

Does specialisation lead to improved investment performance? **2018**

Research | Academic Paper

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.

INREV

Ito Tower, 8th floor

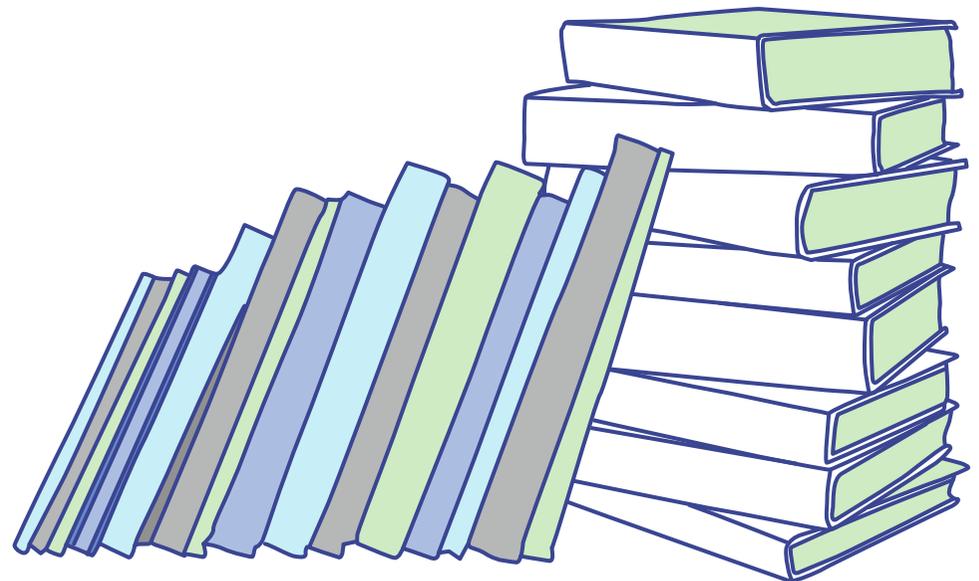
Gustav Mahlerplein 62

1082 MA Amsterdam, The Netherlands

+31 (0)20 235 86 00 | research@inrev.org | www.inrev.org

© Vereniging INREV

This document, including but not limited to text, content, graphics and photographs, are protected by copyrights. You agree to abide by all applicable copyright and other laws as well as any additional copyright notices or restrictions contained in this document and to notify INREV in writing promptly upon becoming aware of any unauthorised access or use of this document by any individual or entity or of any claim that this document infringes upon any copyright, trademark or other contractual, statutory or common law rights and you agree to cooperate to remedy any infringement upon any copyright, trademark or other contractual, statutory or common law rights.



Contents

Executive summary 4

Sections

1. Introduction 6

2. Previous studies 8

3. Data 10

4. Methodology 20

5. Results 22

6. Conclusions 27

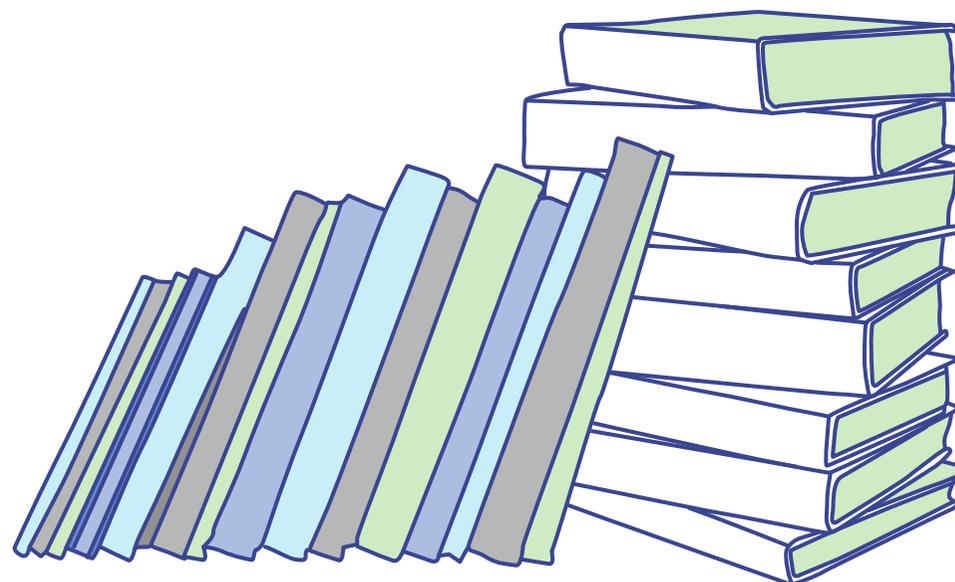
Appendices

1. Country coverage in the sample and IPD index 29

2. Regression estimates 31

3. GAV distribution over time 40

4. References 44



Executive summary

- > Specialist funds outperformed generalist funds on average over the period 2001 to 2017
- > Single sector single country funds performed most strongly, while multi sector multi country funds performed weakest over the research period
- > Higher leverage has been associated with weaker performance over the past 15 years, while smaller funds have tended to underperform

Is a portfolio of specialist funds likely to perform better than one or a few generalist funds? Does specialisation lead to improved investment performance? This study addresses these questions by analysing the investment performance of specialist and generalist European non-listed real estate funds.

The analysis was based on the annual performance of 445 European non-listed real estate funds over the period 2001 to 2017, providing a set of 2605 observations.

The research found that single sector funds outperformed multi sector funds, delivering returns that were 1.4 percentage points higher per year on average. Similarly, single country funds outperformed multi country funds by over 2.1 percentage points per year on average. This pattern of performance was also reflected in the risk-adjusted returns for these fund groupings.

Combining sector and country strategies together, specialist funds - those with a single sector single country strategy - outperformed less specialist strategies, both single sector multi country and multi country multi sector strategies.

Of all the combinations of sector-country strategies, single sector single country funds delivered the strongest returns (4.5% p.a.) and multi sector multi country funds the weakest (1.2% p.a.).

However, market factors and fund characteristics should not be ignored. Previous research has shown that they can have a significant influence on performance. Such influences include the markets where the fund invests and the associated risks, as well as the fund's size, leverage, vintage, structure and style.

But even accounting for the impact of these factors, this analysis shows that specialisation still had a positive impact on performance, again confirming earlier studies. Single sector single country, sector and country specialists all outperformed multi country multi sector funds. However, the differences in returns between single sector funds, either single country or multi country, and multi sector funds are not statistically significant.

Analysing the impact of fund characteristics on performance confirmed the findings of previous studies. There was new evidence of the negative impact of highly leveraged funds,

the underperformance of smaller funds and the outperformance of funds launched after 2008.

The underperformance of multi country funds was therefore down to a simple allocation effect. A market index, the INREV All Funds Index, shows similar results, while mimicking the allocations of diversified funds with a portfolio of single country single sector funds also produces underperformance.

This means that building a diversified portfolio from a selection of specialist funds does not necessarily yield higher returns than investing in a diversified fund. In turn, it remains critical to adopt a thorough due diligence process when carrying out fund selection.

‘Fund selection is critical in portfolio construction. A portfolio of specialist funds may not necessarily outperform a few generalist funds’

Introduction

In deciding how to invest, a fundamental choice is whether to use a range of specialist funds or to rely on others to make decisions about which country or which sector to invest in. This study helps inform this decision by exploring the differences in investment performance between specialist funds and multi country or multi sector funds.

The study analyses the annual investment performance of specialist and generalist European non-listed real estate funds (NREFs) over the period 2001 to 2017.

There have been some studies on whether specialisation improves performance in REITs, but relatively little such research has been conducted on non-listed real estate vehicles.

For the purposes of this study, a specialist is defined in two dimensions: sector specialist and country specialist. A sector specialist is a fund that only invests in a single sector, whereas a country specialist is a fund that only invests in a single country.

Note that single or multi sector or country is self-defined in the INREV universe of funds.

NREFs not only differ from one another in the breadth of their asset allocation but also in their structures (closed end or open end), investment strategies (core, value added or opportunity) and other characteristics (gearing, size and vintage), which potentially will have a significant impact on performance. It is therefore important to control for these structural differences to avoid biased and

inaccurate estimates of the impact of specialisation. After some simple analysis of the data, a random effects panel regression is used.

This approach to analysing performance looks at the differences in performance between specialists and generalists after controlling for fund characteristics and market risk. The study also explores some of these characteristics, including size, leverage, vintage and the effect of excluding UK only funds, in more detail.

This research was carried out by:

- Nick Mansley, Executive Director of Real Estate Research Centre, University of Cambridge
- Zilong Wang, Research Associate, University of Cambridge
- Franz Fuerst, Professor in Real Estate Finance, University of Cambridge

The research team had guidance and support from the project focus group:

- Maarten Jennen, Real Estate Strategist, PGGM
- Mark Long, Head of Real Estate Strategy, Orchard Street
- Iryna Pylypchuk, Senior Market Analyst – European Real Estate Research, Fidelity International

- Felix Schindler, Head of Research, Warburg-HIH Invest Real Estate GmbH
- Hans Vrensen, Head of Research, AEW

INREV thanks both the research team and the focus group for their contributions to this paper.

Literature review

A number of studies have explored the impact of fund characteristics on performance. Based on data from Preqin for US funds (value added and opportunity funds only) over the 1980 to 2009 period, Tomperi (2010) found that a fund's realised returns are positively linked to size, after controlling for investment style, managers' experience, GDP, inflation and the direct real estate market. Alcock et al. (2013) examined the role of financial leverage in the performance of private equity real estate funds (PEREs). Using global real estate funds from the Property Funds Research database over the 2001 to 2011 period, they found that leverage does not enhance performance during stable or up market periods and that as one would expect, leverage has a negative effect on performance during down market periods.

Focusing on European real estate funds, Fuerst and Matysiak (2013) used INREV data over the 2001 to 2007 period, finding that fund size, investment style, gearing and distribution yield are important factors for fund performance. Using the same dataset and extending the end date to 2012 to cover the global financial crisis period, Fuerst, Lim and Matysiak (2014) explored the asymmetric effect of leverage on fund performance. They found that the magnitude of the leverage effect is lower in up market periods than in down market periods. Furthermore, their results showed that younger funds (aged 3 years or less) on average produced lower returns.

Delfim and Hoesli (2016) made a comprehensive study analysing risk factors that have an impact on European NREFs. They considered both fund specific characteristics and macroeconomic factors. Using INREV data for the period 2001 to 2014 they found that investment style, vehicle structure, size and gearing are important factors in determining fund returns. Furthermore, they highlighted that investors should pay more attention to certain fund characteristics during different phases of economic cycles. Open end funds had limited losses compared with closed end funds. Core funds did better than value added funds in the immediate post-crisis period. The Delfim and Hoesli study also noted that over their sample period 2001-2014, returns did not differ significantly by country, but office and industrial funds underperformed retail funds.

