

His problem wasn't lack of focus....



Focus or Hocus Pocus?

Is it worthwhile to invest in focused private real estate funds, or is this just an illusion?

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Introduction

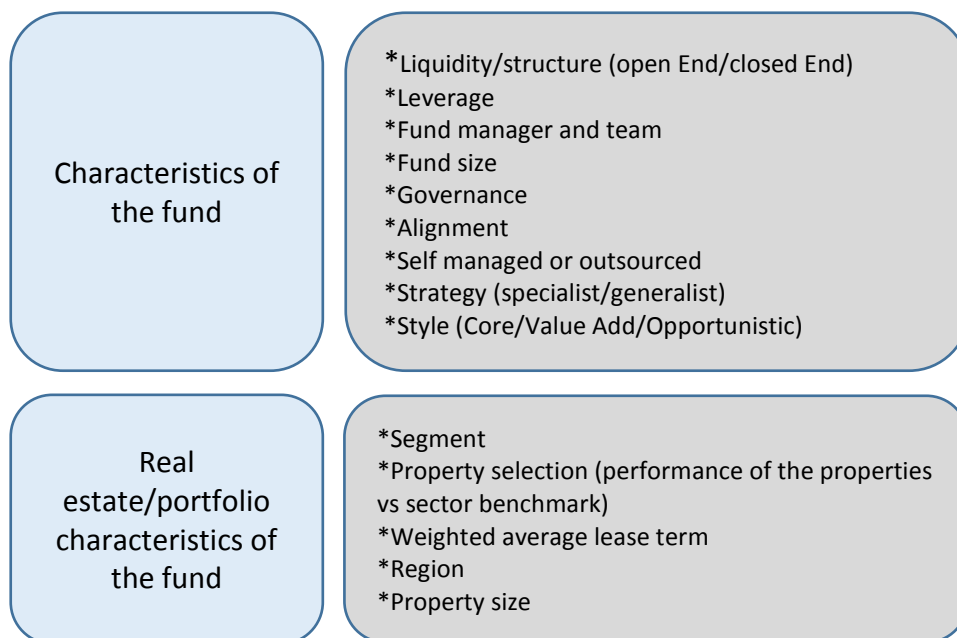
Among practitioners, there has been a debate on the question whether private real estate funds that specialize in a specific sector perform better than private real estate funds that are diversified. To investors, this is an important issue: if diversifying over specialist fund managers doesn't improve the risk/return profile of their total Real Estate portfolio, then they could be better off by investing their money in a limited number of diversified funds. This topic has been addressed by various authors, with mixed results, but it hasn't been studied for the non-listed funds in Europe so far.

The **research question** for this thesis is whether or not private real estate funds that specialize in one sector show a better risk adjusted performance than diversified private real estate funds. The null hypothesis that will be tested is the following:

Private real estate funds that specialize in specific sectors have a better risk adjusted performance than diversified private real estate funds.

Studying the characteristics of unlisted property funds can get quite complex, as multiple sources for return and risk could be of importance: it's not only the performance of the properties that a fund holds; fund structure and its characteristics adds an extra layer of risk and return. Differences between funds, as illustrated in figure 1 below, could in theory lead to very different risk/return profiles.

Figure 1: Fund characteristics, underlying real estate portfolio and possible sources of performance and risk



Therefore, it's important to know what determines fund performance. Analyzing funds, not taking into account possibly important factors could lead to wrong conclusions and ultimately to misguided portfolio construction.

Preferably, we would disentangle the influence of different performance drivers and assess what factors account for differences in performance/risk profile. Usually, this is done by multiple regressions for various years of fund performance, or by panel data regressions, controlling for factors that in studies were found to be significant in explaining fund performance, such as the general market performance of underlying properties, size, investment style, leverage and structure.

Although a specific and detailed dataset to undertake such a study is available, due to governance policies¹ this dataset couldn't be shared with the author. However, aggregate (segmented) data could be obtained and analysed.

This thesis will proceed as follows: chapter 2 will put the research question in perspective by briefly discussing portfolio construction in general, and then continue by a review of the literature on the 'generalist versus specialist' debate. Chapter 3 will describe the methodology and the data. In chapter 4 the results will be presented and discussed, followed by conclusions in chapter 5.

Literature Review

Portfolio construction

Pension funds and insurance companies are not alike, in many aspects. They tend to allocate different percentages of their total portfolio to Real Estate. According to Staal this varies from 0% up to 40% in the Netherlands (Staal, 2010, pp. 118-119). Staal points out that different characteristics, such as size, structure of the population of participants, ageing of participants, risk tolerance, funding ratio, investment beliefs etc, can lead to very different choices in portfolio construction. Tailormade advice is required to ensure that an allocation to Real Estate fits to the requirements of the customer.

Having said that, though, according to Hudson-Wilson e.a. (2005) the main reasons for investing in Real Estate are:

- To reduce the overall risk of the portfolio by combining asset classes that respond differently to expected and unexpected events
- Achieve an absolute return competitive with other asset classes
- To hedge against unexpected inflation
- To constitute a part of a portfolio that is a reasonable reflection of the overall investment universe
- Access to strong cash flows, especially when income is valued as a way to meet current liabilities.

Please take note that Hudson-Wilson e.a. propose exposure to real estate in the four combinations that are available (between debt and equity on the one hand and public and private on the other).

Institutional investors can invest in Real Estate in broadly three ways: direct holdings (Bricks & Mortar), through investing in non-listed funds and through investing in listed funds.

In line with the remarks above, and as expected, institutional investors do show a rather big variety in composition. Mosselman (2013, pp.57-58) concluded for institutional investors in the Netherlands that, using a cluster analysis, four groups could be identified:

- Well diversified investors. In this group the strategy is to seek for optimal diversification, with respect to region, style, structure etc. This strategy is adopted by the biggest pension funds.
- Real Estate specialists with home bias. Here, the strategy is to focus on investing in the Netherlands, mainly through direct holdings. This strategy is adopted by approximately 17 middle large pension funds.

¹ A data file containing information for each fund, including relevant attributes like year of origin, composition of the portfolio for each year, leverage for each year etc is available, but can be provided to academics only. As the author works for a fund manager, (although data is anonymized) it is believed that fund managers could identify competitors and disclose possibly sensitive information.

- Diversified investors. These investors seek diversification, through investments in listed and non-listed. According to Mosselman, the impression is that these investors have a preference for multi-sector funds. These investors were typically the smaller investors, in search of optimal diversification given their size.
- Private fund investors. These are investors that have a strong preference for specialist (single sector) funds.

The first two “investor types” had the best performance, as measured by their Sharpe ratios during the period 2000-2011: the Real Estate specialists with homebias taking the lead with a Sharpe ratio of 0,63, followed by the well diversified investors that had a Sharpe ratio of 0,51. The two other types showed a distinctively lower Sharpe ratio of 0,39.

So the problem at hand is only a small piece of the puzzle: we’re considering a situation wherein an investor already has chosen to invest in non-listed real estate and tries to determine whether or not it’s beneficial to diversify over managers that are specialized in a specific sector or not.

Generalist versus Specialist

Studies on this topic can be categorized into 3 fields:

- Direct property
- Listed property funds
- Unlisted property funds

Direct Property

Studies with respect to international direct Real Estate are limited and tend to study the benefits of diversification. On the topic of the benefit of a focused strategy, only two studies on this topic could be found. It looks like there’s a lot of potential for further study in this field.

De Wit (2009) studies the performance of international Real Estate, segmented by property type and region. Using a constrained cross section regression with dummy variables for region and property type, he concluded that geographic factors have the largest influence on the volatility of international real estate returns. After controlling for a “global return component”, the regional component was much more important in explaining returns and variance than the sectorchoice did. However, this result did not seem to stable in time: over time property type seemed to become a more important factor. The study had a wide scope: USA, Australia, Asia, UK and continental Europe.

Van Wetten (2016) wrote a paper on the building blocks for a pan-european portfolio strategy. Using clusteranalysis he found that four groups of countries could be identified. Those groups are relatively homogenous within the cluster, but differ in characteristics between clusters. As the cluster analysis showed a clustering based on country, not based on sector (what could have been an outcome as well), this finding suggests that “region is dominant over sector”. He also shows, an interesting finding, that by selecting a limited number of countries, diversification benefits can be realised.

Listed Property

For listed property funds, more data has been available. There is an ongoing and unfinished debate on whether or not listed real estate has the same (investment)properties as direct real estate and/or unlisted real estate. Advocates for listed property point out that on the long run the returns are driven by essentially the same cashflow properties as the other two types. Pagliari, Scherer and Monopoli (2005) compare public and private real estate inidices. They control for differences between the indices with respect to three aspects:

property-type mix, leverage and appraisal smoothing. With the two “restated” indices tests were run to determine in a statistical sense whether means and volatility were different from each other. They concluded that they clearly were not (at least for the longer term). Moreover, differences narrowed in time. Differences between “platforms” (i.e. listed, non-listed, direct) exist between liquidity, governance, transparency, control and compensation.

Critics of listed property think that listed property has the properties of a share rather than the properties of Real Estate. However, for the topic at hand, studies could provide useful insights.

One of the earlier studies was done by Goetmakers and Van Wetten (1996). Using an attribution analysis between an index that consisted of diversified Dutch listed property companies and an index that consisted of local property companies, they found that composing a portfolio by selecting local (listed) property companies produced better results than composing a portfolio of (Dutch) property companies that diversified into different countries. However, it was not clear what exactly caused this performance differential due to lacking data at the time.

A year later, a study by Eichholtz, Op ’t Veld and Schweitzer (1997), found that REITS that specialized in a specific property type outperformed the market. In contrast, REITS that specialized in regions underperformed the market. This study was repeated by Brounen, Boer and Op ’t Veld (2005). Making use of a sample of 275 listed property funds in the US, UK, France, The Netherlands and Sweden, they examined the nature of the relationship between corporate focus (in terms of geographical- and property-type concentration. They found that an increase in geographical focus is associated with an increase of Jensen’s alpha (a measure of outperformance), both in Europe and the United States. An increase in industrial focus was also associated with an increase in Jensen’s alpha. Interestingly, big differences between the US and Europe were found: US was relatively high concentrated in sectors (and distinctively higher than in Europe), Europe showed a relatively high regional concentration.

Bond, Karolyi and Sanders (2003) studied listed property companies in 14 different countries, making use of EPRA return series. Their conclusion was that there is strong global market risk component in returns (a common factor driving returns), but controlling for this global component, there’s still a highly significant country specific market risk. These findings were consistent with a study by Ling and Naranjo (2002), also for listed property funds. Bond, Karolyi and Sanders found, however, that other risk factors (value and size) did not provide additional explanatory power.

Hamelink & Hoesli (2004) found that country factors dominate property type factors. They studied the effect of various factors (such as a common factor, “value/growth” characteristics, size, sector and country), making use of the GPR database (listed property stocks). Ten countries were studied, the ones with the bigger market caps. An interesting finding was that size (measured by the market cap of a property company) had an adverse effect on returns. According to Hamelink & Hoesli, this is consistent with the financial economics literature, however they don’t explain why this is the case. Size might matter, but it is the question in what ways it matters. For example, (dis)economies of scale could be related to size. Possibly by spreading fixed costs over a larger sum of assets under management, total management costs could be driven down. On the other hand, for bigger companies coordination costs and agency problems could induce higher costs.

Glascok and Kelly (2007) determine the relative effect of property type and country factors in listed Real Estate. They used the GPR 250 Property Security Index, for five property types and twenty one countries. The period under study was 1990-2005. They concluded that country diversification is a more effective tool for achieving risk reduction than diversification via property type. Property type effects explained, on average, 6% of the variance, where country effects accounted for about 49%. They also found however that effects aren’t

stable over time: although country effects stayed (by far) dominant over property type effects, the relative importance of country effects was decreasing over time. This could be an indication of globalization (i.e. integrating markets).

A study by Ro & Ziobrowski (2009) examines how property focus or diversification contributed to value in US equity REITS from 1997-2006. Using the CAPM and the Carhart four-factor model they assessed whether or not a difference between “specialized” and “diversified” REIT indices could be determined. No statistical significant differences could be found. However, they found that “specialist” REITS have a higher risk profile.

More recent research by Pavlov, Steiner and Wachter (2015), seems to confirm the older findings: “Global stock market is highly significant in explaining the time series of international real estate securities returns, but they appear to offer diversification benefits as country and residual real estate factors remain highly significant” (Pavlov, Steiner and Wachter, p.26)

Unlisted Property

In studies with respect to unlisted property funds, no study was found that directly relates specialism or “focus” to the risk/return profile of unlisted funds. However, given the fact (and referring to figure 1 on page 3) that several factors might impact risk and performance of funds, a review of some relevant studies is given below. This, hopefully, provides useful insights and puts perspective on the subject.

Baum and Farelly (2008) performed a case study on a unlisted closed end value add fund. Using attribution analysis and an analytical framework for identifying α and β sources². To make a long story short, they concluded on the basis of that particular case that there is no convincing evidence for outperformance due to managerial skills, except for the specific activity “timing of the drawdowns”, i.e. the managers skill to time the market. If this result could be generalized (which ofcourse we can’t, based on one casestudy), it would be hard for fund managers to generate alpha by superior stock picking.

Higgins (2010) “benchmarked” (Australian) unlisted funds against a corresponding direct property index, using regression analysis. He postulated that if property funds could provide superior risk-adjusted returns, he would have to find “alpha”. He couldn’t find evidence for this, although he found that tracking errors were higher in unstable market conditions than in stable conditions. Also, funds with large property portfolios and debt levels below 20% seemed to provide better tracking error performance.

Fuerst, Lim and Matysiak (2013) investigated the key drivers of European non-listed real estate fund performance, looking at different factors. The factors they included in their paneldata regressions were the overall weighted market performance (“market”, correcting for the country/sector composition of individual funds), fund size, gearing (leverage), fund structure and macro economic variables. They found that the “market” (“weighted market return”), fund size and economic indicators, like bond yields, stock market returns and economic growth were important and positive contributing factors. In contrast, gearing had adverse effects overall. This, however, was dependent on market conditions. Gearing had a positive effect in bullish markets, but was contributing negatively in bearish markets. These effects were assymetrical: the negative effect of a 10% increase in gearing level was 0,7% in bullmarkets but -2,9% in bearmarkets. Gearing seemed to have an optimal level, as it was found that the added value diminished at higher gearing levels. Interestingly, the finding that fund size was positively associated with returns, was not found in a previous study. Fuerst, Lim and Matysiak think that the reasons for bigger funds performing better could be attributed to economies of scale or the fact that larger funds have the possibility to undertake larger investments (i.e.

² the use of alpha and beta refers to the origin of differences in performances. The key question is whether activities deliver extra returns through skills (alpha) or through risk (beta)

bigger properties), but it could also be that the relationship merely reflects the fact that successful funds tend to attract more investors (and money). The concluded that the identified factors accounted for about 50% of the variation in returns, and that further work was required.

Hesp (2011) takes a similar approach. In performing regressions for each separate years (2001-2010) he looks at the influence of fund structure (i.e. open-end or closed end). He expected that closed end funds would have a “premium” (an illiquidity premium). He couldn’t find convincing evidence to support such a illiquidity premium. Underlying property returns (in line with the methodology of Fuerst, Lim and Matysiak), gearing and style were found to be the main drivers of fund performance. Hesp draws the same conclusion with respect to leverage as Fuerst, Lim and Matysiak. With respect to style: core funds performed better in the post crisis years 2009 and 2010, as expected. Hesp couldn’t find a relationship between fund size and (fund)performance. In this study, 1/3 of the variance could be explained, which called for extra explaining variables.

INREV (2015) studies the risk factors of European non listed real estate funds, in a manner that is closely related tot Fuerst, Lim and Matysiak. It was found that leverage has a positive impact, but there seems to be an optimal level. Leverage levels between about 17-25% were found to be optimal. At higher levels of leverage adverse effects can happen. Also, for core strategies, effects were found to be more modest. In line with other mentioned studies, asymmetrical effects for market conditions were found for leverage: leverage provides more negative effects on performance in downturns that it adds positively in upturns.

In the context of the study, size proved to be important. INREV found that larger funds perform better, with an optimal fund size of approximately €2,2 billion (by contrast, median fund sizes are about €0,5 billion). The age of funds had a significant influence on returns for closed end funds only: older closed end funds performed worse on average. This could be an indirect relationship though, as this could reflect the fact that older funds weren’t able to sell properties (some odd version of survivorship bias).

The INREV study provides usefull insights in the development and movement of (the composition of) non listed real estate funds. It shows that the share of value add³ funds in the index rose steadily until the crisis, but this trend was reversed afterward. The same goes for structure (the share of open ended funds decreased until the crisis, but grew sharply afterward) and the use of leverage (levels rose until the crisis and diminished afterward).

Pagliari (2016) studied net returns of core, value added and opportunistic funds in the United States, using data of the NCREIF OCDE index. He adjusted for leverage, by gearing up core fund returns to match the (average) gearing levels of value added and opportunistic fund returns (as measured by the NCREIF OCDE (sub)indices). Pagliari finds that net returns of value add – and opportunistic funds from the NCREIF OCDE fund universe can’t compete with core funds⁴ within the same universe ; comparing adjusted “levered” core funds with the value add and opportunistic fund subindices from the NCREIF OCDE index, value add funds show an estimated underperformance of 180 basispoints and a (statistically insignificant) outperformance of 6 basispunts for opportunistic funds.

3 INREV uses an investment style classification. Broadly speaking, three styles are identified: core, value add and opportunistic. The style Core aims at low risk, stable, income driven investments. Value Add investments is essentially a buy-improve-sell strategy. Opportunistic strategie are characterized by a high risk/return profile. In general, core strategies have lower leverage levels. Value add and opportunistic strategies in general have higher leverage levels.

⁴ This finding is based on average return series: individual funds can, ofcourse, be the exception, not the rule.

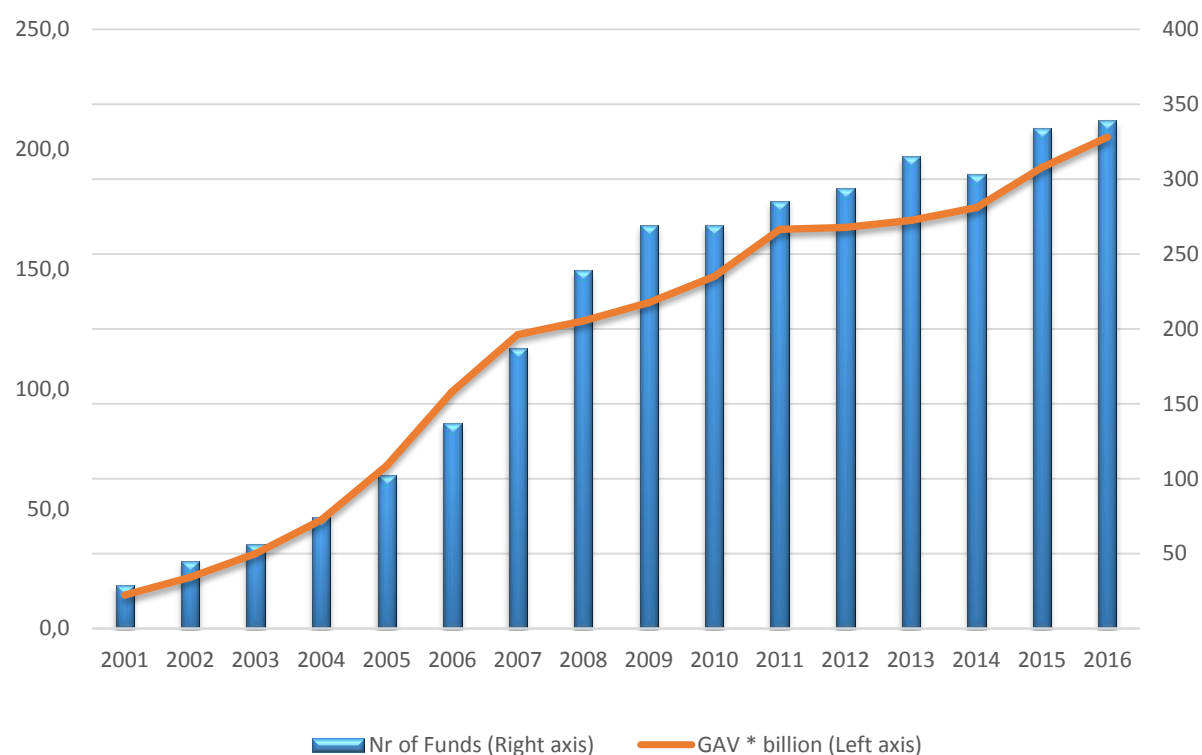
Data

Data was drawn from the INREV website. INREV collects data of currently 339 Funds, that are managed by 81 managers. That presents a current total volume of € 214 billion (Gross Asset Value).

INREV was founded in 2002 and seeks to promote investing in non-listed real estate by creating more transparency, professionalism and standardized best practices. Fundmanagers provide data to INREV, that in turn makes this information available to members.

Since inception INREV has been succesful in attracting new participants. Therefore, comparing (aggregated) data from the earlier years to more recent data has it's drawbacks, because the composition of (sub)indices differs over time. Figure 2 below shows the development of the INREV ALL Funds Index (that comprises all funds that participate).

Figure 2 Development of INREV ALL fund index



Source: INREV

INREV provides an analysis tool on their website that allows creating customized indices.

More specific, it is possible to differentiate on the following variables:

- Style (core/value Add)
- Structure (open end/closed end)
- Vintage year
- Size (gross asset value)
- Valuation Approaches
- NAV calculation method
- Vehicle domicile
- Target geographical strategy (one or more single countries, multi country)

- Target sectoral strategy (single sector or multi sector)

In order to study the topic at hand, the following subdivision was used:

- **Specialist funds** were defined as follows: funds that have a single sector strategy. These funds can adopt a single country or multi country approach. In the remainder of this paper these strategies will be referred to as follows: Single Country/Single Sector (SCSS) and Multi country/Single Sector (MCSS)
- **Generalist Funds** were defined as follows: funds that have a multi sector strategy. These funds can, again, adopt a single- or multi country approach. In the remainder of this paper these strategies will be referred to as follows: Single Country/Multi Sector (SCMS) and Multi country/Multi Sector (MCMS)

Table 1: Abbreviations for Specialists and Generalists

	Single Country	Multicountry
Single Sector	Specialist (SCSS)	Specialist (MCSS)
Multi Sector	Generalist (SCMS)	Generalist (MCMS)

An even closer look can be taken, if the four subindices are further differentiated by style (core/value add) and structure (open end/closed end).

A breakdown of the different “flavours” in specialist and generalist fund indices is given below in table 2. This breakdown makes clear that these subindices show a substantial variation in composition. Not only is this the case for the number of funds/fund managers and size, but perhaps even more importantly, this also holds for the composition of these funds in terms of geography and sector.

Table 2: Characteristics of “customized” specialist and generalist subindices (INREV), totals and/or averages.

Gross Asset Value (*€ bln)

Strategy	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
SCSS_ALL	30,5	43,0	44,3	38,0	42,0	42,0	47,0	49,5	51,6	50,9	55,1	61,9
MCSS_ALL	14,0	21,0	29,6	39,7	39,6	40,3	41,4	41,7	41,8	39,5	42,1	46,7
SCMS_ALL	17,4	24,2	27,4	23,2	27,1	36,1	47,5	46,6	47,2	54,0	62,7	63,2
MCMS_ALL	6,1	10,6	21,2	27,4	27,2	28,5	30,6	29,6	29,7	31,2	32,3	33,3

Avg Leverage (%) ⁵

Strategy	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
SCSS_ALL	28,7	25,7	28,0	37,5	38,3	33,1	29,9	29,1	28,0	23,9	22,2	24,5
MCSS_ALL	46,3	46,8	46,9	51,8	52,5	50,5	50,6	50,5	50,1	45,4	38,3	36,3
SCMS_ALL	19,1	19,1	27,7	36,4	33,5	27,5	21,6	19,5	17,5	15,2	11,0	13,3
MCMS_ALL	41,0	39,5	40,7	48,1	48,0	45,0	42,8	41,2	35,9	32,7	27,8	26,5

Nr. Of funds

Strategy	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
SCSS_ALL	45	55	67	80	95	91	95	94	102	90	109	107
MCSS_ALL	20	26	35	49	52	52	54	55	66	66	70	71
SCMS_ALL	19	28	43	55	65	68	74	75	76	76	78	79
MCMS_ALL	18	28	42	55	57	58	62	70	71	71	77	82

⁵ Average leverage level is calculated as the proportion of debt has relative to the value of it’s assets. That is aggregated on the index level.

Composition

Strategy	Dominant sectors	Dominant Countries (#)
SCSS_ALL	RET (30%), RES (28%), OFF (18%)	UK (32%), NL (32%), GER (21%)
MCSS_ALL	RET (31%), IND (29%), OFF (15%)	GER (20%), FR (13%), UK (12%)
SCMS_ALL	OFF (25%), RET (24%), IND (12%)	UK (56%)
MCMS_ALL	OFF (33%), RET (28%)	GER (17%), FR (8,6%)

Source: INREV, authors calculations

#: Country represents the country where the funds is invested in.

*SCSS_ALL: Single Country/Single Sector

*MCSS_ALL: Multi Country/Single Sector

*SCMS_ALL: Single Country/Multi Sector

*MCMS_ALL: Multi Country/Multi Sector

The performance is measured in local currency, to avoid distortion by currency effects.

To account for differences in style (core/value add) and structure (open end/close), a further breakdown was done. For each of the four strategies, where possible, four additional subindices were constructed: for each combination of core/value add and closed end/open end.

In this way, not only the properties of the identified main strategies (specialist versus generalist) can be studied, but also the properties of underlying combinations of structure and style.

As can be verified in table 5 on page 13, the open end core fund indices account for over 60% of the total GAV of all participants. Also noteworthy is the composition of the open end core multi country/single sector subindex. It looks like this is mostly capturing the bigger logistic funds within the INREV fund universe.

