DWS

ASSET ALLOCATION

March 2018

WHY PASSIVE ISN'T RED AND ACTIVE ISN'T DEAD

Some active equity managers argue passive undermines price discovery. Rubbish. Nor should stock pickers be so defensive – their fortunes are looking up.

SUMMARY

The rise of passive is a phenomenon. However, a small and vocal backlash has begun. Equity index trackers are accused of undermining free markets and the efficient allocation of capital. One report even called passive "worse for society than Marxism".

We believe these critics are mistaken. They also tend to be active managers, who understandably feel threatened. This paper has two objectives, therefore. First, to show why passive has nothing to do with price discovery or communist plots. Second, to persuade stock pickers they need not be so defensive. Their current woes are in large part cyclical, not structural.

That is because the rise of passive is the result of changes in the investment environment – not the other way round. Economic fundamentals have caused the dispersion in total shareholder returns among companies to fall over the past two decades, making it harder for professional active managers to generate alpha. Passive is merely a rational response to this trend.

But dispersion is already widening again, with active managers performing better since the start of 2017. What drove dispersion down over the past 20 years was that even low quality companies could grow their margins. They benefited from a sustained decline in interest costs, wage pressure and effective taxes. All three of these are either reversing, or the large gains will not be repeated.

As poor quality companies are found out, return dispersion should rise, as it has done for the last 18 month or so – helping active managers. In fact there has been a reasonable correlation between alpha and passive penetration, with the latter tending to be lower where active managers have performed better versus their benchmarks.

If a large part of the passive story is cyclical, then active and passive should not be seen as contradictory investment philosophies but rather as specialised approaches to differing economic and financial conditions. When companies are affected in a way that reduces their ability to produce differentiated returns investors should favour passive. When the reverse occurs a more active approach has a better chance of producing outperformance. Smart-beta lies somewhere in between.

The conclusion? Asset managers that do not offer their clients all three approaches across the spectrum – active, passive and smart-beta products – are potentially denying them the change to profit from a shift in the macroeconomic backdrop.

Stuart Kirk
Head of Global
Research Institute
stuart.kirk@db.com

Outside the U.S. For Qualified Investors (Art. 10 Para. 3 of the Swiss Federal Collective Investment Schemes Act (CISA). For Professional Clients (MiFID Directive 2014/65/EU Annex II) only. For Institutional investors only. Further distribution of this material is strictly prohibited. Not suitable for the retail market. **In the U.S.** For Institutional Use and Registered Rep Use Only. Not for Public Viewing or Distribution

Introduction

The rise of passive investing is a phenomenon. Even better, its success is widely considered a good thing, with index vehicles such as exchange traded funds potentially giving investors more choice and value for money. Recently, however, a small and vocal backlash has begun. Equity index trackers are accused of undermining free markets and the efficient allocation of capital[1]. One report even called passive "worse for society than Marxism"[2].

Luckily, critics of passive are mistaken. They also tend to be active managers, who understandably feel threatened – active US equity strategies, for example, have not have year of inflows in more than a decade, with cumulative outflows passing $900bn[3]. This paper has two objectives, therefore. First to show why passive has nothing to do with price discovery or communist plots – that no economies suffer in the making of this industry. The second aim is to persuade stock pickers they need not be so defensive. Their current woes are in-large part cyclical, not structural, and there are good reasons to believe that better times are around the corner.

Ultimately the hope is to end the misconception that active and passive are philosophical and methodological enemies. Rather, the attractiveness of either depends on economic fundamentals and therefore ideally investors should have access to both. Asset managers offering passive products alongside teams of active portfolio managers are not being inconsistent – as sometimes accused – they are offering clients a better chance of superior returns.

