
THE QUANT CONFERENCE 2019
WORLD'S LARGEST QUANT CONFERENCE OF ITS KIND
NOVEMBER 1
LONDON

Opening Remarks

The Quant Conference

Nikita Fadeev
Founder of *The Quant Conference*

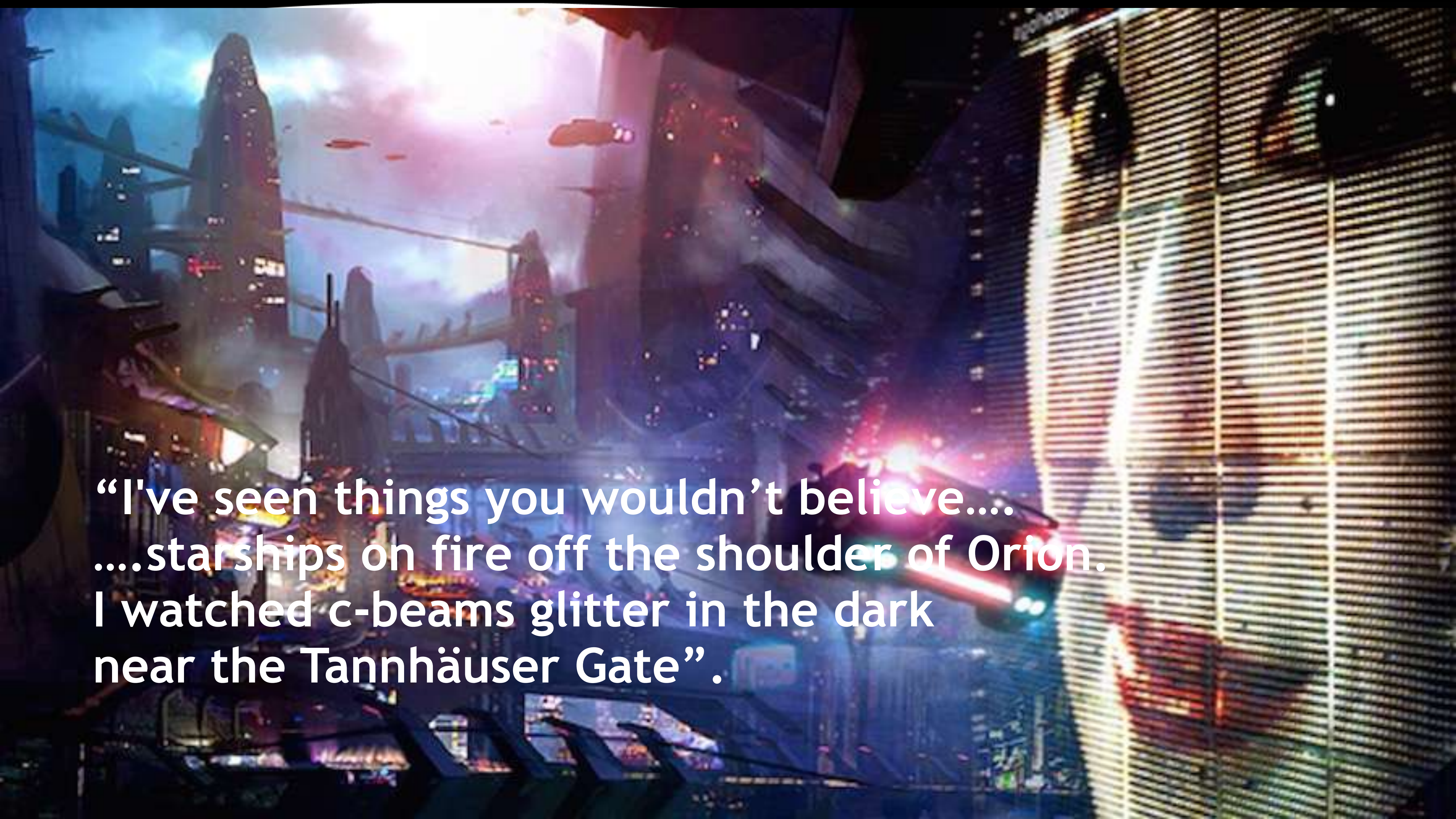
Stuart MacDonald
Managing Partner at *Bride Valley Partners*

KEYNOTE: What the past tells us about the future

The Quant Conference

Stephen Norman

Director, *DTSQUARED*; Ex-CIO, *RBS*; Ex-CTO, *Merrill Lynch*


“I've seen things you wouldn’t believe….
….starships on fire off the shoulder of Orion.
I watched c-beams glitter in the dark
near the Tannhäuser Gate”.

What the past tells us about the future

Stephen Norman

Quant Conference London 1 Nov 2019

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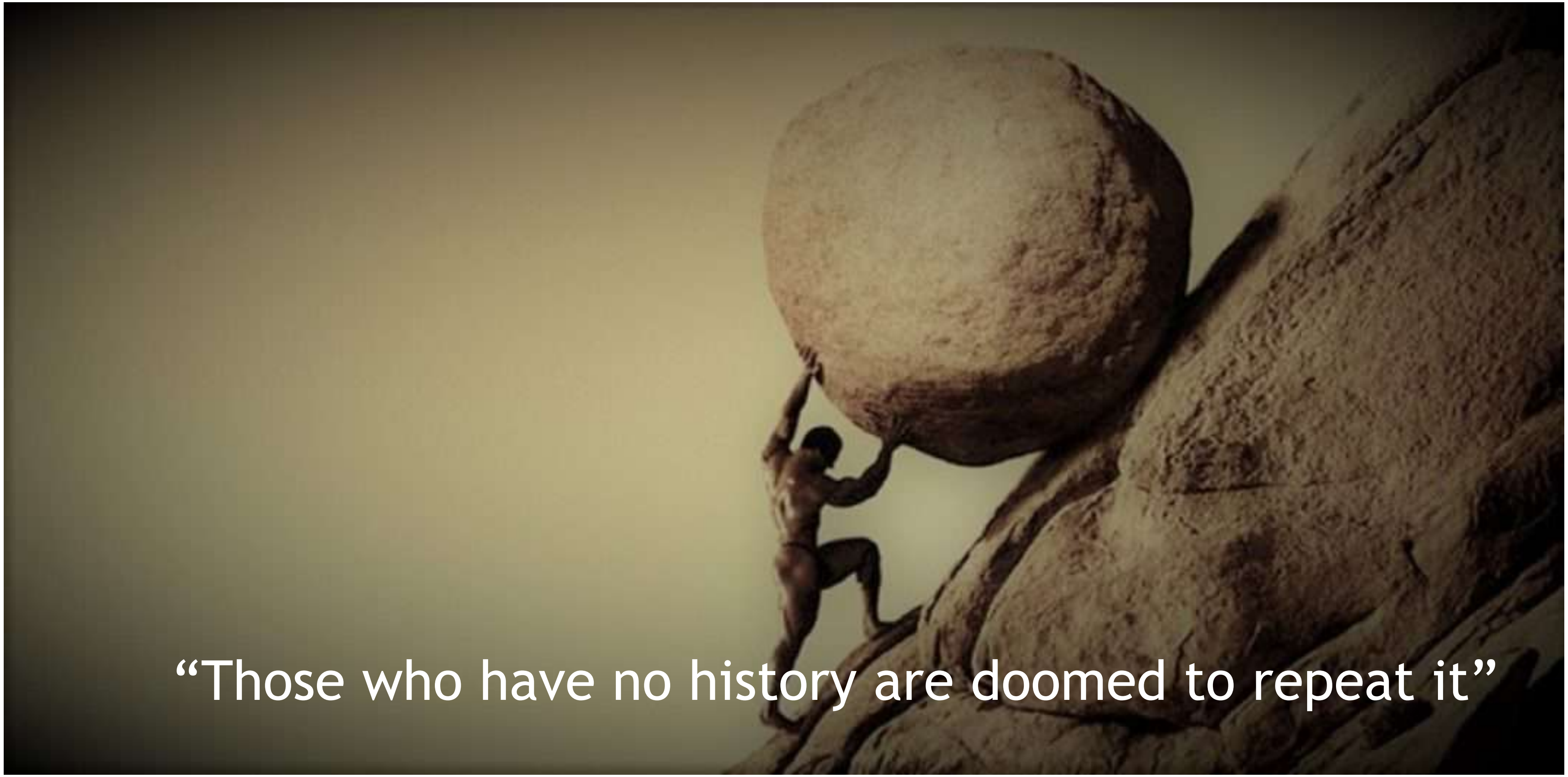
Business Partner



[DT]²

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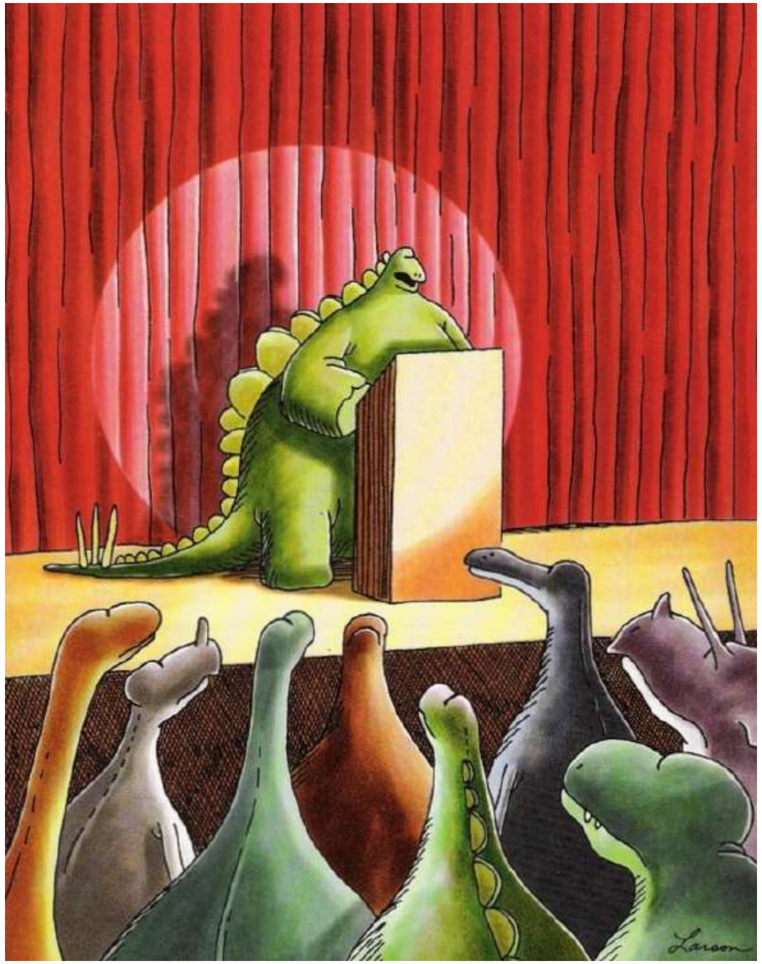


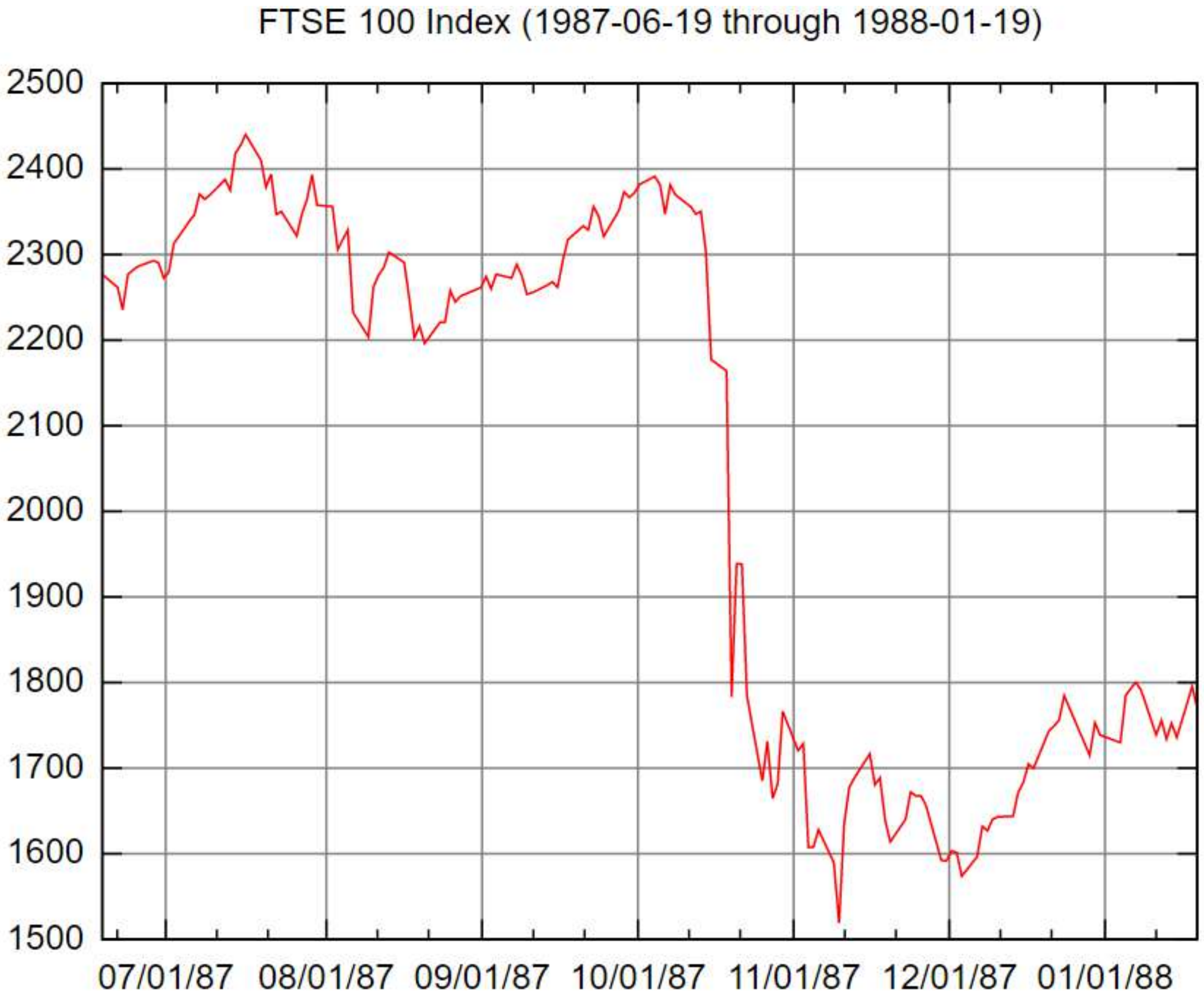
The picture's pretty bleak, gentlemen…the world's climate is changing, the mammals are taking over, and we all have a brain the size of a walnut."

[DT]²

30 years of the FTSE-100

Source: Yahoo Finance

Black Monday: the making of a legend

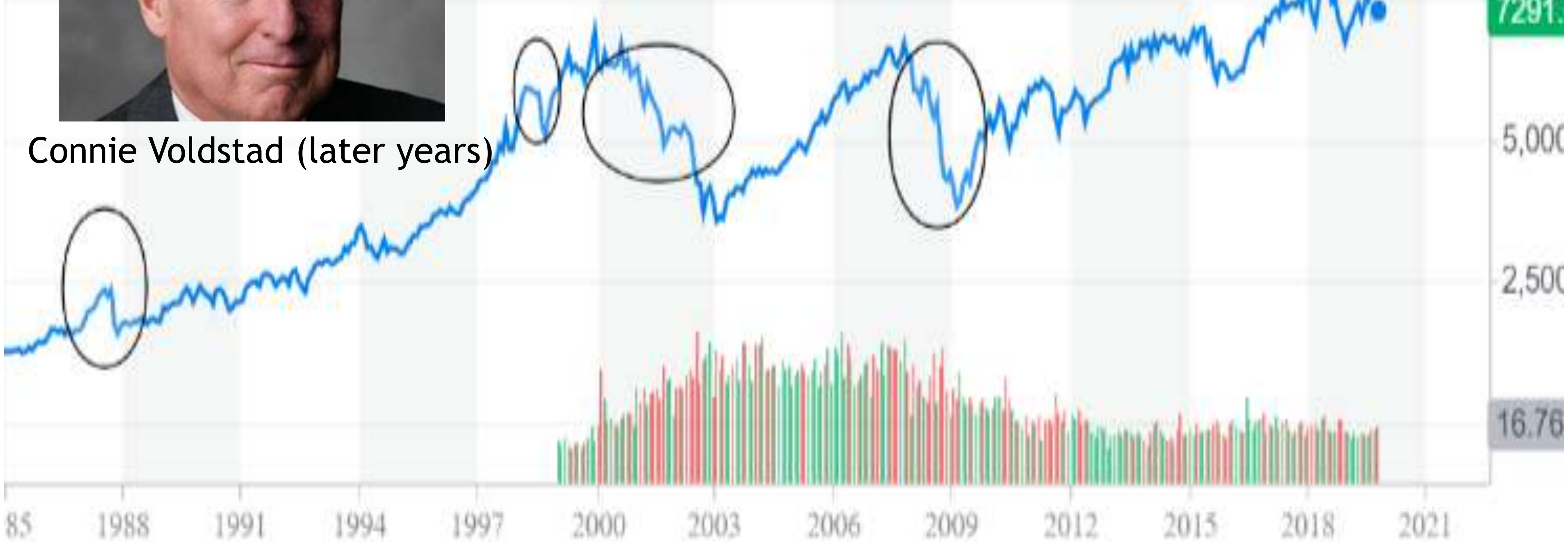


Adrian Pinkus

Source: Autopilot - Own work, CC BY-SA 3.0

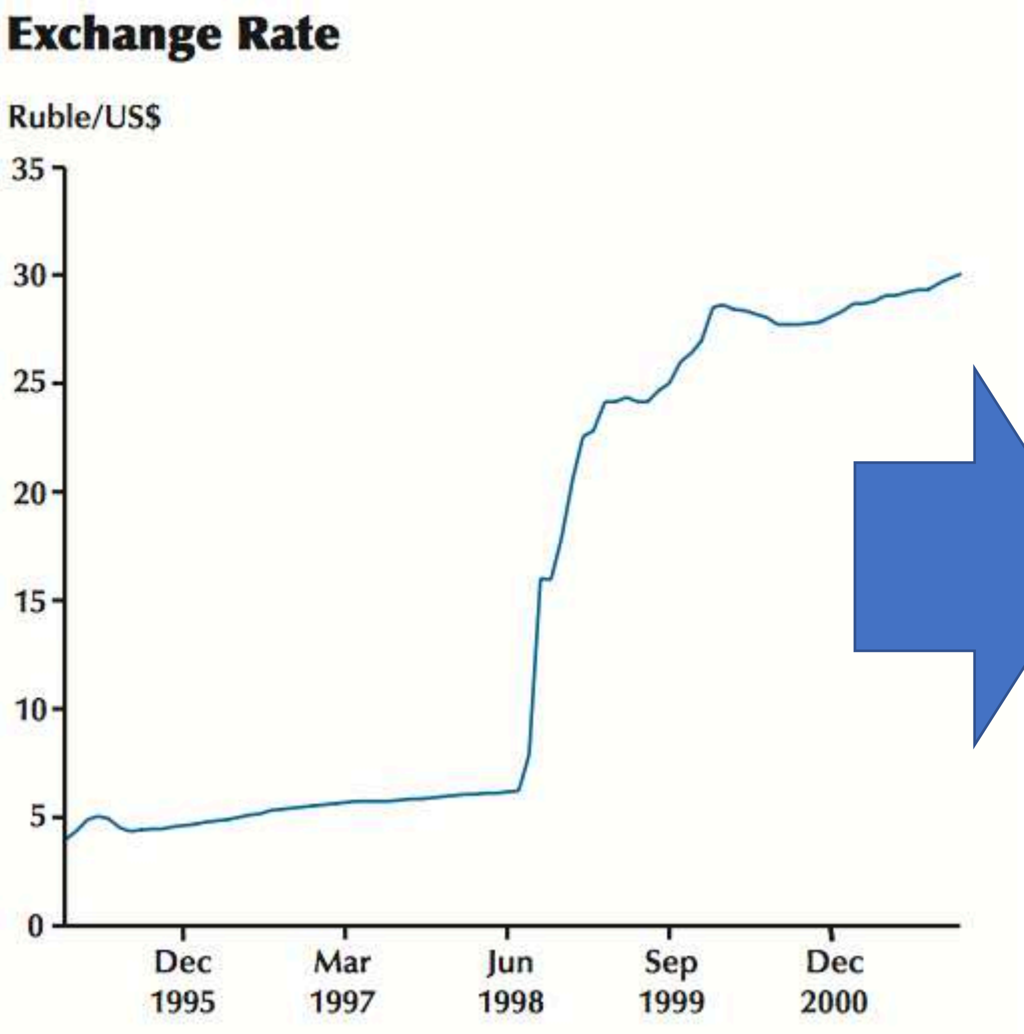
August 1998 – a surprising dinner

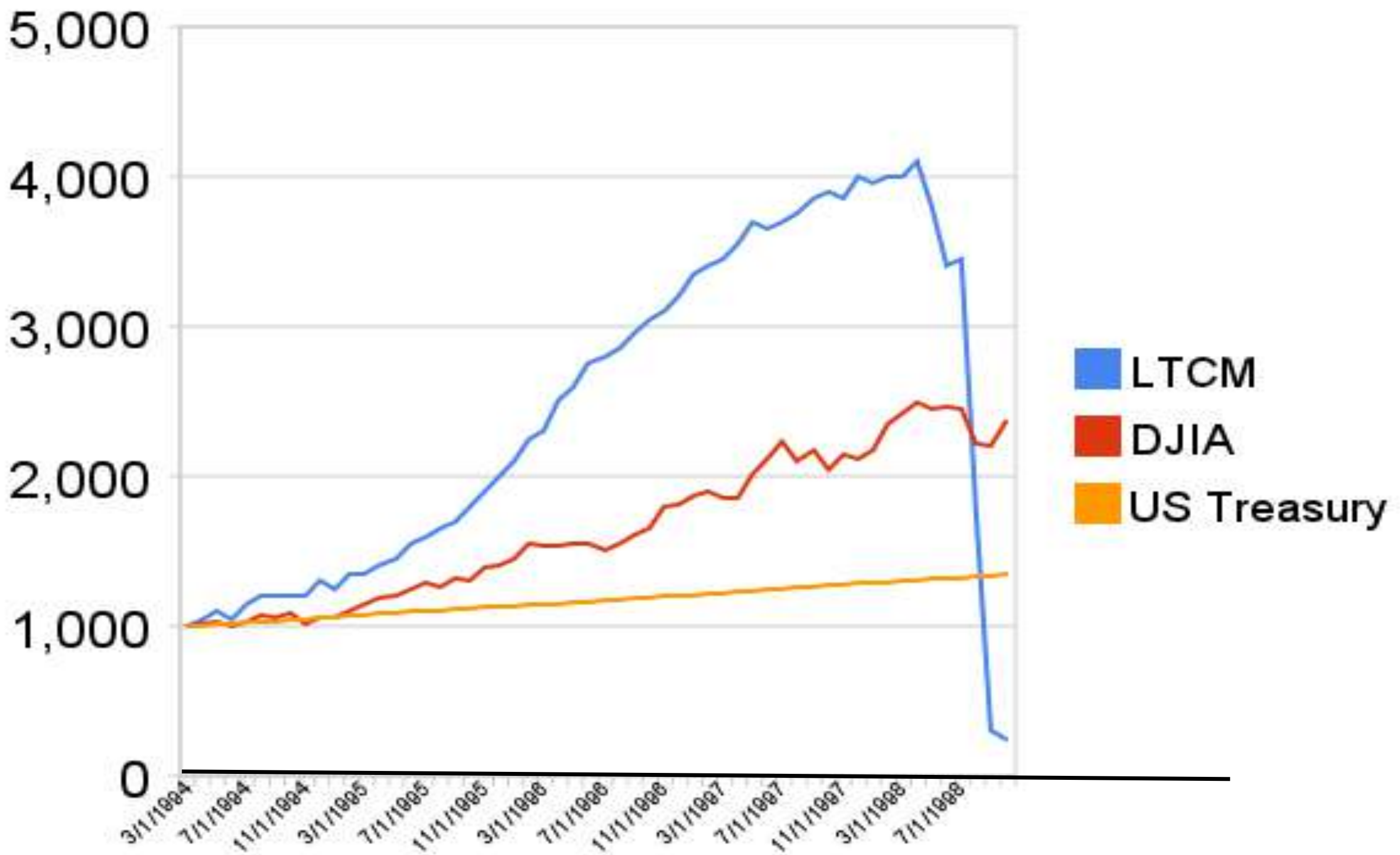
Connie Voldstad (later years)