Finally, to account for fund size effects, the different subindices were also broken down by fund size categories:

- Small: < € 300 million
- Small-medium: € 300-€ 600 million
- Medium-large: € 600-€ 1000 million
- Large: > € 1000 million

This last breakdown is not presented anymore, this would have resulted in an unclear table and it regarded not to necessary for a further understanding of the data. However, the resulting returns (if available) are used in calculations.

During the process of breaking down and preparing subindices, it became evident that for some subindices data was inadequate. Sometimes this didn't come as a surprise. For example, open end value add funds have a small share in the index and can't be broken down by size. But it is also attributable to the vintage year. The composition of the aggregate INREV index has changed over time and includes additions of new funds as well as withdrawals/termination of funds. Also, as fund sizes possibly changed in time, causing some data to relocate from one size category to another.

As a result, it was not always possible to get data at all, nor was it always possible to construct return series with equal length. Therefore, it was decided to include the subindices that at least contained data starting

from 2010. Other data were discarded. Where available, the return data starting from 2005⁶ was included for comparison.

So, for example, if a certain subindex has data starting from 2007 onward, only the subset starting from 2010 was included. If a subindex contained data for the whole period 2005-2016 (this was the common length of the “main categories”, then ofcourse it was included as well.

In the remainder of this paper, the following abbreviations will be used for style and structure:

Table 3: Abbreviations for style/structure combinations

	Core	Value Add
Open End	OEC	OEVA
Closed End	CEC	CEVA

So, for clarity: the expression SCMS OEC means: Single Country/Multi Sector Open End Core.

Table 4: Overview of used abbreviations

Abbreviation	Meaning
SCSS	Single Country Single Sector
MCSS	Multi Country Single Sector
SCMS	Single Country Multi Sector
MCMS	Multi Country Multi Sector
OEC	Open End Core
OEVA	Open End Value Add
CEC	Closed End Core
CEVA	Closed End Value Add

⁶ The year 2005 was chosen, because as off this year most subindices (i.e. the ones including style- and structure characteristics) had datacoverage.

Table 5: Breakdown of Generalist and Specialist Funds by structure and style

Generalists	# Funds	# Fundmgrs	Total GAV ult 2016 * mld	% total GAV	Dominant investmentcountries	Dominant sector
Multicountry/multi sector (OEC)	47	22	23,1	11%	Germany (19.8%), France (9.1%)	Office (32.8%), Retail (26.2%)
Single country/multi sector (OEC)	48	24	51,5	24%	UK (60.8%), Germany (11.4%)	Office (24.9%), Retail (25.1%), Industrial/Logistics (12.8%)
Multicountry/multi sector (OEVA)	4	4	1,4	1%	France (28,2%), Germany (15%), The Netherlands (10,2%)	Office (43%), Retail (28,1%)
Multicountry/multi sector (CECO)	10	10	4,5	2%	Poland (16,4%), Czech Republic (12,4%), Germany (10,2%)	Retail (45,3%), Office (31,4%)
Single country/multi sector (CECO)	14	11	7,5	4%	Zwitserland (43,5%), UK (33,1%)	Mixed (43,5%), Retail (15,3%), Office (14,9%)
Multicountry/multi sector (CEVA)	21	14	4,3	2%	Denmark (19,1%), Poland (8,7%), Finland (8,5%)	Office (35,6%), Retail (17,2%), Residential (12,7%)
Single country/multi sector (CEVA)	15	11	3,1	1%	Italy (36,6%), UK (23,6%), Sweden (21,4%)	Office (52,5%), Retail (19,7%)
Total	159	96	95,4	45%		

Specialists	# Funds	# Fundmgrs	Total GAV ult 2016 * mld	% total GAV	Dominant countries	Dominant sector
Multicountry/single sector (OEC)	23	15	26,7	13%	Germany (25.2%), Netherlands (16.2%), France (13,5%), UK (13.3%)	Industrial/Logistics (46.4%), Parking (22.2%)
Multicountry/single sector ex parking/Logistics (OEC)	14	10	8,6	4%	Germany (34,3%), Netherlands (11,6%)	Office (57,4%), Retail (17,2%)
Single country/single sector (OEC)	52	17	32,4	15%	Netherlands (63,7%), Germany (35%)	Residential (55,7%), Retail (17,7%), Office (12,9%)
Single country/single sector (OEVA)	4	4	3,8	2%	UK (80,3%), Germany (12,3%)	Student Housing (71,8%), Other (12,5%)
Multicountry/single sector (CECO)	27	14	10,1	5%	France (19,6%), Germany (15,6%), Finland (11,7%)	Retail (43,9%), Industrial/Logistics (18,2%), Office (14,7%)
Single country/single sector (CECO)	35	19	18,5	9%	UK (56,3%), Italy (20,4%), France (13,8%)	Retail (64,4%), Office (17%)
Multicountry/single sector (CEVA)	19	11	9,7	5%	UK (16,9%), Italy (15,4%), Portugal (15,3%)	Retail (87,1%), Office (8,6%)
Single country/single sector (CEVA)	16	14	7,2	3%	UK (74,1%), Germany (8,4%)	Office (74,7%), Industrial/Logistics (29,2%), Retail (13%)
Total	190	104	117	55%		
INREV ALL FUNDS	339	81	213,6	100%	UK (31,3%), Germany (16,4%), Netherlands (12,8%)	Retail (28,1%), Office (22,1%), Industrial/Logistics (13,5%)

Methodology

Preferably, a regression analysis would have been done, following the example of recent studies of Matysiak and Fuerst, as mentioned in the literature review. Data to perform such an analysis is available at INREV, but INREV has a strict policy not to provide (anonymized) data to participants. As the author works for a participant of INREV's, this method couldn't be executed. This leaves room for others to follow up on this paper. Instead, an analysis of the INREV index was done. As explained in the data section, the INREV website allows for constructing various subindices. Basically, what has been done is a breakdown by "strategy", i.e. breaking down the index by country- and sector orientation. Then, based on the what we know from previous studies, indices were broken down further by structure (open end, closed end), style (core, value add) and fund size.

The results from the customized subindices are analyzed. This is done by:

- graphical analysis of the data
- calculating and analyzing risk adjusted ratios for subindices
- correlation analysis
- examining the relationship between leverage and risk adjusted returns
- mean/variance analysis

Risk adjusted returns are calculated by dividing the average performance by the standard deviation for each subindex. This is done for the whole review period 2005-2016, as well as for the post crisis period (2010-2016).

Markowitz mean variance analysis is performed by calculating portfolio returns and –variance, for 30.000 different combinations of subindex weightings (ofcourse adding up to 100%). First this was done for the four "main" specialist and generalist subindices (the highest aggregation level):

- subindex single country/single sector
- subindex multi country/single sector
- subindex single country/multi sector
- subindex multi country/multi sector

Ranking the results by risk adjusted portfolio return shows the combinations that lead to the optimal compositions. The top 20 results were summarized.

Next, the abovementioned subindices were broken down by style (core or value add) and structure (open end, closed end) and again the risk adjusted returns were calculated. This resulted, as will be shown later, in the following (best performing) subindices:

- subindex single country/single sector, open end core
- subindex multi country/multi sector, closed end core
- subindex single country/multi sector, open end core
- subindex multi country/ single sector, closed end core

Making use of the resulting best (risk adjusted) performing subindices, the same mean variance procedure was repeated.

Repeating the procedure for a shorter timeframe (post crisis) and/or for other characteristics wasn't considered to be feasible, as for mean variance analysis a time series of sufficient length is required. A return series starting from the year 2010 contains six years of data, which doesn't meet that requirement.

Results

Analysis of customized subindices

Let's take a look at the two "specialist" and the two "generalist" strategies. In the graphs below (figures 3a and 3b) the returns of those subindices are represented. Figure 3a shows the yearly returns per subindex, in figure 3b the cumulative index development⁷ of each subindex is shown.

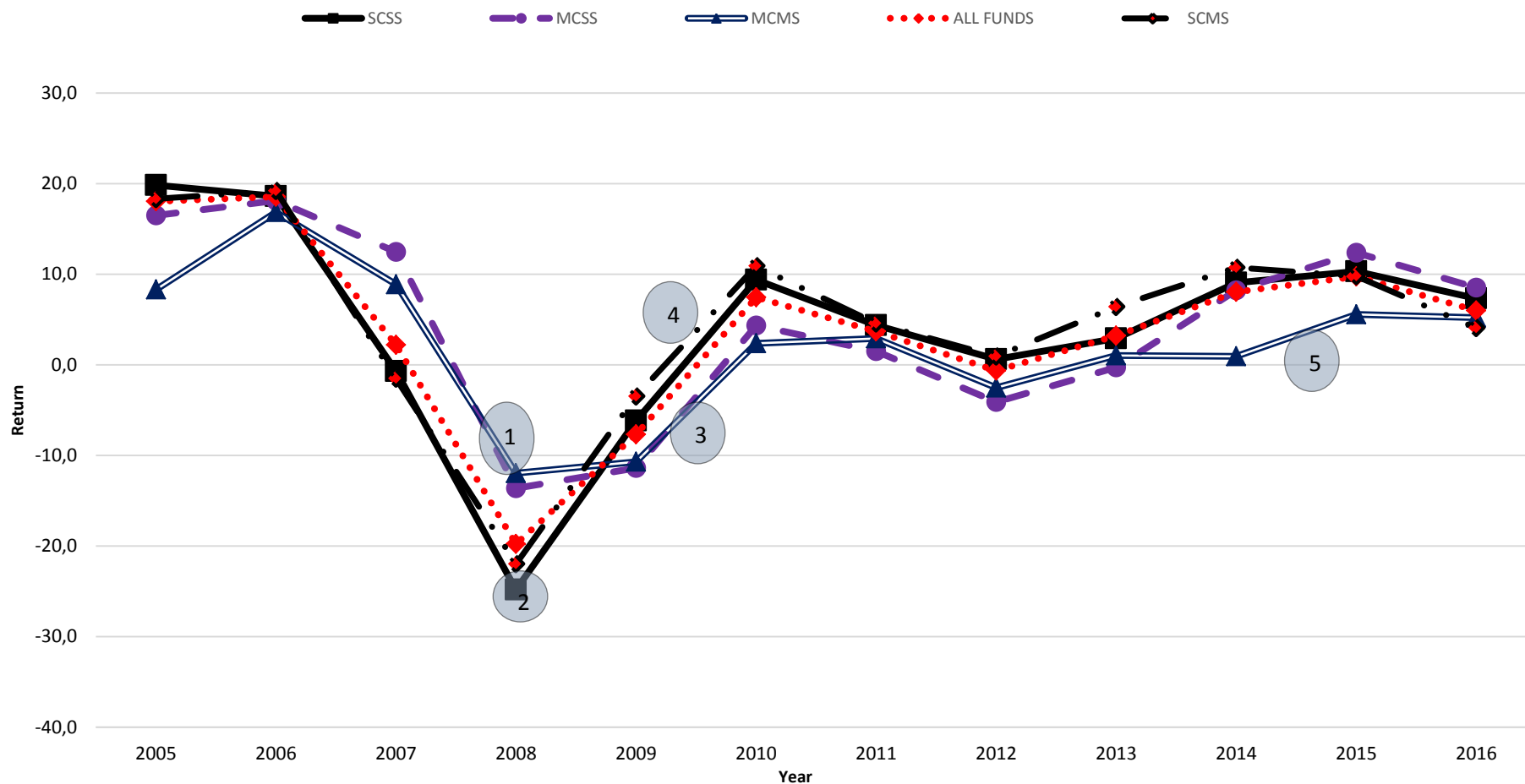
Some interesting features of these graphs can be seen:

- For the subindices multi country/multi sector and multi country-single sector, the crisis seemed to have had less impact than the other subindices. Both a generalist and a specialist subindex were resilient in those years: both multicountry indices. At the same time the single country indices (a single sector and a multi sector strategy) were more severely impacted. The overall index also plunged, indicating that investors that were mainly invested in multicountry funds would have been better off. In the graph this is marked by circles 1 (the impact of the crisis on the multicountry funds) and 2 (the effect of the crisis on the single country funds). In the graph this might seem to be a modest difference, but the gap is almost 10% points.
- In the years 2009 and 2010 this turned around, the multi country/single sector and multi country/multi sector subindices (indicated by circle 3) clearly underperformed the single country indices (indicated by circle 4). This is even more clear from figure 3b.
- After the year 2013 the subindex multi country/multi sector is clearly underperforming, indicated by circle 5 in the graph, and again this is even more clear from figure 3b.
- The influence of the Brexit is not (yet) present in the performance. Comparing the returns of subindices measured in local currency with the returns of subindices in euros, it became apparent that the influence of the Brexit is limited to a currency effect in the year 2016.

The graphical representation of the "specialist" versus "generalist" does not confirm a clear difference between specialist and generalist performance. It is rather an indication that country focus is an important factor in explaining performance.

⁷ As can be seen in chart 3b, the index started in the year 2000 as did 3 of the four subindices. The subindex 'multi country, multi sector' started one year later. The reason that the year 2005 is chosen as a base year, has to do with the fact that when other variables are included such as structure and style, most subindices have different starting years. To include as many subindices as possible, the year 2005 was optimal.

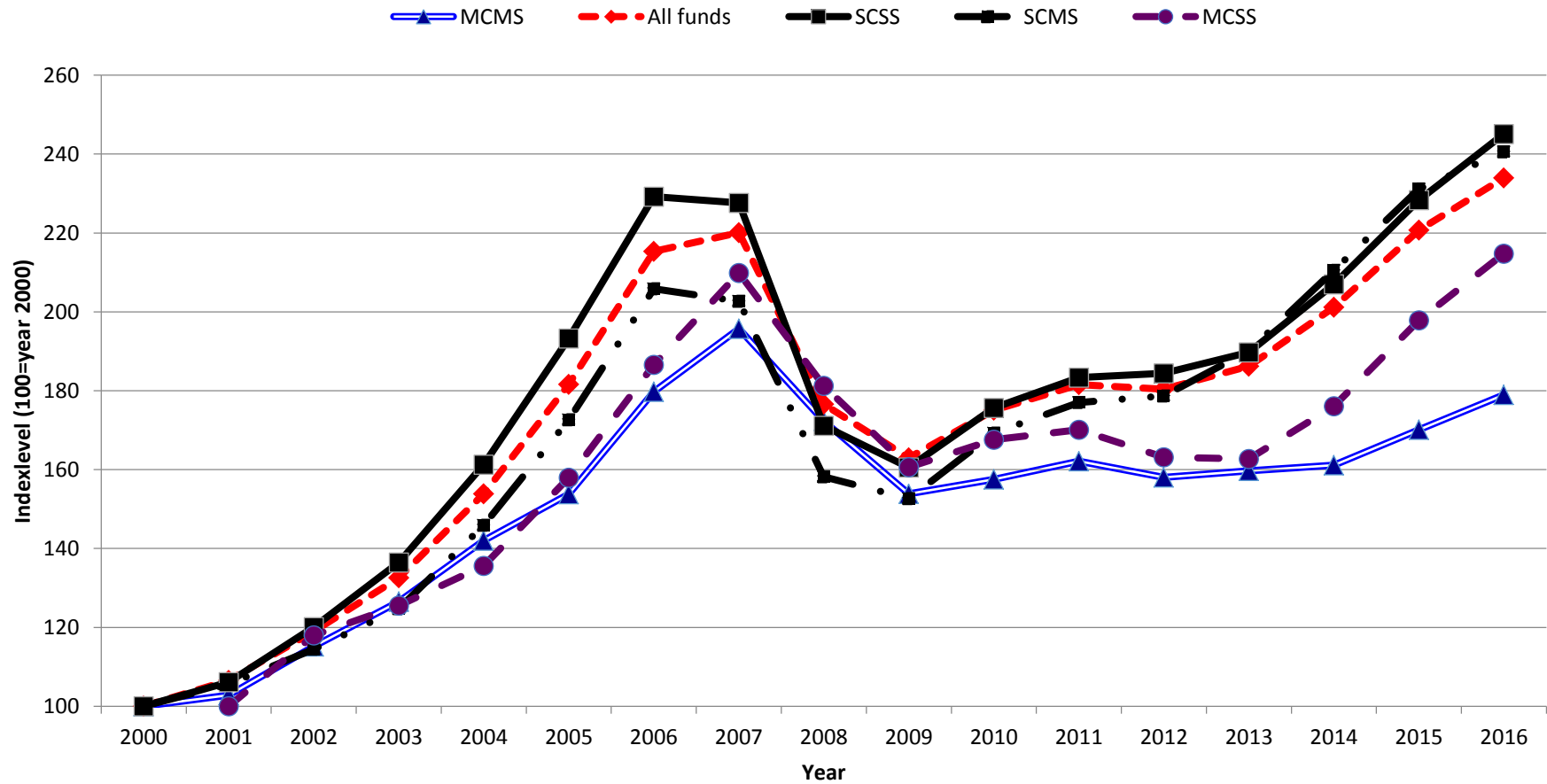
Figure 3a: Performance by specialist and generalist subindices



Source: INREV

*SCSS: Index, composed of all Single Country, Single Sector Funds
 *MCSS: Index, composed of all Multicountry, Single Sector Funds
 *SCMS: Index, composed of all Single Country, Multi Sector Funds
 *MCMS: Index, composed of all Multi Country, Multi Sector Funds

Figure 3b: Cumulative performance by specialist and generalist subindices



Source: INREV

*SCSS: Index, composed of all Single Country, Single Sector Funds

*MCSS: Index, composed of all Multicountry, Single Sector Funds

*SCMS: Index, composed of all Single Country, Multi Sector Funds

*MCMS: Index, composed of all Multi Country, Multi Sector Funds

What strategy had the highest risk adjusted pay-off? Does it show a clear pattern? For each subindex, as well as the ALL FUNDS index, the risk adjusted returns were calculated. Risk adjusted returns were calculated by dividing the average performance by the standard deviation.. The results are shown in the table below. Because the results are expected to be heavily distorted by the crisis, the risk adjusted returns were also calculated for the post crisis period 2010-2016. The table is sorted by the risk adjusted returns for the whole period (2005-2016). In the second part of the table, the risk adjusted returns for the post-crisis period are given.

Table 6: Risk adjusted returns for specialist versus generalist subindices.

	2005-2016				2010-2016			
Strategy	AVG	STDEV	R.A.R. (*)	RANK	AVG	STDEV	R.A.R.	RANK
Single Country Multi Sector (SCMS)	4,83	11,00	0,44	1	6,77	3,84	1,77	1
Multi Country Single Sector (MCSS)	4,39	10,32	0,43	2	4,37	5,75	0,76	5
Single Country Single Sector (SCSS)	4,23	11,83	0,36	4	6,29	3,70	1,70	2
Multi Country Multi Sector (MCMS)	2,24	8,03	0,28	5	2,21	2,77	0,80	4
ALL FUNDS	4,07	10,45	0,39	3	5,35	3,52	1,52	3

*R.A.R. = Risk Adjusted Return

In table 7 and 8, the correlations for the different strategies are shown, again for the whole period as well as for the postcrisis period. All correlations were tested for significance. Correlations that are significant at the 95% level are indicated with an asterisk.

Table 7: Correlations for Specialist versus Generalist subindices (2005-2016)

		Specialists		Generalists	
		SCSS_ALL	MCSS_ALL	SCMS_ALL	MCMS_ALL
Specialists	SCSS_ALL	1			
	MCSS_ALL	86% (*)	1		
	SCMS_ALL	99% (*)	81% (*)	1	
	MCMS_ALL	82% (*)	95% (*)	78% (*)	1
Generalists					
ALL FUNDS		99% (*)	91% (*)	98% (*)	89% (*)

Table 8: Correlations for Specialist versus Generalist subindices (2010-2016)

		Specialists		Generalists	
		SCSS_ALL	MCSS_ALL	SCMS_ALL	MCMS_ALL
Specialists	SCSS_ALL	1			
	MCSS_ALL	91% (*)	1		
Generalists	SCMS_ALL	84% (*)	65%	1	
	MCMS_ALL	70%	82% (*)	38%	1
	ALL FUNDS	98% (*)	94% (*)	87% (*)	74%

Source: INREV, calculations by author

Looking at the correlations, combining this with the risk adjusted returns is a sensible thing to do: combining good performing funds with less performing funds probably results in lower correlations, but (in the opinion of the author) in the end you would end up losing money. The question is; would it have been possible to diversify over well performing funds (or strategies)?

The tables above, combined with the risk adjusted returns gives us a first indication that sector oriented funds do not perform better than diversified ones. This is based on the following findings:

- A generalist fund index (single country/multi sector) produced the best risk adjusted results, as well for the whole period as for the postcrisis period.
- The post crisis results reveal that risk adjusted returns were best for a generalist index, but closely followed by a specialist index. It is clear from table 6 that there's a big distinction between single country indices on the one hand (with risk adjusted returns that are about 1,7, marked grey in the righthand side of the table) and multi country indices on the other (producing rather disappointing results with risk adjusted returns of about 0,8). This, at least to the author, indicates that what matters the most is actually country focus instead of sector focus. A plausible explanation for this is that fund managers that have a focus on a particular country have local presence, have specific knowledge about the market and institutions, have established relationships and a good network that allow them to acquire good assets and are aware of the (im)possibilities of the institutions.

As expected, lower correlations often stem from worse performance, rather than from a different behaviour in time while maintaining a good performance. The correlations between return series did change however in the last years: on average correlations went down while Risk adjusted returns went up. Investors diversifying through single country funds (single and multisector) would have been better off: both strategies had the highest risk adjusted performance and at the same time the correlations went down, providing room for diversification benefits.

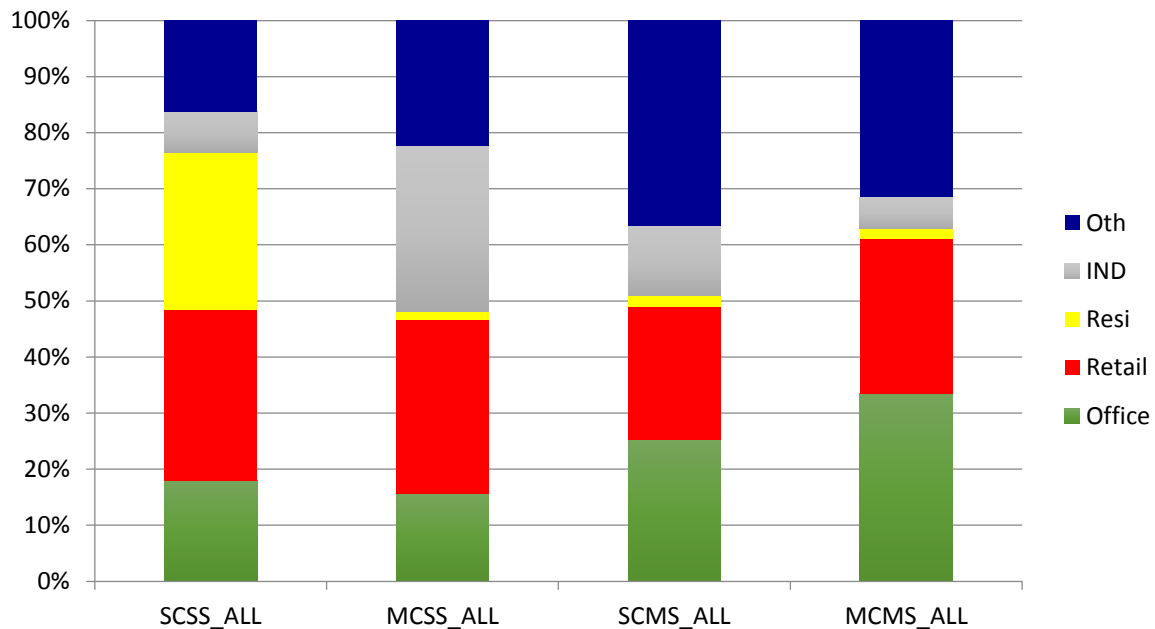
Somewhat puzzling is the fact that the correlation between the single country/single sector and multi country/multi sector went up, especially as risk adjusted returns differ so much.

A word of caution is in place: the subindices represent average numbers. It's very well possible that some underlying funds do provide added value and diversification potential. A typical example would be investing in

logistics. It is expected that logistics adds value to real estate portfolios, being a typical multicountry, location specific product.

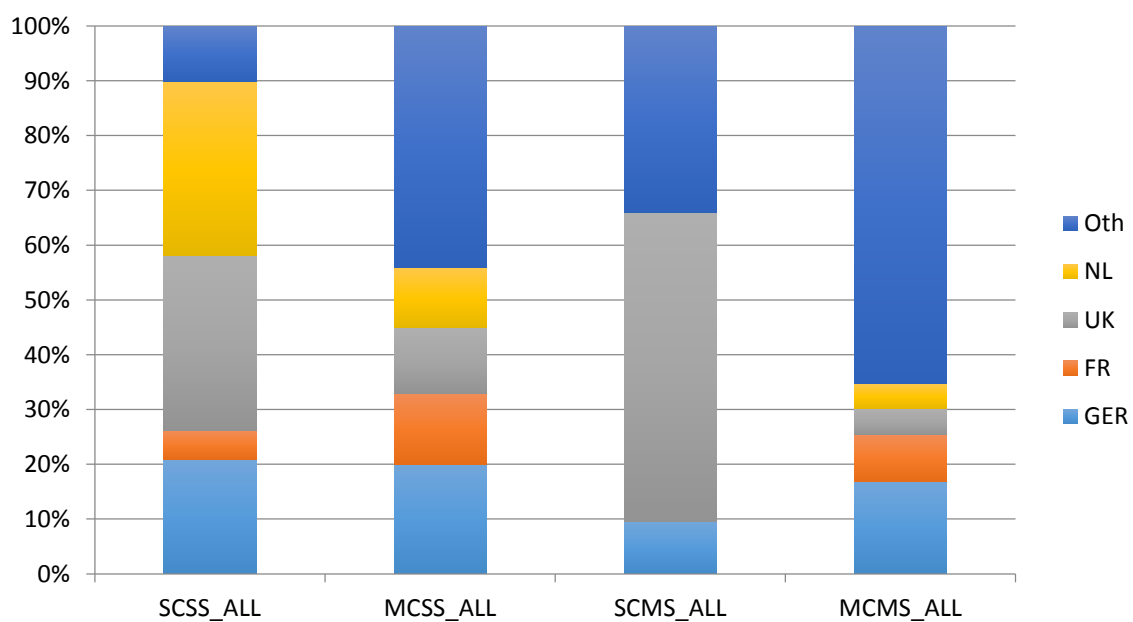
To further investigate the properties of the subindices, it is helpful to take a closer look at the sector- and country composition of the subindices. Below, in two graphs, the composition of the different subindices is depicted.

