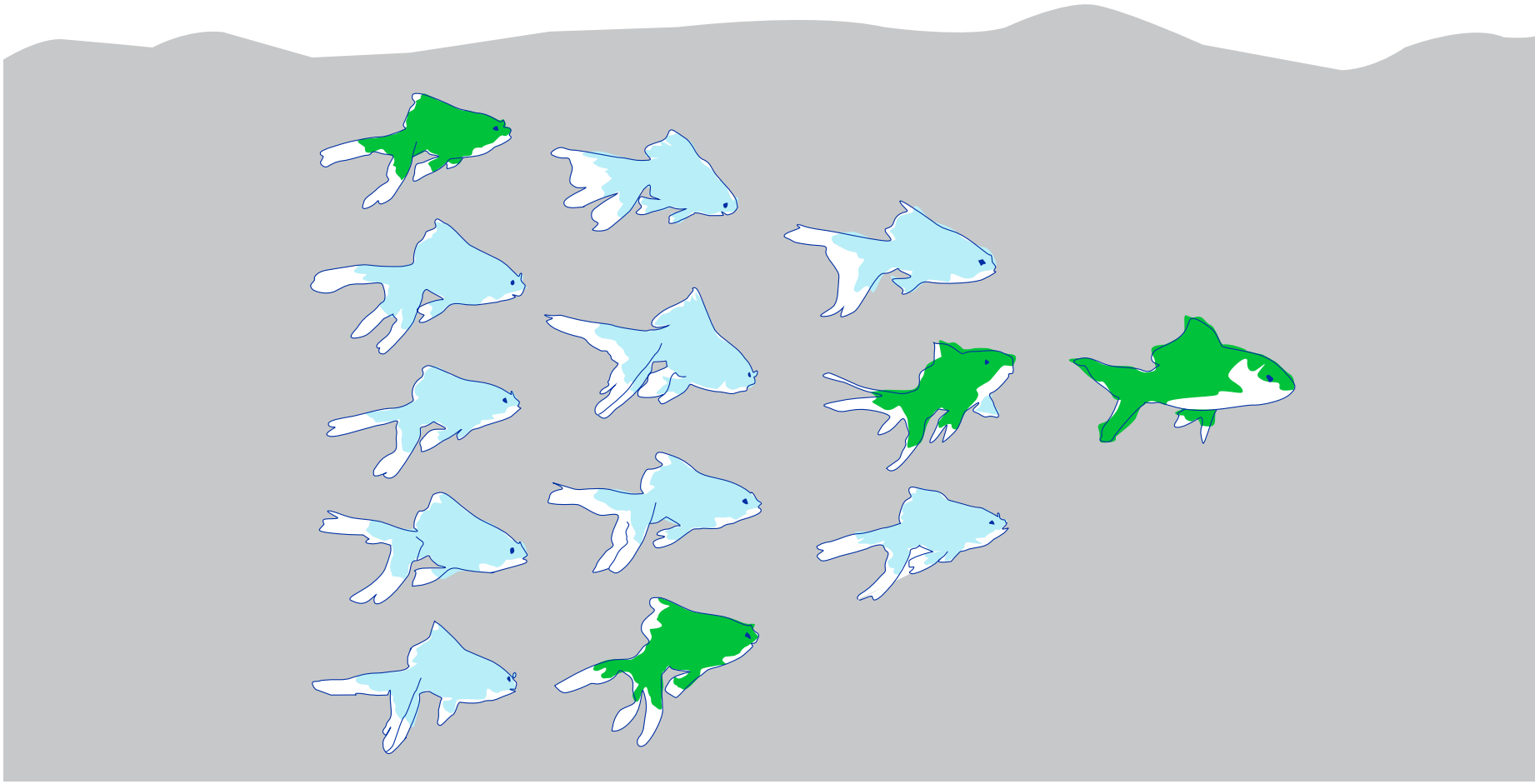

INREV Persistent Performance Among Core Open End European Real Estate Funds **2016**

Research

INREV is the European Association for Investors in Non-Listed Real Estate Vehicles. Our aim is to improve the accessibility of non-listed real estate vehicles for institutional investors by promoting greater transparency, accessibility, professionalism and standards of best practice.

As a pan European body, INREV represents an excellent platform for the sharing and dissemination of knowledge on the non-listed real estate industry.

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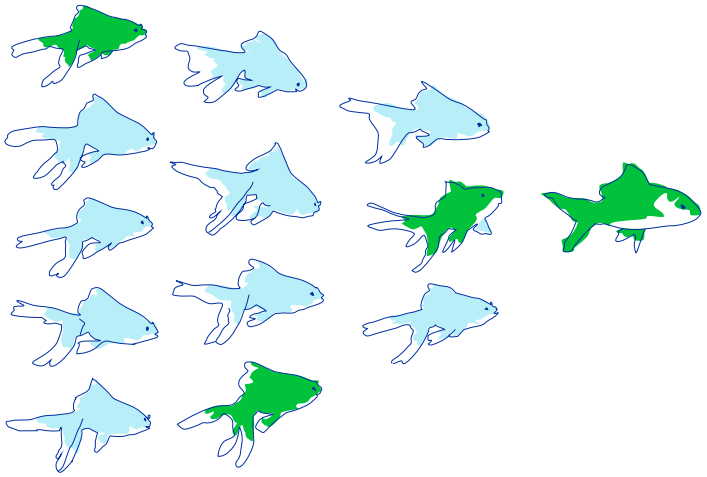

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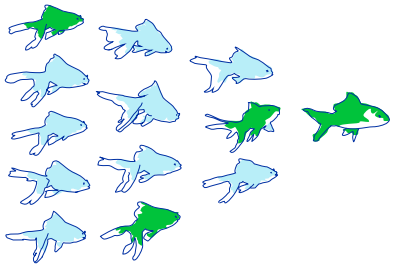


Executive summary

> Persistent performance patterns exist and are not consistent
> Persistence can endure for as long as 11 years
> Top half performers delivered excess returns of 2.3% per annum

Despite the familiar caveat that past performance is no guarantee of future performance, persistent performance is real, significant, and should not be ignored. Clearly there is no guarantee that the pattern will be sustained, but a good track record increases the probability of a successful investment.

The challenge lies not so much in showing that performance persistence exists but in demonstrating under which circumstances it does so. While widespread, it is not consistent across all core open end European real estate funds. It is not limited to a particular sector or style. It exists among funds of all sizes and for all levels of gearing, and it is applicable across various countries.

‘Where persistent performance is present, it is not perpetual, though it can last for several years’

Nonetheless bottom quartile funds demonstrate greater stickiness in performance than top quartile funds. Top quartile funds have a tendency to ‘drop out’ quite quickly; indicating that stellar returns produced in a short-time period (maximum of four years) can occur but sustaining that performance for a long period of time is more difficult. On the other hand, bottom quartile funds maintain their position for longer (up to seven years).

Greatest performance stability is observed in the top half of funds. In fact, they can maintain their position for up to 11 years on average, which can also be stretched to 12 years in some sub categories. In contrast, the bottom half performers can hold onto their position for an average of nine years.

Irrespective of how funds are grouped or ranked, there is one commonality across all of them. Performance persistence does not last forever. It tends to fall away over time. Further, the pattern of decay is broadly similar for bottom quartile and bottom half performers.

The pathways analysis which looked closer at the paths a fund takes as it transitions from one ‘state’ to another showed that certain pathways were a lot more travelled than others, and some pathways were not travelled at all.

‘Outperformance in general tends to fade away quite rapidly, but there are exceptions’

Persistency in performance would be of little interest to investors if the excess returns available were very small, but that is not the case. Investors in funds that were ‘pure top half performers’ earned excess returns[1] of 2.3% on average, depending on which category they are in.

Investors who were invested in ‘pure bottom half performers’ earned returns that in one case (UK domiciled funds) were over 10% less annually than the average return within that peer group.

Sustaining persistent performance over a longer period of time is difficult and funds eventually drop out of any category. In other words, the ‘neither’, neither pure top nor pure bottom, category expands as funds drop out of the other persistent performance categories. Eventually, all persistence reduces to a very low number, and can potentially reduce to zero. This brings us to an interesting conclusion: while track record is important, sticking to a top quartile performing fund for a prolonged period of time can result in sub-par returns. Therefore it would be better to focus on funds that are solid top half performers.

[1] Returns are measured against the average unweighted return from a peer group of comparable funds

Section 1

Introduction

Introduction

Past performance is no guarantee of future results is the standard investment disclaimer. Yet investors frequently consider past performance and related metrics as important factors in investment and fund selection. Furthermore, investors prefer high returns to low returns in any given period, and persistently high returns are, of course, best of all.

Persistence in this sense means returns that are consistently better or worse than those of comparable funds for periods longer than one year.

Persistent outperformance (or 'alpha') in actively managed equity and bond funds has been studied in depth, and the consensus seems to be that it is very rare. Interestingly, the opposite applies to lower liquidity asset classes and to the real estate fund industry in particular. Previous studies rejected the standard investment mantra supporting the claim that historical returns can be a guide for future performance, and therefore a useful tool in fund manager selection.

This research explores whether there is evidence of persistent performance among core open end European non-listed real estate funds using the INREV dataset of 162 funds that are a subset of INREV's Annual Index from the period 2001 to 2014.

The analysis begins with ranking the annual performance of funds into quartiles and halves, and observing the number of funds remaining in subsequent periods of time. Next, the maximum duration that a fund's performance can maintain its ranking over a consecutive period of time is analysed before looking into greater detail at the transition pathways of performance and the associated excess return. Finally, the analysis considers whether patterns of persistence depend on fund factors such as country and/or sector strategy, fund domicile, fund gearing level, fund size and vintage year.

The paper is organised as follows: Section 2 reviews previous studies on persistent performance, while Section 3 presents the data used in the analysis. Section 4 discusses methodology and Section 5 presents the empirical results. Finally the report concludes with suggestions for further research.

Please note that in the report quartile 1 or Q1 refers to the top quartile, while quartile 4 or Q4 refers to the bottom quartile and H1 refers to the top half and H2 refers to the bottom half, where performance is above or below the median value respectively.

INREV would like to thank the project focus group for their support and guidance on this paper:

- Anish Goorah, Senior Analyst, AXA Real Assets
- Martin Laursen, Senior Investment Associate, ATP Real Estate
- Jose Pellicer, Partner & Head of Research, Rockspring Property Investments Managers and Chair of the INREV Research Committee

Section 2

Literature review

Literature review

Research into performance persistence in equities has a long history. Since Jensen's (1968) investigation into performance of mutual funds half a century ago, the issue has grown to have significant importance to market participants. Economists and scholars turned their attention to this phenomenon in the belief that a better understanding of performance persistence can lead to better informed investment decisions and cut associated investment risk.

Mutual funds received probably the largest share of attention and the majority of studies found little evidence of performance persistence among mutual fund managers (Berk and Green, 2004). Soe and Luo's (2014) persistence scorecard showed that relatively few funds can consistently stay at the top. Over the period March 2012 to March 2014 only 4% out of the 687 funds managed to excel.

This lack of persistent performance led researchers *inter alia* Malkiel (1995), Kahneman (2012) and Taleb (2007; 2008) to comment that superior performance of equity fund managers is nothing more than just luck.

Research into persistent performance among lower liquidity sectors such as private equity, hedge funds (Peskin et al., 2000, Schneeweis et al.2001, and Kat and Menexe, 2003), and real estate funds presents mixed results. In the private equity domain, Ljungqvist and Richardson (2003) found that fund performance is auto-correlated, therefore implying performance persistence. A greater appreciation of fund persistent performance presented by Kaplan and Schoar (2005) supported the claim that successful partnerships can deliver returns in successive funds. A more recent commentary by Marquez (2014) and Harris et al. (2014) confirmed the hypothesis that successful private equity funds can provide persistent abnormal returns for their investors. These findings were in support of an (in) famous industry slogan 'Invest in the best, forget about the rest'[2] when considering private equity funds.

The real estate fund industry has been characterised by contrasting analyses. Hahn's (2005, p.2) scrutiny of real estate opportunity funds' performance persistence showed that 'manager performance in a given fund is a significant indicator of performance in subsequent funds'. Bond and Mitchell (2010), using transition matrices, concluded that only the best performing UK property funds deliver persistent performance relative to a benchmark. Tomperi's (2010) regression analysis of private equity real estate fund performance and the performance of the realised returns of successive funds was in support of persistent performance, though not among emerging managers. However Downs et al. (2014) were not able to demonstrate that direct real estate investment funds' performance persists. Instead they found that investors chase past returns at the detriment to their capital. A more recent study by Farrelly and Stevenson (2015) looked into performance persistence among 421 US closed end private real estate funds with vintage years over the period 1990 to 2008. Their results suggest that persistent performance is a short-term phenomenon with underperforming funds having the strongest persistence.

