

# Big Data & Machine Learning in Investing Systematic Active Equity (SAE)

Silke Nowotzin, BlackRock Alternatives Specialists



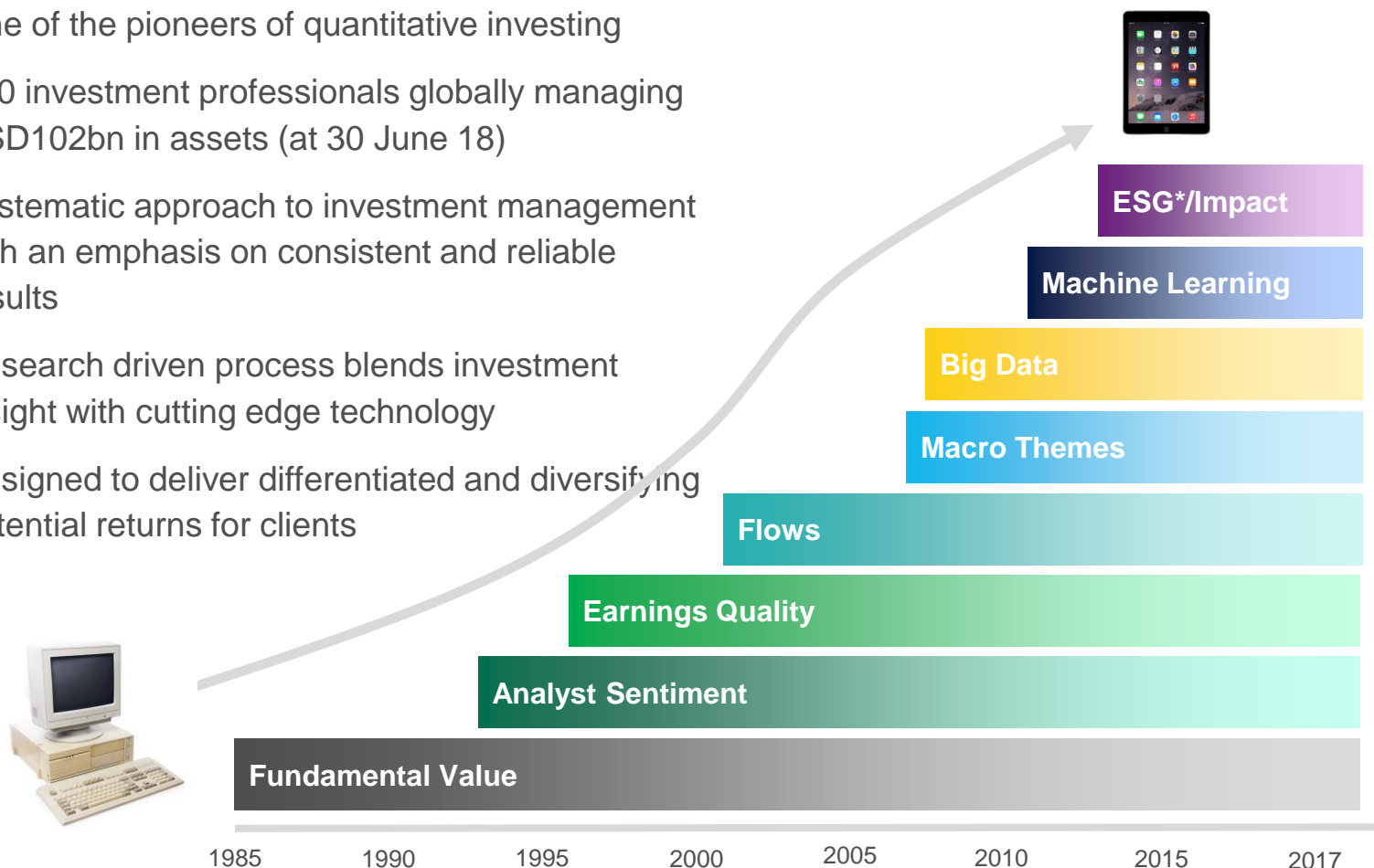
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# Systematic Active Equity (SAE) – Introduction

## +30 year track record of innovation

- ▶ One of the pioneers of quantitative investing
- ▶ +80 investment professionals globally managing USD102bn in assets (at 30 June 18)
- ▶ Systematic approach to investment management with an emphasis on consistent and reliable results
- ▶ Research driven process blends investment insight with cutting edge technology
- ▶ Designed to deliver differentiated and diversifying potential returns for clients



***Research driven investment approach designed to deliver differentiated returns***

Source: BlackRock & Shutterstock, 30 June 2018. For illustrative purposes only. Figures shown in US Dollars. \*ESG stands for Environmental, Social and Governance. There is no guarantee that research capabilities will contribute to a positive investment outcome.

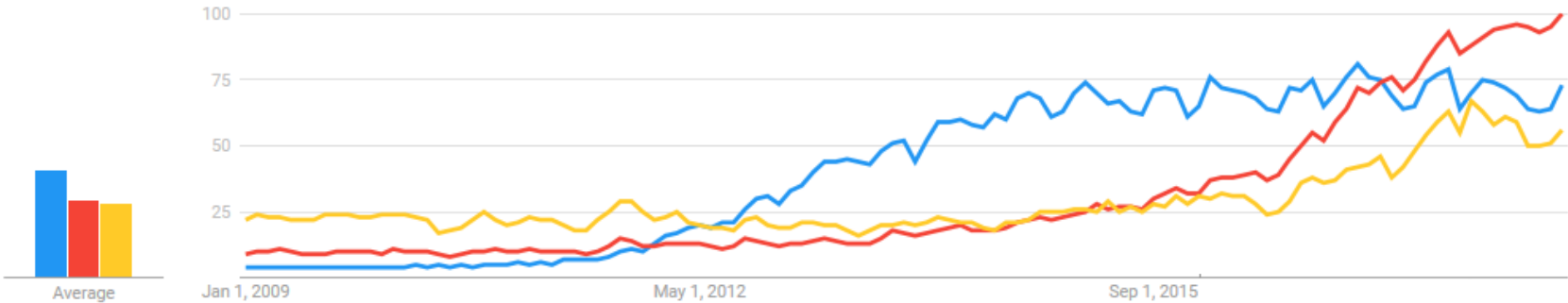
# Shape of the phenomenon and hype

● big data  
Search term

● machine learning  
Search term

● artificial intelligence  
Search term

Interest over time ?