Source: Yahoo Finance

As the ruble collapsed, so did LTCM





Source: JayHenry - Own work, Public Domain

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	Region	Y2K exceptions	Bad Quality	Rejection Score
Lux’bg	West	130	10	8%
Norway	West	50	2	4%
Belgium	West	30	0.5	2%
Italy	West	20	0.6	3%
Greece	East	100	7	7%
Finland	East	10	0	0%
Poland	East	15	0.2	1%
Holland	East	40	3	8%
Russia	North	150	20	13%
Belarus	North	40	0.5	1%
Sweden	North	50	1	2%
Switzer	North	20	0.4	2%
• k	North	10	0.7	7%
Norway	South	90	4	4%
Germany	South	95	3	3%
France	South	40	1	3%
Eire	South	20	0.2	1%

[DT]²

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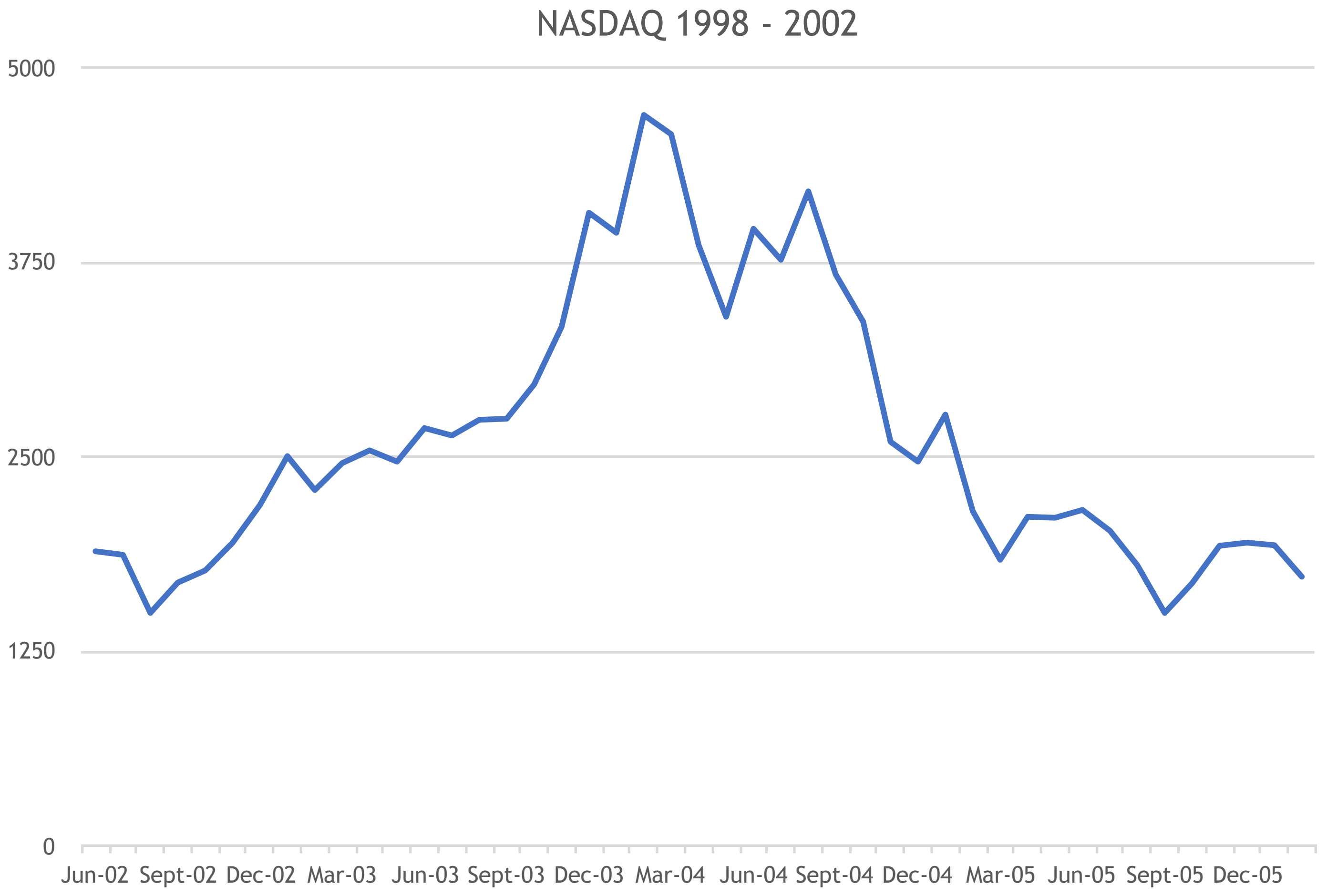
Collapse of the dot coms

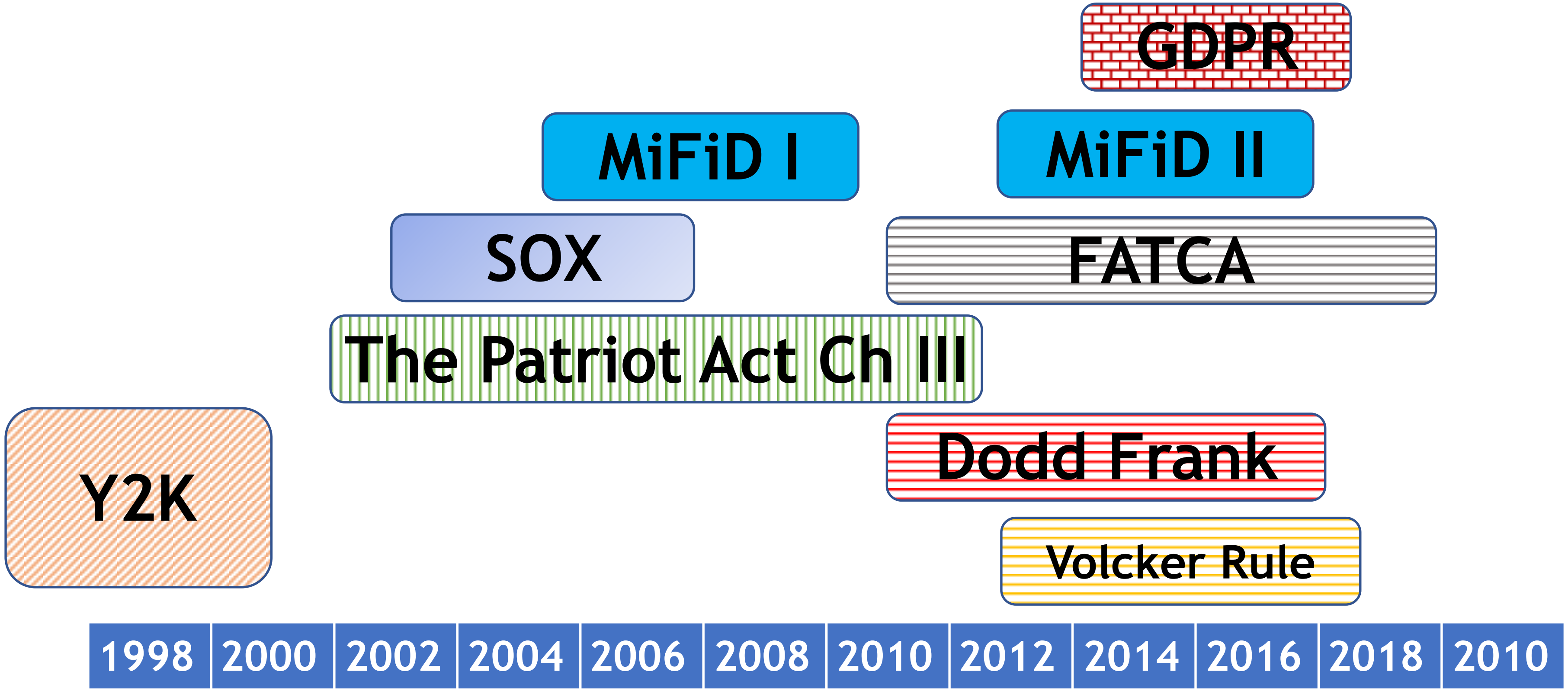
Source: Yahoo Finance

[DT]²

Collapse of the dot coms on the NASDAQ



Since Y2K, there has always been a major US/Euro reg. initiative



[DT]²

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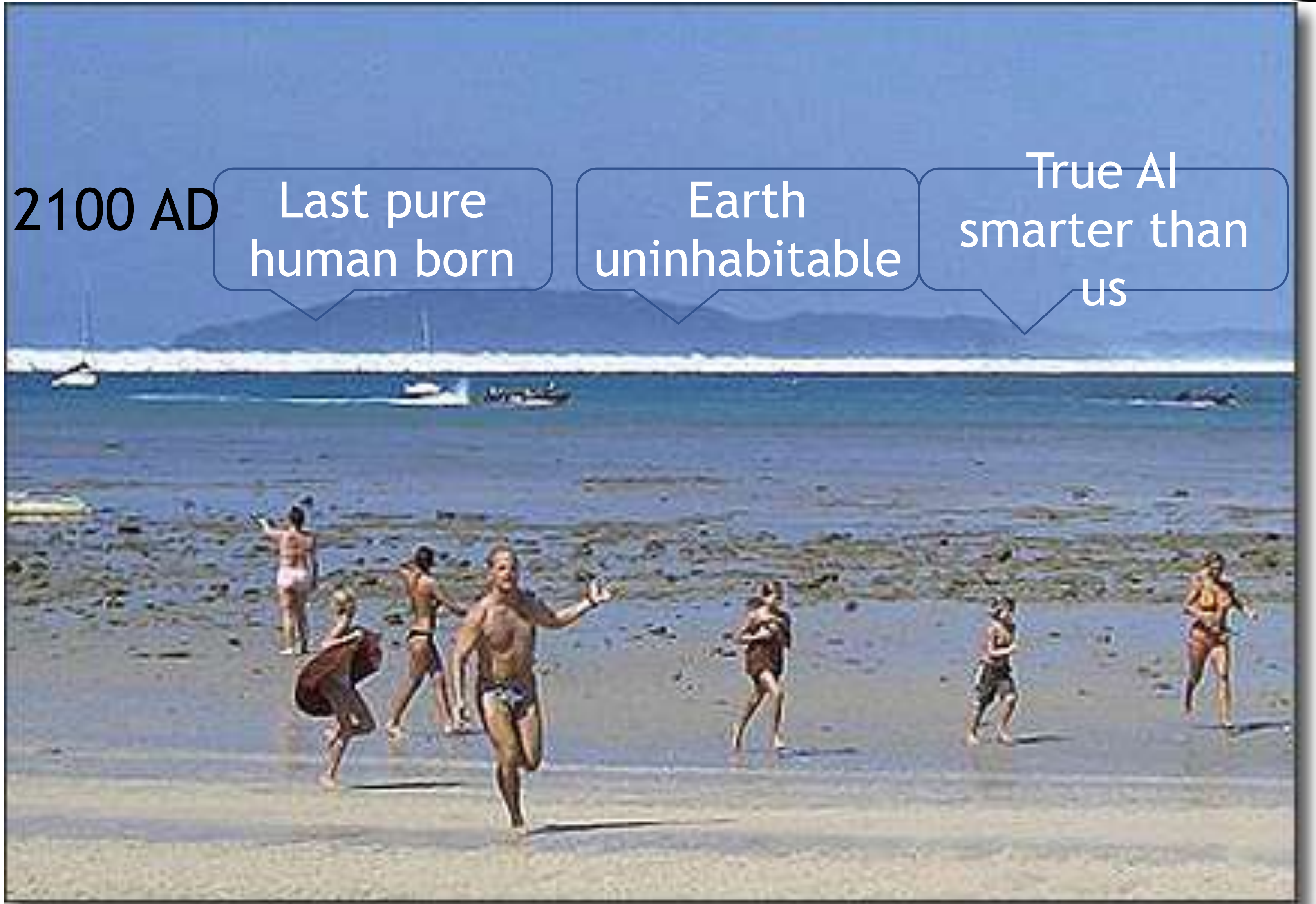

[DT]²

There will always be crazes.

1979 – 2019: constant migration to the vanilla.

- **Higher volumes, faster execution**
- **Lower spreads and commissions**
- **Commoditised research**

Interest rate derivatives

Property and insurance

Precious metals

Weather derivatives

Credit default swaps & options

Mortgages and CDOs

[DT]²

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New assets, old facts:

- HOW-TO KNOWLEDGE IS FREELY AVAILABLE
- COMPUTE POWER IS ON DEMAND & CHEAP
- LOTS OF CODE IS OPEN SOURCE AND FREE

DATA REMAINS EXPENSIVE & VALUAB

[DT]²

Only the first movers make money.

RIGHT NOW…

..feels like a bubble. Two bubb

1. Tech IPOs
    - (Uber, WeWork, Pinterest, Lyft…)
2. Fintech, Insurtech….

[DT]²

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Blockchain is a bust

- *Crypto/blockchain is a cute tech ecosystem*
- *Based on a simple fallacy*
- *Technically it's nuts but…*
- *…the supertechies are hypnotised by its ingenui*
- *Consultants are bewitched by $$$*
- *Practitioners are running (away) hard*
- *And the "business" is afraid to ask*

The Emperor has no clothes!

[DT]²

USD: time for a change?

- *The $-clearing weapon has been over-used*
- *China and Russia hate it*
- *It will be slow but eventually…*
- *…there will be an alternative.*

- *PS. It will not be cryto.*
- *PPS. Bitcoin is here to stay*


There will always be surprises
Would you want it any other way?

Handover to legends of the industry…

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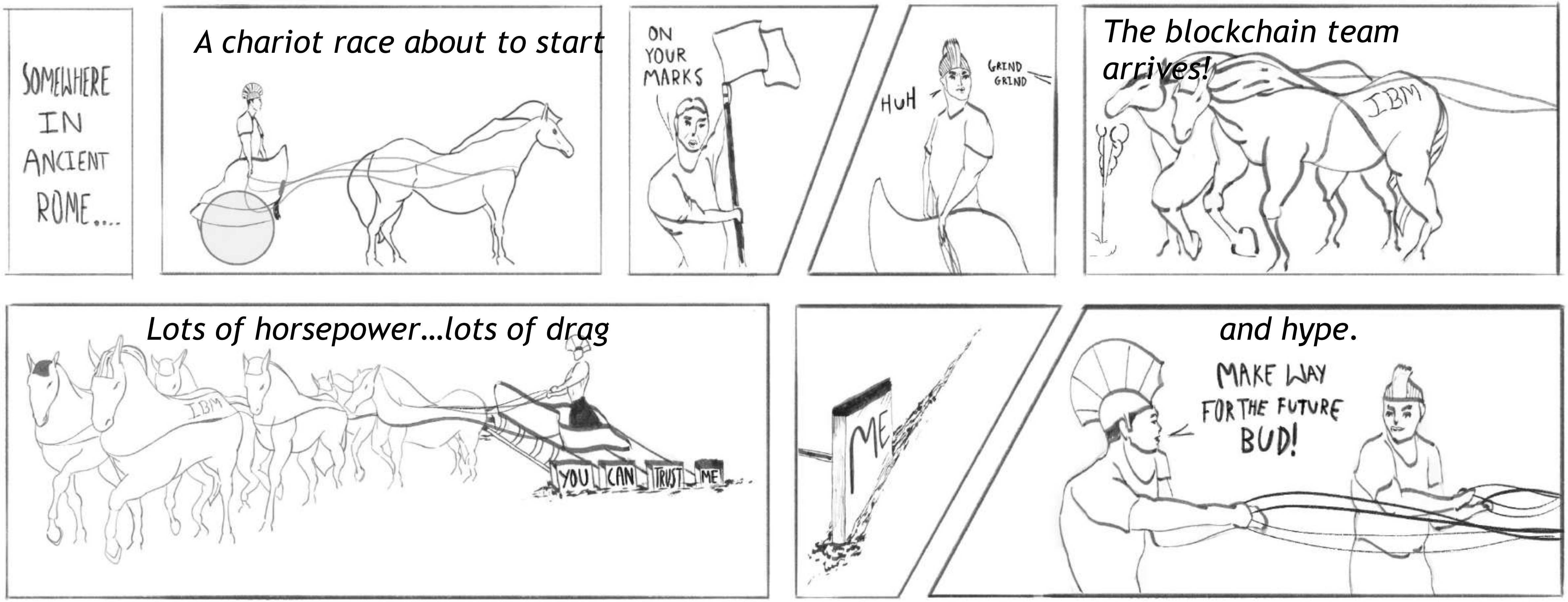

[DT]²

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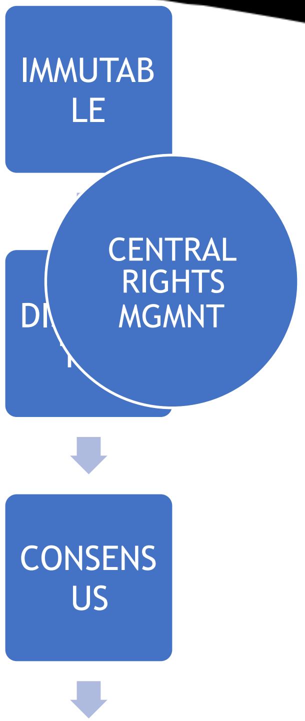
SCOPE OF THIS TALK

A LEDGER

DATE	SUPPLIER	TRAN NO	TYPE	QTY	PRODUCT	DELIVERY STATUS	PAY STATUS
3 Mar 19	Calif Fruit	401943	BUY	8900	Apples	Ordered	LOC
3 Mar 19	Del Monte	401944	BUY	10000	Pineapples	Arrived	Pending
4 Mar 19	Walmart	401945	SELL	500	Pears	Packed	Billed

+



=

A PERMISSIONED BLOCKCHAIN LEDGER

(Permissioned) blockchain solutions[1]

- IBM blockchain system – trade financing - has saved 75% time IBM spent on transaction disputes
- Walmart has created a supplier blockchain. You can tell where a mango comes from in 2.4 seconds, and it used to be days…
- Everledger provides a distributed ledger that assures the identity of diamonds, from being mined and cut to being sold and insured that “can reduce blood diamond trade”.
- UK Government Chief Scientific Advisor: *capital markets still rely on paper records to reconcile a trade between counterparties*. Blockchain can provide transparency & keep the regulators happy
- Interbank settlement of “stocks and shares.” Autonomous Research says blockchain could take 30% out of $54 billion annual coss of securities processing, saving $16 billion. By 2021!
- Blockchain may help the nemesis of big IT projects, the national patients’ record scheme.
- Chancellor Philip Hammond says blockchain technology *may help solve the Irish border question*.