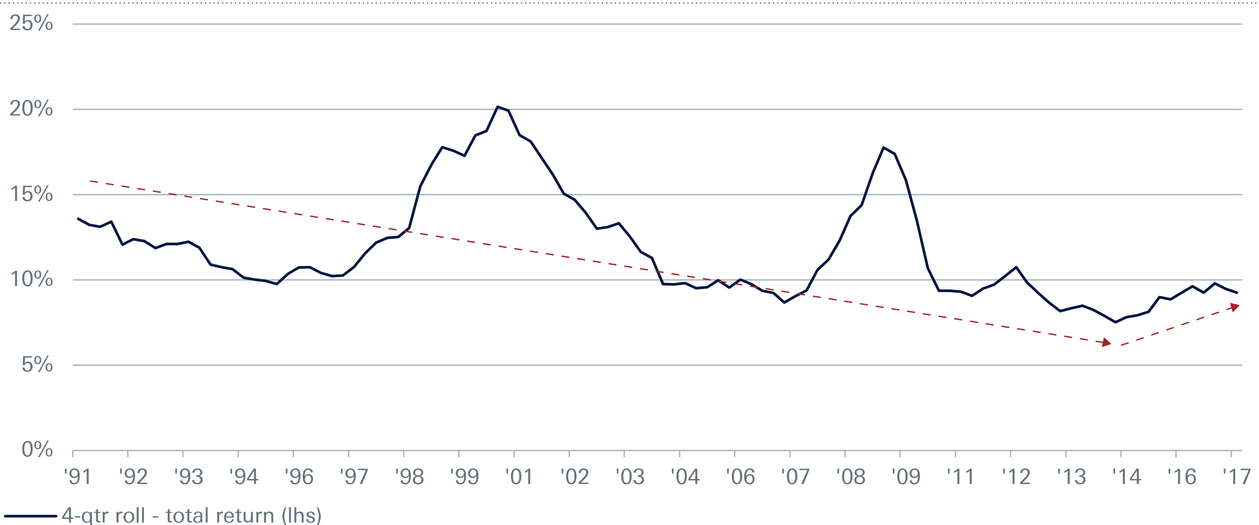
Passive the end not the means

The first thing to understand is that the rise of passive equity investing is the result of changes in the investment environment – not the other way round. To summarise, over the past two decades the dispersion in total shareholder returns among companies has fallen[4], making it harder for active managers to generate alpha (Figure 1). Passive is merely a rational response to this trend. As the performance between low and high quality stocks narrowed, investors realised they might as well own all of them. But it is unwise to assume dispersion cannot widen again.

In fact the dispersion of total returns in the US has already started to widen and stock pickers are slowly performing better again. In the US and Europe about half of active managers beat the benchmark in the year to mid-2017, versus only 20 and 30 per cent respectively over five years[5]. Yet the rise in global passive funds has been so relentless that everyone assumes it is structural. Passive assets have ballooned to more than $16tn – growing four times faster than active funds in the past decade[6]. In the 12 months to November last year, $900bn flowed into US EFTs alone[7]. Deutsche Bank's financial services analyst reckons by 2020 passive will account for half of total invested assets.

Structural factors have helped the rise of passive. But many of these are less to do with indexing and more about the creation of conveniently tradable vehicles that allow investors to move across a huge range of different sectors, markets, geographies, themes, and styles. And mostly replicating an index is less costly than paying humans to pick and choose within it. That fact will never change.

Figure 1: Dispersion of total return of S&P 500 companies



[1] Financial Times, May 2017
[2] The Silent Road to Serfdom: Why Passive Investing is Worse than Marxism" Sanford C. Bernstein & Co, August 2016
[3] EPFR
[4] Deutsche Asset Management
[5] Spiva Scorecard (SPDJI)
[6] PwC/Morningstar
[7] EPFR

However, despite these structural advantages the strongest inflows into passive funds have tended to be in asset classes where active has performed worse than passive. For example US large cap equity assets have been 70 per cent penetrated by passive mandates as active managers have struggled to produce alpha[8]. Meanwhile, global, emerging markets, and asset allocation strategies have been more immune to passive as active funds have maintained their edge.

It's all about dispersion

So passive cannot be seen purely as a structural phenomenon. In certain geographies, sectors or styles, relative performance versus active is key. And it follows that if stock pickers can beat the index after fees then money should flow their way again. Therefore the question to ask is why the dispersion in total shareholder returns has declined over the past fifteen years, making it harder for stock pickers to add value. Answering that it is possible to forecast the relative flows between active and passive.

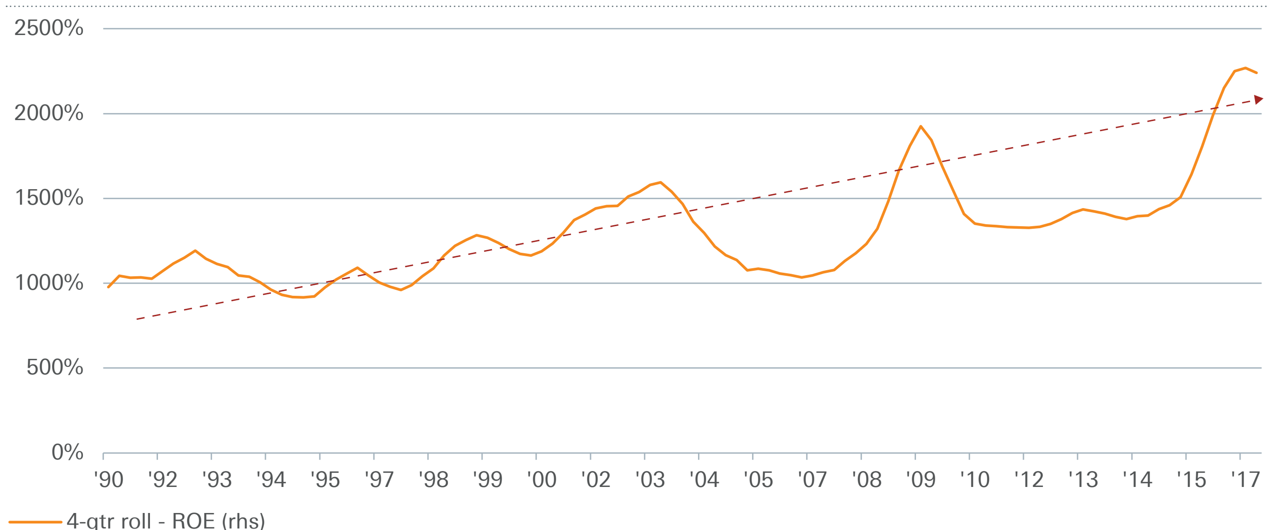
Start with what should be the biggest cause of lower return dispersion: that companies have become more homogeneous over time. But this has not been the case. While shareholder returns have narrowed – such as in America and Europe – the dispersion in returns on equity has not (Figure 3). For example for the S&P 500, the spread between the median return on equity for the top and bottom quartile of companies has widened by about 100 per cent in the past ten years[9]. The dispersion in other operating metrics has increased too.