Figure 4: Composition of subindices by sector



Source: INREV

Figure 5: Composition of subindices by country



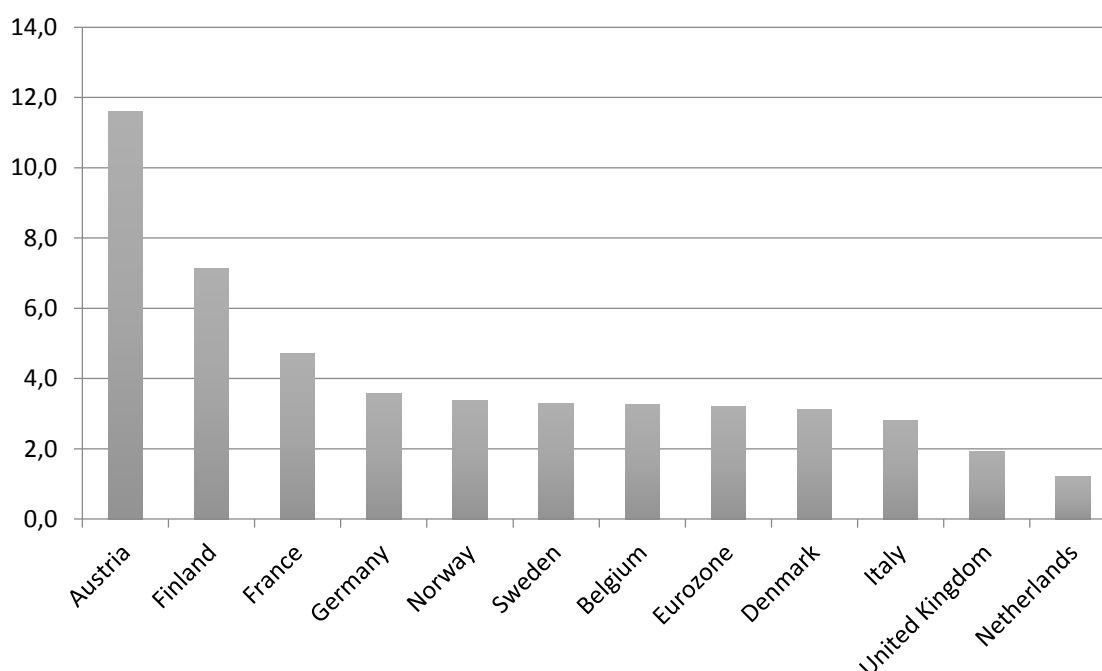
Source: INREV

The figures above indicate that sector choice wasn't of the biggest importance. Although sector distributions are not the same for the two single country fund indices, risk adjusted performance was more or less "comparable" (1,77 versus 1,7 in the postcrisis period and 0,44 versus 0,36 measured over the whole period). The sector composition of the multi country fund indices differ, mostly because of the "logistics" and "parking" funds impact that was discussed before. Both indices have comparable Risk adjusted returns. That doesn't make it very likely that sector choice by itself (apart from being able to select the "right" product) is an important factor in explaining performance.

Looking at figure 5, the index composition by country also does not produce straight forward results. A possible explanation for the poor performance of the multi country fund indices (at least for the period 2010-2016) is that they tend to be less concentrated to countries then the single country fund indices. This is not as logical as it may seem: multi country funds can be highly concentrated to a few countries. Funds that are very much diversified by countries might have (access to) less specific knowledge, presence and resources to produce good results.

It might be that exposure to specific high performing countries drive performance. To get a quick feel for that, risk adjusted returns for European countries were calculated. The results are shown in figure 6 below. Ofcourse, this is nothing more or less than a very crude quickscan, based on the finding in this paper so far that sector choice is less relevant than choice of country.

Figure 6: Risk adjusted returns of MSCI country indices (2010-2016), local currency



Source: MSCI

Amongst the best performing countries in the period 2010-2016 were France and Germany. The United Kingdom and the Netherlands on the other hand clearly lagged behind. The results for Germany should be interpreted with caution however. This might have to do with the appraisal methods in Germany. Supposedly, German appraisal methods lead to excessive smoothing. This however a study in it's own right, but if it's true, then the risk adjusted returns for Germany might be overstated.

The results don't shed extra light on the problem at hand. Had country performance of the underlying bricks & mortar been an explanation, then we would have expected fund indices with high weightings to "high"

performing countries such as Germany and France to perform better. This is not the case. So, although we have found that fund indices that focus on single countries clearly perform better than multi country indices, we cannot conclude (based on this “quicksan” anyway) that country choice in itself is the discriminating factor. A complicating factor is that one has consider the size of the investable market. For example, Austria and Finland seem to stand out, but they have rather small markets. Impact of choice of country on performance is a topic that requires further study.

To investigate what an optimal portfolio composition would look like, based on the properties of the subindices and their mutual correlations, a “Markowitz” mean variance analysis was done. This was only done for the review period 2005-2016, as for the post crisis period not enough data was available (six years of data is insufficient for mean-variance analysis). For 30.000 combinations of the four “main” subindices, the resulting portfolio means and variances were calculated, as well as the risk adjusted portfolio returns. The results were then ranked by risk adjusted return. In the graph (figure 7) and the tables (9 and 10) below, the results are presented.

Figure 7 Mean variance portfolio results for the four “main” specialist and generalist subindices

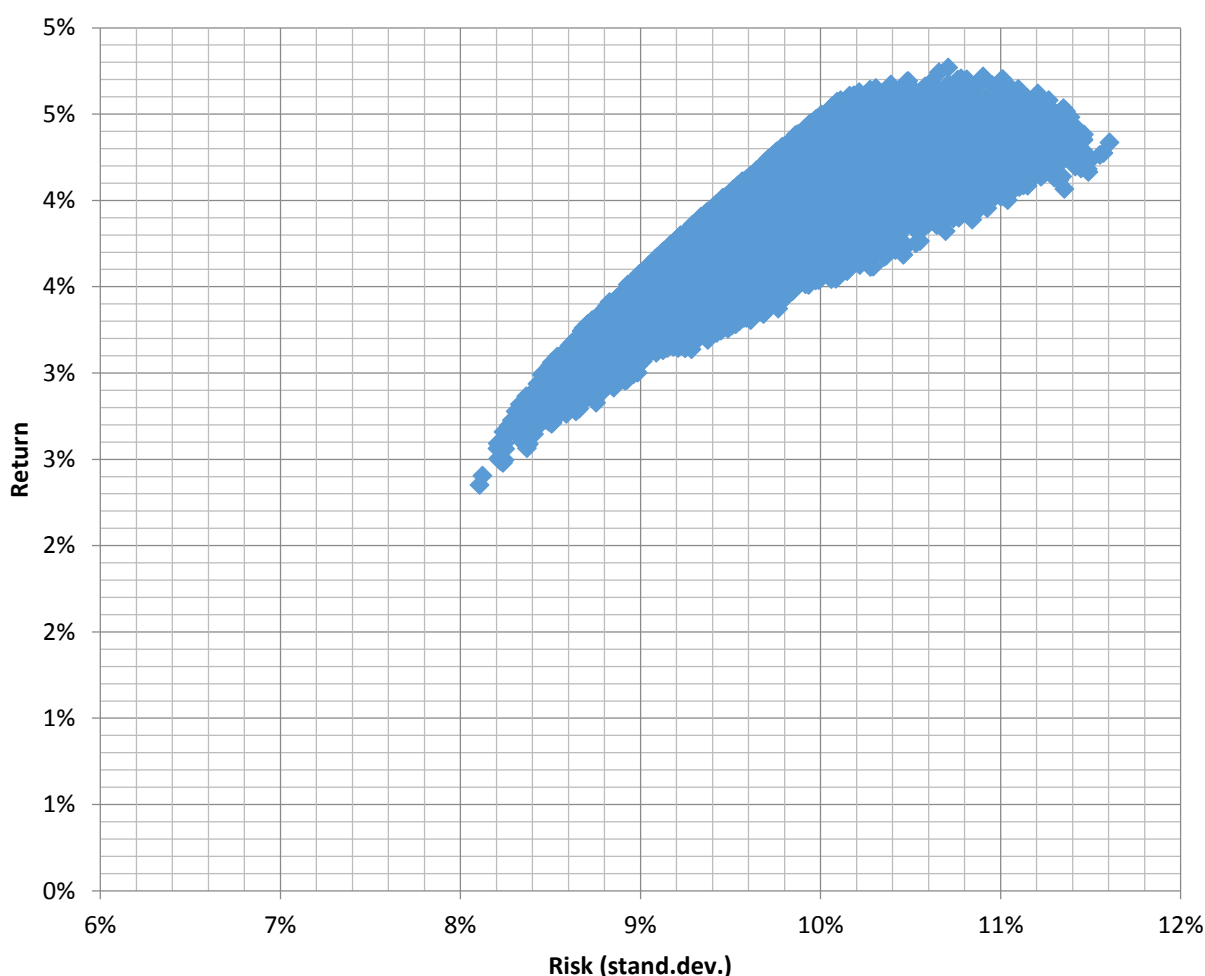


Table 9: Results mean variance specialist and generalist subindices ranked by risk adjusted portfolio return.

Rank	Run	Portfolio weights						
		SCSS	MCSS	SCMS	MCMS	Risk	Return	R.A.R.
1	11644	1,603%	47,867%	50,347%	0,183%	10,163%	4,606%	0,453%
2	13589	0,277%	45,594%	52,238%	1,892%	10,113%	4,580%	0,453%
3	2032	2,211%	42,781%	54,874%	0,134%	10,217%	4,626%	0,453%
4	6803	0,403%	50,855%	47,403%	1,339%	10,093%	4,570%	0,453%
5	27769	2,781%	47,068%	50,112%	0,038%	10,186%	4,606%	0,452%
6	6743	0,912%	51,843%	45,946%	1,299%	10,094%	4,564%	0,452%
7	26562	1,523%	33,580%	63,567%	1,331%	10,276%	4,640%	0,452%
8	29355	2,045%	53,441%	43,809%	0,705%	10,115%	4,565%	0,451%
9	12387	0,596%	48,176%	48,366%	2,862%	10,065%	4,541%	0,451%
10	20085	1,673%	31,616%	65,465%	1,246%	10,308%	4,650%	0,451%
11	9146	2,560%	40,860%	54,996%	1,584%	10,190%	4,595%	0,451%
12	15399	2,131%	50,352%	46,066%	1,451%	10,110%	4,559%	0,451%
13	15699	1,845%	44,877%	51,044%	2,234%	10,123%	4,565%	0,451%
14	6622	2,208%	58,299%	39,313%	0,180%	10,111%	4,556%	0,451%
15	10056	2,545%	32,747%	63,488%	1,220%	10,301%	4,640%	0,450%
16	10381	0,206%	36,288%	58,843%	4,663%	10,110%	4,550%	0,450%
17	16570	3,294%	43,356%	51,600%	1,749%	10,167%	4,575%	0,450%
18	15151	4,430%	43,497%	51,373%	0,700%	10,212%	4,595%	0,450%
19	27390	2,662%	50,779%	44,810%	1,748%	10,104%	4,546%	0,450%
20	12972	5,195%	45,205%	49,575%	0,025%	10,227%	4,600%	0,450%

Table 10: Range of allocations top 20 portfolio composition

Reeks	Min	Max	Optimum
SCSS	0,2%	4,4%	1,6%
SCMS	31,6%	58,3%	47,9%
MCSS	39,3%	65,5%	50,3%
MCMS	0,0%	4,7%	0,2%

As expected, the two best (risk adjusted) performing subindices dominate the optimal (20) portfolios. The risk adjusted return of the single country, multi sector index and the multi country, single sector index are almost the same, but are not perfectly correlated (81%). That explains why both indices are present in the top 20 best performing portfolio compositions and also why a wide range of combinations of those two indices. The gain from diversification is not very impressive (0,453 for the optimal portfolio, compared to 0,44 for the best performing subindex.

Looking back to table 6, it can be seen however, that the impact of the crisis is very substantial. During the crisis, returns converged (in a very negative way). Looking at the post crisis period, risk adjusted returns diverge. This leads, in terms of portfolio construction, to a (substantial) different view on optimal portfolio composition.

Further decomposition of the subindices by structure and by style

Could it be that the aggregation level is too high? As already mentioned in the introduction, other factors could be of importance, and they may be “drowned” in the averages. Let’s dig a little deeper, by differentiating each subindex by style (core/value add) and structure (open end/closed end). Again, using the selection tool on the INREV website, a further breakdown was done. For each subindex, risk adjusted returns were calculated and the subindices were ranked by their risk adjusted return.

First, let’s take a look at the graphs of the subindices on the pages below. Again, a distinction as made between specialists and generalists. The red dotted lines represent the average returns for each identified specialist or generalist strategy. The other lines represent the different underlying subindices by style and structure. Please note that, as mentioned in the data description, some subindices are not available/non existent. For example open end value add fund indices are not available, or have insufficient coverage over the whole period.

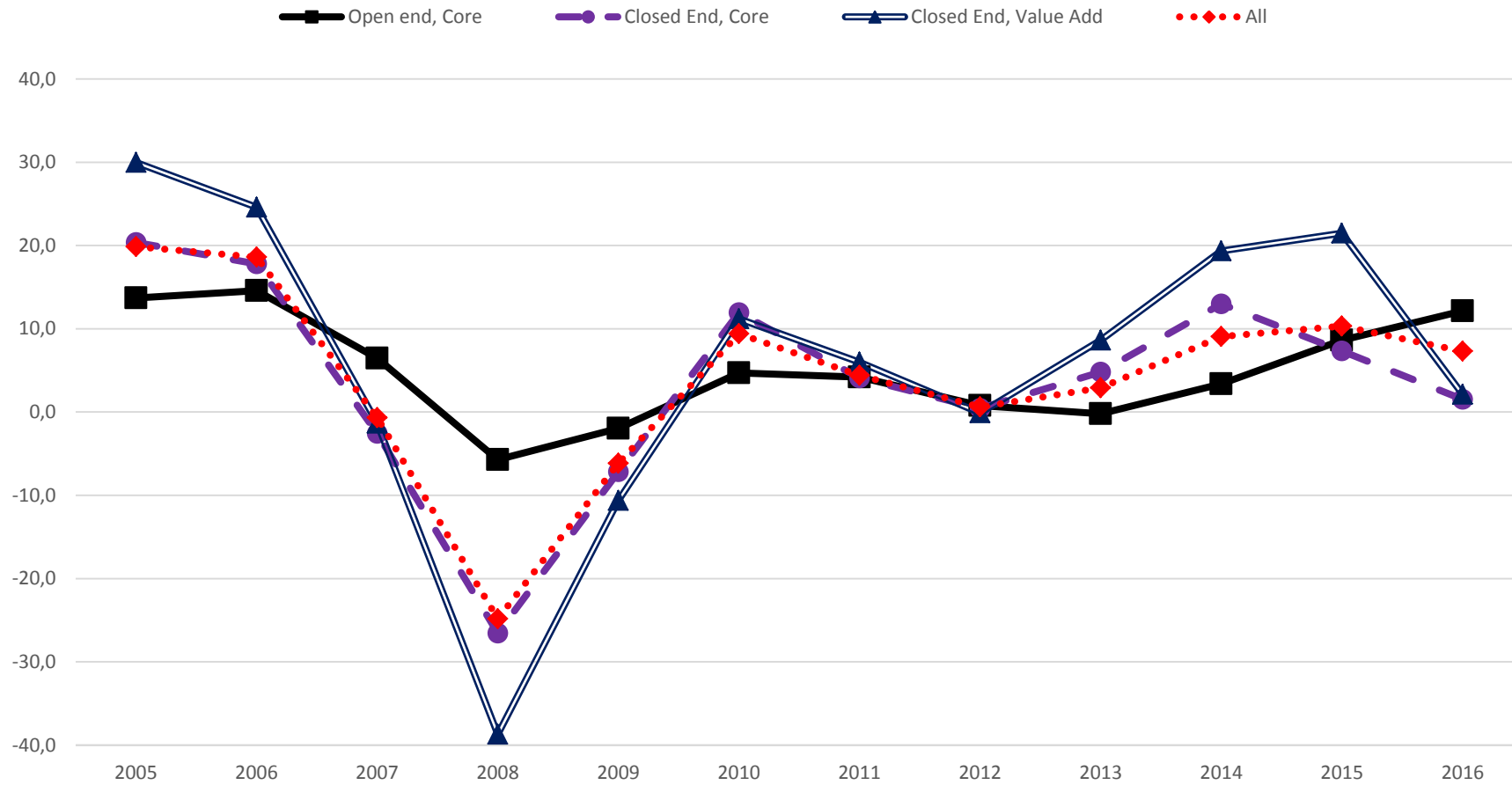
The graphs reveal that risk/return properties indeed are not uniform across style and structure.

Some observations from the graphs:

- In all subindices, from the pattern of the value add indices, it is clear that this style is producing more volatile results.
- On average, across the board, open end core indices show what we’d expect: clearly less volatile, but also more moderate returns.
- Closed end core fund indices have shown a less stable return pattern than open end core fund indices. Given the fact that both fund types aim at creating a core portfolio, this is somewhat surprising. The higher volatility probably is caused by the characteristics that closed end funds tend to have, not by structure itself. Closed end funds usually are smaller in size than open end funds, what might cause less diversification (what in turn could lead to higher volatility). Closed end funds might also have higher leverage levels, what also could lead to higher volatility.
- The multi country, single sector open end core index has a rather good risk/return profile, but we know that for a big part this index contains logistics and parking. These are sectors, especially logistics, that have a businessmodel that is (believed to be) suitable for a multi country approach. Logistic properties need to be situated at international hubs and are usually part of an operator that serves clients internationally. Therefore, a core index without logistics and parking was constructed as well. This shows, at least for the last four years, that a multi country, single sector approach in the traditional sectors had a poor (relative) performance.
- On average, it looks like the single country funds were more severely hit by the crisis than the multi country ones. This has to be interpreted with caution. The country allocations of the aggregate single country funds index have a rather high weighting to the UK (44,6%) in comparison to the aggregate multi country funds index (9%). This finding could mean that the UK property market was relatively hard hit by the crisis, although it is also believed that appraisals in the UK absorbed the sharp economic downturn more quickly (and recovered more quickly as well).
- The graphical inspection of these subindices does not show very clearly whether specialist subindices perform better than generalist ones.

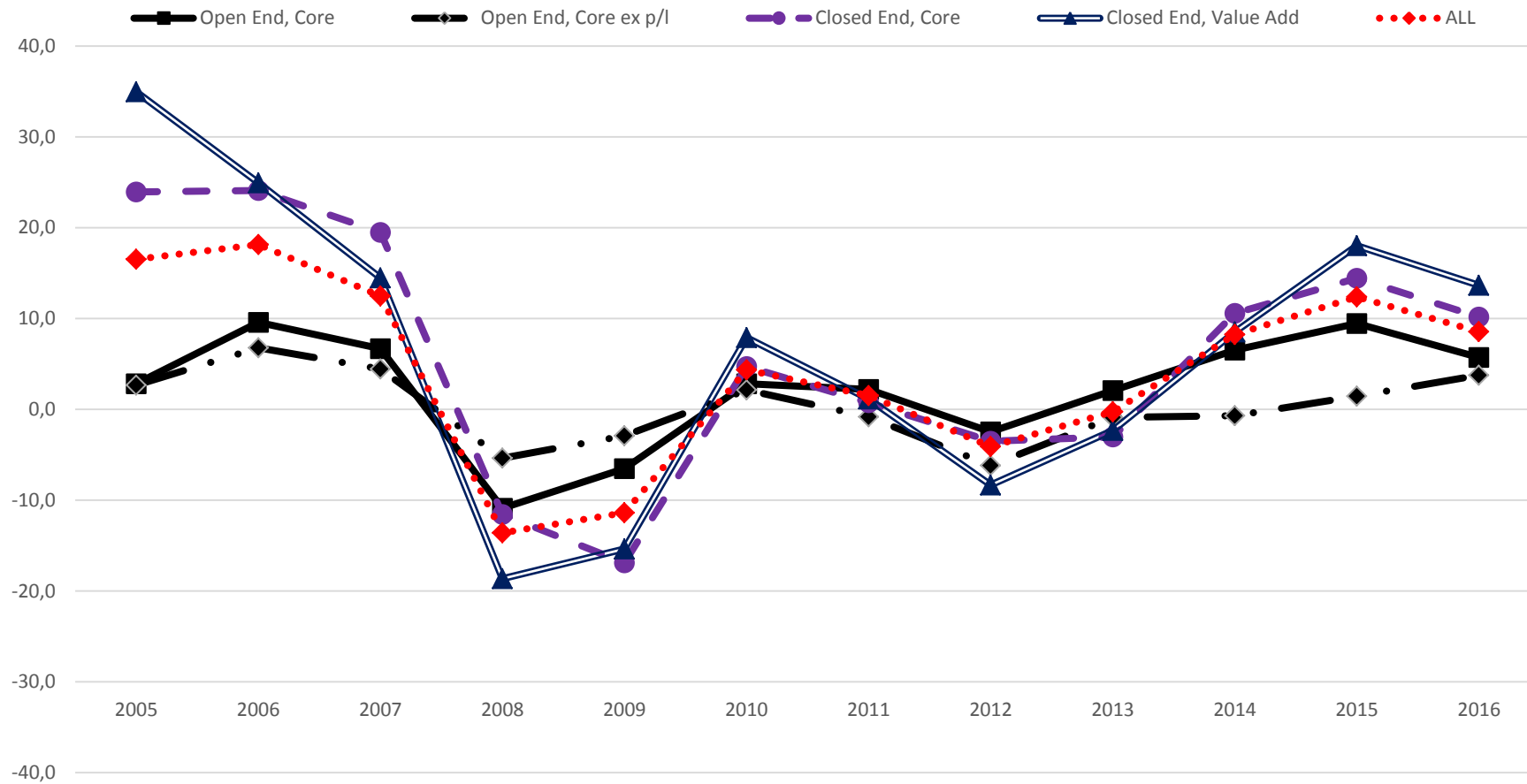
Specialists

Figure 8: Returns Single Country/Single Sector indices by style and structure (returns in local currency)



Source: INREV

Figure 9: Returns Multicountry, Single Sector, by style and structure (returns in local currency)

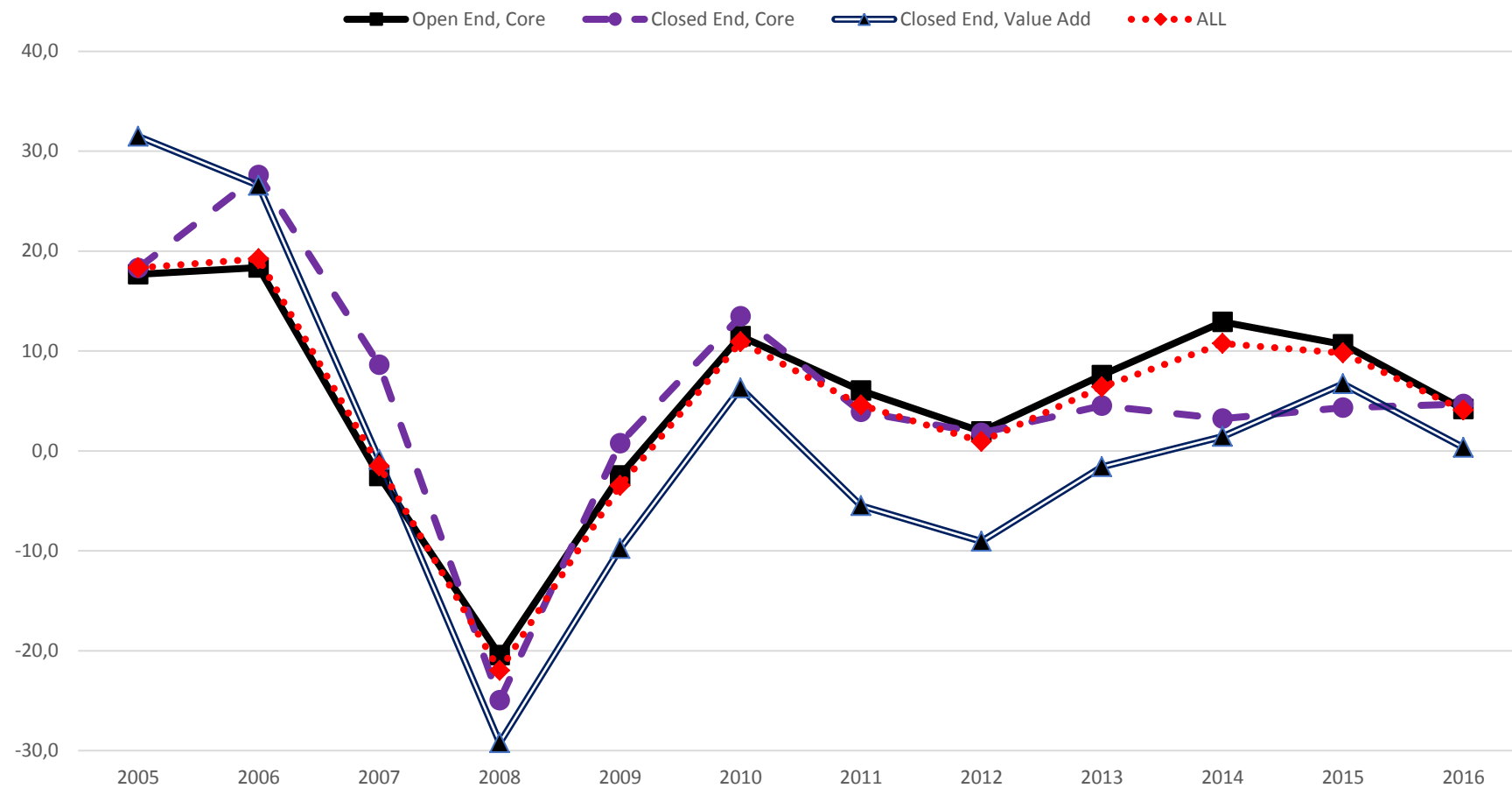


Source: INREV

- for Open End Core, ex p/l means ex parking and logistics. As can be seen in the Graph, excluding these categories does have quite an impact