[1] In ascending hype order

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THESE CLAIMS ARE ALL BOGUS

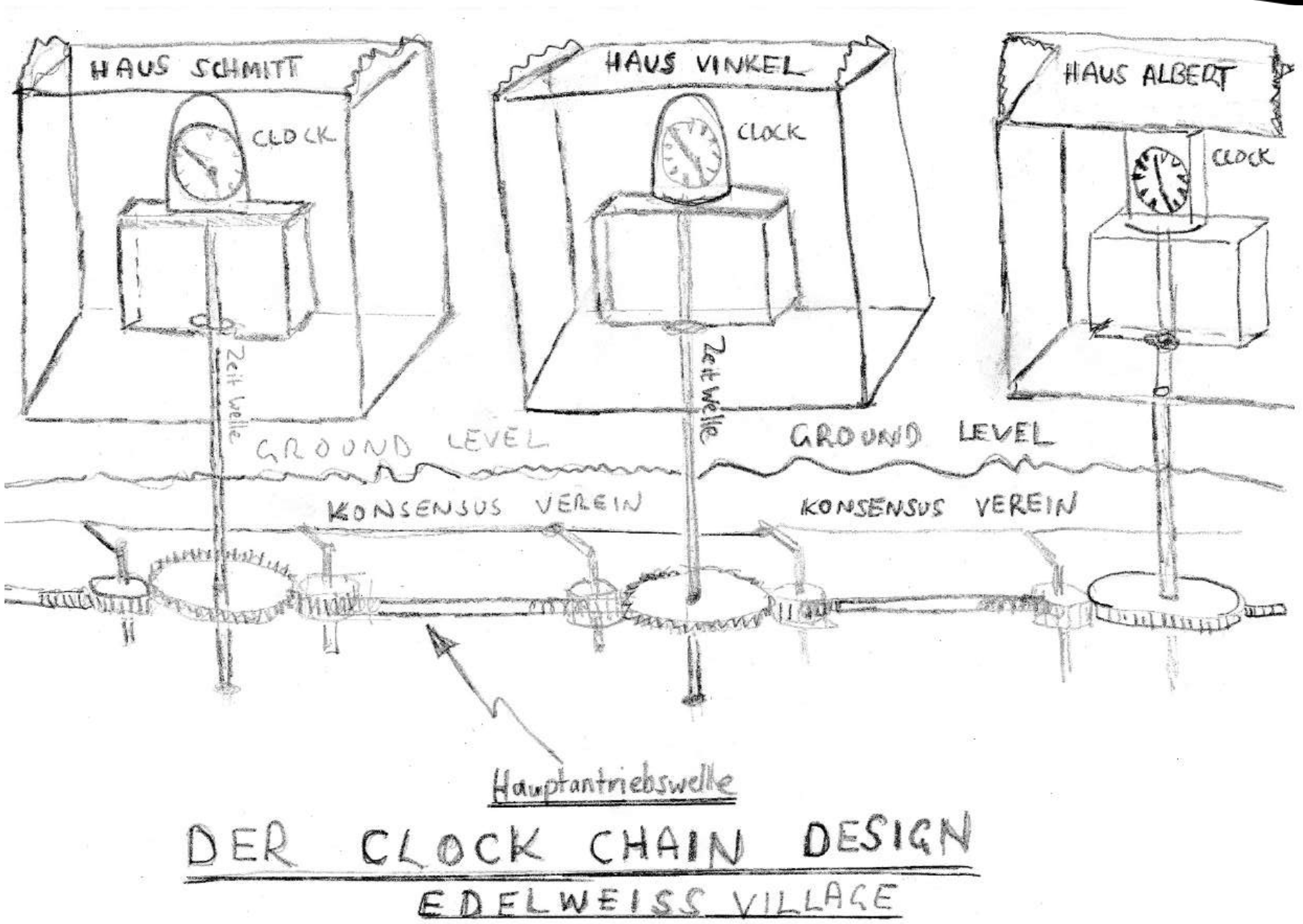
THESE CLAIMS ARE ALL BOGUS

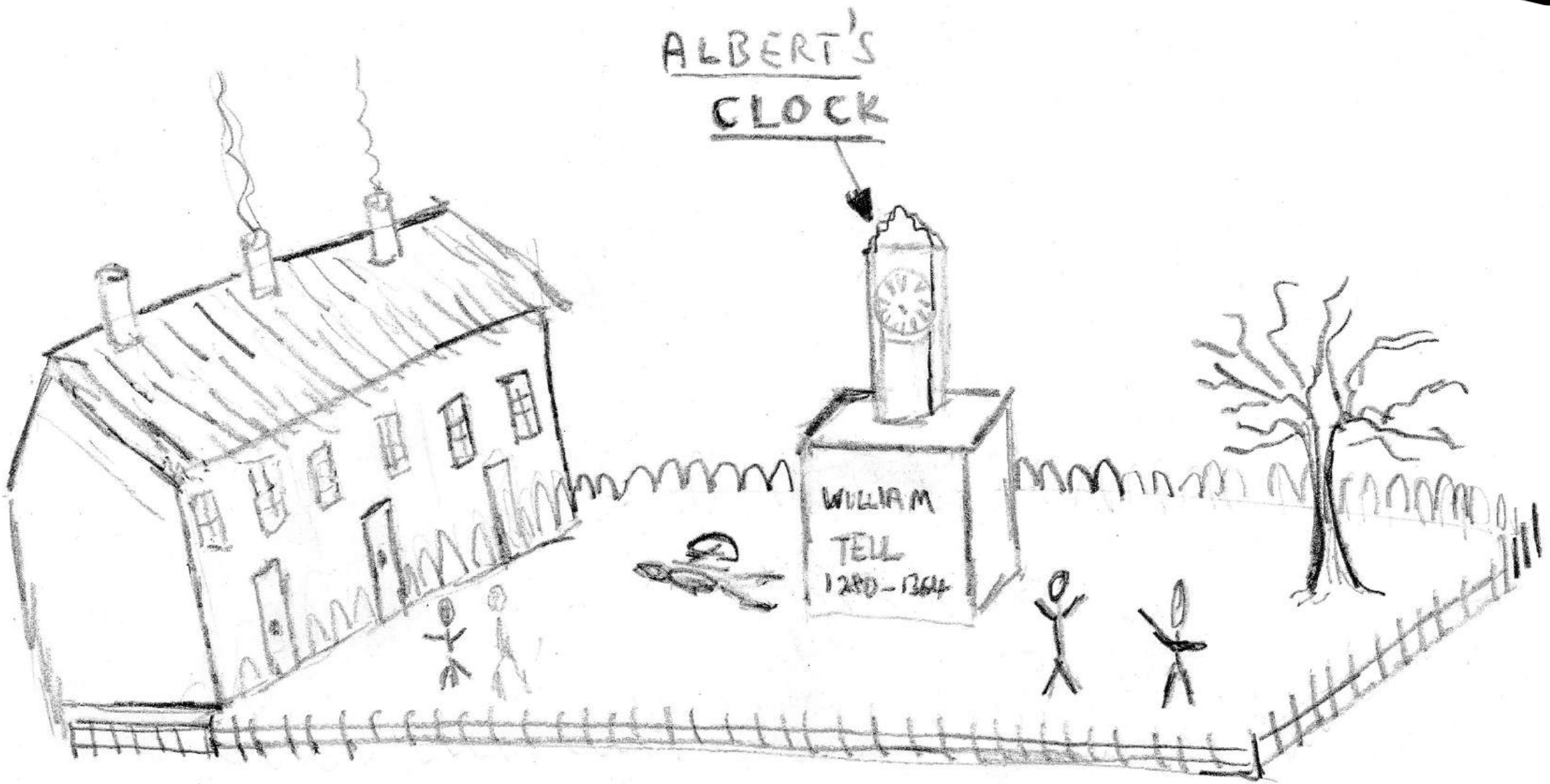
NOT BECAUSE THEY ARE UNTRUE
BUT BECAUSE YOU CAN ACHIEVE
THE SAME BUSINESS FUNCTIONALITY
QUICKER, CHEAPER AND MORE RELIABLY
WITH CONVENTIONAL TECHNOLOGY

SO WHY USE BLOCKCHAIN ?

1. TRUST
2. IMMUTABILITY
3. NO MIDDLEMEN
4. SMART CONTRACTS


It’s 1890 in this idyllic Alpine village
But all is not well…


HAUS SCHMITT
CLOCK
HAUS VINKEL
CLOCK
HAUS ALBERT
CLOCK
Zeit welle
Zeit welle
GROUND LEVEL
GROUND LEVEL
KONSENSUS VEREIN
KONSENSUS VEREIN
Hauptantriebswelle
DER CLOCK CHAIN DESIGN
EDELWEISS VILLAGE


ALBERT'S
CLOCK
WILLIAM
TELL
1280 – 1364

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The trust credentials of distributed ledgers rest on a beguiling confusion:

that it is better to have many private versions of the truth than a single public version that everyone can see and dispute

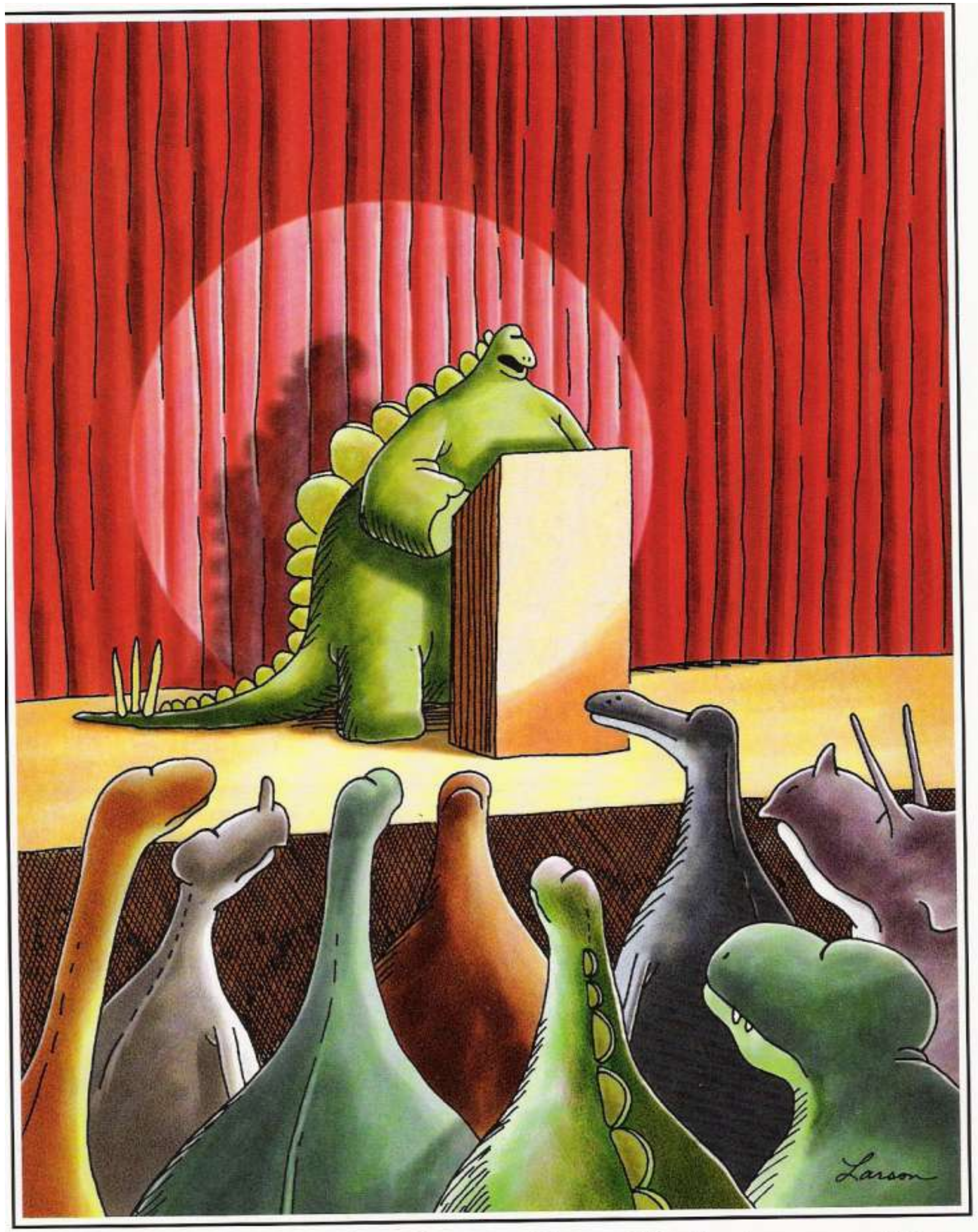
[DT]²

Collibra Business Partner

SO WHAT JUSTIFIES THE EXPENSE?

1. ~~TRUST~~
2. IMMUTABILITY
3. NO MIDDLEMEN
4. SMART CONTRACTS

[DT]²



"The picture's pretty bleak, gentlemen. … The world's climates are changing, the mammals are taking over, and we all have a brain about the size of a walnut."

The Quant Conference

PANEL: Legends of the industry on its future

Stuart Roden

Ex-Chairman of *Lansdowne Partners*

Off the Record Stuart Roden

Ewan Kirk

CIO and Founder, *Cantab*

Matthew Sargaison

Co-CEO, *Man AHL*

Off the Record Matthew Sargaison

Stuart MacDonald

Managing Partner, *Bride Valley Partners*

KEYNOTE: Talent as an Asset Class: Alpha via Quantitative People-Selection

The Quant Conference

Sham Mustafa

Co-Founder and Co-CEO, *Correlation One*

correlation one

AIR SUMMIT

TALENT AS AN ASSET CLASS

ALPHA VIA QUANTITATIVE PEOPLE-SELECTION

SHAM MUSTAFA | CO-FOUNDER & CO-CEO, CORRELATION ONE

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The fundamental law of active management

$$IR = \sqrt{N} \times IC$$

Information Ratio

Investment Opportunities

Information Coefficient

The fundamental law of active management

Bets

x

Skill per Bet

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Quant investors exploit the fundamental law

Bets

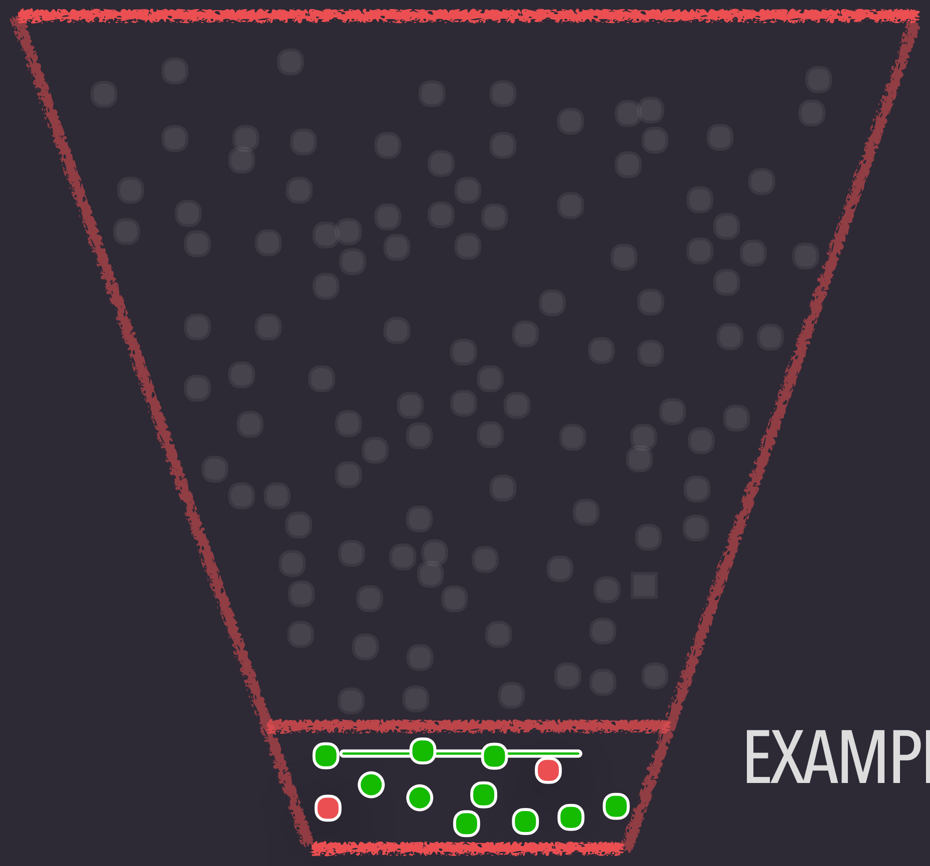
X

Skill per Bet

- ✓ More bets via access to new markets
- ✓ More bets via high-frequency trading
- ✓ More bets via automation

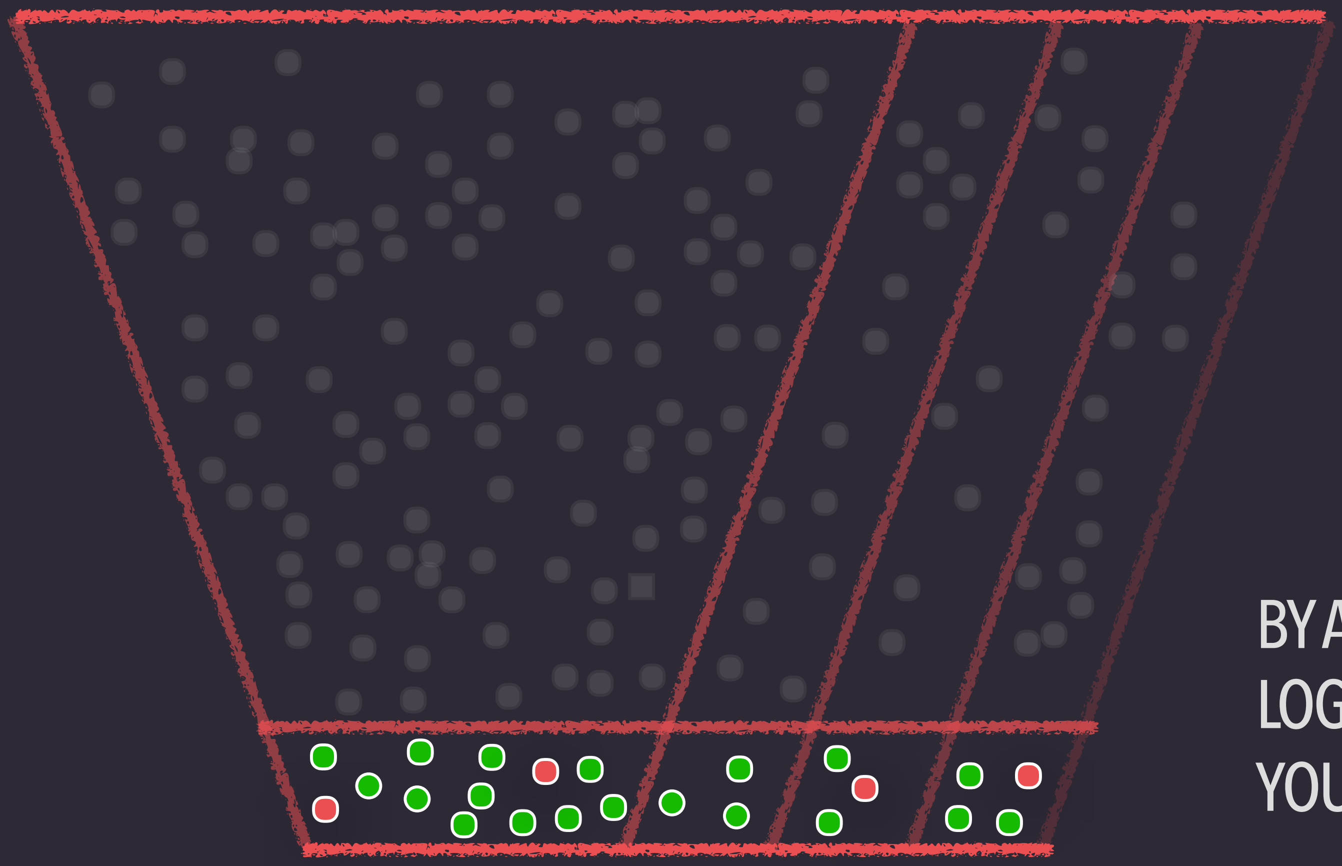
- ✓ Backtesting to measure skill per bet
- ✓ Better data & models to improve skill

A simplistic model of quant investing:
The Stock Screen



EXAMPLE MODEL → ONLY INVEST IN STOCKS WITH P/E RATIO < 12

Once a model is built, increasing its scope of bets is trivial



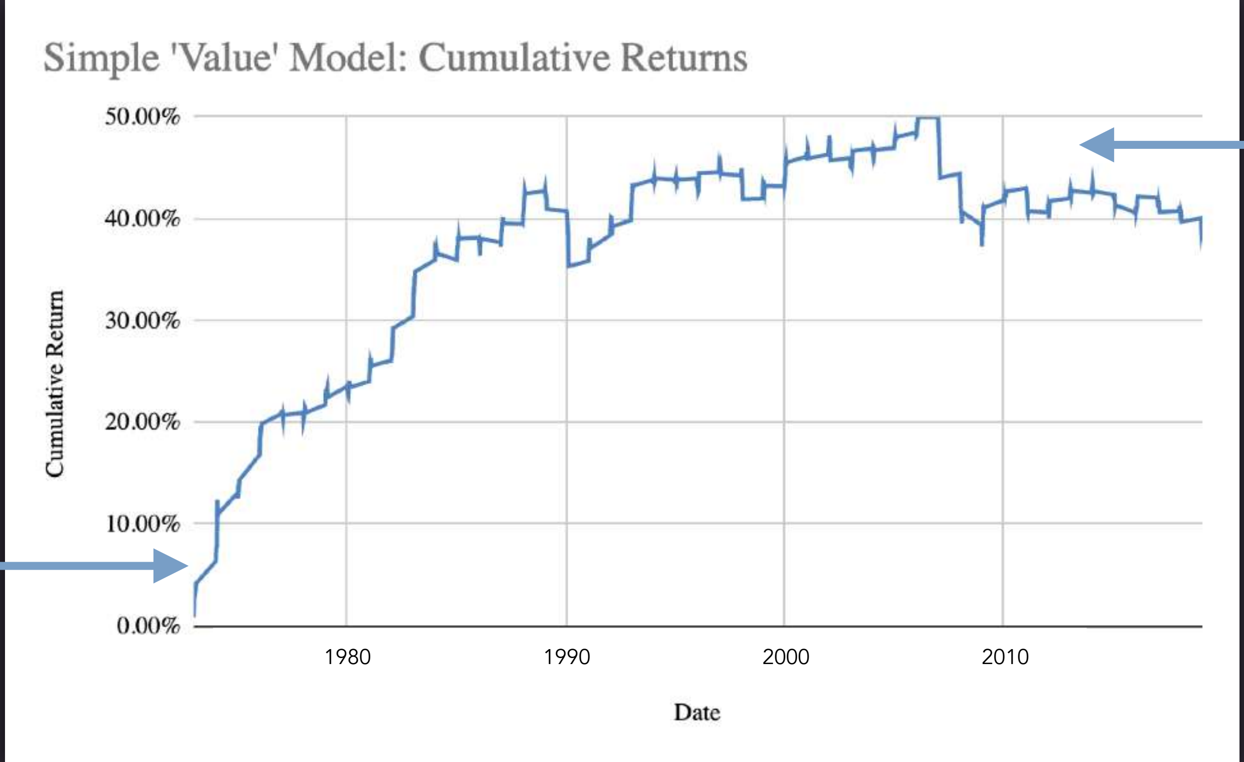
BY AUTOMATING YOUR FILTERING LOGIC, YOU CAN MASSIVELY INCREASE YOUR TOTAL NUMBER OF BETS

correlation one

However…

A MODEL, NO MATTER HOW SMART, ONLY HAS "EDGE" IF IT IS AHEAD OF THE CURVE

... until it became a crowded trade in the 1990s and 2000s



Simple P/E model worked well in the 1970s and 1980s...

There is enormous power in discovering new asset classes

Research March 13, 2019

How Does Yale Do It? By Being Different

Yale's asset allocation bears no resemblance to the average university endowment.

Over the past 10 years, Yale's $29.4 billion endowment has earned annual returns of 7.4%, outpacing its benchmark and institutional fund indices, and adding $6.5 billion in value—roughly the size of the University of Chicago's entire endowment –during that time. And for six of the past 10 years, Yale's 10-year record has ranked first in the Cambridge Associates universe.

How has it managed to achieve this success on a consistent level over the long term? Not by being like everyone else, that's for sure—and definitely not by being passive. A look at the asset allocation of Yale's endowment shows just how vastly different its thinking is from other university endowments.