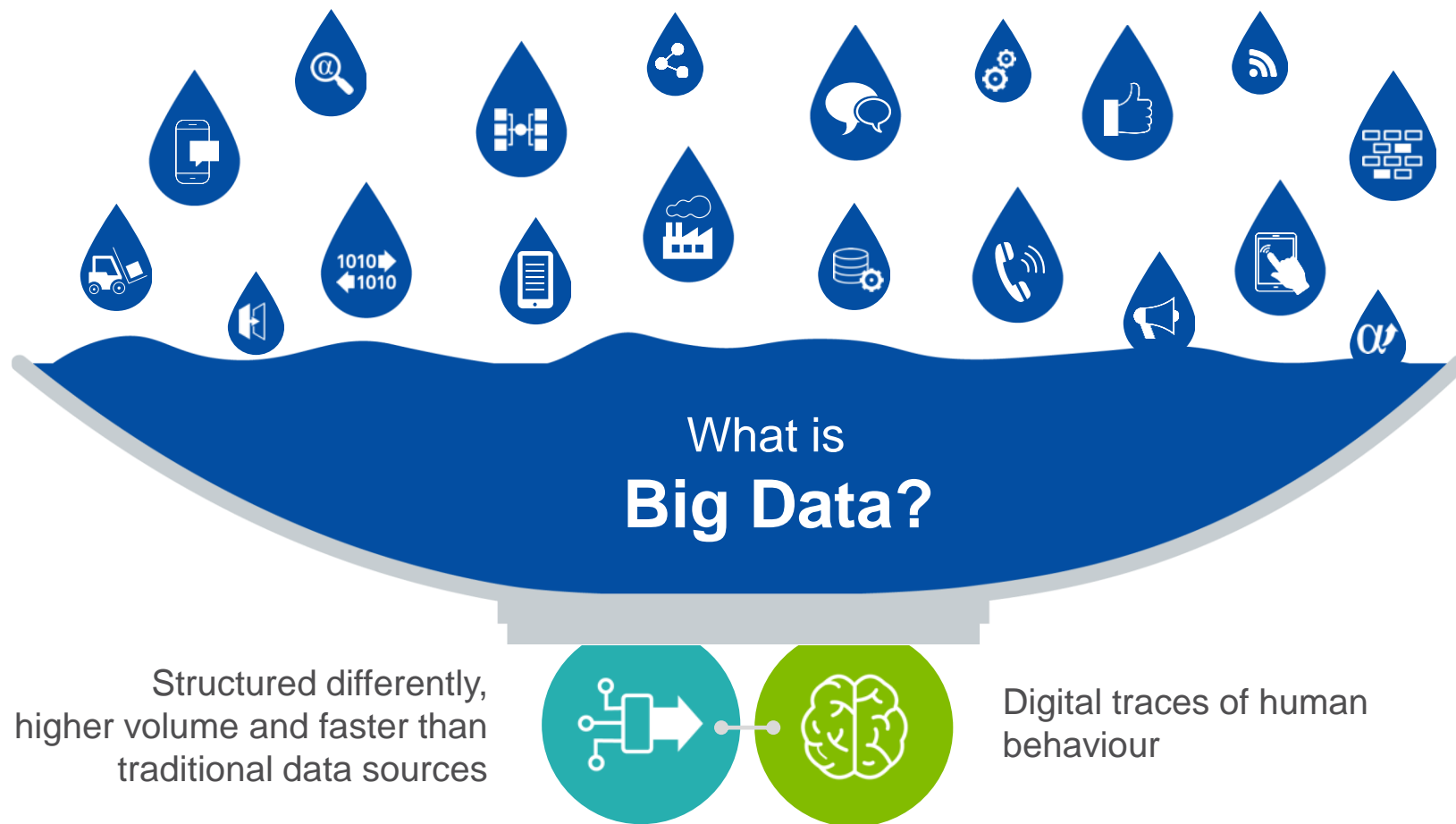


Source: <https://trends.google.com/trends/explore?date=2009-01-01%202018-09-27&q=big%20data,machine%20learning,artificial%20intelligence> As of 27/09/2018. For illustrative purposes only.

## Why are we doing this






- Seeking to deliver investors better result and experience
- Forecast more things, forecast better
- Measure exposures with higher precision
- Higher level of customisation
- Innovation, differentiation, additivity

# Big Data



Source: BlackRock, 31 July 2018. For illustrative purposes only.

# Where is the data coming from?

Text and images	You!	Sensors	Businesses	Institutions
 <p>Things that didn't used to be considered data are now data</p>	 <p><u>Your online activity (search, clicks, views)</u> leaves traces of preferences and sentiment <u>Your smartphone (apps, location)</u> creates anonymous geolocation data</p>	 <p>Robots, satellites, weather, transportation, smart cities, all provide and create data</p>	 <p>Business transactions (B2B, B2C), ad preferences, employment</p>	 <p>Governments, central banks, regulators all create and gather data</p>

## Conclusion

The world is now digital. If you can think of something, there probably is a way to measure it and someone is already trying to do it

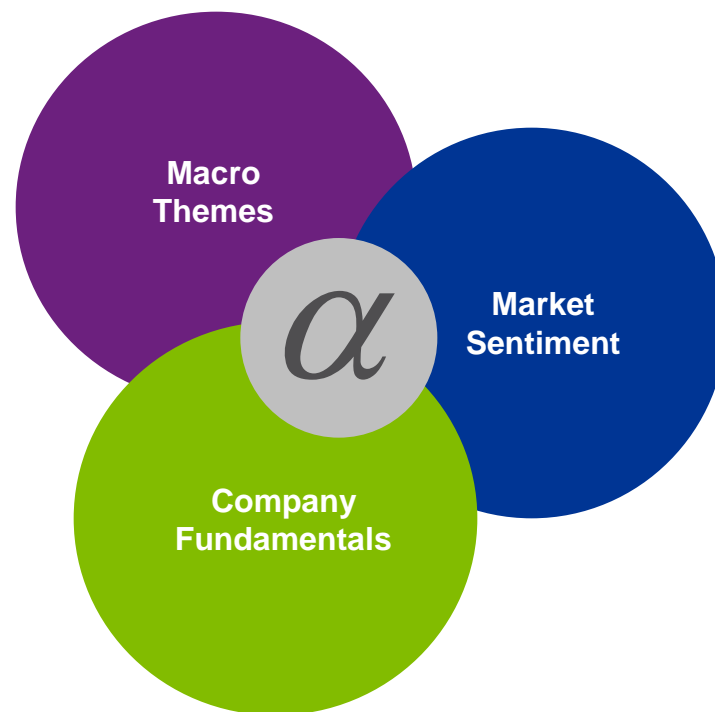
For illustrative purposes only.

