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Cost intensity of active portfolio management

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Abstract

A fundamental question for stakeholders in the active management industry is what level of active management fee could be considered fair when factoring in the active risk deployed to generate the gross active return. To explore this topic, we introduce a new, simple and effective metric, the information ratio threshold (IRT), which reframes the fee signature of an active manager in terms of its cost intensity: the ratio between a fund's fee and its tracking error volatility (TEV). Intuitively, the higher the cost intensity, the higher the bar for the investors to obtain a net (i.e., after fee) outperformance against the relevant benchmark, all else equal. We test the IRT on a sample of 3937 share classes belonging to 1230 active equity and bond funds in 14 main asset allocation categories. Our data confirm the intuition that the greater the IRT, the lower the net information ratio (IR) delivered to investors. We believe that our findings could support funds' due diligence, product governance, and assessment-of-value considerations.

Keywords: Active management fee, Information ratio, Mutual fund cost, Closet indexing

JEL Classification: G11 G20 G23 G28

Introduction

Given the active risk of an investment strategy, what level of fees is adequate to preserve a reasonable expectation of net outperformance against a relevant benchmark? This is a fundamental question for stakeholders in the active management industry. When fees are disproportionately high against a reasonable magnitude of expected gross outperformance (i.e., before fees), this may result in significant underperformance and other adverse effects: misallocation of saving/capital, trust placed in financial intermediaries, and detriment to investor protection.

In this work, we provide a new approach, called the information ratio threshold (IRT), with the purpose of supporting a systematic evaluation of the fairness of fees within mutual fund categories. The IRT reframes fees in an intuitive way in terms of cost intensity: the ratio between fee and the active risk (the latter measured by tracking error volatility—TEV). For example, if an active manager has an active management fee of 1% and a TEV of 2.5%, the IRT is 40% (i.e., 1%/2.5%). This means that the manager must be able

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to generate at least a gross IR of 0.40 (the IRT) before the investor starts receiving a net outperformance against the relevant benchmark.

In that way, IRT provides a positive welfare outcome threshold because its level defines the minimum gross IR that the active manager must be able to deliver before the investor starts receiving a positive net IR.

It is relevant to note that the ultimate reason for hiring an active manager is the expectation of a positive net IR, since this metric integrates skill, costs, and active risk into a single efficiency measure (Hodgson et al. 2000). The focus of a typical manager research and selection process is on the "best-in-class" group of investment managers that are expected to provide better than average IR because of their superior expected investment skill (Hodgson et al., *op. cit.*). Foster and Warren (2015) focus on how investors form performance expectations about—and select—active managers: investors have a perceived ability to select good managers and do not see themselves investing with an average manager, notwithstanding that, on average, they pay more in fees than they receive in excess returns (alpha).

Another advantage of the IRT is that it is dimensionless, facilitating a systematic comparison and ordering of funds within each fund category because it is agnostic to the absolute level of fee, the total return of each fund, their volatility, or the magnitude of the relative performance against a peer group benchmark.

McKay et al. (2018) and the French regulator (The Autorité des Marchés Financiers, AMF) inspired the IRT. The AMF (2022a, 2022b, and 2022c) asked asset managers to have "*procedures in place to identify funds with high fees relative to their tracking error vis-à-vis their benchmark*". McKay et al. (2018) developed a new metric, the FAR ratio (Fee per unit of Active Risk = management fee/active risk), to study the negative effects of excess diversification from a US perspective, resulting from adding active US equity managers to a portfolio. We reframe the FAR ratio in terms of IRT to study the effect of cost intensity on net IR in the cross-section of fund categories.

In contrast to McKay et al. (2018), our purpose is to study a fair, reasonable range for IRT in the cross-section of 14 equity and bond fund categories, from a European perspective and at the single manager level, such that the net excess return (net ER) for investors is not undermined by disproportionately high costs. Our analysis offers a European perspective on the 14 equity and bond fund categories most frequently used as asset allocation buckets by institutional investors, financial advisors and wealth management departments of financial institutions for their clients and beneficiaries. McKay et al. (2018) focused instead on three categories of US domestic equity funds (blend, large cap growth, and value).

Furthermore, McKay et al. (2018) studied the active risk against one index, the Russell 1000, while we use the specific Prospectus Benchmark applicable to each share class to analyse their TEV, ER, and realised IR. In this way, we can analyse the real welfare outcomes for investors, whereas generic mapping to only one benchmark, as in McKay et al. (2018), cannot provide that insight. Generic benchmarks may work well with categories and asset classes in which there is little difference in the index design of different index providers (equity large cap blend, government bonds, etc.) but that choice could lead to erratic findings where the impact of index design and construction is greater. For

example, the performance disparity between some of the US small cap indices was up to 12% in 2021.

There are two other advantages to using the Prospectus Benchmark in evaluating the performance of mutual funds.

First, seeing a fund's performance through the factor lens (Fama and French 1996; Carhart 1997) may lead to erroneous conclusions about the active manager's skills in delivering alpha. Factor models produce non-zero alphas when applied to the passive indices typically used as mutual fund benchmarks (Cremers et al. 2022). For example, during a period of benchmark underperformance, standard factor models can erroneously identify a fund as a 'loser' only because its Prospectus Benchmark delivers a negative alpha against the factor model (and vice versa). It is relevant to note that a properly specified performance measure should not deliver over/underperformance when applied to passive Prospectus Benchmarks (Chen and Knez 1996).

Second, Prospectus Benchmarks usually represent a tradable opportunity set against which the real incremental welfare for investors (the net ER) is measured. In contrast, widely used academic factors (Fama and French 1996) are non-tradable and are subject to large retroactive changes, with substantial differences in the estimated alpha between factor vintages (Akey et al. 2023). Nonetheless, by using Prospectus Benchmarks, our analysis is exposed to the strategic behavior of funds that cherry-pick mismatched benchmarks versus their actual style/strategy to embellish their past relative performance and maximise the economics related to the subsequent investment inflows into their funds (Sensoy 2009; Cremers et al. 2022). We mitigate this issue by using Morningstar fund categories: before assigning a fund to a category, Morningstar carries out an independent analysis of the fund's portfolio/objective/performance (Morningstar 2021).

Another novelty of our approach is that we explore the fairness of the overall offering to investors in detail by analysing all share classes of each active mutual fund; McKay et al. (2018) did not distinguish between classes. Our innovative approach to analysing each single share class is corroborated by the recent initiatives of regulators and industry players. In the UK, the Financial Conduct Authority's (FCA) mandatory value assessment must be performed at the share class level (FCA 2021b, 2021c, 2021d). On the industry side, Morningstar (2019) devised a new mutual funds' rating methodology "*in order to accurately capture the impact of fee differences on expected net-of-fee alpha between different classes of the same vehicle*".

In our study, we systematically explore the topic of the fairness of fees by answering three questions:

1. Is the IRT useful in ordering funds within each fund category, from low to high IRT, such that this ordering is associated with a decreasing magnitude of realised net IR?
2. What IRT levels can be considered fair across asset classes and fund categories from a positive welfare perspective (e.g., for investors to achieve a net IR greater than 0.0 or 0.2)?
3. Do the IRT offer a complementary perspective on the closet indexing issue already explored by regulators?

We explore these questions by analysing 14 asset allocation categories for a 10-year period (June 2011 to May 2021). We collected data for 3937 share classes of 1230 active equity and bond mutual funds, representing 505 bn Eur asset under management (AUM) as of May 2021. We only consider funds that operated through the whole of the sample period (full data conditioning) (Rohleder et al. 2011) because we are interested in studying the cross-sectional characteristics of our new metric on all the vehicles with data available for the whole period. This avoids potentially misleading comparisons of funds with different data lengths exposed to different risk regimes. Turbulent environments can also artificially exacerbate the TEV through the channel of contractual provisions when the asset manager applies alternative pricing rules (full or partial swing pricing) to adjust the fund net asset value (NAV) in the direction of net flows. The objective of this provision is to protect non-transacting investors from the performance dilution arising from trading costs (Jin et al. 2022). The active risk calculated from the 'swung' NAV tends to be artificially higher than the true 'unswung' active risk derived only from changes in the valuation of the fund's underlying assets. In the context of bond index funds, Mehta and Moulay (2020) showed that the 'swung' TEV can be up to 3–4 times higher than the 'unswung' TEV.