It appears from literature that persistent performance is not consistent across all asset classes and is an area to be further researched. Assets classes with higher liquidity such as public equities tend to lack persistence in performance, unlike less liquid asset classes such as private equity and real estate.

The European non-listed real estate industry is a private market driven by many characteristics, including style, structure, and leverage. It is therefore reasonable to assume that managers can capitalise on nuances of the industry to generate superior returns over a prolonged period of time (Hahn et al., 2005). Further emphasis on portfolio composition, stock and timing (movement of capital in and out of the fund) can enhance performance persistence (Baum and Farrelly, 2009). The new research described in this paper examines performance persistence among core open end European non-listed real estate funds using INREV's proprietary dataset which allows for a greater appreciation of performance persistence within the sector.

[2] Donoghue (1994)

Section 3

Data characteristics

Data characteristics

The research study uses data extracted from INREV's proprietary dataset of European non-listed real estate funds which comprise the INREV Annual Index universe.

The INREV Annual Index measures net asset value (NAV) based annual performance for non-listed real estate funds. Returns are net of all fees and other costs and represent the aggregate investor return.

The INREV Index universe has grown from 29 funds in 2001 to 303 in 2014, collectively representing total gross asset value (GAV) of €172.4 billion at the end of 2014. Of the 303 funds 144 are open end and 159 are closed end funds, representing 62.4% and 37.6% of GAV respectively.

The Index universe is a mix of balanced funds that are diversified across multiple sectors and multiple countries, and specialist funds that are focused on single country or single sector investments. Non-listed real estate funds can also vary by style and structure, as well as other fund characteristics.

The distinguishing factor between an open end or closed end structure is that the shares or units of open end funds, at the request of any of its shareholders or unit holders, can be repurchased or redeemed prior to the commencement of its liquidation phase or wind down, either directly or indirectly from the assets within the fund. This is carried out in accordance with the procedures and frequency set out in its rules or instruments of incorporation, prospectus or offering documents. A closed end fund is one that is described otherwise[3].

This research study focuses only on core open end funds, which can be further categorised by target country and target sector strategy, as well as gearing levels, domicile, size and vintage. Sample statistics for the core open end funds universe can be found in Appendix 1.

The number of core open end funds in the INREV Annual Index universe has grown from 17 in 2001 to 133 in 2014; correspondingly, aggregated GAV has increased from €7.8 billion to €101.8 billion. Over this period 162 funds in total have been in and out of the universe.

Performance of open end funds is generally less volatile than that of closed end funds which tend to be non-core in style. However, the spread in returns has generally been quite wide throughout the analysis period, though performance within the interquartile range has narrowed since 2010.

Target single country funds dominate the core open end funds universe, though the proportion of target multi-country funds has increased over the sample period to just under half (43.6%) in 2014. The most popular destinations for single country funds are Germany, the Netherlands and the UK, which comprise 63 out of the 75 target single country funds at the end of 2014.

Conversely funds with a multi-sector strategy make up a larger share of the core open end funds universe than single sector strategy funds (77 out of 133 in 2014). Single sector funds tend to be dominated by the mainstream sectors, retail, office and industrial/logistics, though there are an increasing number of alternative sector funds in the universe.

When it comes to vehicle domicile, Germany is by far the main domicile for core open end funds in the universe, representing 49 of the 133 funds in 2014. Netherlands comes second as a domicile for these funds representing 30 of the 133, then Luxembourg and the UK follow next.

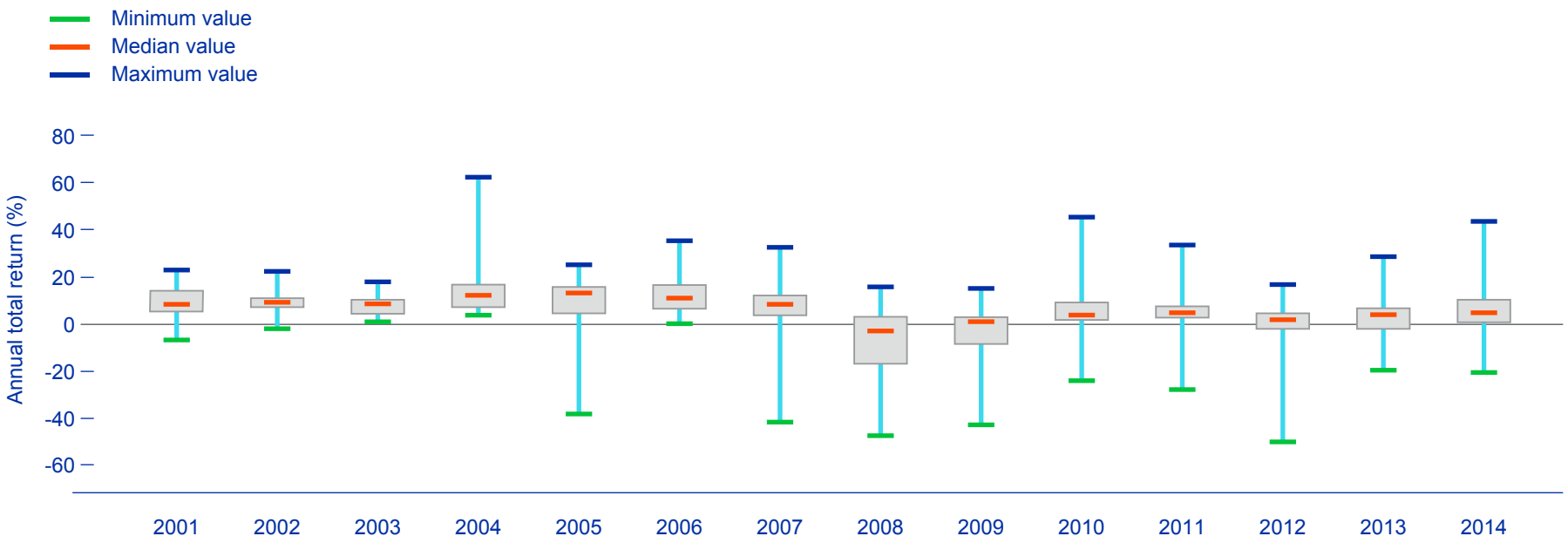
By nature core funds tend to use very little debt therefore it is unsurprising that the majority of the core open funds have less or equal to 40% gearing (98 out of the 133 funds in 2014, and representing GAV of €84.4 billion).

The majority of the funds in the universe are less than €500 million in size, with only a small proportion above €1 billion.

Core open end funds tend to have a longer lifespan than closed end funds, and this is also seen in the sample where a fair proportion of funds (38 in 2014) were launched pre 2001.

[3] European Commission, commission delegated regulation (EU) as of 17.12.2013, supplementing Directive 2011/61/EU of the European Parliament and of the Council with regard to regulatory technical standards determining types of alternative investment fund managers

Figure 1: Distribution of core open end fund performance



Note: The box represents the interquartile range, the difference between the upper quartile and lower quartile values.

Section 4

Methodology

Methodology

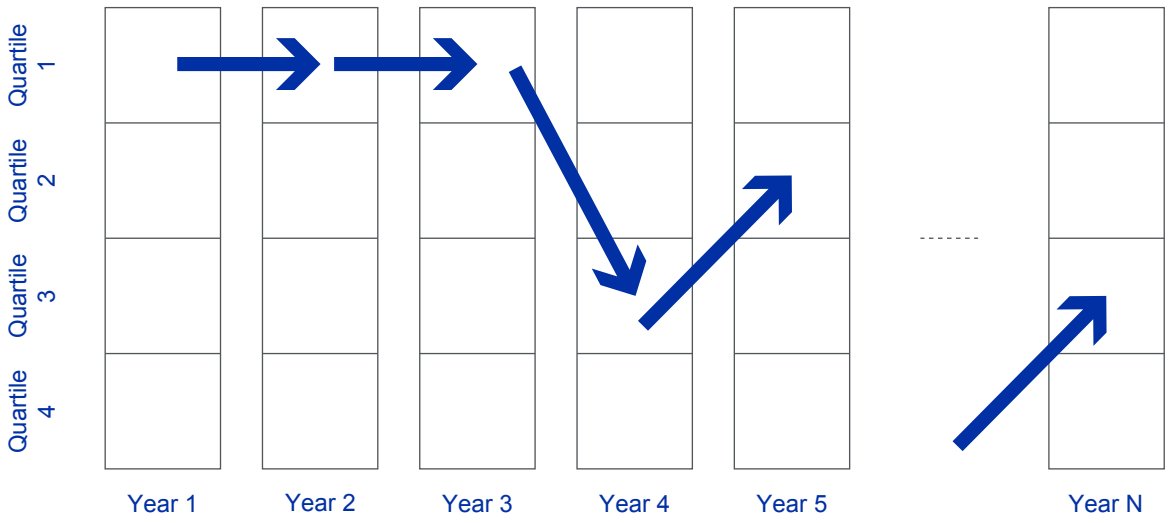
To assess potential persistent performance among core open end European non-listed real estate funds, a three-step methodology is adopted:

(a) The performance of funds is ranked by either quartile or half, and tracked over time to assess whether funds can retain their initial rank. The number of funds remaining is compared with a random expectation, and any deviations from randomness imply that performance persistence may exist.

(b) A duration analysis. We estimate the maximum amount of time a fund stays in a particular ranking. By focusing on top and bottom performing funds, we are able to draw conclusions regarding how long performance persistence lasts.

(c) A pathway analysis. As and when funds move from one grouping to another, we analyse if a certain route taken is more common (e.g. does a top quartile fund go straight into the third quartile or does it transit through the second quartile). Figure 2 provides an illustration of a fund's possible trajectory over time.

Figure 2: An example of a fund's trajectory through quartiles



Tracking performance through quartiles and halves

Here, the historical performance of funds are ranked by quartiles or halves, and their ranking compared against a random expectation in order to determine whether persistent performance exists.

Hypothetically, if there is no performance persistence then there is a one in four chance that a fund would rank in any given quartile at any given point in time. The random probability of doing so would be 25%. If the same fund was to randomly repeat performance in the same quartile then the probability of doing so would be 6.25% (25% x 25%). By year three the chance of retaining the same quartile ranking is significantly reduced to 1.56% (25% x 25% x 25%). By year N the probability of the fund remaining in the same quartile would be 25%^N, where N is the number of time periods. If performance persistence was present, different outcomes would result.

To illustrate these random expectations Table 1[4] demonstrates the transition of 100 funds over a three-year period. If the number of funds remaining is higher than random expectation then performance persistence exists.

The same analysis can be applied to halves, where the performance of a fund is ranked according to top half or bottom half performance. In this instance, the random probability of a fund falling into a particular half would be one in two (50%) in any given time period.

Table 1: An example showing the expected number of funds remaining in their original quartile

	Cumulative random probability			
	25%	6.3%	1.6%	0.4%
	Fund count at start (Year 1)	Funds remaining		
Quartile performance		Year 2	Year 3	Year 4
Top quartile	25	6	1	0
Second quartile	25	6	1	0
Third quartile	25	6	1	0
Bottom quartile	25	6	1	0

Table 2: An example showing the expected number of funds remaining in their original half

	Cumulative random probability					
	50%	25%	12.5%	6.25%	3.13%	1.56%
	Fund count at start (Year 1)	Funds remaining				
Quartile performance		Year 2	Year 3	Year 3	Year 4	Year 5
Top half	50	25	12	6	3	1
Bottom half	50	25	12	6	3	1

[4] Adopted from Bond and Mitchell (2010)/Harris et al. (2014)

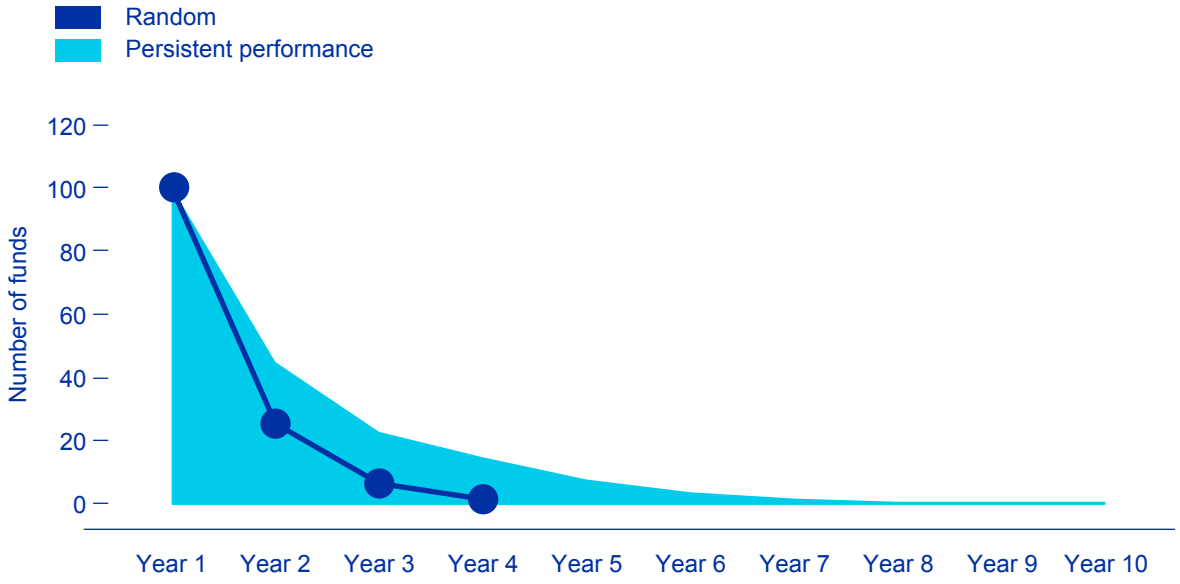
Maximum duration

Next the analysis looks at how long performance in any given quartile or half can endure. To measure duration the number of periods (in this case years) that a fund stays in a particular ranking is observed. The tracking performance analysis explained earlier indicates that the probability of staying within a ranking reduces significantly over time, hence it would be difficult for any fund to sustain persistent performance for a long period.