## We ask the same questions as any traditional investment manager

Which stocks have strong **fundamentals**?

Offer positive **sentiment**?

Are exposed to attractive **macro themes**?



Source: BlackRock, as at 31 May 2018.

# Big data allows you to ask questions directly

- Instead of looking for answers or relying on interviews/polls, big data allows us to get an answer directly from the largest set of relevant people.

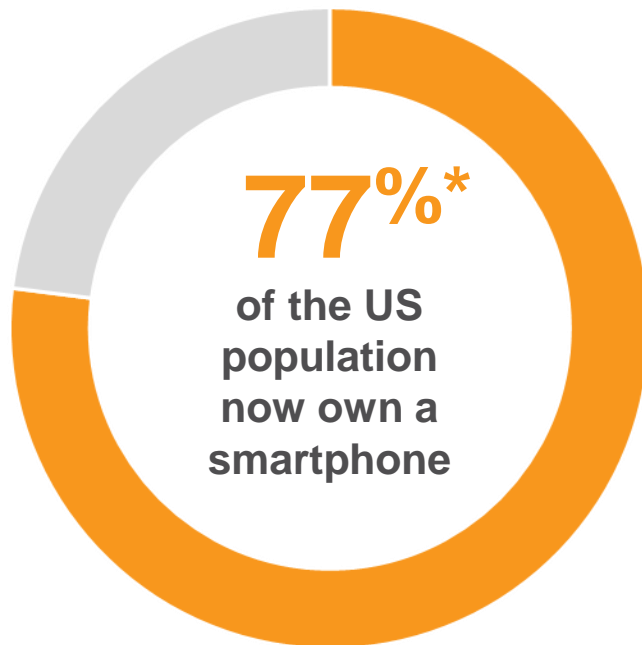
Who to ask	The consumer	Companies	Central Bankers	Sell-side brokers	Employees
Question	What are you buying? What do you like/dislike?	How is your company doing?	Where is monetary policy going?	What do you think of the companies you cover?	How is it to work at your company?
How to get an answer	Online activity reveals intentions, emotions, preferences. Geolocation reveals physical activity	Text-mine conference calls, filings, news, job ads; measure business performance and supply chain	Text-mine minutes, speeches, Q&As	Text-mine broker reports, news, machine-learn analysts accuracy	Track online career websites

Source: BlackRock, as at 31 May 2018. For illustrative purposes only.



# Tracking consumer foot traffic through geo-location

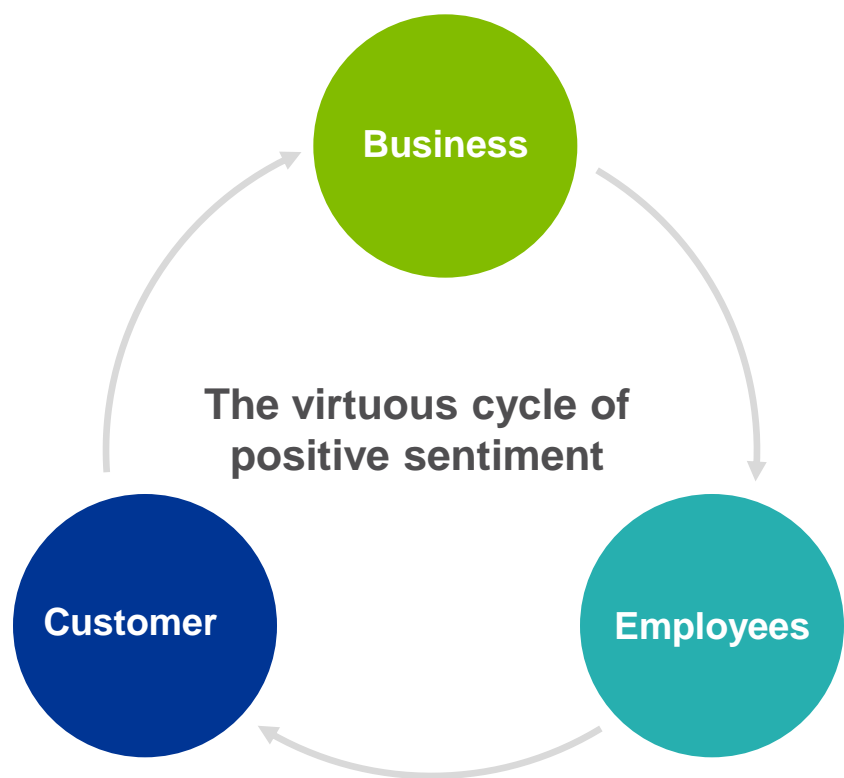
- Multiple sensors in mobile phones - GPS, Wi-Fi and Bluetooth – can provide accurate mapping of user's location
- This can be collected by a third party with the user's permission when they allow apps to access their location
- 50 million active users provide on average 100+ daily data points each, giving 60 billion total data points per month\*\*
- These data points can be mapped with high accuracy to individual locations and aggregated to a company level
- The combined data can be used to find companies that are seeing increasing/decreasing consumer footfall – a key driver of sales



\*Pew Research Center. Survey conducted Jan 2018. \*\*BlackRock, Feb 2017. Image source: Shutterstock

# Using social media to see employee views towards company and management

- Companies that have employees that like where they work tend to outperform
- SAE analyses job focused social media to find employee views on their employers
- Data includes comments, CEO approval, likelihood of recommendations and a total score
- Trends in the employee views can drive positive & negative views across our investment universe



## BlackRock Reviews

1,591 reviews

Filter Full-time Part-time

3.7 ★ ★ ★ ★ ★ Rating Trends

77% Recommend to a friend

93% Approve of CEO



Laurence D. Fink  
1,001 Ratings  
Highest Rated CEO 2017

## 1,591 Employee Reviews

9 Mar 2018



### "Top employer in the industry"

★★★★★ Current Employee - Anonymous Employee

Recommends Positive Outlook Approves of CEO

I have been working at BlackRock full-time

#### Pros

Great people, the place to be for a good intersection of finance and technology.