Focusing on the main question of this study – whether specialisation leads to improved investment performance – Chen and Peiser (1999) examined the risk and returns of US REITs over the 1993 to 1997 period, finding that property type diversified REITs underperform in terms of both absolute and risk adjusted return. Ro and Ziobrowski studied US REITs between 1997 and 2006, a later period than Chen and Peiser. By using both CAPM and Fama-French three factor models, they found property type specialised REITs do not outperform diversified REITs, after adjusting for risk.

Focusing on specialisation and non-listed real estate vehicles, Hisher and Hartzell (2016) explored whether US funds specialised on either property type or geography outperform diversified funds. Based on data from Burgiss for 1980- 2013, using dummy variables to capture funds with allocations of more than 75% of investments in any single region or property type, or in development, they found that specialisation has a limited effect on fund performance. Their sample consisted only of value added and opportunity funds and was mainly focused on investing in North America. One limitation of the data from Burgiss was that leverage was not provided. Farrelly and Stevenson (2016) examined the drivers and characteristics that influence the performance of private real estate funds in the US. By using the Herfindahl Index to measure property type and regional concentration, they found that property type specialisation has no effect on fund performance, while regional specialisation has a positive effect. They used data from the Townsend Group for US focused closed end value added and opportunity funds with vintage years between 1990 and 2008. Furthermore, leverage was not analysed in their study. This study differed from previous studies of non-listed real estate vehicles in that it used INREV data for European funds, covered a substantial number of core funds and integrated the effect of leverage.

Data

The analysis for this study was carried out using data from the INREV Annual Index. The INREV Annual Index measures net asset value performance of European non-listed real estate funds on an annual basis. The INREV dataset includes 3,631 fund-year observations over the period 2001 to 2017.

The main task of this study was to investigate how specialisation at a sector or country level affects fund total returns. An important factor that needs to be controlled for is market risk. Funds allocate their assets to various sectors and countries and consequently have differing market exposures. Instead of using European property market returns to capture a general level of market risk (which is explored later), this study primarily uses weighted market returns (WMRs), which are unique for each fund in each year.

The WMR is constructed by aggregating the value weighted returns of the individual sector and country specific allocations of each fund in each year. Thus, the WMR expresses what the anticipated portfolio return would have been, had the individual properties that the fund holds performed exactly in line with the sector and country averages. To be able to construct the WMR, both the allocations of the fund and the market returns for each sector in each country are needed. Therefore, this study used the MSCI Investment Property Databank (IPD) index to measure the average performance of each sector, in each country.

If the funds hold cash, the three-month interbank rate in their domicile country was employed as the measure of cash return.

In order to compute the WMR and deal with extreme values, this study used the following data filtering and adjustment procedure:¹

- Observations are excluded if the development allocation is larger than 10% (4 observations).
- Observations are excluded if there is no market (MSCI/IPD) data for more than 20% of the fund's country allocations (304 observations).
- Observations are excluded if the student housing allocation is larger than 20% (464 observations).
- Observations are excluded if less than 50% of the allocation breakdown is reported (43 observations).
- Observations from 2001 are excluded (29 observations) but are included as lags from 2002 onwards.
- Parking, leisure, care and aged care were combined with other niche segments in the 'other' category. In the absence of return information for these niche segments, the IPD index was assumed to be the market return.
- Interpolate missing observations. Gaps in asset allocation are filled using linear interpolation when the previous and following years' data are available and the gap is no larger than one observation. The previous year's asset allocation is used when the missing value occurs at the end of the time series. The following year's asset allocation is used when the missing value occurs at the start of the time series. In total 221 missing values are interpolated with these methods. The interpolation appears justified as asset allocations are relatively stable and do not change rapidly over the time periods observed in this study.
- Exclude outlier observations if the fund returns are below the 1st percentile or above the 99th percentile of the sample (77 observations).

¹ Appendix 1 shows the sample's country allocation and the IPD index coverage.

Analysis of the data by sector

An exploratory analysis of the average current asset allocation by sector shows that the office and retail sectors have the highest allocations whether the sample is taken as a whole, or for single sector funds or multi sector funds alone.

The office sector represents 32.0% of the overall sample, while retail follows closely with 30.9%. Industrial / logistics comes next, comprising 16.0% of the overall sector allocation, followed by residential with 7.7%. These four sectors, often considered as 'mainstream sectors' in Europe, represent 86.6% of the overall sector allocation. The remaining 13.4% is made up of 'other' sectors, which include hotel, development, student housing and other unspecified sectors.

There are some notable differences in the sector allocation of single sector funds versus multi sector funds. Multi sector funds have a much higher allocation to the office sector than single sector funds, while single sector funds have greater exposure to the residential sector than multi sector funds. Single sector funds also have higher allocations to the retail and industrial / logistics sectors than multi sector funds.

Figure 1: Allocation by sector - all

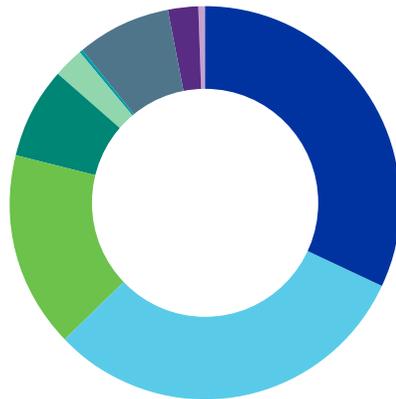
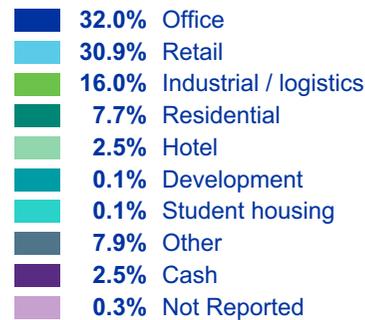


Figure 2: Allocation by sector - single sector funds

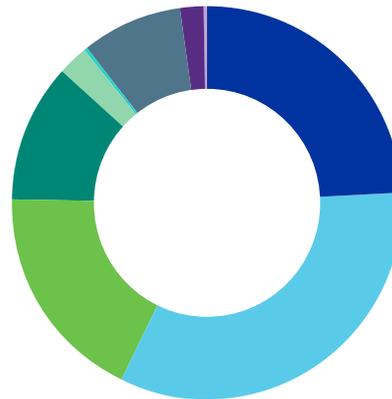
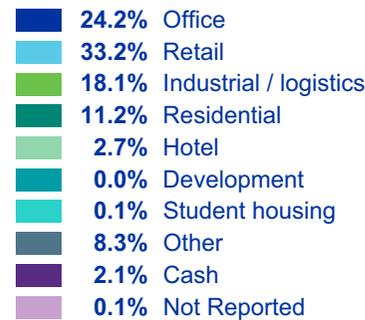
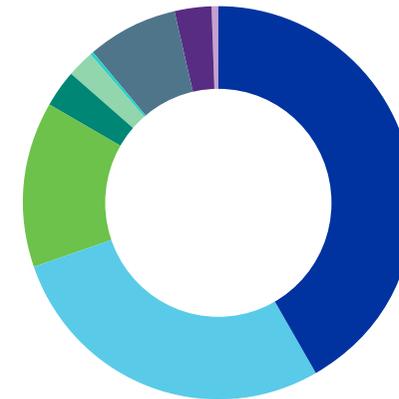
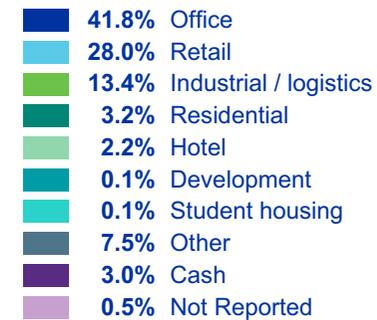


Figure 3: Allocation by sector - multi sector funds



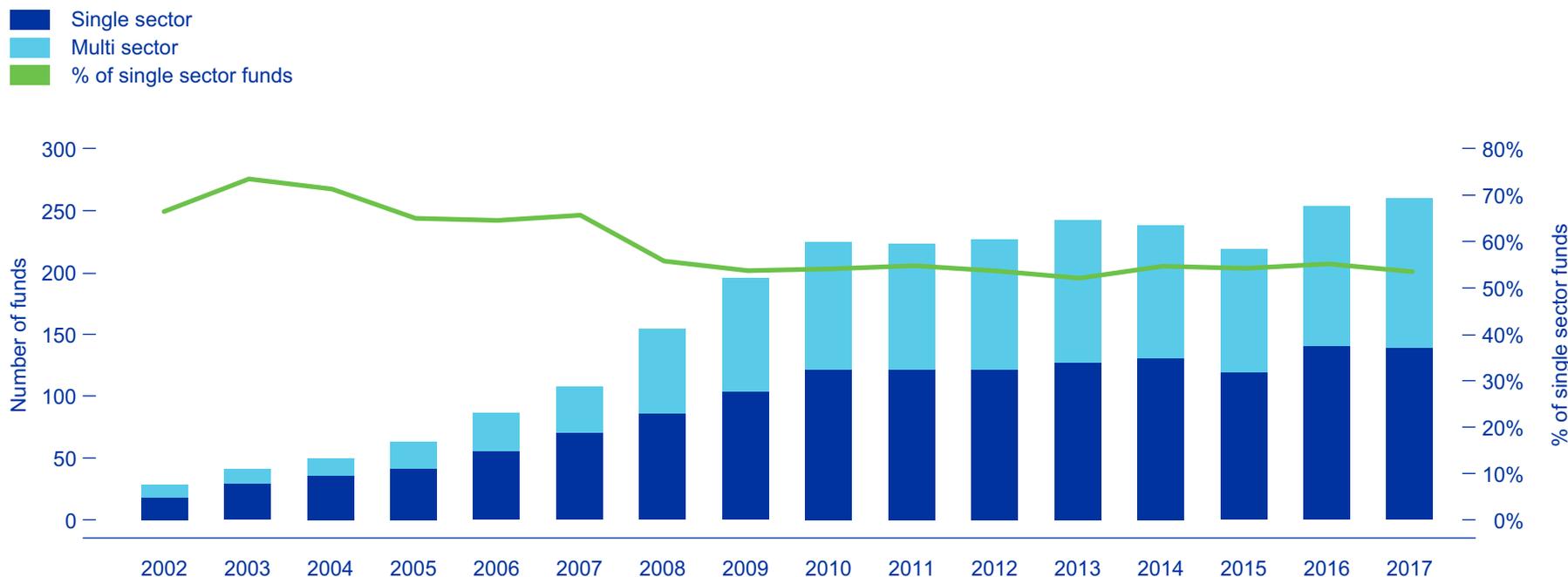
The sample² was separated into single sector and multi sector funds, with variations in composition measured over time.

The analysis shows that single sector funds dominated the sample throughout the research period, but to a much larger extent in the earlier than the later years.