The gap between the dispersions in fundamentals and total returns suggests investors are ignoring differences in the quality of companies when they buy and sell shares. One reason they may be happy to do this because even low quality companies are managing to keep their shareholder returns relatively high. How? A prolonged period of elevated margins has boosted cashflows and allowed them to pay out a large chunk of their retained earnings as dividends and buy backs.

We know this is happening because whereas at the turn of the millennium capital appreciation accounted for almost 90 per cent of the S&P 500's total shareholder returns, today this has fallen to less than 70 per cent (Figure 4). In fact, equities are looking increasingly like bonds, with dividends making up a growing proportion of their returns, while bonds have exhibited equity-like characteristics, with more performance coming from capital gains. In a low interest rate world, a hunger for yield has meant that equity investors have been happy to see payouts rise across their portfolios.

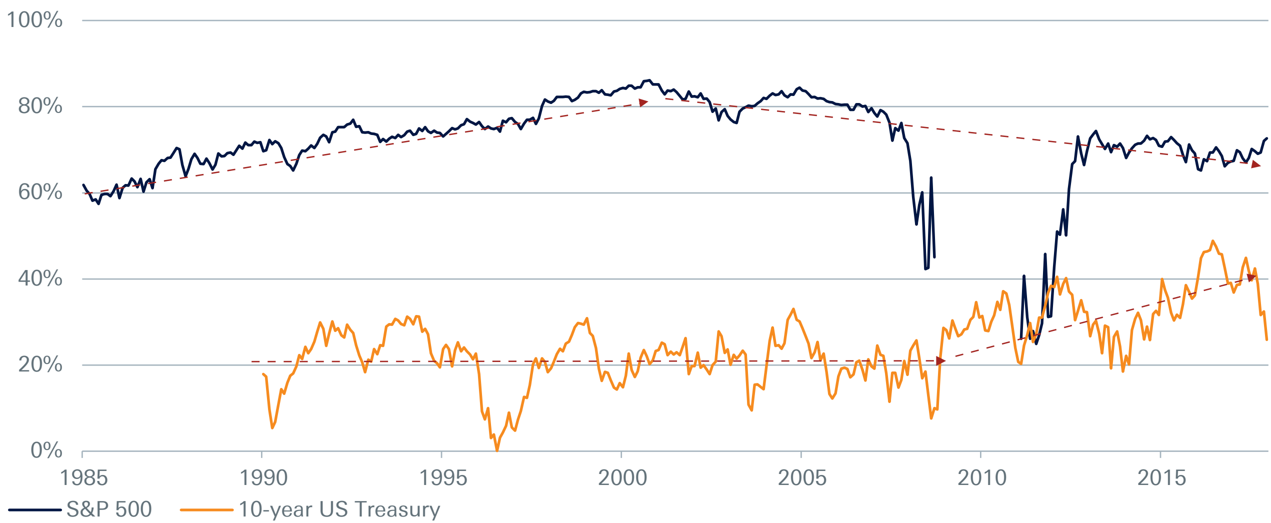
With every company keen – and able – to boost dividend yields, performance dispersion declined, and therefore active funds suffered versus passive. Portfolio managers moaning about finding it hard to beat the index had a point. For investors, buying the market blind was the rational approach to take, especially after fees. So lower performance dispersion was the fuel which powered the rise of the passive industry. Those accusing index strategies of hurting price discovery in equity markets have their causation muddled: the narrowing in prices came first.

Figure 2: Dispersion of ROE of S&P 500 companies



[8] Deutsche Bank
[9] Deutsche Asset Management
Forecasts are based on assumptions, estimates, opinions and hypothetical models or analysis which may prove to be incorrect.

Figure 3: Share of capital gains verses yield or income[10]



Why passive doesn't affect price discovery

So calling passive a Marxist attack on the efficient allocation of capital is mistaken. Nor does the argument make sense from first principles either. Index funds buy and sell so their portfolios match a benchmark. Therefore flows just move the market up and down – and not even that if the money has come from active. Only the marginal buyer or seller matters, so price discovery and the efficient allocation of capital between companies is always determined by active investors. This is true if index funds end up accounting for 99.9 per cent of the market.

Consider an equity market with two stocks, Apple and Pear, both trading at $100 per share, and two small active managers and one large passive manager only, each with shares in both companies (Figure 4). What happens if money flows into passive from an outside source? The active funds are the only source of shares and they see there is demand for their stock.
They also know the passive manager has to buy so prices rise until a level is reached at which the two active managers are willing to trade with each other, based on their differing views of the relative prospects of Apple and Pear. At these prices ($209 and $177 respectively in the example[11]) they are indifferent to whom they sell – and hence the passive fund gets its 400 shares.

Figure 4: What happens as passive grows?

		Active AM	Active AM	Passive AM	
	Share price	Number of shares	Number of shares	Number of shares	Index
Apple	$100	500	500	5,000	600
Pear	$100	500	500	5,000	600
AuM		$100,000	$100,000	1,000,000	

(Now assume $ 1 million passive from outside source)

	Share price	Number of shares	Number of shares	Number of shares	Index
Apple	$ 209	600	300	5,100	1,254
Pear	$ 177	300	400	5,300	1,062
AuM		$178,500	$133,500	$2,004,000	

[10] Deutsche Asset Management
[11] For illustrative purposes only.
Forecasts are based on assumptions, estimates, opinions and hypothetical models or analysis which may prove to be incorrect.