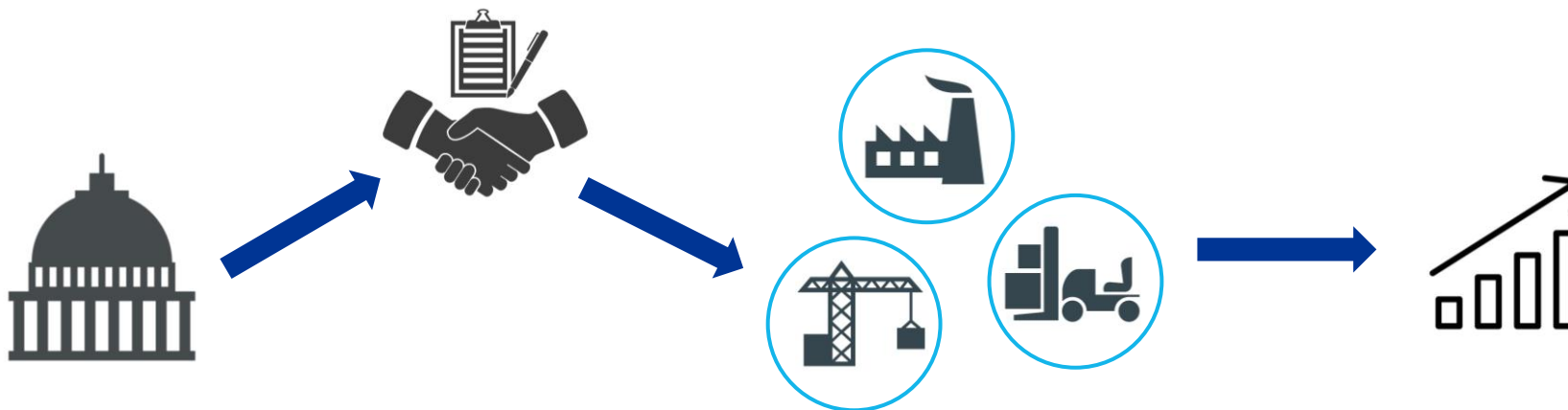
#### Cons

Small cog in a gigantic machine, one can easily lose team camaraderie.

Source: BlackRock Research & Glassdoor. As at 31 March 2018. For illustrative purposes only. Past performance is not a reliable indicator of current or future results.

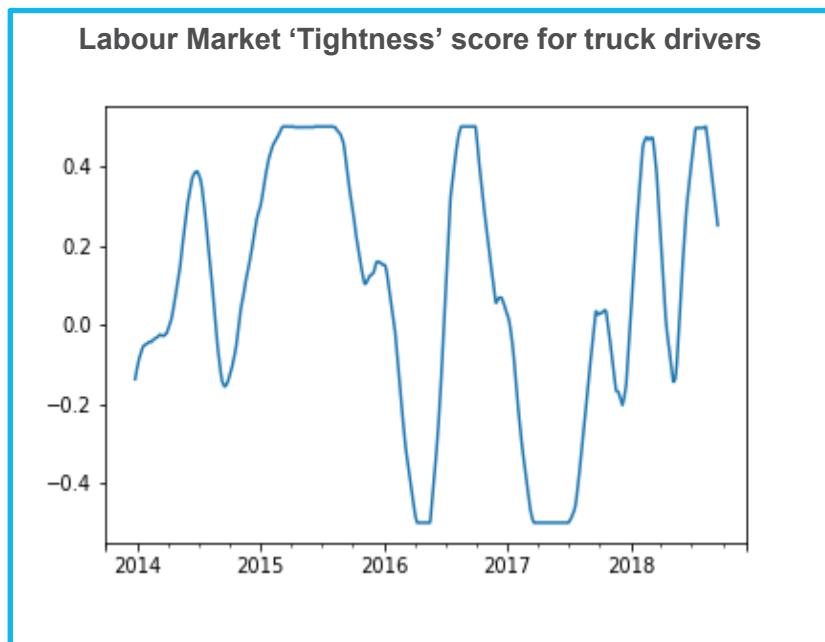
# US government contracts impact company revenues across many industries

- Each year, the US government awards approximately US\$500bn in contracts for specific goods and services.
  - Any federal contract, grant, loan or financial assistance above US\$25,000 has to be published on a publicly searchable website
  - Transactions financed by the Department of Defense are required to be reported within 90 days whereas all other transactions must be reported within 30 days
  - We analysed over 37 million transactions between 2006-2016
- Transactions with companies across industries as diverse as capital goods, health care, software and pharmaceuticals
- We select stocks that have a growing dollar amount of US government contracts



Source: Top: BlackRock Research, 30 June, 2018, USAspending.gov, accessed 21 November, 2017 bottom: Shutterstock, 22 August, 2018. For illustrative purposes only. There is no guarantee that a positive investment outcome will be achieved.

## Using job posting data in a novel way



*"The American Trucking Association says we'll need 898,000 more drivers over the next decade to keep up with growth and demand. It's not exactly clear how the trucking industry is going to shake out."*

- azcentral.com

*"The median salary for truckers increased 15 percent from 2013 to 2017, according to the ATA, and some companies are offering sign-on bonuses as high as \$10,000 to attract drivers."*

- bloomberg.com

By comparing the current level of job postings for a particular skill with the long-term average, we can estimate how 'tight' the job market for that skill is

We find that an increase in tightness score predicts higher labour costs at the industry level

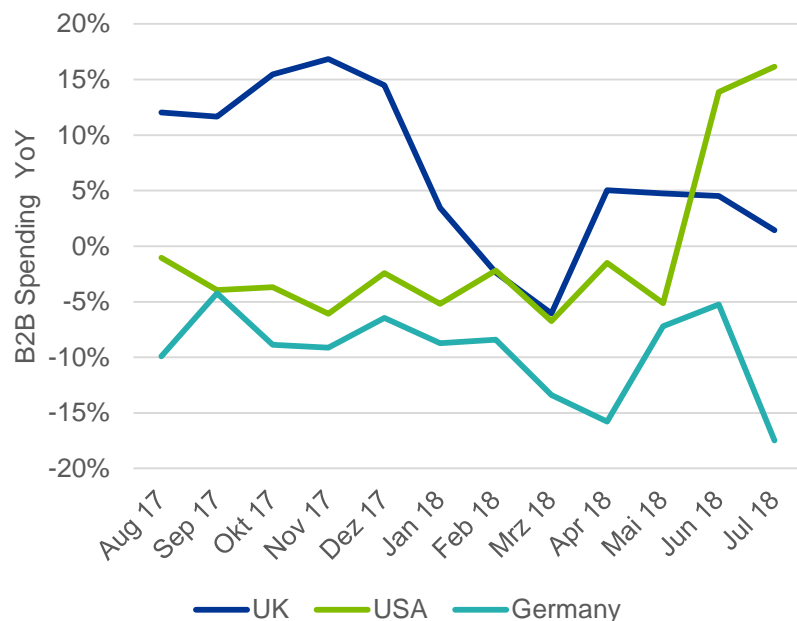
And at the firm level, more tightness predicts lower operating margins and higher SG&A expenses

Source: BlackRock, as of 31 August 2018, for illustration purposes only.