Single sector funds represented around two-thirds of the sample prior to 2008, and as much as 73.2% in 2003. Since 2008, their share has fallen to around 54.1% on average over the past 10 years. However, the number of single sector funds in the sample exceeded 100 by 2009 and has continued to remain high, reaching as many as 140 funds in 2016.

Meanwhile, the proportion of multi sector funds increased significantly between 2002 and 2008, from just one-third in 2002 to almost half, 44.5%, by 2008. Since 2008, their share has stabilised at Multi sector funds broke the 100-fund barrier in 2010 with 103 funds, and reached a peak of 121 funds in 2017.

Figure 4: Single sector versus multi sector funds across time



² GAV distribution over time across single sector and multi sector is shown in Appendix 3.

Single sector funds outperformed multi sector funds during the immediate pre-GFC and post-GFC periods. Returns to single sector funds have been very similar to those of multi sector funds throughout the rest of the research period.

On an unweighted or 'equally weighted' basis, single sector funds consistently outperformed multi sector funds in the years prior to 2006 and post-2013. Out or under performance was marginal in most years, with the largest difference in 2006 when multi sector funds outperformed single sector funds by 430 basis points. On a value weighted basis, the outperformance of single sector funds was more extreme in the earlier years.

Average returns for the research period stood at 4.3% and 2.7% respectively for single sector and multi sector funds, on an unweighted basis, and 6.1% and 4.8% respectively on a NAV-weighted basis. This indicates that, for this sample, larger funds performed better than smaller funds, on average.

More extreme performance was observed for the INREV All Funds Index³ than was seen in either the single sector or multi sector groups. The most extreme observation was in 2008 when the INREV All Funds Index delivered -19.8% while the value weighted returns of single sector and multi sector funds were -14.6% and -14.1% respectively.

³ A net asset value weighted index that includes all the observations that were excluded from this research sample, as indicated on page 10.

Figure 5: Average return by sector - unweighted

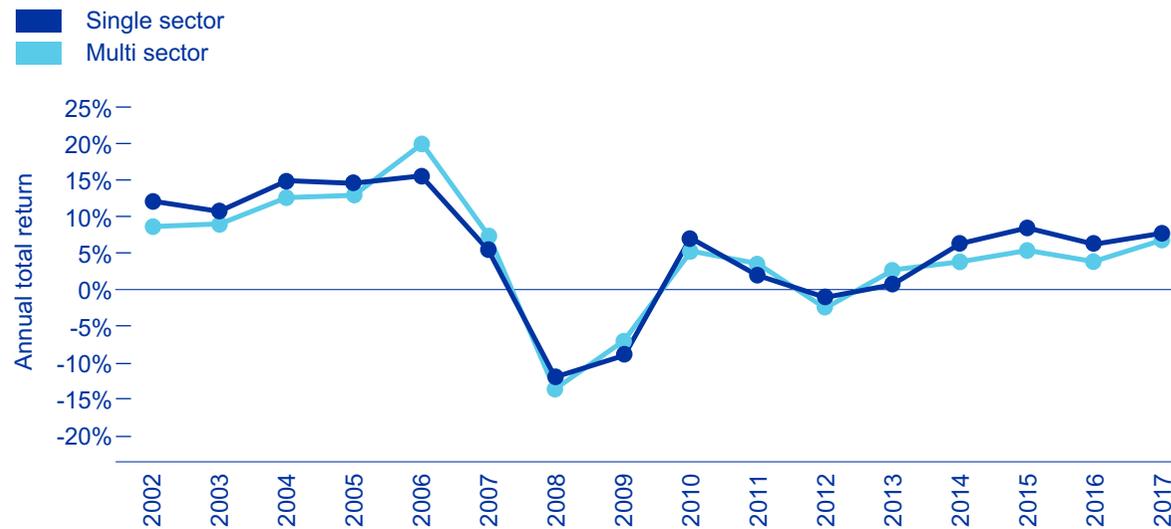
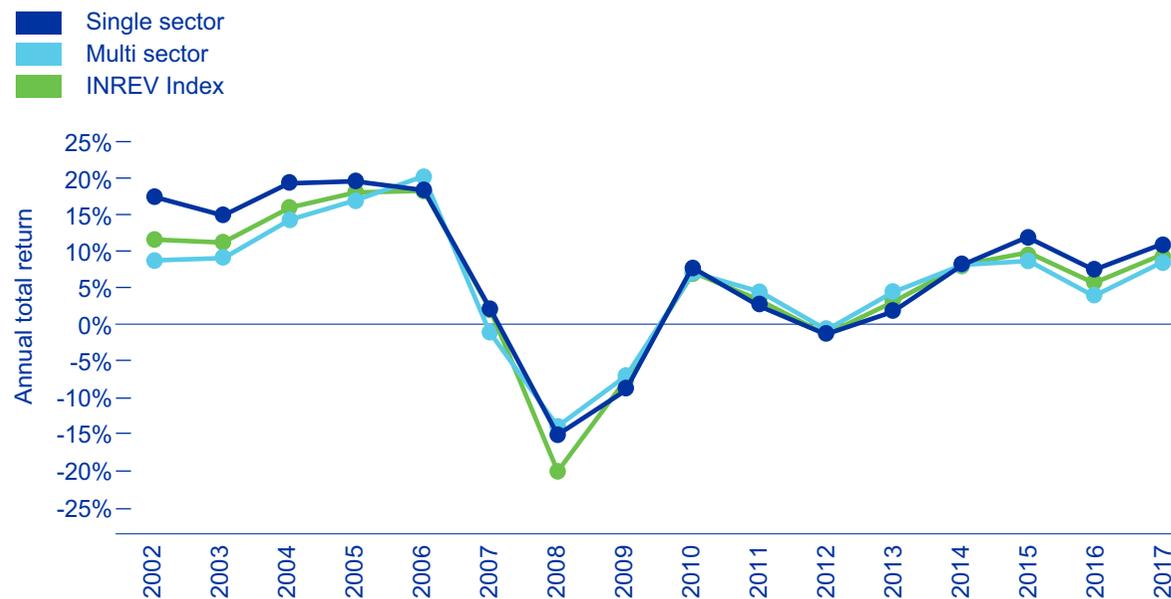


Figure 6: Average return by sector - weighted



Analysis of the data by country

An analysis of the average current asset allocation by country shows that the greatest exposure is to the UK, representing one quarter of the whole sample. Germany, the Netherlands and France follow next, with double digit allocations. Italy is close behind, comprising 9.0% of the total sample.

There is a significant difference between the country allocations of single country and multi country funds. The UK and the Netherlands are the largest target markets for single country funds while Germany and France are largest for multi country funds.

Over one-third, 36.0%, of all single country funds' total allocation is to the UK, while the UK exposure of multi country funds is just 6.0%. The Netherlands shows a similar pattern, though to a smaller degree than the UK. At the other end of the spectrum, multi country funds have far greater exposure to France than single country funds, at 18.0% versus 8.0%, and greater exposure to a wider range of countries.

Figure 7: Allocation by country - all

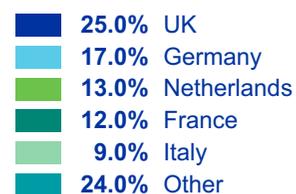
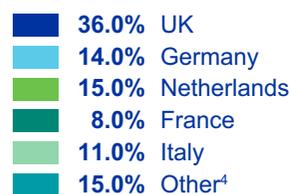
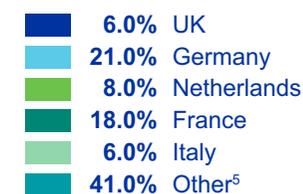


Figure 8: Allocation by country - single country funds



⁴ Other consists of Finland (3.7%), Sweden (3.2%), Switzerland (1.3%), Portugal (1.2%), Norway (1.1%) and Austria (1.1%).

Figure 9: Allocation by country - multi country funds



⁵ Other consists of Portugal (6.6%), Finland (5.5%), Poland (5.0%) with the remaining 22.8% being in other countries.

The sample⁶ was separated into single country and multi sector country funds, and the variations in the compositions were observed over time.

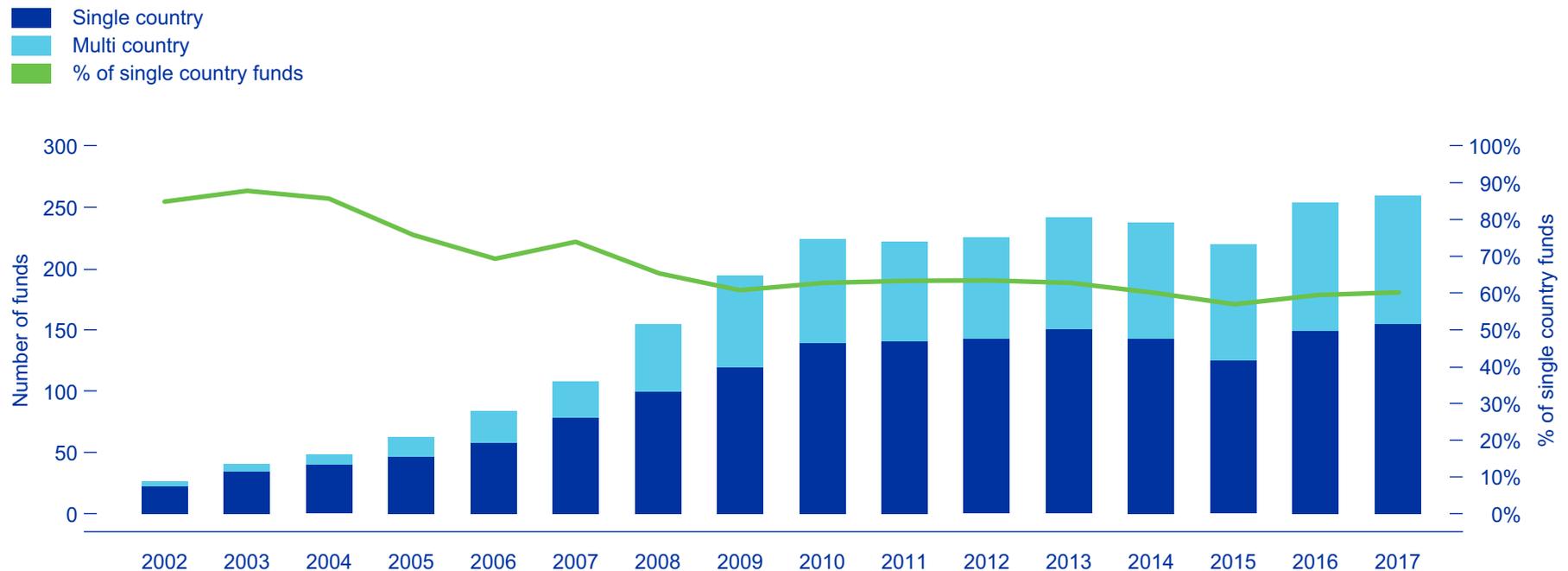
Similar to the observations in the sector analysis, single country funds dominated the sample throughout the research period, though to a much larger extent in the earlier

than in the later years. They still represent around 60.0% of the sample.