For the above reasons, our work does not focus on testing (or back-testing) an investment strategy based on IRT. We note that both the ESMA (2016) and the European Commission (2018) have used a similar approach when analysing the closet indexing issue. In our work, we consider the realised TEV of each fund/share class *as is*; hence, we are not investigating the specific sources of TEV and its risk attribution, which is beyond the aim of this paper.

Our study only focuses on the fairness of the *ad valorem* fee in terms of paying a fair rate for the realistic outcome of a service, whereas researching an optimal fee model is outside the scope of this work. An optimal fee model should consider both fairness and alignment of interest (the sharing of an appropriate level of risk for both parties in the transaction) between asset owners and their delegated managers (Dell & Sykes 2018). The specific fee model to best implement a given fair fee in a way that maximises the alignment of interests (for example, through a mix of base fees and multi-period symmetric performance-based fees with carryover structures or other structures) is beyond the scope of our study.

A significant stream of literature has been devoted to studying active management fees by using an option-based framework and TEV. Kritzman (1987) first showed that the remuneration to the active manager using a performance fee based on ER over a benchmark portfolio (such as the Stoxx Europe 600) is analogous to that of an exchange option (Margrabe 1978), which gives the holder the right to exchange one asset for another. The value of the option depends on the TEV and not on the ER or alpha assumption, facilitating comparison across different managers with different fee structures.

Recently, Dai, Merton and Rizova (2021) extended this framework by analysing the total fee (i.e., the sum of the *ad valorem* fee and performance fee) by varying the TEV, holding other parameters fixed (*ad valorem* fee = 0,25%, performance fee = 20%, one year time-horizon and no hurdle rate). As the TEV increases from 1 to 10%, the total fee increases from 0.33 to 1.05%. Putting these numbers in relation to our work, this is equivalent to saying that the IRT is between 10.5% and 33%, depending on the level of

TEV. These IRT values are similar to those found in our empirical analysis: for equity categories, classes with IRT < 30–35% tend to have better realised net IRs; for fixed income, that range seems to be up to 45–55% IRT. We did not compare the option-based approach of Dai et al. (2021) with IRT, given that the performance fee is less commonly applied in the UCITS space, and the related values are not consistently filled by data providers (ESMA 2022b).

Other works (Edelen et al 2013) have analysed the impact of trading costs and found decreasing risk-adjusted performance when trading costs increase.

The outline of our study is as follows. Sect. "Regulators' perspective on fee fairness" discusses the regulatory perspective on fee fairness. The empirical analysis in Sect. "Do the IRT offer a complementary perspective on the closet indexing issue already explored by regulators?" provides answers to our research questions. Finally, the conclusions are given in Sect. "Conclusion".

Regulators' perspective on fee fairness

Regulators have focused on several aspects related to cost fairness: the assessment of value (FCA 2021b, 2021c, 2021d), undue costs and product governance (ESMA 2020a, 2020b, 2021, 2022a; FCA 2021a), and closet indexing (e.g., ESMA 2016; Danieli et al. 2020). Regulators want to avoid the fact that "*unfair and disproportionate costs and fees can increase investor detriment and affect investors' trust in financial markets*". From a product governance perspective, providers of financial products should ensure that "*costs and charges are reasonable*" and "*do not undermine the financial instrument's return expectations*" (ESMA 2021). Undue costs (ESMA 2020a) arise when investors pay costs that are inconsistent with the investment objective of the fund and/or the costs prevent the fund from achieving its objective. The "*legitimate expectations of investors in respect of the service provided by*" active managers is the "*possibility that a fund may outperform the market*" (Danieli, *op. cit.*), by delivering a positive welfare outcome, i.e., a positive net ER above the benchmark index specified in the fund documentation.

In summary, if the ultimate (and only) reason to invest in an active manager is the possibility of achieving a positive net ER against the relevant benchmark (Hodgson *op. cit.*), the notion of undue cost implies that the net ER objective should not be hindered by unfair, disproportionate, or unreasonable costs. When costs are disproportionate to the gross ER attainable by the active manager in the medium term, given its active risk, we would argue that investors might be exposed to a different risk/return profile than they envisaged.

In this regard, the FCA has recently introduced a requirement for asset managers to annually assess whether fund costs at the share-class level are justified by the value provided to investors against at least seven "*minimum considerations*" (as prescribed in FCA 2021d). With regard to the assessment of fund performance, FCA asks asset managers to consider "*what the fund should deliver given its investment policy, investment strategy and fees*" by using the appropriate comparator benchmark because generating positive *absolute* returns in a context of rising markets "*do not necessarily deliver good value*" (FCA 2021b, 2021c). Here, the regulator is pushing for ongoing, greater transparency and fairness at the share class level on the relationship between gross ER, costs, and the final investor outcome (i.e., the net ER).

Closer to our approach, in May 2022, the French regulator (AMF) asked asset managers to have "*procedures in place to identify funds with high fees relative to their tracking error vis-à-vis their benchmark*". The new AMF policy (applicable from 1/1/2023) asks all institutions that provide investment advice services to "*assess the long-term relationship between the level of fees*" of active funds and "*the closeness of their performance to that of their benchmark (for example, by calculating the tracking error)*". The AMF found that some share classes have ongoing fees that are twice the level of TEV (let's say, an IRT = 200%), and assuming a normal distribution, the probability of these share classes outperforming the benchmark index is extremely low. We found similar results in our empirical analysis.

Empirical analysis

Data and metrics

We collected data on mutual funds through a snapshot of the Morningstar Direct Global Database Italy Open-End Funds, containing 45,000 + share classes, as of May 2021, distributed among 150 + EAA (Europe, Asia, and South Africa) Morningstar Categories. For practical relevance, we only selected the classes belonging to the 14 most common asset allocation buckets used as opportunity sets by institutional investors, financial advisors and wealth management departments of financial institutions to populate the standard long-only strategic asset allocations for their clients and beneficiaries (Table 1). The 14 Categories group funds that can be reasonably considered to be close investment alternatives, and for which investment strategy/style, performance, fund characteristics (e.g., there are not currency-hedged classes in the categories we used) and other statistical measures are comparable. Our focus is on funds that survived at least 10 years (from 31 May 2011 to 31 May 2021), representing 505 bn Eur AUM as of May 2021, allocated across 3937 share classes belonging to 1230 unique funds.

We dropped from our sample funds/share classes whenever at least one of the following data were missing: realised ER, TEV, IR, ongoing charge, total expense ratio, Isin code, and Prospectus benchmark. Funds with composite benchmarks (e.g., 95% equity, 5% cash) have been excluded because for them, some of the metrics are not available on Morningstar Direct.

Given our focus on active managers, we also excluded funds/share classes:

- Containing 'index', 'indice', 'indeks', etc., in their Fund Legal Name. We kept all the 'enhanced index' funds/share classes given their active focus.
- With active risk below a given threshold: 0.50% for equity funds and 0.30% for bond funds. The threshold for equity funds is more conservative than, for example, the 0.30% monthly TEV exclusion criteria used by Levy (2023) in the context of US active equity fund analysis
- When active risk levels were potential outliers (above a threshold of 17% for equity funds and 14% for bond funds).

Table 1 Funds/share classes included in the empirical analysis

				COST		EXCLUSIONS	
FUNDS' CATEGORY	**AUM**	**UNIQUE FUNDS**	**SHARE CLASSES**	**FEES (AMT)**	**FEES (%)**	**MINIMUM TEV**	**MINIMUM FEES**
EUROPE EQUITY LARGE CAP BLEND	47,72,20,35,937	188	473	67,83,25,469	1.42%	0.50%	0.30%
US EQUITY LARGE CAP BLEND	36,02,89,61,720	116	316	46,80,04,807	1.30%	0.50%	0.30%
EUROZONE EQUITY LARGE CAP BLEND	46,18,58,20,329	177	405	68,80,00,523	1.41%	0.50%	0.30%
JAPAN LARGE CAP EQUITY	18,05,18,73,651	91	354	20,30,54,510	1.12%	0.50%	0.30%
GLOBAL EMERGING MARKET EQUITY	45,83,96,86,517	94	328	63,16,05,697	1.38%	0.50%	0.30%
GLOBAL LARGE CAP GROWTH EQUITY	1,20,31,39,02,334	109	396	1,53,04,66,597	1.27%	0.50%	0.30%
GLOBAL LARGE CAP EQUITY BLEND	47,28,96,05,560	67	223	66,35,01,645	1.40%	0.50%	0.30%
EURO GOVERNMENT BONDS	19,69,85,61,110	64	154	10,29,84,809	0.52%	0.30%	0.10%
EUR CORPORATE BONDS	44,90,61,83,977	55	238	34,12,20,096	0.76%	0.30%	0.25%
EUR DIVERSIFIED BOND	30,81,97,86,973	118	308	24,14,00,469	0.78%	0.30%	0.25%
GLOBAL BOND	8,13,07,98,263	55	211	6,97,34,099	0.86%	0.30%	0.30%
GLOBAL EMERGING MARKET BOND	13,23,54,69,495	39	257	15,06,50,307	1.14%	0.30%	0.30%
GLOBAL HIGH YIELD BOND	11,76,09,58,947	23	124	15,52,96,893	1.32%	0.30%	0.30%
EURO HIGH YIELD	15,10,61,01,250	34	150	14,28,11,866	0.95%	0.30%	0.30%
TOT	5,05,08,97,46,062	1230	3937	6,06,70,57,788	1.20%		
TOT. EQUITY	3,61,43,18,86,047	842	2495	4,86,29,59,248	1.35%		
TOT. BOND	1,43,65,78,60,015	388	1442	1,20,40,98,540	0.84%		