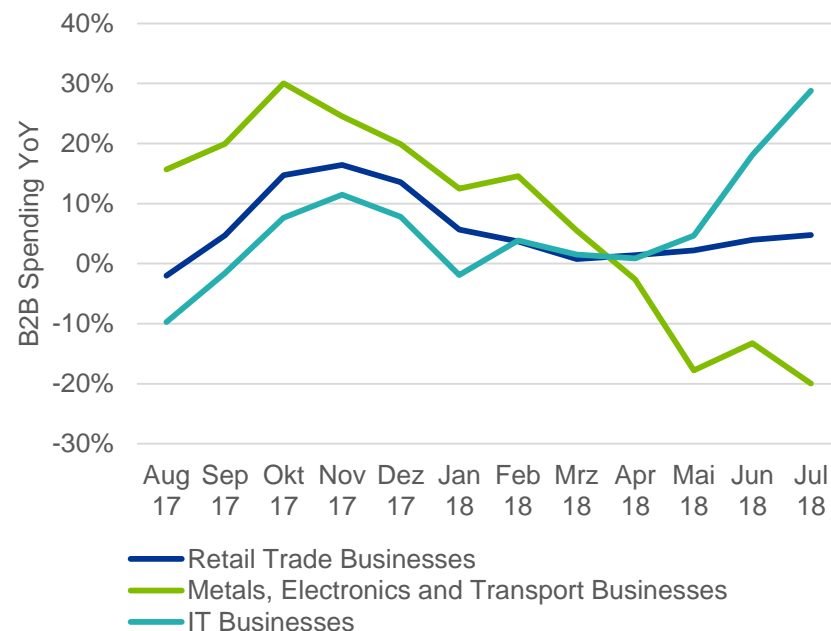
# Capturing B2B spending activity using e-invoices

- We track business-to-business (B2B) electronic invoices from a global sample of 150,000 major companies worldwide, covering 100bn+ USD transactions per year
- Aggregated data on country- and industry-level business spending provide early read on trends in economic activity
- Timeliness of invoicing information allows us to get ahead of both macro data and company sales accounting data
- Capturing data from both listed and unlisted firms provides a more complete picture of the economic strength of individual countries and sectors

## B2B Spending - UK, USA and Germany



## B2B Spending Diverging across Industries



Source: BlackRock Research. As at 31 July 2018. For illustrative purposes only.

# Machine learning (ML) and Artificial Intelligence (AI)

## What do people mean when they say Machine Learning?

Getting a computer to do things without explicitly programming all the details

Very useful when describing task/environment that is prohibitively complex

Very useful when cause/effect isn't clear-cut, or when you have many interdependencies, interactions, non-linearities

Very useful when forecasting models have a lot of inputs

Open and lively discussions in the field on terminology

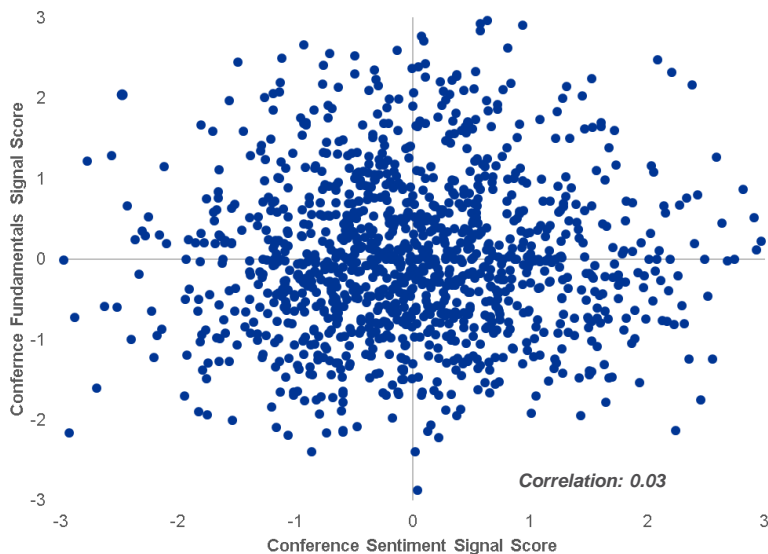
## Rules of thumb

- 1 If it can be done in a few seconds by a human being, it can likely be automated today with ML/AI
- 2 If there are a lot of good examples available, ML/AI can likely figure it out
- 3 Things are happening fast, more and more things are possible by the month

# Predicting fundamentals with company conference calls

- Conference calls used extensively to forecast sentiment towards the company
  - Prior work has been based on word-counts of pre-defined dictionaries or used machine learning to identify most predictive individual words
- New signal goes beyond sentiment to identify firms with improving fundamentals
  - Machine learning used to identify the types of language used by firms which have improving fundamentals
  - Entire conference call is used and captures the importance of context, word order, collocation, adjectives/nouns
  - Signal forecasts changes to long-term fundamentals; cash flows, EPS, operating margin & asset turnover

High proportion of US LC stocks' signal scores assessing sentiment & fundamentals from conference calls are contrasting



Carnival Cruise Lines Q4 2017 call highlights the difference between short-term sentiment and long-term fundamentals

We achieved full year 2017 adjusted earnings of nearly \$2.8 billion or \$3.82 per share, that's \$0.37 **higher** than last year's record results and well **above** the high-end of our original December guidance range of \$3.30 to \$3.60 and that's despite a \$0.32 **drag** from fueling currency moving **against** the aforementioned hurricane **disruptions**; **challenges** in the China market, including itinerary **disruptions** involving Korea and elsewhere ongoing geopolitical **concerns** preventing port calls to popular higher-yielding destinations like Turkey; **strong** operational improvement contributed \$0.58 per share for the bottom line year-over-year, which when combined with the level of business **accretion** from our share repurchase program overcame the variety of significant **headwinds** this year to deliver another full year earnings record.