In theory, the profile of funds remaining in any ranking should look like a decay over time (Figure 3) where a high number of funds maintain their performance ranking over a short period, while very few do over a longer period.

The actual duration is compared with expected duration to determine whether performance stickiness exists, and whether there are distinct patterns across top or bottom performers as well as sub categories of funds.

Figure 3: An illustration of funds at start and funds remaining (random versus persistent performance)



Note: Each fund has a 25% (1/4) chance of staying in the same quartile at random

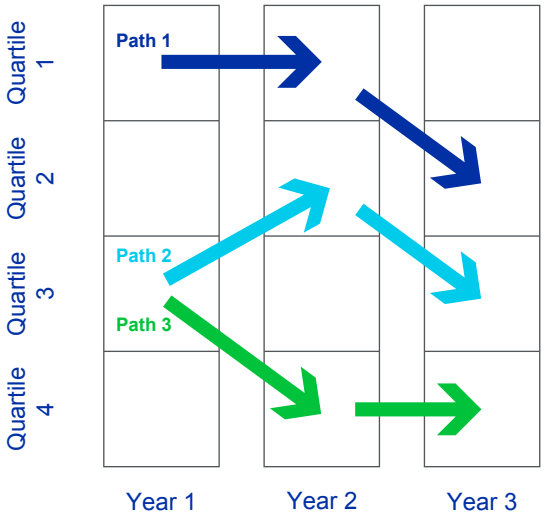
Pathway analysis (transition pattern)

The next part of the analysis tracks the pattern of returns of a fund as it transitions from one 'state' to another, where a 'state' is the ranking of returns in either quartiles or halves over a three-year time period. A three-year time period was selected for this part of the analysis as institutional investors often review their investment strategy on a three-year cycle.

The pathways computed for the sample of funds are then compared with two hypothetical transition patterns to determine if movements between quartiles or halves are at random or that some patterns occur more frequently than others. In other words, if returns were evenly distributed and random across all potential pathways, each pathway would occur the same number of times.

Theoretically a fund can move from its quartile in Year 1 to any of four quartiles in Year 2, and to any of the four quartiles in Year 3. Therefore over any given three-year period there are 64 (4 x 4 x 4) potential paths that a fund can take.

Figure 4: Examples of return pathways through quartiles



Note: Each path has a 1.6% (1/64) chance of occurring at random

A similar approach is adopted for the halves analysis. For the halves analysis there are eight (2 x 2 x 2) paths that a fund can take over a three-year period, with the probability of remaining in any half in any given period being 50%.

Here a pure top half performer is denoted as a fund that retains top half performance over three years, while a pure bottom half performer is a fund that never leaves the bottom half. Meanwhile funds that fluctuate between top and bottom half rankings are denoted as flip-flop performers.

There is only one path that a pure top half or pure bottom half performer can take but six paths that a flip-flop performer can travel through over a three-year period. Each path has a 12.5% (1/8) chance of occurring at random. If any path occurs more frequently than at chance then this further supports the argument that persistency exists.

An extreme performer is denoted as one that experiences both pure top half and pure bottom half performance over the entire analysis period.

Figure 5: Pure top half performer

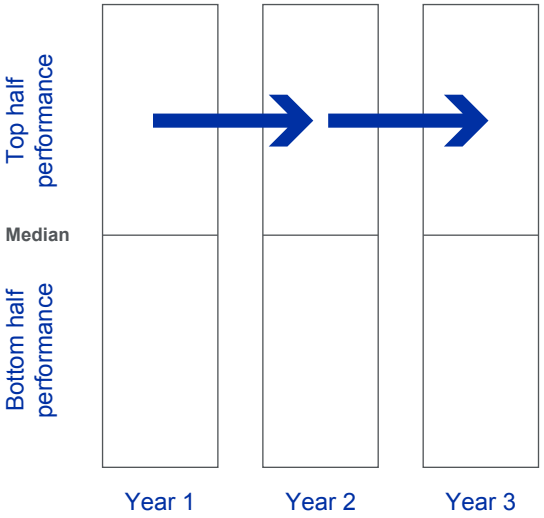


Figure 6: Pure bottom half performer

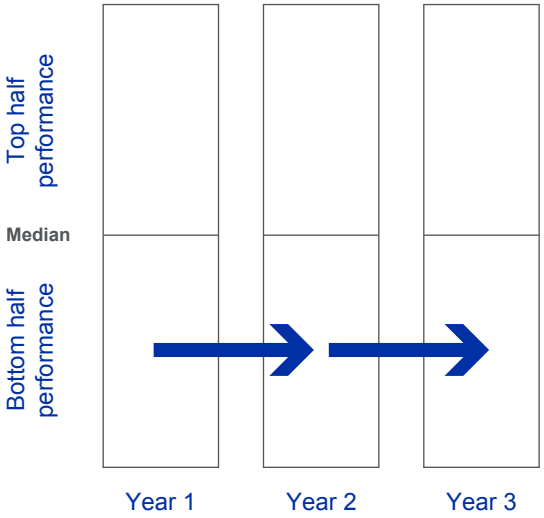
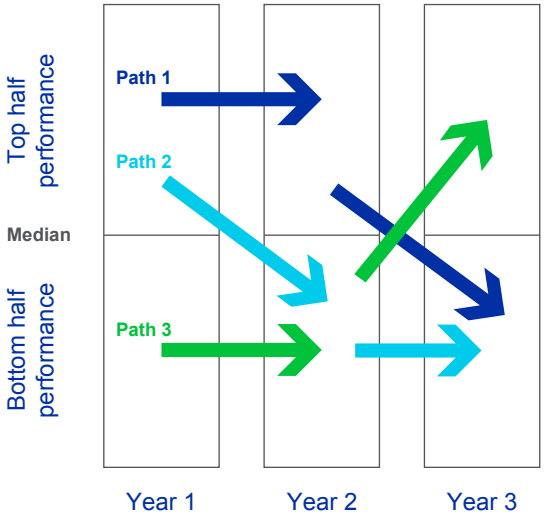


Figure 7: Examples of flip-flop performers



Note: Each path has a 12.5% (1/8) chance of occurring at random

Section 5

Empirical results

Empirical results

> Funds that sustain quartile ranking share some common characteristics
> Bottom quartile performance tends to stick during the period 2007 to 2014
> Sustained top quartile performers tend to be single country funds, with gearing less than 40%
> Sustained bottom quartile performers tend to be funds launched between 2001 to 2007
> Likelihood of funds staying in the top quartile is lower than staying in the top half

The section discusses patterns of persistent performance for the entire universe of core open end European real estate funds first, before moving onto the analysis within the sub categories outlined in Appendix 1.

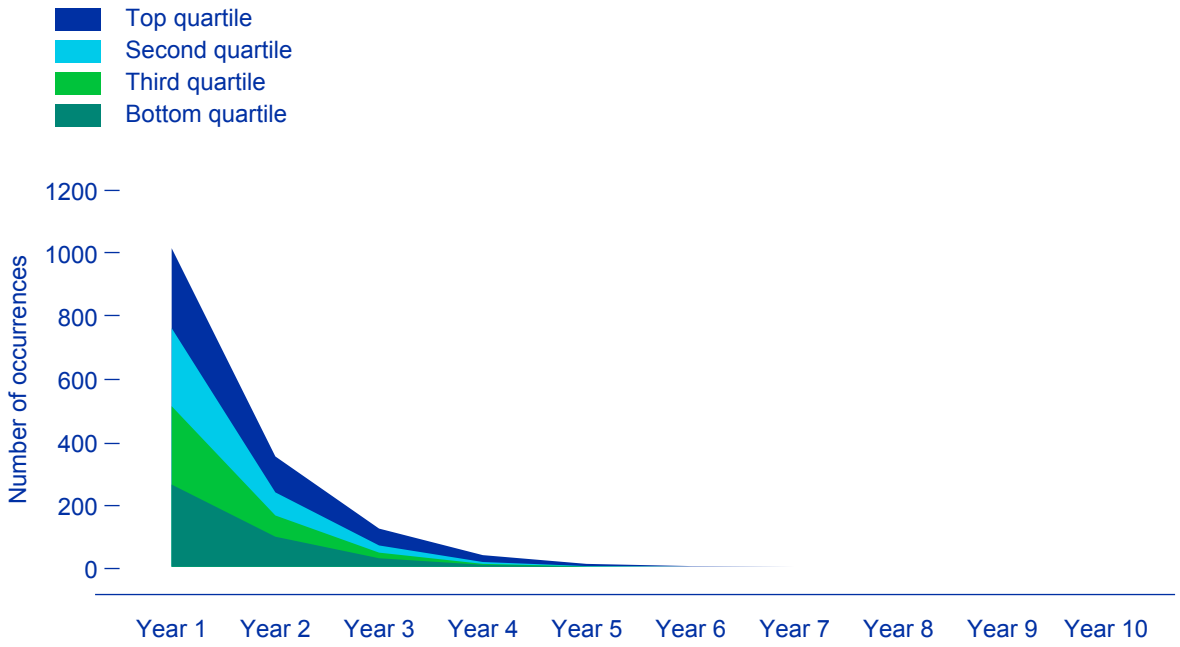
The results from the analysis show that there is evidence of persistent performance among core open end European real estate funds. The proportions of funds that maintain a quartile or half ranking is greater than 25% (for quartiles) and 50% (for halves) respectively, indicating that performance stickiness exists and is not simply random.

On average between 30% to 50% of funds in the bottom quartile stay in the bottom quartile, while the funds in the other three are more likely to drop out and move to another. The likelihood of funds in the top quartile staying there is lower than it is for bottom quartile funds, and reduces rapidly over time.

For example, after the first year, just over 35% of funds that ranked top quartile retained this position; by year 3 this had dropped to just over 20%. Therefore, stickiness varies depending on where a fund ranks in its starting position, with performance being stickiest for bottom quartile funds.

Not only are bottom quartile funds more likely to maintain their quartile position than any other quartile ranking, but they also do so for a longer period of time while top quartile funds managed to retain their position for a maximum of only four years.

Figure 8: Persistence in quartiles among core open end funds



Further scrutiny of funds that have endured bottom quartile performance for three years or more yields some interesting results. The first observation is that such performance is widespread throughout the universe of core open end funds. However, funds that exhibit enduring bottom quartile performance had certain unifying characterstics that are worth considering.

First of all, there is a tendency to be in the oldest or second oldest age bracket - in other words, to have a launch date that is either before 2001 or in the 2001 - 2007 period. There is also an observable tendency relating to size - funds with sustained bottom quartile returns are disproportionatey likely to be small in terms of gross asset value. This is not unexpected, as funds with sustained bottom quartile performance will struggle to attract and/or retain assets. In terms of domicile, funds in this grouping are slightly more likely to be domiciled in the Netherlands.

In other respects the cohort of funds that has displayed sustained bottom quartile performance does not differ much from the universe of core open end funds as a whole.