The Table shows data as of May 2021 for funds/share classes included in our empirical analysis (3937 share classes belonging to 1230 unique active equity and bond funds in 14 fund categories with 505 bn Eur AUM). These funds/share classes have been in operation for at least 10 years (May 2011-May 2021), with continuously available monthly data. For each included fund/share class, we were able to jointly retrieve data on the Prospectus Benchmark, Isin, tracking error volatility, excess return, information ratio, ongoing charge, and total expense ratio. Given our focus on active managers, we excluded funds/share classes with tracking error volatility and/or fees equal to, or below, the levels shown in the exclusion columns. The tracking error volatility has been calculated using the most recent 5-year period (June 2016-May 2021)

Source Authors' calculation on data from Morningstar Direct, Refinitiv-Lipper, Bloomberg L.P

- With fees below a given threshold: 0.30% for equity[1] and high yield/emerging market bond; 0.25%[2] for corporate, global and diversified bonds and 0.10% for government bonds[3]. The Investment Company Institute (2022) calculated the average cost of index tracking fixed income Ucits at 0.14% in 2021. In that way, we keep in our analysis certain share classes (e.g., super-institutional, institutional, etc.) offered only to certain categories of investors for a more comprehensive cross-sectional comparison.

We excluded all funds that were merged/liquidated during the 10-year period of our analysis. Excluding merged/liquidated funds implies perfect foresight at the start of our sample in 2011 regarding the funds that were going to survive the subsequent 10 years and depicts an optimistic picture because in this set-up, the survivorship bias is maximised. This is partially offset by the reverse survivorship bias (Linnainmaa 2013): the counterfactual of 'how well a fund would have performed had it not disappeared' impacts the survivorship bias-free analysis by underestimating the skills of active managers. Funds with positive alpha often disappear because of a run of bad luck, but given their skill, they would have performed better in the future. This bias understates the average alpha by 0.43% p.a. according to Linnainmaa (2013) European funds have shown a 37–52% 10-year mortality rate for most of the 14 fund categories in our analysis during the same 10-year timespan (Morningstar 2021). Similar numbers (40–50%) for equity funds have been found by Cairns and Innes ('SPIVA® Europe Scorecard-2021', 2022). Funds in the graveyard, on average, bear higher costs, lower performance, lower aum, or a combination of these elements. It is fair to assume that they show on average worse realised net IRs and higher IRTs against the survivor funds included in our sample. If we were to include non-surviving funds, we would have further confirmation of our empirical findings.

Comparing our sample with the 2021 data released by the Investment Company Institute (2022) for UCITS funds in Europe, we find similar magnitudes in costs and average AUM.

We analyse all share classes made available by each fund because our aim is to explore the fairness of the overall offering to investors. Our approach of looking separately at each class is corroborated by the recent initiatives of regulators (UK FCA, France AMF) and fund rating providers (Morningstar).

The metrics (TEV, ER, and IR) for the 3937 share classes were calculated by Morningstar against their Primary Prospectus Benchmark. From the same provider, we also collected the ongoing charge figures disclosed in the latest available KIID for each share

[1] Other authors have used different thresholds. For example, Pástor et al. (2015) excluded from their analysis active Us equity funds with expense ratios below 0.1% per year. Investigating the closet indexing practice, ESMA (2016, *op. cit.*) excluded equity fund with management fee below 0.65% for the period 2012–2014. ICI (2022, *op. cit.*) calculated the average cost of index tracking equity Ucits at 0.26% in 2021. On the fixed income side, Emerging Market Bond ETFs sold in Europe have expense ratios mostly in the range 0.25%-0.55%; Europe High Yield ETFs costs are in the range 0.24%-0.50%. See Trackinsight: www.trackinsight.com

[2] Eur Corporate bonds ETFs sold in Europe have expense ratios mostly in the range 0.05%-0.25%, Global Corporate Bonds ETFs in the range 0.15%-0.25%; Global Aggregate and Global Government in the range 0.10%-0.20% as of December 2022. See Trackinsight: www.trackinsight.com

[3] Eur Government Bonds ETF sold in Europe have costs mostly in the range 0.05%-0.15% as of December 2022. See Trackinsight: www.trackinsight.com

class. The ongoing charge does not include the performance fee. The ESMA (2022b, 2023) followed the same approach, given that the performance fee field is not consistently filled in by data providers. ESMA (2022b) cited the underlying reason as "*the heterogeneity in the way performance fees are computed across markets due to a lack of EU regulatory requirements on calculation and reporting of performance fees*."

Regarding the fee data, Morningstar only has the latest ongoing charge available for download. Because our focus is on the long-term behavior of funds, we collected the total expense ratio (TER) from Refinitiv-Lipper for 2016 and 2021. The TER "*includes all charges paid to the fund itself to cover the costs of resources used to design and operate the fund, as well as to pay for external services employed in the pro*cess" (ESMA 2023). Our approach is similar to ESMA (2022b, 2023), which uses TER data from Refinitiv-Lipper as a proxy for ongoing costs.

Given the data limitations described above, we first screened our dataset by only including classes if their costs were available on Morningstar, and then we maintained those classes in our sample if the Refinitiv-Lipper data in 2016 were also available. Where AUM data were missing from Morningstar, we checked Bloomberg L.P. Funds without AUM data were excluded from our sample.

We define IRT as the ratio between the Cost and TEV and use the following notation:

Cost = Active management fee

GrossER = Gross Excess Return (i.e., before Cost)

NetER = Net Excess Return (i.e., after Cost)

GrossIR = Gross Information Ratio

NetIR = Net Information Ratio

TEV = Tracking Error Volatility

The Cost is paid to the active manager. If the Cost has been fully recovered by the active manager, then $GrossER \geq Cost$ and

$$\frac{GrossER}{TEV} = \frac{Cost + NetER}{TEV} = GrossIR \tag{1}$$

The numerator in Eq. (1) is the total value added by the active manager. This is equivalent to the total amount of money the manager extracts from the market: the sum of the percentage fee multiplied by AUM plus the percentage net ER (after the cost has been fully recovered) multiplied by the same AUM (Berk & Van Binsbergen 2015).

The IRT is the portion of TEV paid to the active manager, as in Eq. (2), while the rest (the Net IR) goes to the investor, as in Eq. (3):

$$\frac{Cost}{TEV} = IRT \tag{2}$$

$$\frac{NetER}{TEV} = NetIR \tag{3}$$

The GrossIR is then the sum of IRT and NetIR as in Eq. (4):

$$GrossIR = IRT + NetIR \tag{4}$$

If the manager does not fully recover the Cost (e.g. $GrossER < Cost$), the Net IR received by the investor is negative:

$$\frac{GrossER - Cost}{TEV} = -NetIR \tag{5}$$

while the manager will, in any case, receive the IRT, as in Eq. (2), notwithstanding a cost recovery of less than 100%.

Analysis and results

The empirical analysis provides answers to our three research questions:

1. Is the IRT useful in systematically ordering funds within each fund category, from low to high IRT, such that this ordering is associated with a decreasing magnitude of realised net IR?
2. What IRT levels can be considered fair across asset classes and fund categories from a positive welfare perspective (e.g., net IR for investors greater than 0.0 or 0.2)?
3. Do the IRT offer a complementary perspective on the closet indexing issue already explored by regulators?

We analysed the three questions in the following paragraphs.

