ASCENT

RISK BASED
PORTFOLIO CONSTRUCTION

COUPON INCOME
A MAJOR DRIVER OF PERFORMANCE

SMALL IS BEAUTIFUL...
FOR THOSE WHO CAN WAIT

EDUCATION:
A MAJOR SUSTAINABILITY DRIVER

Petercam | Institutional
Asset Management

2 INDEX

DEAR
READER

Welcome to the second 2014 edition of Ascent, Petercam Institutional Asset Management's newsletter on its research and management capabilities.

Our cover article focuses on asset allocation, and specifically on Risk Based Portfolio Construction. Risk premiums, volatilities and correlations are time-varying and historical performance is not necessarily representative for the future. The article sheds some light on the Maximum Diversification portfolio. We prefer the maximum diversification portfolio to the Minimum Risk portfolio, mainly because the Minimum Risk portfolio tends to be more concentrated and the allocation is less stable over time.

The second article is on equities. Didier Van De Veire demonstrates the attractiveness of small and mid-caps, and why it is engrained in the DNA of Petercam Institutional Asset Management. Indeed, our core European equity portfolios have an important weighting towards them.

Thirdly, our fixed income contribution demonstrates that coupon income is becoming a major driver of performance in IG Corporate Bonds. Similarly as in 2013, the asset class remains resilient from a fundamental as well as technical point of view. Total returns since 2009 have been compelling, and we expect the asset class to remain well supported.

Finally, in our responsible investment section, Ophélie Mortier shows that the publication of the PISA tests by the OECD demonstrates the importance of education, vital to the future of States. These tests allow for a comparison of the skills and competences of students aged 15-16 in 64 different economies.

We hope you will enjoy this edition, and would be more than happy to have feedback on your side.

Hugo Lasat,
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4

RISK BASED
PORTFOLIO CONSTRUCTION

Frederiek Van Holle
Quant Specialist – Client Solutions

Traditional portfolio optimisation requires three inputs: expected returns (the mean of the distribution), correlations between assets in the investment universe and the volatility of these assets. The last two inputs are represented by the so-called covariance matrix. A naïve way to obtain these inputs is by taking average returns as expected returns and historical correlations and volatilities for the covariance matrix over a certain sample period. However, this is clearly sub-optimal as risk premiums, volatilities and correlations are time-varying and historical performance is not necessarily representative for the future. In addition, to make things even harder, mean-variance optimisation is very sensitive to errors in the estimates of the inputs. Chopra & Ziemba[1] show that errors in the estimate of the expected returns are about ten times as important as errors in variances and correlations. Although the relative importance of the errors depends on the risk tolerance of investors, for typical risk aversion levels of institutional investors, errors in means are predominant, followed by errors in volatilities. Errors in correlations are the least important in terms of their influence on portfolio optimality. This sensitivity of the optimality of the portfolio on expected returns is one of the reasons why more (academic) research appears on risk based portfolio optimisation. These strategies only require the covariance matrix as input and hence no (error-prone) expected returns have to be estimated. Examples of such strategies are the Minimum Risk Portfolio, Risk Parity Portfolio and Maximum Diversification portfolio. In this article we take a closer look at the Maximum Diversification portfolio. We prefer the maximum diversification portfolio to the Minimum Risk portfolio, mainly because the Minimum Risk portfolio tends to be more concentrated[2] and the allocation is less stable over time. By definition, the risk parity portfolio has a non-zero weight in each asset in the investment universe. This becomes problematic when some assets are highly correlated (or duplicated). In this case, the portfolio will be biased towards these highly correlated assets. How to construct the maximum diversification portfolio? We apply a four step procedure as shown below. The following explains the steps with an example.

> **"GOOD FORECASTS OF EXPECTED RETURNS ARE CRITICAL TO THE MEAN-VARIANCE FRAMEWORK"**

Dynamic Portfolio Management

| Investment Universe | → | Estimation of Volatilities and Correlations | → | Risk Based Portfolio Optimisation | → | Rescaling of the Optimal Portfolio to the desired Risk Profile | → |

[1] Chopra, Vijay K. & Ziemba, William T., "The Effect of Errors in Means, Variances, and Covariances on Optimal Portfolio Choice", Journal of Portfolio Management, Winter 1993
[2] This is because the weights in the Minimum Risk portfolio are proportional to the inverse of the variance as opposed to the inverse of the volatility for the maximum diversification portfolio. The inverse of the variance has more extreme values than inverse standard deviation. See Clarke, Roger, de Silva Harinda & Thorley Steven, "Minimum Variance, Maximum Diversification, and Risk Parity: An Analytic Perspective" for mathematical proof.