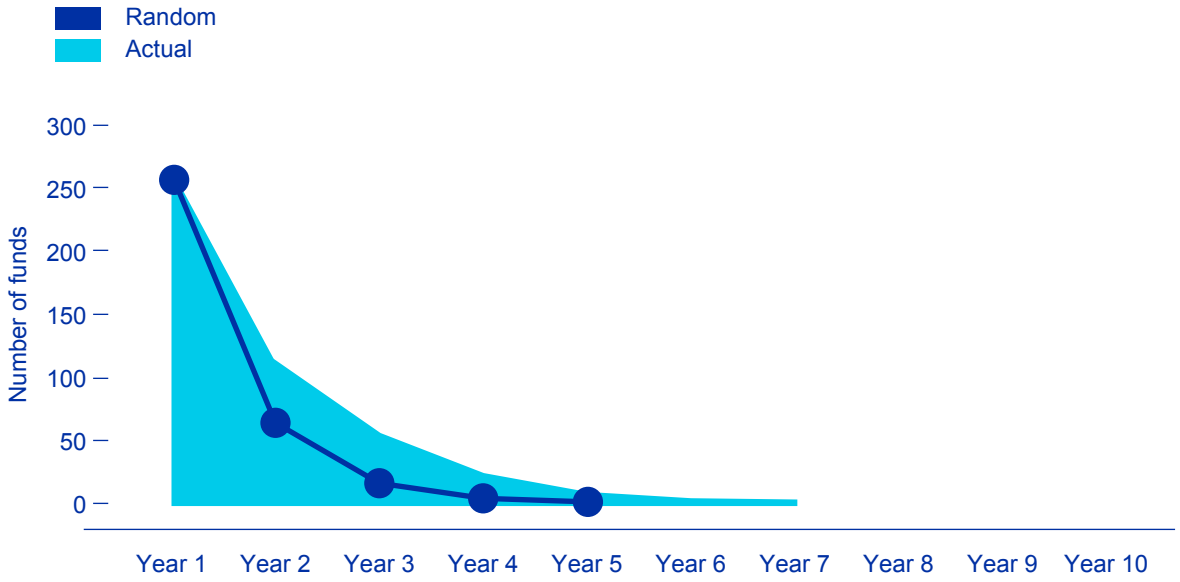
There is no marked tendency for either highly geared or low geared funds to be over-represented among the group of funds with enduring bottom quartile performance.

However, funds with lower gearing (that, of 40% or less) can have bottom quartile performance for longer than funds with higher gearing (that is, over 40%), which is not necessarily the result investors might expect.

There is no material difference between single and multi-country strategies. There is no major gap between single and multi-sector strategies. Of the single sector funds office and retail appear more frequently than any other sector.

However, there is one overarching feature that is common among these funds which is the period in which they sustained bottom quartile performance. This happens to be during the latter years of the analysis period, from 2007 onwards, with very few exceptions.

Figure 9: Persistence among core open end funds: bottom quartile actual versus random



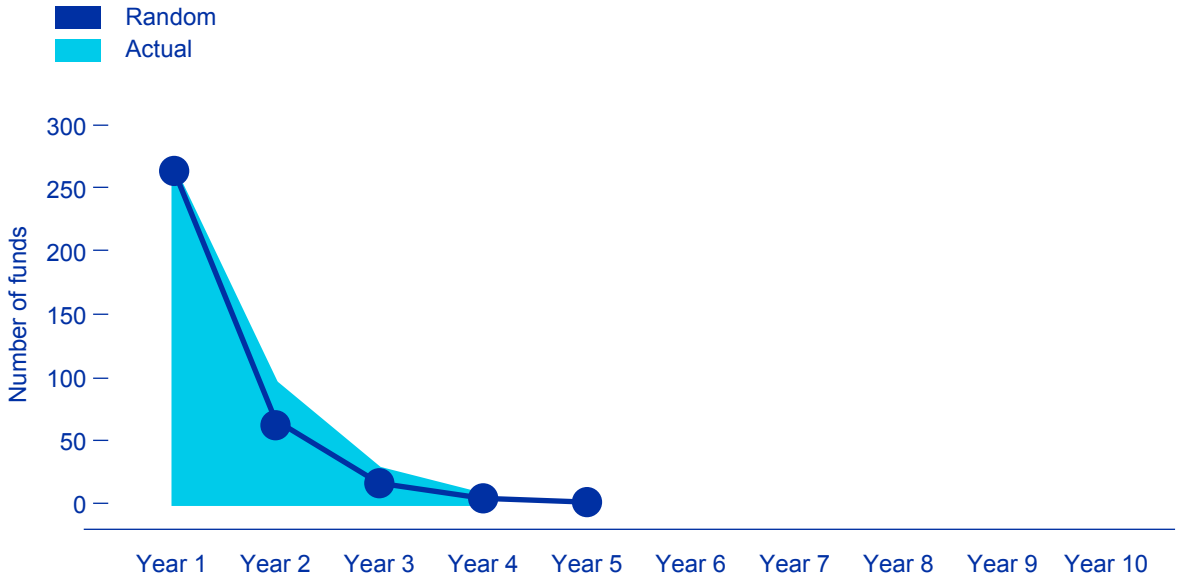
An analysis of top quartile performance lasting for three years or more reveals some interesting patterns. The first point to note is that sustained top quartile is widespread among core open end funds, but to a lesser extent than sustained bottom quartile performance. The second point is that sustained top quartile performance was observed across the full analysis period.

Funds that exhibit enduring top quartile performance had certain unifying characteristics that are worth noting.

They are single country rather than multi-country strategies, many of which are targeting the UK, and they are more likely to be funds launched prior to 2001. They can be of any size, though less likely to be above €1 billion (GAV). (Perhaps this reflects the difficulty in maintaining the outperformance that attracted high investor cash flows in the first place).

There is a tendency towards lower target gearing of no more than 40%, in the sense that funds with target gearing at this level occur more frequently than expected in the cohort of funds with enduring top quartile performance. The proportion of German-domiciled funds in this group is lower than the proportion of German-domiciled funds in the entire universe of core open end funds. In terms of target sectors, funds displaying sustained top quartile performance can be multi-sector or single sector.

Figure 10: Persistence among core open end funds: top quartile actual versus random



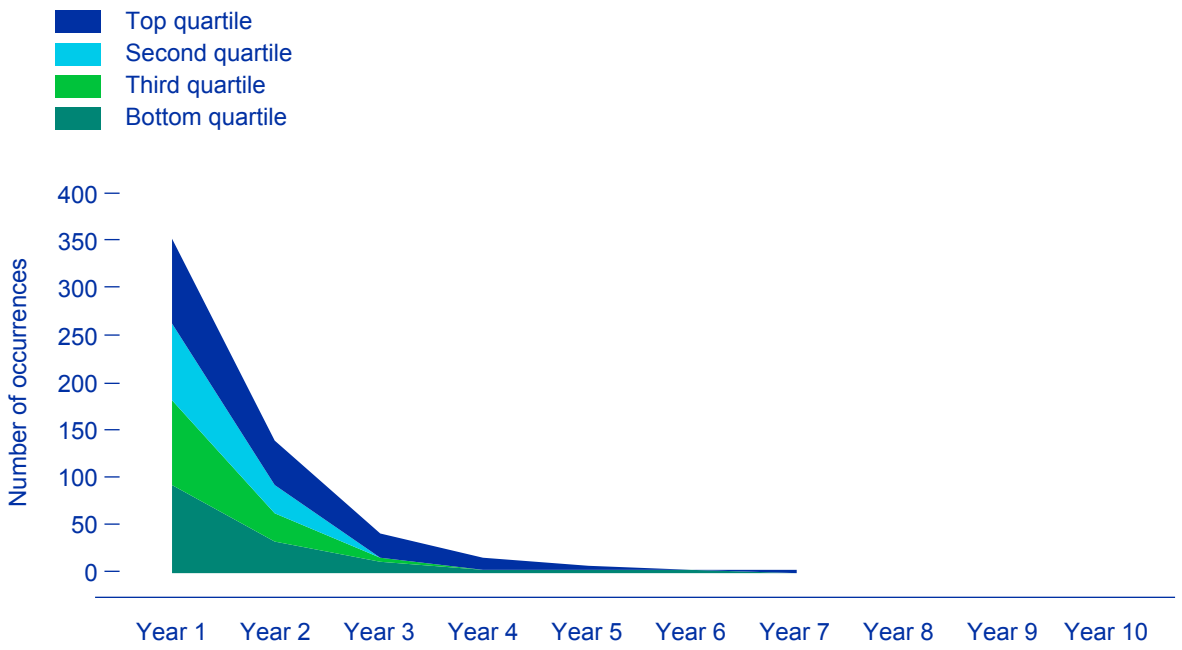
A deeper dive into quartiles persistence

Analysis into performance stickiness (in other words, persistence performance) within peer groups was also carried out to determine whether there were any notable differences within sub groups.

As the findings suggest, performance stickiness is more common among bottom quartile funds than top quartile, which means that funds are more likely to stay in the bottom quartile than in the top quartile. The results are more explicit when fund performance is considered by sub categories. There are some interesting exceptions worth commenting on.

For example, within the sub category of multi-country funds both top and bottom quartile funds maintained their positions for the same duration of seven years, with performance stickiness being more prevalent among top quartile performers of this group.

Figure 11: Persistence in quartiles among multi-country core open end funds



Within the universe of open end core funds, it is noticeable that bottom quartile performance outlasts all other quartiles. Bottom quartile performance endures for up to seven years, while third and second quartile performance can endure for five. The corresponding number for the top quartile is four years.

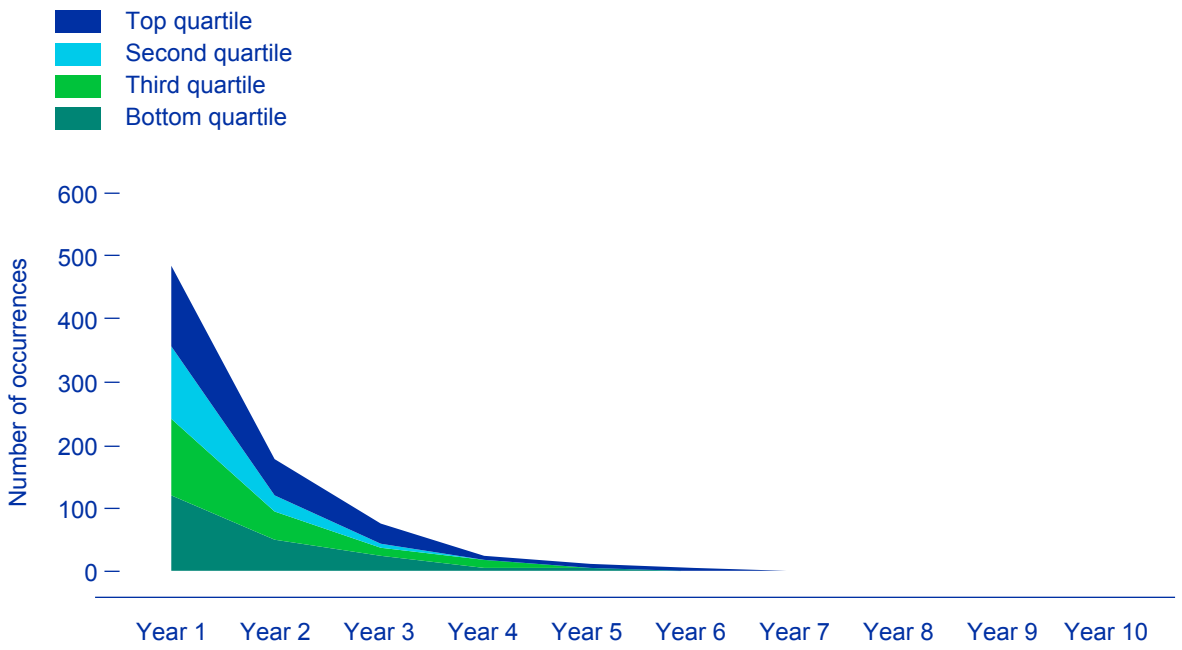
Single country and multi-sector funds show a broadly similar pattern of bottom quartile outlasting the other quartiles, while multi-country and single sector move in the opposite direction. For those two sub categories it is worth noting that top quartile returns have outlasted bottom quartile. The results of the top performing multi-country funds are impressive - they outlasted funds in the other quartiles by either three or four years.

Meanwhile within the single sector group, funds managed to hang onto the top spot for longer than bottom ranking funds. The maximum duration of persistent performance was seven years for top quartile funds.

Second quartile funds endure for five years, while third quartile performance endured for six years.

Finally, bottom quartile performance lasted for seven years.