The relationship between IRT and realised IR

The intuition that a greater IRT would set a higher bar for the active managers trying to deliver a positive net IR to its investors is confirmed in Table 2. We assigned each of the 3937 classes in our sample to one of the 23 IRT buckets shown in the first two columns on the left-hand side of Table 2. The Table shows the AUM-weighted net IRs for each IRT bucket for the 14 fund categories (data range: June 2016-May 2021). The IRT buckets with better (worse) realised IRs in each category are highlighted in green (red). There is a negative relationship between IRT and realised IR across categories: the greater the IRT is, the lower the net realised IR, as intuition suggests.

For equity categories, classes with IRT < 30–35% tend to have better realised net IRs; for fixed-income, the range seems to be up to 45–55% IRT. For IRTs greater than 70–80%, we observe a tendency across all fund categories for the worse realised net IRs. IRT buckets greater than 90% have negative realised net IRs in all categories (except for Euro Corporate Bonds). The better results for fixed-income funds in higher IRT buckets can be linked to two elements. The first is the greater exposure of bonds to systematic risk factors, credit risk, and interest rate risk and the structural overweight to credit risk factors in active fixed-income portfolios. The variance explained by common factors is higher for active fixed-income managers (two-thirds on average) than for equity managers (one-third) (Aye and Xie 2016; Roberts et al. 2018; AQR 2018; Kahn and Lemmon 2015). The second is the potential misclassification of fixed-income funds, given their tendency to report a safer portfolio than they actually hold (Huaizhi et al. 2021).

To explore the negative relationship between IRT and realised net IR, we run an OLS regression for each of the 14 fund categories. Figure 1 shows the regression for the European equity large cap blend (EELCB) category. The scatter plot in Fig. 1 illustrates that

Table 2 Realised net information ratio for the given IRT buckets (2016-2021; AUM-weighted average)

REALISEDIRsFORTHEGIVENIRCBUCKETS(2016–2021;AUM–WEIGHTEDAVERAGE)															
IRT BUCKETS		EQUITY							BOND						
FROM	TO	EUROPE EQUITY LARGE CAP BLEND	US EQUITY LARGE CAP BLEND	EUROZONE EQUITY LARGE CAP BLEND	JAPAN LARGE CAP EQUITY	GLOBAL EMERGING MARKET EQUITY	GLOBAL LARGE CAP GROWTH EQUITY	GLOBAL LARGE CAP EQUITY BLEND	EURO GOVERNMENT BONDS	EUR CORPORATE BONDS	EUR DIVERSIFIED BOND	GLOBAL BOND	GLOBAL EMERGING MARKET BOND	GLOBAL HIGH YIELD BOND	EURO HIGH YIELD
0%	5%														
5%	10%	0.16	−0.23	−0.25	0.36	−0.23	0.81	−0.81	0.15		0.01		−0.09		
10%	15%	0.09	−0.03	−0.03	0.46	−0.22	0.87	0.39	0.57		−0.32	0.34	−0.10	0.39	
15%	20%	0.01	−0.23	0.04	0.22	0.39	0.75	−0.07	0.33		0.04	0.02	−0.09	−0.08	0.20
20%	25%	0.17	−0.05	0.00	0.30	0.40	0.60	−0.15	0.96	0.74	0.19	−0.04	0.03	−0.10	−0.03
25%	30%	0.25	−0.11	−0.08	−0.09	0.15	0.34	0.08	0.24	0.79	−0.14	−0.11	−0.13	−0.14	−0.04
30%	35%	0.05	−0.27	0.05	−0.10	−0.32	0.32	0.07	−0.29	0.38	0.24	−0.04	−0.10	−0.27	−0.07
35%	40%	0.33	−0.14	−0.25	0.11	0.41	0.09	0.14	0.04	0.46	0.06	0.01	−0.23	−0.28	−0.25
40%	45%	0.36	−0.45	−0.13	−0.47	−0.45	0.44	−0.24		0.42	−0.17	0.03	−0.06	−0.49	−0.08
45%	50%	0.37	−0.33	−0.31	−0.24	0.09	−0.39	−0.33	−0.08	1.13	0.19	0.32	0.25	−0.18	−0.11
50%	55%	−0.37	−0.28	−0.36	−0.11	−0.26	0.32	0.01	−0.30	1.00	0.06	0.35	−0.32	−0.47	−0.26
55%	60%	−0.06	−0.86	−0.37	−0.45	0.12	−0.18	−0.05	−0.73	0.74	0.12	−0.02	−0.10	−0.73	−0.66
60%	65%	−0.52	−0.42	−0.36	−0.32	−0.23	−1.47	−0.10	−0.76	0.28	−0.51	−0.31	−0.47	−0.62	−0.45
65%	70%	−0.56	−0.15	−0.02	−0.92	−0.55	−1.05	−0.97	−0.21	0.40	1.08	−0.37	1.09	−1.14	−0.61
70%	75%	−0.23	−0.62	−0.88	−0.01	0.17	0.34	−1.11	−0.00	0.24	−0.32	−0.26	−0.29		−0.12
75%	80%	−0.61	−1.08	−0.12	−0.43	0.12		−1.43	−0.45	0.46	−0.27	0.15	−0.53	−0.96	−0.73
80%	85%	−0.71	−0.70	0.05	−1.40	−0.20	.48	−0.94	−0.34	0.74	−0.36	−0.06	0.94	−0.78	0.09
85%	90%	−0.67	−0.84	−0.94	−1.06	0.16		−0.71	−0.29	0.05	−0.19	0.08	−0.39	−0.02	−0.30
90%	95%	−0.83	−1.22		−0.11	−0.72	1.02	−0.37		0.26	−0.88	−0.87	−0.86	−0.98	−0.34
95%	100%	−1.31	−0.84	−0.91	−1.07				−0.74	0.54	−0.58	−0.72	−0.52	−0.99	−0.70
100%	200%	−1.12	−1.51	−0.56	−1.51	−0.88		−1.39	−0.68	0.41	−0.63	−0.35	−0.52	−1.22	−0.56
200%	300%				−2.79				−2.17	−0.78	−1.90			−2.89	−2.56
300%	500%								−2.73	−2.50	−3.85				

The Table shows the AUM-weighted realised net IR as of May 2021 for the cross-sections of the 14 fund categories. The IR is annualised and calculated over five years (June 2016-May 2021) with monthly data against the relevant Primary Prospectus Benchmark of each share class

Each share class in a fund category is assigned to one of the 23 IRT buckets, and the AUM-weighted realised IR is shown for each bucket

Source Authors' calculation on data from Morningstar Direct, Refinitiv-Lipper, Bloomberg L.P

for all 473 classes in the EELCB category, no class with IRT > 80% can achieve a positive net IR.

The relationship between realised IR and IRT shows a negative slope coefficient of −0.98. This means that a 10% increase in IRT tends to be associated with a 0.10 decrease in net IR. Across the 14 categories, the negative betas are in the range of −0.80–−1.15, with three exceptions: Global Emerging Market Bond (beta −0.21, R-squared 0.01), Equity (beta −0.63, R-squared 0.06), and Global Bond (beta −0.70, R-squared 0.30).

We find several fund outliers across the 14 categories analysed. Overall, the class outliers are mainly characterised by low AUM and do not impact the general conclusion of our analysis; instead, they reinforce the message that the IRT is able to identify funds with disproportionately high-cost intensity (IRT greater than 90%). We name the latter funds Information Ratio Churners, and they tend to have the worst results in terms of welfare outcomes. We will explore these Churners in Sect. "Closet indexing and information Ratio Churners".