They are only three participants in the market, so by definition the passive fund keeps a benchmark weighting because the index is a function of the holdings and prices of the stocks in the three managers' portfolios. It is a closed system. The passive manager, no matter how gargantuan versus the amount of active money, is merely an observer. There is no distortion of prices or misallocation of resources. There is no Marxist plot against free markets, as the Bernstein paper suggests.

Sure, the index is now trading at a higher level. But so would it be if either of the active funds received the large inflow instead – hot money has underpinned bull markets since the dawn of investing. It is not the fault of passive funds that someone is happy to potentially overpay. In reality, however, inflows into passive have largely been at the expense of active strategies so the overall index effect is muted. However in neither scenario is relative price discovery distorted.

This simplified example raises another important point which is often lost in the philosophical debate between active and passive: that in aggregate the investment returns of the two approaches have to perform exactly in line. If our three managers are the market, and passive has to replicate market returns by definition, then as a matter of arithmetic our two active managers will also match the benchmark return, gross of fees. Neither the two active funds in aggregate nor the passive fund ever outperforms nor underperforms the other (Figure 5).

Figure 5: Neither active or passive is superior by simple logic

If...

...the market return is the average of active and passive returns...

...and...

...passive returns equal the market return...

...then...

...active returns must equal passive returns.

Conditions improving for active

In the real world, active and passive funds are not the whole market of course, so their performance can differ. What is more, conditions change so it becomes easier or harder for the best and worst managers to do well or poorly. As described above, the decline in performance dispersion has helped the passive industry and low-quality active players alike. But now the three main reasons for the narrowing in total returns are probably weakening if not reversing. As the difference in performance between companies likely widens, it should benefit the more talented stock pickers.

One major cause of the decline seen in dispersion over the years has been prolonged low and falling interest rates. For S&P 500 companies, borrowing costs have dropped from about a fifth of earnings before interest and taxes in 2001 to around 15 per cent today (Figure 6). Cheap funding keeps business afloat, clients buying and consumers happy. Even the worst firms can afford to increase leverage to finance dividends or buybacks. However central banks around the world are beginning to raise rates or hint that they will. Other extraordinary policy measures are also being reigned in.

Low quality companies have also benefited from weak wage growth. After falling after the millennium and flat-lining since 2011, employment costs are beginning to trend higher (Figure 7). A declining labour share of gross domestic product has much to do with the elevated margins observed in many western countries, and together with a slump in productivity, helps explain why low unemployment has coexisted with low inflation. Nominal wages in America are now growing at about three per cent annually. Either productivity has to rise with them or margins will suffer, as would the ability to pay dividends and support shareholder returns.

Finally, the ability of firms to lower their effective tax rates has also boosted cashflows, irrespective of the fundamentals of their businesses. While the headline Federal rate of corporate tax for American companies has recently been cut to 25 per cent, the average effective rate has declined steadily over the past two decades and is already close this level on average[14]. Certainly, some companies and sectors will benefit from the latest cut, but the huge windfall over the past two decades will not be repeated.

[12] Deutsche Bank

Figure 6: Interest expense/revenues, S&P 500 ex financials[12]