Figure 12: Persistence in quartiles among single sector core open end funds

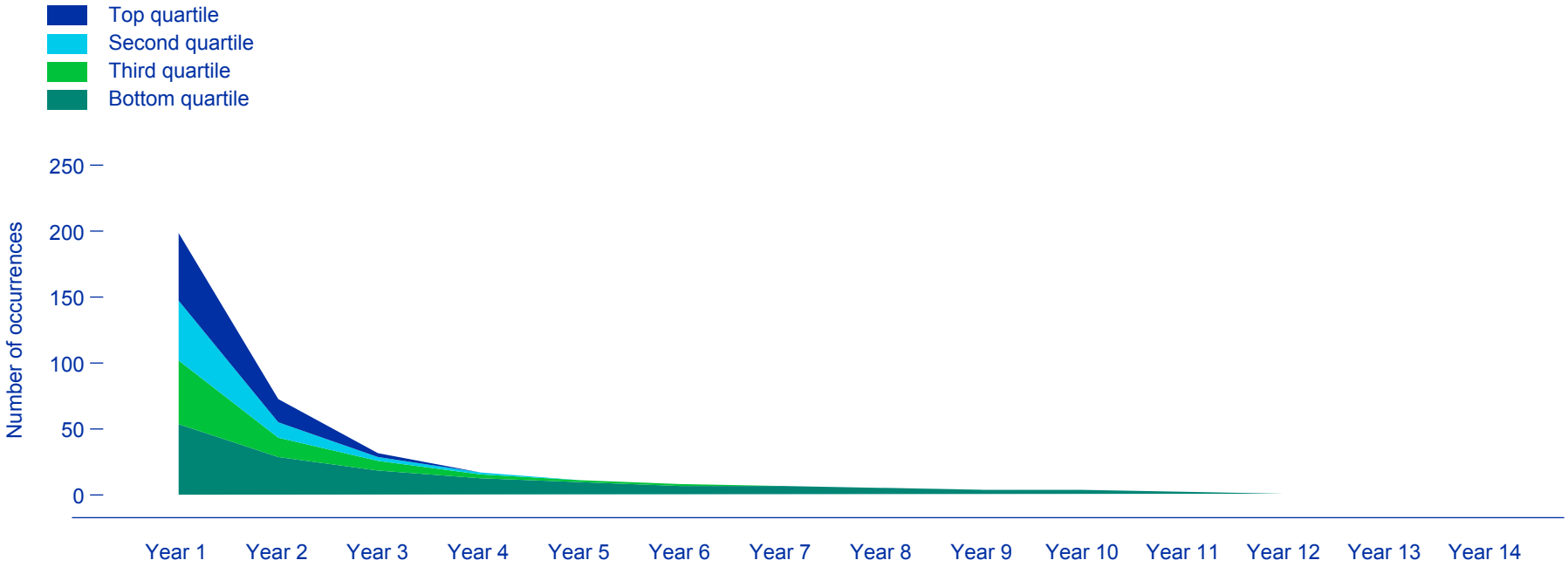


Some extreme results were found within the group of single country funds targeting the Netherlands, where bottom quartile performance was sustained for 12 years within this peer group.

In this group of single country funds, it is noteworthy that the worse the relative performance, the longer it endures.

To be specific, second quartile performance endured for four years and third quartile performance endured for six years, which is only half the duration of the bottom quartile.

Figure 13: Persistence in quartiles among Dutch funds

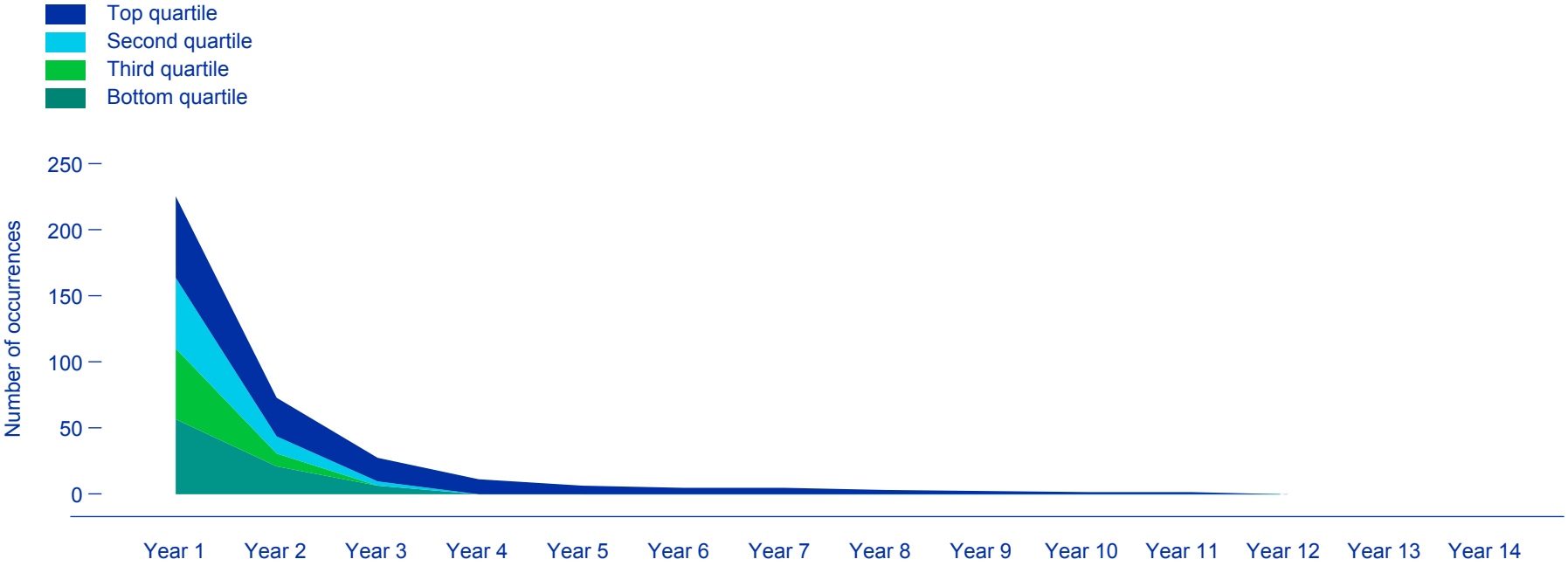


At the opposite end of the spectrum is the peer group of funds domiciled in the Netherlands, where top quartile performance was sustained for 12 years.

Sustaining top quartile performance for such a long period is an impressive feat of endurance. It also creates significant excess returns, as top quartile funds in this peer group generated excess returns of 2.2% per annum.

In stark contrast to top quartile performance, third quartile performance and bottom quartile performance endured for three years and then petered out. Second quartile peformance was sustained for three years also.

Figure 14: Persistence in quartiles among funds domiciled in the Netherlands



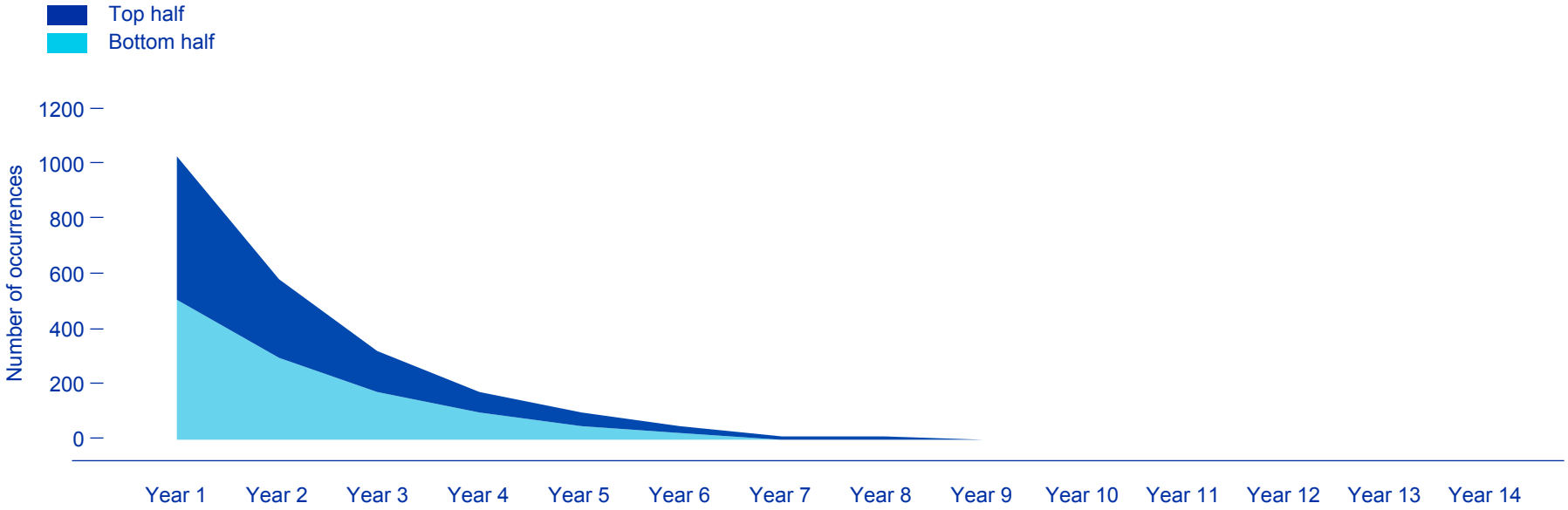
Note: Q1 - top quartile; Q4 - bottom quartile

A tale of two halves

Generally what the results suggest is that performance stickiness is far greater among bottom quartile performers than top quartile performers. However, when we look at performance by halves instead of quartiles we find that the opposite is true, and that performance stickiness lasts longer in top half performers than bottom half performers. Top half performance can endure for as long as 11 years.

The likelihood of staying in top half performance consistently hovers above 50% indicating that this is not simply random, and providing further support for the notion that persistent performance exists among core open end real estate funds.

Figure 15: Persistence in halves among core open end funds

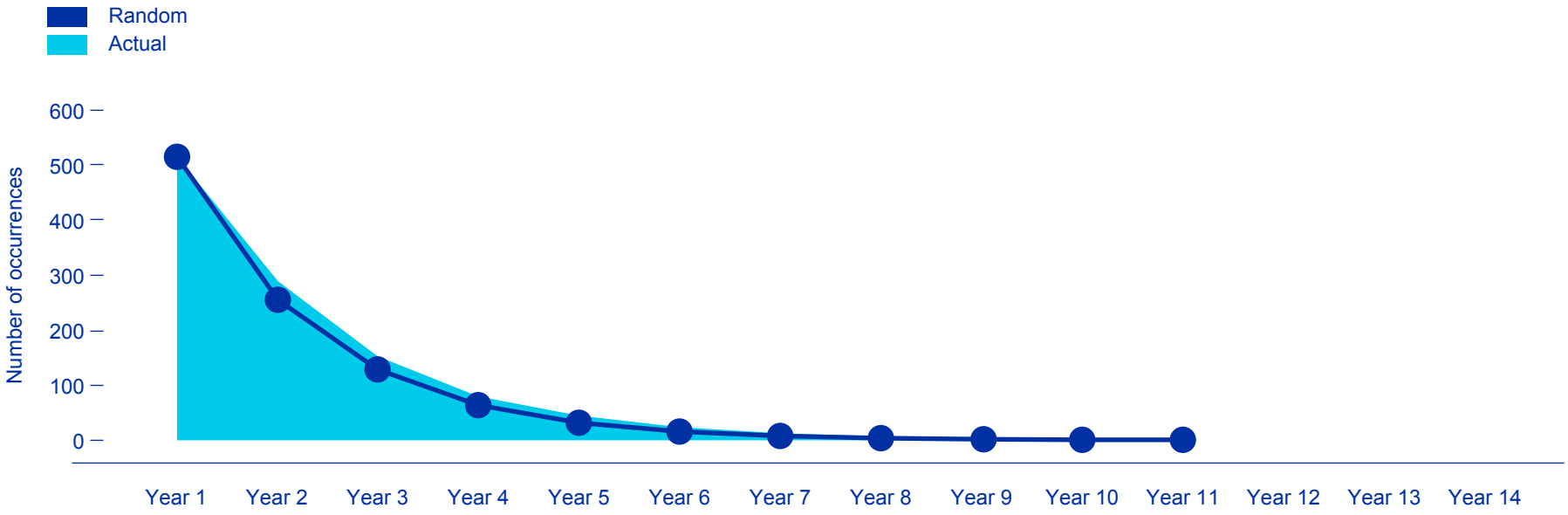


This pattern is generally reflected across most of the sub categories of the analysis. It is worth noting that some sub categories displayed an extended period of persistent performance. As evident in Dutch funds, a top half performance was maintained for as long as 12 years.

The biggest difference found between top and bottom half performers were found in the single sector group where top half performers had a run of 12 years while bottom half performers only lasted for seven. This was even more extreme in the category of funds launched pre 2001 when top half performance lasted for 12 years but bottom half for only six years.

Results of the persistency in quartiles and halves analysis can be found in Appendix 2, and full results for each sub category can be requested from INREV.

Figure 16: Persistence among core open end funds: top half actual versus random expectation



Follow the path

The analysis above shows that as the time frame gets longer more funds fall into the 'neither' category, which means that over a period of time they become neither 'pure top half' nor 'pure bottom half', or neither top quartile nor bottom quartile performers.

Using the halves analysis as an example then, the 'neither category' contains (i) funds that might have been top half performers or bottom half performers or both previously, but could not sustain the persistent performance over the longer periods, and (ii) funds that were 'neither' from the beginning. In other words, the 'neither' category expands as funds drop out of the other persistent performance categories. Eventually, all persistence reduces to a very low number, and can potentially reduce to zero.

Analysis was carried out to gain some insights into the paths that funds take when transitioning through 'states'. If returns were evenly distributed across all potential pathways, it would be possible to expect that over a period of three years there would be an equal weighting across the 64 (4 x 4 x 4) quartiles pathways. However, actual historic data is not evenly distributed and in fact the research found that certain pathways were a lot more travelled than others, and some pathways were not travelled at all.

