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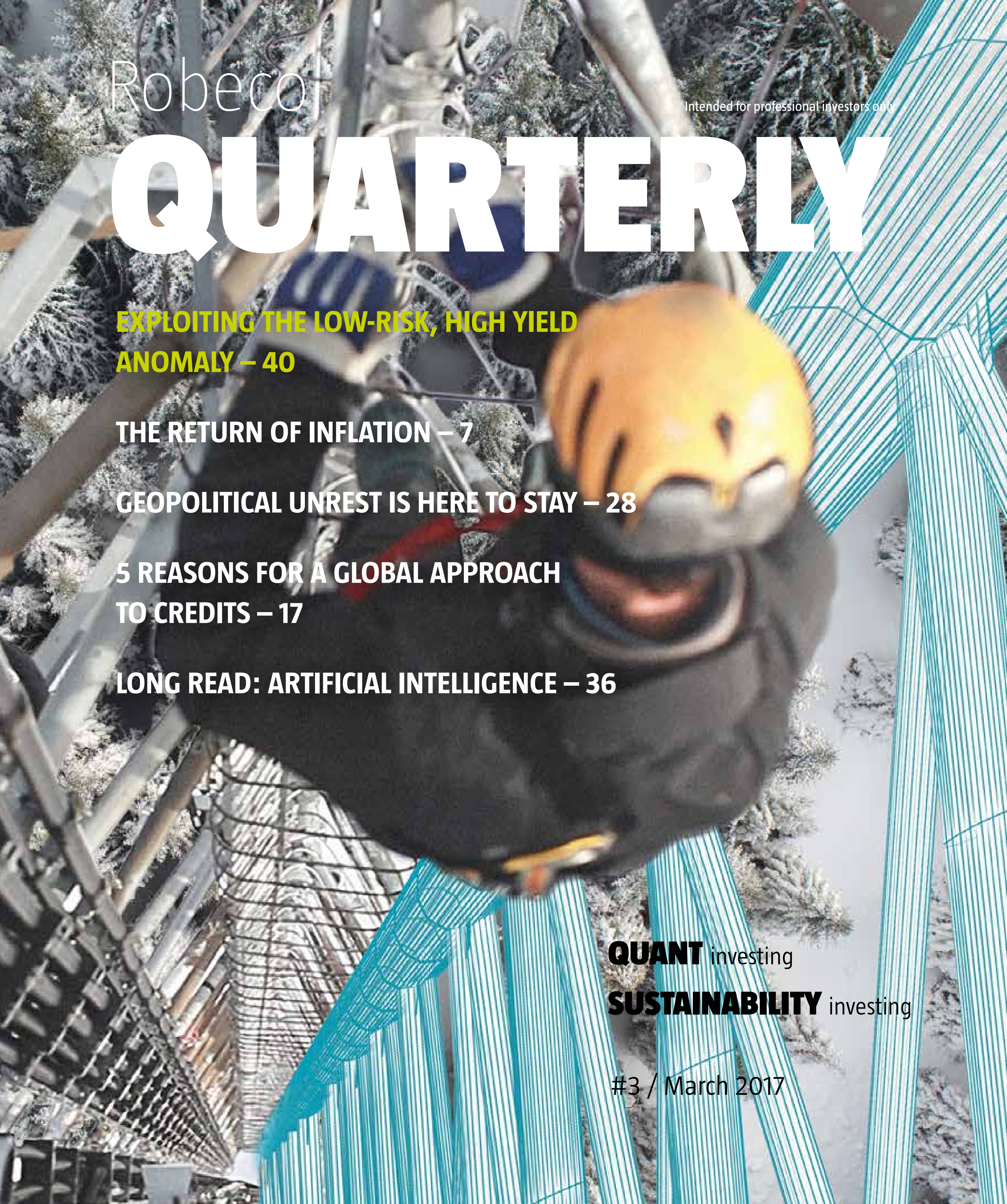
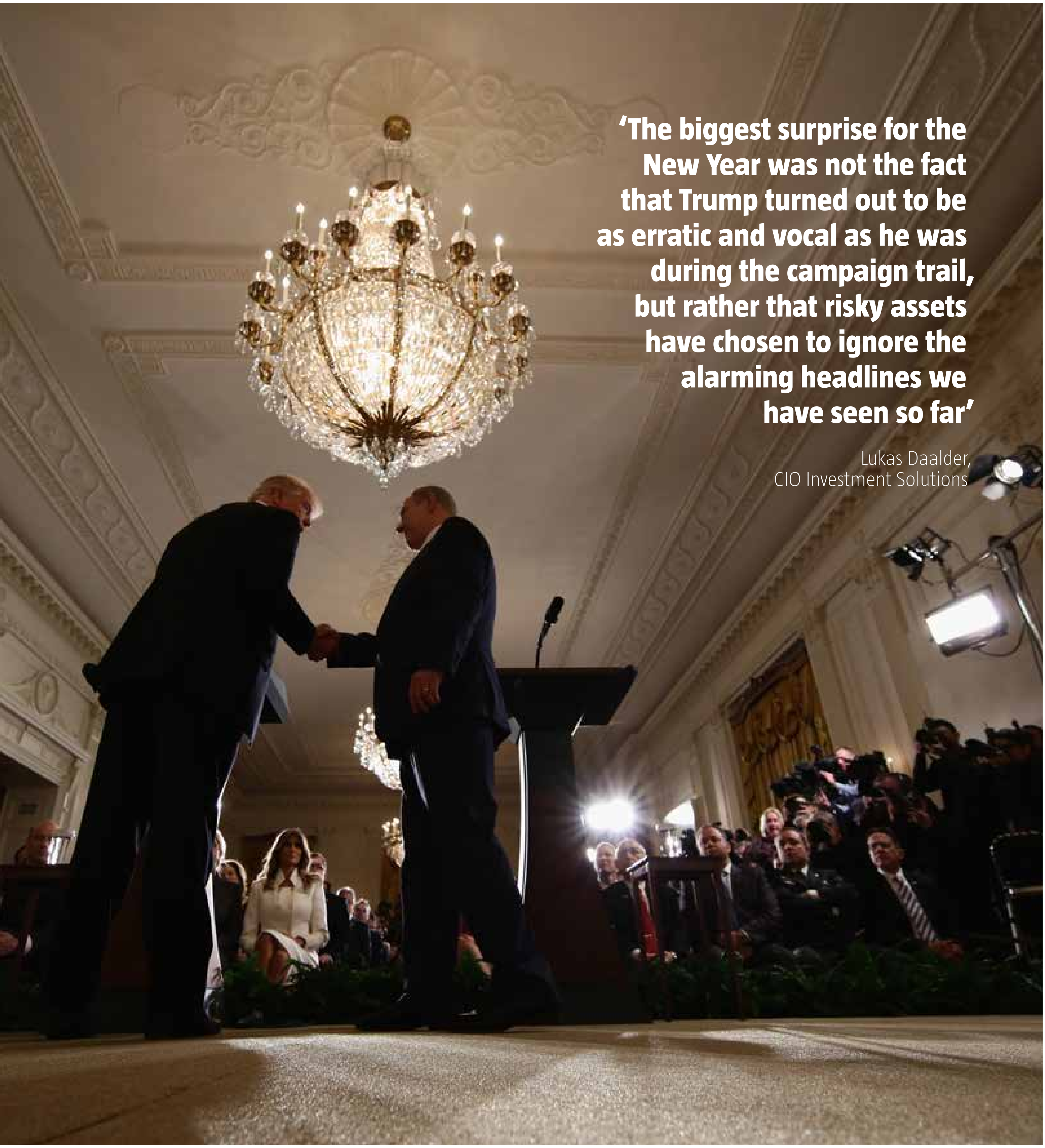


QUANT investing

SUSTAINABILITY investing

#3 / March 2017



‘The biggest surprise for the New Year was not the fact that Trump turned out to be as erratic and vocal as he was during the campaign trail, but rather that risky assets have chosen to ignore the alarming headlines we have seen so far’

Lukas Daalder,
CIO Investment Solutions

CONTENTS

What's bad: sugar or fat?

Trends

It's not the fat that we eat but the vast amounts of unnecessary sugar in food and drinks that is causing health problems, a major Robeco study has found.

Henk Grootveld, Head of Trends Investing, sought to establish who were the true culprits behind the obesity epidemic in his white paper, 'What's bad: sugar or fat?'. The research underpins how Robeco views food and drinks companies when deciding whether to invest in their stocks or bonds. "It is not fat we should worry about; it is sugar," says Grootveld. "Our increased sugar consumption has led to an obesity epidemic, which is increasing the prevalence of diabetes, heart attacks and choked arteries. We expect the food and beverages industry to be faced with declines in the volume of demand for their sugary products as consumers start looking for healthier alternatives."

Grootveld says societal change over decades has replaced healthy food with cheap, processed alternatives, much of which contains high levels of added sugar. And since sugar is itself highly addictive – some investors view it is as the 'new tobacco' in terms of its potency and risks to health – this problem is likely to remain as sticky as sugar itself, he warns.

"In the 20th century, food industrialization made previously man-made products, such as cheese, jams and butter, available at reasonable prices. The increasing consumption of industrialized carbohydrates and sugar speeded up after the Second World War with the invention of fast food and the advance of packaged foods like prefab soups and sauces."

"The more that sugar's potential harm becomes known by the general public, the more the food and beverages industry can be named and shamed," Grootveld says. "This might lead to slower or even negative volume growth, and will most definitely lead to lower stock multiples."

Quo vadis, Europe?

Top 10 largest companies in the world
(by market cap)

1. **Apple**
2. **Alphabet**
3. **Microsoft (no.4 in 2006)**
4. **Berkshire Hathaway**
5. **Exxon Mobil (no.1 in 2006)**
6. **Amazon**
7. **Facebook**
8. **Johnson & Johnson**
9. **General Electric (no.2 in 2006)**
10. **China Mobile**

Source: World Economic Forum.
Compared to 2006 following companies dropped out of the top 10: Gazprom, Citigroup, Bank of America, Royal Dutch Shell, BP, Petrochina and HSBC

Factor investing is not threatened by ETFs

Exchange-traded funds (ETFs) specifically designed to harvest factor premiums, such as Size, Value, Momentum and Low Volatility, have become very popular in recent years. But does this success endanger the existence of such premiums?

Not for now, according to a new paper by David Blitz, Robeco's Head of Quantitative Equities Research. In his study of the monthly excess returns of over 400 US equity ETFs with at least 36 months of history, Blitz finds that there are indeed funds which do offer a large positive exposure to each factor. However, there are also numerous funds that show a large negative exposure to those same factors. On aggregate, all factor exposures turn out to be close to zero, and plain market exposure is all that remains. This finding refutes the notion that factor premiums are rapidly being arbitraged away by ETF investors. It also contradicts the related concern that factor strategies are becoming 'overcrowded' trades.

Sustainability

Going solar

Scientists have become accustomed to equating the effects of climate change with land masses – such as 'an ice cap the size of Luxembourg has broken loose in Antarctica'. It works just as well when describing positive moves to address global warming.

China announced plans to cancel more than 100 coal-fired power stations and replace these with solar power. So let's put the 120 gigawatts of capacity involved into perspective. Power generation on this scale is equivalent to cutting enough coal-fired capacity to be able to power 13 cities the size of Amsterdam for a year. China aims to replace it with generation from solar power by 2020 – which is currently equivalent to the entire renewable power generation of France.

These are mind-boggling figures, but they need to be put into their own perspective, warns Robeco Emerging Markets Equities team analyst Yaowei Xu. "China is still targeting capacity of 1,100 GW of coal-fired capacity by 2020, according to the 13th Five-Year Plan, compared to about 960 GW in end-2015. So there is still a net capacity addition – it will just be growing at a slower pace."

Editorial

Facing the known unknowns

Numerous events that we know about are scheduled to take place this year. But after the events of 2016, we now realize that we cannot foresee election results. And we have learned that the impact of such results is also totally unpredictable.

And although we now know that Trump is the new US president, we don't really know what we can expect from him in this new role. Will the Mexican wall be built? Will Trump and Putin become best friends or will the relationship between the two super powers deteriorate? And what about relations between the US and countries like Japan, China and North Korea. And how will Europe behave in a year with a number of important elections? Will populism win and Europe end the year more divided than ever? Or will European countries choose to stick together, especially now the role of their American 'big brother' has become more unpredictable.

Central banks have kept markets ensnared, soothing them with their accommodative policy – but we can't really expect much further help from them either. Here too it's a case of a 'known unknown'. We know that the central banks have tried to stimulate inflation. And yes, inflation is now picking up. But there is also always a chance that things will snowball and get completely out of hand.

So in a world where almost all indicators are showing great uncertainty and significant unrest, you would expect the VIX Index to go sky high, but this 'fear gauge' is trading at all-time lows. All we see around us are suspiciously smooth waters. Is this the calm before the storm? As an investor, it gives you a very uneasy feeling to see the apparent ease with which the financial markets absorb all the risk and uncertainty. The bond market is hanging in there, while the equity market is gradually moving higher.

Investors should primarily focus on analyzing how their portfolio is positioned and what impact the different scenarios could have on their holdings. The range of potential scenarios is pretty extreme too. But we know there are few places for investors to hide. There are no risk free alternatives available. The traditional safe haven of government bonds can hardly be defined as attractive with budding inflation, rising interest rates and higher duration. There is not much left to cling to other than the undeniably positive economic developments in Europe, the US and even China, which still seems on track to avoid a hard landing. At least that's something.

Peter Ferket, Head of Investments

Column

No Regrexits...

Anxiety about Greece's massive pile of debt has increased once again. Last month, even one of Greece's rescuers, the IMF, described the country's debt level as unsustainable. But we knew that already, right? With a debt-to-GDP ratio north of 170% you are bound to be heading for trouble. The reason that Greece has not yet defaulted is because it doesn't have to pay any interest on its debt until 2022 and it has until the second half of this century to actually pay off the mountain of

debt itself. Greece will have to go to great lengths to realize this scenario. Something it's unlikely to do. It's much more likely that it won't repay all of its debt. At this point though, it's unclear exactly how this will play out. Eurozone politicians don't dare to address this issue, especially with all elections that are taking place this year and will undoubtedly try to kick the can down the road. So, don't expect Greece to disappear any time soon.