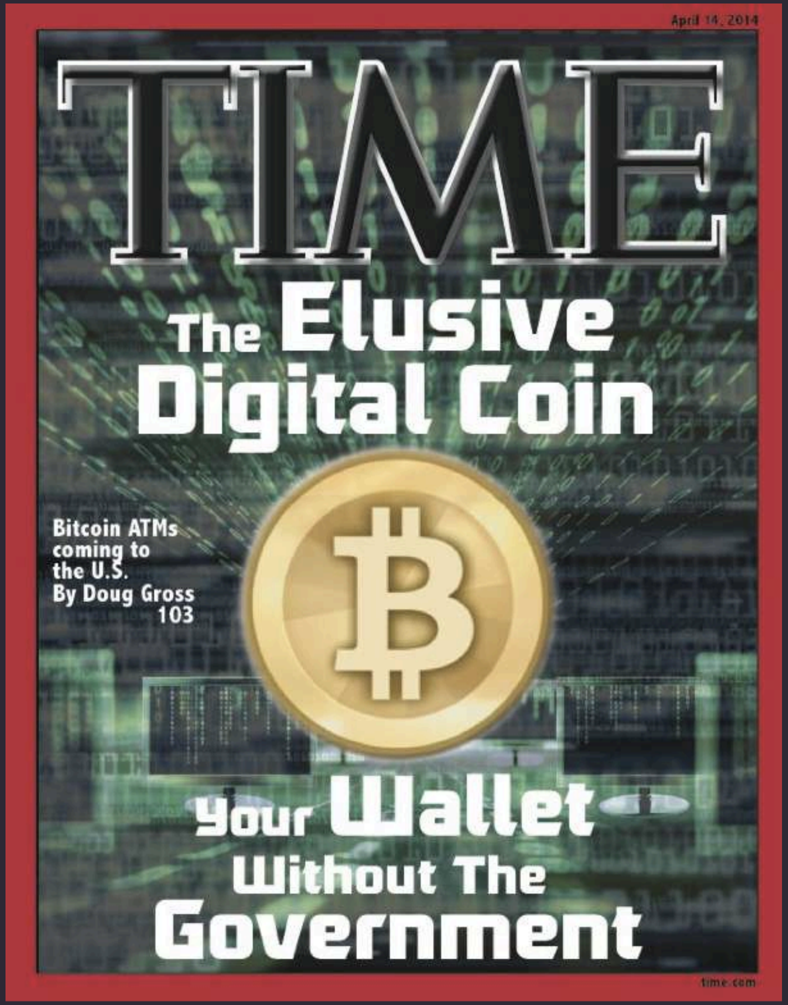
Yale has more than three times the allocation to venture capital and real estate than the educational institution mean, and more than twice the allocation to leveraged buyouts. At the same time, it has one-sixth the domestic equity allocation, less than half the fixed-income allocation, 50% less than foreign equity, and the amount it holds in cash is nearly

Yale's endowment has outperformed by discovering non-traditional asset classes

correlation one

There is enormous power in discovering new asset classes

Bitcoin's emergence created a new asset class opportunity for early investors

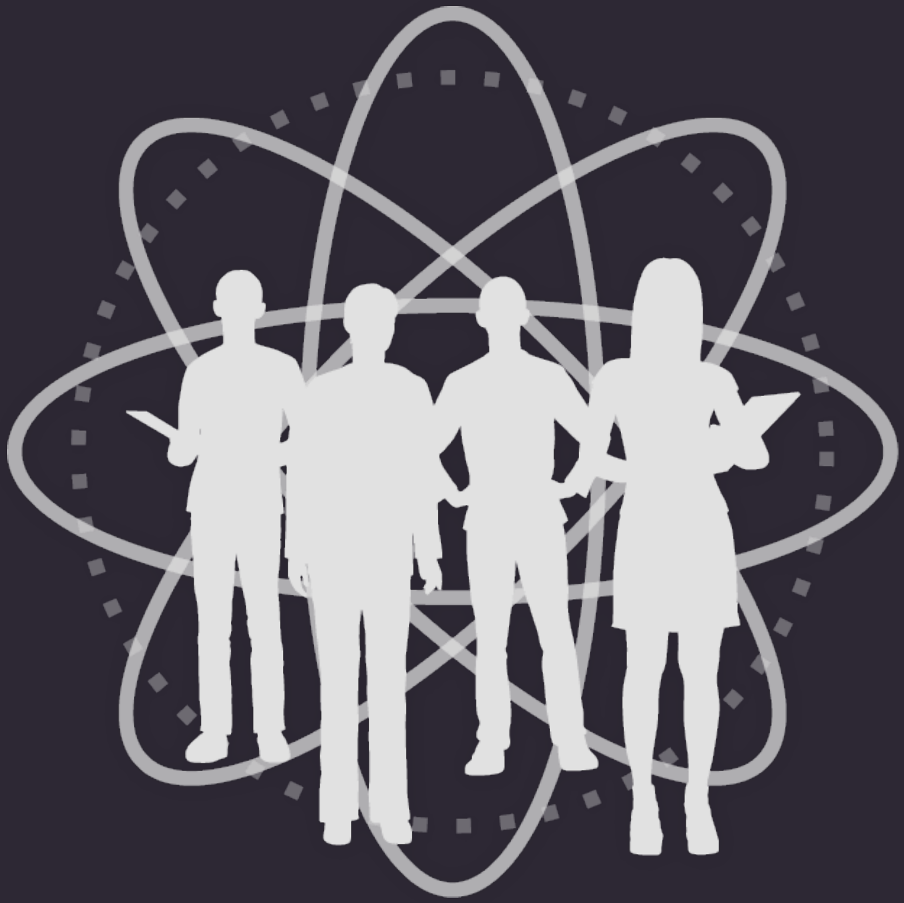


What is the undiscovered asset class today?

?

What is the undiscovered asset class today?

People!



Do people qualify as an asset class?

- ✓ LARGE NUMBER OF INDEPENDENT INSTANCES
- ✓ HIGH VARIANCE IN PERFORMANCE ACROSS INSTANCES
- ✓ VARIANCE IN PERFORMANCE OF A SINGLE INSTANCE OVER TIME
- ✓ SIGNIFICANT BOTTOM-LINE IMPACT GIVEN CORRECT OR INCORRECT INSTANCE SELECTION

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If talent is an asset class, how should we conceptualize "**talent alpha**"?

The fundamental law of **talent alpha**

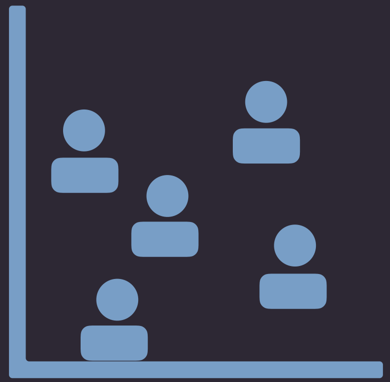
$$IR_p = \sqrt{N_p} \times IC_p$$

PEOPLE INFORMATION RATIO

PEOPLE OPPORTUNITIE S

PEOPLE INFORMATION COEFFICIENT

The fundamental law of talent alpha



PEOPLE BETS

x

SKILL PER HIRE

correlation one

Common practices today

PEOPLE BETS

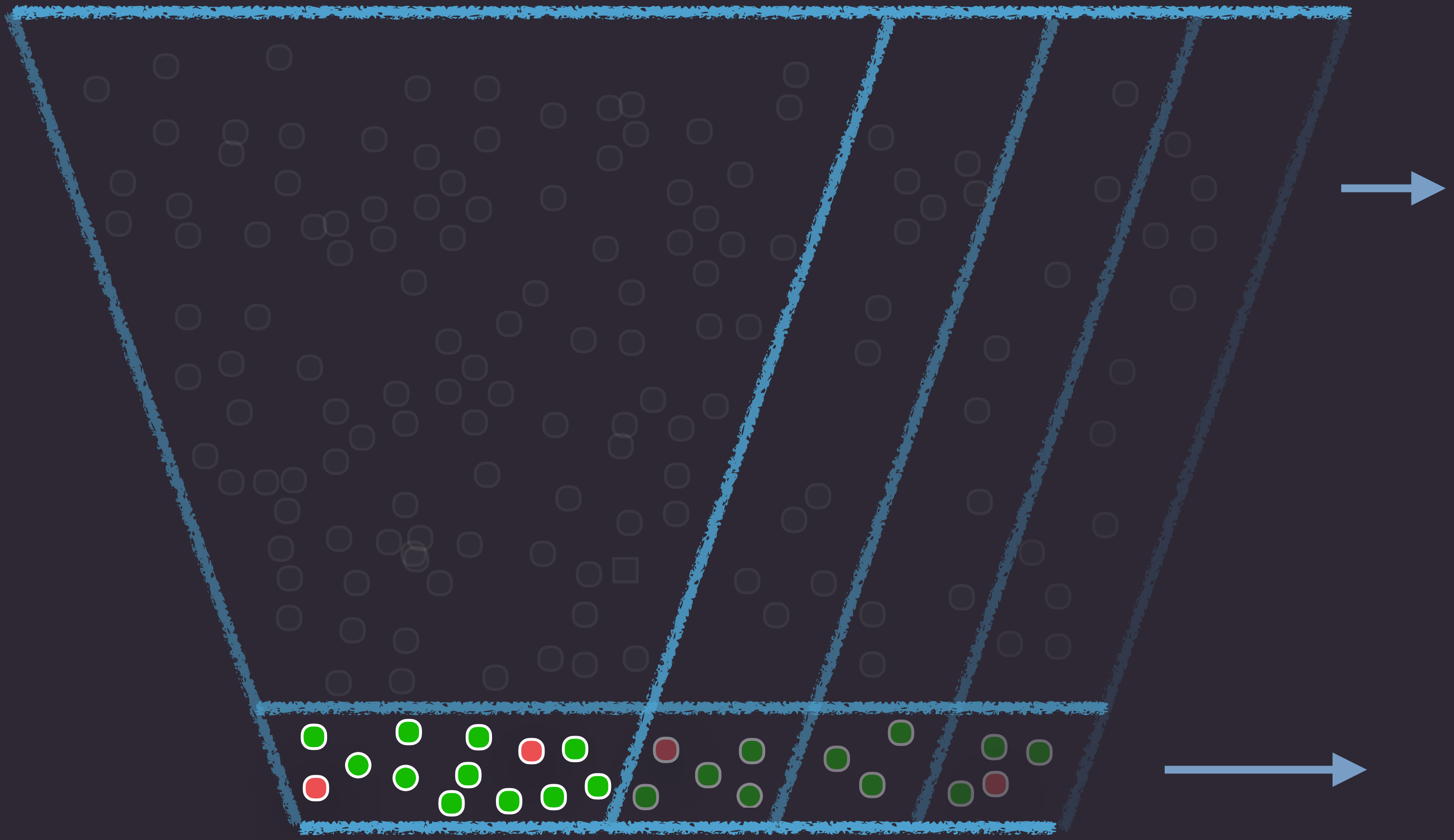
- More bets only through high turnover
- Recruit from a few, highly-competitive talent pools

x

SKILL PER HIRE

- Imprecise qualitative interviews
- Track-record analysis (luck or skill?)
- No backtesting of interview process

How it can be done better



SYSTEMATICALLY EXPAND THE BREADTH OF YOUR CANDIDATE FUNNEL…

…AND IMPROVE YOUR ASSESSMENT FILTER

Breadth of Funnel
x
Filter Accuracy
=
Quality of Hires

How to improve your candidate funnel

THOUGHTFUL TALENT PROGRAMS BOOST EMPLOYER BRANDS AND ENGAGE CANDIDATES AT SCALE

Google code jam

CODE JAM

Google CodeJam is a global hackathon that attracts 25,000 candidates per year

facebook HACKERCUP

HACKERCUP

Facebook launched the HackerCup in 2011. The competition series has over 1.1 million likes on Facebook.

TheData Open

THE DATA OPEN

Correlation One and Citadel partner to run The Data Open, a series of live data science competitions for top students.

CASE STUDY #1: CITADEL

THE WORLD'S BIGGEST AND MOST PRESTIGIOUS LIVE DATA SCIENCE COMPETITION

Problem

Citadel wanted dramatically expand the breadth of its funnel and win top 1% candidates over leading tech firms like Google and Facebook

Solution

A series of global live data science competitions for students of over 25 top universities around the world

Results

The competitions attracted over 25,000 elite students to Citadel's candidate funnel

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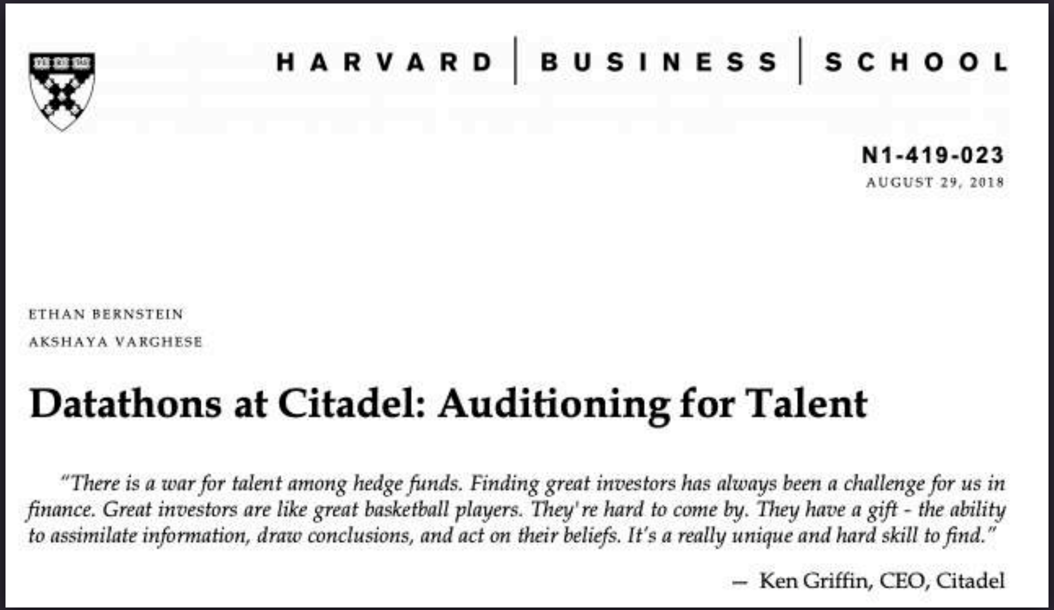
CASE STUDY #1: CITADEL

THE DATA OPEN EARNED A HARVARD BUSINESS SCHOOL CASE STUDY


HARVARD | BUSINESS | SCHOOL

N1-419-023
AUGUST 29, 2018

ETHAN BERNSTEIN
AKSHAYA VARGHESE

Datathons at Citadel: Auditioning for Talent

"There is a war for talent among hedge funds. Finding great investors has always been a challenge for us in finance. Great investors are like great basketball players. They're hard to come by. They have a gift - the ability to assimilate information, draw conclusions, and act on their beliefs. It's a really unique and hard skill to find."

— Ken Griffin, CEO, Citadel

Exhibit 12 Photos from Chicago Datathon and the Data Open Championship

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CASE STUDY #2: XTX MARKETS

AN ONLINE FORECASTING COMPETITION FOR TOP QUANTS AROUND THE WORLD

XTX Markets Global Forecasting Competition

Problem

XTX Markets wanted to hire the world's best quants no matter where they lived in the world.

Solution

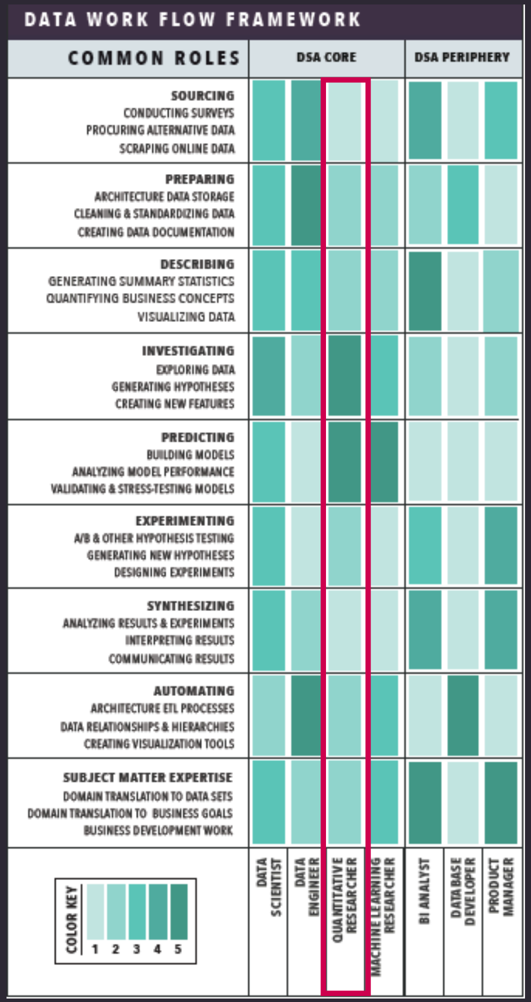
An online, global forecasting challenge, where contestants developed models to predict financial data

Results

Over 4,000 candidates applied. Top performers included graduates from top schools like Harvard and Stanford, but also outliers from areas like Latvia, Bulgaria, and New Zealand.

How to improve your filter accuracy

DECOMPOSE THE IDEAL CANDIDATE PROFILE INTO DISTINCT WORKFLOWS AND SKILLS



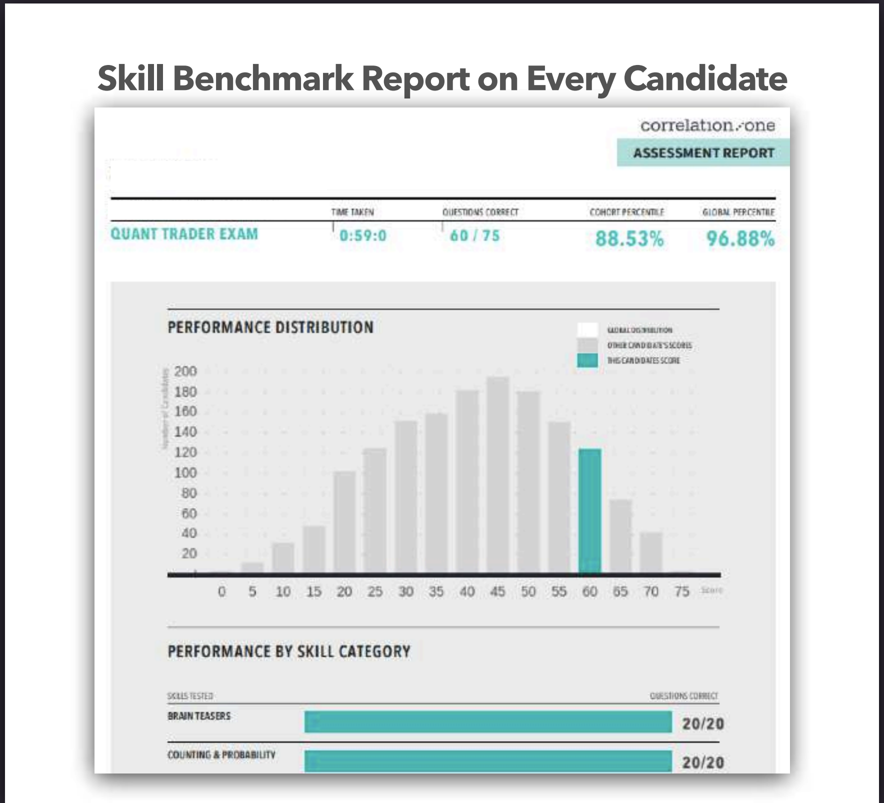
Multi-factor talent assessment frameworks for data, engineering, and investment talent.

The frameworks generate candidate data points across multiple, independent factors.

Candidates that pass the automated screen are ultimately sent through for human processing.

CASE STUDY #2: IMC MARKETS

AUTOMATED ASSESSMENTS TO EVALUATE QUANT AND TRADING SKILLS IN CANDIDATES



Problem

IMC Markets wanted to improve the accuracy of its pre-interview candidate filter, so hiring managers could prioritize their time on top candidates

Solution

Custom-built data science skills assessments, automated and benchmarked against population-level averages

Results

A new filter that is 5x more predictive of candidate success than other filters (e.g. university grade point average)

Get in touch @ sham@correlation-one.com

KEYNOTE: What you don’t know counts

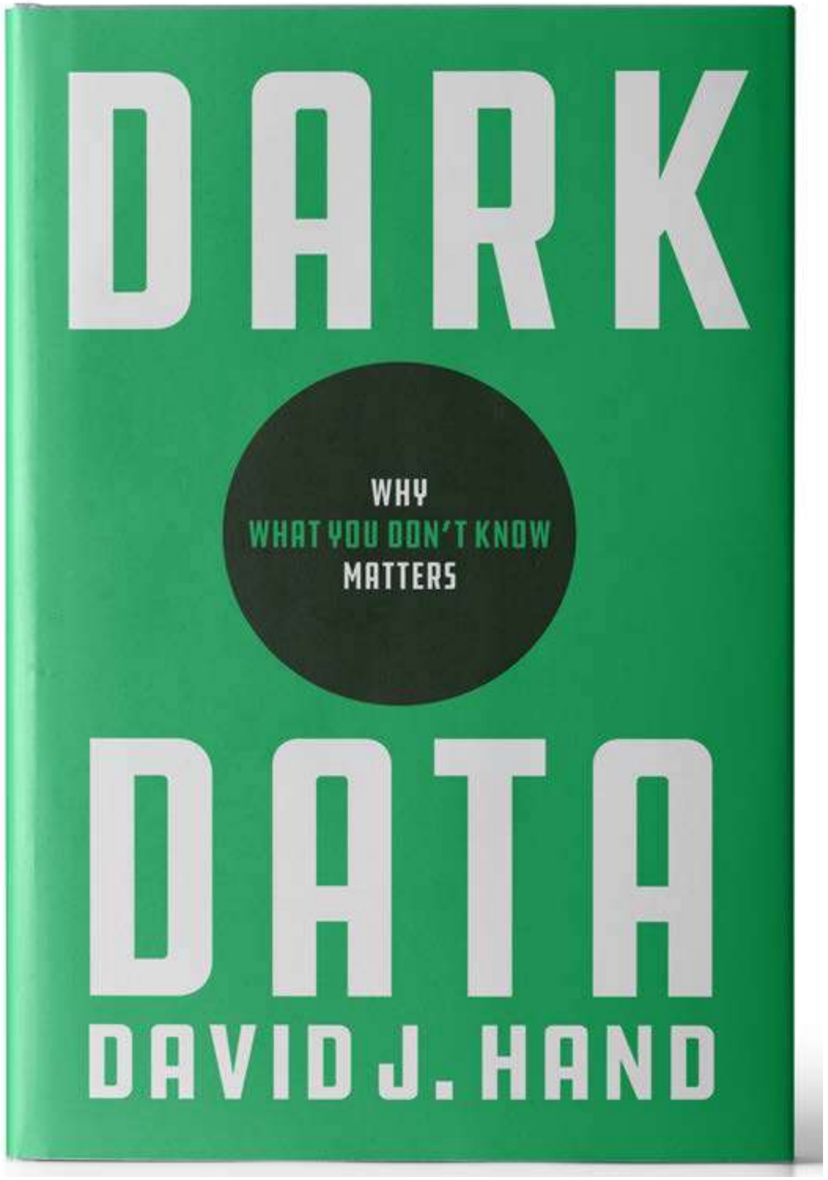
The Quant Conference

David Hand

Emeritus Professor of Mathematics and Senior Research Investigator, *Imperial College*

What you don't know counts

David J. Hand
Imperial College, London



Princeton University Press
January 2020

Big data

Machine learning

Data exhaust

Statistics

Open data

Analytics

Anonymised data

Data trail

Personal data

Pseudonymised data

Artificial intelligence

Alternative data

Confidential data

Observational data

Data science

Experimental data

Administrative data

Survey data

Big data

Machine learning

Data exhaust

Statistics

Open data

Analytics

Anonymised data

Data trail

Personal data

Pseudonymised data

Artificial intelligence

Alternative data

Confidential data

Observational data

Data science

Experimental data

Administrative data

Survey data

- These all tell you about the data you have
- But they don’t tell you about the data you don’t have
- They don’t tell you about the problems that can arise because you are missing some crucial data
- ***The data you don’t have can be even more important than the data you do have***
- ***The data you don’t have or cannot see are dark data***

- elephant powder

https://listverse.com/2012/03/05/top-10-facts-about-elephants/
Morbidity and Mortality Weekly Report, Nov 30, 2018 / Vol.67/No.47
https://fighterjetsworld.com/air/fighter-jets-videos/378-bullet-holes-no-flaps-and-no-speed-brakes/7627/
NASA/Goddard/MODIS Rapid Response Team