*Sentiment on the call is negative. However, new signal able to capture the context around the sentiment and the better long-term fundamental outlook.*

Source: BlackRock. As at 31 March 2018. For illustrative purposes only. Reference to the names of each company mentioned in this communication is merely for explaining the investment strategy, and should not be construed as investment advice or an investment recommendation of those companies. Figures shown are in USD. There is no guarantee that a positive investment outcome will be achieved.

## Capturing topics from company earnings calls

- Text analysis of company conference call used extensively to gauge company level sentiment and management quality
- Similar techniques can be used to capture “topics” that firms are talking about;
- Momentum effects can be exploited across clusters of stocks with exposure to each topic

### Topics mentioned in US semiconductor company Q3 2016 conference call



Source: BlackRock & Wordle.net. Data as of 31 January, 2017. The larger the word the greater frequency of use in the call. For illustrative purposes only.



## Conclusions

**Big data and machine learning** do not replace investing; but we believe they are becoming increasingly necessary for delivering alpha.

**Our competitors** for technology, and increasingly for human capital, are not financial firms; they are technology firms.

These techniques are actively used in our models to potentially **generate alpha**.

Source: BlackRock, as at 31 August 2018. There can be no guarantee that the investment strategy can be successful. There is no guarantee that research capabilities will contribute to a positive investment outcome. Investment processes subject to change and provided here for illustrative purposes only.

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Don't take any unnecessary risks.

Lower risk ← Higher risk  
Typically lower rewards      Typically higher rewards

1	2	3	4	5	6	7
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risk indicator

Read the Key Investor Information Document.

THIS IS A MANDATORY ANNOUNCEMENT.

# Americas Diversified Equity Absolute Return Fund (ADEAR)

## A sub-fund of BlackRock Strategic Funds (BSF)

Systematic Active Equity

October 2018



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ICB1118E-656649-2045168

# BSF ADEAR team



Source: BlackRock. As at 31<sup>st</sup> October 2018, subject to change.

# Investment process

## Forecasting returns across a 3,500 stock universe

### Long Horizon 1 month - 12 months

Fundamentals

Sentiment

Macro Themes

### Mid Horizon 1 day – 1 month

Flow

Trending

Events

US  
Large Cap  
Portfolio

US  
Small Cap  
Portfolio

Latin America  
Portfolio

Canada  
Portfolio

US  
Mid Horizon  
Portfolio

## Portfolio construction Risk forecasting & cost forecasting

### Fund framework consistent with other SAE hedge funds

- Fundamental insights used across a number of portfolios that are split regionally and across the cap spectrum in the US
- Separate mid-horizon portfolio for faster burn signals

### BSF ADEAR also benefits from SAE's emphasis on portfolio construction, risk management and transaction cost forecasting

Source: BlackRock, as at 30<sup>th</sup> September 2018. For illustrative purposes only. Risk management cannot fully eliminate the risk of investment loss

# Long Horizon

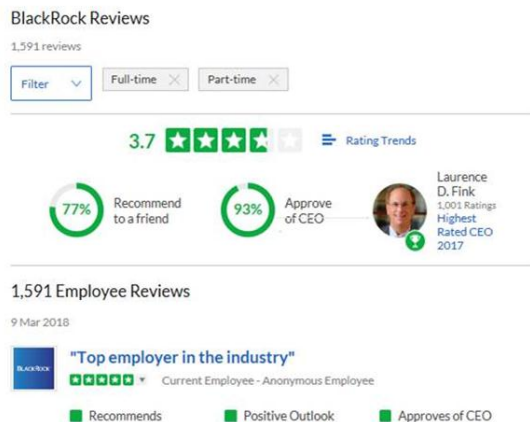
We ask many of the same questions as traditional managers

- ▶ Which stocks have strong fundamentals?
- ▶ Offer positive sentiment?
- ▶ Are exposed to attractive macro themes?

Process utilises cutting edge technology and unstructured data sources to answer the questions

## Fundamentals

Example: Social Media



Use software to read online commentary to gain insights on employee attitudes

## Sentiment

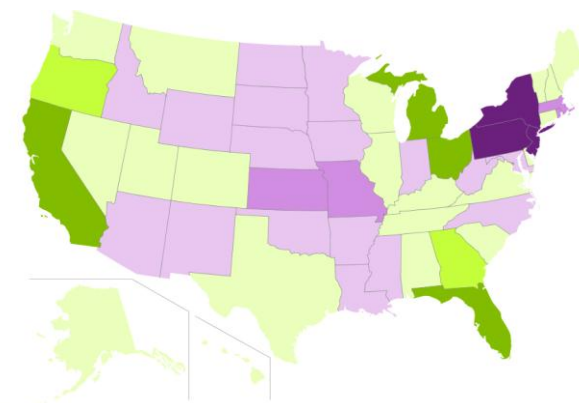
Example: Conference Calls



Scan vast amounts of text data to understand which topics each company has exposure to

## Macro Themes

Example: 10-K Filings

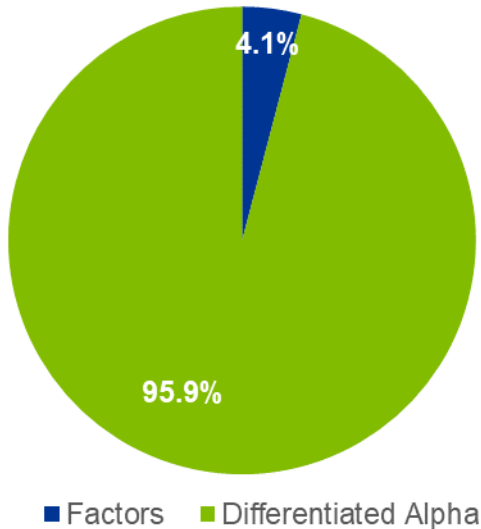


Combine state level economic data with each company's state exposures mined from 10-K filings