First, one has to decide on the investment universe. When applying the maximum diversification method within an asset allocation framework, this boils down to selecting the eligible asset classes. Given that the structure of the investment universe has an impact on the optimal portfolio, we have selected a wide investment universe to allow for sufficient diversification. The following assets are selected for this exercise: euro government bonds (JPMorgan EMU government bond index), US government bonds (Barclays US Treasuries Index), euro corporate bonds (Iboxx Euro Corporate index), euro high yield bonds (Barclays Euro HY bonds index), European real estate (FTSE EPRA/NAREIT Developed Europe Index), European equity

Based on the covariance matrix, we can now optimise the portfolio. In order to maximise the diversification, we must maximise the diversification ratio. The diversification ratio is the ratio of the weighted average volatility to its overall volatility.

$$\text{Diversification Ratio} = \frac{\sum_{i=1}^{N} w_i' \times \sigma_i}{\sqrt{w_i \times CovMat \times w_i'}},^*$$

This diversification ratio is similar to the well-known Sharpe ratio, but with asset volatilities replacing asset expected returns in the numerator. Indeed, one of the assumptions behind the maximum diversification ap-

	Government Bonds		Bonds		Equity			
Correlation Matrix	Euro Government Bonds	US Government Bonds	Euro Corporate Bonds	Euro HY bonds	European Equity	Global Equity Ex-Europe	Emerging Markets Equity	European Real Estate
Euro Government Bonds	100%	16%	68%	0%	-20%	-24%	-19%	-6%
US Government Bonds		100%	12%	-21%	-23%	12%	-20%	-26%
Euro Corporate Bonds			100%	38%	-1%	-3%	5%	12%
Euro HY bonds				100%	38%	32%	42%	42%
European Equity					100%	82%	75%	77%
Global Equity Ex-Europe						100%	65%	60%
Emerging Markets Equity							100%	64%
European Real Estate								100%
Annualized Volatility	4%	11%	3%	9%	20%	18%	24%	20%

(MSCI Europe index), global emerging markets equity (MSCI Emerging Markets Europe, Middle East and Africa) and global equity (MSCI World ex-Europe index). We have selected weekly total returns in euro for these asset classes over the period 5 January 2001 – 4 April 2014.

Second, the volatilities and covariances are estimated. In this article we have used the historical covariance matrix. However, in practice we use a combination of the historical covariance matrix and a dynamic version of the covariance matrix that attributes more weight to recent data and that allows for time-variation in the correlations and the volatilities. The correlation matrix is presented above.

In general, the bond component is a good diversifier against equity risk because the correlations over the sample period were typically negative. In fact, empirical evidence suggests that when stocks see negative returns, government bond returns are typically positive. However, this correlation seems to turn positive when stocks perform. This makes bonds an interesting hedge for equity downside risk. Since the correlations are not constant over time, one can update the correlations on a regular basis to take into account changing market conditions. Please note that the US government bonds are more volatile than the euro government bonds because the dollar exposure is not hedged.

proach is the linear relationship between expected returns and asset risk. By replacing the expected returns by the asset risk, one does not need to estimate the expected returns to construct the optimal portfolio.

Now let us gain some insight into the diversification ratio. The diversification ratio for a portfolio with only one asset class will be equal to one. This is the lower boundary. When correlations between the different assets are all equal to one, the diversification ratio will also be one. Indeed, although the portfolio is invested in different asset classes, since they are perfectly correlated, the effective exposure is only to one asset class and the diversification ratio is rightfully equal to one. When correlations are lower than one (which is typically the case), the portfolio volatility will be smaller than the weighted sum of the volatilities because of risk reduction by diversification effects. As a result, the numerator will be larger than the denominator and hence, the diversification ratio will be larger than one. Hence, in essence, the diversification ratio measures the diversification gained from holding assets that are not perfectly correlated. Choueitafy, Froidure and Reynier[3] describe some core properties of the maximum diversification portfolio. We will discuss some of them based on our example, but first the maximum diversification portfolio is presented hereafter.