The three most popular pathways are shown in Figure 17 where 1st means most popular; 2nd means second most popular and so on. The top ten most popular pathways account for 35% of all the possible pathways, whereas if returns were evenly distributed this number would be 10/64 or 16%.

Figure 17: Most common pathways over a three-year period

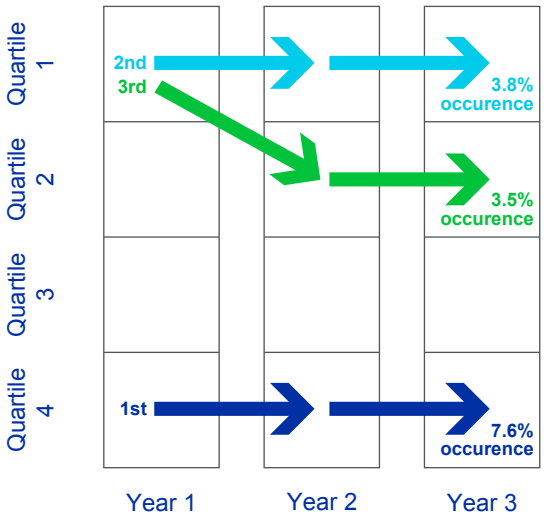
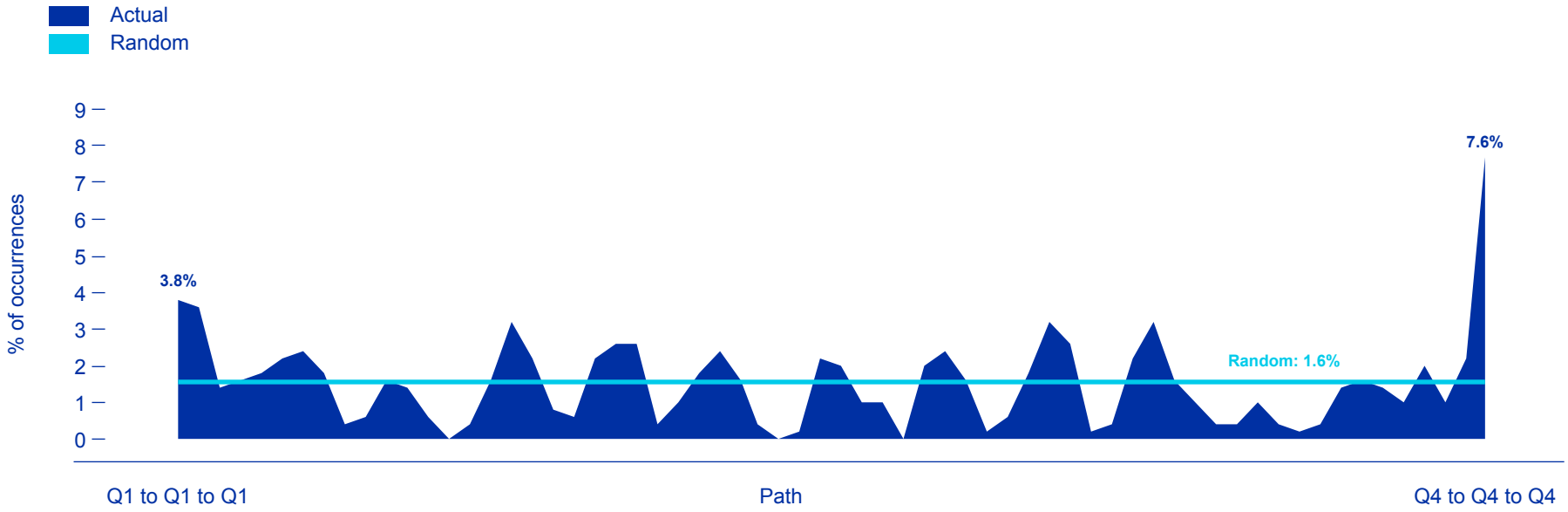


Figure 18 shows the distribution of returns over the 64 possible pathways that could have been taken. The least favourable path in terms of returns (that is, staying resolutely in the bottom quartile) is the most frequently taken pathway, and this occurred 7.6% of the time which is far higher than the random expectation of 1/64 (1.6%). The second most travelled route as shown in Figures 17 and 18 occurs 3.8% of the time which is through the top quartile over three years while the third most travelled occurs 3.5% of the time.

Figure 18: Distribution of return pathways over 64 (4 x 4 x 4) potential pathways



What are the potential gains?

The above analysis demonstrates that persistent performance is widespread. However, the associated excess returns is also of importance and the size of the prize is material; pure top half funds delivered an average return of 7.5%, 230 basis points above the unweighted average of 5.2%.

Funds that have taken any other pathway on average deliver returns that are lower than the unweighted average. Despite having been a top half performer at some point over the analysis period, extreme performers delivered 4.3% on average, 90 basis points below the universe average. Pure bottom half performers delivered 2.6%, half the average returns.

Flip-flop performers (funds that move between the top half and bottom half without ever sustaining a three year period of persistence in either category) are the worst performers of all, delivering an average return of 1.9%, far short of the average of 5.2%.

It is worth noting that funds drawn from the top quartile are more likely to become flip-floppers than funds drawn from the top half performers. As such a narrow focus on the top quartile is more likely to deliver a disappointing return compared to the top half.

Table 3: Persistent patterns and associated impact on returns among core open end funds

	Number of funds	% of total	Average annual return
Pure top half performers	45	28%	7.5%
Pure bottom half performers	41	25%	2.6%
Extreme performers	20	12%	4.3%
Flip-flop performers	56	35%	1.9%
All funds	**162**	**100%**	**5.2%**

Note: Flip-flop performers are funds that do not sustain a three year period of performance in either the top half or the bottom half. Therefore flip-floppers are neither pure top half, nor pure bottom half nor extreme performers and can include funds that have less than three years of performance history.

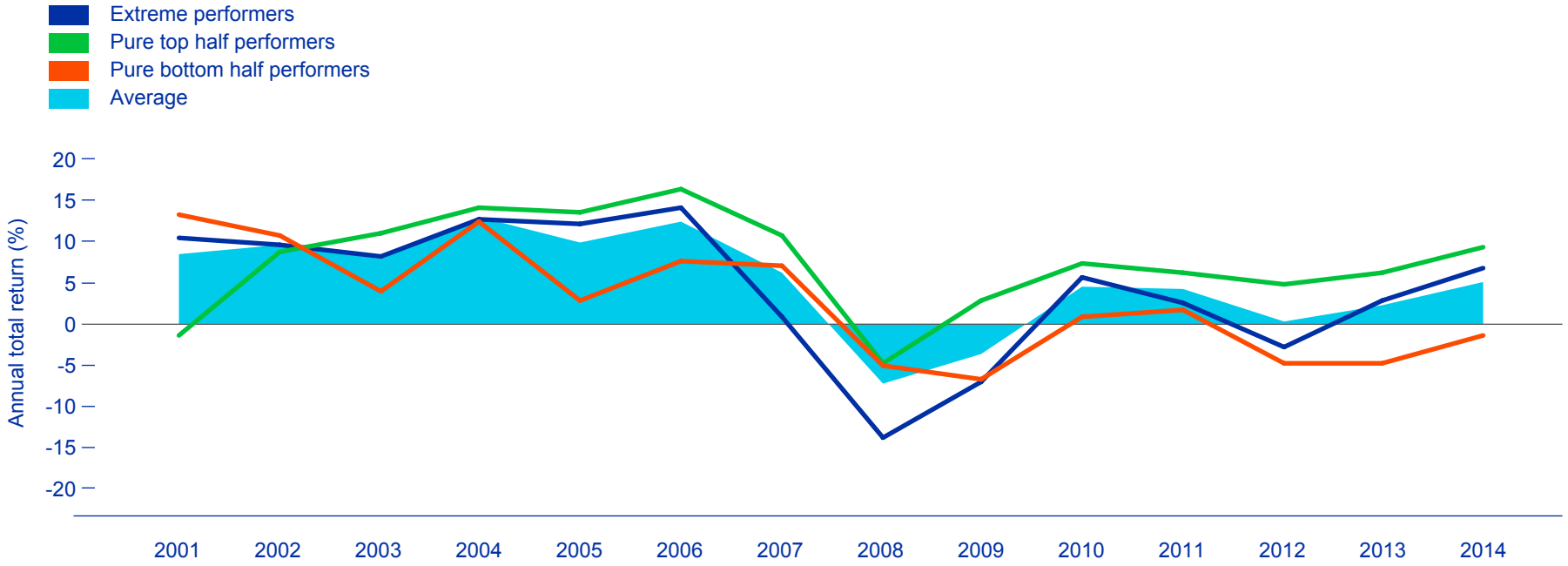
Persistent performance is evident throughout all sub groups, with the exception of three sub groups where one pattern, extreme performer, is absent. These sub groups are funds targeting Germany, funds domiciled in Luxembourg and funds launched after 2007.

The impact of persistent performance on returns varies notably within categories. Across the sub categories there are some interesting findings worth noting.

Pure top half performers delivered excess returns of 3.9% in one sub category - funds launched in the period 2001 to 2007. The excess return is calculated as the average of all top half performers in the group compared to the average returns of all funds in the group.

The impact of persistent top half performance is not always that marked, however, and in some sub categories the excess returns are less than 0.5% per annum.

Figure 19: Performance of core open end funds by category of performers

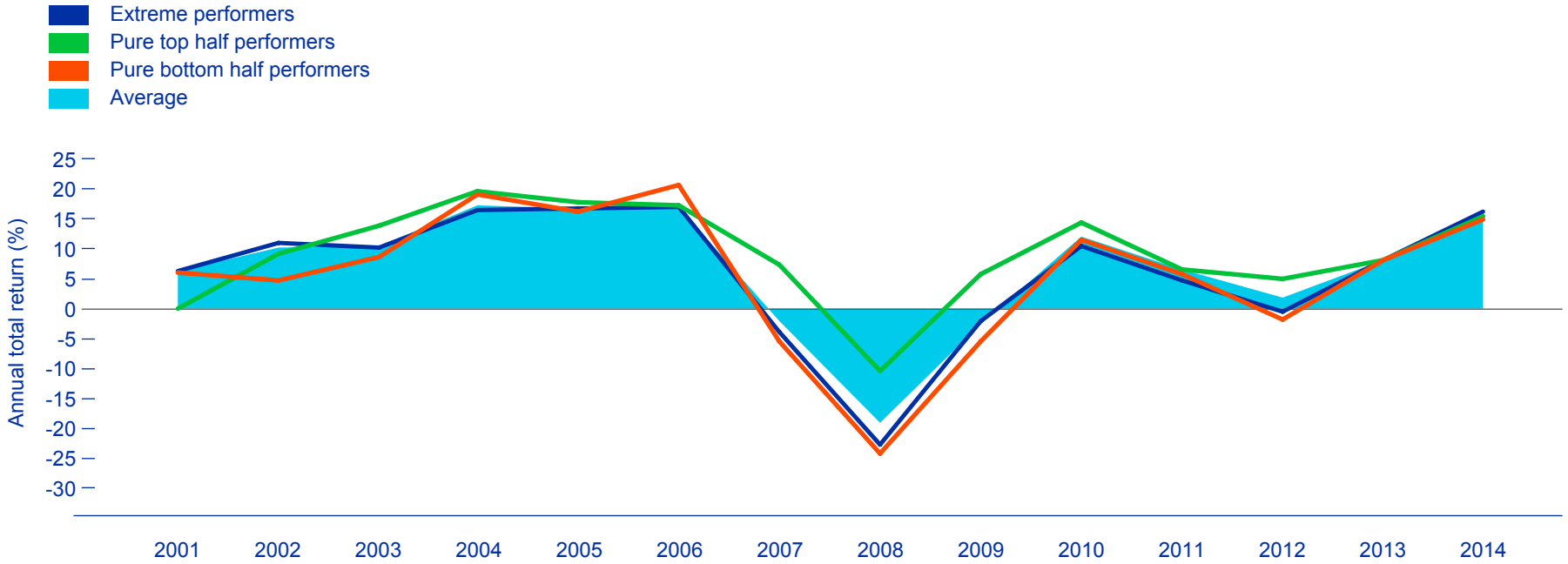


The dispersion of returns among multi-country funds is less than the dispersion among funds that target single countries. Among the single country funds, the UK and Netherlands groups have a wider range in returns than the group that targets Germany, where none of the funds were extreme performers.

Meanwhile the difference between multi-sector and single sector returns is small. This is consistent with the findings in the recent INREV report entitled *Risk Factor Analysis of European Non-Listed Real Estate Funds, 2015*. This study found that 'while differences exist across countries, no statistical differences were found across sectors'.