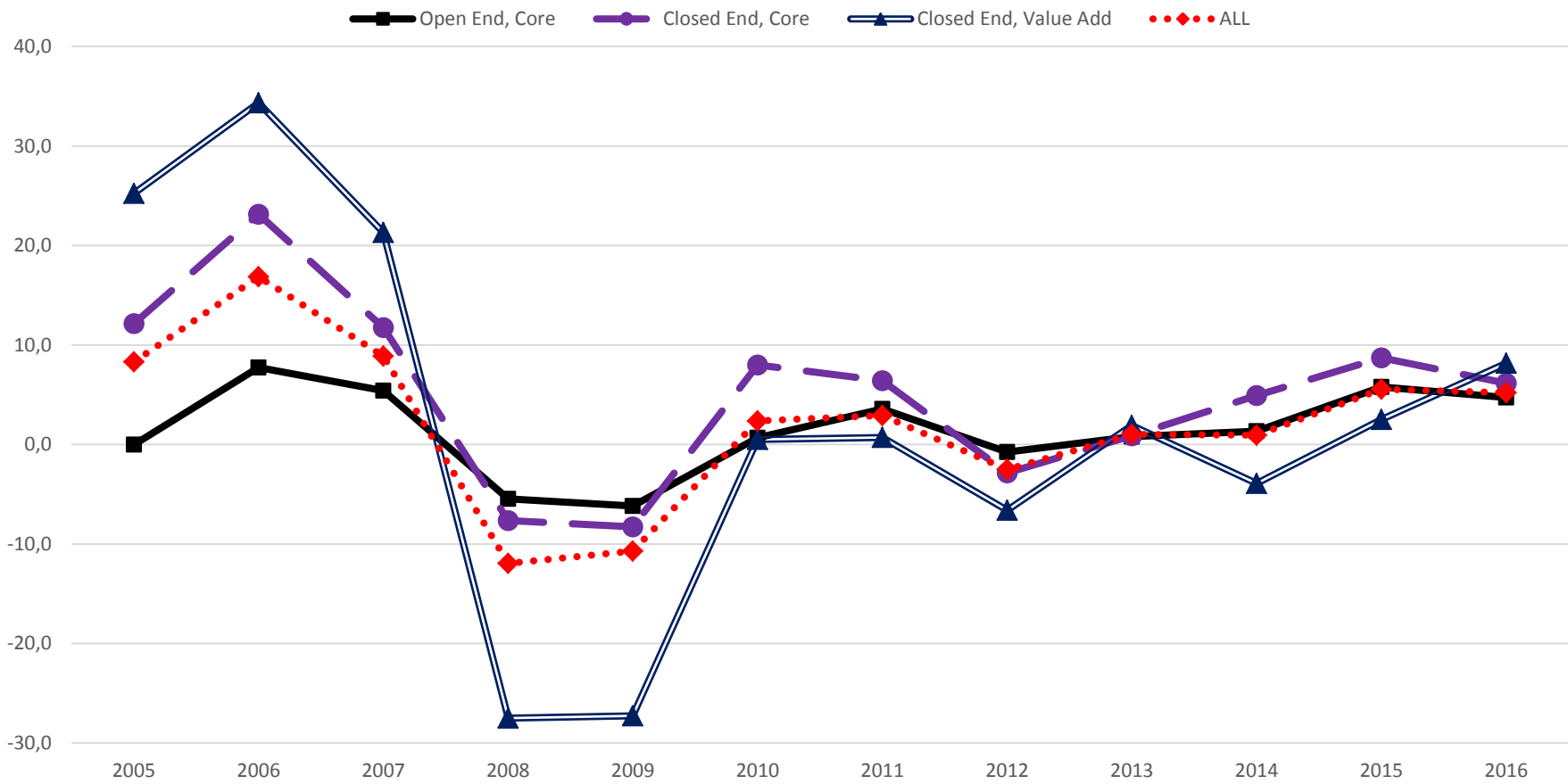
Generalists

Figure 10: Returns Single Country, Multisector, by style and structure (returns in local currency)



Source: INREV

Figure 11: Returns Multi Country, Multisector, by style and structure (returns converted in local currency)



Source: INREV

Next, the risk adjusted returns for each subindex were calculated. This was done for the whole period, as well as for the “post crisis” period 2010-2016. The ranking is based on Risk adjusted returns. The “aggregate” indices were included in the calculations. In table 11 below, the results are presented.

Table 11: Risk adjusted returns for subindices, by Strategy, style and structure

Strategy	Style/Structure	2005-2016				>2010			
		AVG return	STDE V	Risk adj return	RANK	AVG return	STDE V	Risk Adjusted return	RANK
Single Country/Single Sector	Open End Core	5,1	6,4	0,8	1	4,8	4,3	1,1	8
	Closed End Core	3,7	12,6	0,3	14	6,2	4,9	1,3	6
	Closed End Value Add	6,0	18,5	0,3	13	9,8	8,2	1,2	7
	All Styles/Structures	4,2	11,8	0,4	11	6,3	3,7	1,7	3
Multicountry/Single Sector	Open End Core	2,3	6,2	0,4	10	3,7	3,9	1,0	10
	Open End Core (*)	0,3	3,9	0,1	17	-0,2	3,2	-0,1	18
	Closed End Core	6,1	13,4	0,5	4	4,9	7,1	0,7	14
	Closed End Value Add	6,6	16,1	0,4	8	5,5	9,2	0,6	15
	All Styles/Structures	4,4	10,3	0,4	7	4,4	5,7	0,8	13
Single Country/Multi Sector	Open End Core	5,4	10,7	0,5	3	7,8	4,0	1,9	1
	Closed End Core	5,5	12,4	0,4	5	5,1	3,8	1,3	5
	Closed End Value Add	1,4	16,0	0,1	18	-0,2	5,8	0,0	17
	All Styles/Structures	4,8	11,0	0,4	6	6,8	3,8	1,8	2
Multicountry/Multi Sector	Open End Core	1,5	4,3	0,3	12	2,3	2,4	1,0	11
	Closed End Core	5,3	8,9	0,6	2	4,6	4,2	1,1	9
	Closed End Value Add	2,4	18,7	0,1	16	0,5	4,7	0,1	16
	All Styles/Structures	2,2	8,0	0,3	15	2,2	2,8	0,8	12
ALL FUNDS	All Styles/Structures	4,1	10,5	0,4	9,0	5,4	3,5	1,5	4

*ex parking and logistics

Source: INREV, calculations author

The table reveals that taking into account the factors style and structure is (slightly) altering the results, compared to the previous generic results (table 6). For example: where on a more aggregate level the conclusion was that the single country/multisector subindex had the best risk/return profile for the whole reviewperiod 2005-2016, now the single country, single sector open end core subindex produced the best risk adjusted result.

As before, risk adjusted returns go up when leaving out the crisisyears. When comparing the two periods under review, we see that rankings of subindices have changed, sometimes quite considerably. For example, the single country/single sector closed end core and closed end value add indices improved quite dramatically in the period 2010-2016. Others didn't show improvement, like the multicountry/single country “closed end core” and “closed end value add” subindices. Those subindices hardly showed better results for the postcrisis period than for the whole period.

Overall, looking at both periods, the best performing subindices seem to cluster around single country indices, but there are a few exceptions. On average, and especially for the whole period 2005-2016, value add indices

showed disappointing results. Again, however, there are exceptions. In the postcrisis period for example, the single country/single sector closed end value add subindex didn't have such a bad performance. The same goes for the closed end core multi country multi sector subindex, that shows a very reasonable trackrecord. Apparently, it is important to assess the (possible) impact of the different factors. This could be a topic for further study.

A bit puzzling is the fact that for the aggregate single country/single sector, the risk adjusted return is substantially higher than the underlying subindices. This could mean that the aggregate index captures information that is not present in any of the underlying subindices. For the other aggregate indices this is not the case.

We come to the same conclusion as before breaking down the specialist and generalist indices: we cannot support the hypothesis that specialising by sector produces better results. After all, amongst the best risk adjusted performers are both single sector and multi sector fundindices. Again, we have some clear indications that focus on country is more important. It is fair to say though that style and structure are important factors to take into account. The best case to illustrate this is the multi country/multi sector-closed end core index. Measured by the whole period, this subindex was the second best risk adjusted performer.

To assess the impact of these findings for portfolio construction, the mean variance procedure was repeated, but now making use of the best risk adjusted performing subindices for each strategy type, after adding style and structure. As can be verified in table 11, these are the following four subindices:

- Single country, single sector, open end core
- Multi country, multi sector, closed end core
- Single country, multi sector, open end core
- Multi country, single sector, closed end core

In the graph and tables below, the results are presented.

Figure 12: Mean variance portfolio results for the best risk adjusted performing four subindices by strategy

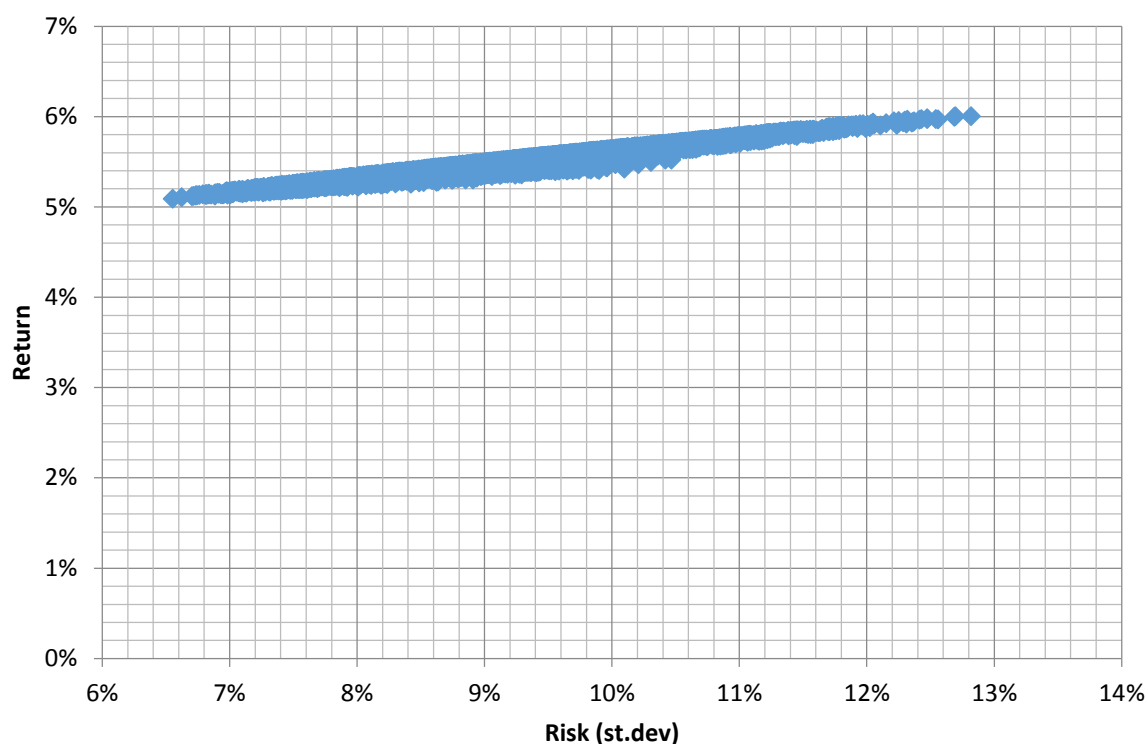


Table 12: Results mean variance subindices by strategy, style and structure, ranked by risk adjusted return

		Portfolio weights						
Rank	run	SCSS_OEC	MCSS_CEC	SCMS_OEC	MCMS_CEC	Risk	Return	R.A.R. (*)
1	25928	89,4%	0,5%	1,3%	8,7%	6,55%	5,09%	0,7761%
2	17270	89,3%	2,1%	3,9%	4,7%	6,62%	5,10%	0,7704%
3	26491	84,7%	2,1%	5,7%	7,6%	6,70%	5,12%	0,7630%
4	23366	88,9%	4,2%	3,1%	3,7%	6,72%	5,12%	0,7621%
5	14148	84,1%	1,8%	12,4%	1,7%	6,74%	5,13%	0,7608%
6	11076	83,8%	2,3%	7,0%	6,9%	6,73%	5,12%	0,7606%
7	191	86,4%	3,8%	5,5%	4,3%	6,74%	5,13%	0,7599%
8	29804	84,4%	2,9%	9,9%	2,8%	6,76%	5,13%	0,7586%
9	20419	85,8%	4,3%	8,6%	1,3%	6,79%	5,14%	0,7564%
10	20184	81,5%	2,6%	12,5%	3,4%	6,82%	5,14%	0,7539%
11	28964	79,1%	2,2%	5,4%	13,3%	6,81%	5,13%	0,7530%
12	24300	83,5%	4,4%	5,2%	6,9%	6,82%	5,14%	0,7528%
13	514	75,1%	0,0%	11,1%	13,8%	6,82%	5,13%	0,7521%
14	26836	86,4%	6,0%	4,9%	2,7%	6,84%	5,14%	0,7520%
15	10597	80,4%	1,3%	18,0%	0,3%	6,84%	5,14%	0,7517%
16	12817	78,0%	1,9%	9,7%	10,4%	6,83%	5,14%	0,7516%
17	18707	75,2%	0,2%	12,9%	11,6%	6,84%	5,13%	0,7508%
18	23616	76,8%	2,2%	5,4%	15,6%	6,86%	5,13%	0,7488%
19	25203	77,0%	2,6%	10,0%	10,4%	6,88%	5,14%	0,7474%
20	18595	78,7%	3,6%	9,7%	8,0%	6,89%	5,15%	0,7472%

*R.A.R.= risk adjusted return

Table 13: Range of allocations top 20 portfolio composition-subindices by strategy, structure and style

Subindex	min	max	Optimal
SCSS_OEC	75,1%	89,4%	89,4%
MCSS_CEC	0,0%	6,0%	0,5%
SCMS_OEC	1,3%	18,0%	1,3%
MCMS_CEC	0,3%	15,6%	8,7%

The results show that accounting for structure and style yields different results. The optimal portfolio is now clearly dominated by the single country, single sector, open end core subindex. This is not a big surprise, as the risk adjusted return of this subindex clearly stands out from the other subindices as can be verified in table 11. The reason that other subindices show up in the top 20 optimal portfolio combinations probably has to do with the lower correlations between subindices. Below in table 14 the correlation matrix for the relevant subindices is shown.

Table 14: correlations subindices by strategy, structure and style

	SCSS_OEC	MCSS_CEC	SCMS_OEC	MCMS_CEC
SCSS_OEC	100%			
MCSS_CEC	90%	100%		
SCMS_OEC	74%	67%	100%	
MCMS_CEC	88%	93%	73%	100%

Compared to the earlier results (before decomposing the specialist and generalist subindices), the risk adjusted portfolio returns improved and the composition clearly changed. Obviously, it's important to take the factors structure and (especially) investment style into account.

Accounting for fund size

Finally, we made cross sections of the subindices above, based on fund size. Four groups of fund sizes were used, as described in the datasection. So, to summarize, the INREV index was broken down into subindices by strategy (single or multi country/ single or multi sector). Then it was broken down further by style (core/value add) and structure (open end, closed end). The last decomposition is done by fund size. For clarity, the graphical representations are not presented here, but is provided in appendix I. Examining these graphs confirm that adding the size dimension can lead to different characteristics of subindices.

The graphs reveal the caveats of working with aggregated data: sometimes returnseries are discontinued, lacking completely, or have different years of origin.

First, let's look at the effect of fund size on the aggregate indices. In table 15 the risk adjusted returns are reported by fund size. If we look at the overall period 2005-2016, a size effect seems to present but less clear than thought. The sizecategory € 300-€ 600 is the best performing category overall. This was unexpected. Ofcourse, maybe this result disappears when controlling for other factors. There is however a very clear distinction between the smaller funds subindex (< € 300 million) and the others. Also, we see that large funds account for more than half of the index.

For the post crisis period, a clear relationship between fund sizes and risk adjusted returns is present.

We conclude that is rather save to say that on average bigger funds perform better, or maybe a better way to put it: on average smaller funds tend to perform worse than bigger ones.

Table 15: Aggregate fundindices, split by size category

Style (code)	Sizecategory	GAV (2016)	Leverage (AVG)	2005-2016	2010-2016
				Risk adjusted return	Risk adjusted return
ALL FUNDS_LARGE	>1000	126,1	25%	0,40	1,79
ALL FUNDS_MEDIUMLARGE	600-1000	35,1	33%	0,37	1,49
ALL FUNDS_SMALLMEDIUM	300-600	31,4	38%	0,45	1,25
ALL FUNDS_SMALL	<300	21	37%	0,22	0,53
INREV ALL FUNDS	ALL	213	31%	0,39	1,52

Source: INREV, calculations author

In table 16, the risk adjusted returns per subindex are given. Only subindices that at least contained data points since 2010 were included. In the table, different aggregation levels were included as follows:

- The "All Funds" indices (including the breakdown by fund size category) are printed **BOLD**.
- The "specialist" indices, i.e. the different combinations in strategy (country-and sector orientation) are printed in **Blue**, including the breakdown by fund size category.
- The subindices containing the most detail, i.e. broken down further by structure, style and size is printed "normal".

The results are ranked by Risk adjusted return > 2010. In appendix II, the same table but including the sector- and country allocations is available.

Table 16: Risk adjusted returns of (subindices) by strategy, fundsize category, structure and type

							2010-2016					2005-2016					>2010				
Style (code)	Strategy	Sizecategory	GAV (2016)	Structure	Style	Type	Leverage (AVG)	R.A.R. (*)	RANK	R.A.R.	RANK	R.A.R.	RANK	R.A.R.	RANK	R.A.R.	RANK	R.A.R.	RANK		
SCMS_OEC_SMALL	SCMS	<300	2,6	Open End	Core	Generalist	27%		0,77	1		2,87	1								
SCMS_CEC_SMALL	SCMS	<300	0,6	Closed End	Core	Generalist	40%		n.a.	n.a.		2,59	2								
SCMS_OEC_SMALLMEDIUM	SCMS	300-600	4,9	Open End	Core	Generalist	18%		n.a.	n.a.		2,22	3								
SCMS_ALL_LARGE	SCMS	>1000	49,2	ALL	ALL	Generalist	9%		0,42	14		1,92	4								
SCMS_OEC_MEDIUMLARGE	SCMS	600-1000	5,1	Open End	Core	Generalist	20%		n.a.	n.a.		1,89	5								
SCSS_ALL_SMALLMEDIUM	SCSS	300-600	10,2	ALL	ALL	Specialist	34%		0,56	5		1,87	6								
SCMS_OEC_LARGE	SCMS	>1000	43,8	Open End	Core	Generalist	5%		0,39	18		1,87	7								
ALL FUNDS_LARGE	ALL	>1000	126	ALL	ALL	ALL	25%		0,40	15		1,79	8								
SCMS_ALL	SCMS	ALL	68,8	ALL	ALL	Generalist	18%		0,44	12		1,8	9								
SCSS_ALL	SCSS	ALL	64,8	ALL	ALL	Specialist	27%		0,36	20		1,7	10								
SCSS_ALL_LARGE	SCSS	>1000	38,4	ALL	ALL	Specialist	26%		0,27	26		1,61	11								
SCMS_ALL_SMALLMEDIUM	SCMS	300-600	6,3	ALL	ALL	Generalist	32%		0,55	7		1,55	12								
INREV ALL FUNDS	ALL	ALL	213	ALL	ALL	ALL	31%		0,39	16		1,52	13								
SCMS_ALL_MEDIUMLARGE	SCMS	600-1000	9,5	ALL	ALL	Generalist	26%		0,45	11		1,51	14								
MCSS_CEC_SMALL	MCSS	<300	2,4	Closed End	Core	Specialist	35%		0,56	6		1,47	15								
ALL FUNDS_MEDIUMLARGE	ALL	600-1000	35	ALL	ALL	ALL	33%		0,37	19		1,44	16								
SCSS_CEC_SMALLMEDIUM	SCSS	300-600	3,9	Closed End	Core	Specialist	41%		0,49	8		1,44	17								
SCSS_ALL_MEDIUMLARGE	SCSS	600-1000	9,7	ALL	ALL	Specialist	22%		0,32	23		1,31	18								
ALL FUNDS_SMALLMEDIUM	ALL	300-600	31	ALL	ALL	ALL	38%		0,45	10		1,25	19								
SCSS_OEC-SMALLMEDIUM	SCSS	300-600	4,9	Open End	Core	Specialist	22%		0,65	3		1,18	20								
MCMS_ALL_MEDIUMLARGE	MCMS	600-1000	10,2	ALL	ALL	Generalist	39%		n.a.	n.a.		1,18	21								
MCMS_OEC_MEDIUMLARGE	MCMS	600-1000	5,5	Open End	Core	Generalist	35%		n.a.	n.a.		1,07	22								
SCSS_CEC_LARGE	SCSS	>1000	10,3	Closed End	Core	Specialist	26%		0,24	27		1,02	23								
MCSS_ALL_LARGE	MCSS	>1000	29,2	ALL	ALL	Specialist	43%		0,59	4		1,01	24								
MCMS ALL SMALLMEDIUM	MCMS	300-600	7,7	ALL	ALL	Generalist	38%		0,3	22		0,92	25								

Style (code)	Strategy	Sizecategory	GAV (2016)	Structure	Style	Type	2010-2016	2005-2016		>2010	
							Leverage (AVG)	R.A.R. (*)	RANK	R.A.R.	RANK
SCSS_CEVA_MEDIUMLARGE	SCSS	600-1000	2,6	Closed End	Value Add	Specialist	34%	n.a.	n.a.	0,91	26
SCSS_ALL_SMALL	SCSS	<300	6,4	ALL	ALL	Specialist	29%	0,5	9	0,86	27
SCSS_OEC-SMALL	SCSS	<300	3,3	Open End	Core	Specialist	22%	0,68	2	0,85	28
MCSS_OEC_LARGE	MCSS	>1000	20,4	Open End	Core	Specialist	44%	n.a.	n.a.	0,84	29
MCSS_ALL_MEDIUMLARGE	MCSS	600-1000	5,6	ALL	ALL	Specialist	51%	0,3	21	0,82	30
MCMS_ALL	MCMS	ALL	33,3	ALL	ALL	Generalist	36%	0,28	25	0,80	31
SCSS_CEC_MEDIUMLARGE	SCSS	600-1000	3,8	Closed End	Core	Specialist	28%	0,32	24	0,80	32
SCMS_ALL_SMALL	SCMS	<300	3,8	ALL	ALL	Generalist	0,4	0,2	30	0,77	33
MCSS_ALL	MCSS	ALL	33,3	ALL	ALL	Specialist	36%	0,43	13	0,76	34
MCMS_OEC_SMALLMEDIUM	MCMS	300-600	4,6	Open End	Core	Generalist	33%	n.a.	n.a.	0,72	35
SCSS_CEVA_SMALL	SCSS	<300	0,8	Closed End	Value Add	Specialist	37%	n.a.	n.a.	0,66	36
ALL FUNDS_SMALL	ALL	<300	21,0	ALL	ALL	ALL	37%	0,22	29	0,53	37
SCSS_CEC_SMALL	SCSS	<300	2,0	Closed End	Core	Specialist	41%	0,39	17	0,45	38
MCSS_ALL_SMALL	MCSS	<300	4,8	ALL	ALL	Specialist	46%	0,1	31	0,38	39
MCSS_OEC_SMALLMEDIUM	MCSS	300-600	2,3	Open End	Core	Specialist	43%	n.a.	n.a.	0,28	40
MCSS_ALL_SMALLMEDIUM	MCSS	300-600	7,2	ALL	ALL	Specialist	53%	0,2	28	0,16	41
MCSS_CEVA_SMALL	MCSS	<300	0,9	Closed End	Value Add	Specialist	58%	n.a.	n.a.	0,11	42
MCSS_CEVA_SMALLMEDIUM	MCSS	300-600	1,6	Closed End	Value Add	Specialist	63%	-0,16	32	-0,11	43
SCMS_CEVA_SMALL	SCMS	<300	0,6	Closed End	Value Add	Generalist	52%	n.a.	n.a.	-0,31	44
MCMS_OEC_SMALL	MCMS	<300	3,7	Open End	Core	Generalist	28%	-0,31	34	-0,37	45
MCMS_ALL_SMALL	MCMS	<300	6,0	ALL	ALL	Generalist	35%	-0,2	33	-0,77	46
MCMS_CEVA_SMALL	MCMS	<300	1,5	Closed End	Value Add	Generalist	47%	n.a.	n.a.	-0,84	47

Source: INREV, calculations author

*R.A.R.= Risk adjusted return

Firstly, based on these results we must reject the hypothesis that specialist (“sector specialist”) strategies produce better results than generalist strategies, for the following reasons:

- When taking into account other factors, in the end a “generalist” type subindex (the single country, multisector open end core, small index) showed the best performance based on the risk adjusted returns as off 2010. Moreover, this subindex has the best performance measure by the whole period.
- In the top 20 measured by risk adjusted returns, nine subindices were generalists and seven specialists⁸. The top performing subindices were generalist ones.
- Also in the lower rankings there’s no clear indication that the worst performing subindices is dominated by specialists or generalists.