"THE DIVERSIFICATION RATIO MEASURES THE DIVERSIFICATION GAINED FROM HOLDING ASSETS THAT ARE NOT PERFECTLY CORRELATED"

[3] Choueitafy, Yves and Yves Coignard, "Toward Maximum Diversification", Journal of Portfolio Management, Vol. 34, No. 4 (2008), pp. 40-51 and Choueitafy, Yves, Tristan Froidure and Julien Reynier, "Properties of the Most Diversified Portfolio", Journal of Investment Strategies, Vol.2(2), Spring 2103, pp. 49-70.

* Where N is the number of assets in the investment universe, w is the vector with portfolio weights and CovMat is the covariance matrix.
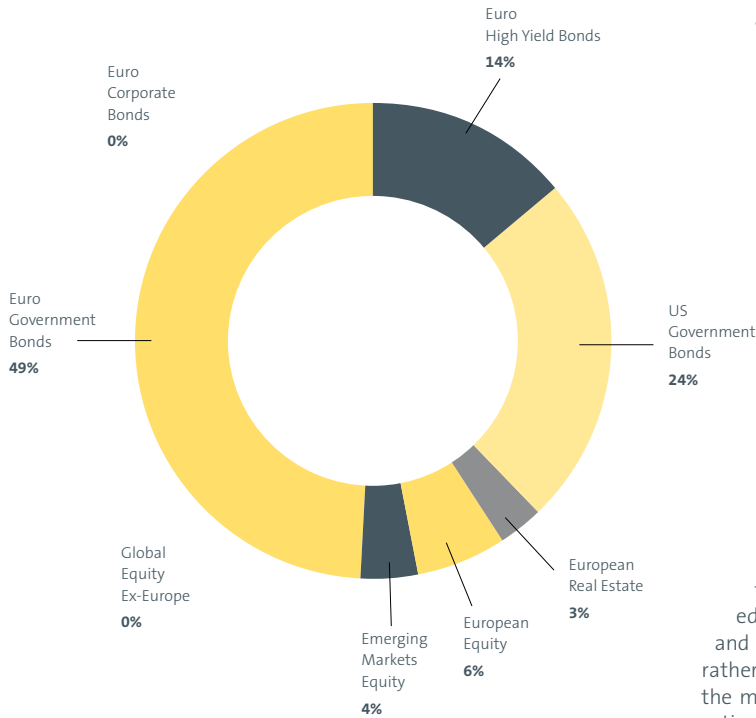
Euro High Yield Bonds **14%**

Euro Corporate Bonds **0%**

Euro Government Bonds **49%**

US Government Bonds **24%**

Global Equity Ex-Europe **0%**

Emerging Markets Equity **4%**

European Equity **6%**

European Real Estate **3%**

Asset Class	Correlation
Euro High Yield bonds	47%
Euro Corporate Bonds	56%
US Government Bonds	47%
European Real Estate	47%
European Equity	47%
Global Equity Ex-Europe	55%
Emerging Markets Equity	47%
Euro Government Bonds	47%

This portfolio is the most diversified one. Its government bond component is quite dominant. This is not a surprise given the high diversification capacity of these assets (see the correlation matrix presented earlier). One can also notice an inverse relationship with volatility. High volatility assets, typically get lower weights. The optimal portfolio does not contain euro corporate bonds and global equity ex-Europe. Why is that? Don't they offer any diversification? The answer to this question brings us to a core property of the maximum diversification portfolio: "Any asset class not held by the maximum diversification portfolio is **more** correlated to the portfolio than any of the asset classes that belong to it. In addition, all asset classes belonging to the portfolio **have the same correlation to it**." By means of illustration, the table presents the correlation of the different asset classes in our investment universe relative to the maximum diversification portfolio. The asset classes that are selected in the portfolio all have an equal correlation to it of 47%. The asset classes that are excluded have a correlation to the maximum diversification portfolio that is higher than the 47%. This property illustrates that all asset classes in the investment universe are effectively represented in the portfolio, even if the portfolio does not physically hold them.

We mentioned earlier that the diversification ratio measures the diversification gain obtained by holding certain assets that are not perfectly correlated. The square of the diversification ratio also has an intuitive interpretation[4]. In fact, it measures the effective number of independent risk factors in the portfolio. In our example, the diversification ratio of the maximum diversification portfolio is 2.11. As a result, the number of independent risk factors in the portfolio is 4.5[5]. A comparison with a naïve Equally Weighted portfolio shows that this portfolio only "exploits" 2 (the diversification ratio is only 1.45) independent risk factors of the 4.5 available in the investment universe. The Minimum Risk portfolio has a diversification ratio of 1.54 and 2.4 independent risk factors. The Equal Risk Contribution portfolio does a better job than the Minimum Risk and the Equally Weighted portfolio. It has a diversification ratio of 1.98 and it has 3.9 independent risk factors, which is rather close to the maximum number of 4.5. Finally, the maximum Sharpe ratio portfolio has a diversification ratio of 1.5 and only 2.2 risk factors are used.