Jeroen Blokland
Senior Portfolio Manager

Emerging markets

Emerging markets first – despite Trump

The outlook is positive for emerging markets equities, despite the protectionist rhetoric of Donald Trump, says senior portfolio manager Fabiana Fedeli.

Trump's 'America First' policies have threatened tariffs against imports from countries such as Mexico and China, but the reality is this would end up hurting Trump's own electorate, she says.

"We're positive: we expect emerging markets equities to continue outperforming developed markets, as they have done since the beginning of the year," says Fedeli, who manages Robeco's Emerging Markets Equities strategy.

"This is driven by improvements in trade and industrial data, and in the net profit margins of companies. All of this is leading to improvements in earnings, which are key for emerging markets equities."

"This outperformance has occurred despite all the odds following Trump's election." The main reason for this can be found in the US President's own backyard, she says.

"For US companies, imports from emerging markets are a big part of their costs. In some key industries like telecoms and IT, up to 60% of their non-labor input comes from emerging markets such as China. If Trump were to put 45% tariffs on Chinese imports, this would hurt US companies."

"And when you look at who is really utilizing those goods made in China, for example, it's companies like Wal-Mart. And who goes shopping at Wal-Mart? Trump voters. So he would hurt his own electorate. Trump likes to put out tough statements, which will cause some volatility, but the impact will be short-lived. Don't panic!"

Mind the gap: exceeding expectations with the return of inflation

Anyone remember inflation? What was once a curse for economies with episodes of escalating prices in the 20th century all but died out in the aftermath of the financial crisis in the 21st. But now it's back, and it has massive implications for investors.

Opinion

Society has generally disliked rising prices, but a manageable level of inflation is important to developed economies, as it historically coincides with a healthy pace of economic activity and employment. The nightmare scenario is actually the reverse: deflation. When this happens, nobody buys anything today in the expectation that the same products will be cheaper tomorrow, and a recession occurs. Deflation led to the Japanese 'lost decade' of the 1990s.

Modern central banks are tasked with targeting low levels of annual inflation; for the European Central Bank it is 'below, but close to 2.0%' for the 19 Eurozone economies. In recent years, the ECB has not come close to achieving it, despite injecting hundreds of billions of euros into the financial system through quantitative easing – a process that is supposed to be inflationary.

Surprise, surprise

Now, figures show that inflation is coming back. Eurozone inflation for January 2017 was 1.8%, which is indeed below, but close to 2.0%, while the US was already showing headline inflation of 2.1% in December. Robeco Investment Solutions' strategist Peter van der Welle illustrated how this feeds through into markets with a chart entitled 'Mind the Gap: Inflation is back' for the Robeco 2017 Outlook.

The chart shows the global bond yield index mapped against an aggregate of inflation surprise indices for developed economies – indicating whether the reported level of inflation was lower or higher than what economists had predicted. In a fairly efficient, forward-looking market like the bond market, what really matters are surprises to consensus inflation expectations; it is these surprises that trigger a reaction in bond prices. And that is precisely what we have seen recently. "This is one of the essential charts in my recent '2017 Outlook' presentations because it shows that Trump was probably the lighter, but certainly not the fuel, for the reflation trade," says Van der Welle.

"The blue line shows the steady downtrend in global government bond yields since the financial crisis of 2008, while the orange line shows how inflation surprises likewise sank deeper into negative territory, as the inflation print repeatedly came in below economists' expectations. They more or less mirror each other until summer 2015, but then inflation surprises bottomed, well before the Trump campaign was in full swing."

Potential game changer

"The potential game changer for bonds in this graph is that more recently, inflation surprises in developed markets have even become positive for the first time in four years. The pace of the return of inflation after being absent for so long has been the main surprise for markets."

So, what's underscoring this sea-change? "Basically, the orange line depicts a behavioral process – the gradual emergence of the deflation scare in the bond market since 2012 – as the inflation print persistently came in below expectations, causing secular stagnation to become the base case economic scenario for bond market investors," Van der Welle explains. "There were several deflationary forces at work which fed the scare of a persistent low-inflation, low-growth environment during this episode, including excessive production capacity, significant slack in labor markets, the disruptive impact of new technology, fiscal belt-tightening by governments, increasingly ineffective (un)conventional monetary policy, deleveraging, and last but not least, the oil market rout in autumn 2014."

Opinion

"Now, with labor markets tightening, capacity utilization rates trending up, credit growth improving, the oil market rebalancing and governments more skewed towards fiscal stimulus, the economy has changed direction and is headed towards the reflation path – something that would have happened regardless of a Trump election victory."

Deflationary forces are still here

But can it continue? For reflation to remain a big market theme in 2017, one needs to see a continuance of these positive inflation surprises to hold the attention of investors, and there are some obstacles to this, Van der Welle says.

"Firstly, consensus inflation expectations are being adjusted upwards in response to higher inflation prints, lifting the hurdle rate for future surprises," he says. "So, as economists have become savvier in realizing that inflation is back, the capacity for a positive surprise is diminishing, and the market is becoming less bothered with it. Secondly, the reflation we are experiencing could be what Donald Trump likes to call 'fake news'. Recent surprises in inflation can be mainly traced back to surprises in headline inflation, caused by rising energy prices on an annual basis. This so-called base-rate effect will fade away in the coming months if oil prices remain around USD 55 a barrel."

"ECB President Mario Draghi has also repeatedly indicated that the central bank will 'look through' this temporary uptick in headline inflation, and only tighten monetary policy if it proves to be self-sustaining, and shows up in core inflation. But core inflation will only rise if higher energy prices are able to trigger so-called second round effects."

Can workers fight back?

Van der Welle says the big question therefore is whether workers are able to negotiate higher wages to compensate the erosion of their spending power because of higher energy prices. "In the US this is more likely, as workers have made strong gains in negotiating power versus employers, but in the Eurozone the case is less clear cut," he believes.

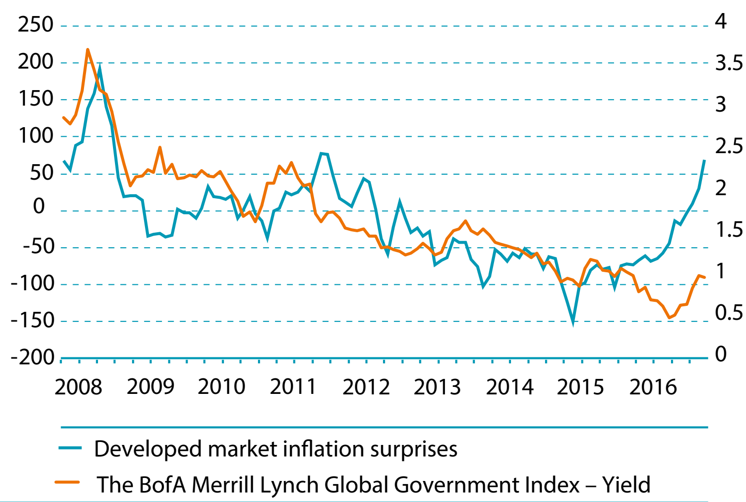
"Second-round effects here will be much smaller, given the existing slack in the Eurozone labor market, even discounting for the fact that the Eurozone has a greater proportion of unionized labor, which typically delivers a higher pass-through of inflation to wage growth. And finally, it is good to remind investors of the point we made a couple of years ago in our Expected Returns 2015-2019, namely that 'the deflation scare will ebb, but not vanish'. Indeed, not all deflationary forces in developed economies have vanished overnight: in the US, the strong dollar lowers imported inflation, while in Europe there is still a lot of unused capacity. Both regions are experiencing lower prices for technology goods and an episode of historically low productivity, reducing pricing power."

Don't forget China

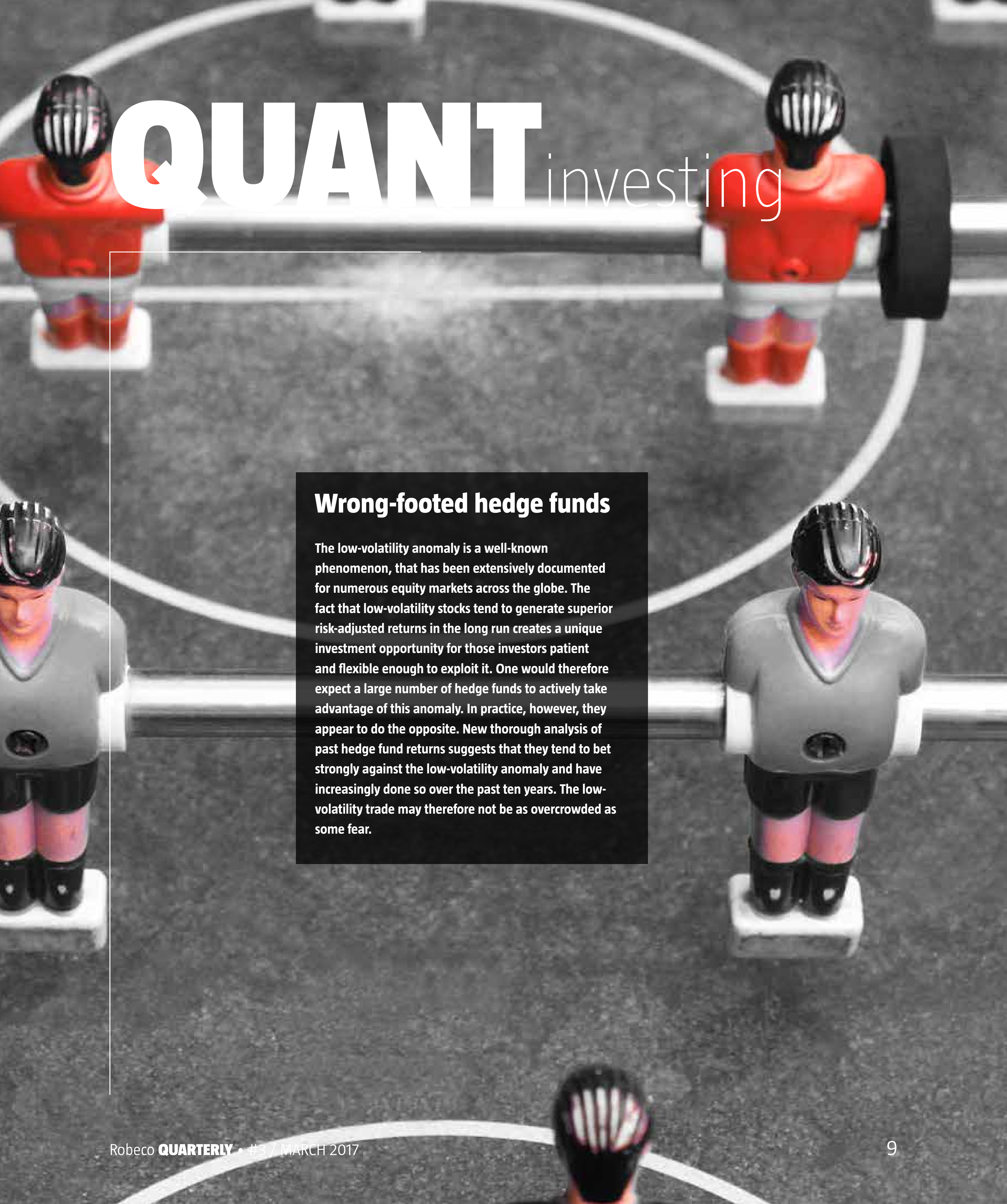
Van der Welle says investors also should not rule out the growing influence of China and the ongoing saga of devaluing the yuan. "If the yuan depreciates further, China could still remain a deflationary force for the global economy, despite the rising domestic inflation in China," he says. "Therefore, like central banks, economists and investors will need to be really convinced that we are moving away from a deflationary world. Forward inflation-swap expectations confirm this as they are still below central bank inflation targets."

"And here is the crux of the matter: it is precisely this slow adaptation to a different world, with consensus still expecting fairly low inflation prints in 2017, that will give more room for upward inflation surprises and thus move the bond markets, in our view."

Global Bond index versus inflation surprises



Source: Robeco, Bank of America Merrill Lynch



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Wrong-footed hedge funds

The low-volatility anomaly is a well-known phenomenon, that has been extensively documented for numerous equity markets across the globe. The fact that low-volatility stocks tend to generate superior risk-adjusted returns in the long run creates a unique investment opportunity for those investors patient and flexible enough to exploit it. One would therefore expect a large number of hedge funds to actively take advantage of this anomaly. In practice, however, they appear to do the opposite. New thorough analysis of past hedge fund returns suggests that they tend to bet strongly against the low-volatility anomaly and have increasingly done so over the past ten years. The low-volatility trade may therefore not be as overcrowded as some fear.

Low Volatility is still far from overcrowded

Thorough analysis of two hedge fund return datasets shows that, despite their flexible approach to investing, these funds tend to bet strongly against the low-volatility anomaly. This suggests that limits to arbitrage are not the main reason for this phenomenon and that other reasons, such as the structure of asset managers' compensation schemes, may be more important. This also suggests the low-volatility trade is still far from being overcrowded, says David Blitz.

The low-volatility anomaly, the finding that low-volatility stocks tend to have superior risk-adjusted returns in the long run, is a well-known phenomenon. Over the past four decades, it has been extensively documented by academics for numerous equity markets across the globe.

Among the frequently cited explanations for this counterintuitive observation are the so-called limits to arbitrage. This concept encompasses a variety of common investment restrictions investors face, such as constraints on leverage and short selling, or being evaluated against a benchmark. But new thorough analysis of past hedge fund returns suggests that these issues may not be the key driver of the anomaly after all.

Limits to arbitrage are much less of a concern for hedge funds than for conventional asset managers, as hedge funds are typically characterized by an absolute return target and have ample flexibility to apply leverage and short selling. They therefore seem to be well-positioned to actively take advantage of the low-volatility anomaly. In practice, however, they actually appear to do the opposite.

Significant but negative explanatory factor

We regressed aggregate hedge fund returns to look at the return difference between low and high-volatility stocks. We found that this return difference is indeed a highly significant explanatory factor for aggregate hedge fund returns, but that there is an inverse relationship. In other words, hedge funds tend to bet strongly against the low-volatility anomaly.

