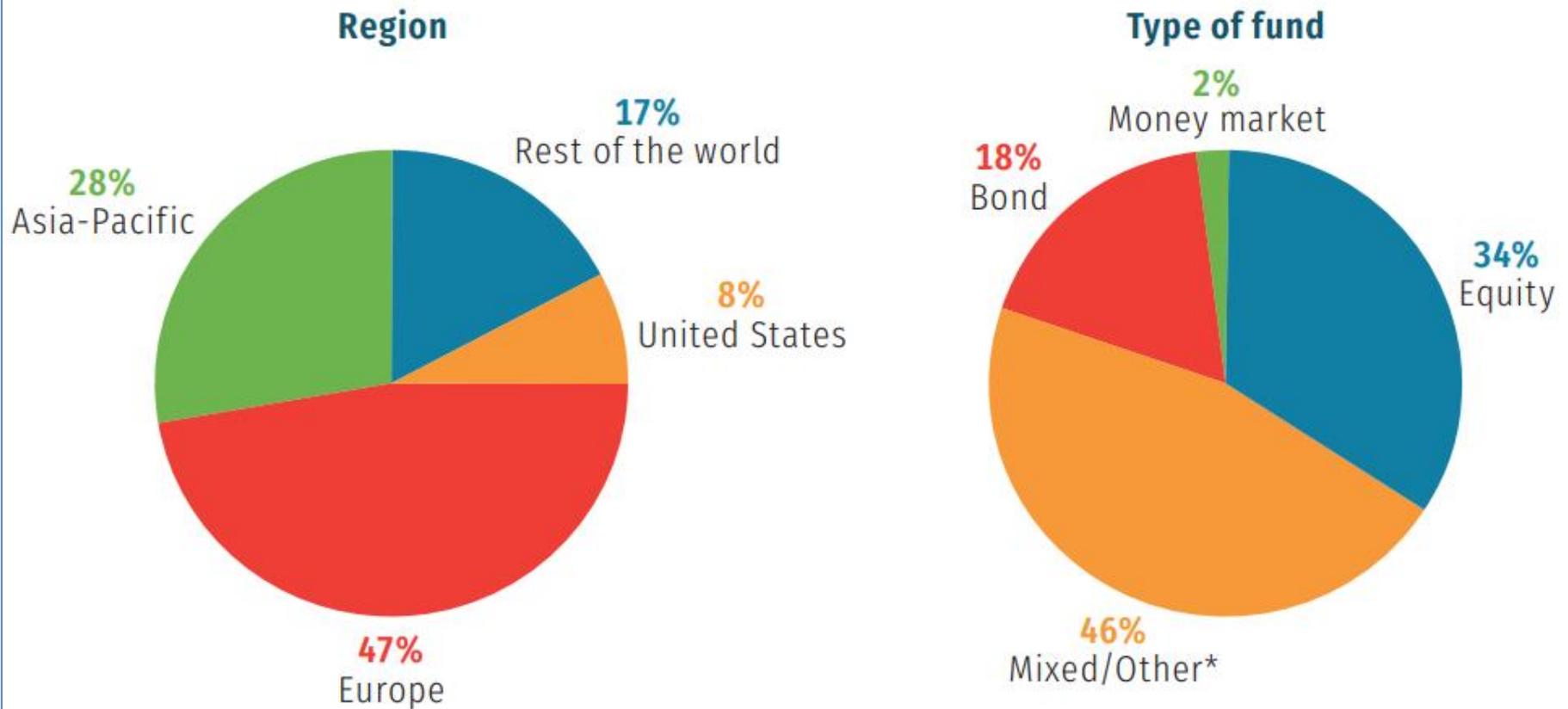
- periodic earnings (sometimes: “distributing” funds and liquidity/performance issues)
- capital gains (mostly)

GLOBAL SNAPSHOT (2018 ICI DATA)

FIGURE 1.8

Number of Worldwide Regulated Open-End Funds

Percentage of funds by region or type of fund, year-end 2018



Number of worldwide regulated open-end funds: 118,978

GLOBAL SNAPSHOT (2018 ICI DATA)

2018 Facts at a Glance

Total worldwide assets invested in regulated open-end funds*	\$46.7 trillion
United States	\$21.1 trillion
Europe	\$16.5 trillion
Asia-Pacific	\$6.4 trillion
Rest of the world	\$2.7 trillion

US household ownership of US-registered funds

Number of households owning funds	57.2 million
Number of individuals owning funds	101.6 million
Percentage of households owning funds	44.8%
Median mutual fund assets of mutual fund-owning households	\$150,000
Median number of mutual funds owned	4

PERFORMANCE MEASURES

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
- Specific performance of an investor
- Funds performance relative to a benchmark market
- Funds' net performance
- ...

PERFORMANCE MEASURES

- Sharpe's ratio

$$SR = \frac{r_P - r_f}{\sigma_P}$$

- Modigliani's ratio

$$M = \frac{r_P - r_f}{\sigma_P} \sigma_m$$

- Treynor's ratio

$$Treynor = \frac{r_P - r_f}{\beta_P}$$

- Sortino's ratio

$$Sortino = \frac{r_P - r_f}{DSR}$$

- MWRR

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

- Tracking error

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

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

Effective *performance* based on individual choices: net in/outflows and average invested amounts

St. dev. of differences in returns from benchmark

TYPES OF MUTUAL FUNDS

Among several potential categories, a few emerge:

- **close-end:**

- mutual funds' shares are fixed in number at the initial offering
- withdrawals and new investments are not possible
- entering/exiting only finding somebody willing to exit/enter

- **open-end:**

- new investors can get new shares, buy-back/liquidation option
- the fund has a variable number of shares

Example

In 2016 Germany had:

- *3.500 closed-end funds, AUM 83 bln €*
- *6.000 open-end funds, AUM of 1.800 bln €*

Why?