The table reveals some other interesting findings:

- Maybe the most important finding is that country focus seems to be the discriminating factor, not sector focus. The single country indices are dominating the top rankings. As stated before, this calls for follow-up. It would be interesting what drives the performance of those subindices: is it choice of country that matter, or does specialising in one country assure better asset picking?
- The fact that a subindex representing smaller funds had the best risk adjusted performance came as a rather big surprise. After all, we found at least an indication that bigger funds tend to perform better than smaller funds (on average). Apparently the size effect is modest and can be dominated by other factors.
- Value add funds are clearly not delivering what is expected of them. This might have to do with the leverage levels, which are typically higher for value add strategies. We will get to the leverage factor later on.
- Fund structure doesn’t seem to be an important factor in explaining performance. There’s no clear and obvious relationship between risk adjusted returns and fund structure.
- Measured by the whole period (2005-2016) the bandwidth of risk adjusted returns is much more narrow than the post crisis period (2010-2016). Most (but not all) risk adjusted returns went up and a much bigger variation in returns can be seen. Ofcourse we can only make this statement for (sub)indices that had coverage for both periods. It could be that the funds started after the crisis have an impact (i.e. we might have to control for vintage year). This is something to look into in a follow up study.

As mentioned earlier, the data set becomes insufficient for mean variance analysis when further breaking down subindices. However, it is clear from the mean variance analysis that it’s important to look at the combined effects of relevant factors and that it can alter the optimal portfolio combinations. Since the correlations for the whole review period were quite high, it made sense that the subindices with the most favorable risk adjusted return profile tended to dominate in calculated optimal portfolios.

These high correlations might, however, be the result of the impact of the crisis. During the crisis, all fund returns converged. But after the crisis, as has been shown, results diverge. It is therefore very likely that the composition of the optimal portfolio deviates a lot from the ones that have been calculated for the whole review period 2005-2016.

⁸ Excluding the ALL Funds subindices

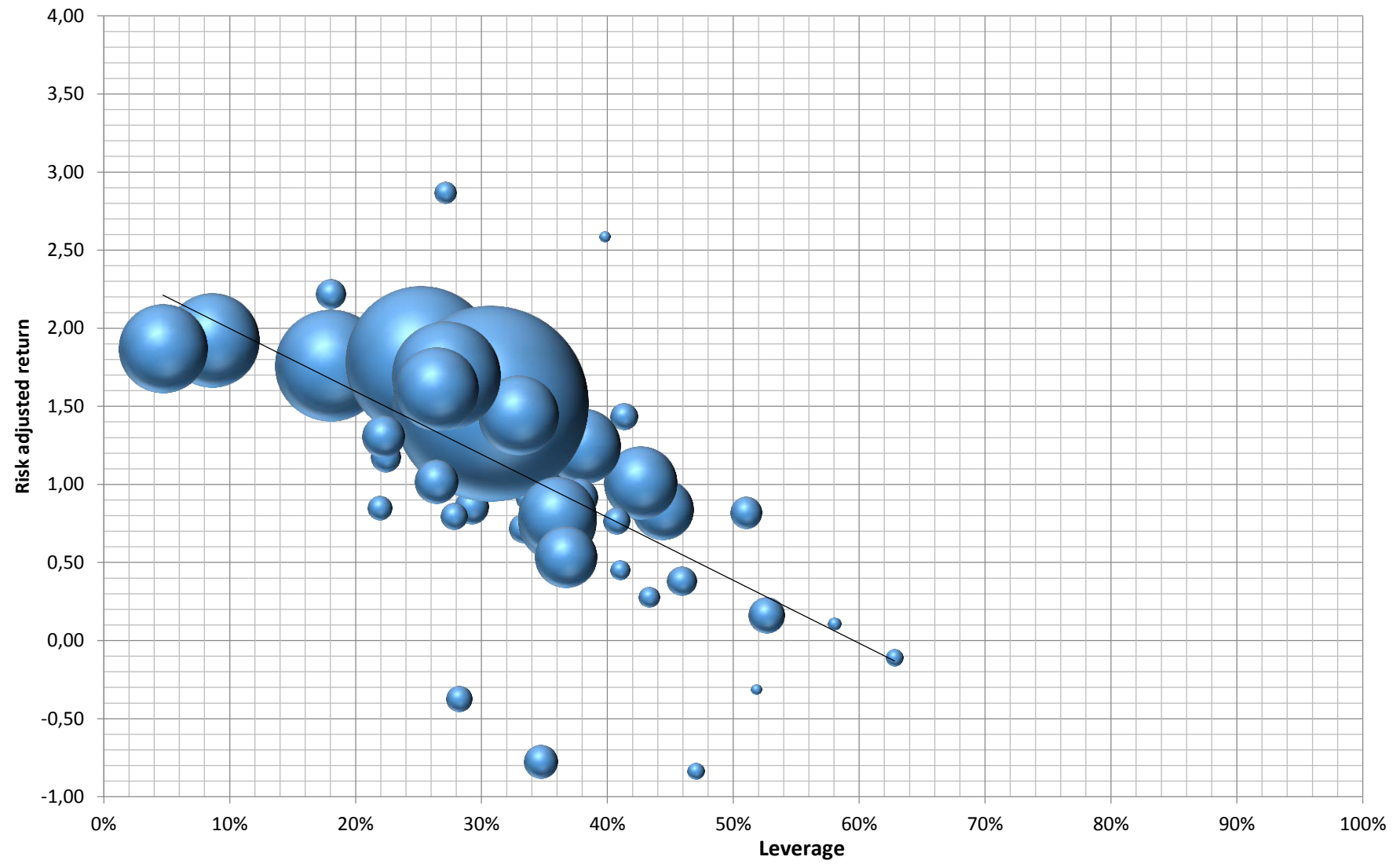
What about leverage?

Obviously, leaving leverage out of the equation is no option. As has been noted in the literature review, leverage does influence the risk/return profile of funds. Further breaking down subindices wasn't ideal. Probably we would have lost more data and presenting the data would have become very unclear. Therefore another route was taken.

As reported in table 16, for each subindex the average leverage level was calculated for the period 2010-2016. Then we plotted the risk adjusted returns against the leverage ratios.

The results are shown in the graph below. The size of the bubbles in the graph corresponds to the size of the subindex as reported in table 16. This reveals a negative relationship between leverage and risk adjusted returns. Because different cross sections of the same fund data were used (that means data is "double counted"), instead of quantifying the relationship the nature of the relationship is shown. These results confirm the earlier findings that higher gearing levels are not optimal.

Figure 13: Relationship between leverage and risk adjusted returns



A final critical note

The conclusions that were drawn in this paper rely in part on the calculation of risk adjusted returns. These are calculated by dividing the average returns by the standard deviation. It should be noted that because the review period is relatively short the estimation of the standard deviation is subject to uncertainty. Hopefully, the large number of underlying observations count for something, but six years of data is not much to work with. Again, an academic study using anonymized data from INREV might help confirm the indications that are found in this paper.

Conclusion

The null hypothesis of this thesis was stated as follows:

Private real estate funds that specialize in specific sectors have a better risk adjusted performance than diversified private real estate funds.

To answer this question, “specialist” (single sector) and “generalist” (multi sector) subindices were constructed, for both single country and multi country funds. For those indices, a graphical analysis was done and risk adjusted returns and correlations were calculated for the period 2005-2016. Risk adjusted returns seemed to be heavily influenced by the crisis. For this reason, also a post crisis period was considered (2010-2016). Generally speaking, the bandwidth of risk adjusted returns went up and correlations tended to go down.

Based on the findings we must reject the null hypothesis:

- The risk adjusted return of a multi sector fund index (single country multi sector) was superior in both periods.
- For the whole review period (2005-2016), the correlation between a multi sector index (single country, multi sector) and a single sector index (single country, single sector) was very high (99%). Given the fact that a multi sector index was the better (risk adjusted) performer, sector focus was clearly not paying off.
- In the post crisis period, risk adjusted returns went up, and correlations went down (on average). The risk adjusted returns of the same subindices (single country, multi sector and single country, single sector) were clearly standing out from the other two (multi country) indices. This led to the conclusion that maybe focus wasn’t “hocus pocus” after all, but that instead of sector focus, country focus was the factor of importance.

Mean variance analysis showed that, for the whole review period 2005-2016, two subindices (the single country/multi sector subindex and the multi country/single sector subindex) dominated calculated optimal portfolio combinations. This is caused by the fact that these subindices were very much alike in risk/return profile and at the same time showed a rather high correlation.

From previous research we know that other factors can be important in explaining fund returns. To investigate whether adding more factors into the equation had an influence, first a further breakdown of our “specialist” and “generalist” single- and multi country fund indices was done by structure (open end, closed end) and style (core, value add). The analysis showed that it is important to include those factors. Inclusion of these factors altered the results.

Overall and measured by the whole review period (2005-2016), the subindex single country/single sector open end core produced the best results, where before adding the factors style and structure, we concluded that the single country/multi sector subindex produced the best results.

Repeating the mean variance procedure, optimal portfolio combinations now were (very heavily) tilted to the subindex single country/single sector open end core. The risk adjusted return of this subindex clearly stood out from the other subindices. Taking into account style and structure clearly improved the risk adjusted portfolio returns, compared to the analysis that didn't take style and structure into account.

Because of the impact of the crisis, as was shown by the improved risk adjusted returns and the more divergent correlation patterns, it is concluded that a "post crisis" mean variance analysis likely would result in different outcomes. Unfortunately, the return series for the post crisis period are not long enough (six years is insufficient) for repeating a mean variance analysis.

Adding the factors style and structure to the analysis provided more "depth" into the analysis. To illustrate, value add fund indices on average showed disappointing results, but some exceptions were found. For example, although on average value add fund indices showed weak results, we found one subindex (a single country/single sector one) that had a reasonable performance. The same goes for multi country/multi sector subindices: in general these funds tend to have a weak performance, but drilling down to the structure/style combination "closed end, core", beneath the surface a very reasonable risk adjusted performance showed up for both periods. Inclusion of the factors structure and style didn't lead to a different conclusion with respect to our research question however: amongst the best risk adjusted performers were both sector specialist indices and generalist indices. The best results tended to cluster around single country subindices, confirming the earlier finding that focus on country (not sector) is driving risk adjusted returns.

To account for differences in fund size, the next step was to further breakdown the indices by four fund size categories. First and foremost, the INREV All Funds index was broken down by size category. Especially for the postcrisis period 2010-2016 there is a clear relationship between size and risk adjusted returns: bigger funds perform better, on average, than smaller ones. Then, all separate subindices that were defined before were broken down by size category (including different aggregation levels). Then risk adjusted returns were calculated for the whole review period (where available) as well as for the post crisis period and the results were ranked based on the risk adjusted returns for the review period 2010-2016 (as for this period the most data was available).

Again, also based on these findings, no support could be found for the null hypothesis. Generalist fund indices (multi sector indices) showed the best risk adjusted results, while in the lower rankings both generalists and specialists were found. Generally speaking, single country indices tended to show the better risk adjusted performance, compared to multi country fund indices. But again, it's important to take into account other factors. For example, the single country closed end core index for small fund sizes (< € 300 mln) has a rather weak performance, for both timeframes. And on the other hand, the best performing subindex (single country multi sector open end core) belonged to the small fund size category. It might be that the impact of fund size could be dominated by other factors. A clear relationship between fund structure and performance was not found.

Finally, we looked at the impact of leverage. Instead of further breaking down the data, the risk adjusted returns of the various constructed subindices were plotted against the corresponding average leverage ratios for the period 2010-2016. This shows a negative relationship, indicating that leverage has an adverse effect.

To summarize, though admittedly unscientific and in general:

- Focus on country matters, more than does sector focus
- Take into account style- and fund size attributes, as they influence fund performance
- Style matters: value add strategies don't pay off in general
- Leverage adversely affects risk adjusted performance
- Structure doesn't seem to influence performance

The impact of the various factors on performance is a topic for further study. It was shown in this paper that factors have to be studied in conjunction. For example size effect can be dominated by choice of country. In appendix III a method is proposed to further study the (quantitative) relationship between performance and explanatory variables. This could be done, using anonymized fund data by INREV.

Other topics that could be looked into are:

- Country focus is found to be relevant for performance. But the question which countries accounted for the better performance (and which not) is unexplored.
- What causes the best performing multi sector fund indices to perform better than single sector fund indices? Intuitively, diversifying over specialised funds should be yielding more or less the same or maybe better results than diversifying over generalist funds, controlling for differences in characteristics. A reason why, especially for bigger funds, diversified single country funds don't have to perform worse than ones with a sectorfocus, is that diversified funds hire the same type of sectorspecialists and develop the same kind of expertise.

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Appendix I: Graphs subindices, broken down by size category

Figure 14: Performance Single Country, Single Sector (All Sizes)

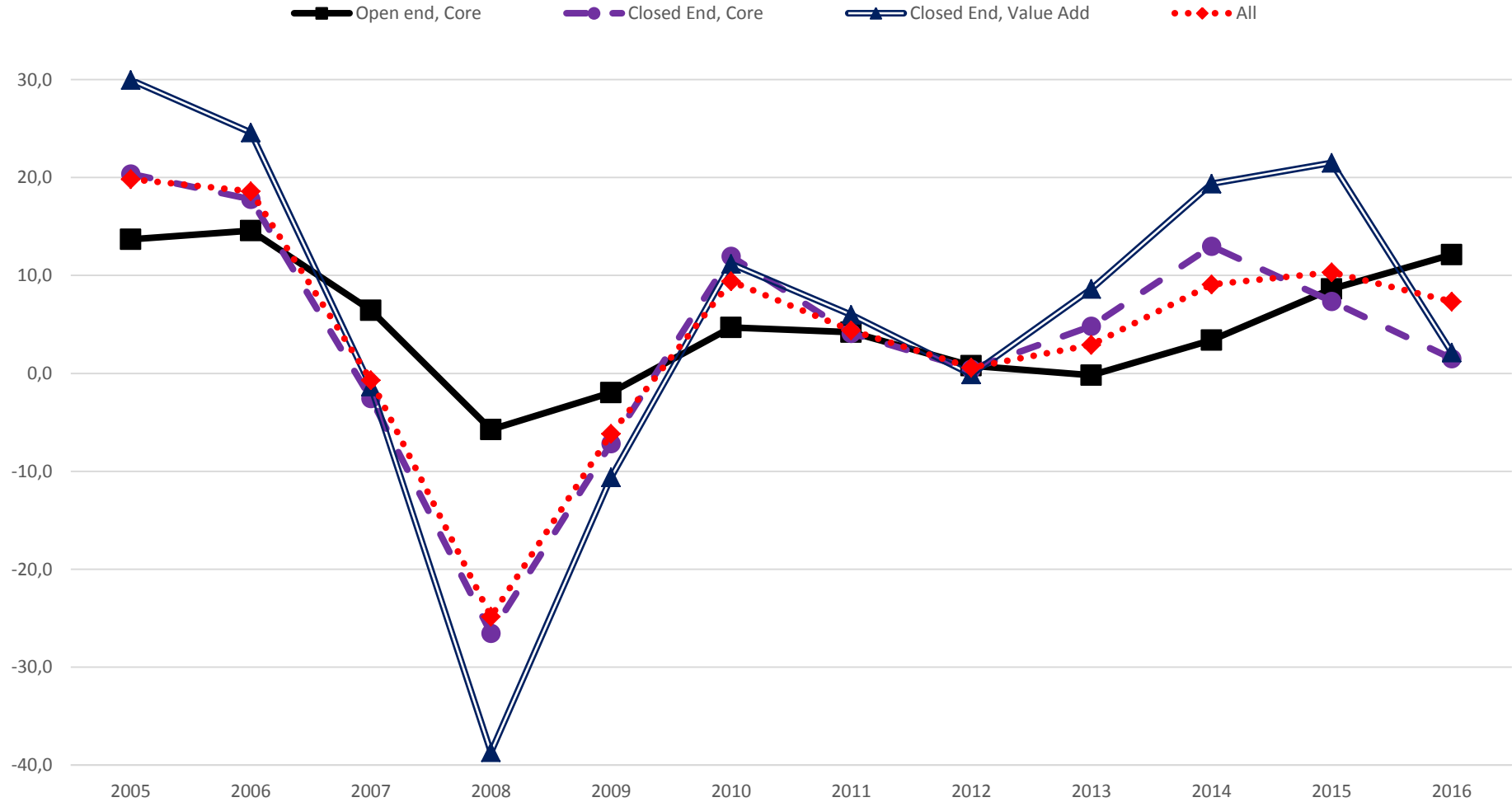


Figure 15: Performance Single Country, Single Sector-Large (>€ 1000 million)

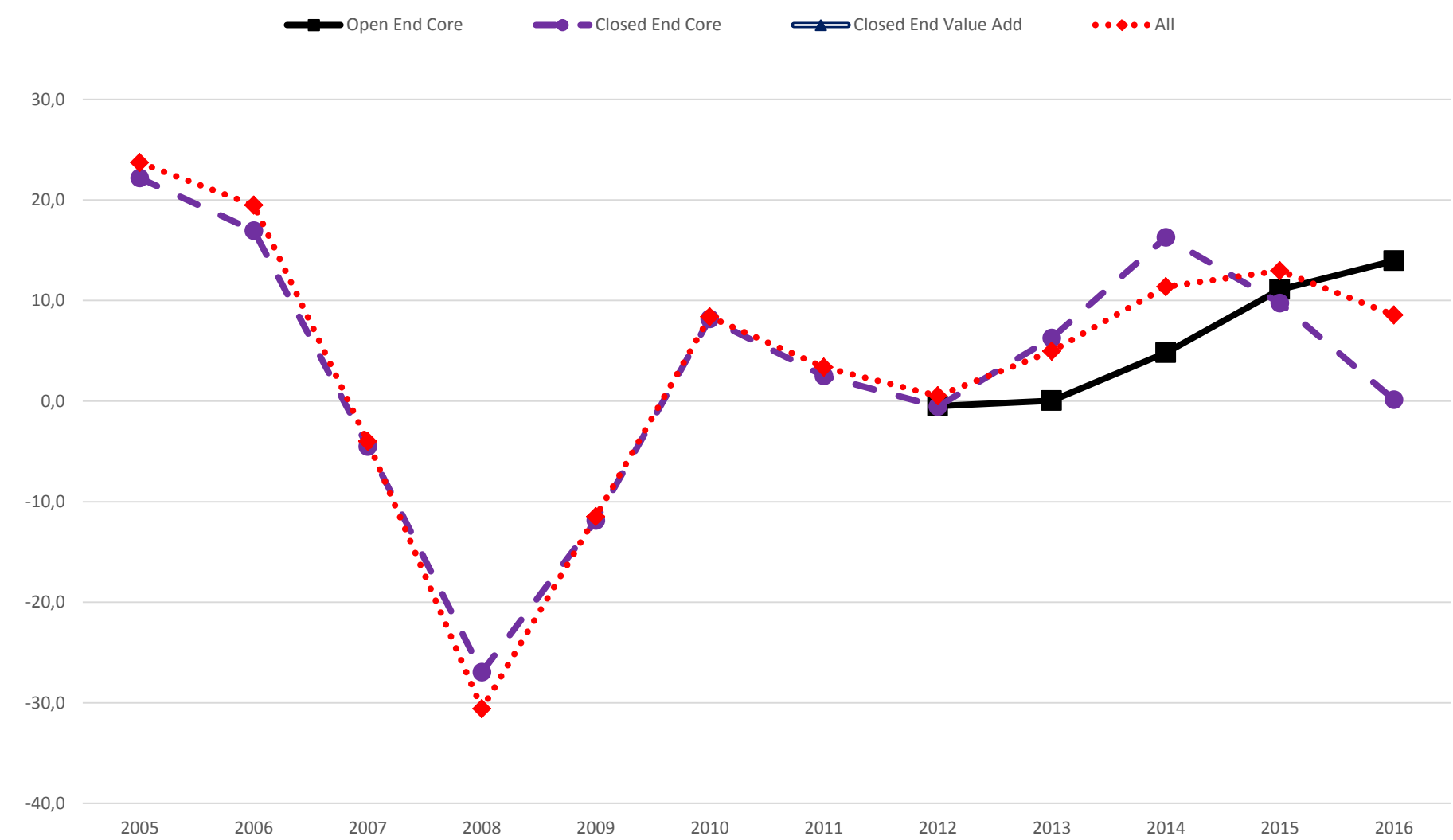


Figure 16: Performance Single Country, Single Sector-Medium Large (€ 600-€ 1000 million)

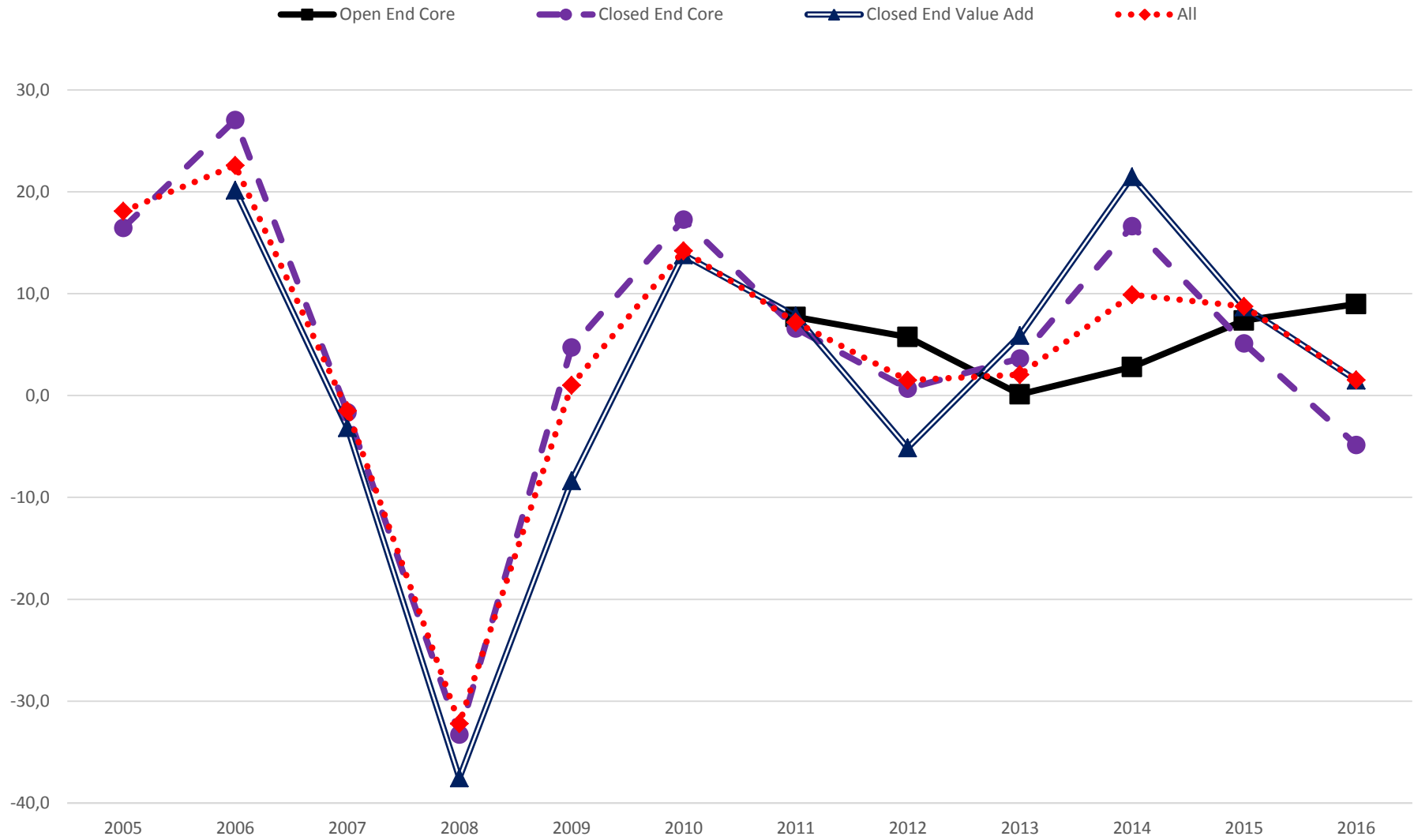


Figure 17: Performance Single Country, Single Sector-Small Medium (€ 300-€ 600 million)