The pie chart with the maximum diversification portfolio allocation demonstrates that the optimal portfolio is very defensive. The historical annualized volatility is only 4% p.a. which is the same risk profile as a 100% euro government bond investment. Therefore we added the fourth step in our investment process. Depending on the risk budget, the portfolio can be linearly rescaled to the desired risk level. Since we linearly increase the weights of the assets within the portfolio, the diversification ratio remains unchanged. However, of course, the risk increases and so does the expected return.

Finally, the portfolio should be managed in a dynamic way. By updating the covariance matrix on a regular basis, changing correlations and volatilities are taken into account. The optimal portfolio composition will gradually adapt to the new market information.

In sum, the maximum diversification portfolio exploits the maximum possible exposure to independent risk factors in the investment universe. The diversification ratio provides insight into the diversification gains by investing in not perfectly correlated asset classes and informs about the number of independent risk factors present in the portfolio. The highly disciplined optimisation process is made dynamic by updating the covariance matrix on a regular basis and reduces input sensitivity and instability typical for return-to-risk based optimisation processes. The optimal weights 'obey' a strict correlation law and represent an un-diversifiable portfolio with attractive risk characteristics. Finally, the maximum diversification portfolio can easily be levered up to the investor's desired risk profile.

"THE SQUARED DIVERSIFICATION RATIO MEASURES THE EFFECTIVE NUMBER OF INDEPENDENT RISK FACTORS IN THE INVESTMENT UNIVERSE"

[4] See Choueitafy, Yves, Tristan Froidure and Julien Reynier, "Properties of the Most Diversified Portfolio", Journal of Investment Strategies, Vol.2(2), Spring 2103, pp. 49-70 for more details.
[5] Note that since we maximized the diversification ratio, the square of the diversification ratio of the maximum diversification portfolio represents the total available independent risk factors in the investment universe.

COUPON INCOME
A MAJOR DRIVER OF PERFORMANCE IN IG CORPORATE BONDS

Peter De Coensel
Head of Corporate Bonds

Investment Grade Corporate Bonds remain an important building block of any diversified portfolio. The market remains well supported going into the second quarter of 2014. Coupon income is becoming the main driver of performance. Our preference goes out to higher quality names in the 8 to 10 year part of our investment universe.

What is the scenario for IG Corporate Bonds in 2014?

Similar as in 2013, in that the asset class remains resilient from a fundamental as well as technical point of view. Total returns since 2009 have been compelling, as exhibited by the graph on the right.

Coupon income is becoming the main driver of performance, as we will demonstrate later on. Given the attractive credit risk premium over core cash government bonds, around 115 basis points, and the lower average investment horizon, namely around four and a half years, European Investment Grade bonds will continue to garner healthy attention.

Parallel with central bank policy rates remaining close to the zero bound, default expectations remain at historically low levels. Overall IG corporate management teams remain vigilant when it comes to balance sheet discipline. They are poised as well to have continued global investor interest when tapping public capital markets.

Which sectors look attractive, and which ones should be avoided?

In the banking sector, we have taken active risks in Lower Tier II banking credits alongside specific subordinated insurance credits, both out of the core EU countries (France, the Netherlands, Germany, UK).

Total Return of the Iboxx Euro Corporate Index
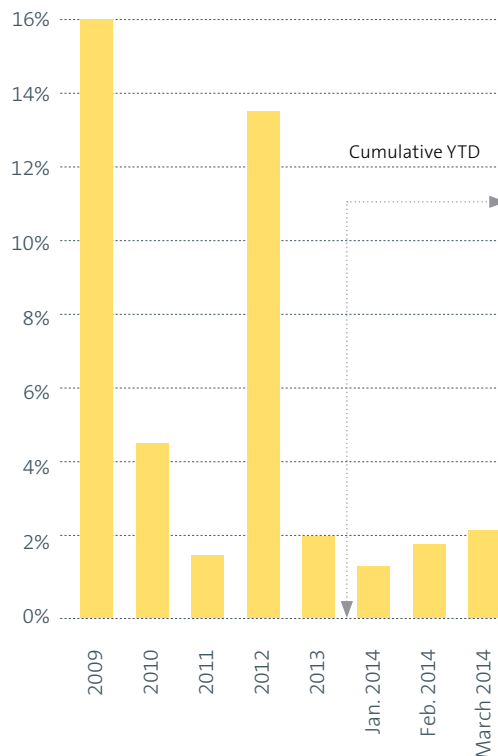
In non-financials, we build positions in hybrid corporate bonds from core Europe incumbents providing they are backed by a stable regulatory and fiscal environment. Examples include utilities in France (not present in Germany).