For this analysis, we used hedge fund indices from two leading providers, Hedge Fund Research and Credit Suisse, over the ten-year period from January 2006 to December 2015. The preceding ten-year period was also taken into account in a robustness analysis. We focused on aggregate indices which include hedge funds from all categories, but also looked at the various sub-category indices too.

All hedge fund returns were taken in excess of the risk-free return provided by Kenneth French. We also controlled for a wide number of known explanatory factors, such as the equity premium, the term premium, the standard size and value factors (as described by Eugene Fama and Kenneth French in their well-known three-factor model), and various momentum and trend-following factors.

On the whole, the picture that emerged from the regressions is that the main systematic exposures provided by hedge funds tend towards classic betas, such as the equity risk premium, the emerging versus developed equity return, and the default premium. Most importantly, our calculations showed a strong bet against the low-volatility anomaly within the equity market, as well as an exposure to various forms of momentum.

In addition, we also found that hedge funds have actually increased their bets against the low-volatility phenomenon over time. This behavior differs from the broader trend seen in the equity market, where specialized low-volatility investment vehicles have become increasingly popular since the mid-2000s. Unreported tests also showed that hedge fund strong bets on high volatility have not reversed during the most recent years of the sample period.

These findings clearly go against the notion that limits to arbitrage are the main reason for the low-volatility anomaly.

Other explanatory factors that have been proposed, such as the fact that portfolio managers may be willing to overpay for high-volatility stocks in order to maximize the expected value of their option-like compensation schemes, may be more important.

An anomaly which is here to stay

The fact that the multi-trillion hedge fund industry is not arbitraging but contributing more and more to the low-volatility anomaly also contradicts the popular view that the anomaly has already been largely arbitraged away, or that it may have turned into an 'overcrowded trade'. These worries were initially caused by the rising valuations of low-volatility stocks and the significant growth of assets under management in both active and passive low-volatility strategies.

> 'Hedge funds tend to bet strongly against the low-volatility anomaly'

This study also identifies a new factor with strong explanatory power for hedge fund returns, which supplements the existing literature on hedge fund performance evaluation. Interestingly, the return difference between low and high-volatility stocks turns out to be a stronger explanatory factor for hedge fund returns than many previously documented factors.

Looking for higher returns with Value for government bonds

The Value factor has been exploited for decades by equity investors and academic research proves it can also be applied to government bonds. However, our analysis shows that unsophisticated Value strategies can lead to highly volatile excess returns. Efficiently harvesting the Value premium with government bonds requires a smart approach, that seeks a balance between maximizing value, and managing risk and transaction costs, says Martin Martens.

Investing in value government bonds requires first and foremost a precise definition of the value concept for this kind of security. And that may not be as simple as it seems.

Indeed, the first intuitive measure of value that comes to mind is yield. The higher the bond yield the more attractive the bond is. But this very simple reasoning ignores a crucial element for a global bond investor: currency risk.

International investors usually look at a bond's yield adjusted for currency hedging costs, or the difference between the short-term interest rate of a foreign country and the domestic short rate. And this is far from trivial, as currency hedging costs can easily exceed any yield differential between bonds from two different geographical regions. The hedged yield is also known as the yield pick-up.
On top of the yield pick-up, there is another key element that determines a bond's attractiveness: the roll-down return that arises when the yield curve slopes upwards (the longer the maturity the higher the yield). As years pass, the time to maturity declines and a bond investor benefits from the repricing of a bond to reflect the lower market yield. Roll-down return can also be described as the capital gains from rolling down the curve.

Beware of 'generic' Value

All in all, we believe that the value of a bond can therefore be defined as the sum of the yield and the roll-down return, minus the currency hedging costs. It is important to note that this measure of value will depend on the steepness of the yield curve, not the absolute yield level. The yield pick-up depends on the difference between the bond yield and the short-term interest rate, while the roll down reflects the steepness of the yield curve for maturities slightly shorter than the maturity of the bond in question.

As a result, a value strategy focusing on government bonds will look for the best issuer countries and the most attractive maturities based on this measure of value. But our simulations show that allocating naively just according to value may lead to highly volatile performance.

Using market data from JP Morgan, covering a period from January 1985 to May 2016 for a sample of seven issuer countries and six maturity buckets, we simulated the returns of a generic value strategy. Every month, this strategy would have invested half of its holdings in bonds

Figure 1. Cumulative (out)performance Robeco smart value

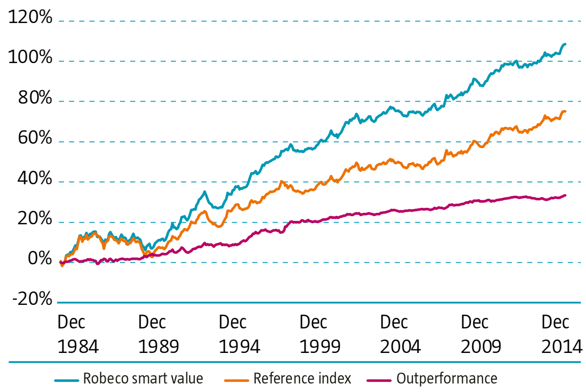


Figure 2. Generic value versus Robeco smart value

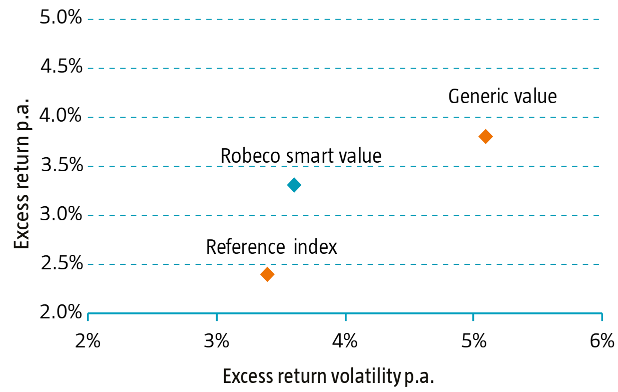
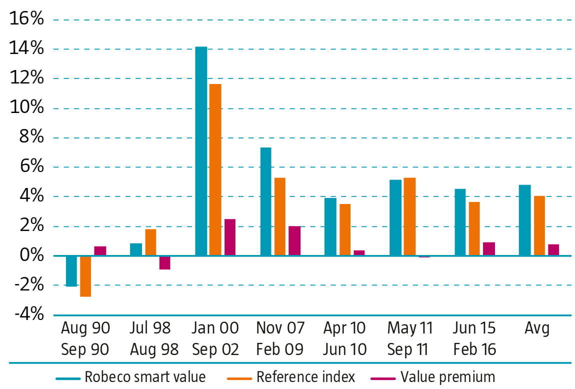


Figure 3. Robeco smart value returns during equity drawdowns



Source: Robeco, JP Morgan. The figure shows the historical performance from January 1985 to May 2016 for generic value, investing 50% in the best country and 50% in the best maturity of each country based on the value measure. Also shown is the reference index which invests in all 42 country/maturity combinations based on market capitalization. 'Return' is the annualized average excess return over cash, and 'Risk' is the annualized standard deviation of the excess returns over cash.

from the best country and the other half in the best maturity in each country.
We compared its returns with those of a reference index investing in all 42 country-maturity combinations according to bond market capitalization. Our calculations showed that the generic value portfolio would have achieved higher but much more volatile excess returns than the index (see Figure 1). The main reason is that the best maturity is often the longest maturity. This means that when yields rise, a generic value strategy magnifies the losses for bond investors.

Meanwhile, being forced to buy at least one maturity bucket from each country would guarantee some diversification but may also lead to suboptimal exposure to the value factor. That is the case, for example, when a particular country only has bond maturities with poor or negative value measures.

A balanced approach is needed

To address the different issues raised by 'generic' value, a more sophisticated approach is needed. This is why Robeco designed a 'smart value' selection process. Our bond selection process seeks to find a balance between value, risk and costs. These three aspects are managed at portfolio level, leaving enough flexibility to select high value bonds.

The starting point is to maximize the value exposure minus a penalty for transaction costs. Only when the increase in the value exposure exceeds these costs will the trade be executed.

To manage the risk, we require the portfolio duration to equal that of the market cap weighted portfolio of our universe. This means that the strategy can deliver outperformance both in markets with rising and falling interest rates. We also make sure that the portfolio is invested in at least two countries and four maturities, to ensure a minimum level of diversification.

Additional simulations using the dataset mentioned above show this 'smart value' approach efficiently harvests the value premium for government bonds, with stable outperformance over time (see Figures 1 and 2). We calculate that, on average, this premium is 0.9% per annum. In the long run, an investor can therefore not only benefit from the bond risk premium, which is also estimated at 0.9% per annum, but he can also double it by exploiting the value factor.

For investors who consider government bonds as a diversifier for equities there is also good news. In the seven worst equity drawdowns since 1990, Robeco smart value returned 4.5% compared to 4.1% for the reference index. Hence besides the diversification offered by safe bonds the value premium also contributed 0.4% per drawdown (see Figure 3).

Tailor-made quant solutions

Robeco's Core Quant equity strategies exploit the Value, Quality and Momentum factors. They combine these within a transparent portfolio construction algorithm designed to consistently outperform a benchmark. But what if investors want a portfolio focused on the European stock market or seek a reduction in the carbon footprint of their holdings? To address these needs, Robeco enables clients to adjust their strategies according to a series of parameters, say Michael Strating, Wilma de Groot and Weili Zhou.

Many academic studies show that portfolios based on particular characteristics such as attractive valuation or high momentum tend to outperform the broader market over the longer term. At Robeco we have been exploiting some of these proven factors in our quantitative stock selection models for over 20 years.

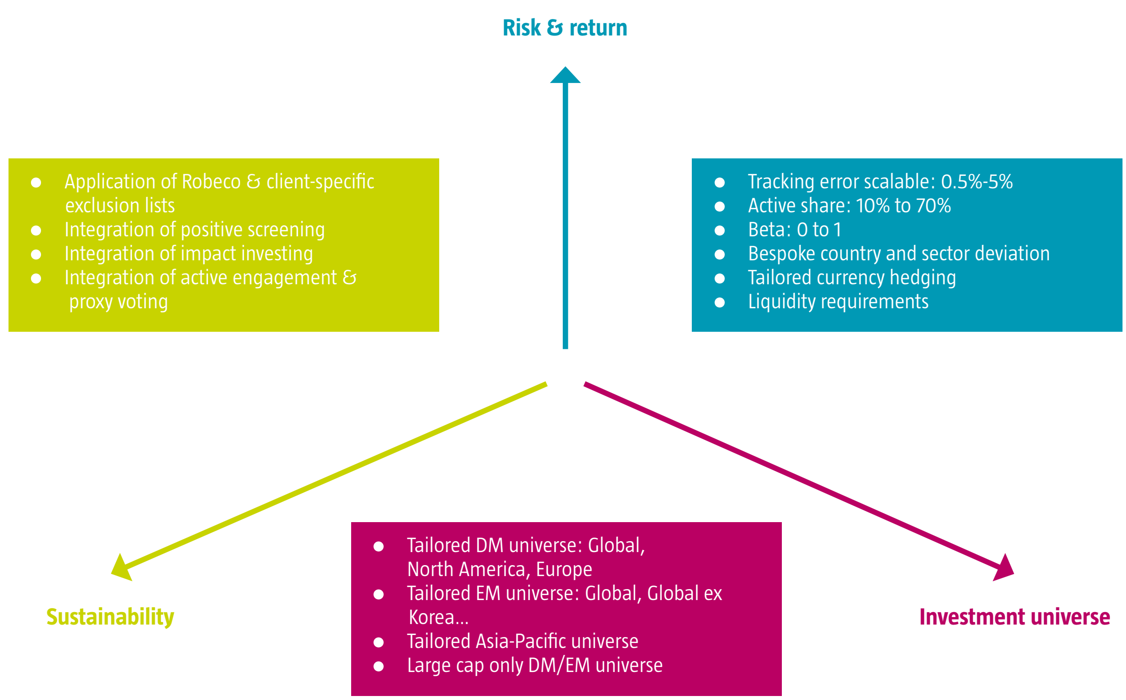
Our Core Quant equity strategies actually exploit the value, quality and momentum factors, and are designed to build portfolios with a superior risk-return profile. Their ultimate goal is to consistently deliver outperformance and to maximize the information ratio, a measure of excess returns generated from excess risk taken in a portfolio relative to a benchmark. However, the path to constant above market returns can greatly differ from one investor to another. A one-size-fits-all solution is not suitable for most sophisticated investors and that is why we enable our clients to adjust their Core Quant equity strategies according to a series of different parameters.

'The path to constant above-market returns can greatly differ from one investor to another'

This customization feature is not new. From the very beginning, back in 2002, Robeco offered clients the possibility to adapt Core Quant equity portfolios in order to meet their specific requirements. And this concept has become increasingly popular over time.

For almost 15 years, we have designed custom-made quantitative strategies, in close cooperation with our clients. Our proprietary portfolio algorithm features a flexible set-up, so we can easily adapt to a variety of individual requirements. Based

Figure 1 | Three ways to customize portfolios



Source: Robeco

on this experience, we highlight three main areas of possible customization: the investable universe, the risk-return profile and the integration of sustainability criteria (see Figure 1).

Defining a precise pool of investable stocks is certainly the most obvious way to adjust a portfolio to fulfill a specific need. Core Quant equity strategies can be applied to a variety of universes, as long as these remain broad enough to enable factor premiums to be captured.

As a result, portfolios can easily be geared to a particular geographical region or a certain group of business sectors, for example. Our research shows the effectiveness of Core Quant equity strategies for numerous investment universes, including geographical ones such as Europe, North America or Asia-Pacific excluding Japan.

'We ensure that ESG scores of all portfolios, are higher than that of the benchmark'

Adjustable risk-return profile

But the customization of our Core Quant equity strategies can go well beyond the definition of a restricted investment pool. By allowing a long-only portfolio to deviate more or less from its benchmark, its expected tracking error can also be adjusted by between 0.5% and 5%.

Portfolios with tracking errors up to 1.5 percentage points are very good substitutes for passive strategies, as they aim to generate at least market-like returns. This is particularly relevant for investors looking for alternatives to passive strategies, which inevitably underperform the market once trading costs are taken into account. Portfolios with greater tracking error flexibility are more suitable for clients who aim to capture more of the factor premiums in a consistent way. Our backtests show that the looser the tracking error criteria, the higher the expected returns tend to be.