- elephant powder
- measles eradication

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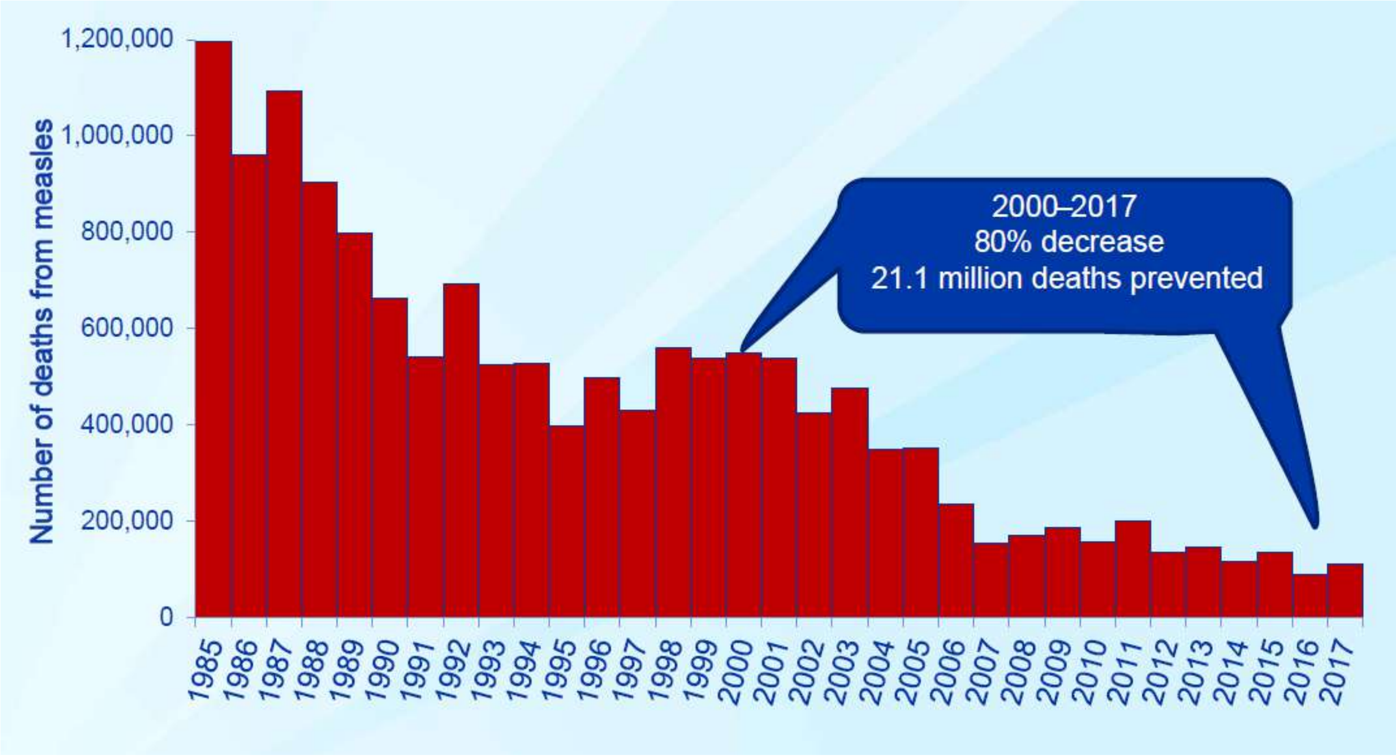

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- elephant powder

- measles eradication

- bullet holes in aircraft

- Hurricane Sandy

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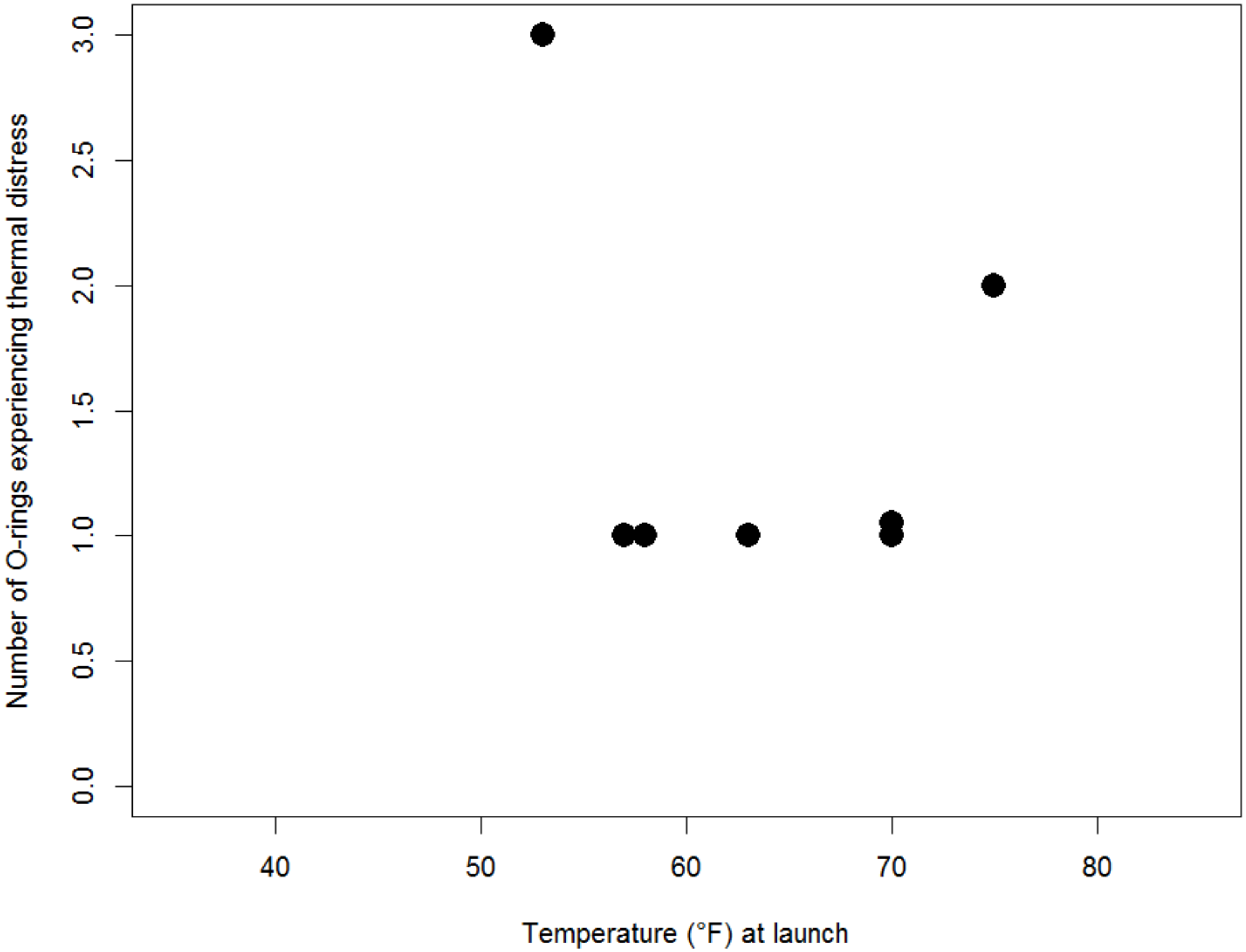
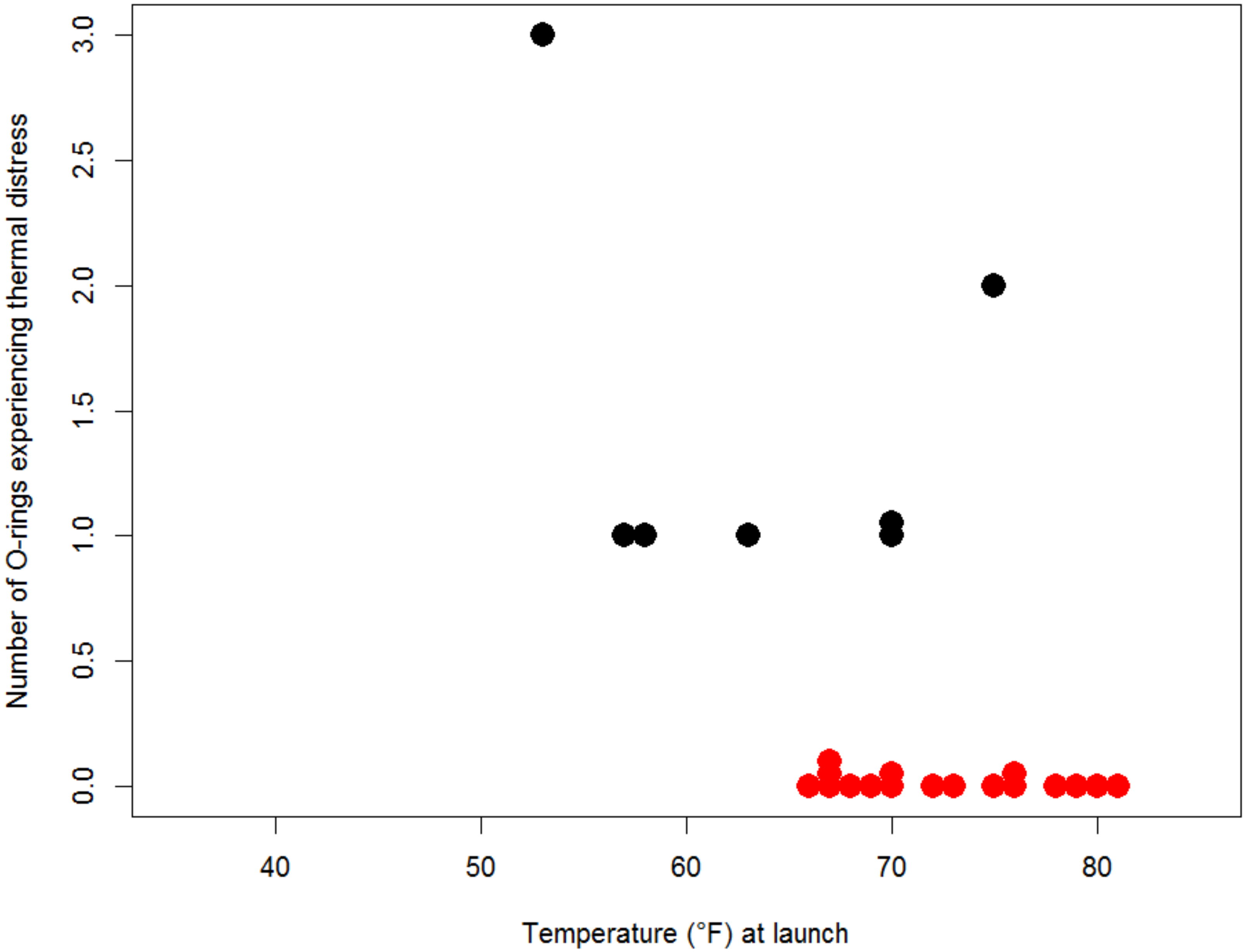
NASA/Goddard/MODIS Rapid Response Team

https://www.nasa.gov/mission_pages/shuttle/flyout/shuttleachievements.html


Number of O-rings experiencing thermal distress
0.0
0.5
1.0
1.5
2.0
2.5
3.0
40
50
60
70
80
Temperature (°F) at launch



0.0
0.5
1.0
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3.0
Number of O-rings experiencing thermal distress
40
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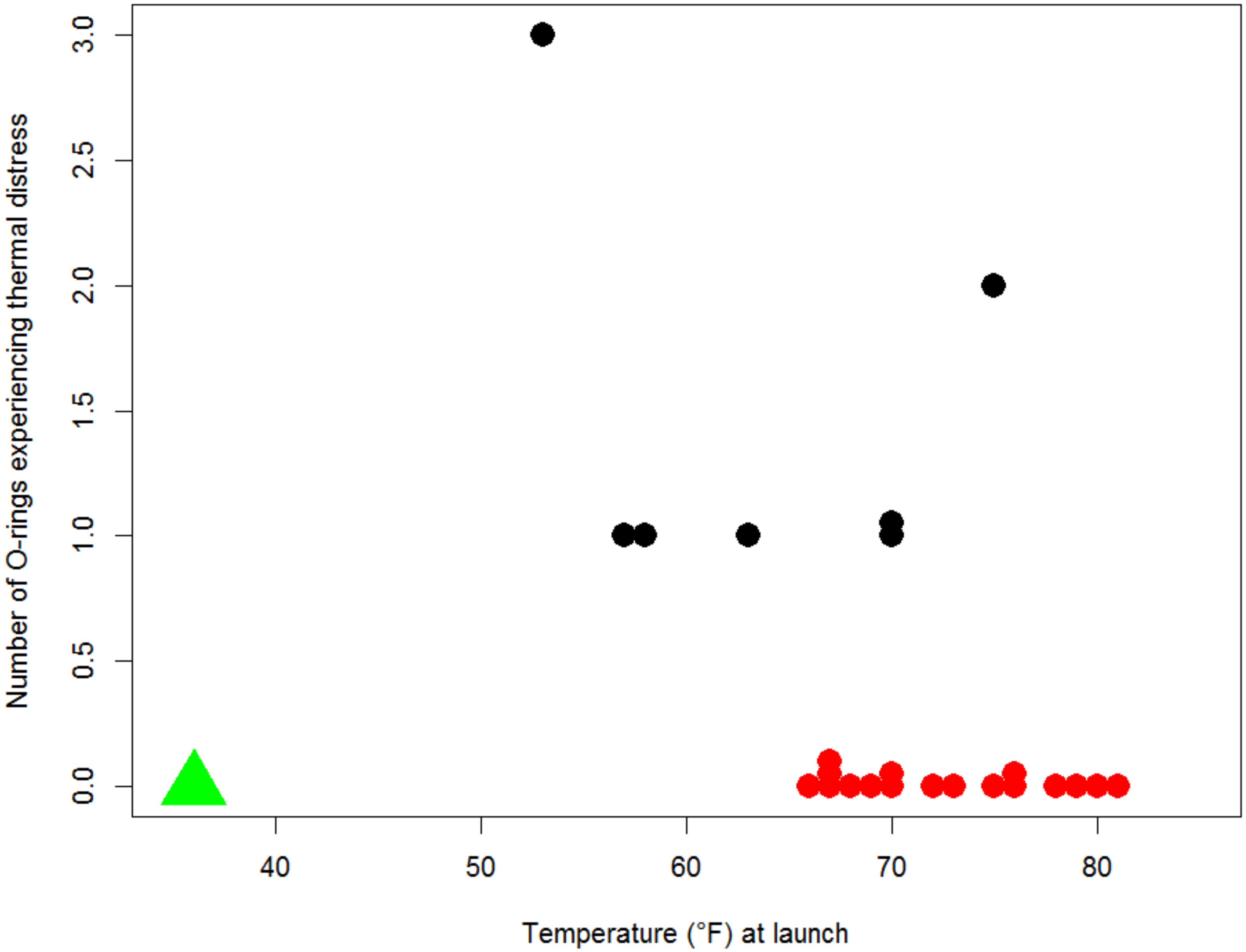
80
Temperature (°F) at launch


Number of O-rings experiencing thermal distress
3.0
2.5
2.0
1.5
1.0
0.5
0.0
40
50
60
70
80
Temperature (°F) at launch

It took months for the official investigation to conclude

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But Morton Thiokol’s stock price crashed 11.86% on the day of the disaster

(changes of more than 4% in its price were rare)

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(changes of more than 4% in its price were rare)

The stock prices of other companies involved in constructing the shuttle launch vehicle also slumped, but by less

MORTON THIOKOL, INC.   COMPANY PRIVATE

Wasatch Division

Interoffice Memo

31 July 1985
2870:FY86:073

TO: R. K. Lund
Vice President, Engineering

CC: B. C. Brinton, A. J. McDonald, L. H. Sayer, J. R. Kapp

FROM: R. M. Boisjoly
Applied Mechanics - Ext. 3525

SUBJECT: SRM O-Ring Erosion/Potential Failure Criticality

This letter is written to insure that management is fully aware of the seriousness of the current O-Ring erosion problem in the SRM joints from an engineering standpoint.

The mistakenly accepted position on the joint problem was to fly without fear of failure and to run a series of design evaluations which would ultimately lead to a solution or at least a significant reduction of the erosion problem. This position is now drastically changed as a result of the SRM 16A nozzle joint erosion which eroded a secondary O-Ring with the primary O-Ring never sealing.

If the same scenario should occur in a field joint (and it could), then it is a jump ball as to the success or failure of the joint because the secondary O-Ring cannot respond to the clevis opening rate and may not be capable of pressurization. The result would be a catastrophe of the highest order - loss of human life.

An unofficial team (a memo defining the team and its purpose was never published) with leader was formed on 19 July 1985 and was tasked with solving the problem for both the short and long term. This unofficial team is essentially nonexistent at this time. In my opinion, the team must be officially given the responsibility and the authority to execute the work that needs to be done on a non-interference basis (full time assignment until completed).

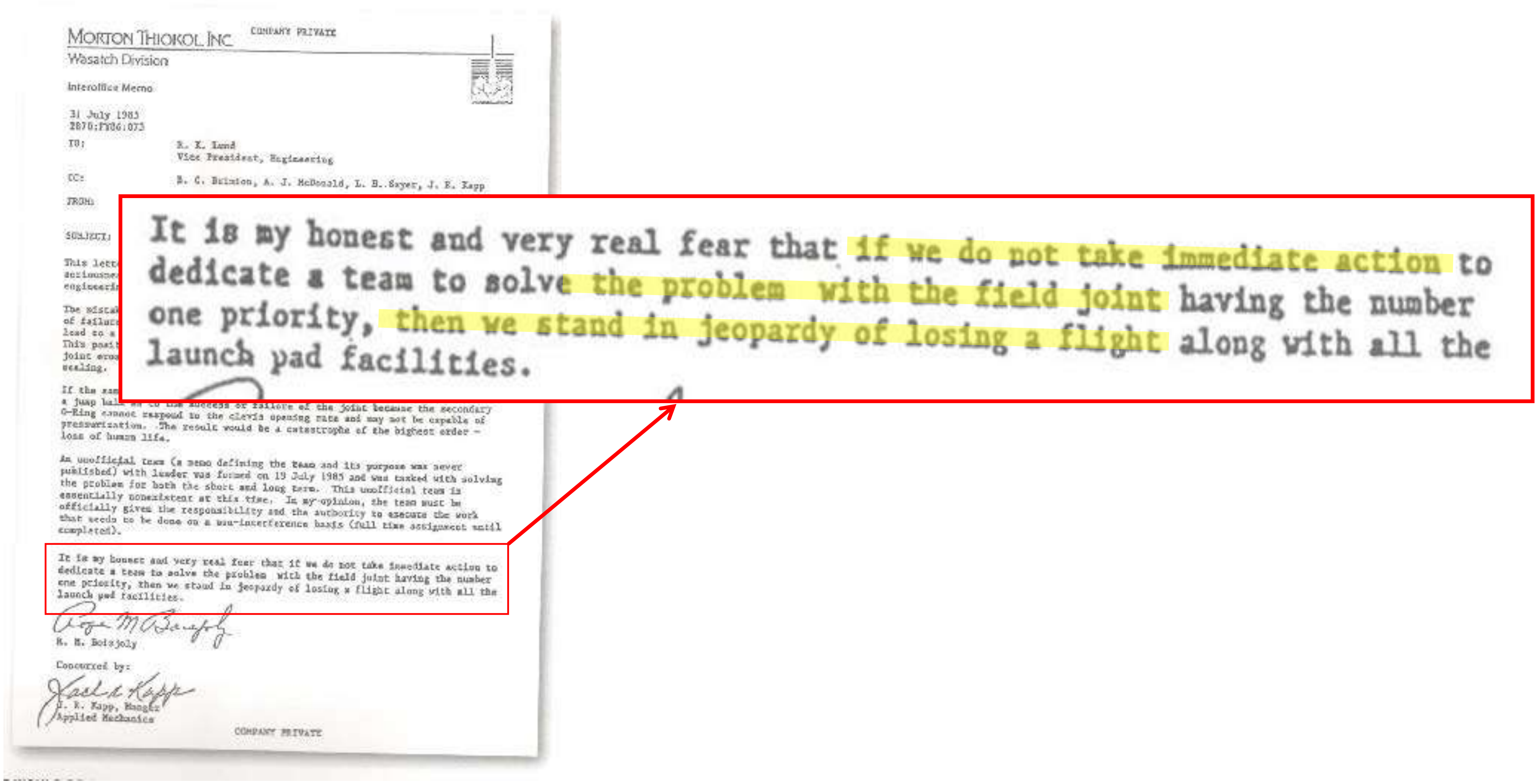
It is my honest and very real fear that if we do not take immediate action to dedicate a team to solve the problem with the field joint having the number one priority, then we stand in jeopardy of losing a flight along with all the launch pad facilities.

R. M. Boisjoly

Concurred by:

J. R. Kapp, Manager
Applied Mechanics

COMPANY PRIVATE



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Rate of heart disease in Japan vs US

Japan US

https://medium.com/the-mission/why-japanese-men-have-far-less-heart-disease-badbc3841322
https://www.worldlifeexpectancy.com/cause-of-death/coronary-heart-disease/by-country/

Rate of heart disease in Japan vs US

	Japan		US
Heart disease rate / 100000	**41**	<	**87**

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Stroke rate	**33.6**	**>**	**23.7**

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Fifteen types of dark data

Not mutually exclusive:

they can occur together

Two of the 15 types will be familiar to you:

Type 1: data we know are missing

Type 2: data we don't know are missing

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(1) Pundit's views on share prices when they don't tell you

(2) Crowdsources views on the movements of a particular share price

Type 3: choosing just some cases

A psychic's successful predictions

Type 4: self-selection

The customers who shop at a particular store

Type 5: missing missing variables

Who survived the *Titanic* ?

Crew	Third class passengers
212/908	151/627

Crew	**Third class passengers**
212/908 **= 23.3 %** **<**	151/627 **= 24.1 %**

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	Crew	Third class passengers
Men	192/885	75/462

	Crew	Third class passengers
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	Crew		Third class passengers
Males	192/885 **= 21.7 %**	>	75/462 **= 16.2 %**

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Females	20/23		76/165

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	Crew		Third class passengers
Males	192/885 **= 21.7 %**	**>**	75/462 **= 16.2 %**
Females	20/23 **= 87.0 %**	**>**	76/165 **= 46.1 %**

Sometimes data are dark by design

UK Equality Act (and other similar elsewhere):

People must not be treated differently on the basis of their group membership rather than on the basis of their own merits

(for certain "protected characteristics": sex, religion, etc)

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(for certain "protected characteristics": sex, religion, etc)

→ must not include these characteristics in any decision-making process

But the EU Gender Directive (2004/113/EC) included a clause saying:

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> *where the use of sex is a determining factor in the assessment of risk …*
> *[when there are] relevant and accurate actuarial and statistical data.”*

That meant different driving insurance premiums for males and females were allowed
provided there was data showing the risks differed

But in 2011, the European Court of Justice decided this was *incompatible with the principle of equal treatment for men and women*

From 2012, it was illegal to have differential insurance premiums based on gender

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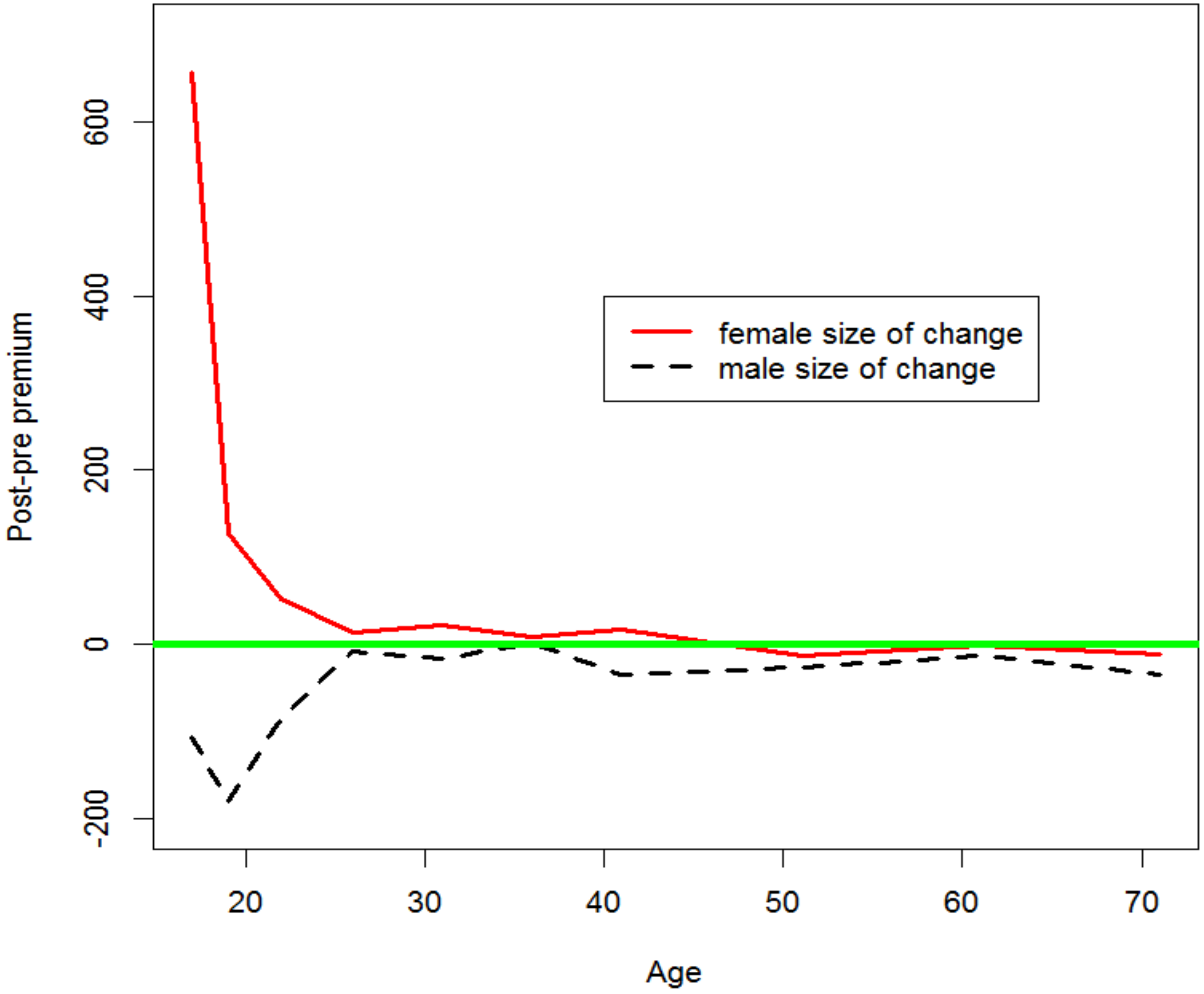
From 2012, it was illegal to have differential insurance premiums based on gender

Females previously had lower motor insurance premiums, but these differences would no longer be allowed, ***even though the data showed females to be safer drivers***

Change in size of premiums



Overall average premiums

£	Before	After
Men	658	619
Women	488	529

There are other consequences of making the data dark

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- more young men can now afford insurance

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- more young men can now afford insurance
- so more young men on the road

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→ ***more of the riskier drivers on the road***

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- fewer young women can now afford insurance
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→ ***fewer of the safer drivers on the road***

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- UK: men cause 95% of "deaths by dangerous driving"
- UK: men commit 82% of speeding offences

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→ ***fewer of the safer drivers on the road***

→ ***more accidents and higher premiums for everyone***

The consequences can be surprising

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From *The Times*, 31 July 2018:

Man changes his gender to get cheaper car insurance

"Legally I'm a woman," the man from Alberta told the Canadian Broadcasting Corporation, after successfully obtaining a new birth certificate that declared him female. "I did it for cheaper car insurance."