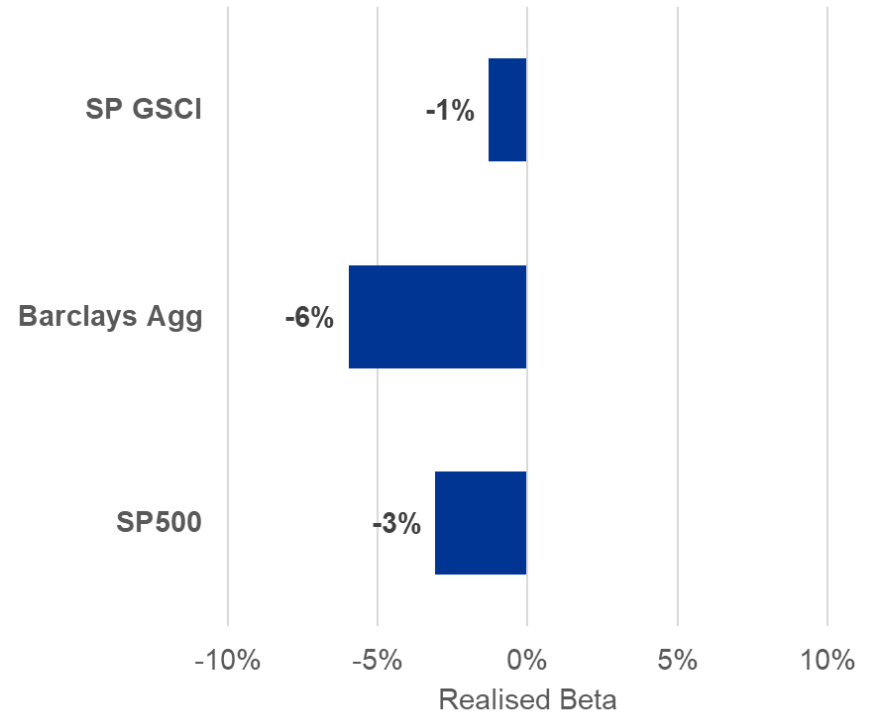
Source: BlackRock and Glassdoor, 30<sup>th</sup> September 2018. For illustrative purposes only

# Differentiated alpha – low exposure to factors and uncorrelated to the market

Source of return - High % of differentiated alpha\*



Since inception realised betas of BSF ADEAR to market indices (using weekly returns)\*\*



**The figures shown relate to past performance. Past performance is not a reliable indicator of current or future results and should not be the sole factor of consideration when selecting a product or strategy.**

\*Source: BlackRock, HFRI, Fama-French as at 30<sup>th</sup> September 2018. R-squared statistic calculated from regression of monthly performance over 5 year period October 2013 – September 2018, against monthly returns to Fama-French factors. Differentiated factors exclude commonly used sources of alpha in the industry as identified by the Fama-French global factors. BSF ADEAR performance is the \$A2 share class returns of BSF ADEAR, on a NAV to NAV basis. Allocations may not sum to 100% due to rounding.

\*\*Source: BlackRock & Bloomberg, using weekly returns of BSF ADEAR \$A2 share class, S&P Goldman Sachs Commodity Index, Barclays Global Aggregate Bond Index and S&P 500 Index from 17<sup>th</sup> February 2012 to 31<sup>st</sup> October 2018. Fund inception was 17<sup>th</sup> February 2012.



# BSF ADEAR risk allocation

Blend of US Large Cap, US Small Cap, Canada, Latin America and Mid Horizon strategies offers un-correlated return stream

Balanced allocation targeted at all times

- Fundamental (US LC, US SC, Canada and Latin America) 60-80%
- Mid Horizon 20-40%

Daily correlations*	Large Cap	Small Cap	Mid Horizon	Canada	Latin America
Large Cap	1				
Small Cap	0.29	1			
Mid Horizon	0.50	0.22	1		
Canada	-0.04	0.15	0.03	1	
Latin America	0.07	-0.05	0.00	-0.09	1

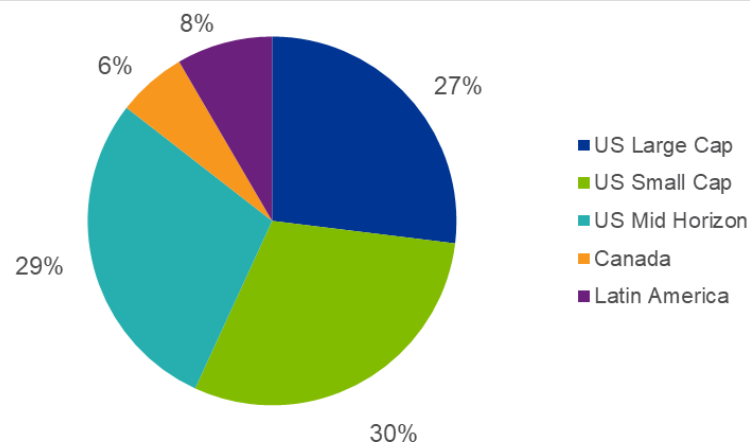
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Daily correlations from sub-strategy performance gross of fees from 1<sup>st</sup> November 2017 to 31<sup>st</sup> October 2018.

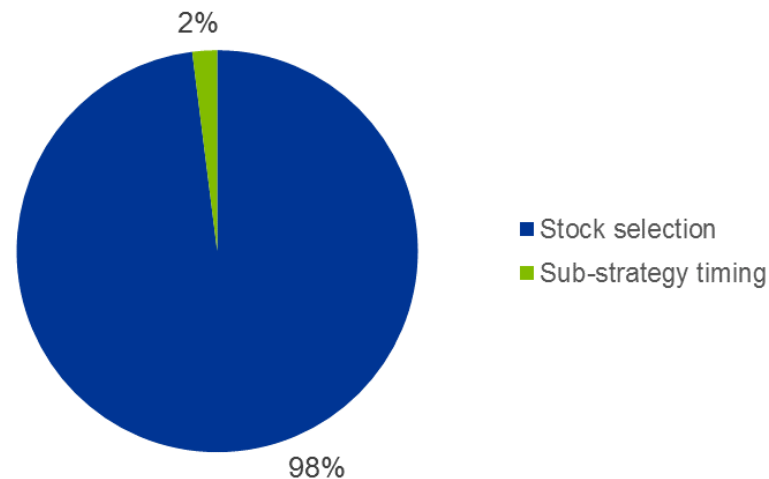
\*Source: BlackRock, data as at 31<sup>st</sup> October 2018. \*\*Source: BlackRock, data as at 31<sup>st</sup> October 2018.

Allocations may not sum to 100% due to rounding.