TYPES OF MUTUAL FUNDS

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

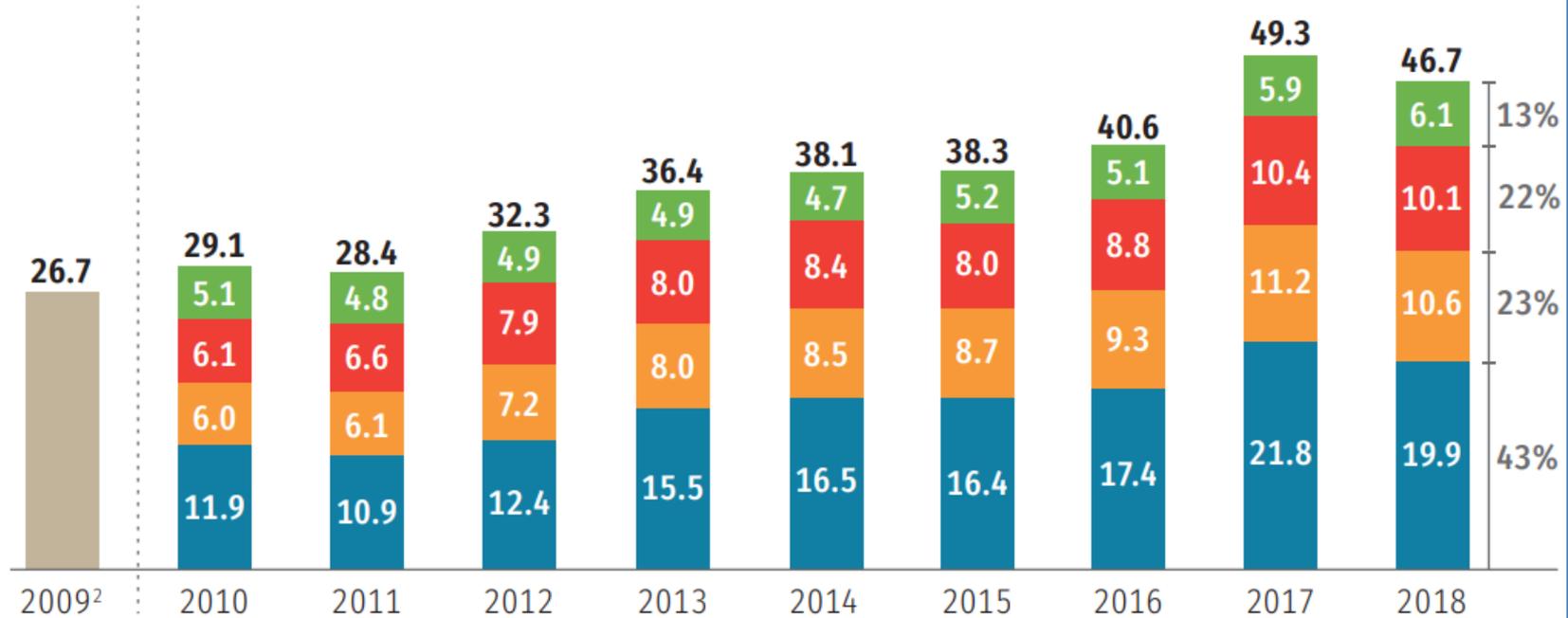


GLOBAL SNAPSHOT (2018 ICI DATA)

FIGURE 1.1

Total Net Assets of Worldwide Regulated Open-End Funds Fell to \$46.7 Trillion in 2018
Trillions of US dollars by type of fund, year-end

- Money market
- Bond
- Mixed/Other¹
- Equity



Total number of worldwide regulated open-end funds

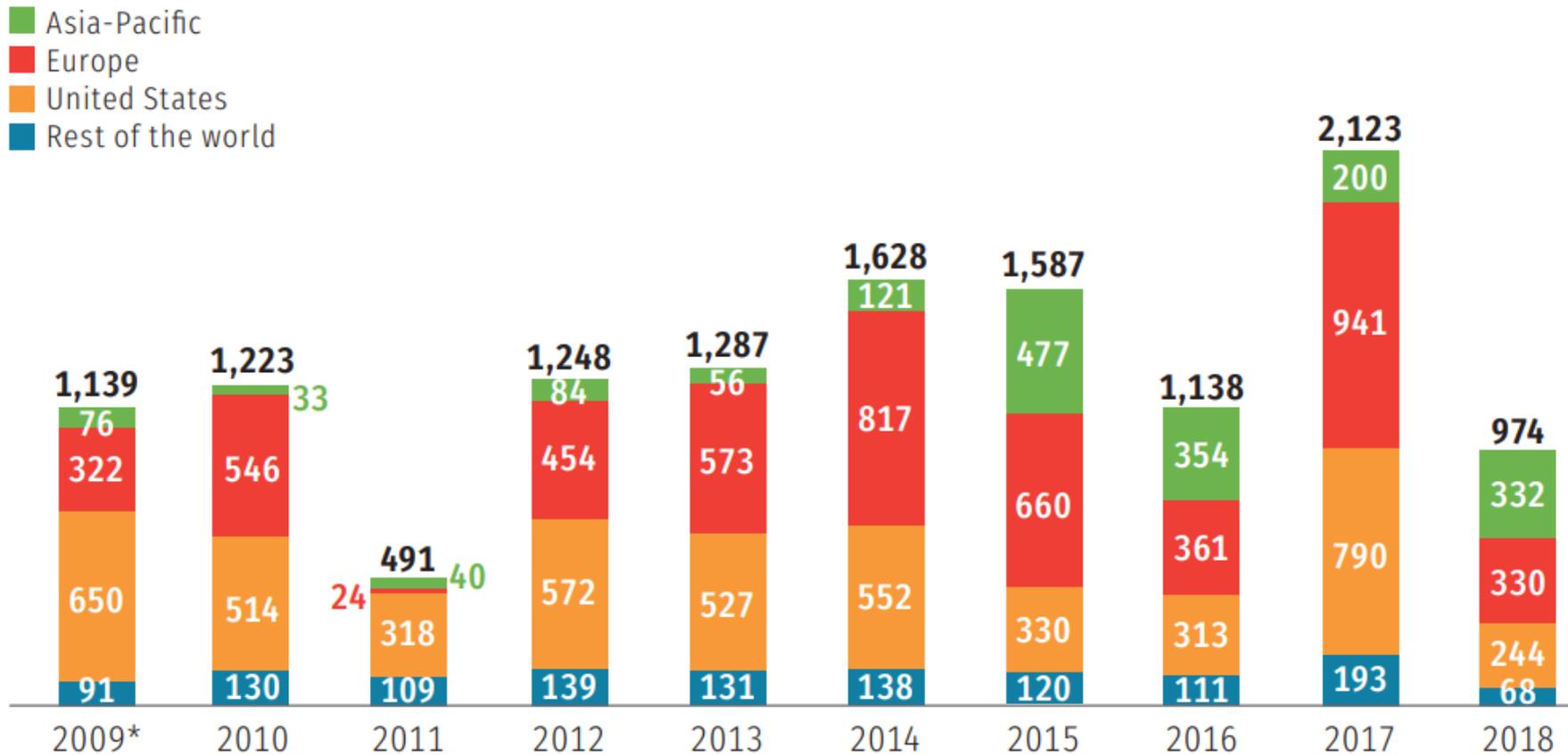
82,991 86,301 92,074 94,398 97,939 101,686 106,675 110,790 113,646 118,978