Our exposure to the European periphery rests mainly within the Italian power and oil & gas sector and Spanish gas franchises that are less sensitive to tariff deficit regulation.

In telecom we remain very defensive on European incumbents as consolidation and competitive forces create high uncertainty. As such, we have directed our investments towards US names present in our investment universe.

What are the decisive factors selecting bonds for the portfolio on a company level?

Credit recommendations are primarily driven by fundamental analysis. Our in-house team of five dedicated credit analysts is of great added value in that respect. The objective of this credit analysis is to determine the capacity of the issuer to pay its coupon and repay its debt in time and fully, once the business risk profile and the financial risk profile of the issuer have been assessed.

We select issuers for which we believe their credit profile will remain stable or will improve over time. At any time we want to avoid any refinancing risks.

The business criteria are:
❶ Understand the key drivers of the industry;
❷ Evaluate the competitive position of the issuer;
❸ Quality of the management is key; and
❹ Analyze the company ownership.

The financial profile analysis is done via an integrated financial model developed by our Credit Research team. We input the historical financial statement of the company, its debt maturity profile, and the available credit lines not drawn. Then we input forward looking estimates related to the Profit & Loss, balance sheet and cash flow side. We also make the off-balance adjustments needed to have a complete assessment of the company.

We focus our attention on three main financial factors:
❶ Understand the origin and predictability of cash generation (we prefer issuers that generate sustained positive free cash flows),
❷ Analyze the refinancing risk (we only recommend issuer with no refinancing risk over the next 18 months and
❸ Assess the actual and forward-looking credit metrics (we evaluate if these ratios are line with the requirements of the rating agencies).

Is there still value in IG Corporate Bonds at current spread levels?

Value is still more than present. Under disinflationary conditions, with sticky YoY inflation readings around 1%, IG index yields around 2% are still attractive. With an expected real rate of return of around 1%, investors are correctly rewarded.

Objectively, on a risk adjusted basis, IG credit provides a healthier investment proposition than High Yield European credit. Moreover the IG credit investor does not need to be overexposed to Italian or Spanish country risk which is the case for European Government Bond investors.

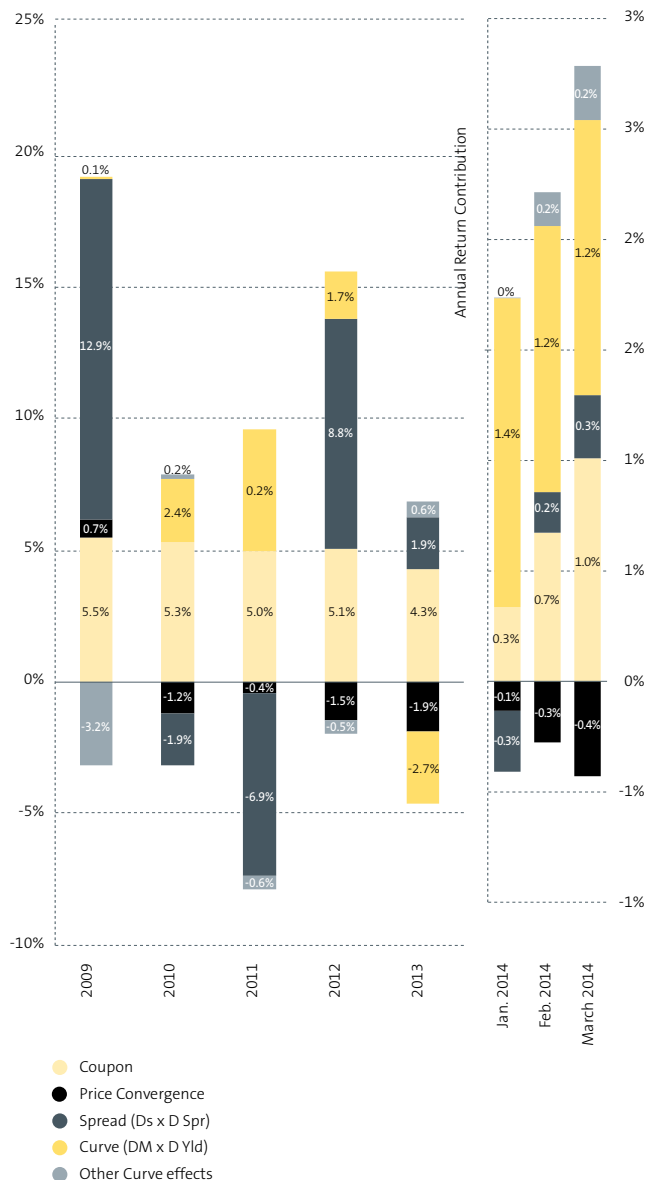What are the expectations in terms of return for investors in the corporate sector?