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From *The Times*, 31 July 2018:

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"Legally I'm a woman," the man from Alberta told the Canadian Broadcasting Corporation, after successfully obtaining a new birth certificate that declared him female. "I did it for cheaper car insurance."

Reducing his insurance bill by £649 per year

The law might require data to be concealed in ways which are not conducive to effective statistical modelling:

GDPR

So what do we do about dark data?

Shining a light

Use what you do know about what you don't know

Based on Donald Rubin's taxonomy

Shining a light

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- ***Not Data Dependent (NDD)***

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  It's missing for reasons related to data you have got

- ***Unseen Data Dependent (UDD)***

  It's missing because of the values you would have obtained

Based on Donald Rubin's taxonomy

The key:

Modelling ***how*** you don’t know what you don’t know

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NDD: equivalent to a smaller sample

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SDD: predict what you don’t know from what you do

The key:

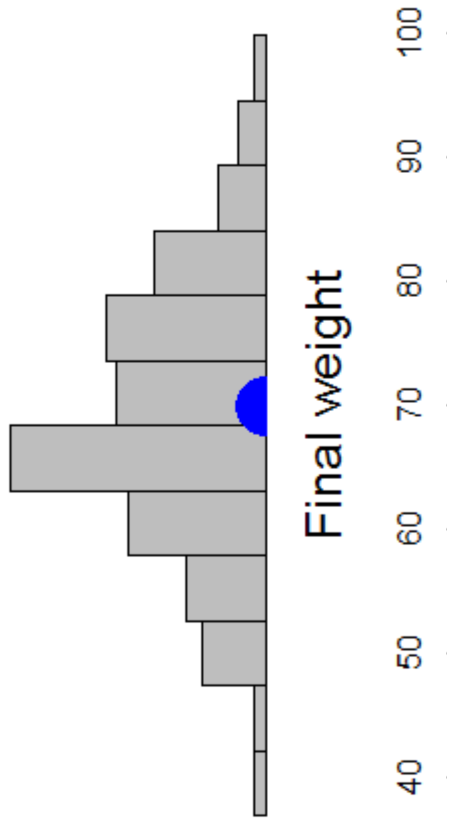
Modelling ***how*** you don’t know what you don’t know

NDD: equivalent to a smaller sample

SDD: predict what you don’t know from what you do

UDD: need to make extra assumptions

Complete



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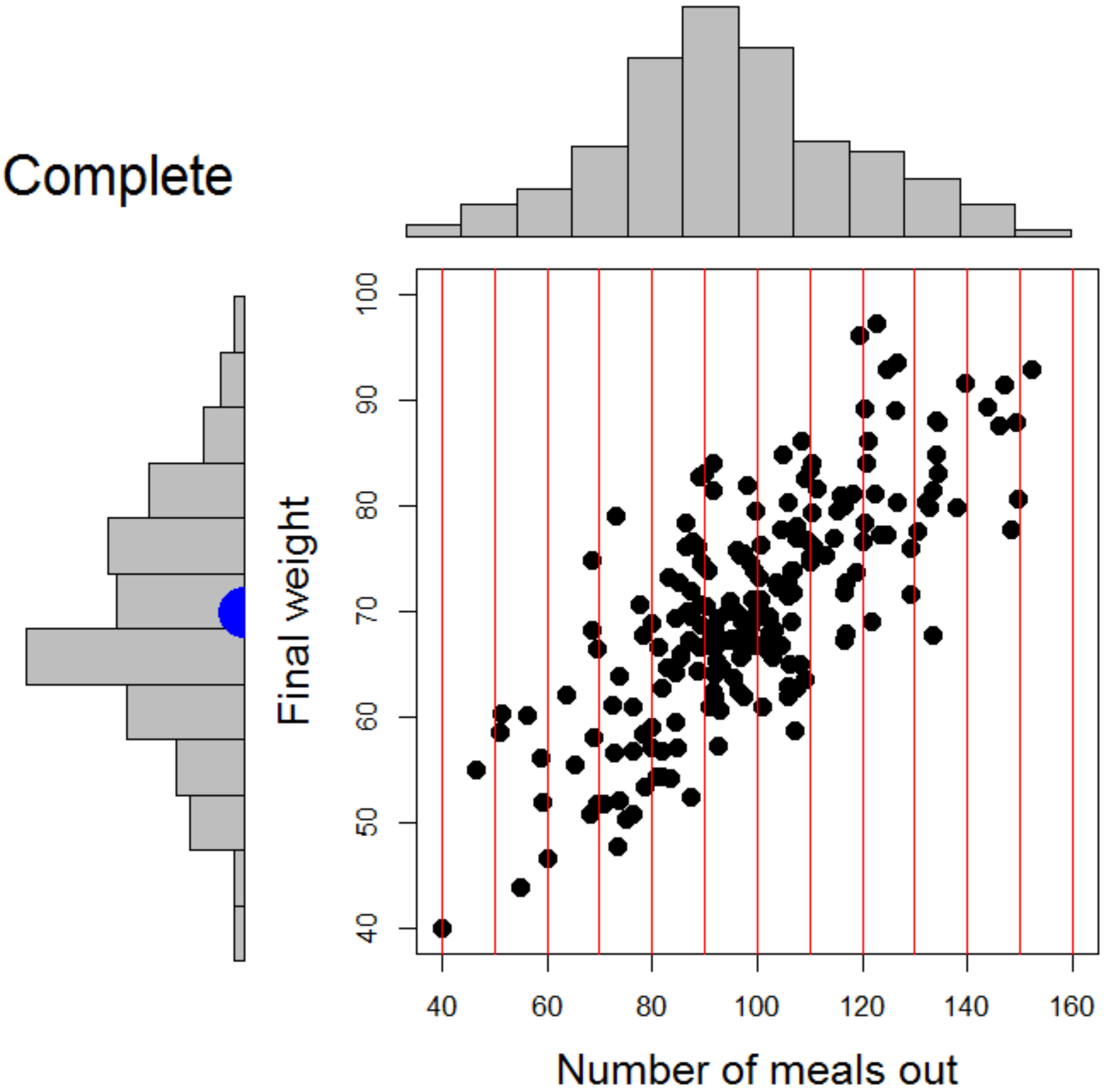

Final weight
100
90
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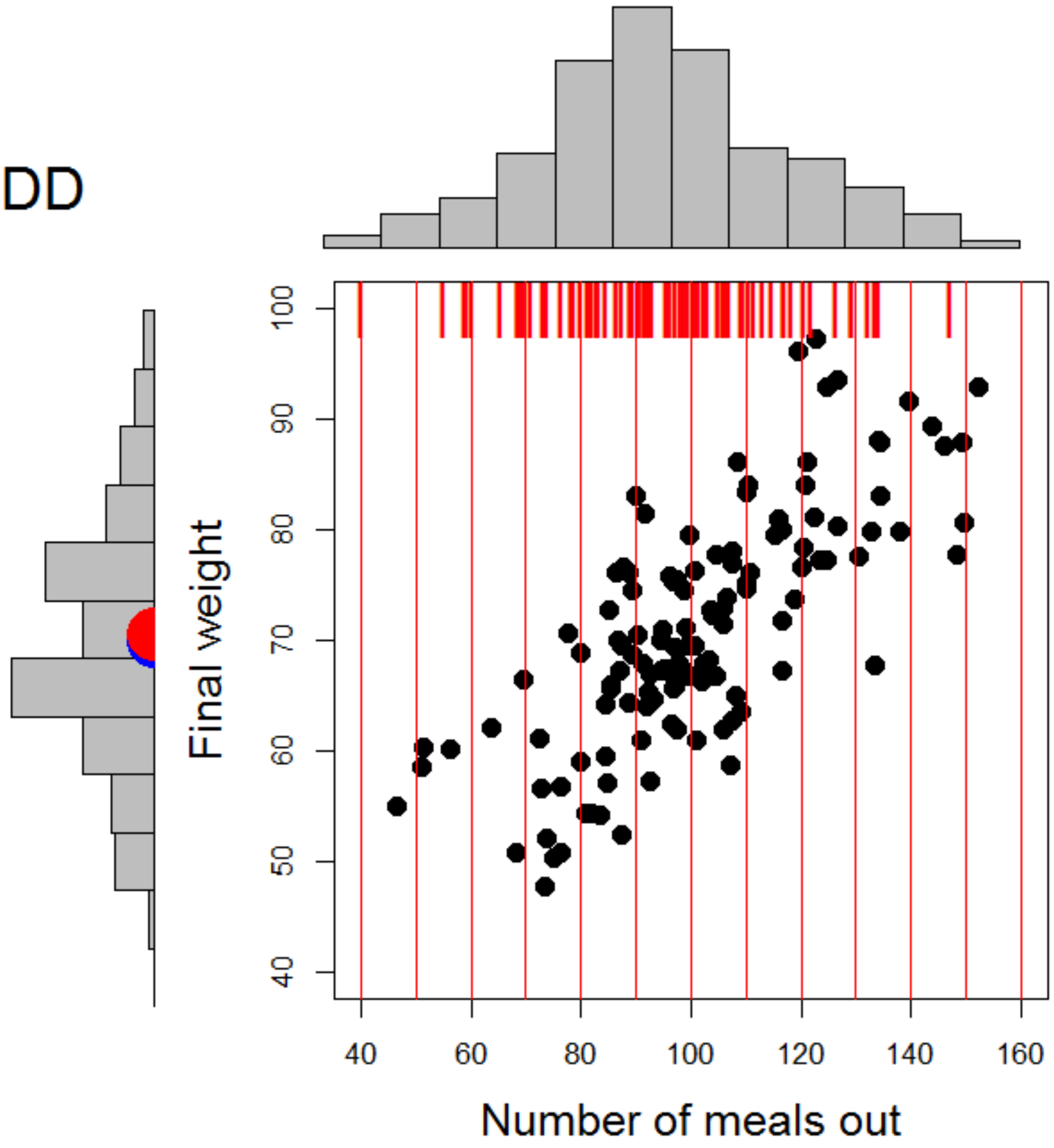
120
140
160
Number of meals out

NDD



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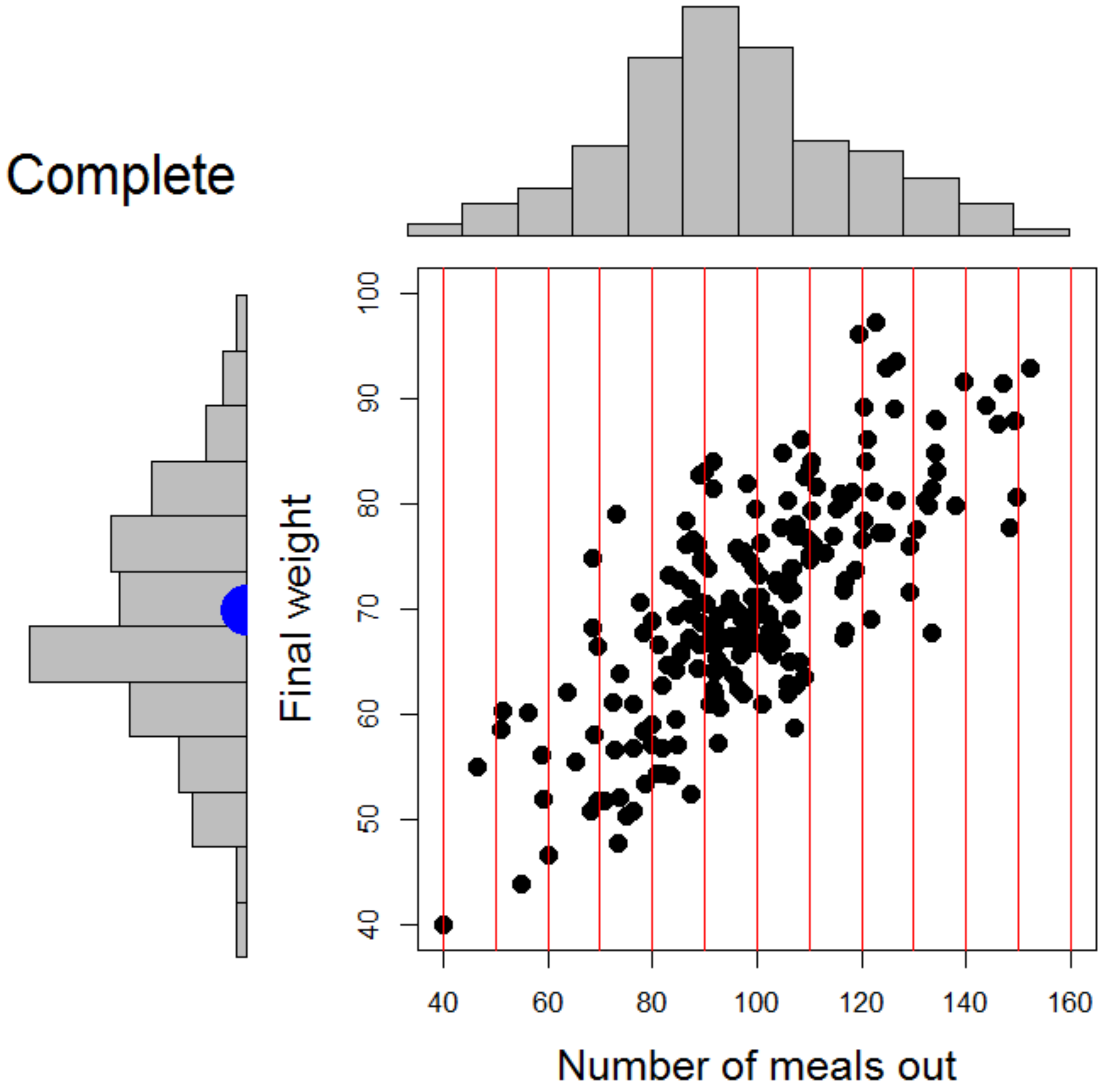
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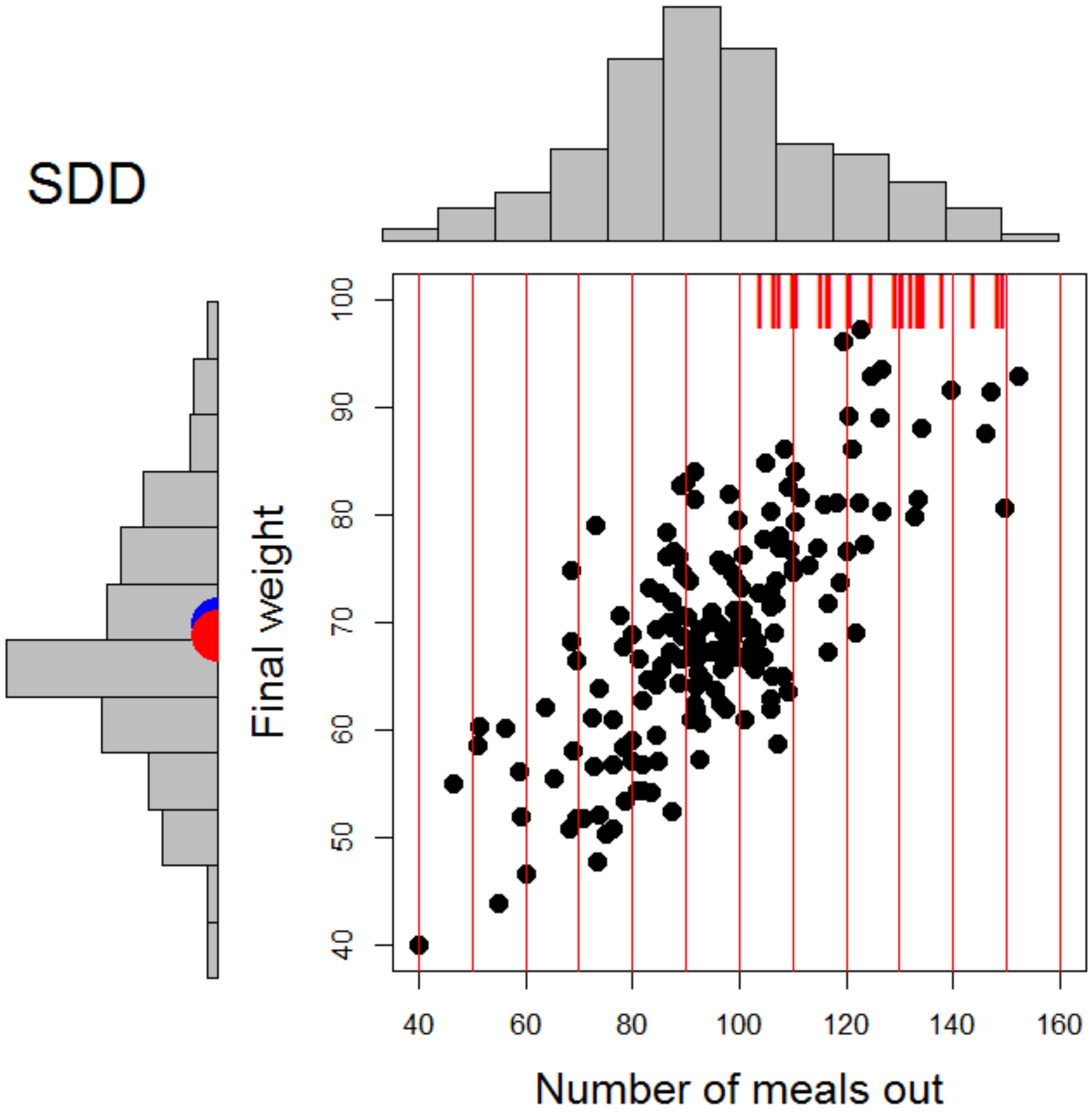

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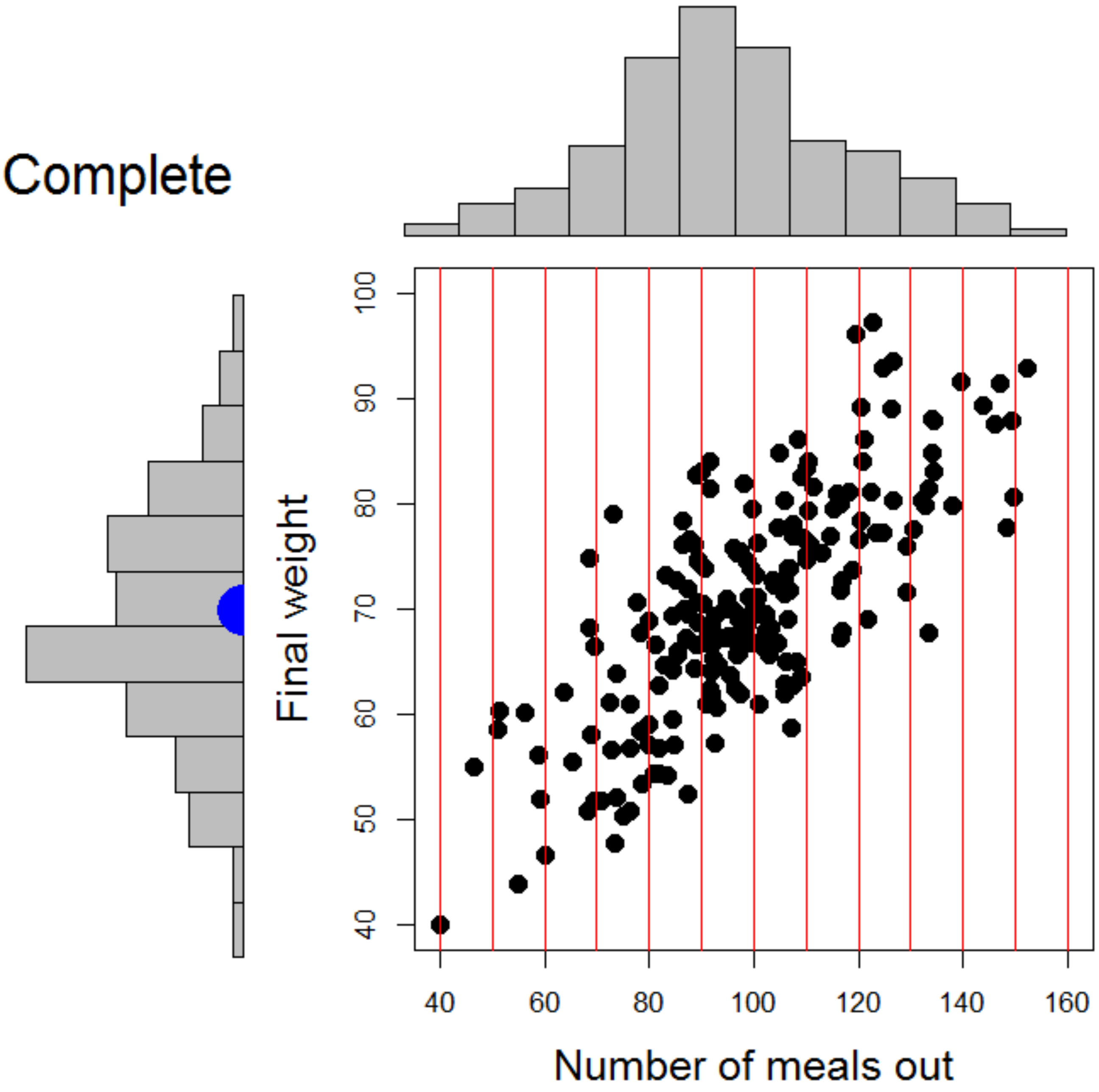