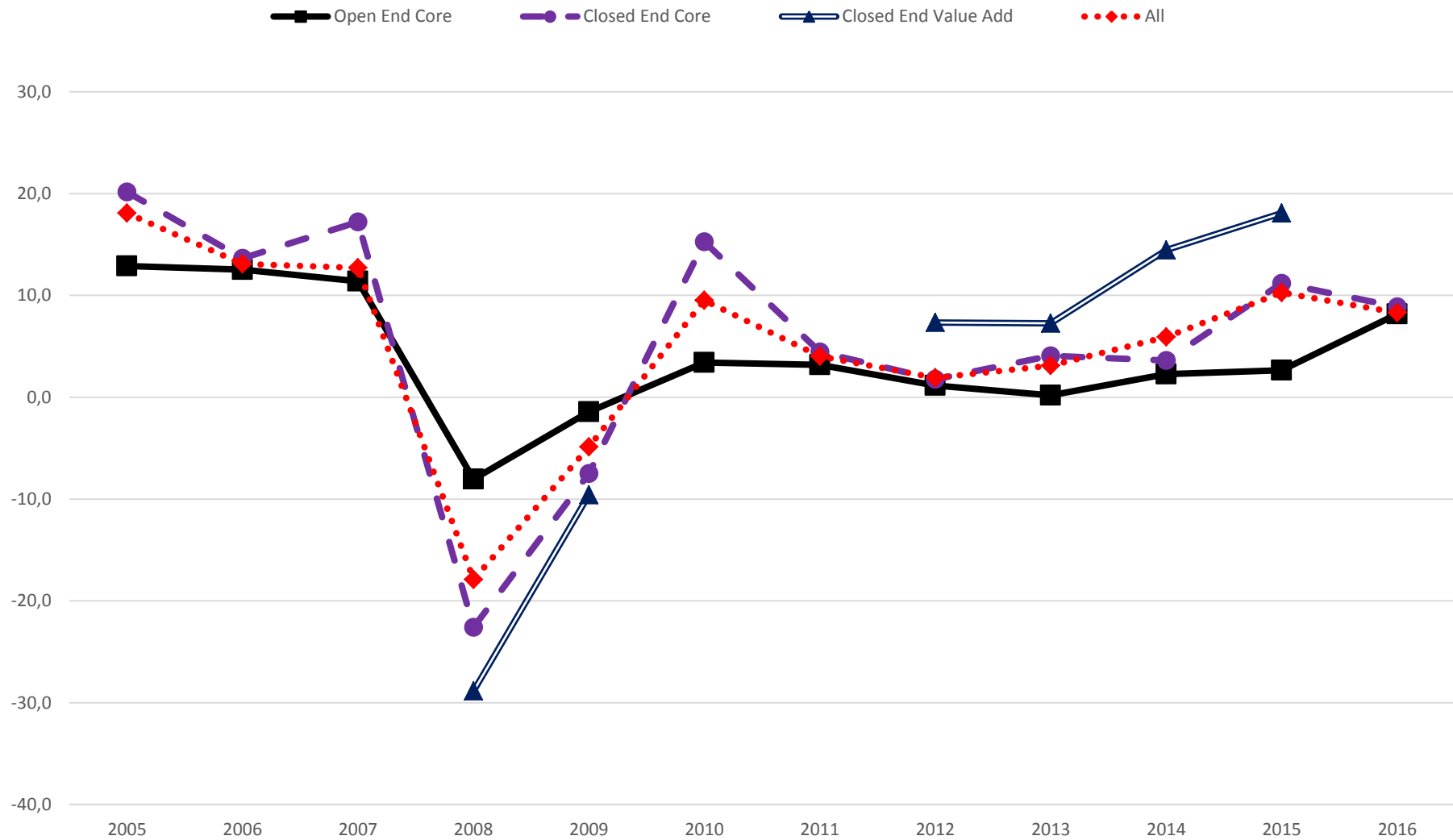


Figure 18: Performance Single Country, Single Sector-Small (< € 300 million)

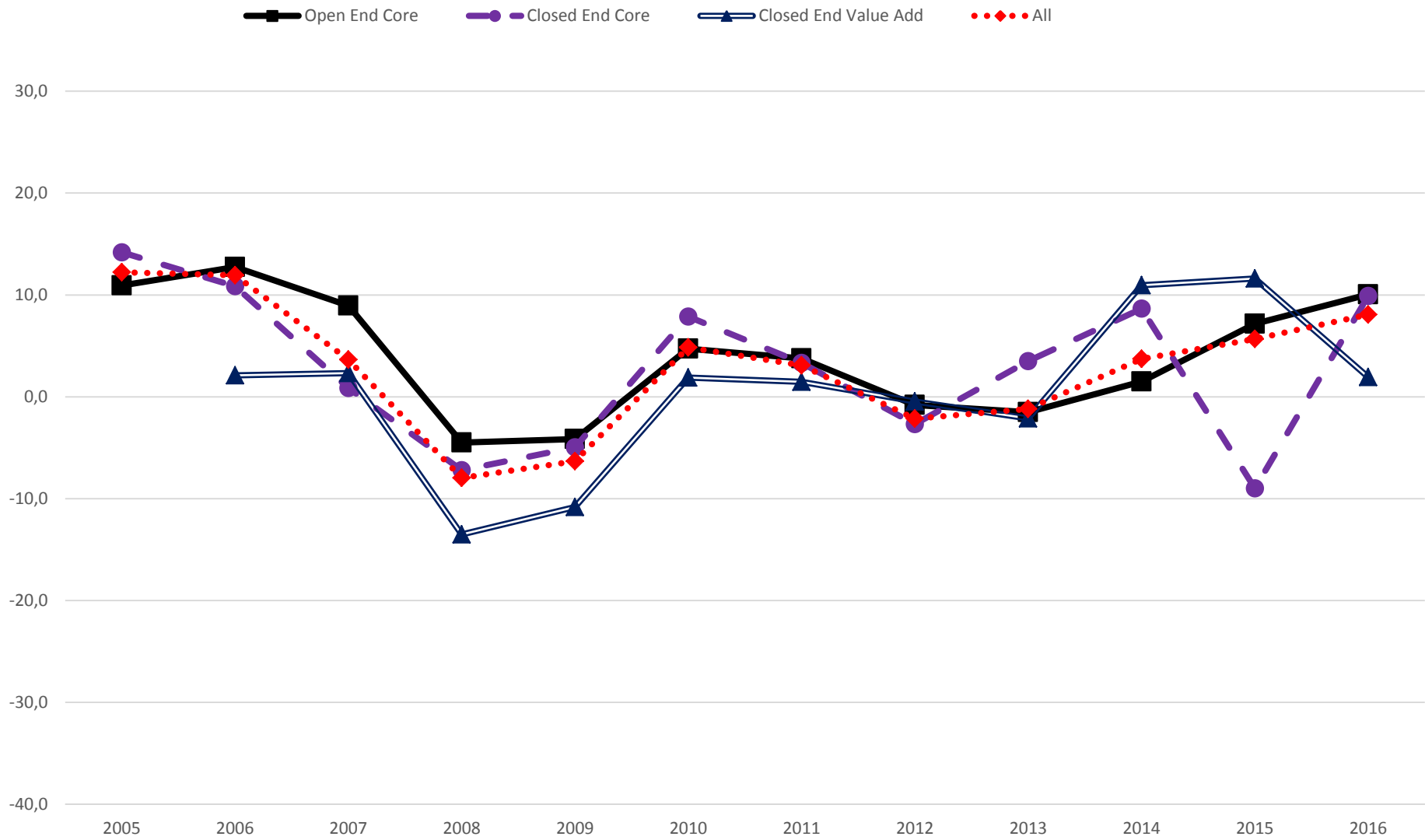


Figure 19: Performance Multi Country, Single Sector (All Sizes)

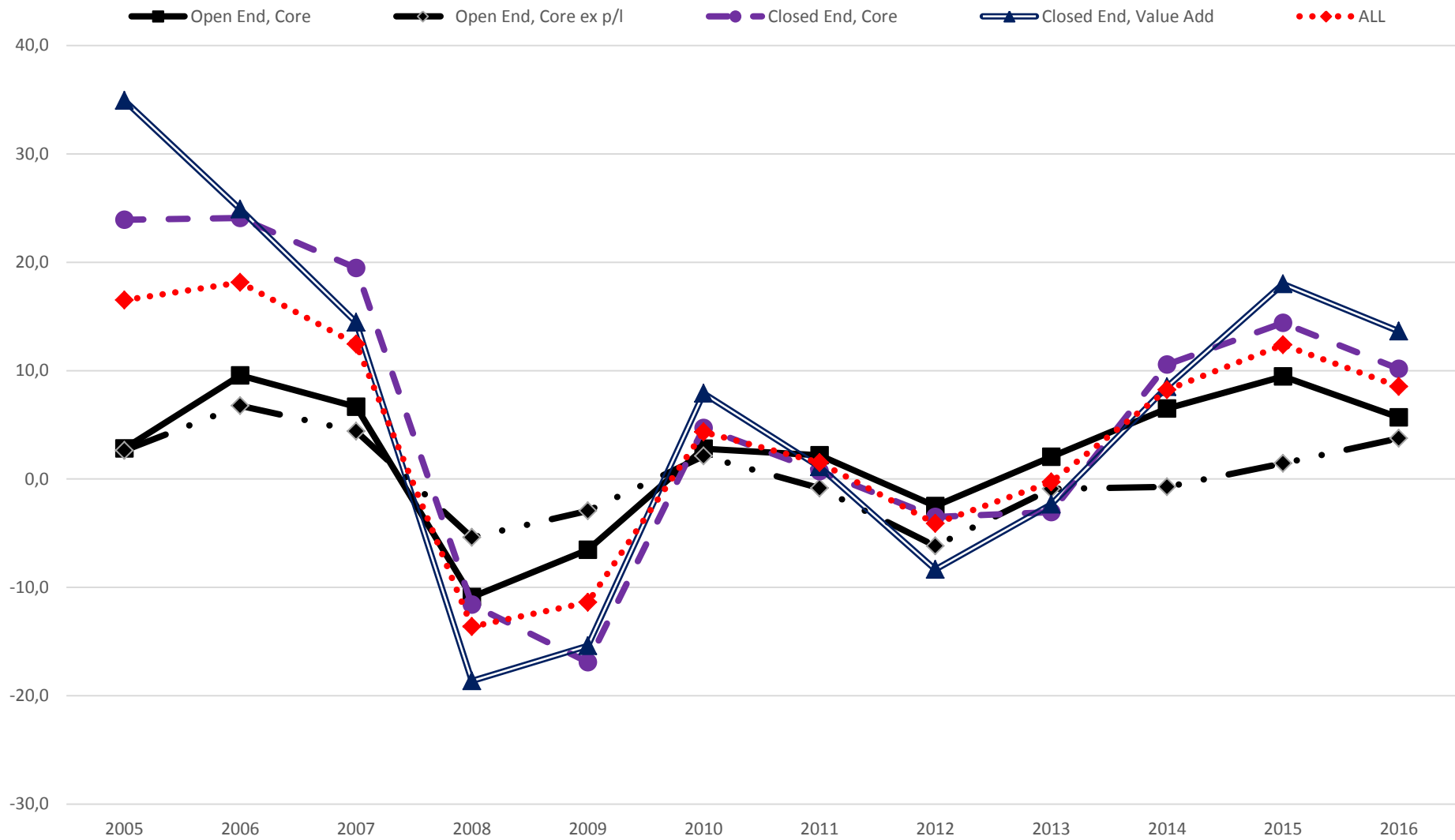


Figure 20: Performance Multi Country, Single Sector-Large (>€ 1000 million)

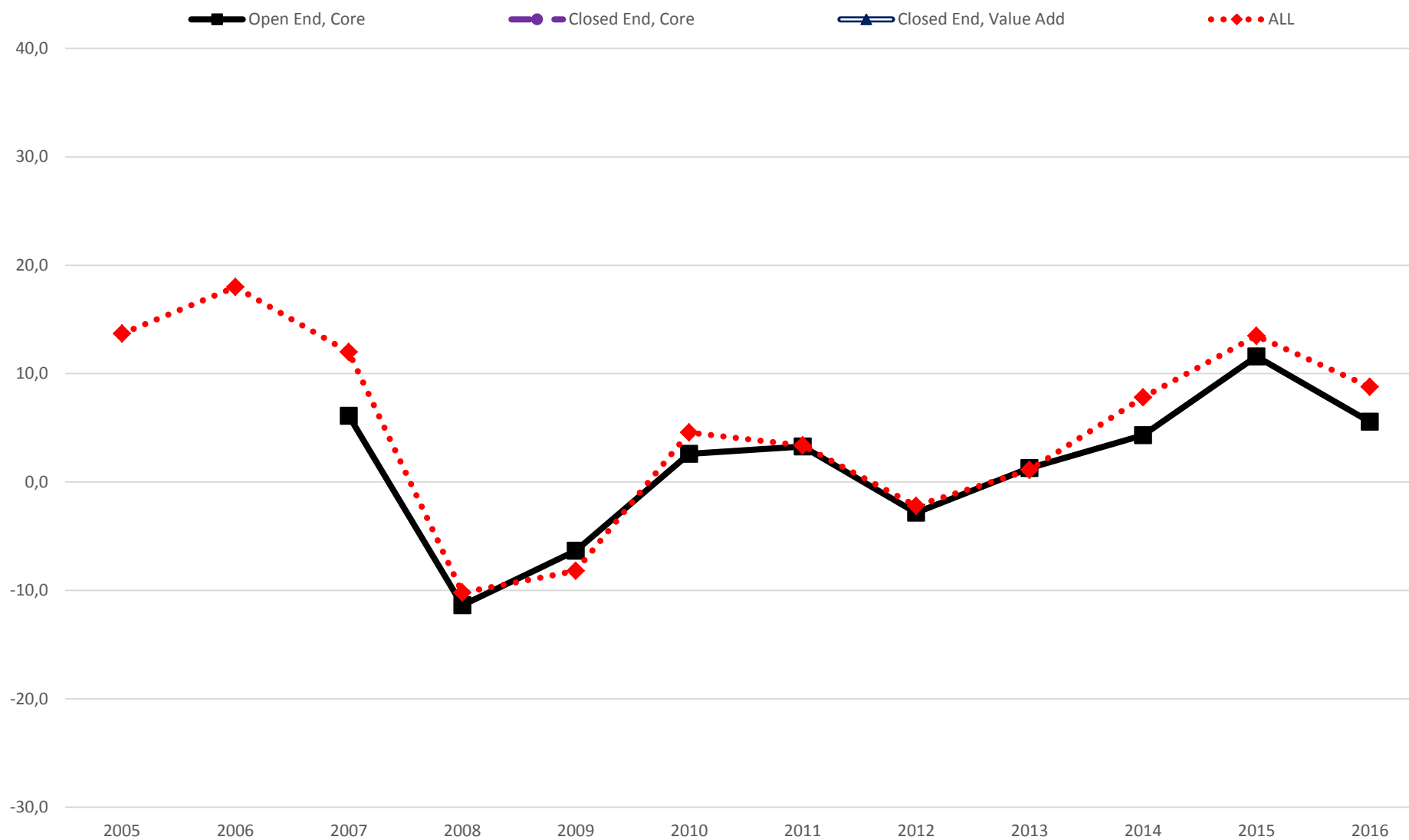


Figure 21: Performance Multi Country, Single Sector-Medium Large (€ 600-€ 1000 million)- No data available for this fundsize category

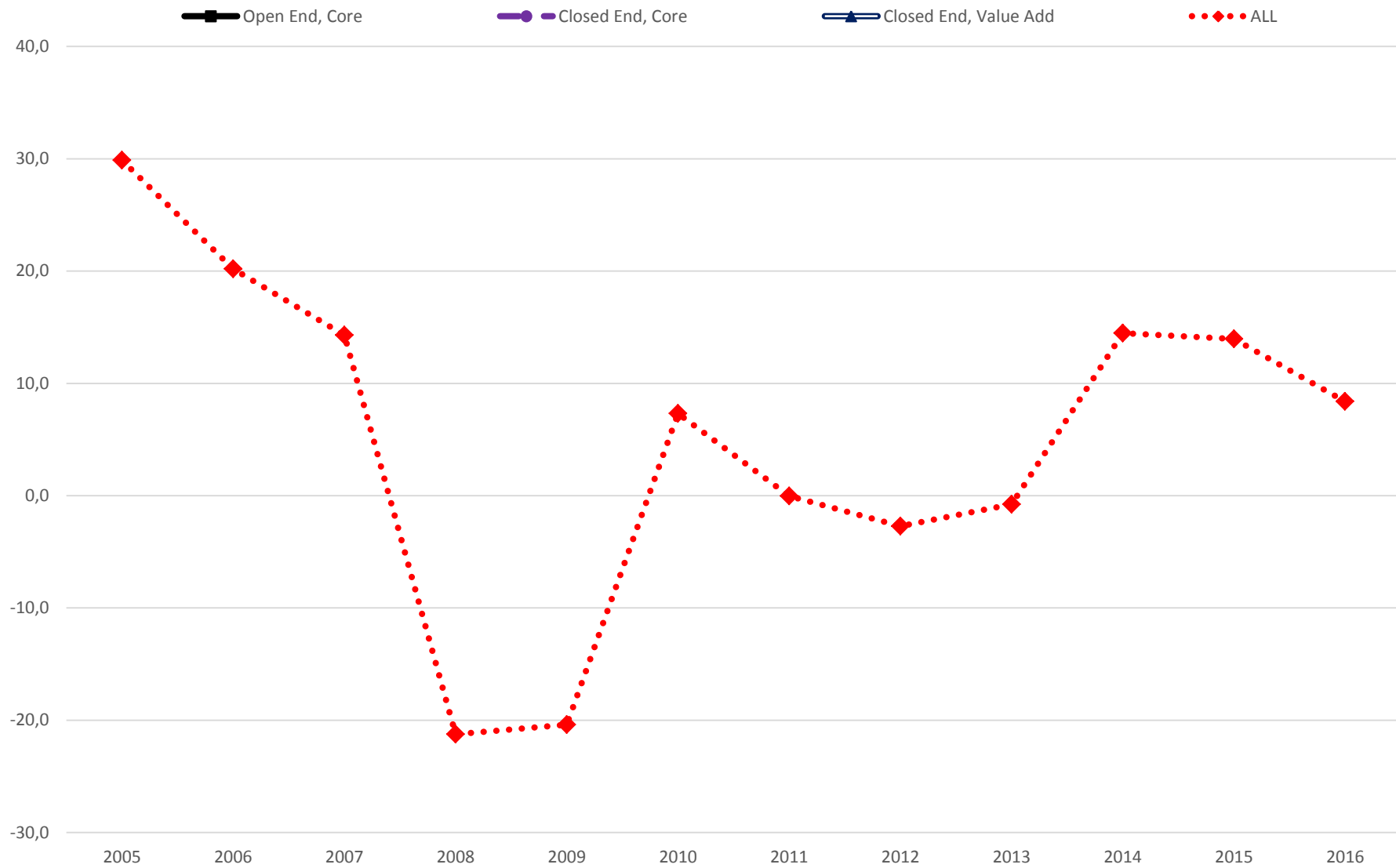


Figure 22: Performance Multi Country, Single Sector-Small Medium (€ 300-€ 600 million)

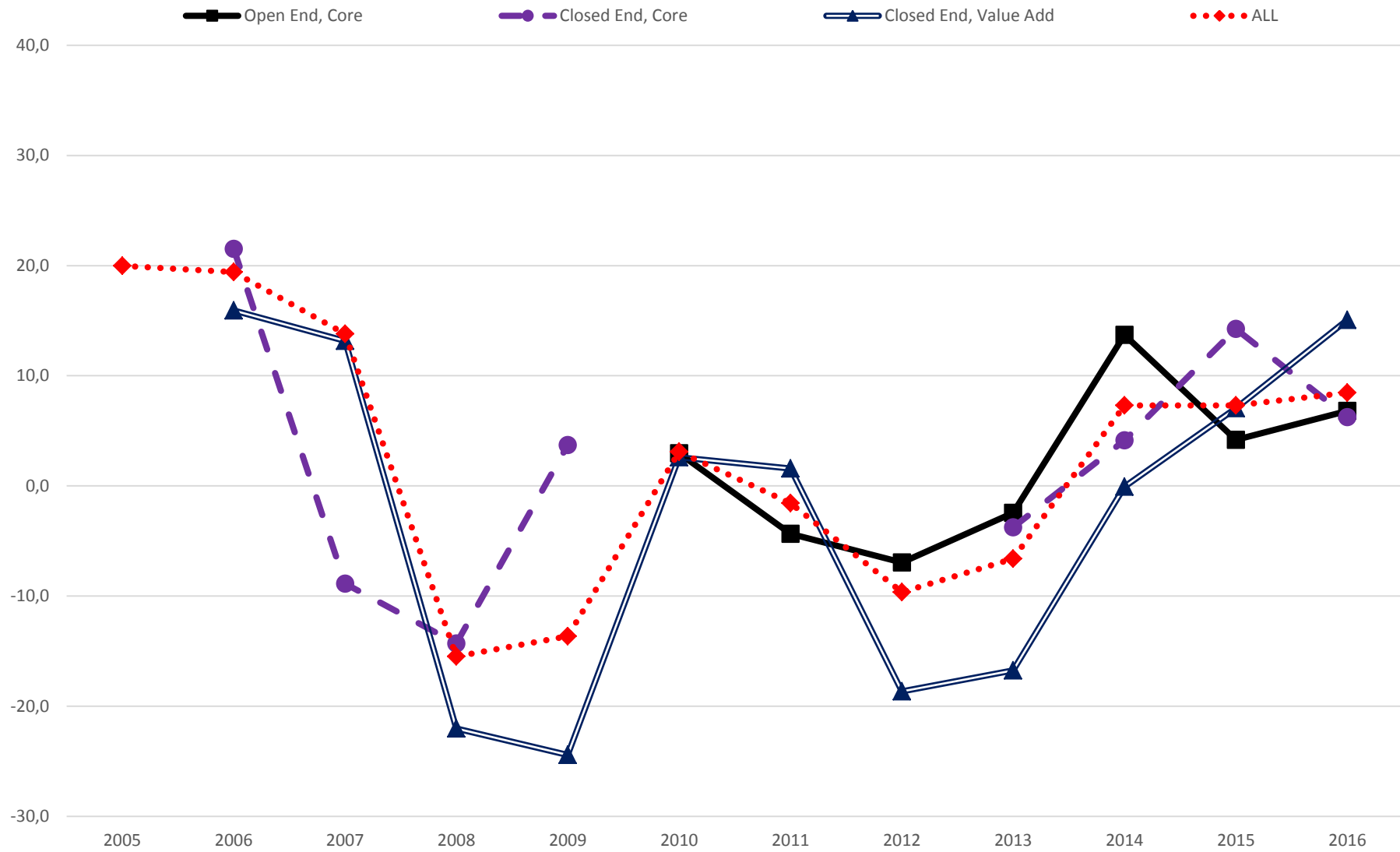


Figure 23: Performance Multi Country, Single Sector-Small (< € 300 million)

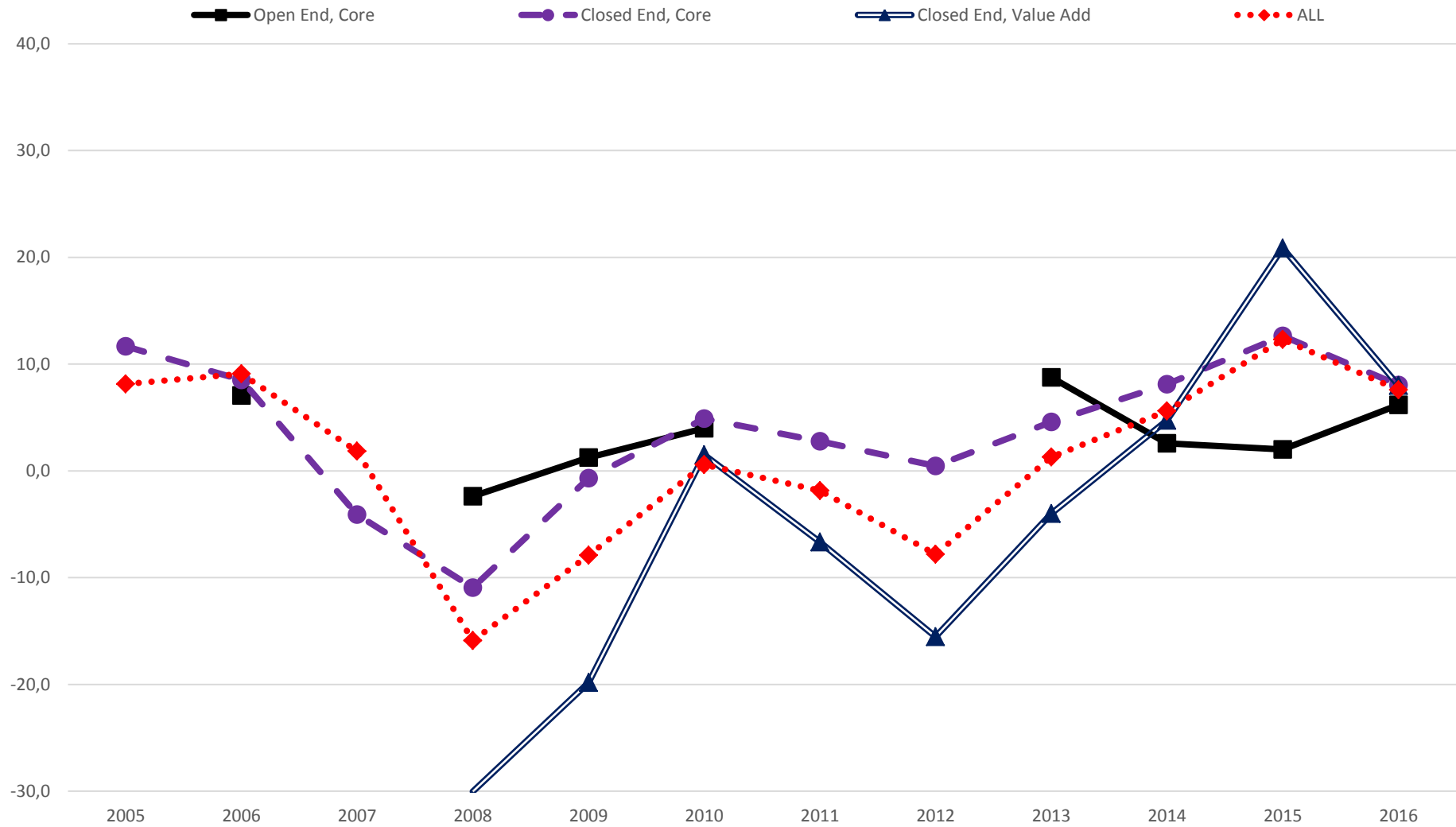


Figure 24: Performance Single Country, Multi Sector (All Sizes)