Single country funds represented 85.7% of the sample before 2005. From 2008 onwards, their share fell to 65.2% or lower, while single sector funds fell to 55.5%. By 2008, the number of single country funds in the sample exceeded 100 and by 2017 had reached 154.

The proportion of multi country funds increased significantly in 2008 and has represented 38.5% of the sample on average over the past ten years. The number of multi country funds in the sample did not exceed 100 until 2016. By 2017, there were 104 multi country funds in the sample.

Figure 10: Single country versus multi country funds across time



⁶ GAV distribution over time across single country and multi country is shown in Appendix 3.

Over time, the average returns of single country funds were higher than those of multi country funds.

There were some exceptions. During the global financial crisis years, 2007 and 2008, the UK underperformed, dragging down the performance of single country funds. Single country funds outperformed multi country funds in almost all other years. Similar to the sector analysis, on a value weighted basis the outperformance of single country funds was more extreme, especially in 2008.

Over the research period, unweighted average returns for single country and multi country funds were 4.3% and 2.2% respectively; they were 6.6% and 3.5% respectively on a NAV-weighted basis.

The INREV All Funds Index showed more extreme performance than was seen for either the single country or multi sector country funds. The most extreme case was in 2008 when the INREV All Funds Index delivered -19.8%, while the value weighted returns of single country and multi country funds were -18.3% and -8.2% respectively. These reflect the exclusion of some observations according to the criteria mentioned earlier.

Figure 11: Average return by country - unweighted

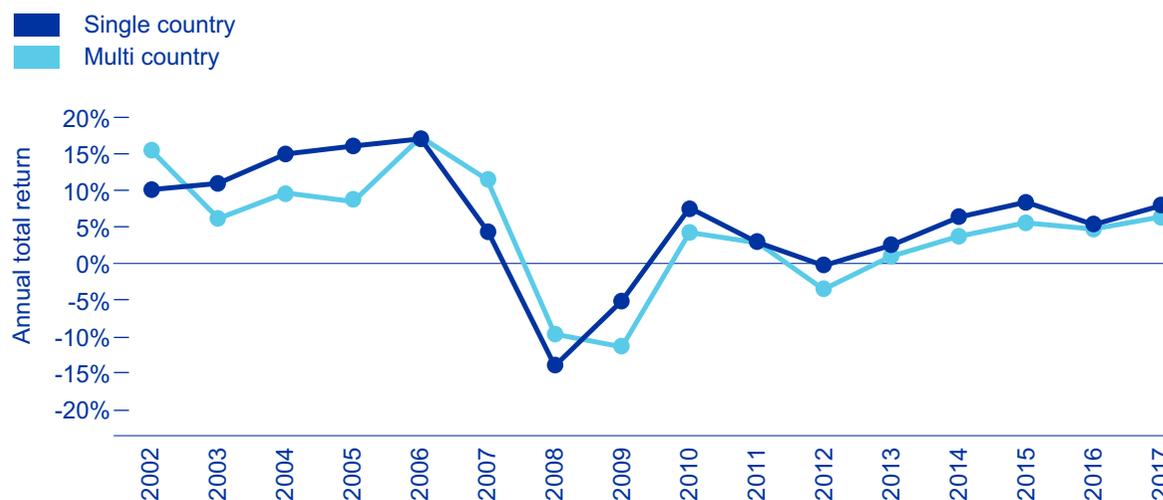
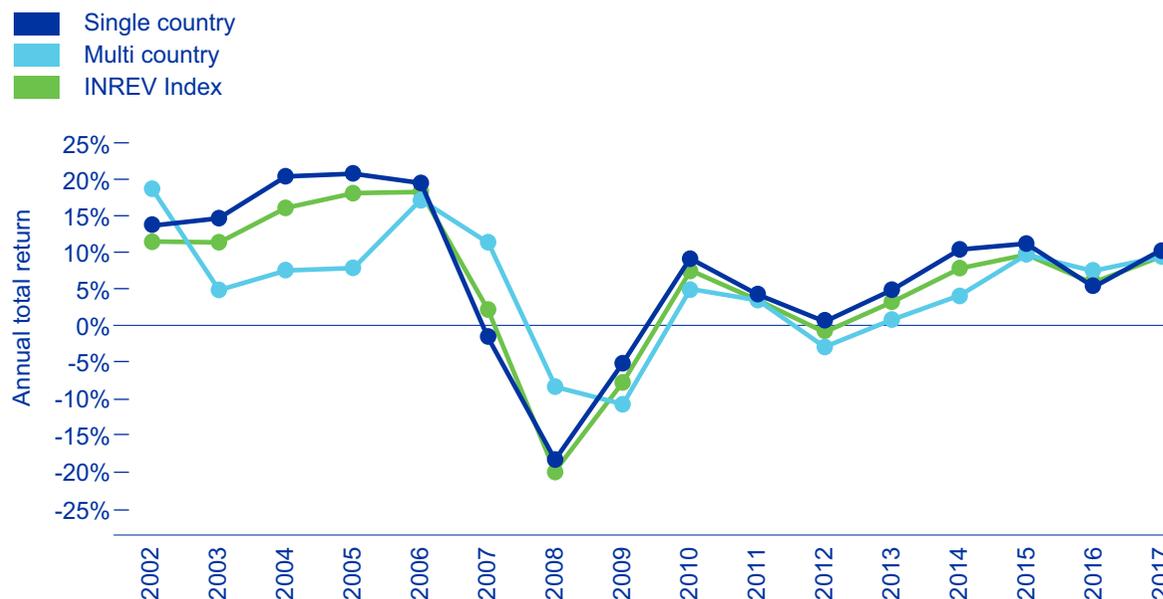


Figure 12: Average return by country - weighted



Analysis of the data by combinations

The funds⁷ were divided into four additional categories for further analysis:

- SCSS – single country single sector
- SCMS – single country multi sector
- MCSS – multi country single sector
- MCMS – multi country multi sector

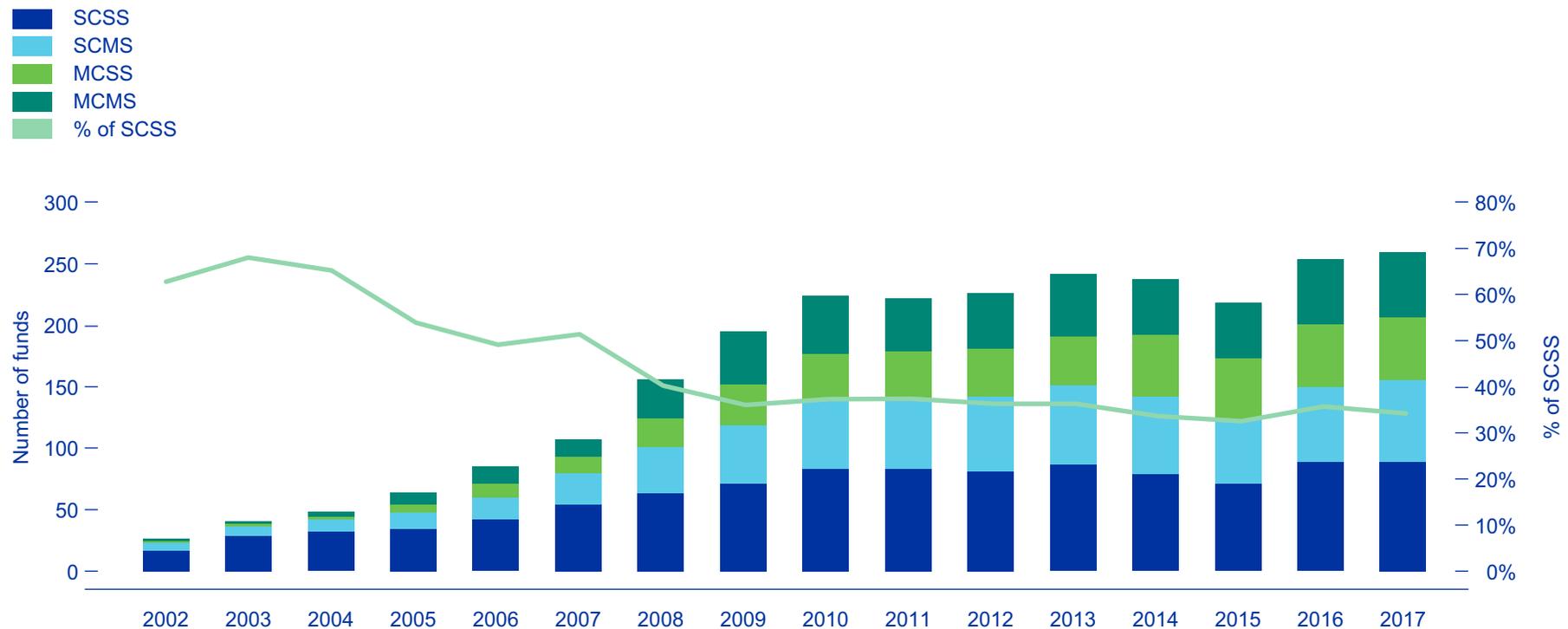
SCSS denotes the most specialised of the fund categories, while MCMS denotes the most diversified, with SCMS and MCSS sitting in between.

The degree of specialism has varied over time, from being mostly specialised in the earlier years to a more even distribution of the four fund categories in more recent years. At the beginning of the research period, SCSS funds dominated, representing 63.0% of the sample. By 2010 this proportion had fallen to 37.5%, and has stabilised around 35.4% on average over the past seven years. However, SCSS funds continue to be the largest category of funds.

At the other end of the spectrum, the presence of diversified funds (MCMS) has increased, from 7.3% in 2003 to circa 19.7% since 2007. On average, this represents the third largest category of funds.

The second largest group are SCMS funds. These funds comprised 19.5% of the sample at their lowest point and 27.0% at their highest. Meanwhile, MCSS funds comprised 14.7% of the sample on average.

Figure 13: Four categories of funds across time



⁷ GAV distribution over time across SCSS, SCMS, MCSS and MCMS is shown in Appendix 3.

Summary statistics

Panel A shows the summary statistics of the returns for the broad categories of funds.

The total return of single sector funds was higher on average than that of multi sector funds, whether on an equally weighted or value weighted basis. However, single sector funds show slightly more variation in returns, demonstrated by a higher standard deviation than multi sector funds.

Similarly, the performance of single country funds was also higher than that of multi country funds on average, whether on an equally weighted or value weighted basis. However, unlike sectors, single country funds have a slightly lower standard deviation than multi country funds, indicating greater volatility in returns for multi country funds.

Panel B shows summary statistics for the returns of the funds divided into four categories by degree of specialism. The SCSS funds show the highest total return and MCMS funds the lowest. MCSS funds show the highest volatility and SCMS funds the lowest.

These results correspond to earlier findings.