GLOBAL SNAPSHOT (2018 ICI DATA)

FIGURE 1.4

Net Sales of Regulated Open-End Long-Term Funds in the United States and Europe Slowed in 2018

Billions of US dollars by region, annual



COSTS OF MUTUAL FUNDS

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)

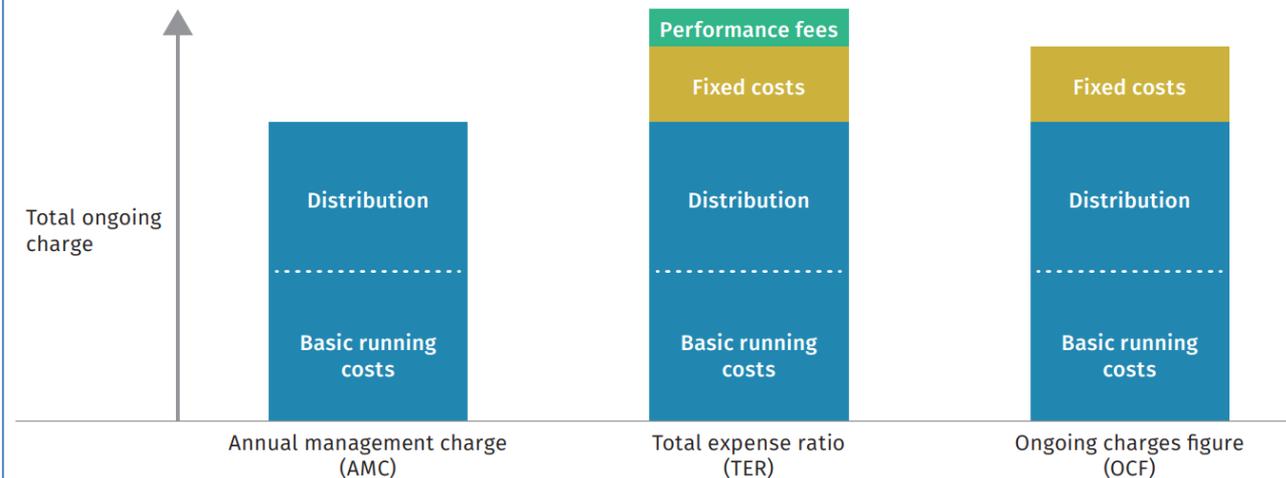


Several other fees:

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

Elements of Ongoing Charges Incurred for Investing in UCITS

EU – ICI.com

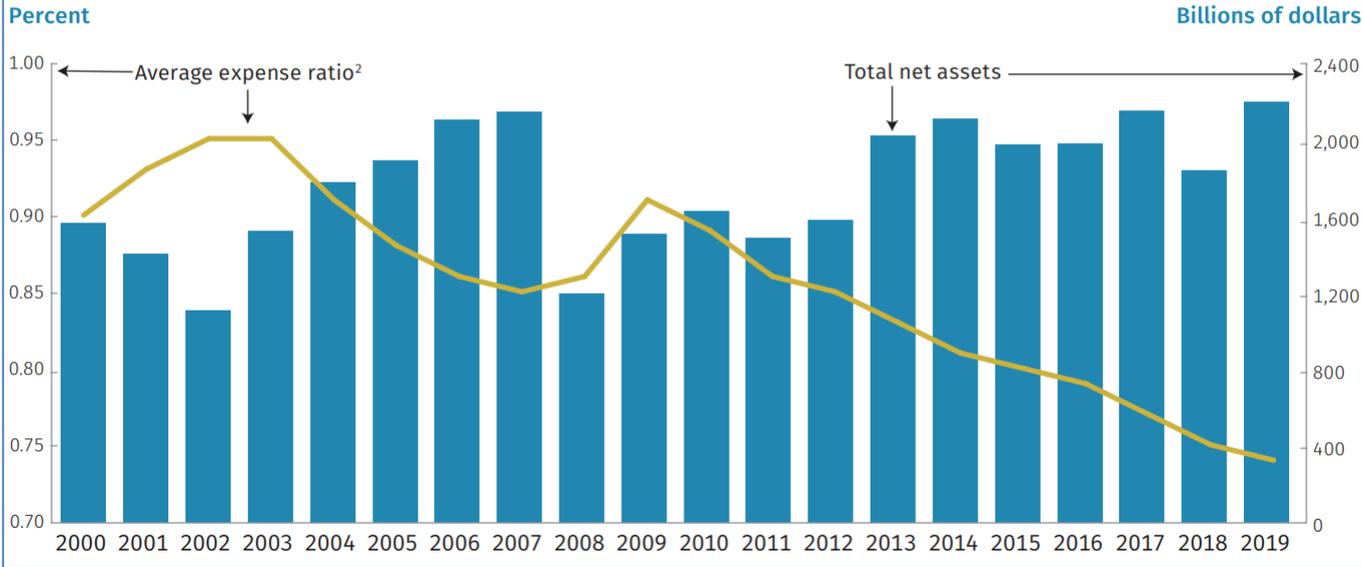


GLOBAL SNAPSHOT (2018 ICI DATA)

FIGURE 2

Mutual Fund Expense Ratios Tend to Fall as Fund Assets Rise

Share classes of actively managed domestic equity mutual funds continuously in existence since 2000¹



GLOBAL SNAPSHOT (2018 ICI DATA)