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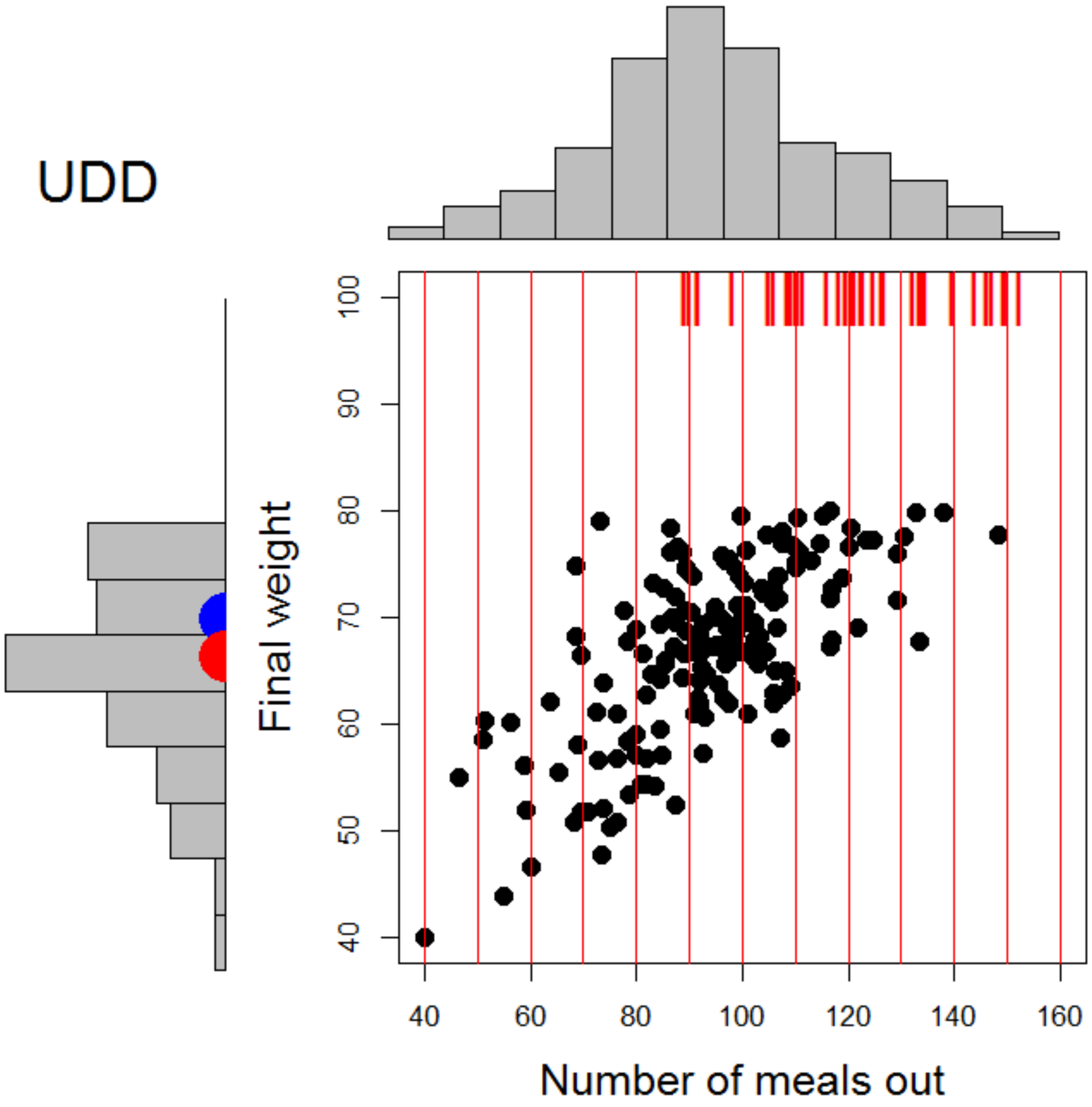

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The power of dark data

Deliberately darkening data

Algorithmic performance is evaluated by seeing how they do on data they *have not yet seen*

Surveys collect data on a sample of cases, treating the others as *dark*

In clinical trials treatments are randomised and researchers are blinded, so the treatment received is *dark*

In 1927 Holland adopted a confidential system of reporting causes of death

Bowker and Star p141

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And the number of deaths in Amsterdam attributed to syphilis increased dramatically

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Previously invisible data is made ***visible***
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Bowker and Star p141

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Strategic application of ignorance

Bowker and Star p141

Simulation

Smoothing

Bootstrap

Boosting

…

can all be viewed as generating previously unseen, dark, data

Your medical records
Your financial records

Passwords keep data dark

Allowing you to selectively reveal data

Opt in and opt out?

Bowker and Star p141

In conclusion

Sophisticated strategic use of dark data can be a very powerful tool

But dark data has serious risks

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The drunk looking for wallet beneath a lamppost

In conclusion

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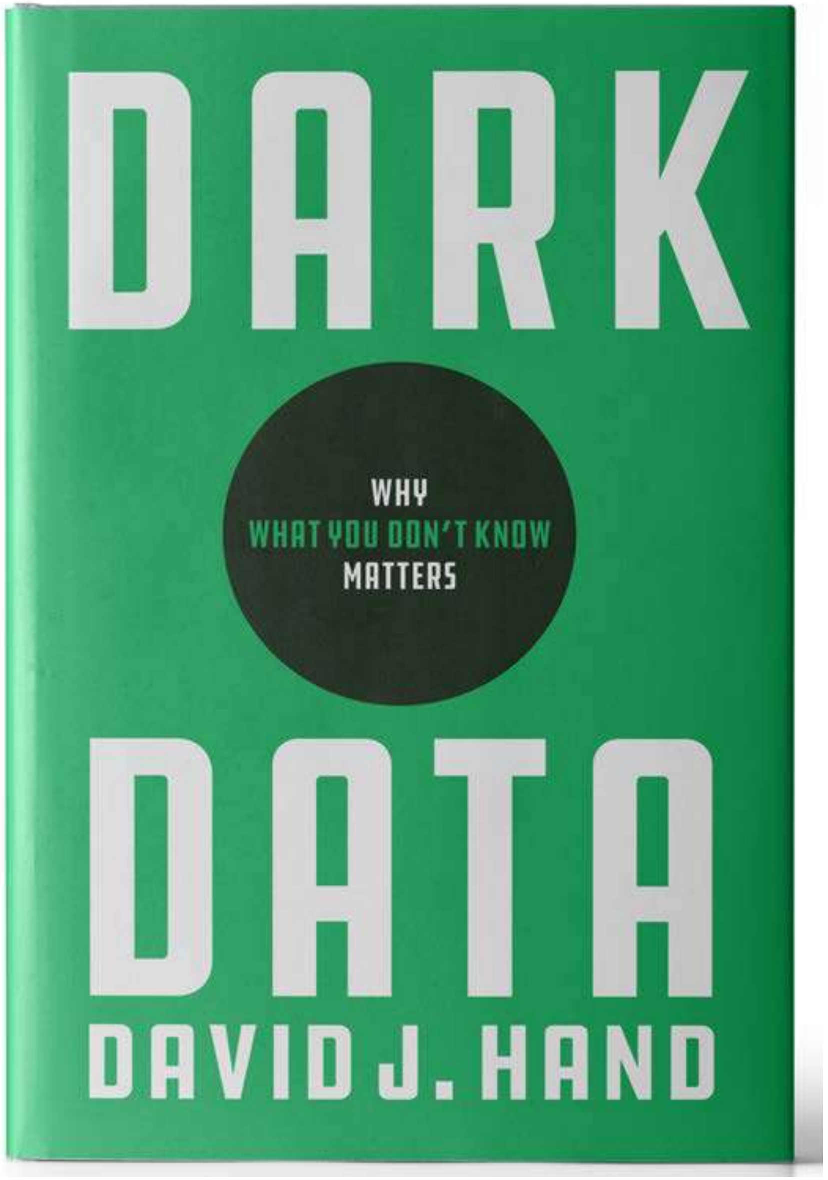
If you ignore dark data,
you are behaving like that drunk



Princeton University Press
January 2020

The Quant Conference

PANEL: What allocators are looking for in the digital age?

James Price

Senior Investment Consultant, *Willis Towers Watson*

Kishen Ganatra

Director of Business Development, *QMA*

Matthew Roberts

Partner, *Fulcrum Asset Management*

Stuart MacDonald

Managing Partner, *Bride Valley Partners*

KEYNOTE: AI-Based Macro Investment Strategy, human- machine collaboration and the problem of causality

The Quant Conference

Sebastien Guglieta

Co-Head of AI Strategies Group, *Brevan Howard*

AI-Based Macro Strategy

human-machine collaboration and the problem of causality

The Quant Conference

S.GUGLIETTA – BREVAN HOWARD

Content

1. Why Use AI

identifying, predicting and trading causality

2. Causality as a Deep Object

few stylized theoretical facts

3. Why AI Works

AI-based macro strategy works in theory

4. Building an AI-Based Macro-Investment Strategy

how to make AI work in real life

5. Understand the Why(s)

meta-learning and inferring causal structures

Disclaimer

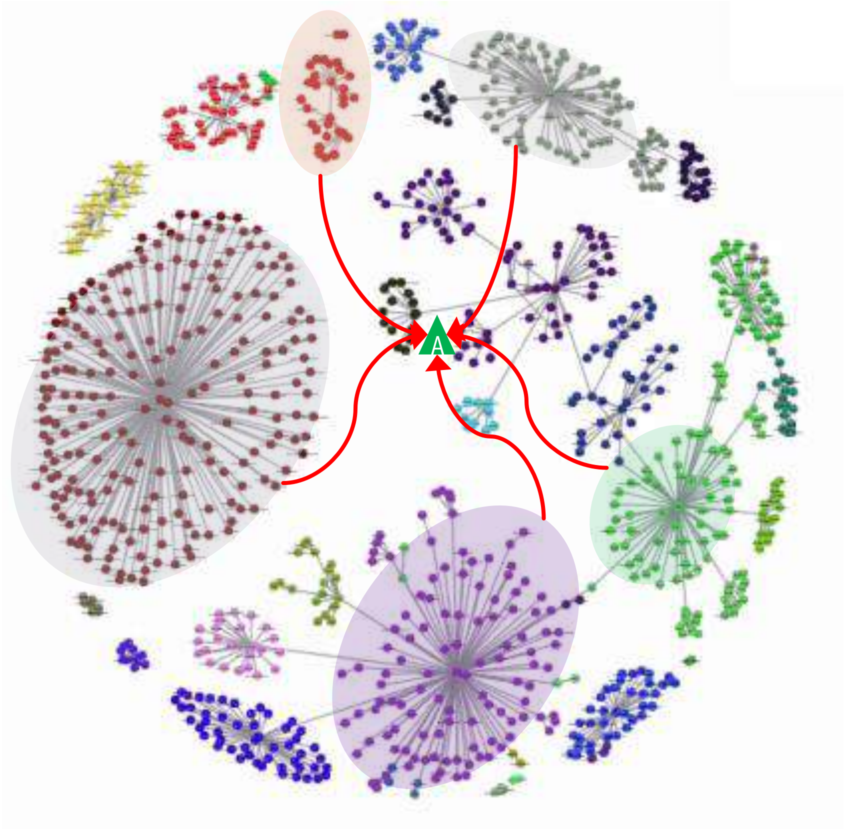
The opinions expressed in this presentation are those of the author. They do not purport to reflect the opinions or views of Brevan Howard or its members.

Why Use AI

identifying, predicting and trading causality

Macro Financial Markets as a Large Network

- Think about an asset A as being a 'node' immersed in a very large web of relationships where the other nodes are essentially hundreds of macro variables describing the state of the economy and few other assets.



Understanding, Predicting and Trading Causality

- **Identify causality is key in order to make profitable predictions**

causality

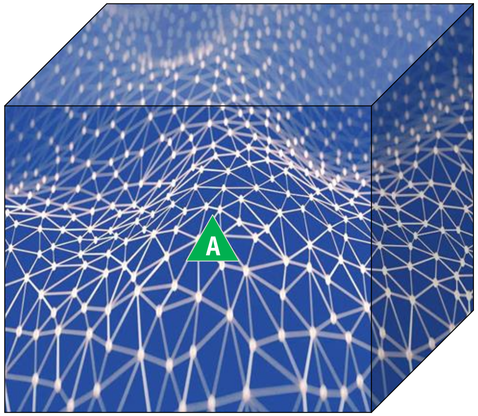
$$\underbrace{\hat{r}_{Asset}(\text{in the future})}_{\text{what the model tells us}} = \underbrace{E}_{\text{model}} \Big[\underbrace{r_{Asset}(\text{in the future})}_{\text{what we don't know}} \;\Big|\; \underbrace{Macro(\text{past, now}) \;\cup\; Asset(\text{past, now})}_{\text{what we know about the market}}\Big]$$

Causalities as Algorithmic Subtleties

- Identifying causalities?

  - Initial selection of macro driving factors
  - Stability
  - Interaction between factors
  - Cycles, boom-burst phenomenon and reflexivity

- Market is a ***deep object*** with ***deep algorithmic subtleties*** that are hardly captured by invoking multi-linear models.



Causality as a Deep Object

few stylized theoretical facts

Learning Algorithmic Complexities

- Machine Learning: efficient solution to learn algorithmic subtleties of a *system* $\mathcal{M}$: $X \rightarrow Y$ that transforms a 'thing' X into another 'thing' Y

$\mathcal{M}$:  $\longrightarrow$ A

- Building a machine learning model? Remember a profound thought from R. Solomonoff (*A Formal Theory of Inductive Inference, 1964*):

Proposition

Learning is compressing complexity by accepting a given amount of uncertainty.

Fighting Uncertainty

- Building a model of such a system $\mathcal{M}$ is about reducing its apparent complexity and fighting against its inherent uncertainty.

- The task should be easier if the amount of remaining disorder which is not captured by the model is relatively small: **a model always fights against the system's entropy** (*).

Proposition

Complexity is not disorder. A model is searching for order.

A macro-investment model is trading order. It does not trade noise.

(*) *Shannon entropy measures the remaining microscopic uncertainty despite a good macroscopic description.*

Algorithm is a Narrative

- **In algorithmic and information theories it all begins with data.**

- What can we say about a string S containing 1 billion of 0? A short efficient narrative - an algorithm, much shorter than S itself - is:

‘1 billion of 0’

- But, what can we say about a random string S that contains 1 billion of 0 and 1?

- Nothing. Impossible to find out an efficient macroscopic description of such a string so that the remaining microscopic uncertainty is small:

‘random series of 1 billion of 0 and 1’

- Model = *'random series of 1 billion of 0 and 1'?* Its Shannon's entropy is very high because the exact knowledge of S values stemming from this description is very small.

- Crucial implication for macro-investment model:

Proposition

If a model fails to capture enough algorithmic subtleties then it will suffer from high entropy.

From Complexity to History

- A string of 0 and a random string are both intuitively trivial. **They are not interesting in terms of organized complexity**.

- However, many natural structures (biotope) and many social systems (financial markets, economies) are clearly not trivial: **they contain a nontrivial history**.

  Proposition

  Complexity arises from complex historical processes

Bennett's Logical Depth

- C.H. Bennett (*Logical Depth and Physical Complexity*, IBM Research, Yorktown Heights, 1988).

- Notion of **organized complexity** which is central for systems with a **subtle causal history**.

Definition

The Bennett's logical depth of a system is the time required by a short algorithm (in the sense of a standard universal Turing machine) to generate it. It measures the time needed by a minimal program to compute a certain string.

- This crucial inclusion of computing time means that a high - or deep - value in logical depth shows that a system has a rich causal history.

Implication for AI-Based Macro Strategies

- Deep systems cannot be produced from shallow machines. A shallow model trying to simulate a system with a deep causal structure can't work.

- A macro systematic strategy – with deep algorithmic subtleties – based on structural VAR or multi-linear models – with shallow algorithmic subtleties - is doomed to fail.

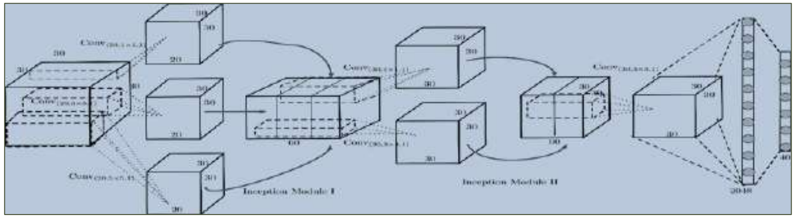
- Bennett's logical depth: **algorithmic formalization of historical processes**. It measures the **computational content** $\mathcal{L}(S)$ of a system S that differs from the Kolmogorov complexity $\mathcal{K}(S)$ which measures its information content.

- Shallow or deep evolutionary systems cannot generate very sudden innovative computational structures.

- Bennett's slow growth law states.

> ***Proposition***
>
> ***When such a system S_t evolves, $\mathcal{L}(S_t)$ cannot grow suddenly.***
>
> ***Making predictions about a system requires that this system must satisfy a slow growth law.***

deep system
complex causality



deep computing structure

Why AI Works

AI-based macro strategy works in theory

The Problem of Learning is Mainly One of Programming

- The difficulty of making predictions about a system depends on its computational and informational content. Learning a system requires to model its algorithmic subtleties.

- Two main approaches to create AI:
  - **Ontology Teaching**: large formalized knowledge base for supporting reasoning in a variety of domains. Machines do what we tell them to do explicitly.
  - **Machine Learning**: algorithmic structures trained with data so that they learn by their own. Machines eventually evolve.

- Writing an explicit ontology with many billion incompressible lines of code would take a very long time. It is impossible and quoting Turing *"some more expeditious methods seems desirable"*.

Turing's Legacy

- A.W. Turing in *Computing Machinery and Intelligence* (Mind, New Series, Vol. 59, No. 236, Oct. 1950) about the simulation of the intelligence of an adult mind $I(a)$.

MIND

A QUARTERLY REVIEW

OF

PSYCHOLOGY AND PHILOSOPHY

I.—COMPUTING MACHINERY AND INTELLIGENCE

By A. M. Turing

1. *The Imitation Game.*

I PROPOSE to consider the question, 'Can machines think?' This should begin with definitions of the meaning of the terms 'machine' and 'think'. The definitions might be framed so as to reflect so far as possible the normal use of the words, but this attitude is dangerous. If the meaning of the words 'machine' and 'think' are to be found by examining how they are commonly used it is difficult to escape the conclusion that the meaning and the answer to the question, 'Can machines think?' is to be sought in a statistical survey such as a Gallup poll. But this is absurd. Instead of attempting such a definition I shall replace the question by another, which is closely related to it and is expressed in relatively unambiguous words.

Why AI Works – Revisiting the Turing's Proof

- Historical process that brought $I(a)$ to the state it is in.

  We distinguish:

  - the initial state of the child mind I_0 (i.e. **algorithmic structure**)
  - the education and other experience L to which I_0 has been subjected (i.e. **supervised and unsupervised learning**)

- Instead of writing a very complex program simulating $I(a)$ it is easier to produce one simulating I_0 which is less complex and compressible.

- The problem has **been divided into two parts**:

  The child program I_0 and the learning process L so that:

$$I(a) = \mathrm{L}[I_0]$$

AI? Deep Learning + Reinforcement Learning

- The revolution introduced by Turing is the possibility to create this:

learning machine I_0

which is able to evolve, adapt and grow in complexity helped with the right:

learning program $\mathbf{L}[.]$

- **This approach works because a proof of concept exists: the human mind.**

Machine Learning Enables Artificial Intelligence

- S is a deep object with a large informational and computational complexity.

$\mathcal{I}(S)$ is an incompressible AI that simulates exactly S.

- A very long program is required to build $\mathcal{I}(S)$. But it is technically impossible to write a code with such a deep algorithmic complexity.

- Therefore, any other method which is able to produce a program generating $\mathcal{I}(S)$ will be unsurpassable.

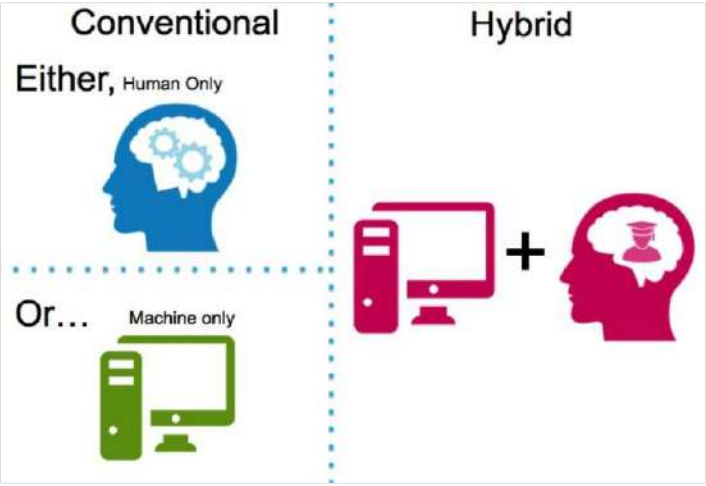
- A learning machine decomposing $\mathcal{I}(S)$ into a [child program] that slowly becomes more complex with the right [education program] is a solution as it is shown by the human mind as a proof of concept.

Human-Machine Collaboration: Centaur Solution

- So what? **AI works in theory**.

- In practice, if machine learning is **powerful to explore the frontiers of a systematic reasoning** it **struggles to form logical bifurcations**. The learning process needs to consume a large amount of data (in order to grasp the algorithmic subtleties of the studied system).

- Following G. Kasparov: the solution is to build a ‘centaur’ with is a collaboration between human expertise and machine learning.



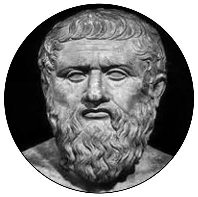
Building an AI-Base Macro Strategy

how to make AI work in real life

- **Solomonoff 's Theory of Inductive Inference**, mathematically formalized combination of:

Ockham's razor or simplicity principle

Models should not multiplied beyond necessity



Principle of Multiple Explanations

If more than one model is consistent with observations, keep all the models

- **'Centaur' learning workflow** inspired by **Bayes' Probability Theory**

$$\text{Posterior}\,(\mathit{Hypothesis}|\mathit{Data}) \approx \text{Likelihood}\,(\mathit{Data}|\mathit{Hypothesis}) \times \text{Prior}\,(\mathit{Data})$$

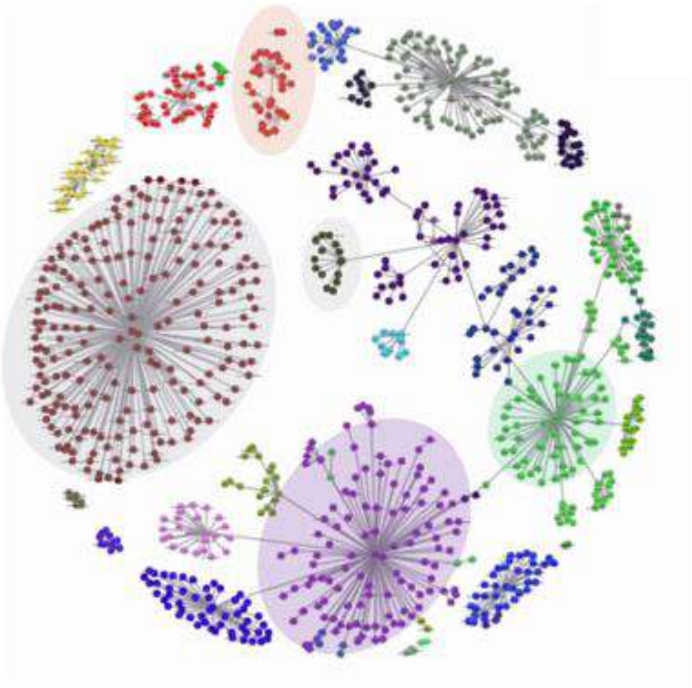
- **Data-driven 'reasoning on steroids'** inspired by **Turing's theory of computation**

Turing's universal machine

Everything computable by a human using fixed rules can also be computed faster and better by a Turing's machine. Explore the frontiers of reasoning with data.