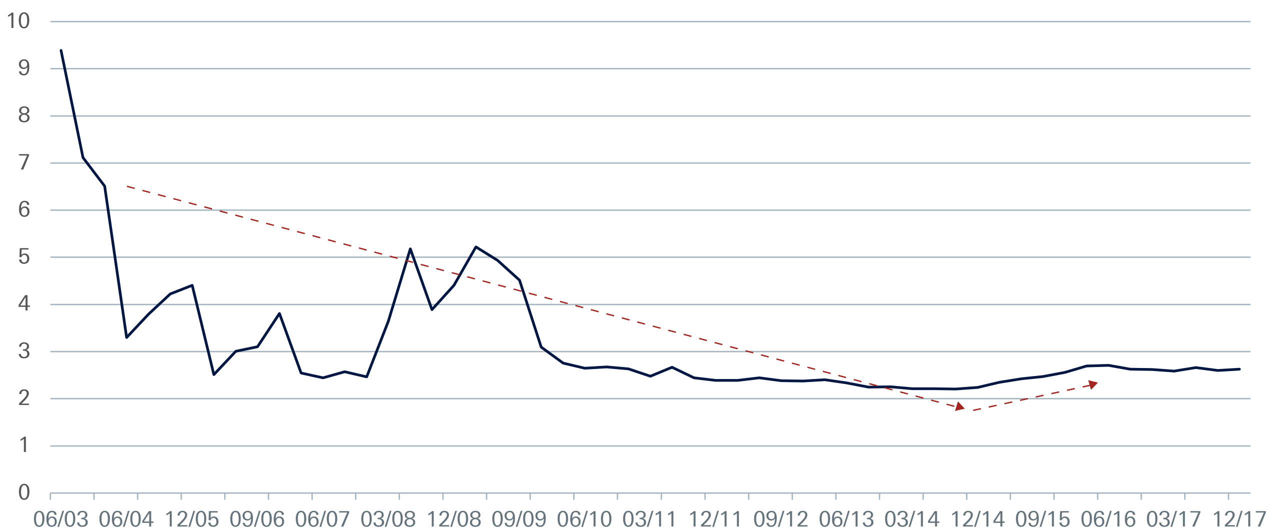
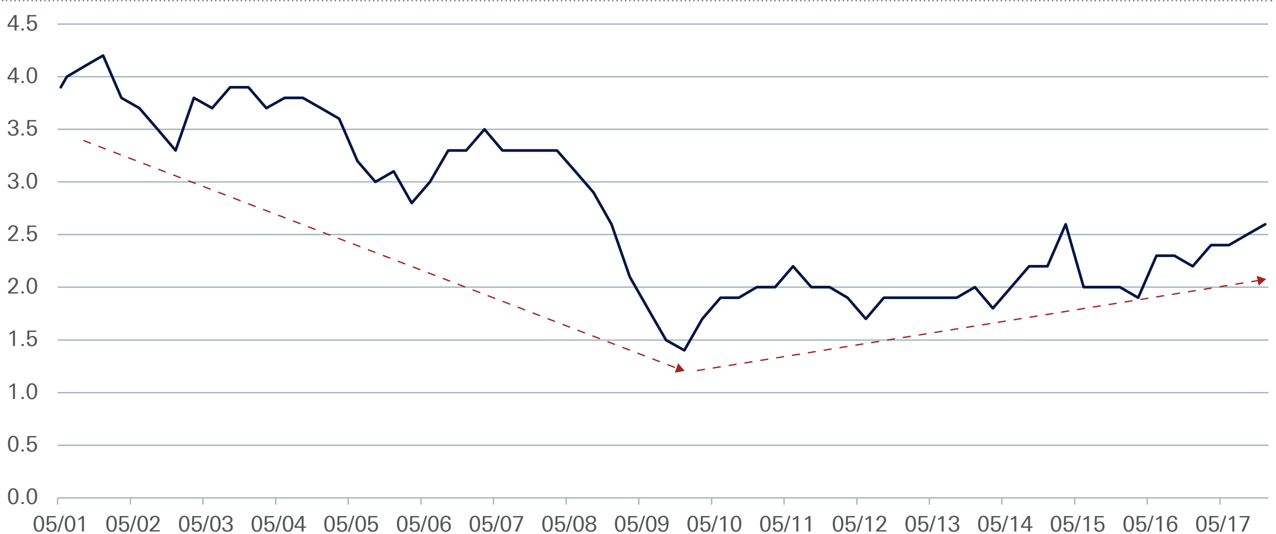


Figure 7: US employment cost index[13]



Other signs that dispersion may rise

There are signs already that the easy ride enjoyed by lower quality companies is becoming bumpier. In the US and Europe the dispersion in share price performance across stocks began to turn in late 2014. Another way to tell that some corporates are feeling the strain is to analyse the dispersion in dividend yields and payout ratios. The former has declined steadily over time as ever more companies have been able to produce outsized returns relative to their fundamentals via higher dividends thanks to elevated cashflows.

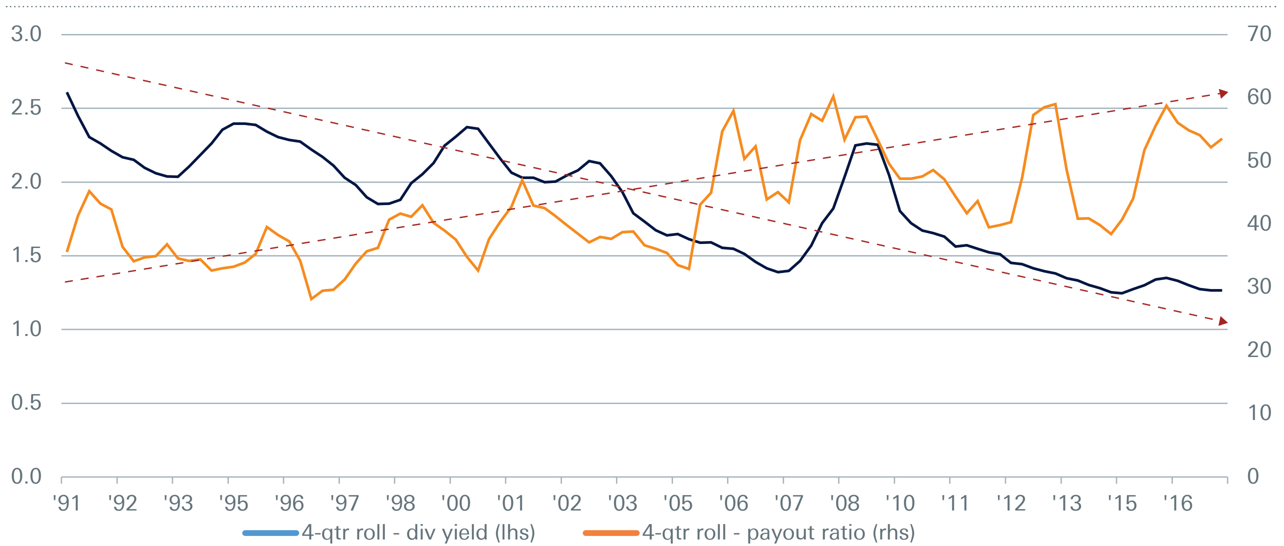
But like a duck swimming serenely across a pond, things are different under the surface. Some companies are having to paddle more furiously to keep up.