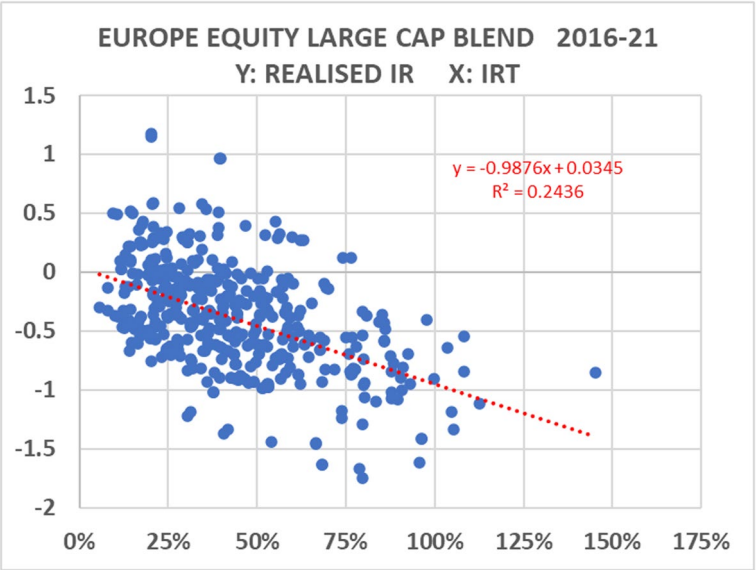

Fig. 1 Europe Equity Large Cap Blend: Realised net IR versus IRT (single share class level). The Figure shows the realised IR (y-axis) and IRT (x-axis) of the 473 share classes belonging to the Europe Equity Large Cap Blend fund category as of May 2021. The information ratio is annualised and calculated over the previous five years (June 2016-May 2021) with monthly data against the relevant Primary Prospectus Benchmark of each share class. All funds/share classes in the analysis were in operation during the previous 5-year period (June 2011-May 2016). The Figure shows the scatter plot representing all share classes in the fund category and the linear regression line with the corresponding equation and R-squared *Source* Authors' calculation on data from Morningstar Direct, Refinitiv-Lipper and Bloomberg L.P

We now discuss the effect of cost and active risk on IRT and realised net IR in the cross-section of each fund category. For this purpose, we focus on the AUM-weighted data in Table 3 to reflect the effective welfare outcomes for investors. From Table 3, we note that share classes with IRT < 30–35% tend to have better realised net IRs, lower costs, and higher TEVs. For IRTs greater than 70–80%, we observed worse realised net IRs, higher costs, and lower TEVs.

The IRT is driven by its two components: ER and TEV. Both components could be impacted by fund size through the transmission channels of diseconomies of scale/capacity constraints and their potential effects on costs and performance deterioration, usually followed by redemption/outflows from the fund, and vice versa. In our work, we are mainly focused on analysing the complementary cross-sectional insights that IRT could provide, and we are not controlling for the dynamics of specific fund sizes during the sample period. Notwithstanding that, we note in the cross-section of each fund category that share classes below IRT 75% tend to command a greater average AUM, signalling that investors are discriminating against high IRT classes. For example, in the EELCB category shown above in Table 3, below IRT 75%, the average share class AUM is 107.4 ml Eur, whereas above IRT 75%, the AUM is significantly lower, at 44.8 ml Eur. Similar results hold across the other fund categories, with the only exception being the Global Large Cap Growth Equity[4] category.

[4] This is due to just one outlier (one class commanding 808 ml Eur AUM in the IRT bucket 90%-95%, with a negative realised IR = -1.02, against an average AUM of 303 ml Eur for the classes below IRT 75% in the same category). It should be noted that the Global Large Cap Growth Equity category has 120.3 bn Eur overall AUM, of which 119.5 bn are in share classes below IRT 75%, with an AUM-weighted IR of 0.65.

Table 3 Europe Equity Large Cap Blend: IRT bucketing of cost, TEV, Realised net Information Ratio and AUM

IRT BUCKETS		EUROPE EQUITY LARGE CAP BLEND					
FROM:	TO:	COST (AUM-WEIGHTED)	TEV (AUM-WEIGHTED)	IRT (AUM-WEIGHTED)	REALISED IR PER BUCKET (AUM-WEIGHTED AVERAGE)	NO. OF FUNDS	TOT. AUM PER BUCKET (eur)
0%	5%					-	-
5%	10%	0.65	7.82	8%	–0.16	5	396,888,251
10%	15%	0.82	6.02	14%	0.09	27	4,107,314,027
15%	20%	0.72	4.14	17%	–0.01	28	1,809,502,275
20%	25%	1.09	5.02	22%	0.17	60	7,695,157,411
25%	30%	1.40	5.03	28%	–0.25	44	6,194,366,231
30%	35%	1.38	4.34	32%	–0.05	47	5,024,033,034
35%	40%	1.53	3.98	38%	–0.33	43	6,498,876,765
40%	45%	1.72	4.01	43%	–0.36	41	2,852,774,843
45%	50%	1.69	3.57	47%	–0.37	26	1,354,486,068
50%	55%	1.71	3.28	52%	–0.37	33	2,341,542,290
55%	60%	1.76	3.09	57%	–0.06	33	4,169,855,845
60%	65%	1.82	2.90	63%	–0.52	18	2,057,772,526
65%	70%	2.01	2.97	68%	–0.56	13	458,365,134
70%	75%	1.85	2.63	70%	–0.23	6	566,007,308
75%	80%	2.25	2.88	78%	–0.61	16	405,874,935
80%	85%	2.16	2.63	82%	–0.71	5	152,756,845
85%	90%	2.17	2.49	87%	–0.67	11	193,917,400
90%	95%	2.20	2.41	91%	–0.83	5	372,327,945
95%	100%	1.74	1.80	96%	–1.31	5	523,446,285
100%	200%	2.44	2.23	110%	–1.12	7	546,770,519
200%	300%					-	-
300%	500%					-	-

The Table disentangles the components of the IRT: cost and TEV. Each share class in the European Equity Large-Cap Blend fund category is assigned to one of the 23 IRT buckets. For each bucket, the table shows the AUM-weighted cost, TEV, and realised IR as of May 2021. The number of share classes for each IRT bucket and the corresponding AUM are also shown

The IR and TEV are annualised and calculated over the previous five years (June 2016-May 2021; monthly data) against the relevant Primary Prospectus Benchmark of each share class

Source Authors' calculation on data from Morningstar Direct, Refinitiv-Lipper, Bloomberg L.P

The discrimination against high IRT classes has positive welfare outcomes for investors across all fund categories: in 2016–2021, the AUM-weighted realised net IR has always been significantly greater for share classes below the IRT 75% in all 14 categories analysed. For example, in the EELCB category, the AUM-weighted realised net IR is −0.95 for share classes above the IRT 75% and −0.14 for share classes below the IRT 75%.

Cost is mentioned as being the most important predictor of active fund outcomes. We would partially disagree. For example, in Table 3, some European equity funds have the same *ad valorem* fee but very different IRTs: in the IRT bucket 95–100%, the cost is 1.74%, the active risk is 1.80% and realised net IR is −1.31, whereas in the 40–45% bucket, we observe a similar cost (1.72%) but higher active risk (4.01%) and realised net IR (−0.36). Notwithstanding the fact that we observe the same cost, a greater IRT may signal a more difficult challenge for managers trying to recover that cost.

While high absolute and relative costs are red flags in a due diligence process, it is not always the raw cost figures taken in isolation that cause a fund to be cheap or expensive but also its cost intensity, i.e., its IRT, or the amount of active risk the investor is buying

by bearing that cost. A higher cost intensity means a higher bar for the active manager trying to recover the fund cost, with tangible wealth implications.

In addition to cost intensity, the IRT can be considered a positive welfare threshold because its level defines the minimum gross IR that the active manager should be able to deliver before its investors start receiving a positive net IR. For example, in the last row of Table 3 (IRT bucket 100–200%), there are seven share classes, with an aggregated 546.7 ml Eur AUM. These classes have an AUM-weighted IRT of 110%. Therefore, the costs are 1.10 times greater than the active risk. This implies that to deliver a positive net ER to its investors, the manager should consistently generate at least a gross IR > 1.10 per annum, which is very rarely observed. In this IRT bucket, 100–200%, we observe that the actual realised net IR is negative and equal to − 1.12, meaning that the manager, while using 2.23% active risk, has delivered zero gross ER, and the investors suffered a negative ER equal to the fee paid.

IRT and positive welfare outcome

What IRT levels can be considered fair across asset classes and fund categories from a positive welfare perspective (e.g., net IR received by investors greater than 0.0 or 0.20)?

We answer this question by testing whether the bucketing offered by IRT can support the identification of areas with better fee productivity in the cost/TEV space.