FIGURE 4

Investors in UCITS Pay Below-Average Ongoing Charges

Percent

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



FIGURE 10

Average Synthetic Ongoing Charges for UCITS Funds of Funds

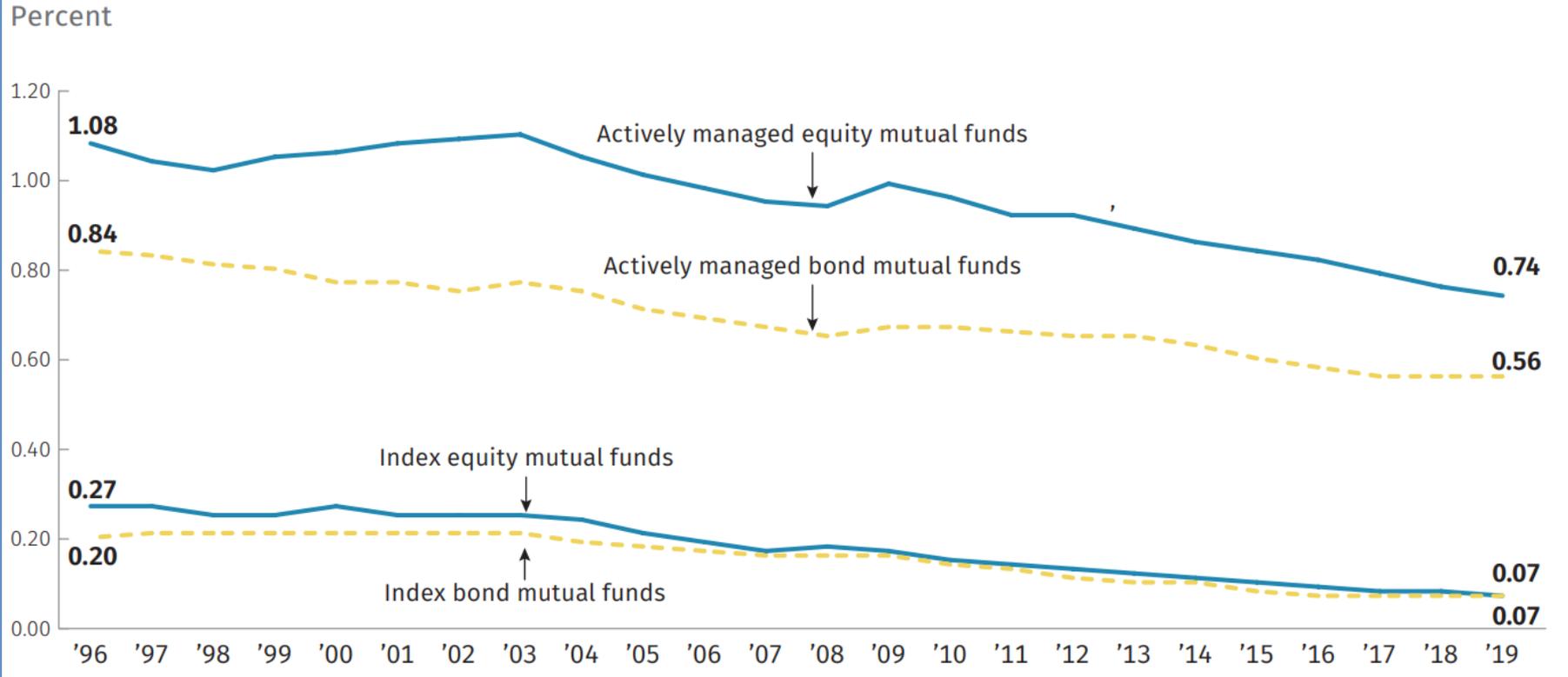
Percent

Year	Asset-weighted average	Simple average	Median
2017	1.78	2.00	1.91
2018	1.71	1.88	1.81

GLOBAL SNAPSHOT (2018 ICI DATA)

FIGURE 13

Expense Ratios of Actively Managed and Index Mutual Funds Have Fallen



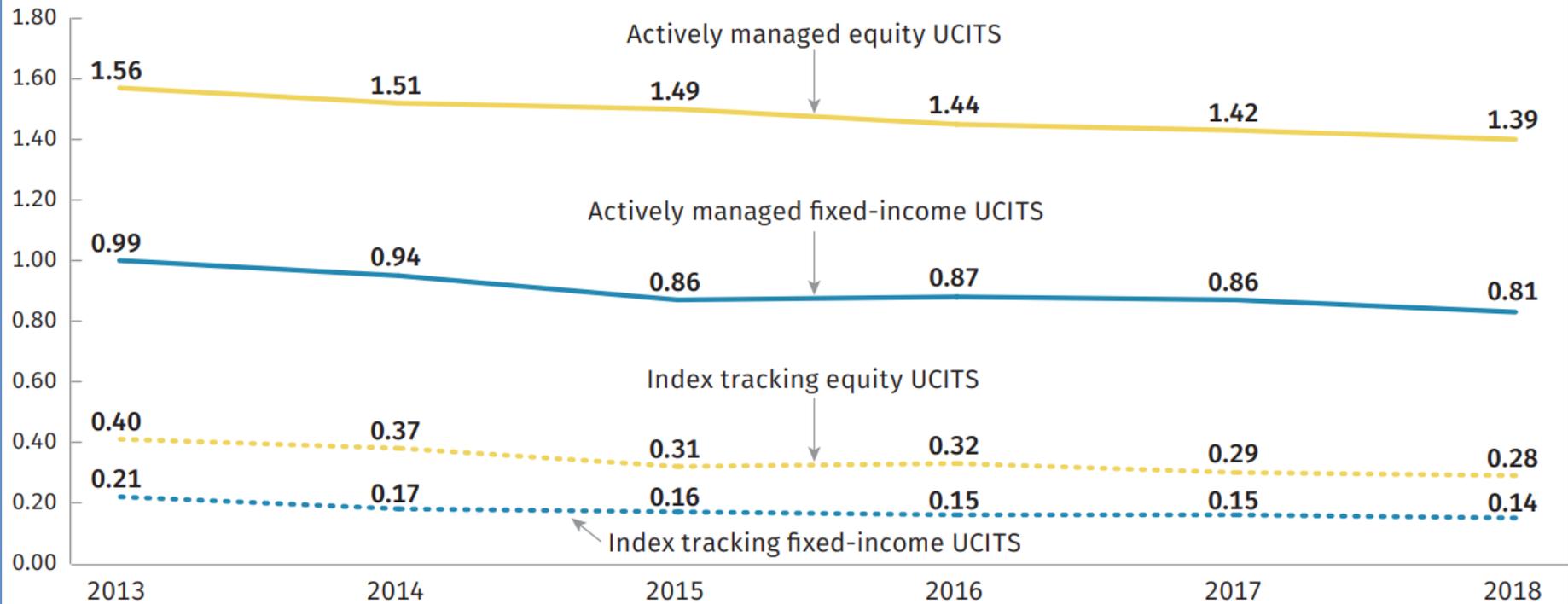
GLOBAL SNAPSHOT (2018 ICI DATA)