While the dispersion in dividend yields moved lower, the dispersion in payout ratio – the amount of paid to shareholders out of profits – has risen dramatically (Figure 8). In other words, weaker ducks are having to divert a larger proportion of earnings in order to swim with their dividend paying friends – no doubt more than they should. This also explains, for example, why the number of companies in Europe paying scrip dividends has accelerated, which often foretells dividend cuts.

A final clue that the falling dispersion game may have run its course is the rise of smart beta funds. Although considered passive, they are mostly subsets of existing benchmarks and hence active-lite. As the difference between high and low quality companies is reflected

[13] Bloomberg, Deutsche Asset Management
[14] Bloomberg

Figure 8: S&P 500: Dispersion of payout ratios and dividend yields[15]



in widening performance dispersion, it makes more sense to exclude parts of the index. So just as passive was born of low dispersion, smart beta is a reaction to the trend reversing. Expect it to become even more popular if return dispersion continues to rise.

Conclusion

Active, smart-beta and passive should not be seen as contradictory investment philosophies but rather as specialised approaches to differing economic and financial conditions. When companies are affected in a way that reduces their ability to produce differentiated returns investors should tend towards favouring passive. When trends change such that the gap between high and low quality firms is better reflected in total returns a more active approach has a better chance of producing outperformance.

Asset managers that do not offer their clients all three approaches across the spectrum – active, passive and smart-beta products – are potentially denying them the change to profit from a shift in the macroeconomic backdrop. What is more, sophisticated factor-based smart-beta solutions can further enhance returns. Active and passive is no either or proposition – they are two sides to the same investment coin.

[15] Bloomberg, Deutsche Asset Management
Forecasts are based on assumptions, estimates, opinions and hypothetical models or analysis which may prove to be incorrect.

IMPORTANT INFORMATION

Outside the U.S. for institutional client use only. In the U.S. for Institutional Use and Registered Rep Use Only. Not for public viewing or distribution

The brand DWS represents DWS Group GmbH & Co. KGaA and any of its subsidiaries, such as DWS Distributors, Inc., which offers investment products, or Deutsche Investment Management Americas Inc. and RREEF America L.L.C., which offer advisory services.

This material was prepared without regard to the specific objectives, financial situation or needs of any particular person who may receive it. It is intended for informational purposes only. It does not constitute investment advice, a recommendation, an offer, solicitation, the basis for any contract to purchase or sell any security or other instrument, or for Deutsche Bank AG or its affiliates to enter into or arrange any type of transaction as a consequence of any information contained herein. Neither Deutsche Bank AG nor any of its affiliates gives any warranty as to the accuracy, reliability or completeness of information which is contained in this document. Except insofar as liability under any statute cannot be excluded, no member of the Deutsche Bank Group, the Issuer or any office, employee or associate of them accepts any liability (whether arising in contract, in tort or negligence or otherwise) for any error or omission in this document or for any resulting loss or damage whether direct, indirect, consequential or otherwise suffered by the recipient of this document or any other person.

The views expressed in this document constitute Deutsche Bank AG or its affiliates' judgment at the time of issue and are subject to change. This document is only for professional investors. This document was prepared without regard to the specific objectives, financial situation or needs of any particular person who may receive it. No further distribution is allowed without prior written consent of the Issuer.

Investments are subject to risk, including market fluctuations, regulatory change, possible delays in repayment and loss of income and principal invested

The value of investments can fall as well as rise and you might not get back the amount originally invested at any point in time.

Forecasts are based on assumptions, estimates, opinions and hypothetical models that may prove to be incorrect. Investments come with risk. The value of an investment can fall as well as rise and your capital may be at risk. You might not get back the amount originally invested at any point in time. The comments, opinions and estimates contained herein are based on or derived from publicly available information from sources that we believe to be reliable. We do not guarantee their accuracy. This material is for informational purposes only and sets forth our views as of this date. The underlying assumptions and these views are subject to change without notice.

IMPORTANT INFORMATION – UK

Marketing Material. This document is a `non-retail' communication within the meaning of the FCA's rules and is directed only at persons satisfying. This document is not intended for and should not be relied upon by a retail client. DB SPECIFICALLY DISCLAIMS ALL LIABILITY FOR ANY DIRECT, INDIRECT, CONSEQUENTIAL OR OTHER LOSSES OR DAMAGES INCLUDING LOSS OF PROFITS INCURRED BY A PROSPECTIVE INVESTOR OR ANY THIRD PARTY THAT MAY ARISE FROM ANY RELIANCE ON THIS DOCUMENT OR FOR THE RELIABILITY, ACCURACY, COMPLETENESS OR TIMELINESS THEREOF.

Issued and approved by Deutsche Asset Management (U.K.) Limited of Winchester House, 1 Great Winchester Street, London EC2N 2DB, authori-sed and regulated by the Financial Conduct Authority ("FCA") Financial services registration number 429806 and regis-tered in England & Wales No 5233891. Authorised and regulated by the Financial Conduct Authority ("FCA"). This document is a financial promotion for the purposes of the FCA's Handbook of rules and guidance. DeAAM Global is also registered with the U.S. Securities and Exchange Commission under the Investment Advisers Act 1940 (the "Advisers Act"), however it complies with the Advisers Act only with respect to US clients.