Flexible integration

Another crucial area of customization is sustainability. All of Robeco's quantitative equity strategies integrate ESG scores, based on RobecoSAM's annual Corporate Sustainability Assessments. We ensure that the ESG scores of all portfolios are higher than that of the benchmark. With this ESG integration methodology, we avoid the risk of being overexposed to less sustainable companies. This is consistent with our integrated risk management philosophy to avoid risks that are not rewarded with higher returns.

Moreover, all our funds comply with Robeco's general exclusion policy. This policy entails the exclusion of companies that do not comply with broadly accepted international treaties, in particular treaties on controversial weapons and the exclusion of countries against which the UN Security Council has issued a resolution.

Robeco also conducts engagement activities and proxy voting, based on the objectives stated by the International Corporate Governance Network (ICGN). This organization brings together institutional investors, advisors and financial services companies from over 45 countries.

But all this is just a starting point. Depending on their own preferences, clients can request stricter criteria for their Core Quant equity portfolios. This can be done, for example, through the use of client-specific exclusion lists or through the implementation of an even higher tilt to companies with a strong sustainability profile. Targeting precise objectives, such as the reduction of carbon footprints is also possible.

Tighter investment rules obviously have an impact on a portfolio's exposure to factor premiums. However, this relationship is not linear. That is because our approach to sustainability ensures that we prioritize the selection of sustainable stocks with the best possible momentum and valuation characteristics.

This does not necessarily happen with a blending approach, where two separate one-dimensional equity portfolios that each ignore sustainability or factor elements are mixed together. Our method, however, enables us to implement stricter sustainability standards without losing too much exposure to factor premiums.

Implementing factor strategies in credit markets

Well-established factors, such as Low Risk, Value, Momentum and Size, also generate economically meaningful and statistically significant premiums in credit markets. However, the peculiar structure of these markets presents a series of practical challenges when it comes to implementing a strategy. Smart implementation requires a specific workflow that systematically maximizes factor exposure while taking into account allocation and risk constraints, with embedded liquidity management, says Mark Whirdy.

What is the main challenge when constructing a Factor Credits portfolio?
"The main challenge is liquidity: specifically, being able to trade those bonds which maximize factor exposure, as indicated by the model, while keeping transaction costs under control. Unlike equities, the likelihood of finding a trading counterparty for a given amount of a particular corporate bond on any given day is much lower. In other words, credit markets lack immediacy.

This is because bond trading takes place not on exchanges but over-the-counter, facilitated by dealers. The dealers either act as agents in matching counterparties or take the bonds into their own inventory and then try to sell them on at the earliest opportunity.

Another reason is that market participants in credit markets are typically large institutions who trade infrequently in large sizes and apply buy-and-hold strategies. The number of corporate bonds outstanding relative to the number of participants is actually much larger for bonds than for equities. Bonds are also more heterogeneous with multiple maturity, seniority and optionality characteristics.

Moreover, while the value of outstanding

corporate bonds has continued to grow substantially, in recent years, dealer inventories have diminished, due to both regulatory and self-imposed risk constraints on banks. Block trades are increasingly difficult to execute, as dealers are shifting towards an agency model resulting in a reduction in immediacy.

All these elements considerably burden the traders' workflow, in particular for large size trades for which search costs can be very high. Transaction costs also differ greatly from one bond to another, and you can achieve substantial savings by trading more opportunistically. When constructing a portfolio, we need to maximize factor exposure subject to cost constraints, while complying with allocation and risk requirements."

'Block trades are increasingly difficult to execute'

How do you address this liquidity issue in practice?
"A traditional fully manual investment workflow is incapable of reconciling all these elements. So we had to develop a more efficient investment process that systematically maximizes factor exposure subject to allocation and risk constraints, where liquidity management is actually embedded into the portfolio construction process itself.

'We leverage on our quantitative expertise in handling big data'

To achieve this, we leverage on our quantitative expertise in handling big data and drawing conclusions from it, as well as the expertise of our traders and portfolio managers in navigating OTC credit markets. In practice, this means we systematically collate a large amount of trading data in real time.
We measure both 'persistent liquidity', based on regular two-way flows, and 'transient liquidity', which reflects short-term dealer positioning. The 'transient liquidity' estimate is updated in real time, and is independent of the 'persistent liquidity' measure. Taken together, these two notions of liquidity imply a tradeable amount for any bond at a specific given time. This thorough analysis enables us to only place orders that have a high probability of being executed.

Ultimately, our systematic workflow with embedded liquidity management allows us to optimally fulfill the mandate of maximum factor exposure subject to cost constraints. This means that selecting which bond to buy and when to buy it is not at the discretion of the portfolio manager, but is the result of a portfolio construction process which embeds liquidity management in the capture of factor premiums."

How do you monitor transaction costs?
"At Robeco, we endeavor to retain data with a view to learning from it and continuously improving the investment process accordingly. This requires quant portfolio managers, analysts and traders to work hand in hand. Through this collaboration we have developed tools to allow us to benchmark executed trades against both intraday pricing composites and third party liquidity measures.
This is important for a number of reasons: it serves to encourage best execution from both portfolio managers and traders, it provides input for further quantitative modelling and research to aid best execution, and finally it allows us to then measure the impact of these developments on the investment process."

Is this investment workflow static?
"Applying factor strategies to credit markets is a relatively new practice. Robeco can actually be considered to be a pioneer in this field. So, our investment process needs to be continuously monitored, in order to adapt to changing market conditions. It requires close collaboration between traders, portfolio managers and quantitative analysts.

For example, when the ECB started buying corporate bonds earlier this year, we were able to promptly adapt to the new more illiquid supply-side environment. We managed to avoid going to the market for paper for which the ECB would bid heavily. As our process requires close cooperation between various teams, we can position ourselves to be agile enough to identify and then adapt to market developments and new platforms that facilitate trading."

Five reasons to take a global approach to credits

Many credit investors only invest in their home currency. They miss out on the many advantages exposure to the broader credit markets can offer. We present five key benefits of taking a global perspective rather than a euro-only approach to credit investing.

Speed read

- Many European asset owners only invest in the euro credit market
- Global approach offers chance to enhance returns and reduce risks
- The benefits outweigh the implementation hurdles

Research

From the perspective of credit investors, there are some advantages to investing in your home currency. For example, simplicity, as you avoid currency risk. However, by restricting yourself to your home region, you miss out on the many advantages of a global approach to credit investing. Potential implementation hurdles such as hedging currency risk or duration differences can be overcome easily and cost-effectively. Patrick Houweling (Researcher and Portfolio Manager), Victor Verberk (Portfolio Manager) and Jeroen van Zundert (Researcher) present five key reasons why European investors should consider adopting a global approach to credit investing.

Benefit 1: More selection opportunities

Credit investors who take a global approach expand the set of companies and bonds they can invest in. Those restricted to a euro-only corporate bond universe can invest in approximately 500 companies that have issued about 2,000 bonds in total. However, by expanding their universe to include bonds denominated in other currencies, especially the US dollar,

investors can greatly increase the number of investment opportunities. The number of companies increases threefold, to about 1,500, and the number of bonds fivefold, to about 10,000. If investors are willing to further broaden their scope to include companies from emerging markets or from government-related sectors, the number of issuers increases further to about 2,100 and the number of bonds to 15,000.

Not only are there more companies and bonds in the global universe, it also offers access to specific sectors to which there is virtually no exposure in the euro universe. For example, the euro credit universe contains only one railroad company bond, whereas the global universe offers the choice of 132 bonds in that sector.

'Implementation hurdles are easily and cost-efficiently overcome'

Being able to choose from more bonds and more companies increases the opportunities to generate outperformance. Figure 1 illustrates this by plotting the minimum and maximum returns per month for the euro-only universe and the global universe. In virtually all months we observe more extreme returns in the global universe.

Benefit 2: More relative value opportunitie

There are often more attractive valuations outside the euro region. Current yield levels are low in Europe, mainly as a result of the ECB's loose monetary policy. So, for European investors it is currently attractive to invest some assets outside the euro area in order to earn a higher yield. The flip side of these higher yields in, e.g. the US dollar market, is that investors take on US Treasury risk, whereas a pure euro portfolio would only be exposed to European interest rate fluctuations. But investors can easily hedge both the duration and FX risk of their non-euro bond holdings.

Benefit 3: More allocation benefits

Global credit investors have more allocation opportunities than investors who are restricted to their home region and currency. Active managers can allocate parts of their portfolio to regions or sectors that benefit from local economic circumstances and steer away from segments they feel may underperform. Historical return data on US dollar- or sterling- and euro-denominated investment grade bonds, evaluated on a 12-month investment horizon, show that return differences can be substantial, often exceeding -1% or +1%.

Benefit 4: More diversification opportunities

Credit investors with a global approach are better positioned to diversify their portfolios than those who only invest in bonds denominated in their home currency. Improved diversification results in lower volatility without harming the return potential. Returns of companies from different regions are affected by different macro-economic developments. Also, bonds denominated in different currencies have their own investor base, so their prices may respond differently to changes in supply and demand.

Benefit 5: More liquidity opportunities

Liquidity conditions tend to vary across regions and market segments. Global credit investors have more opportunities to implement their views and to reduce transaction costs. The number of axes in the global universe is about twice as large as in the euro-only universe. An 'axe' is a specific interest shown by a broker to buy or sell a specific amount of a specific bond. Investors that have access to more axes can more efficiently manage their credit portfolios.

How to overcome potential implementation hurdles

Although investors who broaden their scope to include the global universe can benefit from various advantages, they will also need to cope with several implementation hurdles. First, bonds denominated in currencies other than the euro contain FX risk for euro-based investors. As the volatility of FX movements can easily exceed that of bond returns, investors virtually always hedge the FX risk to their base currency. This can be done easily and cost-efficiently using FX forward contracts.

The second hurdle is that market segments outside the investor's home region may have shorter or longer average durations, potentially generating mismatches in an asset-liability framework. Investors can easily shorten or lengthen their duration exposure using interest rate swaps or bond futures.

Finally, the global investment grade universe contains three times as many companies as the euro universe. This is both an opportunity and a challenge, as it requires active managers to analyze far more companies. Two types of manager are well-equipped to deal with this: fundamental managers with a large team of corporate analysts to assess a relevant subset of companies and bonds. And quantitative managers with a model based on empirical evidence to efficiently analyze the full set of companies and bonds. Robeco offers both fundamentally and quantitatively managed investment strategies.

Cash is a fact, earnings an opinion

To get the best estimate of how a company is doing, Mark Glazener and Jan Keuppens, portfolio managers in the Global Equity team, look at free cash flow rather than earnings. Earnings can be 'managed' in the balance sheet, cash is what it is.

Speed read

- Free cash flow allows a company to enhance shareholder value
- Earnings can be 'managed', cash is what it is
- Academic research confirms forecasting abilities of free cash flow yield

Research

Robeco's Global Equity team uses free cash flow to screen the universe for the most attractive investment candidates for further fundamental analysis. There are many reasons to use free cash flow. Firstly, being able to generate free cash flow is an indication of a viable business. If the company runs a cash deficit on its activities, it will sooner or later require external funding.

Secondly, a company uses capital expenditure to attain its growth and margin ambitions. If less capital expenditure is needed to achieve the same growth and margin targets, this is a good thing. It means company management is using scarce resources in an efficient manner to create value for shareholders.

Thirdly, the amount that remains after operating expenses and taxes can be used freely to pay interest on debt, pay down debt, acquire assets, pay dividends or buy back stock. All with the promise of increasing the value for the shareholders.

Three types of cash flow

When looking at the cash flow statement of an individual company one often sees three categories of cash flow: operating, investing and financing. What is the cash generated from using the existing assets? What is the cash deployed in investments? And how is that financed?

Cash flow is the net amount of cash and cash-equivalents moving into and out of a business. Positive cash flow indicates that a company's cash balances or liquid assets are increasing. This enables it to internally fund investments in its business, to pay off debts or return money to shareholders. Cash can also provide a buffer against future financial challenges. For example, semiconductor companies that operate in a cyclical environment tend to have higher cash balances to provide for darker days.

Free cash flow (FCF) is a measure of a company's financial performance, calculated as operating cash flow minus capital expenditures. FCF represents the cash that a company is able to generate after spending the money required to maintain or expand its asset base. FCF is important because it allows a company to pursue opportunities that enhance shareholder value.

Earnings are not the same as cash

A lot of investors focus on earnings development, which may give a different picture to the cash flow development. Net earnings or

net income include accounts receivable and other items for which payment has not actually been received. Items that have not yet been paid for are not included in cash flow.

Academic research on cash flow

The landmark study that drew attention to the importance of distinguishing between reported earnings and the cash generated by a firm was carried out by Sloan (1996). According to Sloan, the market fails to make this distinction and this is key to finding overvalued and undervalued firms. Sloan shows that investors do not distinguish between accruals and the cash components of earnings. An accrual allows a company to record expenses and revenues for which it expects to spend or receive cash in a future reporting period. In Sloan's study, a portfolio that went long stocks with higher levels of the cash component and shorted stocks with high levels of accruals was able to generate a superior return.

More studies followed, both on the 'accruals anomaly', and on free cash flow indicators as a guide to the firm's future performance. Most studies – of which, interestingly, there have been relatively few – found that FCF indicators, which are harder for firms to manage than earnings, had significant predictive ability in forecasting stock returns.

'The FCFY factor generated average annualized excess returns of 7% per year'

Bernstein: Free cash flow is king

Internal research at Robeco also confirmed the forecasting capabilities of FCF yield. And these studies are confirmed by the Bernstein research, which sang the praises of free cash flow in a 2016 study called 'Free Cash Flow is King'.

In this Bernstein study, free cash flow was defined as Net Operating Cash Flow less Capital Expenditure. The universe for the study consisted of the 500 largest stocks in the MSCI All Countries World Index, from 1990 until the beginning of 2016. The portfolio was constructed by going long the top quintile of stocks ranked by the (trailing) free cash flow yield (FCFY) and short the bottom quintile. The study was conducted on a global basis, but also on a regional basis for Europe, US and the Pacific. The portfolios were rebalanced quarterly. FCF yield was looked at from both a sector neutral and a non-sector neutral basis.