We would like to repeat that historically and in general for fixed income coupon income has provided the bulk of returns. The graph below exhibits this case specifically for European IG credit.

Important credit spread tightening, alongside declining government bond yields, gave rise to outstanding performances in 2009 and 2012. However the graph shows as well that last year, under an environment of rising government bond yields impacting returns negatively (-2.7%), we see that coupon income (+4.3%) and credit spread return (+1.9%) provided for more than enough buffer to close the year nicely in positive territory (+2.24% for Iboxx € corporate bond index).

Debt sustainability requirements for many EMU member states, being confronted with a lower potential growth environment, will force the ECB into a mix of policy choices that ultimately aims to hold long term rates at current low levels.

Our European IG corporate fund has been constructed in such a way that through careful credit selection we provide around an additional 50 basis points of carry over and above the Iboxx index yield. The Petercam L Bonds EUR Quality fund offers a Yield to Maturity of 2.25% for a modified duration of 4.71% (neutral versus Iboxx IG universe).

Decomposition of the Iboxx Euro Corporate Index Total Return

Legend:
- Coupon
- Price Convergence
- Spread (Ds x D Spr)
- Curve (DM x D Yld)
- Other Curve effects

SMALL IS BEAUTIFUL…
FOR THOSE
WHO CAN WAIT

Didier Van De Veire
CFA, Head of European Equity Management

It may sound like a cliché, but all major companies started off small. Bearing this in mind, it comes as a surprise to us that small and medium enterprises (hereinafter SMID caps) are often ignored in diversified portfolios.

As a matter of fact, strategists tend to prefer certain regions, sectors or style factors, but they seldom agree about which market capitalisations one should invest in. Nevertheless, in the long run SMID caps clearly generate consistently higher returns.

The numbers speak for themselves: investors having exclusively invested in an index comprising the 50 largest companies in the world since 2000 would have missed out on a fair share of additional returns. Only during the crisis years of 2001, 2008 and 2011 would such a strategy have led to higher returns. According to recent calculations by Citigroup, such a large cap portfolio has risen by approximately 31% since early 2003, whereas a portfolio of all other companies in the MSCI World index gained about 129%. This is quite a substantial performance differential, considering that these 50 mega caps have strong franchises, solid balance sheets and are extremely profitable.

What is even more remarkable is not only that these mega caps have consistently underperformed, but that SMID caps have consistently outperformed throughout the years. This outperformance further increases as the investment horizon becomes longer. Recent research has demonstrated that SMID caps outperformed large caps nearly half of the time over rolling 1 to 10 year periods. As the investment period is prolonged, the outperformance gap widens spectacularly. Therefore, SMID caps deserve to be included in an investment portfolio geared towards the long term.

Traditional economic theory dictates that higher returns and higher risks go hand in hand. However, it is still to be seen whether this applies to SMID caps. Admittedly, such investments tend to be less liquid, but this is only relevant when buying and selling positions in this segment and therefore of less interest to long-term investors. This lower liquidity nevertheless does not result in SMID caps being substantially more volatile than their larger peers. Research in that regard is inconclusive, and the analysis is primarily influenced by the time periods in question. What is clear is that the risk/return profile of SMID cap investments is very appealing, and that it further improves as the investment horizon becomes longer.