We first check the prevalence of 'success', i.e., when a share class achieves a net IR > 0.0 or IR > 0.20 for each of the 14 categories and 3 holding periods: June 2011-May 2016, June 2016-May 2021 and June 2011-May 2021. Table 4 shows that the success rate can vary substantially between periods/categories, and by increasing the holding period, the success rate strongly declines. Both findings are consistent with the vast body of

Table 4 Positive welfare outcomes (net IR > 0 and net IR > 0,20) across 14 fund categories. 10 years (2011-2021)

	EQUITY							BOND						
SUCCESS RATE	EUROPE LARGE CAP BLEND	US LARGE CAP BLEND	EUROZ ONE LARGE CAP BLEND	JAPAN LARGE CAP	GLOBAL EMERGI NG MARKET	GLOBAL LARGE CAP GROWT H	GLOBAL LARGE CAP BLEND	EURO GOVER NMENT S	EUR CORPO RATES	EUR DIVERSI FIED	GLOBAL	GLOBAL EMERGI NG MARKET	GLOBAL HIGH YIELD	EURO HIGH YIELD
Total number of classes	473	316	405	354	328	396	223	154	238	308	211	257	124	150
5Y: 2011-2016														
No. of classes with IR>0	258	19	189	99	190	183	72	21	92	60	59	6	6	15
No. of classes with IR>0,20	192	4	130	80	137	132	48	12	57	27	16	1	4	10
% of classes with IR>0	55%	6%	47%	28%	58%	46%	32%	14%	39%	19%	28%	2%	5%	10%
% of classes with IR>0,20	41%	1%	32%	23%	42%	33%	22%	8%	24%	9%	8%	0%	3%	7%
5Y: 2016-2021														
No. of classes with IR>0	83	39	118	129	133	262	68	28	113	90	78	44	9	27
No. of classes with IR>0,20	49	24	72	95	94	211	36	16	80	45	36	20	4	8
% of classes with IR>0	18%	12%	29%	36%	41%	66%	30%	18%	47%	29%	37%	17%	7%	18%
% of classes with IR>0,20	10%	8%	18%	27%	29%	53%	16%	10%	34%	15%	17%	8%	3%	5%
10Y: 2011-2021														
No. of classes with IR>0	65	5	64	47	67	135	14	14	69	28	30	1	0	7
No. of classes with IR>0,20	32	2	30	30	38	94	1	6	35	11	4	0	0	1

The Table shows the positive welfare outcomes for each of the 14 fund categories. We defined a positive welfare outcome as a fund/share class showing a net IR > 0 or net IR > 0.20. For each fund category, we report both the absolute number and percentage of classes with net IR > 0 or net IR > 0.20 for three different periods: 2011–2016, 2016–2021 and 2011–2021.
Source Authors' calculation on data from Morningstar Direct

literature on active funds. The relatively high success rates in our data are the result of considering only funds that survived the entire 10-year period. The mortality rate for European funds in the same 10-year period has been in the 40–50% range across fund categories (Morningstar 2021; S&P Dow Jones Indices 2022). Given that the main causes of mortality are bad performance, high cost, and low AUM (or a combination of these elements), a 'back-of-the-envelope' calculation would suggest real success rates half of those shown in the last two rows of Table 4.

Second, for each fund category, we look at the probability of selecting a successful share class (i.e., with a net IR > 0.0 or IR > 0.20) if our search area is below a given IRT level, from the universe of positive IR classes and from the universe of all classes in the same fund category.

For example, from Table 4, we know that 7% of the share classes in the EELCB category achieved a net IR > 0.20 in the 10-year period 2011–2021 (Table 4, bottom-left corner), with 88% of them showing an IRT < 45% (Fig. 2), compared to 57% and 62% for all classes in the EELCB category. This means that there is a greater concentration (88%) of desirable classes with net IR > 0.20, below IRT < 45%, notwithstanding the fact that this area contains only 57–62% of the overall number of classes in the category. If we were also to include non-surviving funds, we would expect a greater distance between the distributions shown in Fig. 2, reinforcing the signal from IRT bucketing. We also note that the distribution of funds with net IR > 0.20 tends to be slightly to the left compared to that of funds with net IR > 0.0. This indicates that funds delivering greater IR tend to be located at lower IRT levels.

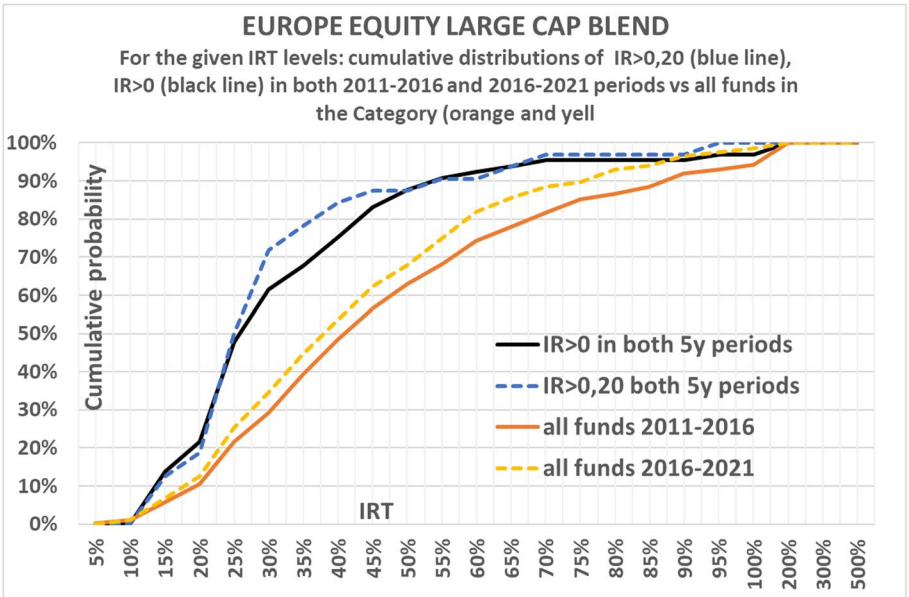

Fig. 2 Europe Equity Large Cap Blend: IRT levels versus positive welfare outcomes (IR > 0 and IR > 0.20). 10 years (2011–2021). The Figure shows, for the given IRT levels, the cumulative distributions of share classes with net IR > 0.20 and net IR > 0 in both the 2011–2016 and 2016–2021 periods versus the two cumulative distributions of all funds in the Europe Equity Large Cap Blend fund category for the periods 2011–2016 and 2016–2021 *Source* Authors' calculation on data from Morningstar Direct, Refinitiv-Lipper, Bloomberg L.P

Some fund categories have a low granularity of positive IR share classes for the full 10-year period: Global and US Large Cap Equity Blend, Global Emerging Market Bond, and Global and Euro High Yield Bond. For this reason, we also analysed the most recent five-year period (June 2016-May 2021) in Fig. 3. Figure 3 shows the cumulative distributions for the EELCB category.

As shown in Fig. 3, for the EELCB category, a similar pattern emerges for the 2016–2021 period: a greater concentration of positive net IR funds for lower IRT levels. Equity categories show a greater concentration below IRT levels of 40–50%, while bond categories are below 50–70%. We note that in 2016–2021, there are three categories where the IRT does not provide a useful indication for selecting positive net IR funds: Global Emerging Market Equity, Global Large Cap Growth Equity, and Euro High Yield. For the latter, , the IRT provides misleading information for funds with net IR > 0.20.

From a practical standpoint, an advantage of IRT is that it does not rely on an arbitrary proportion of top-rated funds (e.g., quintiles or deciles). The IRT only helps in establishing a search area in the cross-section of a fund category where the confidence in finding positive IR vehicles is greater, given a lower cost intensity against active risk and, consequently, a fairer sharing of the potential gross value added between the active managers and its investors.

Closet indexing and information Ratio Churners

We now explore whether IRT offers a complementary perspective on the closet indexing issue already explored by regulators. The closet indexing practice (ESMA 2016) is related to the mismatch between the investor expectation of a true active manager (given the