The outcome of the study was impressive, to quote Bernstein. The FCFY factor generated average annualized excess returns of 7% per year in the non-sector neutral version and 5% in the sector neutral version.

Conclusion

To detect earnings management there is one overriding principle: Cash is a fact, earnings are an opinion. To get the best estimate of what the company is making, use a cash metric rather than an earnings based metric. When using a cash metric, free cash flow yield is an effective discriminating factor in ranking stocks with the best promise of outperformance.

SUSTAINABILITY
investing

Miners prove that ESG works

Many investors still believe that sustainability investing is a form of marketing; nice PR, but doesn't have a real impact. And the more environmentally contentious the industry, the less point there is to it, right? A Robeco study sought to prove this wrong, by focusing on an industry that has been criticized for its practices across the entire environmental, social and governance (ESG) spectrum – mining. The results showed that careful use of ESG metrics in the areas of recycling, country risk and emissions feed directly through to the bottom line. In short, sustainability means higher profits (and investor returns) as well as great PR. Our lead story explains how.

Research shows link between ESG and profitability in mining

A new study shows a clear link between sustainability criteria and the profitability of mining companies, proving that adopting a more sustainable approach feeds directly through to the bottom line.

The study was done by Jaap Smit, a senior portfolio manager in the Robeco credits team, and Iva Koçi, a research associate. They analyzed the use of environmental, social and governance (ESG) factors at companies engaged in the copper, iron ore and gold extraction industries. The research focused on three aspects: the impact of recycling; the degree of country risk; and the link between a miner's greenhouse gas emissions and its cost base.

Robeco has long viewed sustainability as a long term-driver of companies' performance. So the first issue to be tackled was recycling, which has always been positive for ESG. In the metals industry, the further development of countries like China can lead to more secondary recycled material coming onto the market, and this is now competing with primary-sourced material from the mining industry.

'Falling copper prices are hindering new recycling investments'

Recycling remains stable

For copper, the recycling input rate has been stable over the last decade. Global copper demand is expected to rise by 2% per year, and recycling is expected to follow the same trend. As a consequence, the recycling input rate is foreseen to remain stable in the 30-35% range.

China, the world's largest market for copper, has tended to favor primary sourced copper concentrate over a secondary, recycled supply. However, falling copper prices mean the relatively cheap price of concentrate is hindering significant new investment in recycling. More demand combined with higher copper prices would be a better environment for more recycling capacity to come online.

A similar pattern can be seen in iron ore. Scrap iron is integrated into ore production through Electric Arc Furnaces (EAF) as an alternative method of steelmaking to blast furnaces. New EAF capacity is now only being built in Saudi Arabia, because of the country's low construction costs and proximity to ports.

Gold recycling is different because production levels are closely related to the gold price and economic indicators. In periods of distress, gold prices go up due to the safe haven effect, and so there is a higher incentive to sell gold for recycling. If the world enters an economic crisis again, higher gold recycling rates are expected.

The conclusion is that the recycling of these three metals will remain rather stable in the near term and will not impact primary supply.

Country risk is important

The second topic concerns the degree of country risk involved in the mining of these three metals, which has a direct bearing on decisions to invest in the relevant companies. The study constructed a tailor-made country risk index considering four components: environmental policy, political stability, institutional framework and competitiveness.

For this the RobecoSAM Country Sustainability Ranking was used, which evaluates countries via a structured framework covering a broad range of ESG factors. The research shows that gold operations involve greater 'tail risk', followed by copper and iron ore. This is because gold miners tend to operate in riskier countries, since the geological deposits are often found in less stable regions.

The opposite is true for iron ore, which is mainly mined in more stable countries. Nevertheless, one should be careful not to generalize, as iron ore can be also found countries such as Liberia, and gold in countries such as the US and Canada.

The third topic looked at the link between greenhouse gas emissions and a company's cost base. One issue is the 'stripping ratio' – the amount of material required to extract a ton of ore – which is directly related to the energy and water intensity of the operations involved. For instance, deep underground mining operations that have long haulage distances and a large stripping ratio consequently generate significantly higher greenhouse gas emissions. The question is whether more emissions also imply a higher cost base.

'Gold miners tend to operate in riskier countries'

Information was collected from corporate reports and the Carbon Disclosure Project on pure copper, iron ore and gold miners. The research found a significant positive relationship between miners' cost base and emissions per unit of production of iron ore, copper and gold. The relationship is most significant for iron ore, where lower emissions mean lower costs.

For investors, Robeco therefore regards emissions per production unit as a valuable indicator to assess miner competitiveness. On top of that, from a portfolio perspective, investors should allocate their money not only to competitive low emission mining companies but also to a mix of assets with lower country risk when possible.

From the horse's mouth: how companies use engagement

Robeco has been engaging with companies to try to improve their sustainability performance since 2005 – but does it turn into action, not words?

The Governance & Active Ownership team decided to find out by collaborating in a research project with the VDBO, the Dutch investor association for sustainable development, and the University of Amsterdam. The researchers interviewed a number of companies on how they viewed the engagement, and whether they actually implemented the changes that were asked of them.

The results gleaned directly 'from the horse's mouth' showed that engagement programs can influence companies in multiple ways, sometimes directly and sometimes indirectly. And often it is a question of influencing people inside the company, such as by trying to nurture an 'internal champion', who can promote sustainability policies on behalf of the board, says Robeco engagement specialist Peter van de Werf.

"Arguing that it is in the long-term interest of the organization to change particular practices, these 'internal issue champions' can convince others within the organization about the importance of the issue," he says. "Specifically, they sell issues 'up' to gain commitments from top management, and 'sideways' to convince other departments to dedicate resources to them."

How it works

An engagement program itself tends to involve four types of activities: suggesting specific amendments to policies; challenging particular points of view of the board; informing corporations of new developments; and supporting internal issue champions. Usually, organizations change due to a combination of these activities.

One example of how this proved effective could be seen in a three-year engagement with a British real estate investment trust. Robeco repeatedly suggested that the trust develop interim yearly targets for energy consumption and carbon reduction figures at the companies that it owned. The trust's head of Corporate Social Responsibility (CSR) explained that she had already considered that option, and that the engagement served as a confirmation that it was in fact a good idea.

"The CSR manager furthermore explained that she had used the engagement to motivate employees," Van der Werf says. "Her department would use the argument that the owners of the corporation were asking for particular information to motivate other departments to record the necessary data on how the company was performing on different targets. They also explained to these people that environmental, social, governance and sustainability is about our license to operate, is about managing risk, is about all sorts of things that are very pertinent to the investors."

Van der Werf says there were spin-off benefits, as the engagement also served as a means for both the company and the CSR manager to learn which issues would become more important in the near future. This included integrated reporting – a vital process where sustainability data is put on the same footing as traditional performance metrics.

"At the time she was particularly interested in integrated reporting, and the engagement with Robeco was an opportunity for her to discover what integrated reporting entailed, and how her company could improve its disclosure practices," Van der Werf says.

Advancing integrated reporting

Advancing integrated reporting was the core engagement issue at a Dutch listed company, and served as a good example of how influence can often be subtle. While this corporation already had quite an advanced integrated report, Robeco's engagement challenged the corporation to take the next step and maintain its position as a frontrunner. The 'carrot' was an upcoming annual general meeting (AGM) at which shareholders can ask questions, some of which have the potential to embarrass a company if they're not prepared.

'Environmental and social risks may undermine the industry's growth model'

In early 2015, Robeco sent the questions it intended to ask at the AGM to the company secretary, who in turn discussed them with the Sustainability Reporting Manager, who wrote the formal answers to them. The questions with official answers were subsequently included in the AGM briefing folder, which was given to the executive board in preparation for the AGM. So the board became aware of Robeco's questions on the topic. A member of the executive committee then attended a private meeting with Robeco in which the topic of integrated reporting was discussed further.

"Up until that point, the corporation had not committed to improvements to its integrated report," says Van der Werf. "This did not happen until the Sustainability Reporting Manager, who had already helped with the formulation of answers to Robeco's questions, submitted his plan for the subsequent integrated report to the board for approval. This manager referred to questions from external parties, such as Robeco, to sell this proposal to the board."

"This shows that even when a company is considered to be a frontrunner in sustainability, engagement can help the company take the next step and maintain its leading position."

Accelerating progress

The concept of making an issue more important internally than it previously was is another aim of engagement. In conjunction with Eumedion, a collaborative investor platform to engage with Dutch listed companies, Robeco asked a large manufacturing company to put a target on renewable energy usage. Top management had already taken a favorable stance on the issue, and had appointed an internal issue champion to the project. Beginning the engagement helped this employee to gain commitment from subsidiaries, and get the necessary research done to establish the actual target.

'Companies that cannot trace back to the source may increasingly find the market closed to them'

"It was really a matter of accelerating progress rather than needing to start from scratch," says Van der Werf. "This corporation had been in the process of developing a target on sustainable energy usage for some years. In order to set this target, the energy usage of each subsidiary had to be mapped, and research had to be done on which renewable alternatives were available locally."

"As such, support from the controller of every business unit was needed. For these employees, the issue did not have a high priority. However, when external developments, including our engagement, made the issue more urgent, the person responsible for researching the target used this to convince others in the organization to work on this project."

ESG trends in Turkey: a country going astray

Turkey's falling sustainability score due to political instability has had a direct impact on the positioning of Robeco's Emerging Debt strategy.

A failed coup against President Recep Tayyip Erdogan last July was met with a purge against thousands of people he suspected of plotting against him, leading to major human rights breaches in the country. Turkey has also been subject to terrorist attacks, and had a public spat with the EU, threatening its application for future membership.

Turkey is currently one of the bottom ten performers in the RobecoSAM Country Sustainability Ranking, with a rank of 55 out of the 62 countries in the survey. It has fallen 11 places since September 2013, now ranking below Colombia and Ukraine. And considering that the EU row over immigration is not yet reflected in most data, Turkey's sustainability profile could deteriorate further.

For Robeco's Emerging Debt strategy, a country's ESG profile is valuable input in evaluating risk levels for investing in its sovereign debt or currency, along with traditional fundamental economic metrics as well as valuation and technical factors. Robeco has long been convinced that ESG factors play an important role in determining financial returns, and so has embedded them in the investment process of all its fixed income strategies, including Emerging Debt.

In the case of Turkey, this information persuaded the portfolio manager, Paul Murray-John, to hedge part of the Turkish lira investments prior to the currency's significant depreciation against major currencies such as the euro and US dollar. It proved to be a wise move, as the lira was the worst performing currency in the emerging index between September and December last year, depreciating 14% versus the US dollar.

Weakening public governance

"Turkey's governance performance and institutional framework have clearly been affected by disruptive politics and Erdogan's tightening power grip," says

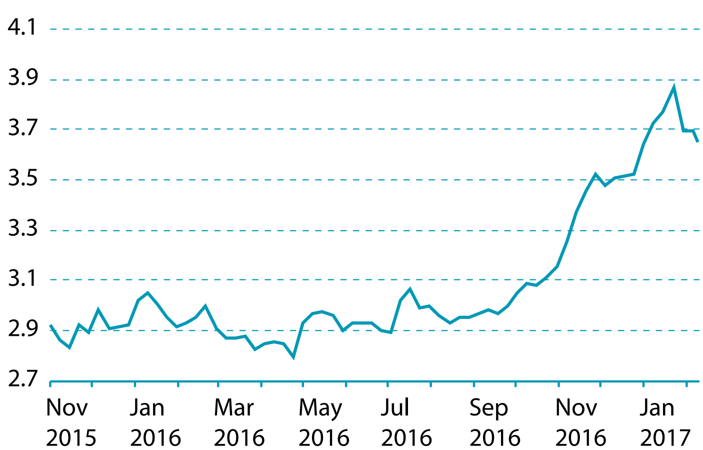
Murray-John. “Instability and unrest have been exacerbated by a myriad of factors including an increasingly authoritarian policy course, the massive inflow of Syrian refugees, terrorist attacks, Islamic State threats and the alleged end of the peace process with the Kurdistan Workers’ Party.”

‘Turkey lags behind all OECD countries in terms of perceived quality and performance of governance’

“These developments have also led to a deep divide between the pro- and anti-government groups that is manifest in all spheres of economic, political and social life – a chasm which is on course to widen with time.”

“The after-effects of the failed coup in July 2016 are aggravating the already delicate political situation. President Erdogan has responded to the failed coup by intensifying his long-running purges of police, military, education and business people as well as political sympathizers (like the Gülen movement), leaving practically no segment of public or private sphere untouched. The crackdown will further weaken the country’s institutions and this is already visible.”

Turkish lira per US dollar



Source: Bloomberg, Robeco

While environmental and governance are important factors for the Country Sustainability Ranking, the ’S’ for social particularly comes into play with Turkey, making the score progressively worse. An EU Progress Report published in November 2016 noted that there has been a relapse in important areas such as fundamental civil rights, democracy, press freedom and rule of law.

The AKP (Justice and Development Party) has also renewed its push for a presidential system that would involve a transfer of executive powers to the president, allowing Erdogan to become even more authoritarian. Moreover, Erdogan has confirmed he will ask parliament to consider reintroducing the death penalty as punishment for the plotters behind the failed coup – a step that would be virtually tantamount to relinquishing the country’s EU membership ambitions.

Persistent gaps

“The clampdown on the country’s institutions is all the more tragic given that the solidity of the governance framework is a key driver of business performance, economic success and social cohesion," says Murray-John.

"Turkey already lags behind all OECD countries in terms of perceived quality and performance of governance, and will now fall further behind its peers. It's true that some progress has been made in the social area, such as a reduction in absolute poverty and improvements in education. However, average household disposable income per capita is still slightly below 50% of the OECD average, working conditions are below OECD standards, and income inequality remains high compared with OECD peers."

Portfolio impact

This had a direct bearing on his investment strategy. "The recent deterioration in the ESG score is not a one-off event, but fits into a negative trend," he says. "For other countries which have experienced a similar decline in the past, such as Brazil, this served as a valuable warning signal."

'Instability and unrest have been exacerbated by a myriad of factors'

"In addition to its weakening ESG profile, the country suffers from ongoing weakness in its current account, stubbornly high inflation and has increased difficulties in attracting foreign direct investment. In our opinion the change in the risk profile of the country had not been fully reflected in the valuation of the currency against peers.