Table 1: Summary Statistics

	Weighted Average	Mean	Standard Deviation	First Quartile	Median	Third Quartile	Min	Max	N
Panel A									
Full Sample	5.6	3.5	12.9	-1.9	4.7	10.3	-50.6	42.4	2605
Single Sector	6.1	4.1	12.9	-1.2	4.9	11.0	-50.6	42.4	1456
Multi Sector	4.8	2.7	12.7	-2.5	4.5	9.8	-49.3	41.7	1149
Single Country	6.6	4.3	12.7	-0.6	5.2	10.9	-49.3	41.5	1657
Multi Country	3.5	2.2	13.0	-3.9	3.7	9.0	-50.6	42.4	948
Panel B									
SCSS	7.4	4.5	12.9	-0.6	5.0	11.2	-45.9	41.5	1009
SCMS	6.2	4.0	12.6	-0.6	5.6	10.7	-49.3	40.9	648
MCSS	5.7	3.3	13.1	-2.8	4.5	10.4	-50.6	42.4	447
MCMS	4.4	1.2	12.8	-4.5	2.8	7.9	-48.4	41.7	501

Methodology

A random effect panel regression is employed to identify the drivers of differences in performance between specialist and generalist funds. Since there are unobserved fund characteristics affecting fund returns, random effect estimation allows us to control for unobserved fund characteristics. Another advantage of using random effects is that the model can include time invariant variables.⁸ Furthermore, year dummy variables are employed to control for unobserved time effects on the fund return.

The baseline model uses the following specification:

$$\text{Total Return}_{it} = \alpha + \beta_1 WMR_{it} + \beta_2 \text{SingleSector}_{it} + \beta_3 \text{SingleCountry}_{it} + \beta_4 X_{it} + \gamma_i + \varepsilon_{it} \quad (1)$$

Where *WMR* is the weighted market return, and *SingleSector* is a dummy variable that takes the value of 1 if the fund is a single sector fund and 0 otherwise. *SingleCountry* is a dummy variable that takes the value of 1 if the fund is a single country fund and 0 otherwise. *X* includes a set of variables that measure the fund's characteristics. The error term includes two components: γ_i and ε_{it} , where γ_i captures the unobserved individual fund effect.

⁸ Conventional fixed effect estimation method will remove time invariant variable automatically. Alternatively, using dummy variables to capture each fund's unobserved characteristics would use up too many degrees of freedom.

This study also tests the performance of fund specialisation by dividing the funds into four categories. The regression formula is shown below:

$$\text{Total Return}_{it} = \alpha + \beta_1 WMR_{it} + \beta_2 SCSS_{it} + \beta_3 SCMS_{it} + \beta_4 MCSS_{it} + \beta_5 X_{it} + \gamma_i + \varepsilon_{it} \quad (2)$$

Where *SCSS* is a dummy variable that takes the value of 1 if the fund is a single country single sector fund, and 0 otherwise. *SCMS* is a dummy variable that takes value of 1 if the fund is a single country multi sector fund. *MCSS* is a dummy variable that takes value of 1 if the fund is a multi country single sector fund.

Alternative models

Alternative models were introduced to capture the effects of fund characteristics.

Size and leverage effects

Regarding the fund's characteristics, this study uses the logarithm of GAV (*lnGAV*) to capture the size of the fund and uses the lag of gearing (*Gearing_{t-1}*) to capture the leverage of the fund.

Structure effect

To capture the fund structure effect, this study adds a dummy variable *Openend*, which takes the value of 1 if the fund is open end and 0 if the fund is closed end.

Style effect

To capture the fund investment style effect, a dummy variable *Core* is added, which takes

the value of 1 if the fund's investment style is core and 0 if the style is value added.⁹

J-curve effect

Previous literature has suggested a J-curve effect, i.e. funds tend to produce negative returns in their earlier years and deliver higher returns the later years. To capture the J-curve effect, this study employs a dummy variable *Young2*, which takes the value of 1 if the fund age is less than or equal to 2 years. The NAV calculation method is not INREV NAV, because the INREV method gradually writes off the initial costs, therefore reducing the J-curve effect.

Vintage effect

In order to test the vintage effect, a variable *Vintage* is introduced, which uses the year of first closing minus 1998, then converts all negative values to 0, because there are funds launched during the 1970s and 1980s in the dataset, which could affect the results of the vintage effect. Thus, funds launched before 1998 have a Vintage value 0.

Crisis effect

In order to test how fund performance is affected by its characteristics during the financial crisis period, this study introduces a crisis dummy variable, which takes value of 1 if the year is in 2007, 2008 or 2009, then interacts the crisis variable with fund structure and investment style.

⁹ In the dataset provided by INREV, there are no opportunity funds.

Initial findings

Several conclusions can be drawn from the t-tests of the total annual returns, which examine whether specialisation by sector or by country, or fund structure and investment strategy, led to statistically significant differences in fund returns.

The results of the t-test shows that:

- Single sector funds outperformed multi sector funds.
- Single country funds outperformed multi country funds.
- Open end funds outperformed closed end funds.
- Core funds outperformed value added funds.
- Single country single sector funds outperformed multi country single sector funds.
- Single country single sector funds outperformed multi country multi sector funds.
- Single country multi sector funds outperformed multi country multi sector funds.
- Multi country single sector funds outperformed multi country multi sector funds.

Table 2: T-test for total annual return difference

	Test Statistics
Single Sector – Multi Sector	1.4***
Single Country – Multi Country	2.1***
Open end – Closed end	1.5***
Core – Value added	3.2***
SCSS – SCMS	0.5
SCSS – MCSS	1.2*
SCSS – MCMS	3.3***
SCMS – MCSS	0.7
SCMS – MCMS	2.8***
MCSS – MCMS	2.1**

Note: SCSS denotes single country single sector. SCMS is single country multi sector. MCSS is multi country single sector. MCMS is multi country multi sector. : * p < 0.10, ** p < 0.05, *** p < 0.01

Regression findings

The results from the regression analysis can be found in Appendix 2.

Findings from the regressions indicate that weighted market return (WMR) is a significant driver of the fund returns, suggesting that for every 1% change in the WMR, fund returns change by 110 basis points.

Other regression findings are as follows:

After controlling for fund characteristics and market return, single country funds still outperform multi country funds. *SingleSector* becomes statistically insignificant, indicating that the outperformance of single sector funds is due to its characteristics.

Gearing (*Gearingt-1*) is significant and negative, indicating that high leverage has a negative impact on total return (the negative period prolonged across the whole period). This result coincides with the findings of Fuerst, Lim and Matysiak (2014). The crisis period and its aftermath may help explain this finding.

The size (*lnGAV*) of the fund is a significant driver of the fund returns. The positive coefficient of *lnGAV* captures the non linear relationship between the size of the fund and its total return. The fund's total return increases with size, but at a decreasing speed.

The coefficient for *Core* and *Vintage* is significant and positive, indicating that core funds outperform value added funds on average and that newly launched funds tended to perform better.

Apart from the crisis period, the fund's structure (open end vs close end) has no effect on the return and there is no sign of a J-curve effect.

*Openend*Crisis* is significant. The positive sign indicates that open end funds perform better than closed end funds during the financial crisis period. This result coincides with the finding of Delfim and Hoesli (2016), who proposed that the outperformance of open end funds during the crisis reflected the greater flexibility of capital allocation allowed by an open end structure

Overall, after adjusting for relevant drivers of performance, single country funds outperform multi country funds, while there is no difference in return between single sector funds and multi sector funds.

When the funds are categorised into four groups, namely SCSS, SCMS, MCSS and MCMS, single country single sector funds, single country multi sector funds and multi country single sector funds outperform multi country multi sector funds after controlling for fund characteristics and market return. Comparing the coefficients, SCSS is the highest, therefore indicating that single country single sector funds show superior performance.

After adjusting for relevant drivers of performance, the more specialised funds outperform the generalist multi country multi sector funds. Among specialists, single country single sector funds exhibit the best performance when controlling for relevant performance drivers.

Alternative Models

Leverage Effect

To further examine the relationship between gearing and returns, an alternative model was specified using gearing dummy variables. Funds were categorised into four groups according to their gearing:

- Less than 20% gearing is the base
- Gearing (20%-40%) is 1 if the gearing is between 20% and 40%, 0 otherwise
- Gearing (40%-60%) is 1 if the gearing is between 40%-60%, 0 otherwise
- Gearing (60%+) is 1 if the gearing is above 60%, 0 otherwise.

When looking at the regression results with gearing dummy variables, it can be suggested that the coefficients of *Gearing (20%-40%)* and *Gearing (40%-60%)* are insignificant, indicating that relative to funds with gearing lower than 20%, funds with gearing between 40% and 60% do not statistically perform differently.

The coefficient of *Gearing (60%+)* is significant and negative, indicating that relative to funds with gearing lower than 20%, funds with gearing above 60% perform worse. The same is evident relative to funds with gearing 20%-60%.

In conclusion, the negative impact of gearing on fund returns is mainly caused by funds with gearing above 60%.

Size Effect

To further examine the relationship between size and returns, an alternative model was specified using size dummy variables. Funds were categorised into four groups according to the quartile of current GAV:

- The first quartile is the base
- Small-Medium is 1 if the GAV is in the second quartile, 0 otherwise
- Medium-Large is 1 if the GAV is in the third quartile, 0 otherwise
- Large is 1 if the GAV is in the fourth quartile, 0 otherwise

When looking at regression results with size dummy variables, the coefficients are significant and positive, indicating small-medium, medium-large and large funds perform better relative to small funds.

The coefficients of *Medium-Large* and *Large* are similar, but much larger than the coefficient of *Small-Medium*, which indicates that once funds are above the medium size, there is no statistically significant size effect. The GAV cut off point for the Medium fund is €0.37 billion.

The results confirm previous findings that fund size is positively related with fund returns.

Vintage Effect

To further examine the relationship between vintage and returns, an alternative model was specified using vintage dummy variables. Funds were categorised into three groups according to their vintage year:

- Vintage prior to 2001 is the base
- Vintage (2001-2008) is 1 if the vintage year is between 2001 and 2008, 0 otherwise
- Vintage (post 2008) is 1 if the vintage year is after 2008, 0 otherwise

When looking at regression results with vintage dummy variables, the coefficients are significant and positive except for *Vintage (2001-2008)*, indicating that relative to funds with a vintage year before 2001, funds with vintage years after 2001 perform better.

The coefficient of *Vintage (post 2008)* is much larger than for *Vintage (2001-2008)*, indicating that relative to funds with vintage years between 2001 and 2008 (pre-GFC), funds with vintage years after 2008 (post-GFC) perform better.

The results confirm our previous findings that newly launched funds perform better.

Excluding UK Funds

A large proportion of single country funds have UK only strategies. The UK suffered a more severe downturn than other countries during the global financial crisis, meaning that the estimation results and earlier findings might mainly capture the UK phenomenon.

Therefore, a separate regression was carried out excluding UK single country funds from the sample. The results show that single country funds still outperformed multi country funds.