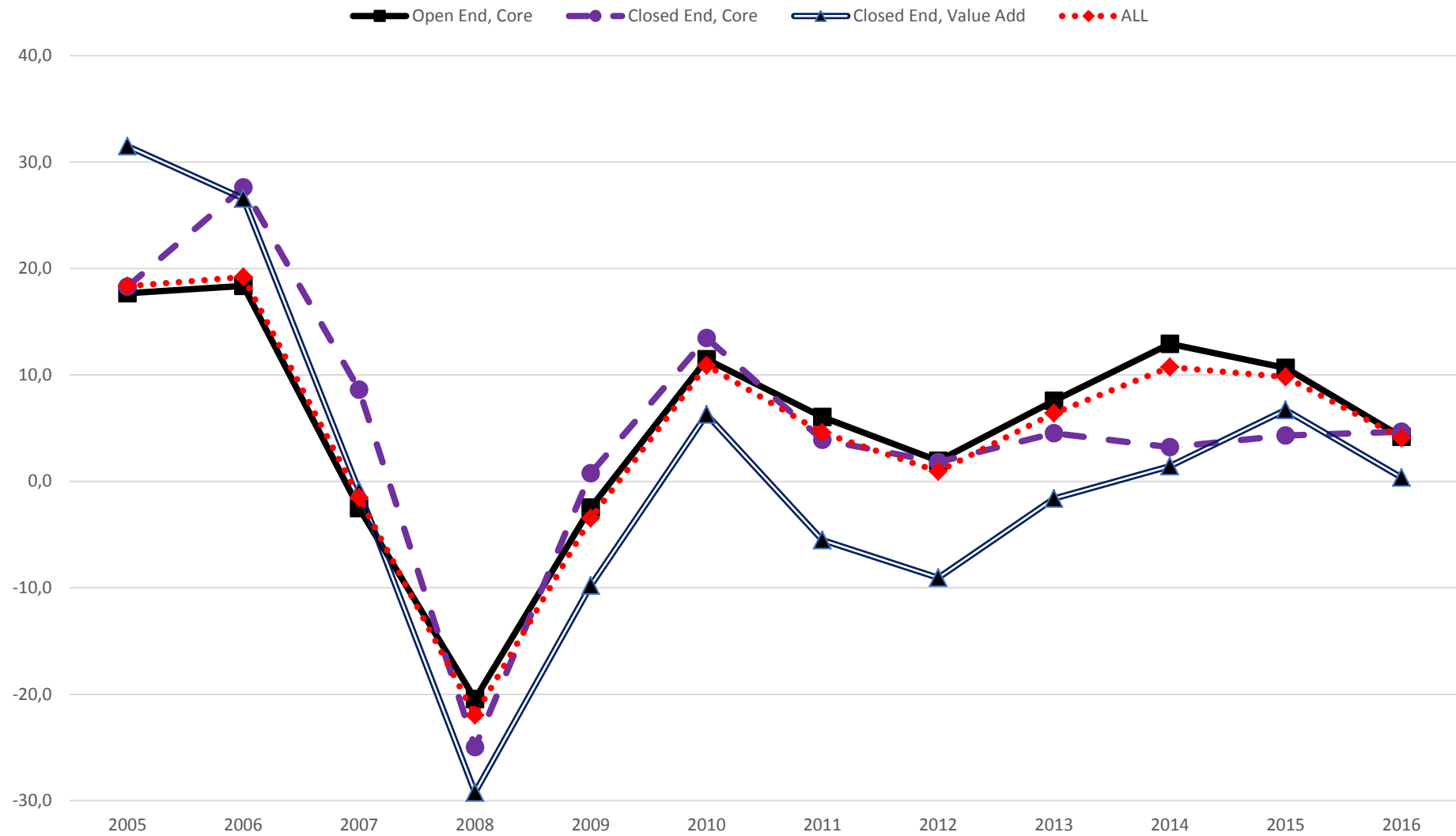


Figure 25: Performance Single Country, Multi Sector-Large (>€ 1000 million)

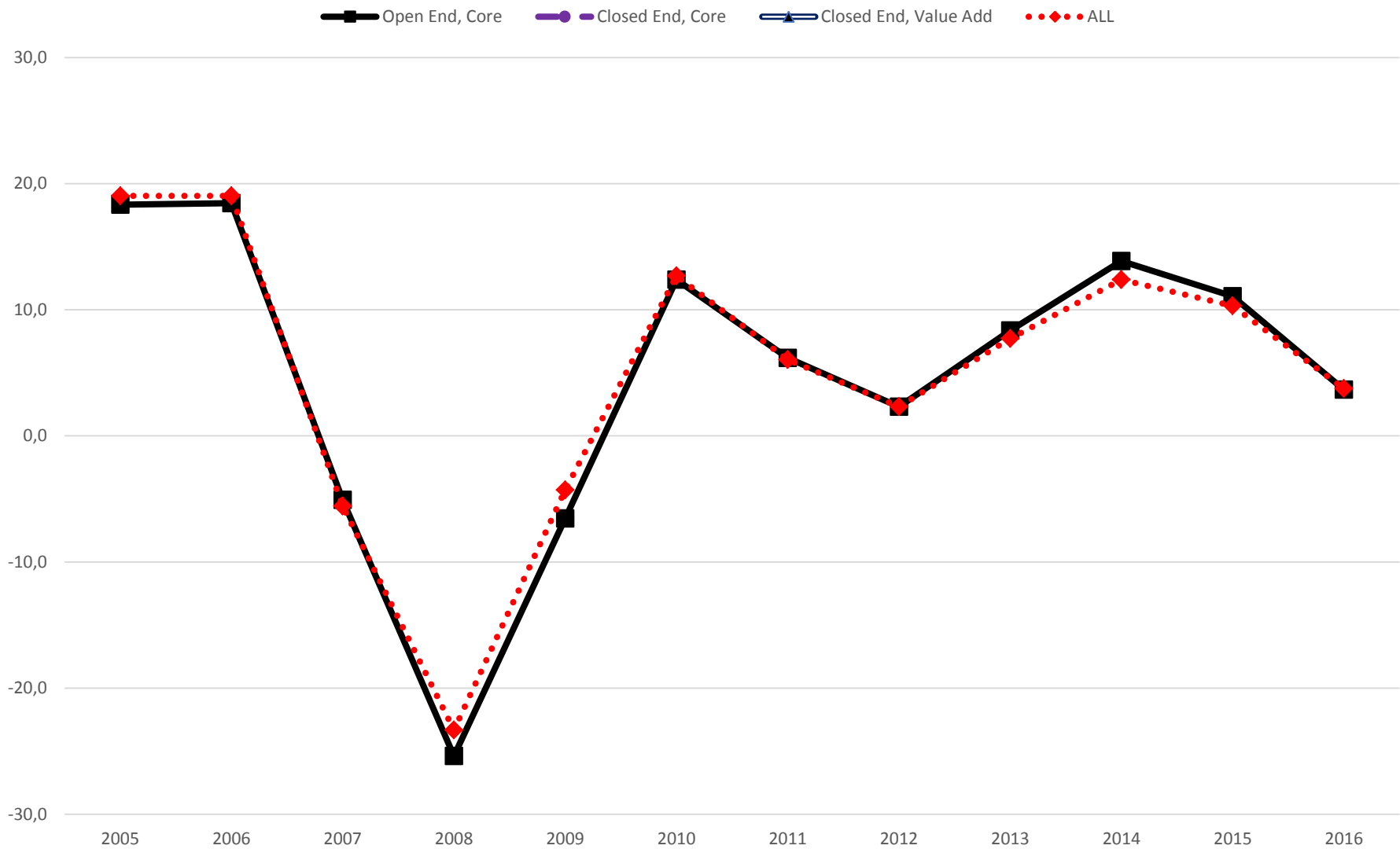


Figure 26: Performance Single Country, Multi Sector-Medium Large (€ 600-€ 1000 million)

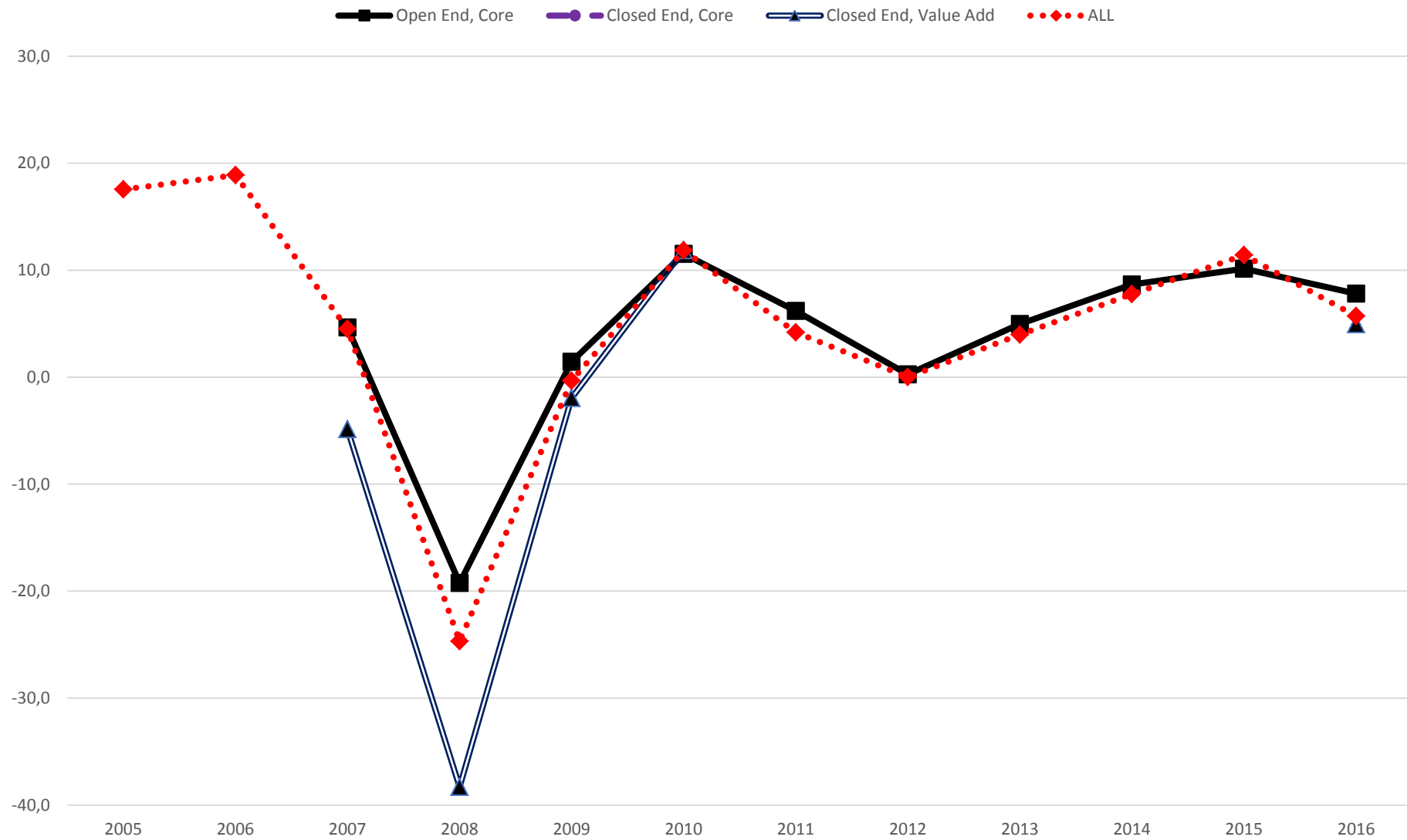


Figure 27: Performance Single Country, Multi Sector-Small Medium (€ 300-€ 600 million)

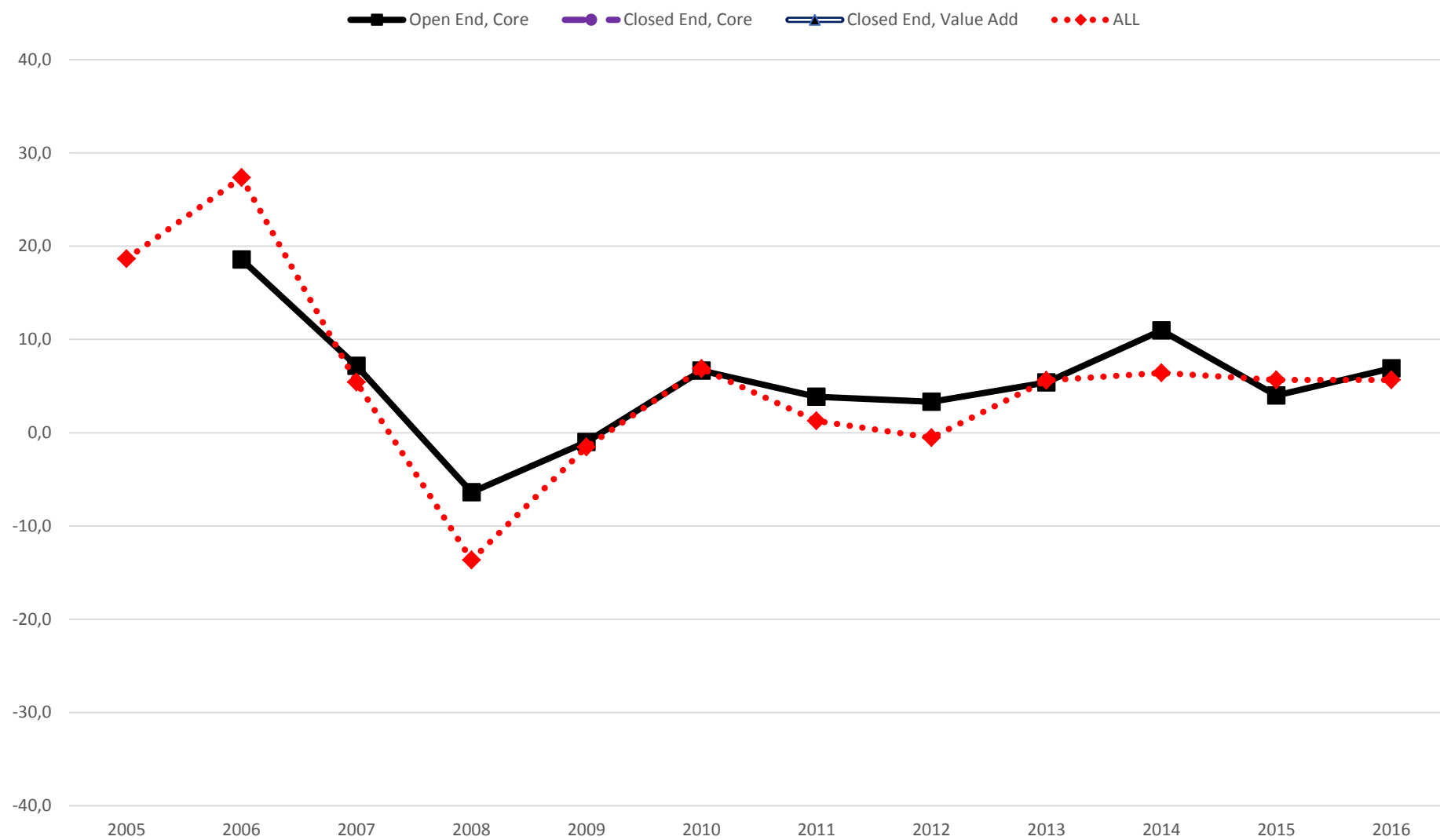


Figure 28: Performance Single Country, Multi Sector-Small (< € 300 million)

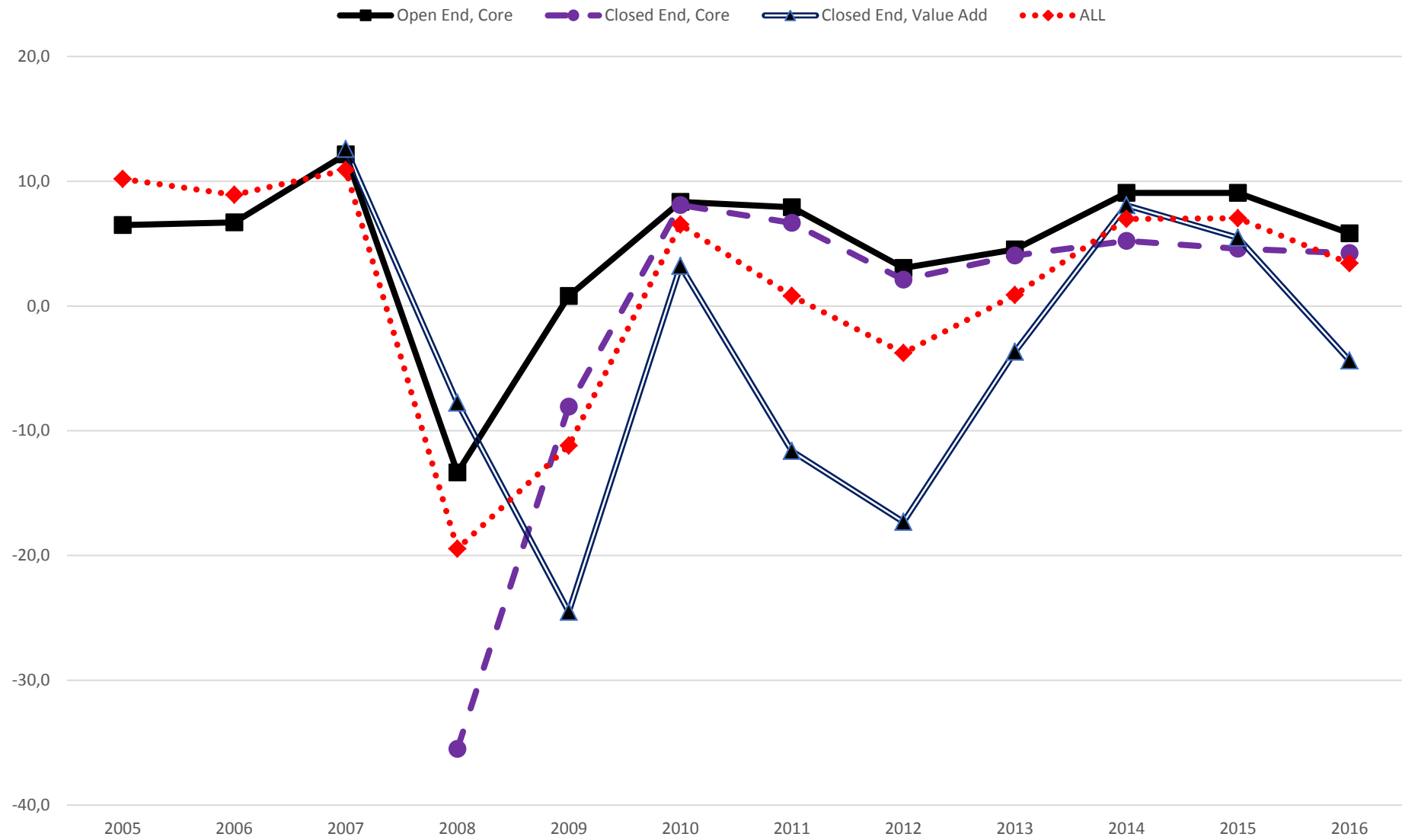


Figure 29: Performance Multi Country, Multi Sector (All Sizes)

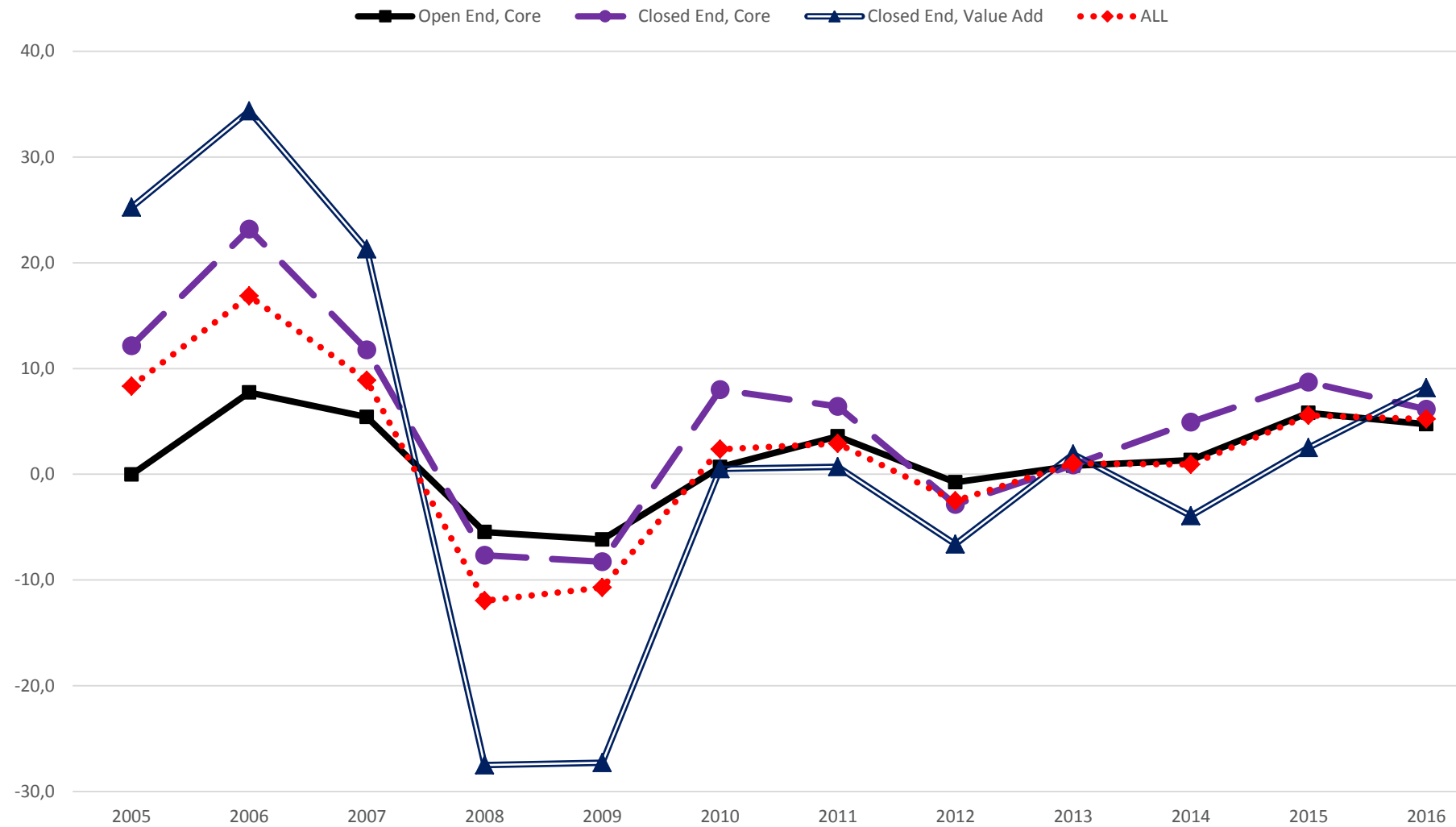


Figure 30: Performance Multi Country, Multi Sector-Large (>€ 1000 million)

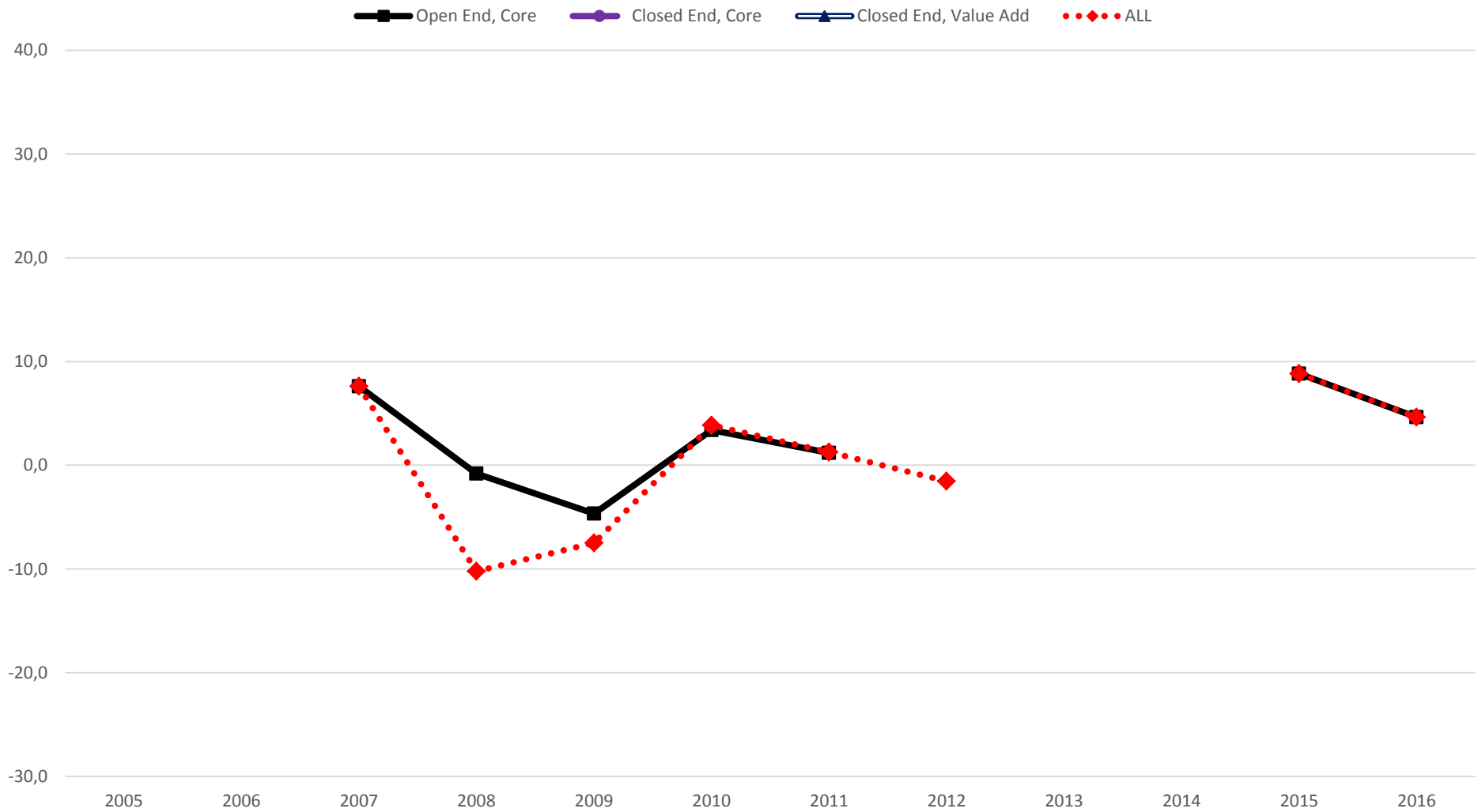


Figure 31: Performance Multi Country, Multi Sector-Medium Large (€ 600-€ 1000 million)