"Subsequently, we reduced investments in the Turkish lira in September, before bringing them back up to neutral in January after the currency had weakened and the central bank tightened monetary policy significantly."

The best of both worlds: when low risk meets sustainable investing

Robeco has long been a pioneer in both low-risk and sustainable investing. Building on this know-how, a Sustainable Conservative Equities strategy was launched in December 2016 to combine the best of both worlds.

In a way it was an obvious product to launch, says Pim van Vliet, founder of the Conservative Equities suite of funds and a manager of the new strategy. "The idea had already come up several times over the past ten years, but besides finding the right idea, it is also important to get the idea right," he says.

"This new strategy is based on the proven concept of Conservative Equities, which exploits the low-volatility anomaly – the fact that low-volatility stocks tend to generate better risk-adjusted returns than the market in the long run. From our conversations with several clients and our sustainability partner RobecoSAM, we found that most existing solutions only cover one dimension of sustainability and ignore others."

"So we realized that integrating all these different aspects in a comprehensive way, while maintaining optimal exposure to the Conservative Equity strategy, addresses a real market need, and one which is currently unfulfilled."

The new strategy allows greater customization as investors increasingly embrace sustainability issues, adds Arnoud Klep, who manages the portfolio with Van Vliet. "Some investors, for example, want a further de-carbonization of their portfolio while others want to fully exclude the thermal coal industry," he says.

"Another area of concern is ethical values. A number of clients want to stay well away from certain 'sin' sectors or stocks. We therefore decided to combine all these market trends to build what is a very ambitious strategy from a sustainability perspective."

"And the new strategy takes a very strict stance in terms of the ESG profile of the stocks in portfolio. Our portfolio's ESG score has to be at least 20% higher than that of the market. The same applies to individual impact scores: each one of the four footprints we calculate for CO2 emissions, energy consumption, water usage and waste output must be at least 20% lower than those of the index."

Great Minds

Pippa Malmgren

'Geopolitical tensions are here to stay'

Robeco interviewed Pippa Malmgren, former advisor of US presidents Ronald Reagan and George W. Bush. She discusses geopolitical tensions, the immigration issue and the rise of the individual against the establishment, but also trends such as inflation and innovation.

US AND GEOPOLITICS

The new Trump era may signal some changes in the world order – will the US really take a step back on the international stage? Geopolitics and its impact on the financial world is something we need to get used to.

"Geopolitics is a scary topic for most people, but they need to get more comfortable with it, because it's here now and it's going to be with us for another 20 years. I grew up in the Cold War and I can assure you: people invested and made money during that period, even at the height of the tensions. So it's just a question of getting accustomed to the situation. Nations have conflicting national interests and we're seeing that right now. But which aspect is most important today?"

"The US together with Nato have definitely had a lot of stress with Russia. America has also certainly had its share of tension with China too, particularly over the South China Sea. But now that we have a new president, it's unclear what kind of relationship there will be. He has been accused by some of being President Putin's best friend, and by others of being a real threat to the stability of international relations. So we first have to figure out what the real situation is."

"A lot of people assume Donald Trump means war and Hillary Clinton means peace. But when I spent time talking to Russian and Chinese officials, they had the opposite view. In their view it was Clinton who had a long and clear track record of being aggressive. When the US moved their military forces from the Middle East to the Pacific, the Chinese saw Clinton as being much more hawkish, and Donald Trump – in their view – has already said that he doesn't want to spend a lot of money on wars."

"He doesn't want to spend money outside the country. In fact, he wants the US to stop being involved on an international level. One thing I find fascinating – and I have worked for two previous presidents, Reagan and George W. Bush – is that throughout my entire life I have heard non-Americans say 'You Americans are too aggressive and involved, you should get out of international affairs'. Now Trump is saying he wants to get out, everybody's response is 'Wait! Don't leave!'. I guess, if you are the international superpower, whatever you do you can't win."

EUROZONE AND IMMIGRATION

Rising populism and the potential disintegration of the Eurozone will be major issues for 2017. Grassroots dissatisfaction compounded by the burden of immigrants flowing into the region may force countries to seek their own solutions.

"I felt this populist uprising was going to happen. And from that I also predicted both Brexit and Trump. These are things that seem to have surprised everybody else. So, why do we keep being surprised? The answer is: people have been in a lot of pain since the financial crisis. They were gracious and willing to wait while their governments said 'let us add more money to the world economy and things will get better'. This was years ago now and people have run out of patience."

"So they are starting to ask their political leaders why they are in charge if they can't deliver better results – 'I've been patient with you, but now I'm throwing you out.' That's behind both Trump's

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victory and Brexit, it's also behind the 'no' vote in Italy. And it's behind the elections now in France and in the Netherlands. Everywhere the public is saying they want a better situation. What do they mean?"

"In Europe what they are saying is: we have youth unemployment at ridiculously high levels – the Italian number just came out at 39%. We live in a world where that is just not acceptable. What a catastrophic waste of human talent. Some of these young people in Europe between the ages of 20 and 40 will never have a job or a career. This is inexcusable in today's society. So the public are voting against this. Especially when money can be found to bailout the big banks that have lost nearly 100% of their share value, but for the kid with no job, there's no money."

"The immigration issue is exacerbating the feeling of pain. It's not the cause, but it's not helping. On the other hand, I don't think Europeans are all that xenophobic. I think the bottom line issue is they want exactly what the British have asked for and that is access to the single market and a hard border. That's not the same as a closed border. Nobody is saying they don't want any immigrants. They're saying they would prefer there to be a more effective process."

"I think Britain will come out of Brexit with a more open immigration policy than it had before, in the sense that prior to Brexit they were only able to choose citizens from the European Union when they hired workers. Now they get to choose from Americans, Indians, New Zealanders, Japanese... It will create a more competitive environment; I don't know if the rest of Europe is ready for this. But I think that's where Britain is heading."

"As for Western Europe, it needs immigration. It's got an aging population; it needs an influx of young energy. The question is: what kind of immigration do you want? That's a reasonable question. And every nation will answer it a little differently."

INDIVIDUAL AND ESTABLISHMENT

In 2016 the people made themselves heard and those in authority are now taking stock. It will be interesting to see whether this results in a return to a more level playing field, to an environment that focuses on growth at all levels.

"Quantitative easing has benefited those that own assets at the expense of those that don't. There's an economist that nobody remembers, he is Swedish and called Knut Wicksell, and he said 'the interest rate is an instrument of social justice, because it balances the interests of the savers with those of the speculators'. When the government comes and firmly tilts the playing field in favor of the speculators, which is what QE does, people will eventually notice and get mad about this."

"Inflation is also something that benefits those who hold assets and hurts those who don't. So we have to ask ourselves how we can protect the most vulnerable members of our society. Having said that, the best way to create growth is through innovation and calculated risk-taking. How do you stimulate that? Generally, by lowering taxes and having less regulation."

"Right now, around the world, the US and Britain have low taxes and intend to reduce these further, while the European Union is saying they like their high level of taxation and regulation, but it comes at the expense of young unemployed people. So the people in Europe are not necessarily going to vote for the end of the European Union, but they are going to ask for a move in a very different direction."

"You don't have to have a dichotomy of being either for or against the European Union. You just want something that is less invasive, less damaging to growth prospects. Money is like water, it will move to the place where it faces the least resistance: the lowest tax rates and the least regulatory pain. Because of Brexit and the US recovery, the world is going to look at the map and say 'where should I put my money to work?'."

SIGNALS AND DATA

There is so much data and information at our disposal, we sometimes forget to really look at what is happening and listen to what people are saying. Brexit and Trump's victory: two major events that we 'misread' in 2016.

"We believe the answer lies in the numbers. So we like data, Big Data, metadata, algorithms. We think this is where the truth is. And yet we completely missed Brexit and Trump. One of the reasons I thought the Trump victory was obvious was from looking at the pictures of all his campaign rallies. They were completely full of people. The lines were two or three blocks long. Everybody wanted to get in. If you looked at pictures of the Clinton rallies, all the seats were empty."

"This sounds so childlike; it's almost embarrassing for a fund manager to say 'I looked at the pictures'. But can pictures tell you more than the polls? Yes. And in this case they did. Polls are numbers. We have a tendency to be blind in one eye: we only look at the world through a quantitative lens and all I'm saying is: let's add a qualitative one too. We missed the silent movement that

‘We have a tendency to be blind in one eye: we only look at the world through a quantitative lens’

took place, both in the Brexit campaign and in Trump’s election. Maybe it’s because we like to talk to the people we already know. In a populist world, it might be the people you don’t know, who hold the power.”

TECHNOLOGY AND EMPOWERMENT

Technology is revolutionizing our lives and the speed at which change occurs does not appear to be slowing. The challenge will be for us to ensure our society adapts accordingly and that we all reap the benefits of innovation.

“Innovation is just beginning. The empowerment of the individual is so incredible. The amount of computing power we all carry around in our mobile phones is actually the same as we needed to go to the moon. But there is so much more we can do with it. There are young people building huge global businesses based on this technology. We have people revolutionizing the production of food, we can now grow plants in a container with no sunlight, no soil, almost no water and we can do it faster than in their natural environment and boost nutrition levels and improve the flavor.”

“Look at how we are able to 3D-print human organs, joints, repair the human body, this is an incredible change. I would disagree with everybody who says we have seen the most of innovation. You can’t even begin to imagine how dramatic the changes are that are coming. And it’s the young that know how to make use of this technology. You need a 14-year-old to tell you how to use your iPhone these days. Every single sector is being revolutionized. Look at the president of the US who doesn’t need to hold a press conference because he can directly talk to the world through YouTube and Twitter. That’s a purely technological phenomenon.”

“To use a religious analogy: the Catholic church said ‘only we get to communicate with God so you have to come to us’ and the Protestants said ‘no, you can talk to God by yourself’. Technology is saying the president can talk to you and does not need CNN or the New York Times to explain what he said. And all the polls say the public trusts social media more than the traditional forms.”

“Human beings don’t like change. They like to be comfortable and technology is making all of us uncomfortable. In many ways. People are afraid they are going to lose their job, their career, their livelihood. The honest answer is: yes, they are going to. But we’re going to lose this anyway. The world economy is constantly demanding that you change the way you do things. Technology just makes this happen faster. People who do routine work of any kind, or manual labor, are going to be replaced by robots or artificial intelligence. But that does not mean that there are no jobs to do. Even they will find new jobs."

BANKS AND INNOVATION

Ever-increasing regulation strengthens the position of those with the capacity to implement it. Risk can never be totally eliminated and too many rules can choke the very innovation we need to make progress.

"Governments thought they could make banking safer by regulating it more. This had the opposite result. The more rules and regulations, the easier it is for a few big companies to 'play' the system and the harder it is for the smaller firms. You also reduce innovation and competition. And you can't regulate losses and risks away. Investors should understand that and take responsibility. The idea that governments can remove these risks and make things safe, is just not true."

As a percentage of GDP, the financial services sector has definitely become smaller than it was. But it will become much more innovative. All sorts of developments are occurring in finance. People say, with Brexit, the City of London will lose its position as a financial service center. I have the opposite view. I think the City will have a bigger position than ever before. And the reason is that if they have less regulation and lower taxes, the money will move there. It will be hard for the British to have tighter regulation and higher taxes than the Eurozone. People tend to have the idea that Brexit will mean the City of London gets smaller; but why should it?"

"We have a tendency to take the past and extrapolate it to the future. Why do we do this? It has never worked. The future is different because it hasn't happened yet. In financial services we all sign documents that say 'past performance is no indication for future returns', and yet we seem to believe that past performance tells us where the economy is going. Really? It strikes me as just too incredible that we think like this."

DEBT AND INFLATION

Central banks have been running the show for some time now, but their influence is dwindling as we see a shift away from monetary intervention back to fiscal policy. Inflation is waiting in the wings and it's a controversial subject.

"Central banks overstepped their role in the financial crisis, because they were the part of government that could act. They did what they had to do, but they have set the stage for inflation to return – which it is – and for an increasing lack of confidence in money. And people now don't have much confidence because of the record-low interest rates, because of the record amount of capital in the system. I think central banks need to revert to their traditional role, a neutral role in the economy."

"Fiscal authorities, i.e. politicians, need to make decisions about the debt problem. Some of them think it is so big that we need to stop spending. Others firmly believe you can fix the debt problem by adding more debt. So, what is the role of central banks in society? The main problem I see in Europe is that Germany and the Netherlands think that inflation must not be used as a means of dealing with the debt problem, because based on historical experience, we know that things can end very badly – with hyperinflation. The rest of the Eurozone believes we must have inflation in order to fix the debt problem. And that division of opinion is the heart of the whole problem in Europe."

"Many people in the investment industry are young and so have never seen inflation. For them it's going to be a steep learning curve. This is something they may have read about at business school, but that's it. They have no experience of it. For them, a rise in inflation from 1% to 3% is no big deal, they just shrug their shoulders. They don't understand that that is a massive change in any society. If you have inflation, the stock market may hit new all-time highs, but your rent is also going to be a lot higher."

"We need to think what the consequences are for different parts of society. We won't have hyperinflation in the industrialized world, technological innovation will prevent that from happening. But even a small change can have a radical impact on society and we should be aware of that. The inflation rate is not a universal or aggregate number. It's just a convenient figure for governments."

"The reality is that your personal cost of living is very different from mine. It depends what age you are. Millennials in the UK and US pay three times as much in terms of cost of living than pensioners do. If inflation comes back, who will it hit hardest and first? Who will it affect more gently and later? Inflation hurts the poorest first, both in a specific country and in the world as a whole. The weak and the poor will feel the pain of inflation. In every community, in every country, everywhere."

INVESTMENT AND ENTERPRISE

Our future lies in creating a sufficiently flexible business environment to nurture enterprise and ensure that investment reaches those companies that need it. Big is not necessarily beautiful.

"You can't hold cash, it's the last place you want to be when you

‘Many people in the investment industry have never seen inflation. For them it's going to be a steep learning curve’

have inflation. That’s why I am optimistic, because the only place money can go to is into the real economy. It can enter through equities; it can enter through private equity or through people starting businesses. All of these are good for the economy. Some people say ‘equities are so expensive, they can’t go any higher’. Given the amount of money that has been pumped into the economy over the last few years, they can go a lot higher.”