FIGURE 15

EU – ICI.com

Ongoing Charges for Actively Managed and Index Tracking UCITS Have Fallen

Percent



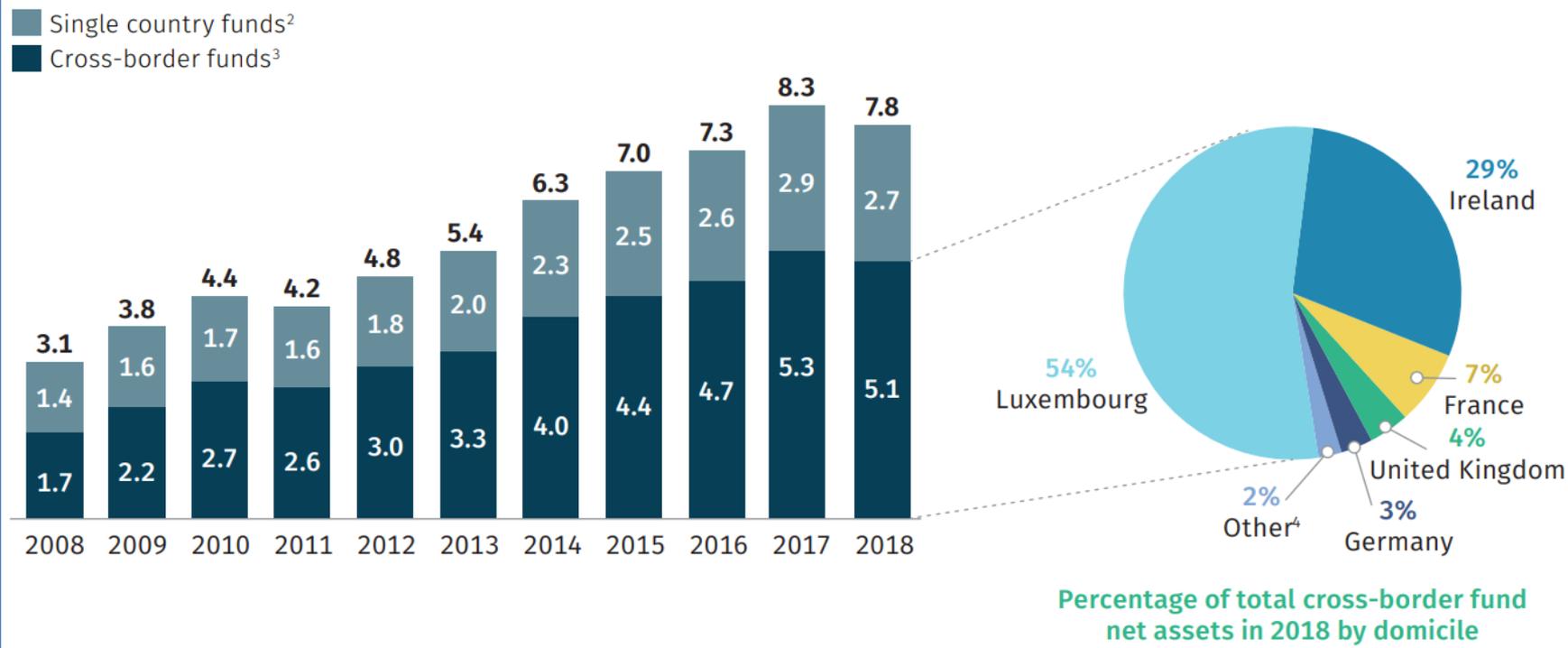
GLOBAL SNAPSHOT (2018 ICI DATA)

FIGURE 12

EU – ICI.com

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

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



As of 2018, over 60% of ETF belongs to IRE

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

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

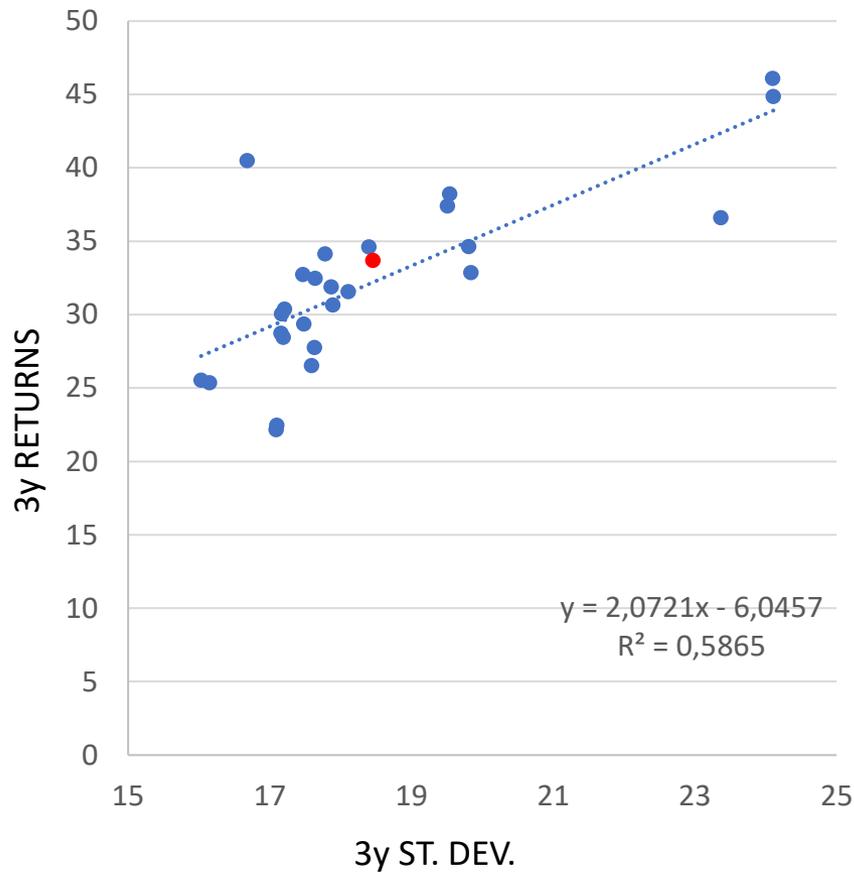
$$FV_2 = \prod_{h=1}^t (1 + i_h - rf_1) \cdot (1 - ff_2)$$