For the vehicle domicile group there are two striking features: first, the low average returns from Luxembourg domiciled funds; and second, the wide range in returns between the bottom half and top half performers, -5.2% and 5.3% respectively, among funds domiciled in the UK.

Figure 20: Performance of core open end funds targeting the UK



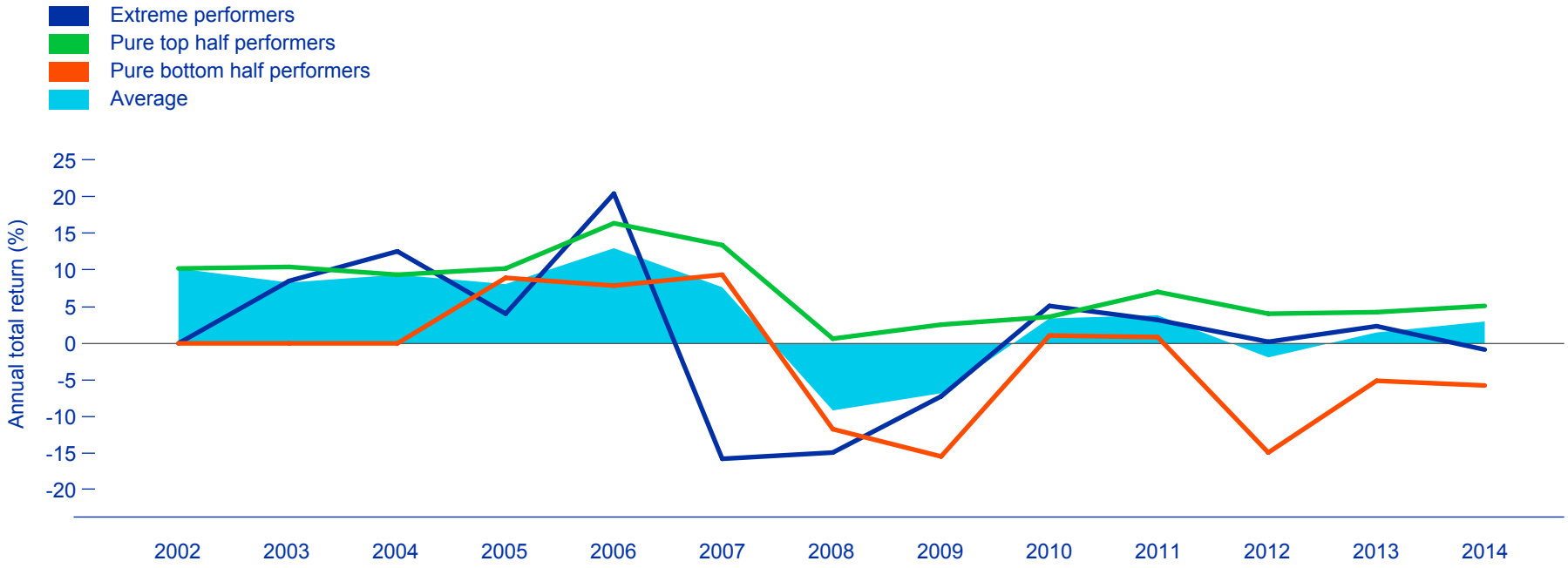
Some interesting patterns emerge from a comparison of returns between the sub category of lowly geared funds (gearing of less or equal to 40%) and the sub category of highly geared funds (gearing of over 40%).

The average return of the lowly geared sub category is higher (5.7%) than the average annual return for the highly geared sub category (3.6%). The excess return earned by top performers in the lower geared group is 1.7% while the corresponding number among higher geared funds is 3.2%.

Investing in the best performing highly geared funds would have delivered an absolute average return of 6.8% per annum, compared to the corresponding figure of 7.4% per annum for the average top performer in the category of low geared funds. However, the dispersion of returns between top and bottom performers is very different across the two sub categories. The dispersion for lowly geared funds is 4.4% while the dispersion for highly geared funds is 10.4%.

So it seems that chasing top performance in the highly geared sub category is riskier, and even if it succeeds it has not delivered a substantial premium over top performance in the lower geared sub category.

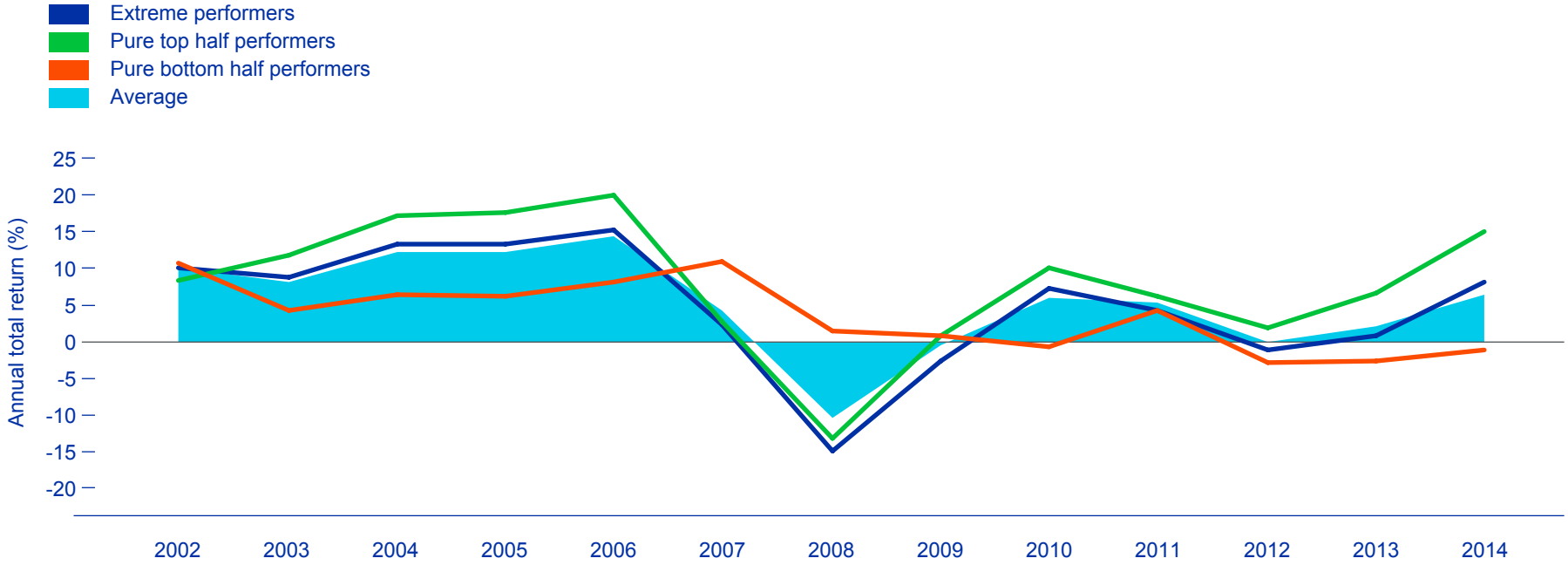
Figure 21: Performance of core open end funds with gearing > 40%



Funds with GAV less than €500 million produced the highest average return and the highest return among top half performers, while funds sized €500 million to €1 billion saw pure bottom half performers deliver the lowest average return among its group, while funds sized over €1 billion saw flip-flop performers deliver the lowest.

Results of the analysis of the associated excess returns of the sub categories can be requested from INREV.

Figure 22: Performance of core open end funds - vintage > 2001



Section 6

Conclusions and further research

Conclusions and further research

> Performance persistence lasts longer in bottom quartile funds
> Top half performers maintain their position for longer than bottom half performers
> Performance stickiness varies across quartiles

Overall, the results from the study strengthen the idea that European non-listed real estate funds are characterised by persistent performance. Despite the exploratory nature of the current study, it is nevertheless possible to conclude that there is a meaningful degree of performance persistence, and that the excess return associated with top half performance is worth a significant amount of attention.

A good track record is therefore relevant to fund manager selection. While not a guarantee of success, having a manager with an established track record of outperformance may improve the odds. It is possibly a factor that should be taken into account when comparing real estate as an asset class with other alternatives or real assets.

‘Persistence patterns and the associated impact on returns is available across all categories’

When it comes to the active versus passive debate, one of the key measurements of successful active management lies in the ability to deliver above average returns consistently over a prolonged period of time. Demonstrating the ability to outperform repeatedly is one way to differentiate between manager skill and just pure luck.

The findings show that relatively few funds can consistently stay in the top quartile. Out of the sample of 162 core open end European non-listed real estate funds, only six managed to sustain a top quartile position for a maximum duration of four years. This result is as expected: by definition, only a few can ‘outperform’. However, bottom quartile performance can endure for longer, and one fund maintained its bottom quartile ranking for as long as seven years.

As such, hanging onto a top quartile position is difficult and does not last for long, but the findings show that holding onto a top half performer might be a better choice. Performance in the top half is far stickier than top quartile performance. Furthermore, the pathways analysis demonstrated that funds can easily transition from top quartile to any of the other quartiles, and that the most common path taken is through the bottom quartile - the ranking that all participants try to avoid.

Therefore it seems intuitive to focus on top half performers, where these funds can sustain their position for as long as 11 years, with some sub categories demonstrating longer periods of top half performance within their sub category.

There is considerable scope for further research addressing these areas: whether persistent performance among open end non-listed funds is unique to Europe, its existence in the world of closed end, value added funds, the potential for momentum trading strategies as well as understanding the source of persistence performance, in terms of exposure to risk factors and the steps that managers could take to extend performance in the top half, and whether different patterns would emerge if a fund’s performance relative to a target return was used.

Some of the practical implications are canvassed below.

It may be possible to exploit persistent performance by using a momentum trading strategy, but the implementation challenges are daunting. The most significant one is likely to be liquidity. Given the non-listed nature of the funds analysed, liquidity may remain difficult even in the case of open end funds. In particular, trading of bottom performing funds may pose a considerable challenge.

A second implication relates to manager selection and track record. Our results, in relation to the duration of performance and the fact that performance persistence exists, may provide guidance in manager selection and in shaping expectations regarding performance.

Appendix 1

Sample statistics

Sample statistics

Table 1: Number of core open end European real estate funds

		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Core open end		**17**	**21**	**24**	**30**	**38**	**49**	**66**	**83**	**101**	**101**	**110**	**118**	**129**	**133**
By target country															
	Multi-country	2	2	4	7	12	18	28	37	42	42	42	49	53	58
	Single country														
	Germany					1	2	5	7	10	10	10	10	15	16
	Netherlands	8	8	8	10	10	12	13	14	19	19	23	26	29	26
	UK	6	10	10	11	11	12	13	17	23	23	25	21	20	21
	Other	1	1	2	2	4	5	7	8	7	7	10	12	12	12
By target sector	Multi-sector	7	8	10	13	18	26	36	45	51	52	58	66	69	77
	Single sector	10	13	14	17	20	23	30	38	50	49	52	52	60	56
By vehicle domicile	Germany	2	2	3	5	11	15	20	26	32	32	32	36	44	49
	Luxembourg				1	1	2	7	12	13	13	13	14	14	15
	Netherlands	8	8	9	11	11	14	18	20	25	25	29	30	33	30
	UK	2	2	3	4	4	5	7	10	14	14	14	15	14	14
	Other	5	9	9	9	11	13	14	15	17	17	22	23	24	25
By gearing levels (% of GAV)	≤ 40%	17	20	20	27	31	38	45	55	62	66	78	85	91	98
	> 40%		1	4	3	7	11	21	28	39	35	32	33	38	35
By vehicle size	< €500 million	13	15	16	20	23	32	36	50	63	60	63	63	74	72
	€500 million - €1 billion	2	3	4	4	8	9	17	21	26	25	26	33	32	37
	> €1 billion	2	3	4	6	7	8	13	12	12	16	21	22	23	24
By vintage year	< 2001	17	21	22	23	23	23	23	27	34	34	35	32	38	38
	2001 - 2007			2	7	15	26	43	54	61	60	63	60	60	57
	2008 - 2014								2	6	7	12	26	31	38

Table 2: Size of core open end European real estate funds (GAV € billion)