“What companies have to do is use technology to create new lines of business, new ways of carrying out their existing business and I think that is exactly what is happening. That’s their whole job and if they can’t, they’ll go out of business. Companies disappear and new entities come to life. The financial crisis began in 2007, the year the iPhone was introduced. I think it comes down to a race between these two things. We’ve had poor economic policies, bad economic results for many, but at the same time we’ve created this incredible technological innovation environment and these two elements race against each other.”

“Populism is about the public asking the government to get out of the way, to stop restricting the ability of the individual to innovate. Two thirds of net new jobs in industrialized economies are generated by firms that employ less than 50 people. The Netherlands (and Germany) have been particularly strong in terms of small and medium-sized businesses. This is where the action is, not the big companies. Big companies usually reduce their number of employees over time.”

“So we need to do everything we can to ensure small and medium-sized companies can thrive. But in general governments come up with tax policies that enable bigger companies to figure out how to pay zero, while the little companies get crushed trying to pay the lawyers and accountants they need just to ensure they comply. This requires some rethinking. Do you want to apply the same set of regulations to a global international player as a small local business? The big guys will survive, but you’ll kill the little guy. And that’s the only place growth will come from.”

“When I look at pension money globally, what is the one area they don’t invest in? Small businesses. Because they are too small to absorb the huge amount of capital, it takes too much time and energy given the amount of return. Secondly, it is perceived to be too risky. But if most of your jobs and innovation comes from these little companies, but the biggest pool of savings can’t go there, don’t we have a structural problem? This is a fascinating question. How can we create structures that allow a little bit of pension money to go the one part of the economy that creates the most performance?”

Finding the best combination of factors

Allocation to factors has become increasingly popular in recent years, but practical implementation remains a puzzle for many investors. Determining the best strategy or the best combination of strategies is often the first pitfall they must face. A growing number of academic studies suggest that systematically harvesting a number of well-rewarded factor premiums, such as Value, Size or Momentum ensures enhanced returns in the long run, both in equity and bond markets.

Speed read

- Diversification is key but factors can also work against each other
- Many smart beta products do not offer maximum factor exposure
- Client-specific beliefs and preferences must also be taken into account

Research

Over the past decade, these findings have led to the emergence of a new kind of investment product, frequently branded as 'smart' or 'alternative' beta, that has definitely drawn investors' attention. However, despite growing awareness, the practical implications of allocating to factors are often still very difficult for newcomers to grasp. There are currently hundreds of smart beta products available in the market, from basic single factor ETFs to sophisticated multi-factor solutions. A FTSE Russell survey carried out in 2016 suggested that determining the best strategy or the best combination of strategies ranked first among investors' concerns, when looking at factor allocation.

Indeed, finding the right combination of factors is a major challenge. The fact that it is very difficult to successfully predict which factors are going to do well in the near future and which factors are going to lag, supports diversification across factors. Unfortunately, individual factors also have negative exposures to one another. For example, strategies focusing solely on the momentum factor tend to have a very negative exposure to the value premium.

Moreover, a 2016 paper[1] by David Blitz, Head of Quantitative Equities Research at Robeco, showed that many existing smart beta products do not offer maximum factor exposure. That's because they are exposed to cap-weighted factor indices, while equally-weighted factor strategies are known to generate higher returns. Efficient factor investing strategies should therefore be designed to avoid risk concentration and to ensure that premiums do not clash with each other.

Portfolio construction processes should never rely on one single factor and should integrate both backward and forward looking measures of risk, including elements such as past volatility statistics or earnings expectations, for example. They should also mitigate concentration risk by having strict research-based concentration limits for region, country, (sub-)sector, size and single stock weights.

No single optimal solution

It is also important to note that there is no single ideal approach to factor allocation. The optimal factor-investing portfolio depends on investor-specific beliefs and preferences. Depending on its own profile, each investor will seek a specific kind of performance, and will be willing to take on more or less risk.

> 'Efficient factor investing strategies should avoid risk concentration'

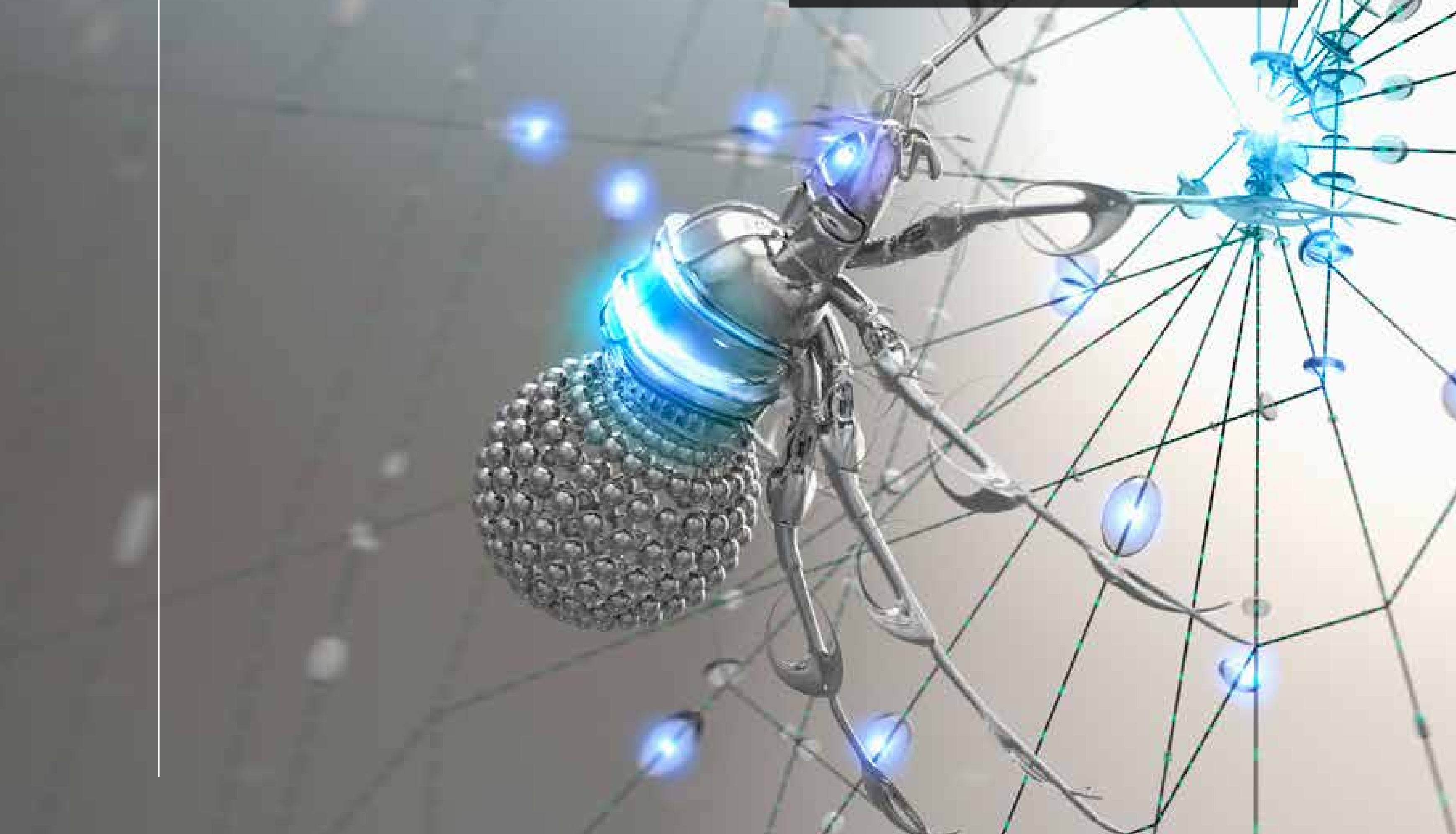
Finally, the existing portfolios and factor exposures of an investor must also be taken into account when building an optimal solution. For instance, an investor who already has a significant value tilt in the core portfolio might want to give less weight to that factor in the factor portfolio. To help investors make their choices, Robeco has actually developed a specific tool that determines the factor exposure profile of a portfolio or a benchmark.

1. David Blitz - Factor Investing with smart beta indices

LAST BUT NOT LEAST

Blurred views

In 1956, a group of computer scientists came together at a conference organized by Dartmouth College. John McCarthy coined the term when he proposed 'a research project on artificial intelligence (AI)'. AI is already used today. Examples are algorithms that define search engines like Google, suggest movies, series and music based on your search and purchasing history or virtual assistants like Siri (Apple), Alexa (Amazon) and Cortana (Microsoft). This is what AI is in its core, but the views of many people have been blurred by Hollywood, which has introduced malicious robots, super-intelligence and other apocalyptic scenarios to the discussion.



Humanity's final invention?

Jeroen van Oerle and Marco van Lent – Robeco Trends Investing

Artificial intelligence (AI) is a broad concept, which has been around since the 1950s. Some foresee a limitless positive future. Others, like Stephen Hawking, predict general artificial intelligence to be humanity's last invention. In this article, Trend Analyst Jeroen van Oerle and Portfolio Manager Marco van Lent examine where investors can find value.

In 1956, a group of computer scientists came together at a conference organized by Dartmouth College. John McCarthy coined the term when he proposed 'a research project on artificial intelligence'. He described the project as follows: "an attempt will be made to find how to make machines use language, form abstractions and concepts, solve kinds of problems now reserved for humans, and improve themselves. We think that a significant advance can be made in one or more of these problems if a carefully selected group of scientists work on it together for a summer."

Three forms of AI

Since then, many definitions have been proposed. We divide AI into three types:

- Artificial narrow intelligence
- Artificial general intelligence
- Artificial super intelligence

Narrow intelligence is used to optimize one specific task. An example is playing chess, or arranging timelines on social media platforms according to your interests. General intelligence matches everything a human can do and super intelligence exceeds general intelligence in that it is superior to the most intelligent benchmark. General intelligence is often seen as the holy grail, super intelligence as the feared and unknown future, but we argue that the focus from an investment perspective should be on artificial narrow intelligence.

AI is already used today. Examples are algorithms that define search engines like Google, suggest movies, series and music based on your search and purchasing history or virtual assistants like Siri (Apple), Alexa (Amazon) and Cortana (Microsoft). This is what AI is in its core, but the views of many people have been blurred by Hollywood, which has introduced malicious robots, super-intelligence and other apocalyptic scenarios to the discussion.

Machine learning key focus for investors

The reason artificial intelligence is back in focus is a breakthrough technology developed in 2012 that is used in machine learning and uses Nvidia's technology in graphical processing units (GPUs). It was discovered that the speed of parallel computing, as performed by a GPU, would enable an increase in performance compared to traditional central computing units (CPUs) by a factor of 10-100 (depending on test conditions). The increased computing power opened up new possibilities in machine learning, namely to have an algorithm writing its own code instead of a human programmer writing it line by line. This subgroup of artificial intelligence consists of three areas:

- In supervised learning, experts have already labeled data, and statistical optimization is used to run an analysis on the labeled groups and extrapolate that knowledge to another set of data. An example would be a group of pictures of either dogs or birds. The computer will then group all pictures with dogs and birds and can run additional statistics such as the likelihood of a picture showing a dog rather than a bird et cetera.
- In unsupervised machine learning this labeling has not taken place and the algorithms search for commonalities in the data. They could for instance group pictures based on the fact that there is a tail or paws rather than feathers and wings. The algorithm would not know it is specifying dogs and birds, but it does know the commonalities that define the pictures.
- The final form of machine learning is reinforcement learning, here data is not labeled either and grouping is done based on what the end user requires. In the example of birds and dogs, the end user would correct a bird being placed in the dog group. The algorithm then uses this feedback to learn and (re)write code. It could be defining traits, as in unsupervised learning, but at the same time it is also able to add meaning to those traits, as in supervised learning.

Within reinforcement learning, most attention focuses on deep learning and neural networks. While the latter try to mimic the design of neuron flows in the brain, deep learning is based on a set hierarchy in the representation of data. The latest innovation is a combination of the two, 'dynamic program generation' or 'deep neural networks'. This essentially uses the best of both – the human world (in placing weight on decision criteria) and machines (in structuring data).

Self-learning does not imply general intelligence

A mistake that is often made is the assumption that the self-learning capabilities of deep neural networks are a form of general intelligence. Although extremely impressive, the code that is developed based on a search algorithm does not allow that same program to drive a car, and programs that learn to drive cars are not going to optimize your agenda or order pizza. All the systems that have been developed are forms of artificial narrow intelligence.

Kurzweil predicts that by 2040-2050, artificial intelligence applications could provide the combined computing power of all humans. We think advances in cloud computing will contribute positively, as not every person will be required to own sufficient computing power themselves; they will merely need access to it. But there is more to general intelligence than computing power.

> ‘We are already using AI, but Hollywood’s apocalyptic scenarios have blurred our views’

General intelligence requires an understanding of emotion

Artificial intelligence is currently able to perform tasks that require thought, but it has not yet mastered doing what humans do without thinking. Kahneman classifies two approaches to thinking and decision making, namely system one and system two. System one refers to decision making in auto-pilot mode while system two refers to decision making by explicitly weighing arguments. System one is 220,000 times faster than system two. Artificial intelligence would speed up the process of making system-two decisions, but the forces that underlie decision making in system-one situations are not as clearly understood. Humans have five senses: sight, hearing, taste, smell and touch. AI is currently able to beat human intelligence on sight (image recognition) and sound (natural language processing). In order to fully understand humans, though, AI needs to grasp the behavior resulting from taste, smell and touch. The consequence of not fully understanding what drives human decision making is that it might make sense for the AI to do X, whereas humans would do Y. This can be linked to emotional decision making, which is not understood either. Until we can solve questions relating to emotions, sense and system-one thinking, it will not be possible to introduce human-like general artificial intelligence.

History suggests we have been overly optimistic on AI before

AI researchers have made some bold predictions in the past. The most fundamental limits that prevented these predictions from coming true were limited computer power, the lack of statistical work on knowledge and reasoning and the lack of understanding of the brains’ functioning. Why would this time be different? There are a couple of reasons why there are more opportunities now:

- Increased computing power and resources
- Availability of data
- Better algorithms
- Limiting of the number of use cases

Figure 1 | Deep learning applications currently in use

Data availability is critical for machine learning. There is a substantial difference between the amount of data today and that during the previous AI hypes.