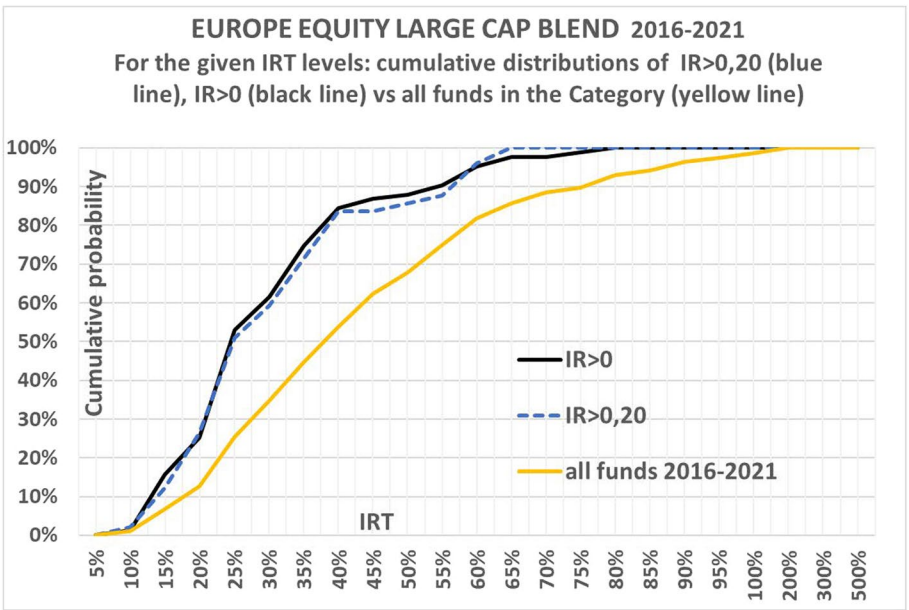

Fig. 3 Europe Equity Large Cap Blend: IRT levels versus positive welfare outcomes (IR > 0 and IR > 0.20). 5 years (2016–2021). The Figure shows, for the given IRT levels, the cumulative distributions of share classes with net IR > 0.20 and net IR > 0 for the most recent 5-year period (June 2016-May 2021) versus the cumulative distribution of all funds in the Europe Equity Large Cap Blend fund category for the same 5-year period *Source* Authors' calculation on data from Morningstar Direct, Refinitiv-Lipper, Bloomberg L.P

level of fee paid and manager disclosure) and the reality of a low degree of active management received. The latter is inferred by various combinations of low levels of active share (Cremers and Petajisto 2009), low TEV, high R-squared, and beta close to one against the relevant benchmark.

The IRT could add a perspective on funds not covered by closet indexing analysis: true actively managed funds showing adequate levels of active risk. In particular, the IRT can shed light on the portion of these funds where the cost of the package to access them, in relation to their active risk, is too disproportionately high to deliver on the investors' legitimate expectation of net outperformance over time. These funds tend to have a high IRT (i.e., IRT > 90%); we name them Information Ratio Churners. Even in an ideal scenario, where a true active manager consistently delivers a gross IR of approximately 1.0 over time, all the value added will be consumed by fees, and the investor will receive the benchmark return, similar to a passive investor (but paying 'alpha fees' for receiving 'beta performance'). This is closet indexing in another form. Here, the mismatch is between the investors' legitimate expectations of receiving a fair percentage of the gross ER generated by the true active manager over time (while bearing 100% of the risk), but the reality is that the costs are so high that, even in the best scenario, the investor will receive, at most, an indexed payoff.

Analogous to the closet indexing phenomenon, with the Information Ratio Churners "*investors may be exposed to a different risk/return profile than they expect*" (ESMA 2016) and paying too much for the service received.

In the cost/active risk space, the Information Ratio Churners are those located near the 100% IRT frontier, as shown in Fig. 4. Figure 4 plots the 23 IRT buckets in the cost/active risk space, together with four IRT frontiers. Around the 100% IRT frontier, there

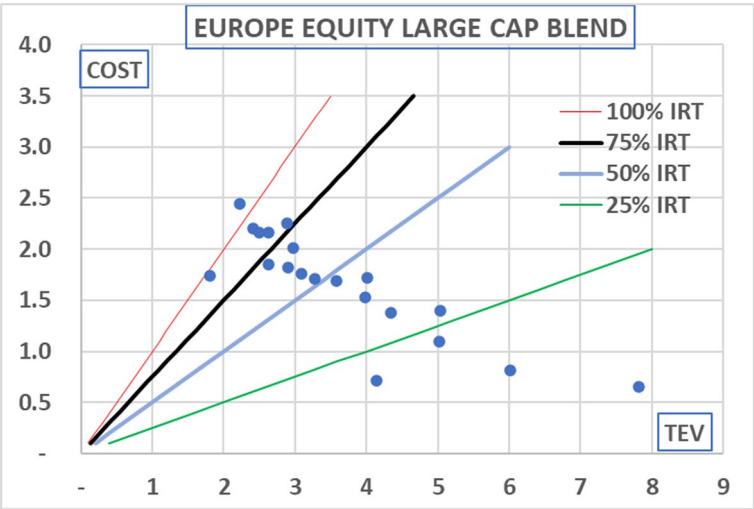

Fig. 4 Europe Equity Large Cap Blend: IRT Frontiers and IRT bucketing. The Figure shows, in the cost/TEV space, the 23 IRT buckets of the Europe Equity Large Cap Blend fund category, together with four IRT frontiers (25%, 50%, 75%, and 100%). For example, below the 25% IRT frontier, there are four IRT buckets. These buckets have a cost/TEV ratio below 25%. The costs for each share class are the latest figures available as of May 2021. The TEV is annualised and calculated over five years (June 2016-May 2021) with monthly data against the relevant Primary Prospectus Benchmark of each share class. All funds/share classes in the analysis were in operation during the previous 5-year period (June 2011-May 2016) *Source* Authors' calculation on data from Morningstar Direct, Refinitiv-Lipper, Bloomberg L.P

are funds with lower TEV, higher costs, and worse realised IRs (see Tables 2 and 3). On the other hand, below the 25% IRT frontier, we find four IRT buckets that tend to show a combination of lower cost, higher active risk, and better realised IRs.

The IRT frontier can support the investigation into how much of the total AUM is allocated beyond a given high IRT frontier. Out of 505 bn Eur AUM in our sample, a total of 6.07 bn Eur (1.20%) is paid to active managers annually. From Table 5 below, we can see that beyond the 100% (90%) IRT frontier, there is 7% (8%) of the overall AUM, 33 bn Eur (40 bn Eur). These funds collect 7% (8%) of the overall fee: 401 ml Eur (500 ml Eur) out of 6.07 bn Eur. This means that Information Ratio Churners are managing 40 bn Eur AUM and collecting 8% of the overall fee as of May 2021. On the other hand, we found that 48% of AUM (242.8 bn Eur) is below the 35% IRT level, collecting 43% of the overall annual fee (2.58 bn Eur). Our analysis does not consider the other costs that are often applied to non-institutional fund investors: distribution/entry and exit costs. If we were to consider these costs on a proper per annum basis, the AUM allocation in Tables 2 and 3 would be attracted toward higher IRT buckets, the realised IRs in Figs. 1, 2 and Table 2 would be lower, the IRT in Figs. 3 and 4 would be higher, and the number of funds with positive welfare outcomes in Table 4 would decrease.

Conclusion

Our work explores the issue of fairness in active management fees by applying a novel metric, the information ratio threshold (IRT). The IRT simply reframes the fee signature of an active manager in terms of its cost intensity: the ratio between a fund's fee and its tracking error volatility.

The IRT can be interpreted as a positive welfare threshold, because its level defines the minimum gross IR that the active manager should be able to deliver before its investors start to obtain a positive net IR. By expressing fees in terms of cost intensity, the IRT is dimensionless, facilitating the systematic ordering and benchmarking of funds within each fund category. Thus, IRT offers a complementary view for each fund within a given category.

In our empirical analysis of IRT, we tried to answer three questions:

1. Is the IRT useful in systematically ordering each fund within its fund category from low to high IRT such that this ordering is associated with a decreasing magnitude of realised net IR?
2. What IRT levels can be considered fair across asset classes and fund categories from a positive welfare perspective (e.g., for investors to receive a net IR greater than 0.0 or 0.20)?
3. Do the IRT offer a complementary perspective on the closet indexing issue already explored by regulators?