BSF ADEAR risk allocation\* – 31<sup>st</sup> October 2018



BSF ADEAR risk allocation\*\* - 31<sup>st</sup> October 2018



# BSF Americas Diversified Equity Absolute Return

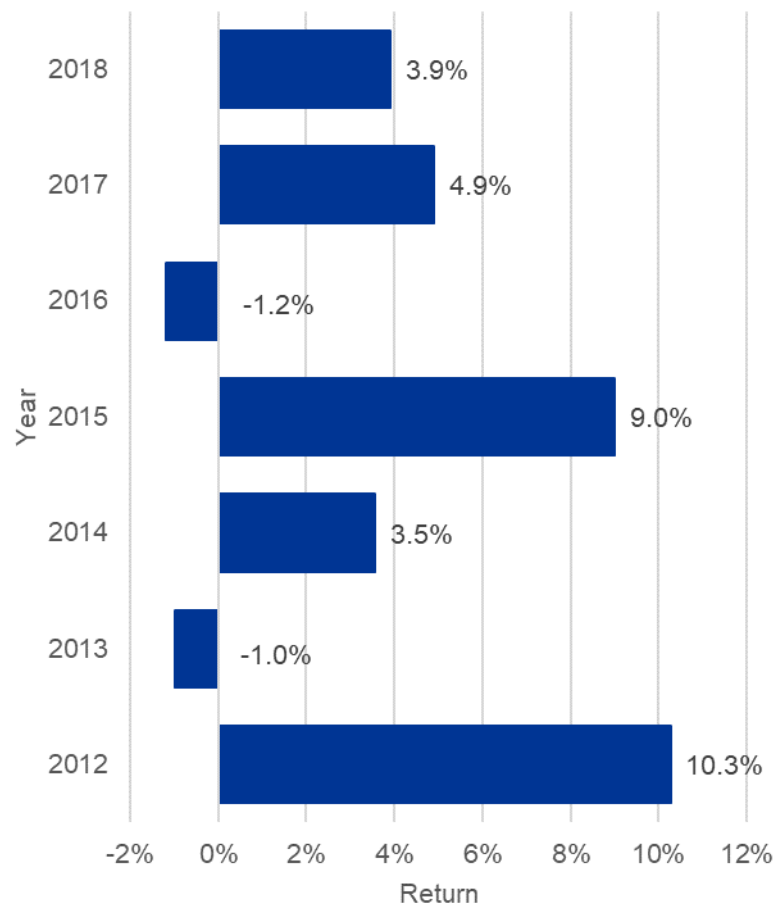
## Overview

- Equity market neutral strategy focusing on the alpha opportunity across the equity markets of the Americas
- The Fund aims to achieve a positive absolute return through a combination of capital growth and income regardless of market conditions
- Fund inception 17<sup>th</sup> February 2012.
- Five underlying stock selection strategies US Large Cap, US Small Cap, US Mid Horizon, Canada and LATAM that provide diversification across multiple dimensions - geography, market capitalisation, investment horizon. Diversification and asset allocation may not fully protect you from market risk
- Research driven investment process with strong emphasis on innovation, data and technology.
- Low correlation to underlying equity markets and other managers

## BSF ADEAR Fund

31 October 2018	YTD	1 year	3 years	5 years	ITD*
Return p.a. (%)	3.91	2.49	1.78	3.76	4.32
Volatility p.a. (%)		4.61	5.44	5.53	5.60
Sharpe ratio		0.5	0.3	0.7	0.8
Fund AUM					\$1,257m

## Annual performance to 31<sup>st</sup> October 2018\*



**The figures shown relate to past performance. Past performance is not a reliable indicator of future results and should not be the sole factor of consideration when selecting a product or strategy.** Returns are net of fees and based on an the dealing NAV of the \$A2 share class, which does not distribute income. Performance is in US Dollar. Returns may increase or decrease as a result of currency fluctuations where the material is being distributed into a country that has a currency other than that used in the past performance calculations. Diversification and asset allocation may not fully protect you from market risk \*Source: BlackRock Performance from 17 February 2012 to 31<sup>st</sup> October 2018.

## Product details

Product details	
Base currency	USD
Available currencies	USD, EUR, GBP, CHF, SEK, AUD, YEN
Hurdle	3 Month USD LIBOR
Liquidity	Daily
Cut off	12 pm CET
Pricing	4 pm CET
Administrator/Custodian	State Street (Luxembourg)
Main CFD trading counterparties	Morgan Stanley, Goldman Sachs, BoAML
Initial fee	Up to 5%
Annual management fee	1.50% (A share class ) or 1.00% (D share class)
Performance fee	20%
Hurdle	Yes
High water mark	Yes
Bloomberg Ticker A Share Class	BSADA2U LX/BSADA2E LX
Bloomberg Ticker D Share Class	BSADD2U LX/BSADD2E LX
Portfolio characteristics	
Forecast volatility	Up to 10%
Gross exposure vs NAV	200% - 700%
Net exposure vs. NAV	-10 - 10%
Forecast Beta	0
Number of long positions	1,000 – 2,000
Number of short positions	1,000 – 2,000
Largest individual stock position vs NAV	</> +/- 5%
Largest industry position vs NAV	</> +/- 10%
Largest country position vs NAV	</> +/- 5%

Source: BlackRock. Date as at 31<sup>st</sup> October 2018.

## Important Information: Risks

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- Past Performance is not a reliable indicator of current or future results and should not be the sole factor of consideration when selecting a product or strategy.
- Specific fund risks
  - The fund invests a large portion of assets which are denominated in other currencies; hence changes in the relevant exchange rate will affect the value of the investment.
  - The Fund may be exposed to finance sector companies, as a service provider or as counterparty for financial contracts. Liquidity in the financial markets has been severely restricted, causing a number of firms to withdraw from the market, or in some extreme cases, becoming insolvent. This may have an adverse affect on the activities of the fund. T
  - The strategies utilised by the Fund involve the use of derivatives to facilitate certain investment management techniques including the establishment of both 'long' and 'synthetic short' positions and creation of market leverage for the purposes of increasing the economic exposure of a Fund beyond the value of its net assets. The use of derivatives in this manner may have the effect of increasing the overall risk profile of the Funds.
  - Investors in this fund should understand that the Fund is not guaranteed to produce a positive return and as an absolute return product, performance may not move in line with general stock market trends as both positive and negative share movements affect the overall value of the fund. The Manager employs a risk management process to oversee and manage derivative exposure within the Fund.
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## Important Information (continued)

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