	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

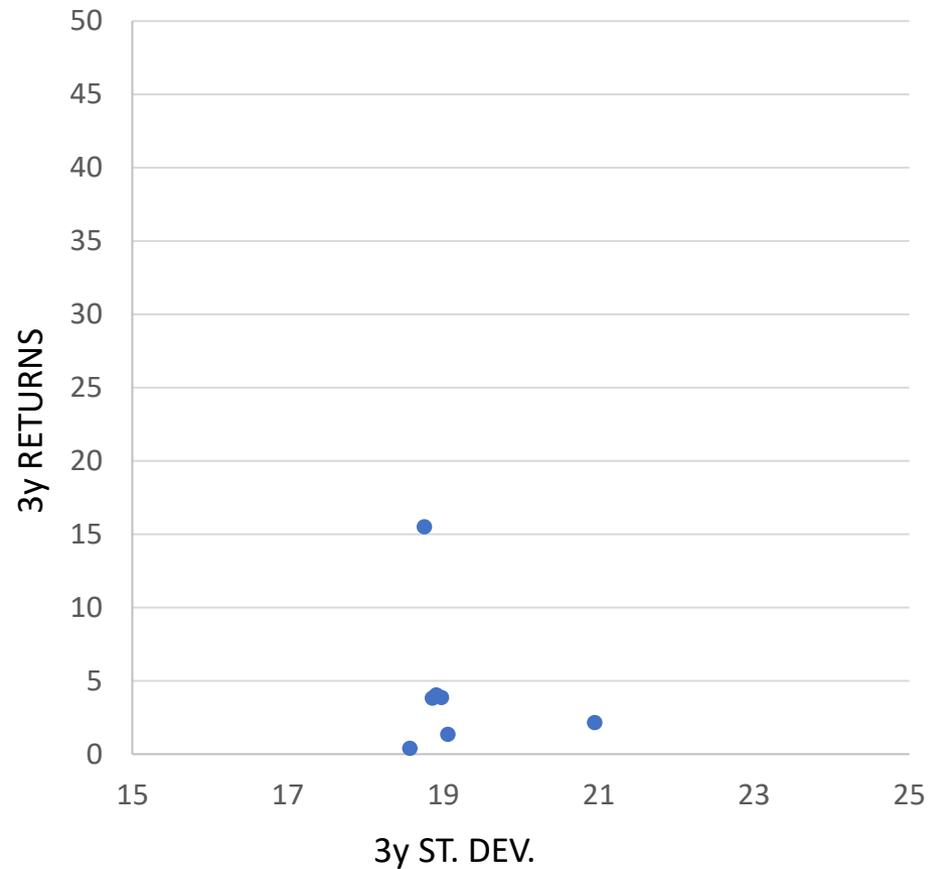
EXAMPLES

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?