Furthermore, *SingleSector* becomes significant. This indicates that once UK focused funds are excluded, single sector funds outperform multi sector funds. The reason for this is the underperformance of UK single sector funds compared to UK multi sector funds. There were 601 observations for UK focused funds and among these 331 were single sector funds and 270 multi sector funds. The average annual returns for UK single sector funds and UK multi sector funds were 5.3% and 6.8%, respectively.

Even after UK focused funds were excluded from the analysis, European single country funds still outperformed European multi country funds, and specialist funds outperformed the generalist multi country multi sector funds.

INREV All Funds Index as a market return

One drawback of using the WMR as a market return is that it takes account of fund asset allocation. Thus, the INREV All Funds Index was used as the market return in a further stage of the analysis.

The results confirm earlier findings that single country funds outperform multi country funds. However, there is no statistical difference in the returns of single sector and multi sector funds.

Furthermore, as noted earlier, specialist funds outperform generalist multi country multi sector funds.

The adjusted R squares are much lower than the base case estimations, indicating that using the INREV All Funds Index provides lower explanatory power for fund total returns than using the more specific WMR benchmark returns.

Mimic Portfolio Returns

To further examine the performance of specialist versus generalist funds, a mimic portfolio was created with the same allocations to generalist funds but using exposures to single sector single country funds, thus creating a diversified dummy portfolio of specialist funds. Essentially, this attempts to mimic the diversified fund's portfolio by investing in specialised funds according to the diversified fund's asset allocations.

Findings show that multi country funds outperform their mimic portfolio returns, but the magnitude is marginal. However, single sector multi country funds outperform their mimic portfolio returns.

Furthermore, t-test results indicate that there was no statistically significant difference between fund returns and their mimic portfolio returns for all the categories.

Concluding remarks

This study set out to explore whether specialisation leads to higher performance for European non-listed real estate funds. The analysis was based on a sample of 445 funds over the period 2001 to 2017, and includes 2605 observations. The results refer only to this sample of funds for this time period, and do not necessarily reflect the entire market and any other period of time.

The initial analysis suggests that specialist, single country single sector funds tend to deliver higher returns than multi country multi sector funds. To control for a broader range of potential impacts and to analyse these differences more systematically, key fund characteristics were also included in the analysis.

The key findings are:

- Adjusting for relevant drivers of performance, country specialisation is associated with superior returns, while in general sector specialisation does not generate superior returns compared with multi sector funds.
- Separating funds into four categories by country and sector specialisation suggests that generalist funds (which are both multi country AND multi sector) fared worse than other, more specialised funds. Similarly, the most specialised funds, single country single sector, exhibited outperformance.

This study also confirms a number of findings from previous studies, notably:

- Open end funds outperformed closed end funds during the crisis period.
- High leverage has been associated with lower performance, especially for funds with leverage higher than 60%.
- Size has a significant impact on performance with small funds tending to underperform, especially those with GAV lower than €370 million. This differential has led to markedly lower performance based on a simple unweighted average measure of performance.
- Funds launched after 2008 have tended to outperform those launched before 2008, controlling for other factors (years, size etc.).

Additionally, the results suggest that the most specialised funds tend to outperform all other fund types. This finding was confirmed by the alternative models, which also took into account fund characteristics and market risk factors.

Although these specialists can be regarded as much more constrained in their investment opportunities compared to generalist funds, which can shift their asset allocation towards more promising sectors and markets, the empirical evidence does not suggest that this has represented a disadvantage.

It may thus be argued that intense specialisation creates additional benefits in terms of market knowledge, asset selection ability and networks that are difficult to replicate for more generalist funds.

This does not however necessarily mean that preference should be given to specialist funds when building a diversified portfolio – choosing many specialists rather than a few generalists. A mimic portfolio analysis does not suggest that this strategy necessarily yields superior results.

Therefore, due diligence and careful selection of individual funds are critical. In addition, as outlined, the findings suggest particular care is required when investing in small funds and funds with high leverage, given their tendency to underperform.

Further research is needed to determine the optimal portfolio investment strategy arising from the differential performance of specialist and generalist non-listed funds.

Inevitably, there remain several limitations to these findings, for example in accounting for differences in liquidity and risk across funds. Furthermore, exchange rate variation and hedging issues are not systematically considered in this study.

Country coverage in the sample and IPD index

Country allocation in the sample	MSCI/IPD Available
UK	UK
Germany	Germany
Netherlands	Netherlands
France	France
Italy	Italy
Finland	Finland
Portugal	Portugal
Sweden	Sweden
Poland	Poland
Belgium	Belgium
Norway	Norway
Denmark	Denmark
Switzerland	Switzerland
Austria	Austria
CzechRepublic	CzechRepublic
Spain	Spain
Hungary	Hungary
Luxembourg	Ireland
Slovakia	Australia
Ireland	Japan
Croatia	
Romania	
Lithuania	
Greece	
Turkey	
Australia	
Latvia	
Ukraine	
Japan	
Slovenia	
Mexico	

Regression estimations – random effect panel (1)

$$\text{Total Return}_{it} = \alpha + \beta_1 \text{WMR}_{it} + \beta_2 \text{SingleSector}_{it} + \beta_3 \text{SingleCountry}_{it} + \beta_4 X_{it} + \gamma_i + \varepsilon_{it}$$

Table 4: Random effect panel estimations of equation (1)

	(1)		(2)		(3)	
	TotalReturn		TotalReturn		TotalReturn	
WMR	1.1***	(22.4)	1.1***	(21.8)	1.1***	(22.3)
SingleCountry	1.2**	(2.0)	1.0*	(1.7)	1.1*	(1.8)
SingleSector	1.1**	(2.1)	0.9	(1.6)	0.9	(1.6)
Gearingt-1			-0.0***	(-2.8)	-0.0***	(-2.7)
InGAV			0.7***	(2.8)	0.8***	(3.1)
Openend			-0.6	(-1.1)	-1.3**	(-2.1)
Core			1.5**	(2.0)	1.3	(1.6)
Young2			-0.8	(-0.8)	-0.7	(-0.8)
Vintage			0.3***	(5.0)	0.3***	(5.1)
Openend*Crisis					4.3***	(3.1)
Core*Crisis					1.8	(1.1)
Constant	-0.5	(-0.3)	-0.6	(-0.3)	0.2	(0.1)
Time Control	Yes		Yes		Yes	
Estimation Method	RE		RE		RE	
N	2605		2605		2605	
Adj. R2	0.4		0.5		0.5	

Note: t statistics in parentheses. * p < 0.10, ** p < 0.05, *** p < 0.01

Regression estimations – random effect panel (2)

$$\text{Total Return}_{it} = \alpha + \beta_1 \text{WMR}_{it} + \beta_2 \text{SCSS}_{it} + \beta_3 \text{SCMS}_{it} + \beta_4 \text{MCSS}_{it} + \beta_5 X_{it} + \gamma_i + \varepsilon_{it}$$

Table 5: Random effect panel estimations of equation (2)

	(1)		(2)		(3)	
	TotalReturn		TotalReturn		TotalReturn	
WMR	1.1***	(22.4)	1.1***	(21.7)	1.1***	(22.3)
SCSS	2.6***	(3.4)	2.2***	(2.8)	2.3***	(2.9)
SCMS	2.2**	(2.6)	2.0**	(2.3)	2.1**	(2.5)
MCSS	2.3**	(2.3)	2.1**	(2.1)	2.1**	(2.2)
Gearingt-1			-0.0***	(-2.9)	-0.0***	(-2.8)
lnGAV			0.7***	(2.8)	0.8***	(3.1)
Openend			-0.6	(-1.0)	-1.2**	(-2.0)
Core			1.5**	(2.0)	1.2	(1.5)
Young2			-0.8	(-0.9)	-0.7	(-0.8)
Vintage			0.3***	(5.0)	0.3***	(5.0)
Openend*Crisis					4.3***	(3.1)
Core*Crisis					1.9	(1.1)
_cons	-1.0	(-0.6)	-1.0	(-0.5)	-0.3	(-0.1)
Time Control	Yes		Yes		Yes	
Estimation Method	RE		RE		RE	
N	2605		2605		2605	
Adj. R2	0.4		0.5		0.5	

Note: SCSS is single country single sector. SCMS is single country multi sector. MCSS is multi country single sector. MCMS is multi country multi sector. t statistics in parentheses. * p < 0.10, ** p < 0.05, *** p < 0.01

Alternative model estimations – leverage effect

$$(1) \text{ Total Return}_{it} = \alpha + \beta_1 \text{WMR}_{it} + \beta_2 \text{SingleSector}_{it} + \beta_3 \text{SingleCountry}_{it} + \beta_4 X_{it} + \gamma_i + \varepsilon_{it}$$

$$(2) \text{ Total Return}_{it} = \alpha + \beta_1 \text{WMR}_{it} + \beta_2 \text{SCSS}_{it} + \beta_3 \text{SCMS}_{it} + \beta_4 \text{MCSS}_{it} + \beta_5 X_{it} + \gamma_i + \varepsilon_{it}$$

Table 6: Leverage effect

	(1)		(2)	
	TotalReturn		TotalReturn	
WMR	1.1***	(22.4)	1.1***	(22.4)
SingleCountry	1.2**	(2.0)		
SingleSector	0.9*	(1.7)		
SCSS			2.4***	(3.2)
SCMS			2.2***	(2.7)
MCSS			2.1**	(2.3)
Gearing (20%-40%)	-0.8	(-1.4)	-0.8	(-1.3)
Gearing (40%-60%)	-0.3	(-0.5)	-0.3	(-0.6)
Gearing (60%+)	-2.8**	(-2.4)	-2.9**	(-2.5)
InGAV	0.8***	(3.1)	0.7***	(3.1)
Openend	-1.0*	(-1.8)	-1.0	(-1.6)
Core	1.2	(1.5)	1.2	(1.4)
Young2	-0.6	(-0.7)	-0.6	(-0.7)
Vintage	0.3***	(4.7)	0.3***	(4.6)
Openend*Crisis	4.3***	(3.2)	4.3***	(3.1)
Core*Crisis	1.9	(1.1)	1.9	(1.2)
_cons	-0.3	(-0.2)	-0.8	(-0.5)
Time Control	Yes		Yes	
Estimation Method	RE		RE	
N	2605		2605	
Adj. R2	0.5		0.5	

Note: SCSS is single country single sector. SCMS is single country multi sector. MCSS is multi country single sector. MCMS is multi country multi sector. t statistics in parentheses. * p < 0.10, ** p < 0.05, *** p < 0.01

Alternative model estimations – size effect

$$(1) \text{ Total Return}_{it} = \alpha + \beta_1 \text{WMR}_{it} + \beta_2 \text{SingleSector}_{it} + \beta_3 \text{SingleCountry}_{it} + \beta_4 X_{it} + \gamma_i + \varepsilon_{it}$$

$$(2) \text{ Total Return}_{it} = \alpha + \beta_1 \text{WMR}_{it} + \beta_2 \text{SCSS}_{it} + \beta_3 \text{SCMS}_{it} + \beta_4 \text{MCSS}_{it} + \beta_5 X_{it} + \gamma_i + \varepsilon_{it}$$