But what explains this apparent paradox whereby higher returns do not dovetail with substantially higher risks? What are the specific features of these SMID caps setting them apart from their larger counterparts and providing long-term investors with higher returns? In any case, the outperformance cannot be explained by higher profitability, higher margins, a healthier balance sheet, or a different geographical and sector mix, as these criteria largely match those of larger companies or even slightly penalise SMID caps. In fact, the higher growth rates of these companies are the main differentiating factor.

Often, SMID caps are at an earlier stage in their growth or product cycle and hence have higher growth potential. They are in many cases more focused and specialised in one or several niches. Also, their more flexible structure (fewer management levels, less red tape) and higher level of entrepreneurship allows them to better take advantage of new trends. A combination of these factors results in their turnover rising at a higher pace than their

> **"OFTEN, SMID CAPS ARE AT AN EARLIER STAGE IN THEIR GROWTH OR PRODUCT CYCLE AND HENCE HAVE HIGHER GROWTH POTENTIAL"**

larger competitors. Consequently, despite their larger competitors enjoying economies of scale, they are capable of showing higher profit growth. In the long run, this results in higher stock market performance.

Nonetheless, higher growth rates are not the only explanation as to the outperformance of SMID caps. Mergers and acquisitions (M&A) are another key element because SMID caps are often takeover targets for larger companies seeking to acquire new technologies, niches or market share. Mega caps are rarely the subject of a takeover bid by another company and hence do not benefit from a takeover premium. The latter element, however, implicitly explains the underperformance of mega caps versus their smaller sectoral peers. Indeed, the CEOs of these companies are not subject to corporate controls. The perceived lower level of corporate governance in SMID caps is often cited as a risk factor, but the risk of losing his job as a result of an acquisition would seem to make it more important to the CEO of a smaller company to keep paying attention to shareholder value creation. In the corporate jungle, the CEO of a mega cap company need not fear for his job as the result of a hostile takeover, so investors do not need to pay any

premium in this regard, except when market uncertainty is on the rise. In such an environment, the supposed safety of mega and large caps may be compelling to investors.

Besides during acute crisis periods with deteriorating prospects, there is another situation where mega and large caps outperform all other market segments, i.e. during the last phase of a protracted bull market when liquidity comes to the fore. We are not

there yet by any stretch, but in the meantime long-term investors can already capitalise on tomorrow's mega caps by buying into today's SMID caps.

We have been doing this for years at Petercam Institutional Asset Management for our European equity portfolios, including our Europe/Euroland, Belgian and dedicated Small & Mid Cap investment solutions. It is the result of in-depth research and extensive corporate contacts, and honestly we can say that we have not been disappointed.

Source: UBS

MSCI Small
MSCI Mid
MSCI Large

Creating value by focusing on under-researched companies

Petercam Institutional Asset Management believes that research efforts in the industry are overly skewed to larger market capitalisations and that incremental value can be created by concentrating efforts on less 'over'-researched areas of the market. Indeed, equity investors or markets tend to concentrate on larger market capitalisations, for which information is more efficiently discounted in expectations and relative valuations. Consequently, incremental or marginal returns on (in-house) research is limited. Petercam Institutional Asset Management concentrates a significant part of its research efforts on less researched value creating mid-caps, which still benefit from significant marginal returns on (in-house) research. Besides the undiscovered growth opportunities, these companies are also able to benefit from an implicit re-rating as the investment case is picked up by more international sell-side research houses on increasing liquidity, a higher market capitalisation, index inclusion, and a better understanding of the investment case by an increasing number of investors covering the name.

Moreover, besides offering 'undiscovered' potential those sustainable value creating mid-caps offer several other attractions compared to their widely covered big cap peers. Firstly, smaller companies offer the purest way of investing in important themes and industry niches. This pure play nature means that they can present higher growth profiles than larger companies, which see these segments being diluted by diversification in other segments. Secondly, not only do mid-caps offer exposure to high growth themes and industries, those with a strong industrial positioning also consistently generate higher revenue growth than large cap peers with a leading industry positioning. Lastly, this also means that those companies are more likely to be strategic M&A targets for bigger more diversified players that are looking to raise their growth profile, or consolidate their positioning in a certain industry.

To spot these opportunities, the portfolio management teams rely on several sources, such as Petercam's buy-side team, other Petercam portfolio managers, company meetings (and read through to other companies), thematic articles and views, brokers, press, screenings, etc. Over the years the portfolio managers have built a good network of local brokers, that acts as 'our eyes and ears' in their local markets to spot potential opportunities early before they get on the radar screens of international players. In this context attention is also paid to peripheral or smaller markets, as they are often overlooked or less efficient than (more researched) bigger markets.