MUTUAL FUNDS

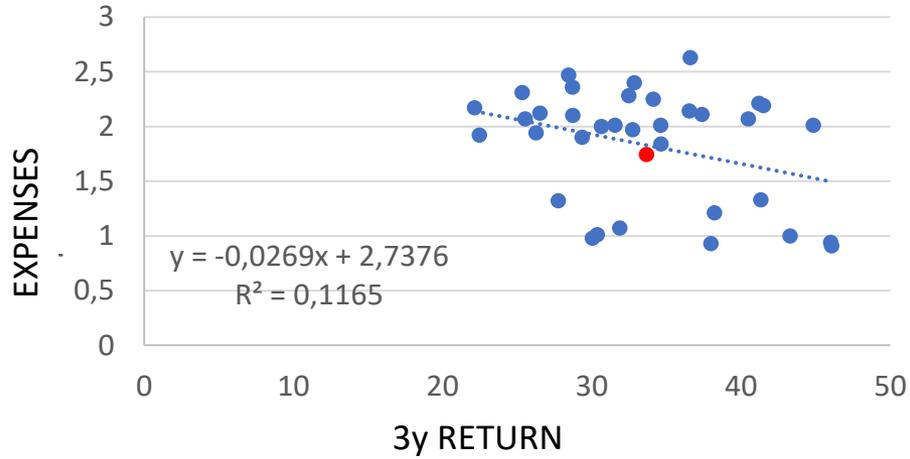


ETF

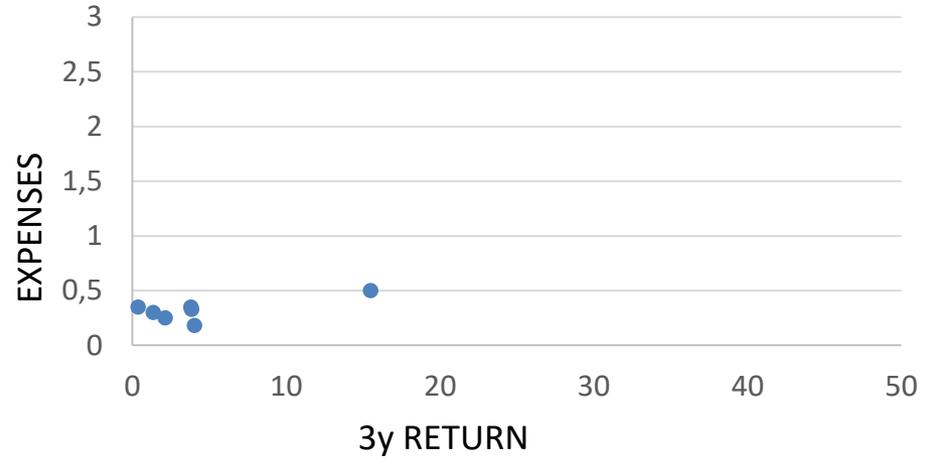


EXAMPLES

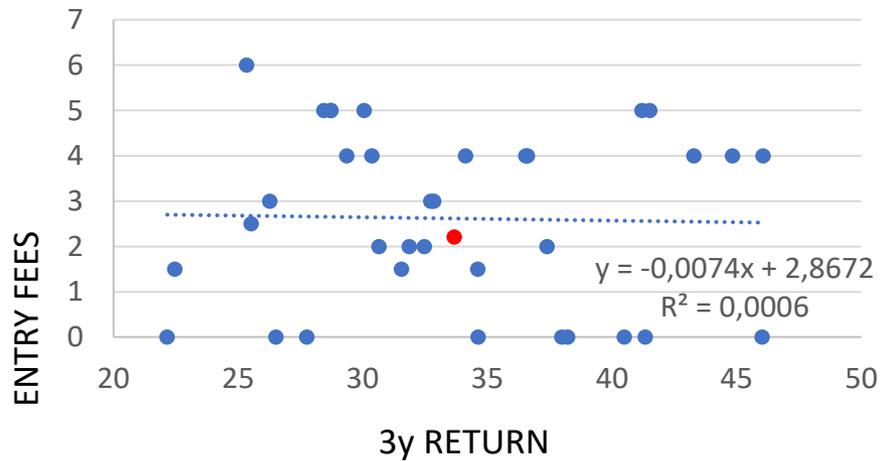
MUTUAL FUNDS



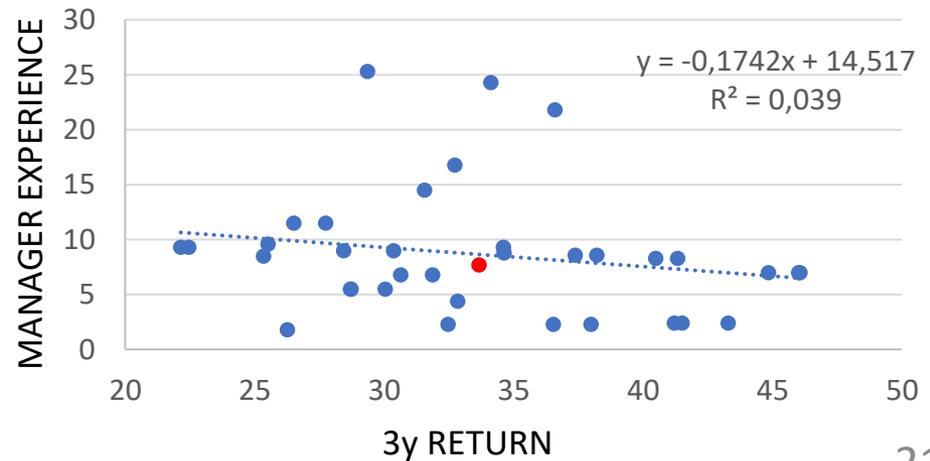
ETF



MUTUAL FUNDS



MUTUAL FUNDS



EXAMPLES

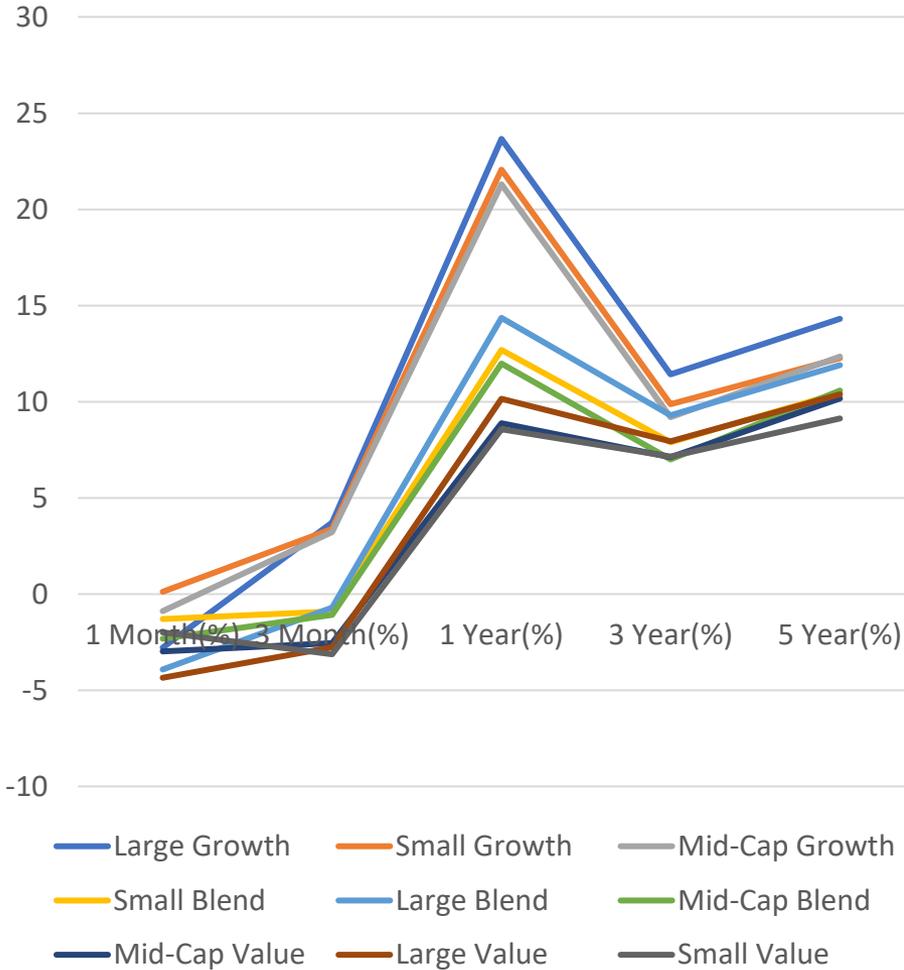
3. Italian mutual funds AUM as % of GDP. Comments?