Table 7: Size effect

	(1)		(2)	
	TotalReturn		TotalReturn	
WMR	1.1***	(22.3)	1.1***	(22.3)
SingleCountry	1.2*	(2.0)		
SingleSector	0.9*	(1.7)		
SCSS			2.4***	(3.1)
SCMS			2.3***	(2.7)
MCSS			2.2**	(2.3)
Small-Medium	1.5**	(2.0)	1.6**	(2.0)
Medium-Large	2.6***	(3.4)	2.7***	(3.5)
Large	2.5***	(3.3)	2.5***	(3.3)
Gearingt-1	-0.0**	(-2.8)	-0.0***	(-2.7)
Openend	-1.2**	(-2.0)	-1.1*	(-1.9)
Core	1.2	(1.5)	1.2	(1.5)
Young2	-0.5	(-0.5)	-0.5	(-0.6)
Vintage	0.3***	(4.9)	0.3***	(4.9)
Openend*Crisis	4.2***	(3.1)	4.2***	(3.1)
Core*Crisis	1.9	(1.2)	2.0	(1.2)
_cons	-2.4	(-1.3)	-2.9	(-1.6)
Time Control	Yes		Yes	
Estimation Method	RE		RE	
N	2605		2605	
Adj. R2	0.5		0.5	

Note: SCSS is single country single sector. SCMS is single country multi sector. MCSS is multi country single sector. MCMS is multi country multi sector.
t statistics in parentheses. * p < 0.10, ** p < 0.05, *** p < 0.01

Alternative model estimations – vintage effect

$$(1) \text{ Total Return}_{it} = \alpha + \beta_1 \text{WMR}_{it} + \beta_2 \text{SingleSector}_{it} + \beta_3 \text{SingleCountry}_{it} + \beta_4 X_{it} + \gamma_i + \varepsilon_{it}$$

$$(2) \text{ Total Return}_{it} = \alpha + \beta_1 \text{WMR}_{it} + \beta_2 \text{SCSS}_{it} + \beta_3 \text{SCMS}_{it} + \beta_4 \text{MCSS}_{it} + \beta_5 X_{it} + \gamma_i + \varepsilon_{it}$$

Table 8: Vintage effect

	(1)		(2)	
	TotalReturn		TotalReturn	
WMR	1.1***	(22.3)	1.1***	(22.3)
SingleCountry	1.1*	(1.8)		
SingleSector	0.8	(1.5)		
SCSS			2.1***	(2.8)
SCMS			2.0**	(2.4)
MCSS			1.9**	(2.0)
Vintage (2001-2008)	1.0*	(1.7)	0.9	(1.6)
Vintage (2009-2018)	5.3***	(6.6)	5.3***	(6.6)
Gearingt-1	-0.0**	(-2.1)	-0.0**	(-2.2)
InGAV	0.7***	(2.9)	0.7***	(2.9)
Openend	-1.4**	(-2.4)	-1.3**	(-2.3)
Core	1.1	(1.4)	1.1	(1.4)
Young2	-0.8	(-0.9)	-0.8	(-0.9)
Openend*Crisis	4.3***	(3.2)	4.3***	(3.1)
Core*Crisis	1.9	(1.1)	2.0	(1.2)
_cons	0.8	(0.4)	0.4	(0.2)
Time Control	Yes		Yes	
Estimation Method	RE		RE	
N	2605		2605	
Adj. R2	0.5		0.5	

Note: SCSS is single country single sector. SCMS is single country multi sector. MCSS is multi country single sector. MCMS is multi country multi sector. t statistics in parentheses. * p < 0.10, ** p < 0.05, *** p < 0.01

Alternative model estimations – excluding UK

$$(1) \text{ Total Return}_{it} = \alpha + \beta_1 \text{WMR}_{it} + \beta_2 \text{SingleSector}_{it} + \beta_3 \text{SingleCountry}_{it} + \beta_4 X_{it} + \gamma_i + \varepsilon_{it}$$

$$(2) \text{ Total Return}_{it} = \alpha + \beta_1 \text{WMR}_{it} + \beta_2 \text{SCSS}_{it} + \beta_3 \text{SCMS}_{it} + \beta_4 \text{MCSS}_{it} + \beta_5 X_{it} + \gamma_i + \varepsilon_{it}$$

Table 9: Excluding UK funds

	(1)		(2)	
	TotalReturn		TotalReturn	
WMR	1.1***	(12.4)	1.1***	(12.5)
SingleCountry	1.2*	(1.9)		
SingleSector	1.3*	(1.9)		
SCSS			2.5***	(3.3)
SCMS			2.0**	(2.08)
MCSS			2.0**	(2.1)
Gearingt-1	-0.0**	(-2.1)	-0.0**	(-2.3)
InGAV	0.9***	(3.1)	0.9***	(3.1)
Openend	-1.3*	(-1.8)	-1.2*	(-1.7)
Core	1.2	(1.3)	1.2	(1.3)
Young2	-0.8	(-0.8)	-0.9	(-0.9)
Vintage	0.3***	(3.9)	0.3***	(3.9)
Openend*Crisis	4.1**	(2.4)	4.0**	(2.3)
Core*Crisis	1.9	(0.9)	2.0	(0.9)
_cons	0.7	(0.2)	0.4	(0.2)
Time Control	Yes		Yes	
Estimation Method	RE		RE	
N	2004		2004	
Adj. R2	0.3		0.3	

Note: SCSS is single country single sector. SCMS is single country multi sector. MCSS is multi country single sector. MCMS is multi country multi sector. t statistics in parentheses. * p < 0.10, ** p < 0.05, *** p < 0.01

Alternative model estimations – INREV index as market

$$(1) \text{ Total Return}_{it} = \alpha + \beta_1 \text{WMR}_{it} + \beta_2 \text{SingleSector}_{it} + \beta_3 \text{SingleCountry}_{it} + \beta_4 X_{it} + \gamma_i + \varepsilon_{it}$$

$$(2) \text{ Total Return}_{it} = \alpha + \beta_1 \text{WMR}_{it} + \beta_2 \text{SCSS}_{it} + \beta_3 \text{SCMS}_{it} + \beta_4 \text{MCSS}_{it} + \beta_5 X_{it} + \gamma_i + \varepsilon_{it}$$

Table 10: INREV index as market return

	(1)		(2)	
	TotalReturn		TotalReturn	
INREV Index	2.6***	(3.2)	2.6***	(3.2)
SingleCountry	1.6**	(2.4)		
SingleSector	0.6	(1.0)		
SCSS			2.5***	(3.0)
SCMS			2.7***	(3.0)
MCSS			1.9*	(1.9)
Gearingt-1	-0.0*	(-1.7)	-0.0*	(-1.8)
lnGAV	1.4***	(5.1)	1.4***	(5.1)
Openend	-0.9	(-1.2)	-0.8	(-1.1)
Core	1.2	(1.2)	1.2	(1.2)
Young2	0.4	(0.4)	0.4	(0.4)
Vintage	0.3***	(4.6)	0.3***	(4.5)
Openend*Crisis	4.6**	(2.2)	4.5**	(2.2)
Core*Crisis	2.6	(1.1)	2.7	(1.1)
_cons	-20.1**	(-2.5)	-21.0***	(-2.6)
Time Control	Yes		Yes	
Estimation Method	RE		RE	
N	2605		2605	
Adj. R2	0.3		0.3	

Note: SCSS is single country single sector. SCMS is single country multi sector. MCSS is multi country single sector. MCMS is multi country multi sector. t statistics in parentheses. * p < 0.10, ** p < 0.05, *** p < 0.01

Mimic portfolio returns

Table 11: Mean of total return and mimic portfolio return

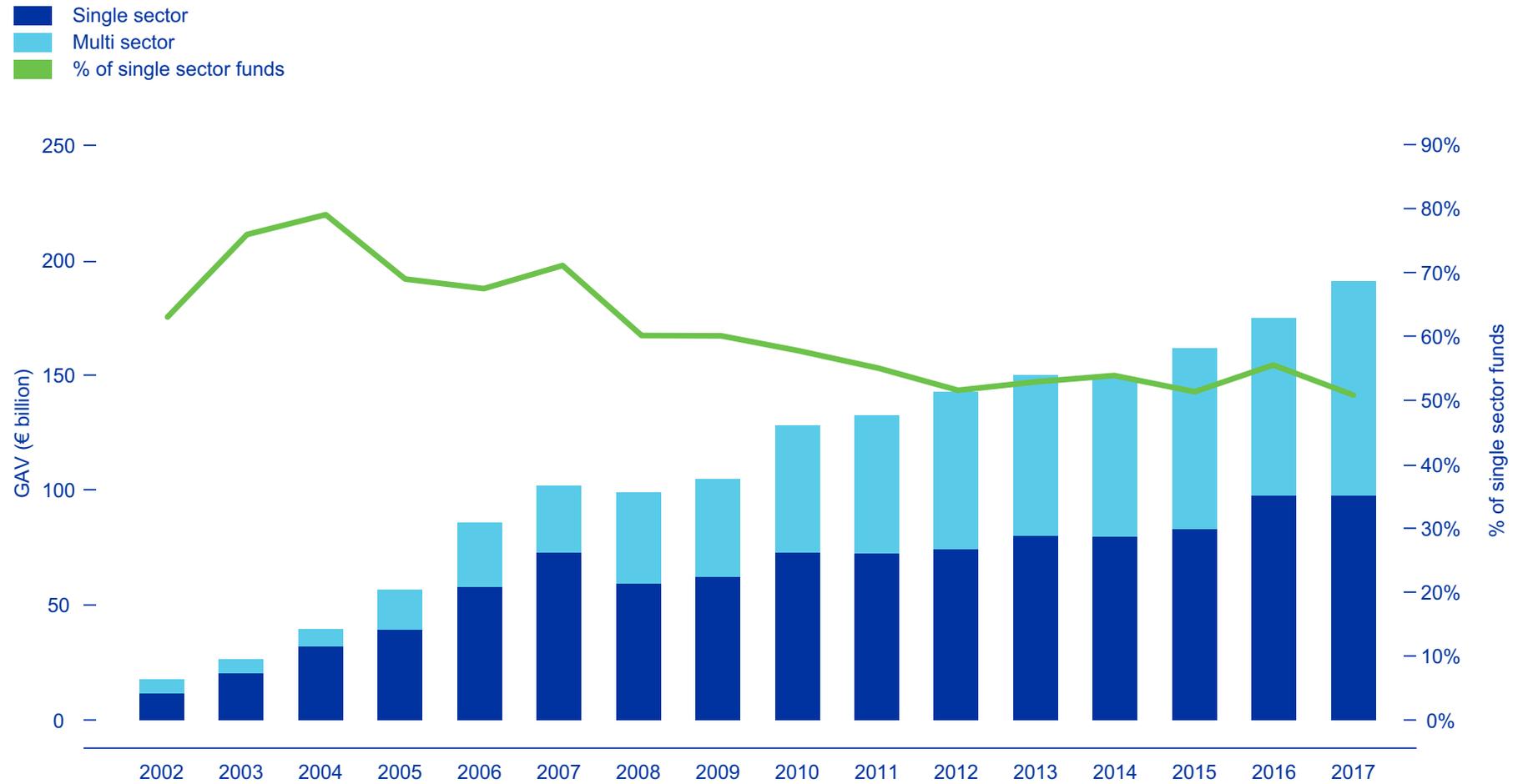
	Total Return(%)	Mimic Portfolio Return (%)
Multi Country	2.3	2.2
Multi Sector	2.6	3.1
Single Country Multi Sector (SCMS)	3.7	3.9
Multi Country Single Sector (MCSS)	3.4	2.4
Multi Country Multi Sector (MCMS)	1.2	2.0