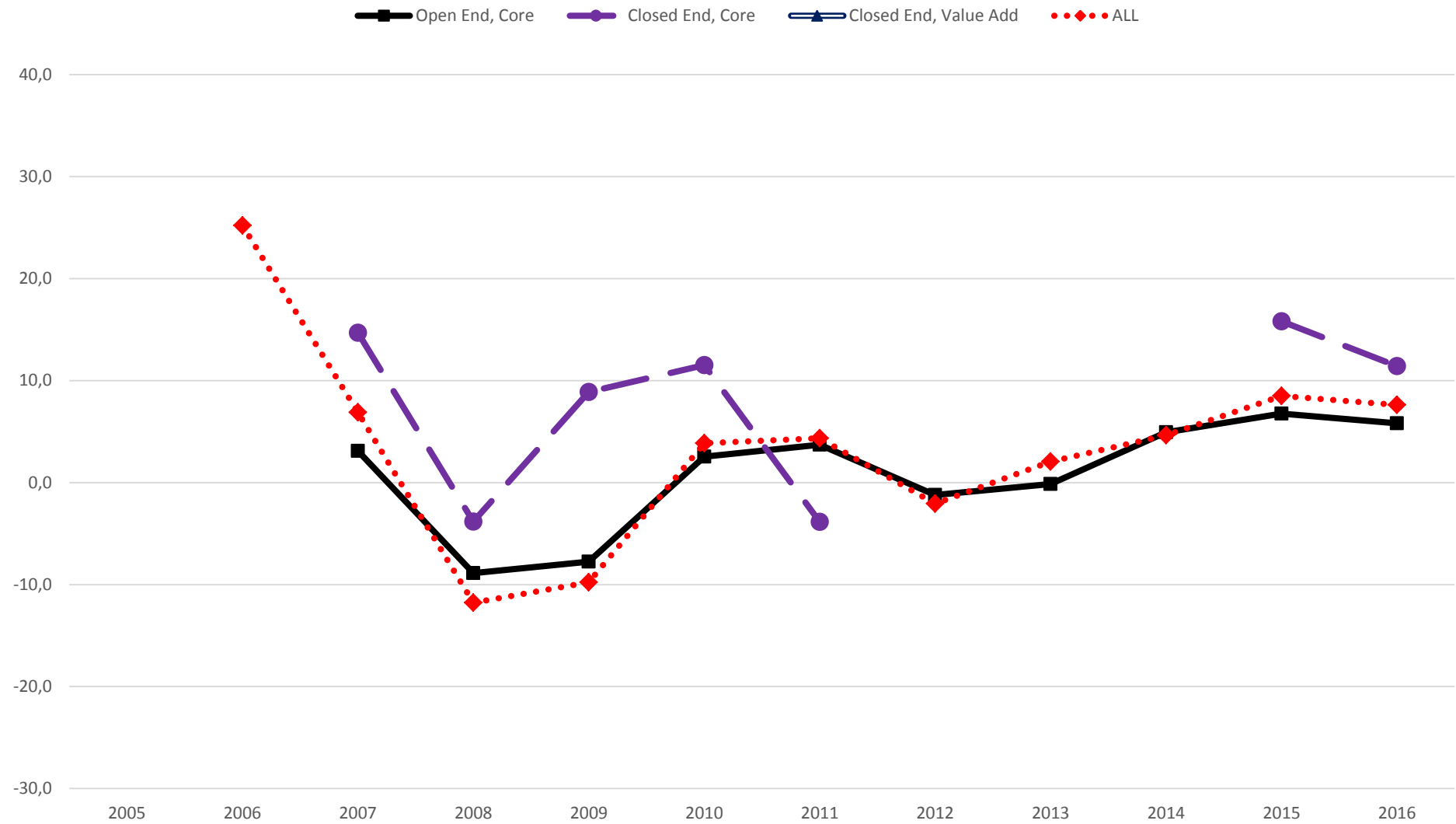


Figure 32: Performance Multi Country, Multi Sector-Small Medium (€ 300-€ 600 million)

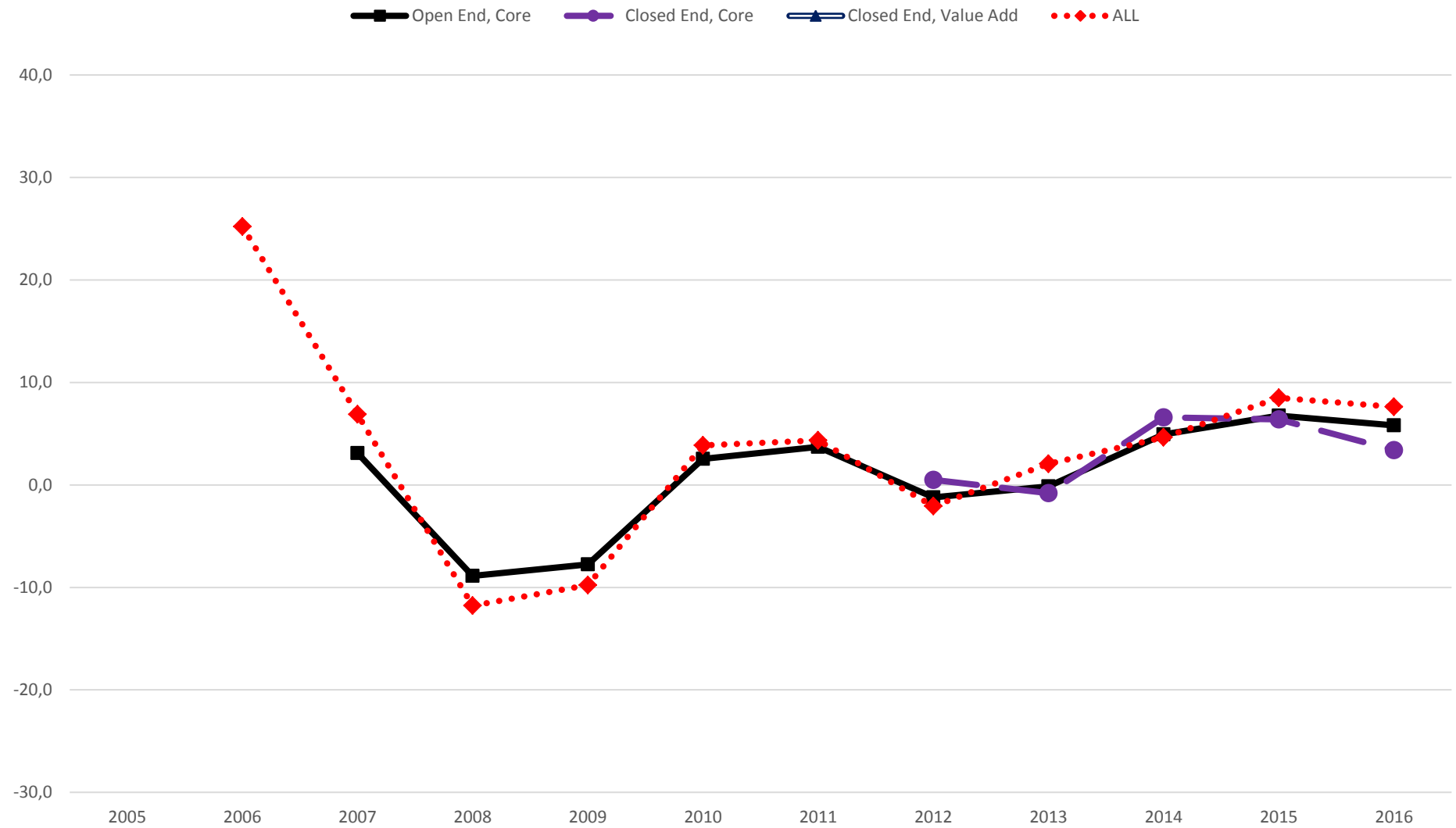
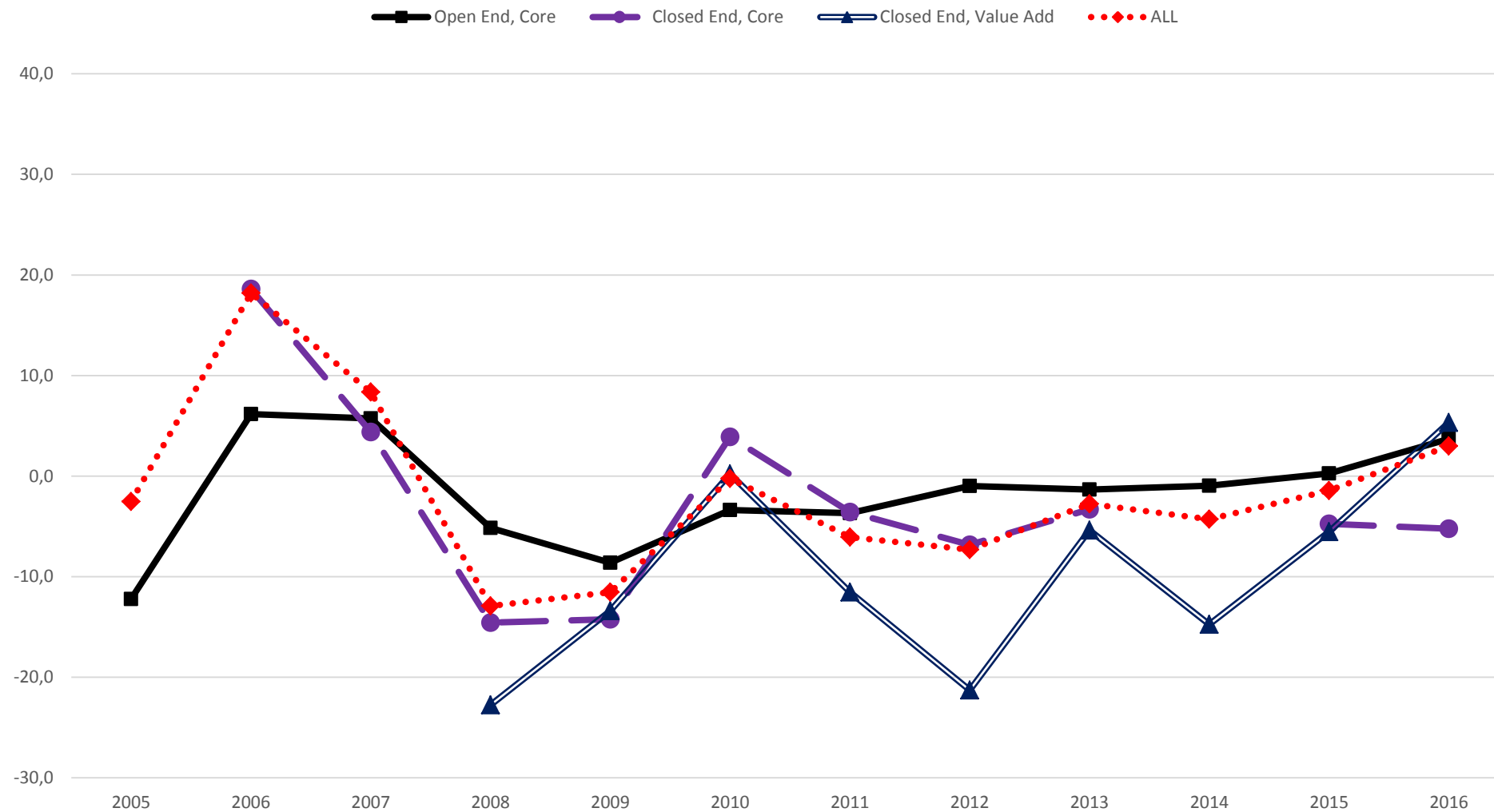


Figure 33: Performance Multi Country, Multi Sector-Small (< € 300 million)



Appendix II Risk adjusted returns INREV subindices by strategy, style, structure and fund size, including characteristics

Style (code)	Strat	Size	GAV (2016)	Struct	Style	Type	2010-2016	2005-2016		>2010		Countryweights					Sectorweights				
							LEV	R.A.R. (*)	RANK	R.A.R.	RANK	GR	FR	UK	NL	OTH	OF F	RET	RE S	IND	OTH
SCMS_OEC_SMALL	SCMS	<300	2,6	Open End	Core	Generalist	27%	0,77	1	2,87	1	37%	0%	15%	0%	48%	25%	25%	9%	10%	31%
SCMS_CEC_SMALL	SCMS	<300	0,6	Closed End	Core	Generalist	40%	n.a.	n.a.	2,59	2	13%	1%	19%	0%	67%	32%	7%	0%	17%	44%
SCMS_OEC_SMALLMEDIUM	SCMS	300-600	4,9	Open End	Core	Generalist	18%	n.a.	n.a.	2,22	3	69%	0%	23%	0%	8%	29%	11%	13%	7%	40%
SCMS_ALL_LARGE	SCMS	>1000	49,2	ALL	ALL	Generalist	9%	0,42	14	1,92	4	0%	0%	71%	0%	30%	21%	27%	1%	14%	37%
SCMS_OEC_MEDIUMLARGE	SCMS	600-1000	5,1	Open End	Core	Generalist	20%	n.a.	n.a.	1,89	5	40%	0%	0%	0%	60%	46%	9%	0%	2%	43%
SCSS_ALL_SMALLMEDIUM	SCSS	300-600	10,2	ALL	ALL	Specialist	34%	0,56	5	1,87	6	48%	26%	12%	8%	5%	28%	27%	21%	6%	18%
SCMS_OEC_LARGE	SCMS	>1000	43,8	Open End	Core	Generalist	5%	0,39	18	1,87	7	0%	0%	75%	0%	25%	29%	22%	1%	15%	34%
ALL FUNDS_LARGE	ALL	>1000	126	ALL	ALL	ALL	25%	0,40	15	1,79	8	9%	4%	43%	16%	28%	18%	26%	11%	17%	27%
SCMS_ALL	SCMS	ALL	68,8	ALL	ALL	Generalist	18%	0,44	12	1,8	9	10%	0%	57%	0%	34%	25%	24%	2%	12%	37%
SCSS_ALL	SCSS	ALL	64,8	ALL	ALL	Specialist	27%	0,36	20	1,7	10	21%	5%	32%	32%	10%	18%	31%	28%	7%	16%
SCSS_ALL_LARGE	SCSS	>1000	38,4	ALL	ALL	Specialist	26%	0,27	26	1,61	11	14%	0%	39%	40%	7%	17%	28%	34%	6%	15%
SCMS_ALL_SMALLMEDIUM	SCMS	300-600	6,3	ALL	ALL	Generalist	32%	0,55	7	1,55	12	54%	0%	28%	0%	19%	35%	14%	10%	6%	35%
INREV ALL FUNDS	ALL	ALL	213	ALL	ALL	ALL	31%	0,39	16	1,52	13	16%	6%	31%	13%	34%	22%	28%	10%	14%	27%
SCMS_ALL_MEDIUMLARGE	SCMS	600-1000	9,5	ALL	ALL	Generalist	26%	0,45	11	1,51	14	22%	0%	20%	0%	58%	40%	14%	2%	9%	36%
MCSS_CEC_SMALL	MCSS	<300	2,4	Closed End	Core	Specialist	35%	0,56	6	1,47	15	28%	21%	6%	7%	39%	20%	22%	0%	7%	51%
ALL FUNDS_MEDIUMLARGE	ALL	600-1000	35	ALL	ALL	ALL	33%	0,37	19	1,44	16	20%	5%	31%	9%	35%	28%	29%	8%	9%	27%
SCSS_CEC_SMALLMEDIUM	SCSS	300-600	3,9	Closed End	Core	Specialist	41%	0,49	8	1,44	17	8%	58%	22%	0%	13%	21%	46%	0%	9%	24%
SCSS_ALL_MEDIUMLARGE	SCSS	600-1000	9,7	ALL	ALL	Specialist	22%	0,32	23	1,31	18	20%	0%	44%	25%	10%	12%	46%	16%	8%	18%
ALL FUNDS_SMALLMEDIUM	ALL	300-600	31	ALL	ALL	ALL	38%	0,45	10	1,25	19	37%	12%	12%	6%	34%	27%	34%	10%	5%	24%
SCSS_OEC-SMALLMEDIUM	SCSS	300-600	4,9	Open End	Core	Specialist	22%	0,65	3	1,18	20	83%	0%	0%	17%	0%	26%	17%	44%	6%	8%
MCMS_ALL_MEDIUMLARGE	MCMS	600-1000	10,2	ALL	ALL	Generalist	39%	n.a.	n.a.	1,18	21	19%	8%	4%	3%	67%	31%	29%	4%	7%	29%
MCMS_OEC_MEDIUMLARGE	MCMS	600-1000	5,5	Open End	Core	Generalist	35%	n.a.	n.a.	1,07	22	25%	7%	3%	3%	63%	30%	19%	0%	6%	45%
SCSS_CEC_LARGE	SCSS	>1000	10,3	Closed End	Core	Specialist	26%	0,24	27	1,02	23	0%	0%	77%	0%	23%	22%	77%	0%	0%	2%
MCSS_ALL_LARGE	MCSS	>1000	29,2	ALL	ALL	Specialist	43%	0,59	4	1,01	24	16%	14%	15%	14%	42%	13%	23%	0%	41%	22%

Style (code)	Strat	Size	GAV (2016)	Struct	Style	Type	2010-2016	2005-2016		>2010		Countryweights					Sectorweights				
							LEV	R.A.R (*)	RANK	R.A.R.	RANK	GR	FR	UK	NL	OTH	OF F	RET	RE S	IND	OTH
MCMS_ALL_SMALLMEDIUM	MCMS	300-600	7,7	ALL	ALL	Generalist	38%	0,3	22	0,92	25	12%	7%	6%	5%	69%	31%	32%	3%	2%	32%
SCSS_CEVA_MEDIUMLARGE	SCSS	600-1000	2,6	Closed End	Value Add	Specialist	34%	n.a.	n.a.	0,91	26	24%	0%	73%	0%	3%	45%	24%	0%	0%	32%
SCSS_ALL_SMALL	SCSS	<300	6,4	ALL	ALL	Specialist	29%	0,5	9	0,86	27	21%	10%	3%	28%	38%	15%	29%	20%	15%	21%
SCSS_OEC-SMALL	SCSS	<300	3,3	Open End	Core	Specialist	22%	0,68	2	0,85	28	38%	0%	0%	54%	8%	8%	19%	35%	10%	28%
MCSS_OEC_LARGE	MCSS	>1000	20,4	Open End	Core	Specialist	44%	n.a.	n.a.	0,84	29	20%	14%	16%	17%	34%	18%	0%	0%	51%	31%
MCSS_ALL_MEDIUMLARGE	MCSS	600-1000	5,6	ALL	ALL	Specialist	51%	0,3	21	0,82	30	21%	17%	13%	6%	45%	29%	23%	13%	14%	21%
MCMS_ALL	MCMS	ALL	33,3	ALL	ALL	Generalist	36%	0,28	25	0,80	31	17%	9%	5%	5%	65%	33%	28%	2%	6%	32%
SCSS_CEC_MEDIUMLARGE	SCSS	600-1000	3,8	Closed End	Core	Specialist	28%	0,32	24	0,80	32	17%	0%	62%	0%	21%	0%	59%	0%	20%	22%
SCMS_ALL_SMALL	SCMS	<300	3,8	ALL	ALL	Generalist	0,4	0,2	30	0,77	33	27%	2%	13%	0%	58%	32%	19%	9%	10%	30%
MCSS_ALL	MCSS	ALL	33,3	ALL	ALL	Specialist	36%	0,43	13	0,76	34	17%	9%	5%	5%	65%	33%	27%	2%	6%	32%
MCMS_OEC_SMALLMEDIUM	MCMS	300-600	4,6	Open End	Core Value Add	Generalist	33%	n.a.	n.a.	0,72	35	15%	12%	6%	3%	65%	32%	32%	0%	3%	33%
SCSS_CEVA_SMALL	SCSS	<300	0,8	Closed End	Value Add	Specialist	37%	n.a.	n.a.	0,66	36	7%	13%	0%	0%	81%	41%	41%	0%	0%	18%
ALL FUNDS_SMALL	ALL	<300	21,0	ALL	ALL	ALL	37%	0,22	29	0,53	37	22%	10%	7%	12%	50%	28%	28%	8%	11%	26%
SCSS_CEC_SMALL	SCSS	<300	2,0	Closed End	Core	Specialist	41%	0,39	17	0,45	38	2%	26%	7%	0%	65%	18%	46%	5%	17%	14%
MCSS_ALL_SMALL	MCSS	<300	4,8	ALL	ALL	Specialist	46%	0,1	31	0,38	39	28%	15%	4%	9%	45%	17%	37%	0%	11%	35%
MCSS_OEC_SMALLMEDIUM	MCSS	300-600	2,3	Open End	Core	Specialist	43%	n.a.	n.a.	0,28	40	53%	5%	6%	15%	21%	0%	47%	0%	19%	35%
MCSS_ALL_SMALLMEDIUM	MCSS	300-600	7,2	ALL	ALL	Specialist	53%	0,2	28	0,16	41	32%	6%	5%	8%	50%	14%	64%	0%	6%	16%
MCSS_CEVA_SMALL	MCSS	<300	0,9	Closed End	Value Add	Specialist	58%	n.a.	n.a.	0,11	42	22%	8%	0%	1%	70%	0%	87%	0%	3%	10%
MCSS_CEVA_SMALLMEDIUM	MCSS	300-600	1,6	Closed End	Value Add	Specialist	63%	-0,16	32	-0,11	43	18%	0%	0%	0%	82%	0%	100%	0%	0%	0%
SCMS_CEVA_SMALL	SCMS	<300	0,6	Closed End	Value Add	Generalist	52%	n.a.	n.a.	-0,31	44	0%	10%	0%	0%	90%	58%	7%	17%	4%	14%
MCMS_OEC_SMALL	MCMS	<300	3,7	Open End	Core	Generalist	28%	-0,31	34	-0,37	45	20%	7%	13%	2%	58%	49%	32%	0%	5%	15%
MCMS_ALL_SMALL	MCMS	<300	6,0	ALL	ALL	Generalist	35%	-0,2	33	-0,77	46	16%	10%	9%	4%	61%	47%	24%	0%	7%	22%
MCMS_CEVA_SMALL	MCMS	<300	1,5	Closed End	Value Add	Generalist	47%	n.a.	n.a.	-0,84	47	7%	5%	0%	7%	80%	42%	9%	0%	10%	38%

*R.A.R. =Risk adjusted return

Appendix III Further study: Multiple Regression analysis

Further study could be done by performing a multiple regression analysis. Preferably, a panel data regression would be performed, as this allows for studying timeseries and cross section data at the same time. To assess the possible impact of being of specialist (or not), a dummy variable could be used for each Fund. Four dummy variables are proposed for each of the following strategies: Single sector/Single country & Single sector/Multi country (Specialist Strategies) and Multi sector/Single Country & Multi sector/Multi country (Generalist Strategies). It is expected, based on previous Research outcomes, that other factors could be significant in explaining (differences in) returns as well. Therefore, it is important to control for these variables in explaining the impact of “Specialist” or “Generalist” strategies.

The general formula for a Multiple Regression

$$y_i = \alpha + \beta_i X_i + \varepsilon_i \quad \text{for } i=1, \dots, N$$

For each year of the 11 years of the sample, a regression analysis is done, with the dependent variable y being the return for fund i .

The following independent variables are proposed, based on previous research, while adding the “Specialist” or “Generalist” dummy variables:

- Fund Size
- Style (Core/Value Add)
- Structure
- Gearing Level
- A customized benchmark that mimics the composition of the Fund portfolio (Weighted Market Return)
- Strategy

A brief explanation of these variables is given below:

- Fund size: according to INREV (2015, p.4), an optimal Fund Size exists. According to INREV, the optimal size is in the range of €1.2 billion to €4.3 billion. The logic behind this finding is that bigger funds could diversify more easily, and possibly yield economies of scale (bargaining power etc). Popularly said: Big is Beautiful. However, they also find that from a certain size, diseconomies of scale tend to occur.
- Style: in theory a core style is associated with lower risk but also lower returns. The value add style is associated with a bigger risk, and higher returns are expected. Therefore, if this is true, it must be accounted for in a regression analysis and the variable should pick up a risk premium.

- Structure: INREV(2015, p.23) showed that open end funds have higher returns and lower volatility. This could be explained by the fact that these funds are bigger, better diversified and have greater flexibility to time investments.
- Gearing level. Again, referring to the same INREV study (2015, p.4), but to other studies as well (van der Spek, 2011) the use of leverage is associated with higher returns, but also with higher risks. To compare funds, we need to correct for differences in gearing levels. One could argue though that higher gearing levels could present itself in a higher volatility, but we wouldn't know if the higher volatility was attributable to (for example) value add activities or just a higher gearing level.
- Weighted Market Return: funds invest in Real Estate properties. According to Fuerst and Matysiak, asset allocation to specific countries and property sectors is perceived to be a crucial factor for the overall performance of funds (Fuerst and Matysiak, 2013, p. 1782). Funds differ in underlying portfolio composition, both in geography- and sector choice. If a fund(manager) creates added value, then he would be able to generate an outperformance compared to an appropriate benchmark (controlling for other possibly return enhancing variables). This could be done by creating a "customized benchmark", by multiplying the weight of each country/sector weight of each fund by the return of MSCI/IPD benchmark for the corresponding country/sector combination. The reasoning behind this is that if a specialist manager is supposed to have superior selection skills, he/she probably would be expected to deliver superior risk adjusted returns, (again) controlling for other aspects such as leverage.
- Strategy: This is the variable that, in the end, should show a significant and positive effect for "specialist" funds and no or even negative effects for "generalist" funds. For each of the strategies that were identified earlier (single country/single sector, multi country/single Sector, single country/multi sector, multi country/multi sector) a dummy variable is included in the regression.

The problem of these variables might be that they're (to a degree) could be interacting. For example, open end funds tend to be bigger in size and have more moderate gearing levels. Or, value add funds tend to have more gearing than core funds. In performing regression analysis the added value of separate factors needs to be assessed.