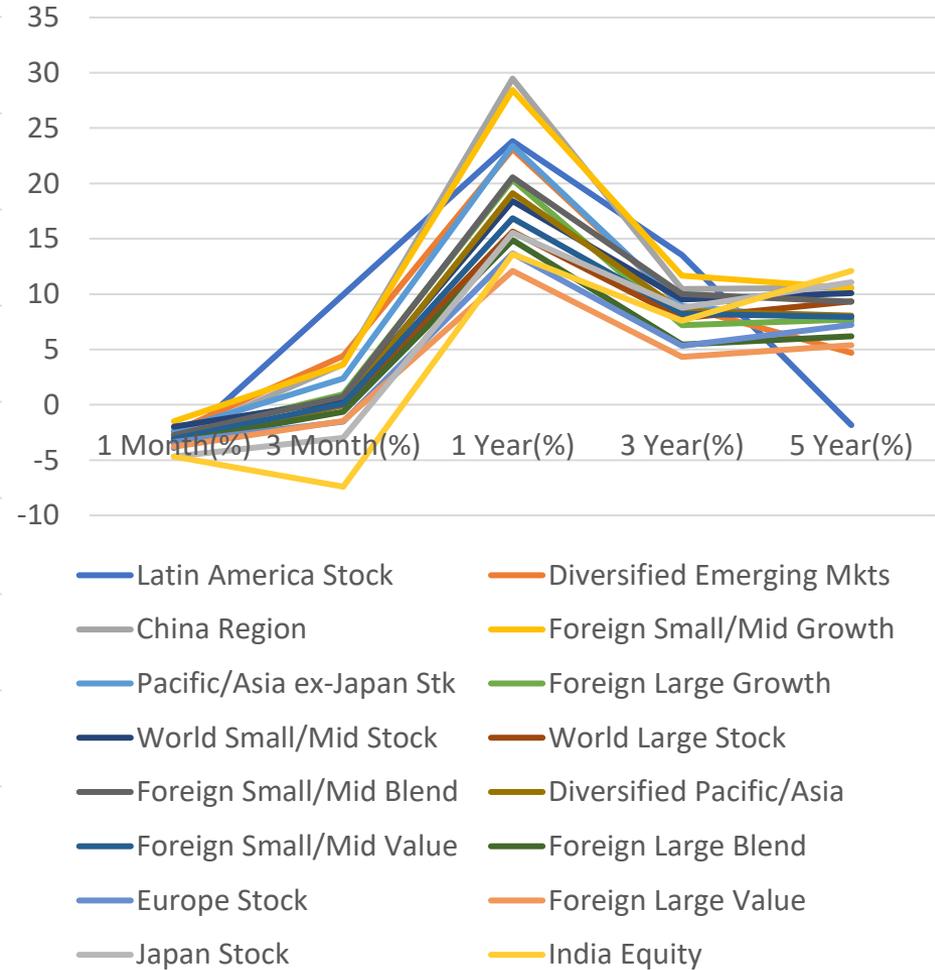
EXAMPLES

4. Global funds: returns and categories (March 2018)

US Equity



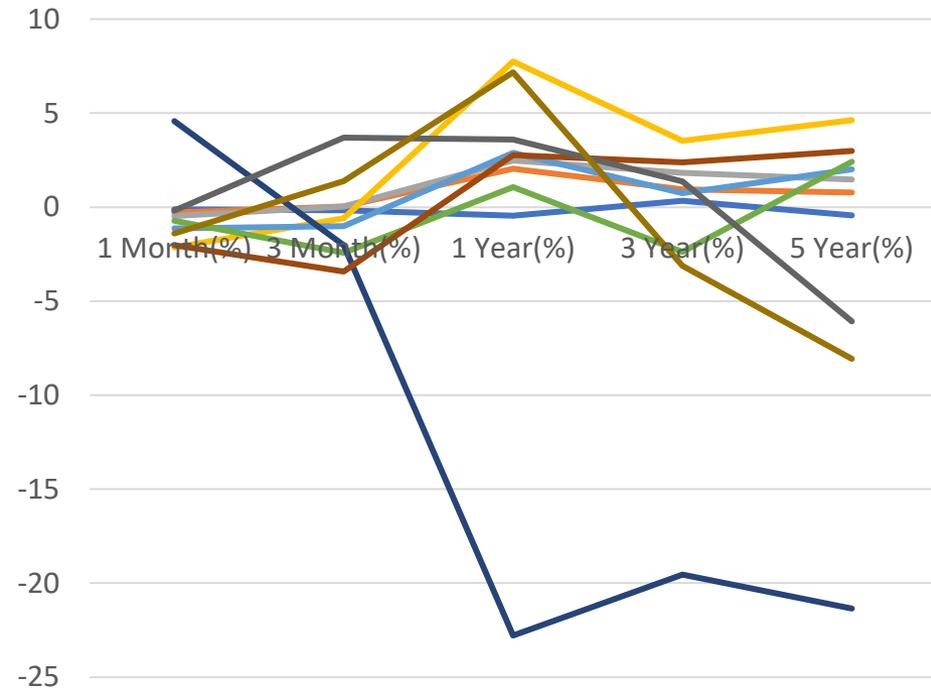
International Equity



EXAMPLES

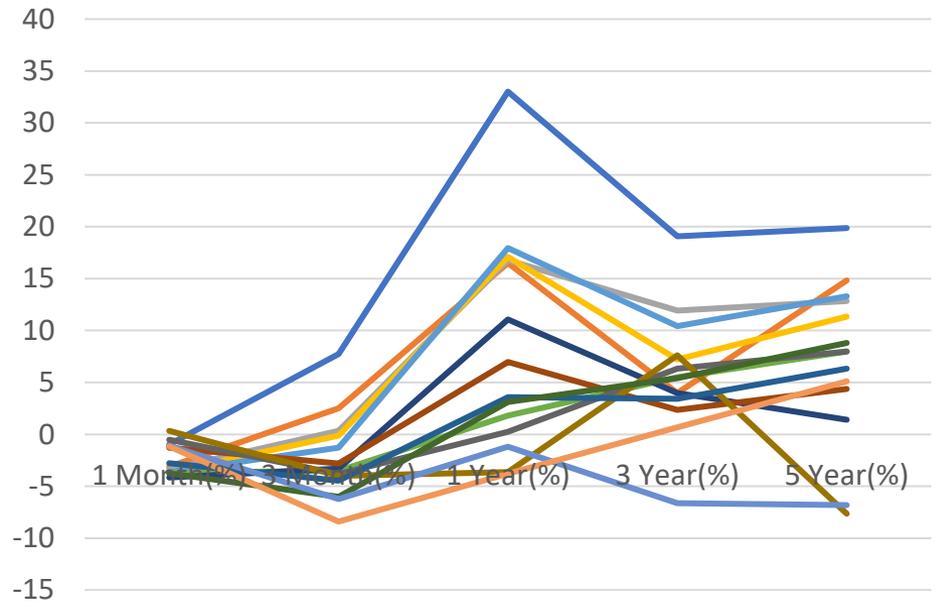
4. Global funds: returns and categories (March 2018)

Alternatives



- Multicurrency
- Long-Short Credit
- Multialternative
- Bear Market
- Commodities Precious Metals
- Market Neutral
- Long-Short Equity
- Managed Futures
- Options-based
- Commodities Broad Basket

Sector Equity



- Technology
- Financial
- Industrials
- Natural Resources
- Utilities
- Infrastructure
- Equity Energy
- Health
- Consumer Cyclical
- Communications
- Global Real Estate
- Equity Precious Metals
- Consumer Defensive
- Real Estate

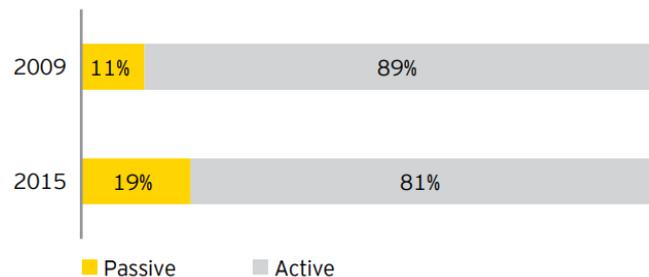
EXAMPLES

5. Passive or active?

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%)

Share of global asset management market



Global ETF AUM and their percentage to mutual funds' AUM