We analysed 3937 share classes belonging to 14 main equity and bond fund categories, representing 505 bn Eur AUM. Each class has survived for at least 10 years (June 2011-May 2021). We analysed funds at the single-share class level, given that recent regulatory (UK FCA, France AMF) and practitioner (Morningstar) initiatives have shown the relevance of the assessment at this level. Regarding the first question, the intuition that

Table 5 IRT frontiers: allocation of cost and AUM across 14 fund categories

A		TOTAL COST		AUM* IN SHARE CLASSES WITH IRC GREATER THAN:					
FUNDS' CATEGORY	**AUM***	**EUR***	**% AUM**	**25%**	**35%**	**50%**	**75%**	**90%**	**100%**
EUROPE EQUITY LARGE CAP BLEND	47,722	678	1.42%	33,713	22,495	11,789	2195	1443	547
US EQUITY LARGE CAP BLEND	36,029	468	1.30%	26,095	20,337	14,034	4008	2420	1688
EUROZONE EQUITY LARGE CAP BLEND	46,186	688	1.41%	38,189	32,230	19,531	2537	729	624
JAPAN LARGE CAP EQUITY	18,052	203	1.12%	5291	3412	1341	439	419	260
GLOBAL EMERGING MARKET EQUITY	45,840	632	1.38%	30,622	19,236	6693	2755	1048	810
GLOBAL LARGE CAP GROWTH EQUITY	1,20,314	1,530	1.27%	31,969	14,037	2572	810	809	–
GLOBAL LARGE CAP EQUITY BLEND	47,290	664	1.40%	37,998	31,181	20,497	2734	186	12
EURO GOVERNMENT BONDS	19,699	103	0.52%	19,116	13,179	10,361	7403	4718	4660
EUR CORPORATE BONDS	44,906	341	0.76%	44,264	41,628	32,576	22,035	10,471	9759
EUR DIVERSIFIED BOND	30,820	241	0.78%	29,387	26,811	22,863	12,599	9839	7783
GLOBAL BOND	8131	70	0.86%	4386	3421	2616	1474	272	140
GLOBAL EMERGING MARKET BOND	13,235	151	1.14%	12,057	11,489	7819	3344	2549	2248
GLOBAL HIGH YIELD BOND	11,761	155	1.32%	11,282	10,903	9688	1479	1188	1061
EURO HIGH YIELD	15,106	143	0.95%	13,277	11,937	9936	4780	3934	3703
TOTAL	5,05,090	6067	1.20%	3,37,645	2,62,296	1,72,317	68,590	40,025	33,294
(*) Mln eur				67%	52%	34%	14%	8%	7%
				IN % OF TOTAL AUM					
B		**TOTAL COST**		**TOTAL FEE PAID* IN SHARE CLASSES WITH IRC GREATER THAN:**					
FUNDS' CATEGORY	**AUM***	**EUR***	**% AUM**	**25%**	**35%**	**50%**	**75%**	**90%**	**100%**
EUROPE EQUITY LARGE CAP BLEND	47,722	678	1.42%	545	389	218	47	31	13
US EQUITY LARGE CAP BLEND	36,029	468	1.30%	374	303	209	75	46	32
EUROZONE EQUITY LARGE CAP BLEND	46,186	688	1.41%	602	539	331	47	12	10
JAPAN LARGE CAP EQUITY	18,052	203	1.12%	83	60	24	8	8	4
GLOBAL EMERGING MARKET EQUITY	45,840	632	1.38%	499	356	131	54	25	19
GLOBAL LARGE CAP GROWTH EQUITY	1,20,314	1,530	1.27%	616	271	59	19	19	–
GLOBAL LARGE CAP EQUITY BLEND	47,290	664	1.40%	584	504	349	58	4	0.2
EURO GOVERNMENT BONDS	19,699	103	0.52%	99	77	66	50	33	32
EUR CORPORATE BONDS	44,906	341	0.76%	338	327	270	204	111	106
EUR DIVERSIFIED BOND	30,820	241	0.78%	235	217	191	122	96	79
GLOBAL BOND	8,131	70	0.86%	41	31	23	11	3	2

Table 5 (continued)

A		TOTAL COST		AUM* IN SHARE CLASSES WITH IRC GREATER THAN:					
FUNDS' CATEGORY	**AUM***	**EUR***	**% AUM**	**25%**	**35%**	**50%**	**75%**	**90%**	**100%**
GLOBAL EMERGING MARKET BOND	13,235	151	1.14%	142	136	95	50	39	34
GLOBAL HIGH YIELD BOND	11,761	155	1.32%	153	150	139	23	19	17
EURO HIGH YIELD	15,106	143	0.95%	133	124	107	65	55	52
TOTAL	5,05,090	6067	1.20%	4443	3485	2214	834	500	401
(*) Mln eur				73%	57%	36%	14%	8%	7%
				IN % OF TOTAL FEE					

The Table shows how the AUM and the cost are distributed beyond one of the six given IRT frontiers: 25%, 35%, 50%, 75%, 90%, and 100%. For example, beyond the 100% (90%) IRT frontier, we find 7% (8%) of the overall AUM, 33 bn Eur (40 bn Eur). These funds collect 7% (8%) of the overall fee, 401 ml Eur (500 ml Eur) out of 6.07 bn Eur. The Table also shows the AUM-weighted percentage fee for each of the 14 fund categories together with the absolute amount of the fee paid. Data as of May 2021

Source Authors' calculation on data from Morningstar Direct, Refinitiv-Lipper, Bloomberg L.P

the greater the IRT is, the lower the net realised IR is mostly confirmed in our data on equity and fixed-income mutual funds, with a negative slope coefficient of 0.80–1.15: a 10% increase in IRT tends to deliver a decrease of ~ 0.08–0.15 in realised IR in most fund categories. Looking at equity (bond) funds in the most recent 5-year period (June 2016-May 2021), for IRT < 30–35% (< 45–55%), we find share classes with lower cost, higher TEV, and better realised IR (although not necessarily positive).

Concerning the second question, from a positive investor welfare perspective, we limited our analysis to positive net IR funds/share classes and extended the sample to the full 10-year data period (June 2011-May 2021). We found a greater concentration of positive IR funds for lower IRT levels, with a differentiation between equity (greater concentration below 40–50%) and bonds (below IRT 50–70%).

Our quantitative analysis tends to corroborate the qualitative view on the fairness of fees found in the literature; for example, Kahn (2018) considered a fee to be fair if its magnitude is up to 20–35% of the realistic gross value added over a relevant benchmark, with a higher fraction for funds with high IR or more capacity constrained or niche products.

Regarding the third question, we found that IRT offers a novel, complementary perspective on the closet indexing issue already explored by regulators. The closet indexing practice (ESMA 2016) is related to the mismatch between the investor expectation of a true active manager (given the level of fee paid and manager disclosure) and the reality of a low degree of active management received. The latter is inferred by various combinations of low levels of active share (Cremers and Petajisto 2009, *op. cit.*), low TEV, high R-squared, and beta close to one against the relevant benchmark.

The IRT could add a perspective on funds not covered by closet indexing analysis: true actively managed funds showing adequate levels of active risk. The IRT can shed light on the portion of these funds that are almost guaranteed to underperform after fees, given that the cost of the package to access them, in relation to their active risk, is too disproportionately high to deliver on the investors' legitimate expectation of net outperformance over time. These funds tend to have high levels of IRT (i.e., IRT > 90%): we

name them 'Information Ratio Churners'. Even in an ideal scenario where a true active manager consistently delivers a gross IR of approximately 1.0 over time, all the value added will be eaten away by fees, and the investor will receive the benchmark return, similar to a passive investor (but paying 'alpha fees' for receiving 'beta performance'). This is closet indexing in another form. Here, the mismatch is between the investors' legitimate expectations of receiving a fair percentage of the gross ER generated by the true active manager over time (while bearing 100% of the risk), but the reality is that the costs are so high that, even in the best scenario, the investor will receive, at most, an indexed payoff.

Analogous to the closet indexing phenomenon, with the Information Ratio Churners "*investors may be exposed to a different risk/return profile than they expect*" (ESMA 2016) and pay too much for the service received.

An advantage of IRT is that it can be used for equity and bonds and seems to work well in the cross-section of almost all 14 categories analysed, whereas other metrics (e.g., active shares, Cremers and Petajisto 2009, *op. cit.*) are more challenging to apply to fixed income. For this reason, we did not compare the IRT metric with the active share and the related active fee metric (Cremers and Curtis 2016).

From a practical standpoint, fund selectors and consultants might use the systematic ordering of each fund category provided by the IRT as an additional tool in their arsenal to obtain a distinct view of the ranking of each fund/share class within the category to which they belong.

We believe that our findings could offer complementary insight for fund due diligence, product governance, and assessment-of-value considerations. By reducing information asymmetries, the IRT could make it easier to find common ground between investors and delegated managers for fee considerations, anchored on empirical evidence offered by reasonable IRT levels and credible IR expectations.

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Declarations

Ethical approval and consent to participate
Authors confirm that the appropriate ethics review has been followed. Authors understand that their participation is voluntary. Authors know that they will be given a copy of this consent form. They voluntarily agree to take part in this study.

Consent for publication
Authors hereby provide consent for the publication of the manuscript. The authors understand that this information will be freely available online and accessible to the general public. They know that under the terms of publication, this information may be reproduced and used for other purposes, including commercial uses. They acknowledge that this will reduce their actual privacy to the extent of the content of the manuscript. Authors confirm that they have been given the opportunity to view the manuscript prior to publication, and authors understand that once published, it cannot be removed from the published record except in exceptional circumstances.

Competing interests
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