EDUCATION:
A MAJOR SUSTAINABILITY DRIVER

Ophélie Mortier
Responsible Investment Coordinator

The publication of the PISA tests by the OECD demonstrates the importance of education, vital to the future of States. These tests allow for a comparison of the skills and competences of students aged 15-16 in 64 different economies.

Southeast Asia - in particular China and Singapore - clearly stands out and occupies the top position in the three required competences: maths, sciences and reading skills. European countries, on the other hand, mostly find themselves in the middle of the ranking. Analysing the results is relevant from a sustainability point of view as it takes stock of a country's education system and its ability to ensure that its future work force will be well rounded. On the one hand, the education system in Europe continues to primarily rely on public funding, and this must be seen in the light of significant budgetary tightening. On the other hand, various developed countries may increasingly face a shortage of engineers, and retaining qualified staff will be a growing challenge to companies and their competitiveness. The PISA 2012 edition primarily concentrated on mathematics tests, which are predictive for an educational path over the longer term and for students' future standard of living. In various European countries, the results are above average and have even improved compared to 2003. Nonetheless, divergences between different regions of one country, among schools, and the socio-economic status of students remain key issues, especially in Germany, Belgium, France, Italy and Spain.

The overall degradation of the output of the European education system, coupled with a certain reticence to new technologies (such as e-learning, tailor-made as well as digital learning, etc.) having an impact on traditional learning models is a real challenge of our times. On the one hand, the education system is essentially based on public funding in a context of budgetary tightening. On the other hand, the shortage of highly-skilled workers results in a scramble to find engineers or other professionals, who do not hesitate to move abroad to look for other more compelling jobs. Italy in particular faces a major brain drain as the economic malaise is not particularly helpful in retaining the country's highly educated young people.

Companies also need to take into account the evolution of their national educational systems in order to be sustainable. They need to attract the best workers and retain them in highly specialised sectors or the ones which thrive on innovation. The overall working environment needs to be assessed in order to determine whether it fosters stability, and particularly whether it is able to retain the company's talents to maintain its future sustainability.

These challenges are at the core of Petercam's proprietary country sustainability model. In fact, nearly 12% of a country's sustainability score is related to the analysis of its PISA scores. Nonetheless, their estimated impact on the ranking of the 34 OECD member countries remains limited for our sustainable OECD bond strategy. As a reminder, the investment team can only invest in the top 50% of the ranking. The PISA results have resulted in South Korea exiting the eligible universe , while that country just recently entered the universe. Aside from this, there has been no change in the selection of the eligible countries, although some have seen their position in the ranking move.

Notably, Finland has seen its score deteriorate. The country has often been shown as an example with regard to its educational system as its results have been far above the OECD average while its education expenditure in function of GDP was lower. Although its performance remains above-average, the trend is clearly on the downside for all PISA indicators. This is an important message for this type of country, which is often at the top of the ranking. Whether by coincidence or not, the Finnish economy is also showing signs of weakness and fatigue.

It is worth mentioning that our strategy investing in sustainable bonds of OECD countries has delivered satisfactory performance since inception, as shown by the GIPS-compliant graph.

GIPS-compliant performance graph of the Euroland Government Bonds Sustainable composite versus its composite benchmark

Composite benchmark
Petercam Composite: Euroland Government Bonds Sustainable
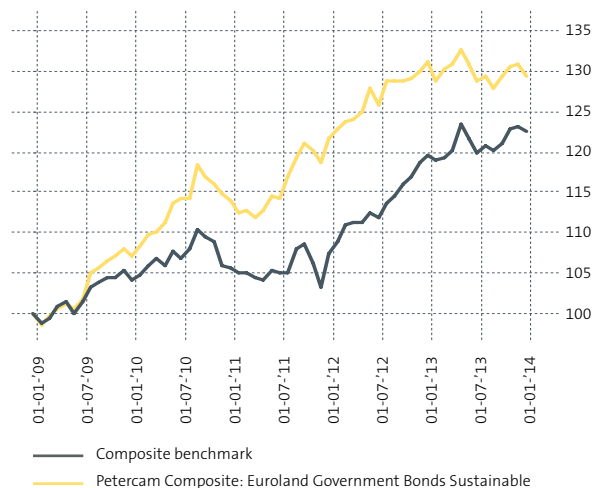
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