Table 12: T-test for the difference between annual return and mimic portfolio return

	Test Statistics
Total return – mimic portfolio return (Multi Country)	0.1
Total return – mimic portfolio return (Multi Sector)	-0.4
Total return – mimic portfolio return (SCMS)	-0.2
Total return – mimic portfolio return (MCSS)	1.0
Total return – mimic portfolio return (MCMS)	-0.8

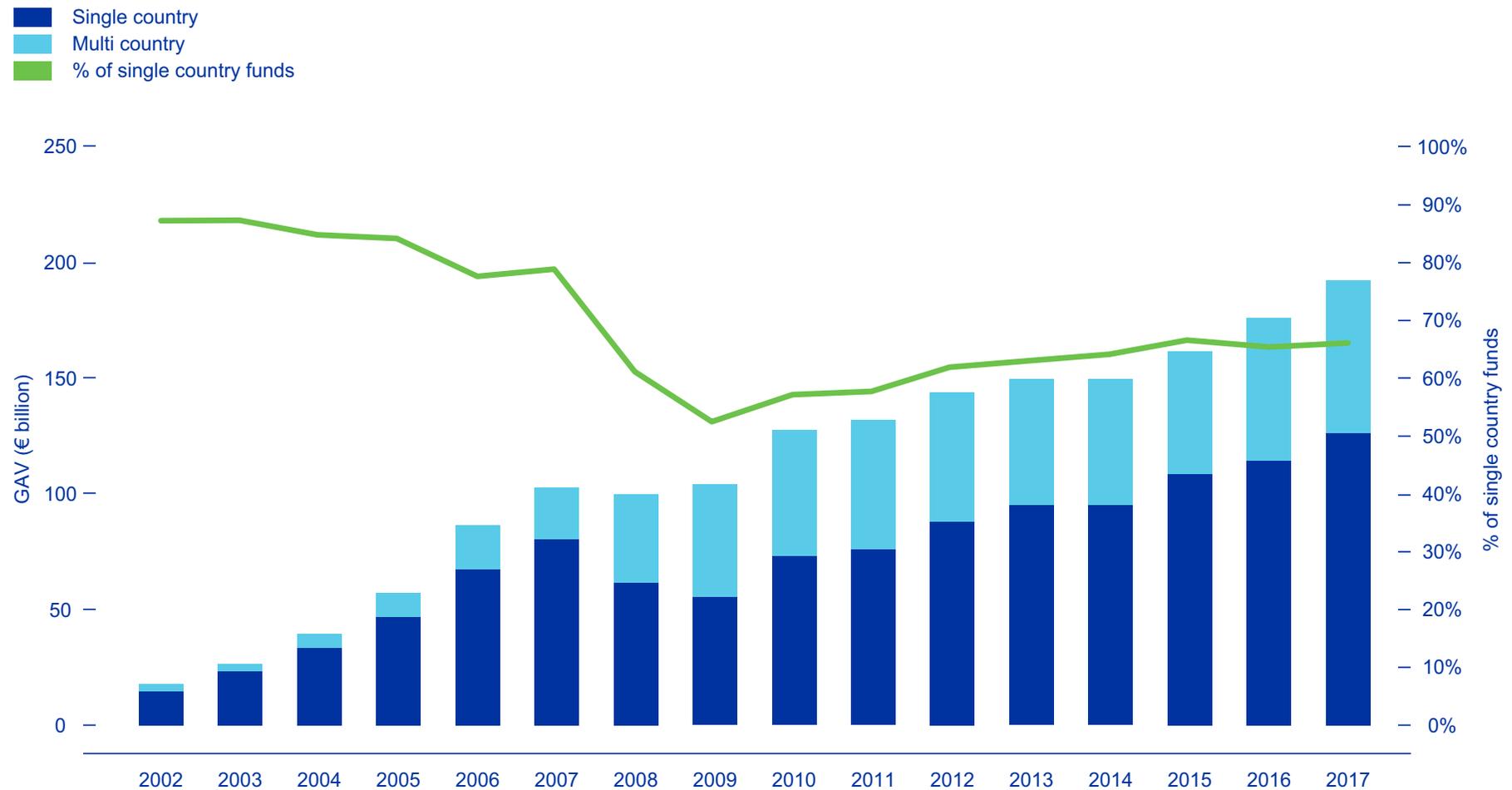
GAV distribution of single sector versus multi sector funds across time

Figure 14: Single sector versus multi sector funds across time



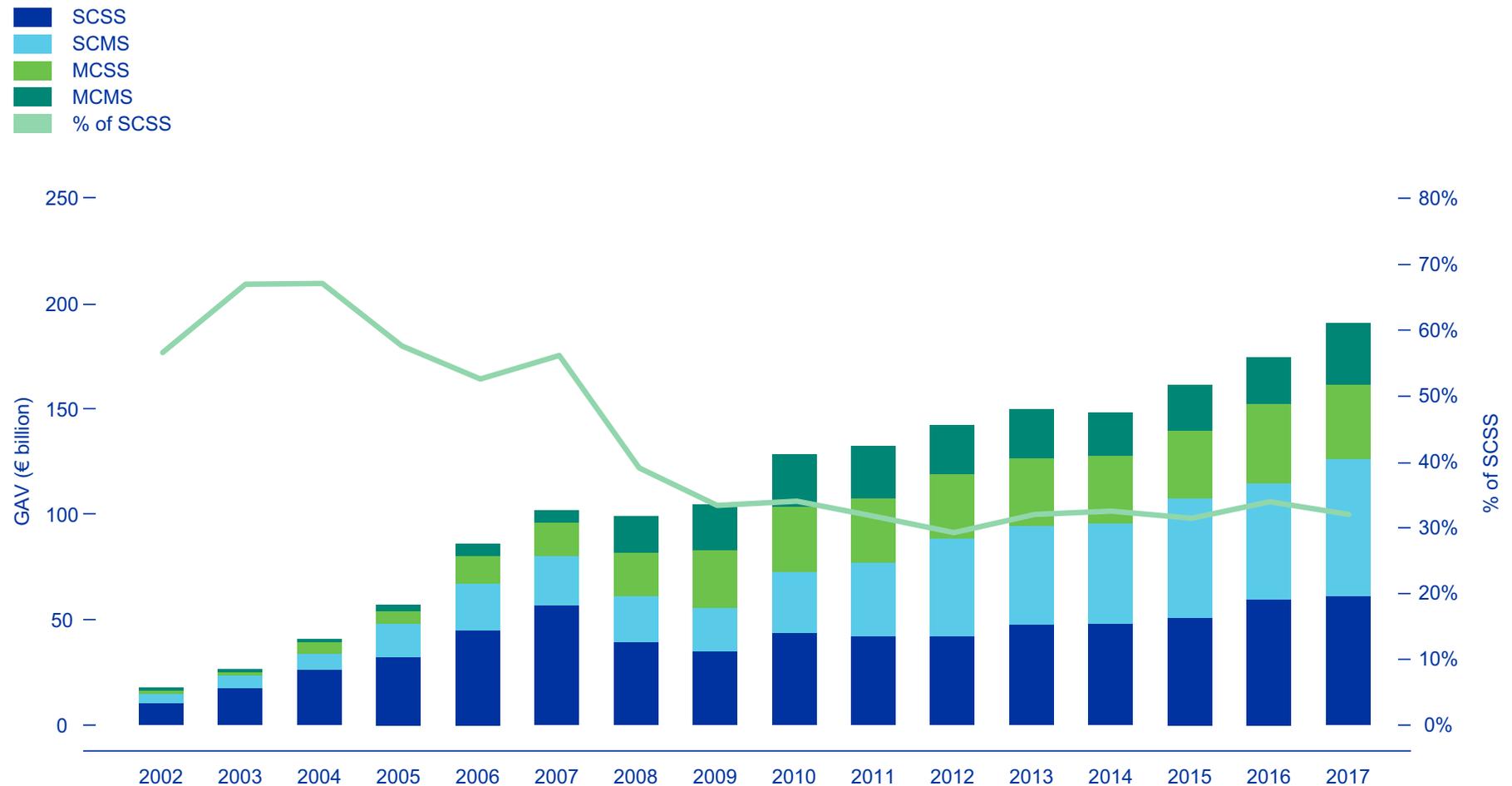
GAV distribution of single country versus multi country funds across time

Figure 15: Single country versus multi country funds across time



GAV distribution of SCSS, SCMS, MCSS and MCMS funds

Figure 16: Four categories of funds across time



References

Alcock, J., Baum, A., Colley, N., & Steiner, E. (2013). The role of financial leverage in the performance of private equity real estate funds. *The Journal of Private Equity*, 80-91.

Chen, J., & Peiser, R. (1999). The risk and return characteristics of REITs 1993-1997. *Real Estate Finance*, 16, 61-68.

Delfim, J. C., & Hoesli, M. (2016). Risk factors of European non-listed real estate fund returns. *Journal of Property Research*, 33(3), 190-213.

Farrelly, K., & Stevenson, S. (2016). Performance drivers of private real estate funds. *Journal of Property Research*, 33(3), 214-235.

Fisher, L. M., & Hartzell, D. J. (2016). Class differences in real estate private equity fund performance. *The Journal of Real Estate Finance and Economics*, 52(4), 327-346.

Fuerst, F., & Matysiak, G. (2013). Analysing the performance of nonlisted real estate funds: a panel data analysis. *Applied Economics*, 45(14), 1777-1788.

Fuerst, F., Lim, W., & Matysiak, G. (2014). Private equity real estate: Asymmetric effects of gearing and drivers of performance. Available at SSRN: <https://ssrn.com/abstract=2519794>

Ro, S., & Ziobrowski, A. J. (2011). Does focus really matter? Specialized vs. diversified REITs. *The Journal of Real Estate Finance and Economics*, 42(1), 68-83.

Tomperi, I. (2010). Performance of private equity real estate funds. *Journal of European Real Estate Research*, 3(2), 96-116