For investors in Nordics: Deutsche Bank AG is authorized under German banking law (competent authority: European Central Bank and the BaFin, Germany's Federal Financial Supervisory Authority. Deutsche Bank Branches operates within the EEA on the back of the legal entity (Deutsche Bank AG) EU Passports within the European Economic Area ("EEA"). Reference is made to European Union Regulatory Background and Corporate and Regulatory Disclosures at https://www.db.com/en/content/eu_disclosures_uk.htm. Details about the extent of our authorisation and regulation by BaFin are available from us on request." DBS is acting for and behalf of Deutsche Asset Management (UK) Ltd and if you decide to enter into a transaction with Deutsche Bank AG or one of its affiliates ("the principal") will any and all contractual and commercial agreements be as entered into with that principal. This presentation is for information purposes only and is not intended to be an offer or an advice or recommendation or solicitation, or the basis for any contract to purchase or sell.

For Investors in Switzerland: This material is intended for information purposes only and does not constitute investment advice or a personal recommendation. This document should not be construed as an offer to sell any investment or service. Furthermore, this document does not constitute the solicitation of an offer to purchase or subscribe for any investment or service in any jurisdiction where, or from any person in respect of whom, such a solicitation of an offer is unlawful. Neither Deutsche Bank AG nor any of its affiliates, gives any warranty as to the accuracy, reliability or completeness of information which is contained in this document. Past performance or any prediction or forecast is not indicative of future results. The views expressed in this document constitute Deutsche Bank AG or its affiliates' judgment at the time of issue and are subject to change. Deutsche Bank has no obligation to update, modify or amend this letter or to otherwise notify a reader thereof in the event that any matter stated herein, or any opinion, projection, forecast or estimate set forth herein, changes or subsequently becomes inaccurate, or if research on the subject company is withdrawn. Prices and availability of financial instruments also are subject to change without notice.

© March 2018 Deutsche Asset Management UK Ltd

(For investors in Switzerland (continued): The information provided in this document is addressed solely to Qualified Investors pursuant to Article 10 paragraph 3 of the Swiss Federal Act on Collective Investment Schemes (CISA) and Article 6 of the Ordinance on Collective Investment Schemes. This document is not a prospectus within the meaning of Articles 1156 and 652a of the Swiss Code of Obligations and may not comply with the information standards required thereunder. This document may not be copied, reproduced, distributed or passed on to others without the prior written consent of Deutsche Bank AG or its affiliates.

IMPORTANT INFORMATION – GERMANY

The information contained in this document does not constitute investment advice.

The terms of any investment will be exclusively subject to the detailed provisions, including risk considerations, contained in the Offering Documents. When making an investment decision, you should rely on the final documentation relating to the transaction and not the summary contained herein.

This document may not be reproduced or circulated without our written authority. The manner of circulation and distribution of this document may be restricted by law or regulation in certain countries.

Deutsche Asset Management Investment GmbH does not give tax or legal advice. Investors should seek advice from their own tax experts and lawyers, in considering investments and strategies suggested by Deutsche Asset Management Investment GmbH.

© Deutsche Asset Management Investment GmbH , March 2018. All rights reserved. No further distribution is allowed without prior written consent of the Issuer.

IMPORTANT INFORMATION – EMEA

Deutsche Bank does not give tax or legal advice. Investors should seek advice from their own tax experts and lawyers, in considering investments and strategies suggested by Deutsche Bank. Investments with Deutsche Bank are not guaranteed, unless specified. Unless notified to the contrary in a particular case, investment instruments are not insured by the Federal Deposit Insurance Corporation (“FDIC”) or any other governmental entity, and are not guaranteed by or obligations of Deutsche Bank AG or its affiliates.

The terms of any investment will be exclusively subject to the detailed provisions, including risk considerations, contained in the Offering Documents. When making an investment deci-sion, you should rely on the final documentation relating to the transaction and not the summary contained here-in. This document may not be reproduced or circulated without our written authority. The manner of circulation and distribution of this document may be restricted by law or regulation in certain countries, including the United States. This document is not directed to, or intended for distribution to or use by, any person or entity who is a cit-izen or resident of or located in any locality, state, country or other jurisdiction, where such distribution, publication, availability or use would be contrary to law or regulation or which would subject Deutsche Bank to any registration or licensing requirement within such jurisdiction not currently met within such jurisdiction. Persons into whose possession this document may come are required to inform themselves of, and to observe, such restrictions.

Kingdom of Bahrain

For Residents of the Kingdom of Bahrain: This document does not constitute an offer for sale of, or participation in, securities, derivatives or funds marketed in Bahrain within the meaning of Bahrain Monetary Agency Regulations. All applications for investment should be received and any allotments should be made, in each case from outside of Bahrain. This document has been prepared for private information purposes of intended investors only who will be institutions. No invitation shall be made to the public in the Kingdom of Bahrain and this document will not be issued, passed to, or made available to the public generally. The Central Bank (CBB) has not reviewed, nor has it approved, this document or the marketing of such securities, derivatives or funds in the Kingdom of Bahrain. Accordingly, the securities, derivatives or funds may not be offered or sold in Bahrain or to residents thereof except as permitted by Bahrain law. The CBB is not responsible for performance of the securities, derivatives or funds.