		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Core open end		**7.8**	**11.2**	**13.5**	**19.5**	**26.8**	**36.9**	**48.3**	**54.5**	**57.6**	**65.5**	**78.6**	**86.2**	**93.7**	**101.8**
By target country															
	Multi-country	0.8	1.4	3.4	5.6	8.2	12.9	23.0	31.4	33.3	34.6	35.5	35.8	37.3	41.8
Single country															
	Germany					0.1	0.6	1.3	2.7	3.3	3.7	3.7	3.2	4.9	5.4
	Netherlands	2.0	2.1	2.2	2.6	3.2	3.8	4.5	5.2	6.8	7.0	10.8	17.3	18.1	17.0
	UK	4.8	7.4	7.6	11.0	14.0	17.9	17.1	12.3	11.7	17.7	21.0	20.7	23.4	27.3
	Other	0.1	0.2	0.2	0.3	1.3	1.8	2.5	2.9	2.5	2.6	7.6	9.1	10.0	10.2
By target sector															
	Multi-sector	7.0	8.0	10.0	13.0	18.0	26.0	36.0	45.0	51.0	52.0	58.0	66.0	69.0	77.0
	Single sector	2.8	4.6	6.4	8.7	10.7	14.5	18.4	25.7	29.0	30.2	35.0	42.1	44.4	43.1
By vehicle domicile															
	Germany	0.8	1.4	2.1	3.3	5.3	7.9	11.5	14.1	16.9	17.2	16.5	15.3	18.5	20.9
	Luxembourg				0.1	0.5	1.3	4.9	11.0	10.5	11.6	12.6	13.4	13.8	16.3
	Netherlands	2.0	2.1	3.2	4.4	5.2	7.5	10.9	13.4	14.7	15.3	19.7	20.9	21.7	20.1
	UK	2.6	2.9	3.2	5.5	7.3	9.3	10.2	8.4	8.1	12.8	14.5	14.8	16.1	17.6
	Other	2.4	4.8	5.0	6.1	8.4	11.0	10.7	7.6	7.3	8.7	15.3	21.7	23.7	26.9
By gearing levels (% of GAV)															
	≤ 40%	7.8	11.1	10.5	17.4	23.7	31.3	34.9	30.8	31.9	42.8	53.3	62.2	70.8	84.4
	> 40%		0.1	2.9	2.1	3.1	5.6	13.3	23.7	25.6	22.8	25.3	24.0	23.0	17.3
By vehicle size															
	< €500 million	2.9	4.0	4.0	4.9	5.6	8.0	8.8	13.1	16.3	16.9	18.3	15.0	18.6	16.5
	€500 million - €1 billion	1.2	2.0	2.7	2.5	5.3	7.1	11.5	15.2	17.2	17.5	18.1	22.5	22.2	25.2
	> €1 billion	3.6	5.2	6.8	12.1	15.9	21.8	28.0	26.2	24.0	31.1	42.2	48.7	53.0	60.1
By vintage year															
	< 2001	7.8	11.2	13.1	18.1	22.2	27.8	27.2	25.2	25.2	30.9	32.7	33.2	37.2	38.8
	2001 - 2007				1.5	4.6	9.1	21.1	28.9	31.2	33.1	39.7	38.4	40.1	41.3
	2008 - 2014									1.1	1.5	6.3	14.5	16.5	21.6

Table 3: Performance of core open end European real estate funds (total return %)

		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Core open end		**7.1%**	**10.1%**	**8.3%**	**13.7%**	**13.0%**	**15.2%**	**1.7%**	**-12.6%**	**-4.2%**	**6.0%**	**4.6%**	**0.5%**	**3.5%**	**7.4%**
By target country															
	Multi-country	19.9%	19.4%	5.7%	7.6%	1.7%	8.8%	6.0%	-7.9%	-6.4%	1.7%	2.9%	-1.6%	1.4%	3.5%
Single country															
	Germany					13.0%	2.4%	7.4%	3.4%	3.7%	3.4%	4.9%	3.3%	1.7%	4.7%
	Netherlands	6.2%	10.1%	6.6%	8.6%	11.5%	13.7%	13.0%	0.9%	-1.7%	4.0%	3.9%	0.0%	-0.4%	3.4%
	UK	5.8%	9.2%	9.6%	17.2%	18.1%	18.4%	-4.5%	-23.2%	-3.6%	12.2%	6.3%	0.8%	8.0%	15.5%
	Other	5.4%	-1.6%	5.2%	6.0%	9.8%	18.0%	14.5%	-9.5%	-1.6%	6.9%	5.2%	6.5%	5.3%	3.8%
By target sector															
	Multi-sector	5.6%	8.1%	8.7%	16.7%	15.1%	16.6%	-0.6%	-15.0%	-4.1%	7.5%	5.3%	1.1%	5.6%	9.2%
	Single sector	10.1%	13.1%	7.7%	9.5%	9.3%	12.6%	6.5%	-8.4%	-4.3%	3.7%	3.3%	-0.4%	0.5%	4.5%
By vehicle domicile															
	Germany	19.9%	19.4%	5.1%	6.3%	-0.2%	5.9%	4.9%	2.1%	1.9%	0.3%	2.8%	0.7%	0.5%	-0.4%
	Luxembourg				5.4%	14.6%	11.5%	9.3%	-19.5%	-16.5%	5.4%	5.0%	-0.5%	6.1%	14.0%
	Netherlands	6.2%	10.1%	6.9%	9.3%	10.2%	14.7%	12.0%	-1.7%	-2.8%	3.5%	4.2%	0.1%	-1.6%	0.3%
	UK	6.0%	8.9%	8.0%	16.8%	17.3%	18.1%	-3.1%	-22.9%	-4.6%	11.8%	6.1%	-0.2%	7.6%	15.8%
	Other	5.5%	8.9%	10.1%	16.7%	17.8%	18.5%	-2.5%	-20.6%	-5.1%	10.1%	4.6%	1.7%	5.5%	8.9%
By gearing levels (% of GAV)															
	≤ 40%	7.1%	10.1%	8.6%	13.8%	13.3%	15.1%	0.4%	-12.7%	-1.5%	7.1%	5.0%	1.3%	4.5%	8.4%
	> 40%		10.3%	6.3%	11.2%	6.1%	16.6%	9.3%	-12.3%	-10.5%	2.0%	2.8%	-3.7%	-2.2%	-1.8%
By vehicle size															
	< €500 mn	6.3%	9.5%	6.6%	11.3%	6.9%	11.0%	9.2%	-6.6%	-2.4%	2.8%	3.6%	0.4%	0.0%	2.4%
	€500 mn - €1 bn	8.1%	9.2%	12.0%	16.5%	15.0%	18.0%	3.0%	-12.9%	-4.2%	6.6%	5.2%	0.9%	2.4%	6.1%
	> €1 bn	7.5%	10.9%	8.2%	14.1%	14.6%	15.9%	-1.1%	-16.1%	-5.8%	7.6%	4.7%	0.3%	5.2%	9.4%
By vintage year															
	< 2001	7.1%	10.1%	8.3%	13.6%	14.2%	16.2%	-1.5%	-15.7%	-0.6%	7.5%	5.3%	0.0%	3.5%	9.2%
	2001 - 2007			4.8%	16.5%	5.1%	11.6%	8.6%	-8.9%	-7.8%	4.2%	3.8%	0.9%	4.1%	7.0%
	2008 - 2014								1.1%	-3.8%	3.6%	4.4%	0.8%	2.1%	4.6%

Note: For confidentiality reasons performance figures are only shown when there are at least three vehicles

Appendix 2

Results from tracking performance through quartiles and halves

Results from tracking performance through quartiles and halves

Table 1: Persistence in quartiles among core open end funds - top quartile

Starting year	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
2001	5	3	1	0							
2002	6	3	1	1							
2003	6	4	4	2							
2004	8	6	3	0							
2005	10	7	2	1							
2006	13	5	3	0							
2007	17	7	2	0							
2008	21	10	1	0							
2009	26	6	2	1							
2010	26	9	2	0							
2011	28	8	2	1							
2012	30	8	4								
2013	33	20									
2014	34										

Table 2: Persistence in quartiles among core open end funds - second quartile

Starting year	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
2001	4	1	1	0	0						
2002	5	2	0	0	0						
2003	6	2	0	0	0						
2004	7	2	1	0	0						
2005	9	3	1	0	0						
2006	12	2	0	0	0						
2007	16	10	0	0	0						
2008	21	4	2	1	1						
2009	25	11	5	2	0						
2010	25	7	3	0	0						
2011	27	6	0	0							
2012	29	5	5								
2013	32	13									
2014	33										

Table 3: Persistence in quartiles among core open end funds - third quartile

Starting year	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
2001	4	2	0	0	0						
2002	5	2	1	1	1						
2003	6	1	1	1	0						
2004	7	4	2	0	0						
2005	9	4	1	0	0						
2006	12	2	0	0	0						
2007	16	3	1	1	0						
2008	20	6	3	0	0						
2009	25	10	4	3	0						
2010	25	9	5	0	0						
2011	27	10	2	0							
2012	29	7	3								
2013	32	14									
2014	33										

Table 4: Persistence in quartiles among core open end funds - bottom quartile

Starting year	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
2001	4	2	0	0	0	0	0				
2002	5	2	1	1	0	0	0				
2003	6	3	1	0	0	0	0				
2004	8	3	2	1	0	0	0				
2005	10	6	1	0	0	0	0				
2006	12	2	1	1	0	0	0				
2007	17	12	7	1	0	0	0				
2008	21	14	3	1	1	1	1				
2009	25	5	2	2	1	1					
2010	25	12	9	7	5						
2011	28	17	14	8							
2012	30	21	13								
2013	32	16									
2014	33										

Table 5: Summary of persistence in quartiles among core open end funds

		Number of occurrences									
		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
All funds	Top quartile	263	96	27	6	0	0	0	0	0	0
	Second quartile	251	68	18	3	1	0	0	0	0	0
	Third quartile	250	74	23	6	1	0	0	0	0	0
	Bottom quartile	256	115	54	22	7	2	1	0	0	0
Multi-country	Top quartile	87	47	25	12	5	2	1	0	0	0
	Second quartile	80	26	2	0	0	0	0	0	0	0
	Third quartile	81	27	4	0	0	0	0	0	0	0
	Bottom quartile	90	33	6	1	0	0	0	0	0	0
Single country	Top quartile	160	60	16	3	0	0	0	0	0	0
	Second quartile	156	45	12	4	1	0	0	0	0	0
	Third quartile	149	38	7	1	0	0	0	0	0	0
	Bottom quartile	159	65	25	5	1	0	0	0	0	0
Multi-sector	Top quartile	140	45	10	3	0	0	0	0	0	0
	Second quartile	131	31	8	3	1	0	0	0	0	0
	Third quartile	129	31	3	0	0	0	0	0	0	0
	Bottom quartile	136	58	27	13	5	1	0	0	0	0
Single sector	Top quartile	126	58	27	9	4	2	1	0	0	0
	Second quartile	118	26	7	2	1	0	0	0	0	0
	Third quartile	117	41	17	8	4	1	0	0	0	0
	Bottom quartile	123	52	22	8	3	0	0	0	0	0

Note: For a summary of all the sub categories please contact INREV

Table 6: Persistence in halves among core open end funds - top half

Starting year	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
2001	9	6	3	1	0	0	0	0	0	0	0
2002	11	8	6	5	5	1	1	1	1	1	1
2003	12	8	7	7	1	1	1	1	1	1	0
2004	15	12	12	2	2	2	2	2	2	0	0
2005	19	16	6	3	3	2	2	2	0	0	
2006	25	13	7	7	4	4	4	0	0		
2007	33	22	14	8	7	6	2	1			
2008	42	28	11	8	7	3	1				
2009	51	27	20	13	7	5					
2010	51	36	19	11	9						
2011	55	32	20	15							
2012	59	35	28								
2013	65	48									
2014	67										

Table 7: Persistence in halves among core open end funds - bottom half

Starting year	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
2001	8	6	3	2	2	2	0	0	0		
2002	10	7	4	4	4	0	0	0	0		
2003	12	8	7	6	1	0	0	0	0		
2004	15	11	7	1	0	0	0	0	0		
2005	19	13	7	1	0	0	0	0	0		
2006	24	11	3	2	1	1	1	1	1		
2007	33	22	18	5	2	2	1	1			
2008	41	32	14	9	8	6	2				
2009	50	26	21	19	17	10					
2010	50	36	29	25	17						
2011	55	36	29	19							
2012	59	38	26								
2013	64	46									
2014	66										

Table 8: Summary of persistence in halves among core open end funds

		Number of occurrences													
		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14
All funds	Top half	514	291	153	80	45	24	13	7	4	2	1	0	0	0
	Bottom half	506	292	168	93	52	21	4	2	1	0	0	0	0	0
Multi-country	Top half	200	109	60	34	19	8	3	2	1	0	0	0	0	0
	Bottom half	196	112	61	36	21	10	4	2	1	0	0	0	0	0
Single country	Top half	316	185	95	49	26	13	6	4	3	2	1	0	0	0
	Bottom half	308	178	106	63	37	18	5	3	2	1	0	0	0	0
Multi-sector	Top half	271	137	59	27	13	5	0	0	0	0	0	0	0	0
	Bottom half	265	139	68	32	18	9	4	2	1	0	0	0	0	0
Single sector	Top half	244	138	83	53	35	24	17	11	7	4	2	1	0	0
	Bottom half	240	137	83	50	28	11	2	0	0	0	0	0	0	0

Note: For a summary of all the sub categories please contact INREV

Appendix 3

References and bibliographies

References and bibliographies

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