We believe another important reason for the 'this time is different' claim is the last one in the list above. Practitioners that 'get it' focus on specific use cases and use that as a basis to train their systems. Amazon's Echo solves very specific personal assistance tasks instead of aiming to know the answer to every question. Algorithms that read road signs differ from those used for lane-keeping. In this way it is easier to use active feedback to enhance deep learning. If we want to do more with AI, computational power needs to grow. In order to live up to today's expectations for machine learning, it will be necessary to beat Moore's law in terms of technological progress. Although not completely unlikely, this does put pressure on current developments in AI and will, inevitably, lead to new disappointments. Not in terms of a lack of progress, but rather due to the abundance of theoretical applications.

Market potential

Although numerous parts of the AI industry have already been around for a while, parts of the machine learning segment have developed only recently thanks to advances in computing power and brain science. Deep learning, artificial neural networks and combinations of these disciplines have given way to interesting new applications. We believe investors should focus on the market potential of machine learning. There is a wide range of estimates on the potential market size of artificial intelligence. Research based on data from Tractica and Bank of America Merrill Lynch provides the cleanest estimate in our opinion. Figure 2 shows their market estimates. Bank of America Merrill Lynch divides the USD 127 billion potential market which should exist by 2025 into software, hardware and services. The services layer is expected to grow fastest, followed by hardware.

> 'Investors should focus on the market potential of machine learning'

Machine learning is the fastest growth segment

Half of all efforts currently focus on deep learning. Neural networks and deep neural networks represent about ten percent of the AI pie. Supervised and unsupervised machine learning make up roughly ten percent as well and the other thirty percent is divided amongst the other disciplines with a focus on image recognition and natural language processing. In our definition, deep learning is part of machine learning. Deep learning capabilities are expected to grow fastest in the coming years.

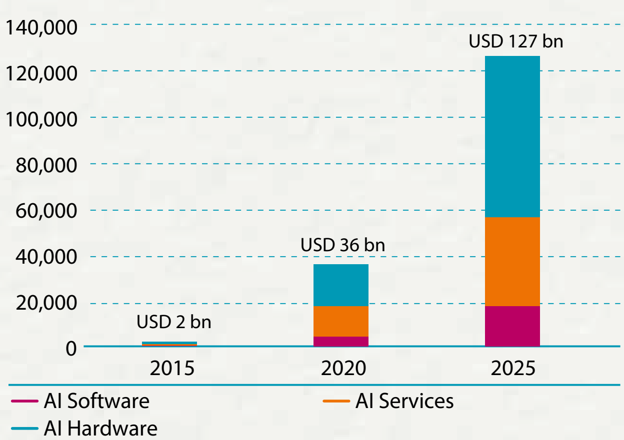
Most benefits of artificial intelligence are found in the industrial end markets rather than on the consumer side. Many applications focus on data optimization and specific expert tasks employed in the industrial arena. Consumer products mainly focus on personal assistants, but there is little need for consumers to use specific data optimization algorithms. Most AI effort goes into advertisement, investments, retail and media. For instance, in advertising, AI is used to generate recommendations based on past search results and other people's input, and to price advertising spots accordingly. Other growth areas for search engines are speech to text and text to speech. Especially in Asia, natural language processing is the key area at this point in time due to the complexity of written queries as a result of the use of characters instead of an alphabet. The potential impact is very large because more people can start interacting through their devices if they don't have to bother with written text anymore.

Mixed message for emerging markets

It is often argued that emerging markets will be the big losers when it comes to artificial intelligence because much of the low-income labor will be replaced by AI and robotization, while these countries often lack the infrastructure required to benefit from AI. However, emerging markets can benefit considerably because this lack of infrastructure facilitates enormous leaps in technology. Moreover, not all low cost labor will be replaced because the cost benefit analysis in the early years will lean towards manual labor rather than automation.

When looking at the types of end market and use cases for AI in Asia, one could argue that the focus is more on the consumer side, which is different to developed markets. Tencent, Baidu

Figure 2 | AI revenue per segment, world markets 2016-2025



Source: Bank of America, Merrill Lynch, 2016 and Alibaba spend a considerable amount of money on AI to make their consumer platforms better. Personal assistants are likely to see faster penetration in Asia than in Western markets. This holds true especially in Japan, where the government is pushing hard to work on AI and robotics in order to cope with an aging population; an issue that China will also be confronted with soon.

A couple of hurdles to overcome

Narrow artificial intelligence and machine learning are already used in many day-to-day processes. Yet, there are two important hurdles to be taken before this technology can indeed fulfill all the roles that people envisage it fulfilling:

- Available computing power needs to increase dramatically.
- Machine learning is based on statistics and therefore depends on data. If the wrong data is used for analysis, the outcome will be wrong too. It is crucial that, for example, self-driving cars are trained with correct data.

> ‘Invest in the suppliers of shovels during the gold rush’

The impact on three types of business model

To find out which type of companies will benefit from developments in AI, we build on research carried out by Steef Bergakker[1] who describes three of the most important generic business models:

- Value chain
- Value shop
- Value network

Value chain companies are about making stuff and getting it from their warehouses to their clients. We think value chains will have to invest in AI in order to remain competitive. We do not expect artificial intelligence to replace processes but it will make business models more efficient. A good example of this is UK online grocery company Ocado. In order to run their warehouses, pick items and schedule distribution routes, the company uses optimization tools that incorporate machine learning applications. There are no human schedulers involved in warehouse logistics optimization anymore.

Value shops are companies that fulfill expert tasks. Artificial intelligence has a large potential to disrupt their business. For example, a company that offers translation services for multinationals is a typical example of a value shop, but their business is at risk of being replaced by natural language processing solutions created through artificial intelligence. We would classify value shops in the ‘at risk’ category, where ironically the threat is coming from companies within the same business model bucket.

Value networks are usually very disruptive to value shops and value chains. Airbnb is an example of a disruptive network in the hospitality sector that is pushing out typical value shops, i.e. the traditional hotels. Companies that are able to shift from being value shops to become value networks are in the sweet spot. In terms of artificial intelligence, many of the leading companies are networks. Facebook, Google, Microsoft, Baidu, Apple and Yahoo! are examples of companies that fit into the value network business model bucket while they are also known for their progress in deploying and researching AI.

Artificial intelligence can have two kinds of impact on value networks. First of all, value networks already use artificial intelligence applications, such as search optimization, big data analysis, speech recognition and sentiment analysis. Second, artificial intelligence in itself can lead to the creation of a value network. Value networks connect two parties and benefit from scale effects. An AI protocol that functions as mediator between people and organizations could become a tool to build a network of its own. Once this network grows big enough, it could become a competitive threat to existing value networks. When asking Amazon’s Echo to order a pizza, it connects the person who asks for pizza to the company that can supply pizza. In this case the artificial intelligence protocol behind this network is owned by Amazon, but it is not unimaginable that new networks will appear.

Winner takes all?

Winners are therefore networking companies and value shops that focus on artificial intelligence services. Although most companies currently working on artificial intelligence are startups (and university spin-offs), we argue the large technology companies are best positioned to end up enjoying the competitive advantages artificial intelligence can offer. Google, Facebook, IBM, Apple, Yahoo, Microsoft, Amazon, Baidu and Alibaba all have large portfolios of artificial intelligence startups.

For a public equity investor this has important implications. It is not possible to invest in unlisted startups and investing in the technology giants will provide little exposure to the artificial intelligence theme. At this point in time, it is therefore better to look at companies that provide the resources used in the process. Or in other words: invest in the suppliers of shovels during the gold rush.

1. Steef Bergakker, Business model disruption, 2016

Sander Bus

'I don't take the easy way out'

For the last 20 years, Sander Bus and his team have purposefully and successfully navigated the financial markets with their High Yield Bonds strategy and their contrarian investment approach. On avoiding the losers, repeating the successes and being a soccer fan.

Interview

An anti-globalization, anti-elitist backlash is gaining momentum. Additionally, quantitative easing is coming to an end and politicians want to boost the economy with fiscal stimulus. How do you deal with these political and economic developments?
"They may lead to more volatility. I don't mind if the financial markets are a bit turbulent. Then I can set myself apart from the competition. Irrational investor behavior and panic mean there are more bargains around in the market. But I am also concerned. The world is changing to the detriment of investors. Thanks to the increasing globalization of the last 20 years, we have benefited from lower inflation, greater efficiency and European integration. Now the tide seems to be turning."

The Credit Quarterly Outlook says you expect to see a boom this year, followed by a bust in 2018.
"Trump's election will prolong both the economic and the credit cycle. That will postpone recession, but once it happens, its effects will be more severe. Expect to see more volatility."

Isn't that attitude typical of a bond investor who focuses on threats rather than opportunities?
<laughs apologetically> "Unlike equity investors, we bond investors actually have a limited upside and a massive downside. After 20 years of high yield investing, focusing on what can go wrong becomes your world view, a way of life."

How can you still manage to stand out from the crowd in such a market?
"The motto of our investing philosophy is 'winning by not losing'. In high yield bond investing, avoiding the losers is more important than finding the winners. We take advantage of the low-risk anomaly: the misperception that higher risk means higher yield. In the long run, however, it's the low risk, high yield bonds that tend to perform better."

"The high yield bond market is a long-term market in which investors have to keep a cool head and try to respond rationally to day-to-day volatility. We also try to avoid herd behavior and investing in the same issues that everyone else is after. Sometimes it's hard to be contrarian. It's easy to follow the market. But several years of outperformance makes it easier to stick to doing your own thing."

Morningstar has praised the Robeco High Yield Bonds strategy for the stable and experienced management team, long track record of solid returns in both rising and falling markets. How do you stay successful?
"Thanks to the disciplined investment process and the stability of our portfolio management team, we can replicate our success. But we must always remain critical and keep improving our team and our analysis process. There may be bubbles in the market, but we must make sure we don't create our own. And we don't become too sure of ourselves. Arrogance is the beginning of the end. If we want to maintain a competitive edge, we must continue to find ways to improve our own processes. And even then there are no guarantees. Even the best investors occasionally have a bad year."

What was your worst investment decision?
"On the eve of the financial crisis in 2007, we bought Dutch asset-backed securities, assuming they were low risk. We thought it was an extremely defensive position that would yield slightly more than cash. However, the entire market for structured products went down the drain, which cost us a couple of percentage

‘There may be bubbles in the market, but we must make sure we don’t create our own’

points in terms of returns. It just goes to show that in a real crisis, there is hardly anywhere to hide. That said, we came through the crisis relatively unscathed thanks to a defensively positioned portfolio.”

Can you imagine being something other than a high yield investor?
“I’d be lost if I couldn’t be an investor. I think it’s the best profession there is. I can’t imagine doing anything else. But I also participate in activities where I can contribute to the community to keep my work in perspective. I move money back and forth – I don’t create anything new. That’s why I have become involved in a group that supports local politics, in which I have done various things including helping with the preparations for a new swimming pool and a school.”

I understand you are a Sparta fan. How did you become so devoted to this soccer team? There’s something contrarian about this as well.
“You don’t become a Sparta fan because of their excellent technique or chances of winning titles. Rather, it’s the team’s many traditions and rich history that make them so endearing. They’re the oldest Dutch professional team, founded in 1888. Sparta plays in Het Kasteel, the very first soccer stadium in the Netherlands, which was built in 1916. Before each match, everyone joins in singing the ‘Sparta march’. And their jerseys are always numbered 1 to 11, and never have names on the back. I was introduced to Sparta when I was studying Economics in Rotterdam. When I’m in the stands watching Sparta, I completely forget about work. But even then I’m still thinking about risk – the risk of relegation.”

A specter is haunting the Eurozone

Column

The consensus in France is that the candidate for the far right Marine le Pen won't be the next president. Although she will win the first round according to current polls, she will be defeated in the second round by a more moderate candidate... If there is such a thing: this could also be someone from the far left like Benoît Hamon or Jean-Luc Mélenchon. And can we be so sure that the French would really prefer a Thatcherite Fillon over a much more leftwing, at least in an economic sense, Le Pen? Foreign investors are less sure about a Le Pen defeat, having learned their lessons from the unexpected wins last year for Brexit and Trump.

But let us not bother here too much about what is and isn't likely. If Le Pen wins, will she be able to get France out of the euro? A month after the presidential elections there will be parliamentary elections. I would guess that a presidential win for Le Pen will increase the likelihood of a parliamentary majority for the Front National (FN) as well. That would make it possible for her to organize a referendum on EU membership, which she then has to win, of course. The EU treaties contain no mention of a procedure for 'leaving' the euro. Some argue that it is necessary to leave the EU first (by invoking Article 50), before you can step out of the euro. This is how it should work, at least, time permitting. Leaving the EU would also makes it possible for France's central bank to regain its independence, enabling it to set its own inflation targets and partly finance the government directly.

The new government would most likely redenominate at least about 80 per cent of France's EUR 2.1 trillion public debt in a new national currency, as this part was issued under French law. This would happen on the basis of the famous lex monetae, where a sovereign state chooses the currency it will use. Only about 20 per cent of France's total public debt falls under international law and would therefore continue to be euro-based, according to a FN strategist. Of course, repaying your debts in a debased new currency would effectively mean the largest sovereign default on record, nearly 10 times larger than the EUR 200 billion Greek debt restructuring in 2012. It would also mean chaos for the world's financial system and most likely cause the single currency to fall apart.

However, the FN suggests a euro exit could be orderly and should preferably be done in accord with the other euro countries. Both of which are highly unlikely. The process sketched above would take a long time, but financial markets will, of course, react immediately after a Le Pen win in the second round, and their response would be more extreme still if there were to be an FN parliamentary victory too. Peripheral spreads would go through the roof. There would be a run on the banks. I wonder just how negative yields on Dutch and German bonds would become. Of course, the attractiveness of assets outside the euro area would rise markedly.

It's no wonder that the Banque de France has taken the extraordinary step of joining the political conversation in warning that a 'Frexit' would cost France EUR 30 billion a year. Unfortunately, frightening the electorate didn't work in the case of Brexit. So will the current 'projet Peur'?

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