IMPORTANT INFORMATION – EMEA (continued)

State of Kuwait

This document has been sent to you at your own request. This presentation is not for general circulation to the public in Kuwait. The Interests have not been licensed for offering in Kuwait by the Kuwait Capital Markets Authority or any other relevant Kuwaiti government agency. The offering of the Interests in Kuwait on the basis a private placement or public offering is, therefore, restricted in accordance with Decree Law No. 31 of 1990 and the implementing regulations thereto (as amended) and Law No. 7 of 2010 and the bylaws thereto (as amended). No private or public offering of the Interests is being made in Kuwait, and no agreement relating to the sale of the Interests will be concluded in Kuwait. No marketing or solicitation or inducement activities are being used to offer or market the Interests in Kuwait.

State of Qatar

Deutsche Bank AG in the Qatar Financial Centre (registered no. 00032) is regulated by the Qatar Financial Centre Regulatory Authority. Deutsche Bank AG – QFC Branch may only undertake the financial services activities that fall within the scope of its existing QFCRA license. Principal place of business in the QFC: Qatar Financial Centre, Tower, West Bay, Level 5, PO Box 14928, Doha, Qatar. This information has been distributed by Deutsche Bank AG. Related financial products or services are only available to Business Customers, as defined by the Qatar Financial Centre Regulatory Authority.

Kingdom of Saudi Arabia

Deutsche Securities Saudi Arabia LLC Company, (registered no. 07073-37) is regulated by the Capital Market Authority. Deutsche Securities Saudi Arabia may only undertake the financial services activities that fall within the scope of its existing CMA license. Principal place of business in Saudi Arabia: King Fahad Road, Al Olaya District, P.O. Box 301809, Faisaliah Tower - 17th Floor, 11372 Riyadh, Saudi Arabia.

United Arab Emirates

Deutsche Bank AG in the Dubai International Financial Centre (registered no. 00045) is regulated by the Dubai Financial Services Authority. Deutsche Bank AG - DIFC Branch may only undertake the financial services activities that fall within the scope of its existing DFSA license. Principal place of business in the DIFC: Dubai International Financial Centre, The Gate Village, Building 5, PO Box 504902, Dubai, U.A.E. This information has been distributed by Deutsche Bank AG. Related financial products or services are only available to Professional Clients, as defined by the Dubai Financial Services Authority.

IMPORTANT INFORMATION – APAC

Although the information herein has been obtained from sources believed to be reliable, we do not guarantee its accuracy, completeness or fairness. Opinions and estimates may be changed without notice and involve a number of assumptions which may not prove valid. We or our affiliates or persons associated with us or such affiliates ("Associated Persons") may (i) maintain a long or short position in securities referred to herein, or in related futures or options, and (ii) purchase or sell, make a market in, or engage in any other transaction involving such securities, and earn brokerage or other compensation.

The document was not produced, reviewed or edited by any research department within Deutsche Bank and is not investment research. Therefore, laws and regulations relating to investment research do not apply to it. Any opinions expressed herein may differ from the opinions expressed by other Deutsche Bank departments including research departments. This document may contain forward looking statements. Forward looking statements in-

IMPORTANT INFORMATION – APAC (continued)

clude, but are not limited to assumptions, estimates, projections, opinions, models and hypothetical performance analysis. The forward looking statements expressed constitute the author's judgment as of the date of this material. Forward looking statements involve significant elements of subjective judgments and analyses and changes thereto and/or consideration of different or additional factors could have a material impact on the results indicat-ed. Therefore, actual results may vary, perhaps materially, from the results contained herein. No representation or warranty is made by Deutsche Bank as to the reasonableness or completeness of such forward looking state-ments or to any other financial information contained herein.

This document may not be reproduced or circulated without our written authority. The manner of circulation and distribution of this document may be restricted by law or regulation in certain countries.

This document is not directed to, or intended for distribution to or use by, any person or entity who is a citizen or resident of or located in any locality, state, country or other jurisdiction, where such distribution, publication, availability or use would be contrary to law or regulation or which would subject Deutsche Bank to any registration or licensing requirement within such jurisdiction not currently met within such jurisdiction. Persons into whose possession this document may come are required to inform themselves of, and to observe, such restrictions.

Unless notified to the contrary in a particular case, investment instruments are not insured by the Federal Deposit Insurance Corporation ("FDIC") or any other governmental entity, and are not guaranteed by or obligations of Deutsche Bank AG or its affiliates.

Notice to prospective Investors in Japan: This document is distributed in Japan by DeAMJ. Please contact the responsible employee of DeAMJ in case you have any question on this document because DeAMJ serves as contacts for the product or service described in this document. This document is for distribution to Professional Investors only under the Financial Instruments and Exchange Law.

IMPORTANT INFORMATION – UNITED STATES

For purposes of ERISA and the Department of Labor's fiduciary rule, we are relying on the sophisticated fiduciary exception in marketing our services and products through intermediary institutions, and nothing herein is intended as fiduciary or impartial investment advice.

Deutsche Bank does not give tax or legal advice. Investors should seek advice from their own tax experts and lawyers, in considering investments and strategies suggested by Deutsche Bank. Investments with Deutsche Bank are not guaranteed, unless specified.

This document may not be reproduced or circulated without our written authority.

© March 2018 Deutsche Asset Management Investment GmbH
All rights reserved.

Global Ex US 055302-1
U.S. only 056191-1