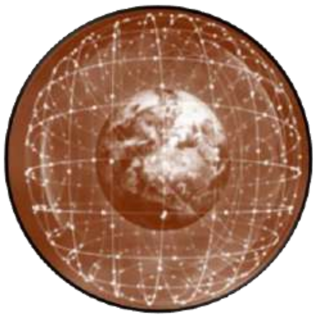
Macro Driving Factors – Human Expertise

- **Ever growing set** of economic and financial data in order to describe the macro factors interdependencies (100 macro features for each economy, some can depend on hidden co-founders)

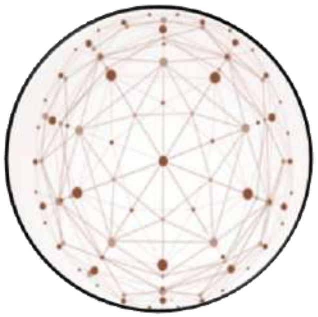


Select and Compress Macro Information

Complex Macro World
large Kolmogorov complexity



Representation of the World
smaller Kolmogorov complexity

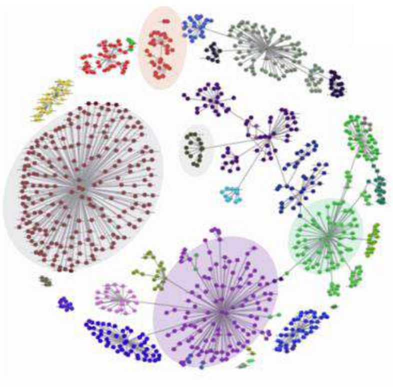


Compressing Information

Decompressing Information

- Activity
- Inflation
- Labour Market
- Credit
- Earnings
- Risk Factors
- Global Factors

Extracting Information



Smaller Dimension
less entropy

High Dimension
large entropy

- Unsupervised machine learning techniques build various macro-indicators reflecting different aspects of an economy

many macro factor → **reduction** → **main aspects of an economy**

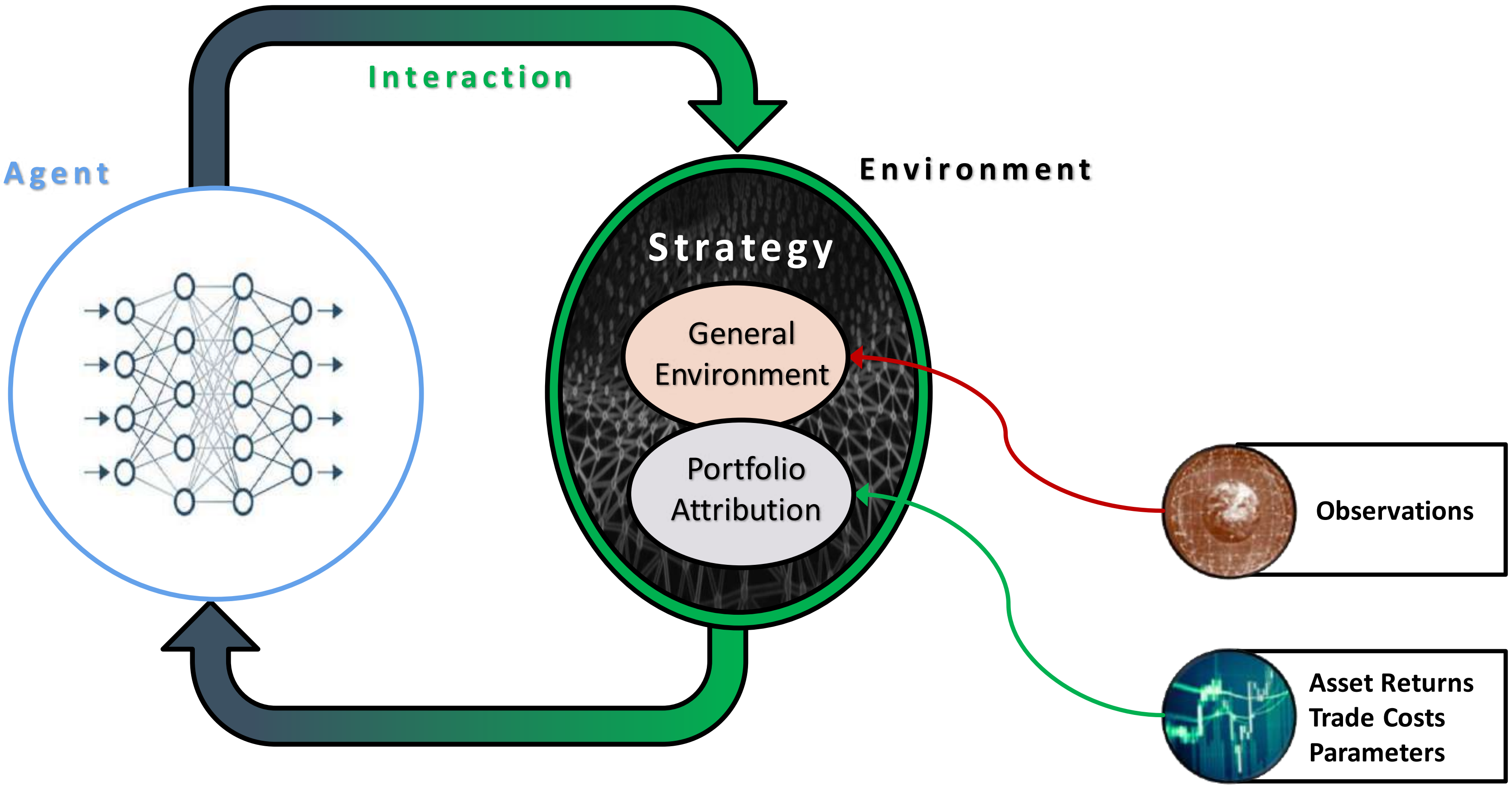
- Machine learning techniques are used to model how this *abstraction of the economy* impacts asset prices by invoking a deep learning architecture

main aspect of an economy → **impact** → **asset expected return**

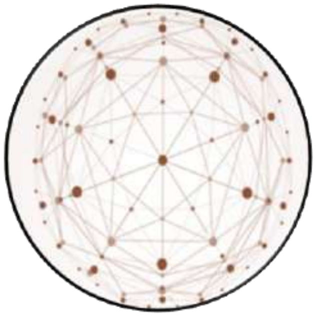
- Fight against the lack of stability and time variability: cross-validation and ensembling techniques are used to ensure the stability of the models and extensive grid-searches are used to tune the hyper-parameters .

Algorithmic Workflow | *Machine Learning* $I(a) = \mathrm{L}[I_0]$

- Reinforcement learning techniques are used to exploit these predictions.



Network Topology | Combining Two Architectures



representation of the world

macro-driving factors

value

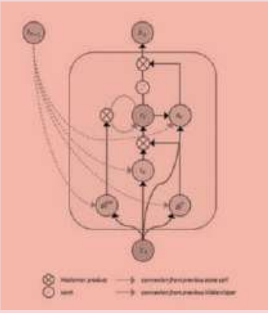
asset expected return

price process dynamics

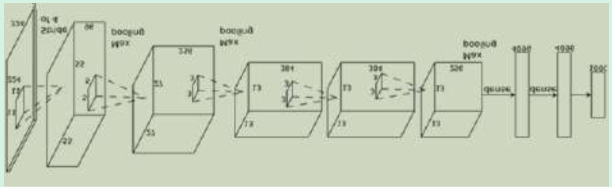
asset price dynamics

momentum

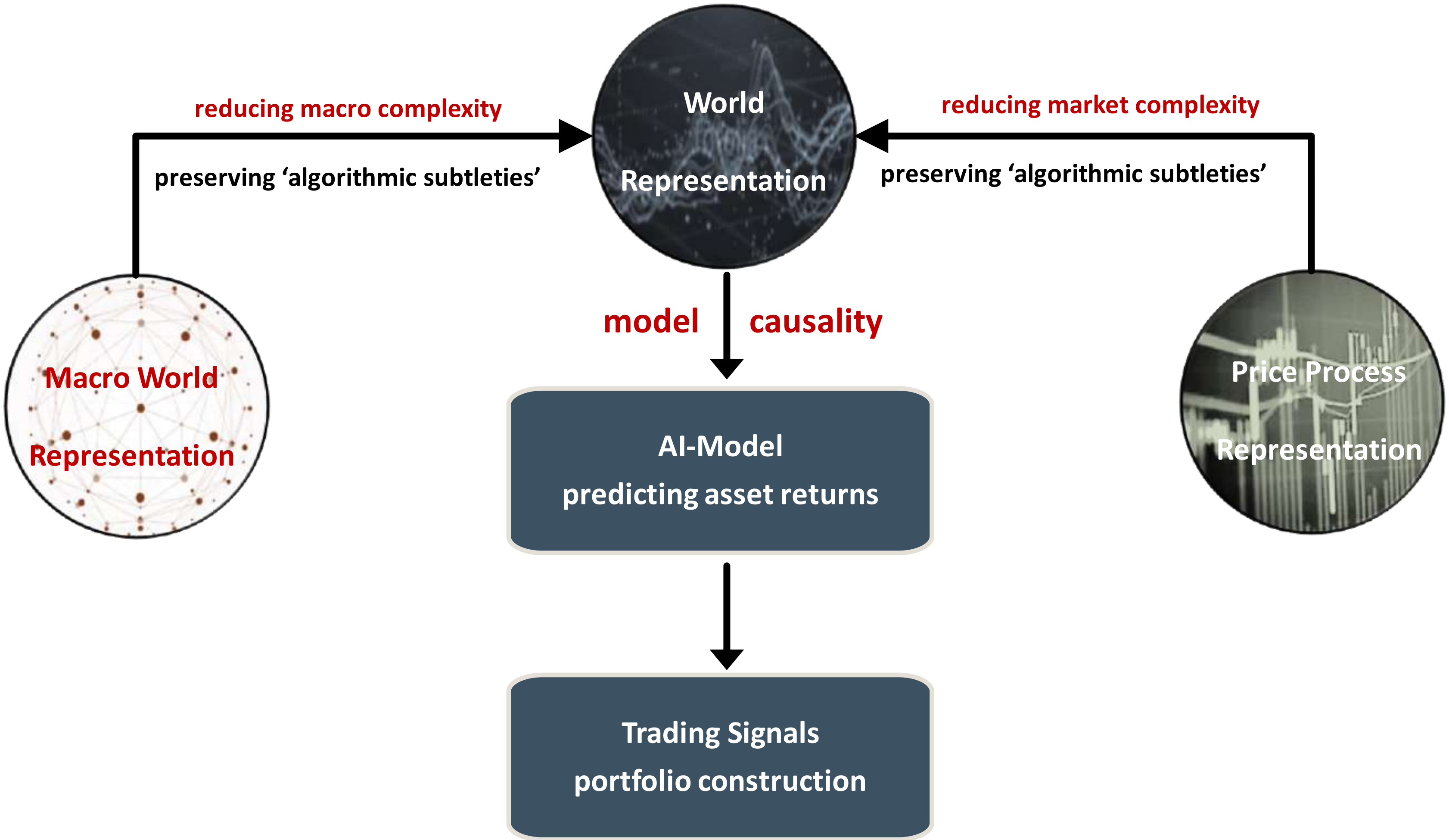
Recurrent Structure



Convolutional Structure



AI-Based Model in Motion



Understand the Why(s)

meta-learning and inferring causal structures

Going Beyond Pattern Recognition

- Betting on stability: classical machine learning techniques assume that the trained solution will be applied on the same kind of data as the training data.

- Instability curse: in real life, stability (e.g. distributional properties) is at best local. Generalization is always a difficult problem.

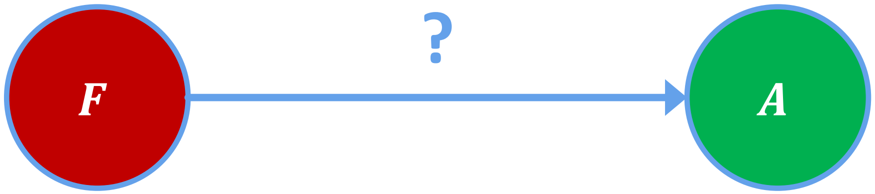
- For now, efficient machine learning solutions have to be highly specific (e.g. one specific model for one specific asset, practical centaur approach).

- Usually, these deep learning systems remain blind to cause and effect.

- In order to achieve a super-human performance (systematically being better than an expert), they need to learn more about causes and effects, to reason about causal relationships. This is a much harder problem.

Reasoning with Logical Graphs

- Deep learning systems usually focus on correlation without causation. They are often left at a loss when they are tested on ‘real life’ conditions that are dissimilar to the ones they were trained on.



- Causal model from a Bayesian perspective:

$$P_{F\rightarrow A}(F, A) = P_{F\rightarrow A}(A|F)\,.\,P_{F\rightarrow A}(F)$$

Ground Truth Mechanisms

- Following Y. Bengio, there is a need to go beyond transfer learning and it requires causal learning and causal reasoning.

- The aim is to build framework '*where one learns from a set of distributions arising from not necessarily known interventions, not simply to capture a joint distribution but to discover the underlying causal structure*'.

- Naive example: $F = raining$ causes $A = open\, umbrella$, and not vice-versa.

- Changing the marginal probability of $raining$ (because the weather changed) does not change the mechanism that relates F and A (captured by $P(A|F)$), but will have an impact on the marginal probability $P(A)$.

- Conversely, an agent's intervention on $A = open\, umbrella$ will have no effect on the marginal distribution of $F = raining$. That asymmetry is generally not visible from the (F, A) training pairs alone, until a change of distribution occurs.

Logical Representations Through a Deep Learning Lens

- A possible solution should combine deep learning and formal reasoning with logical representations (remember the CYC ontology, which is aimed to reproduce human competence in common-sense reasoning).

- But how? Very recently Y. Bengio et al. have proposed the beginning of a promising solution in *A Meta-Transfer Objective for Learning to Disentangle Causal Mechanisms*. The main idea is to build a meta-learner:

  - '[They] propose to meta-learn causal structures based on how fast a learner adapts to new distributions arising from sparse distributional changes (e.g. due to interventions, actions of agents and other sources of non-stationarities).'
  - '[They] show that under this assumption, the correct causal structural choices lead to faster adaptation to modified distributions because the changes are concentrated in one or just a few mechanisms when the learned knowledge is modularized appropriately'

Thank You

Questions …

The Quant Conference

KEYNOTE: Short-term trend following – How to monetise intraday trading patterns

The Quant Conference

Sandrine Ungari

Head of Cross-Asset Quantitative research, *Société Générale*

1 NOVEMBER 2019

SHORT-TERM TREND FOLLOWING

How to monetise intraday trading patterns

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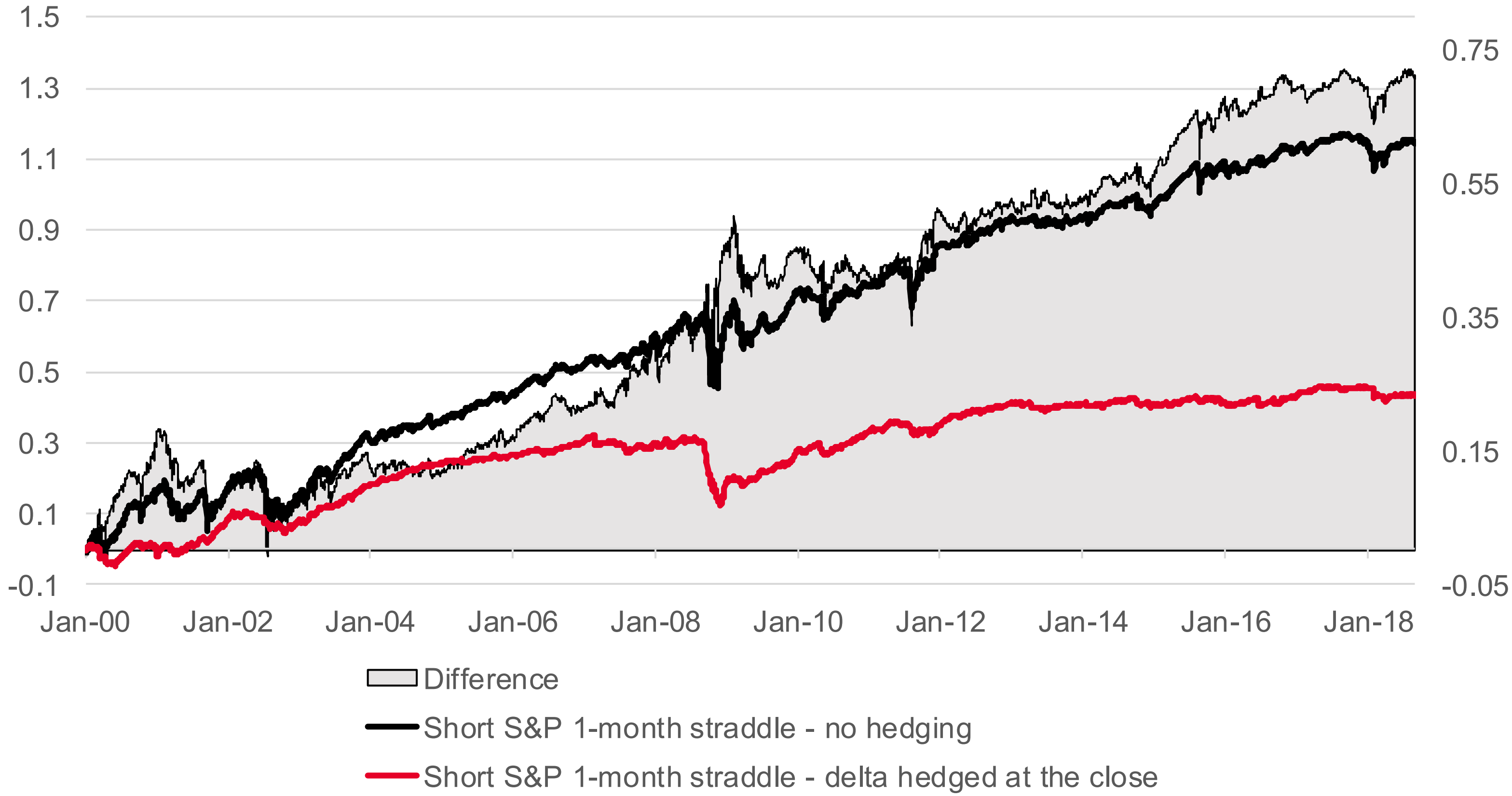
SOCIETE GENERALE
Cross Asset Research

THE SHORT VOLATILITY CONUNDRUM

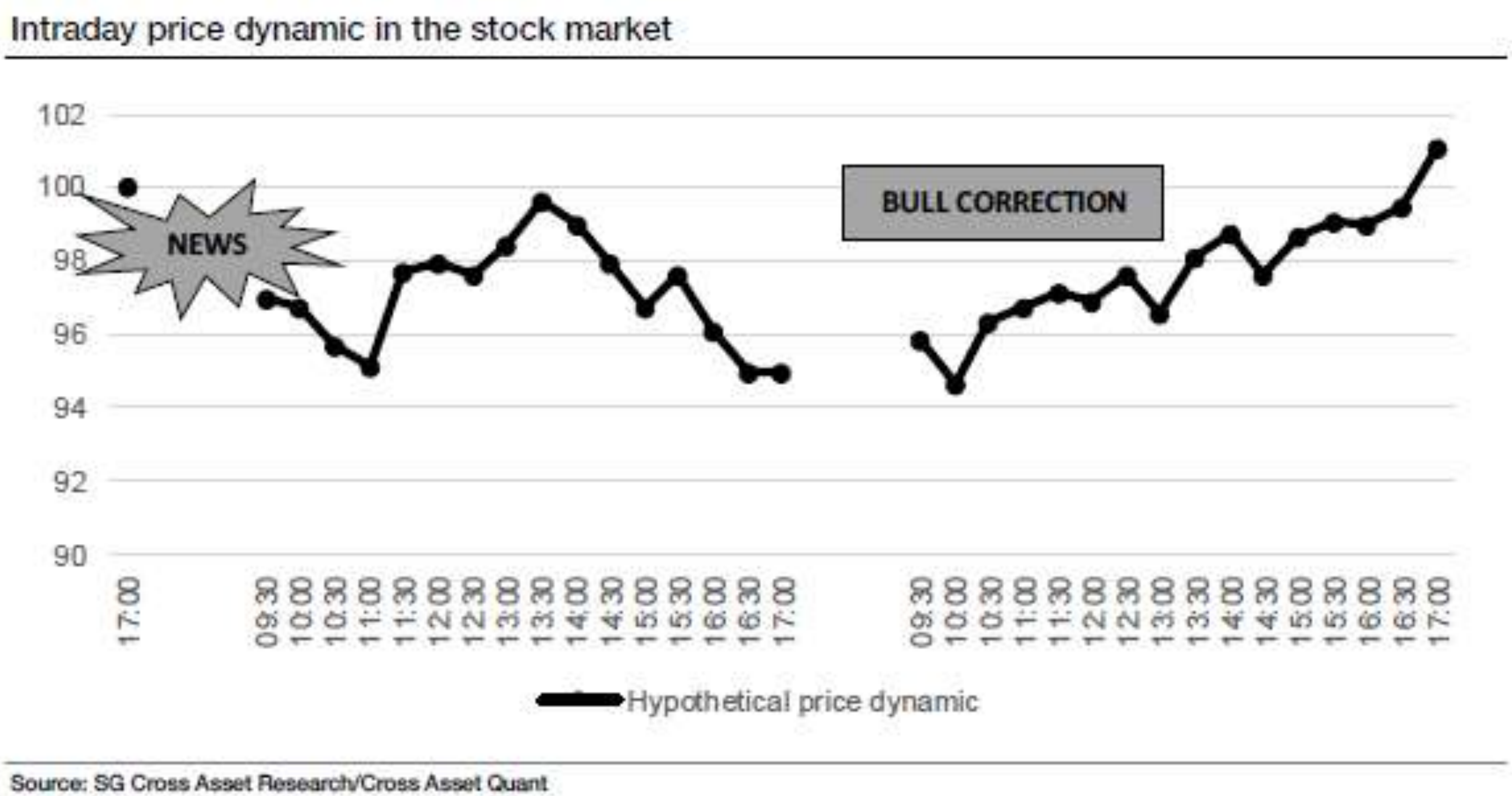
- **Same trade: selling 1-month straddles on the S&P, held until expiry**
- **But different hedging policies: no hedging (insurer point of view), hedging at the close (market maker point of view)**



Source: SG Cross Asset Research/Cross Asset Quant

MONETIZING BEHAVIOURAL PATTERN

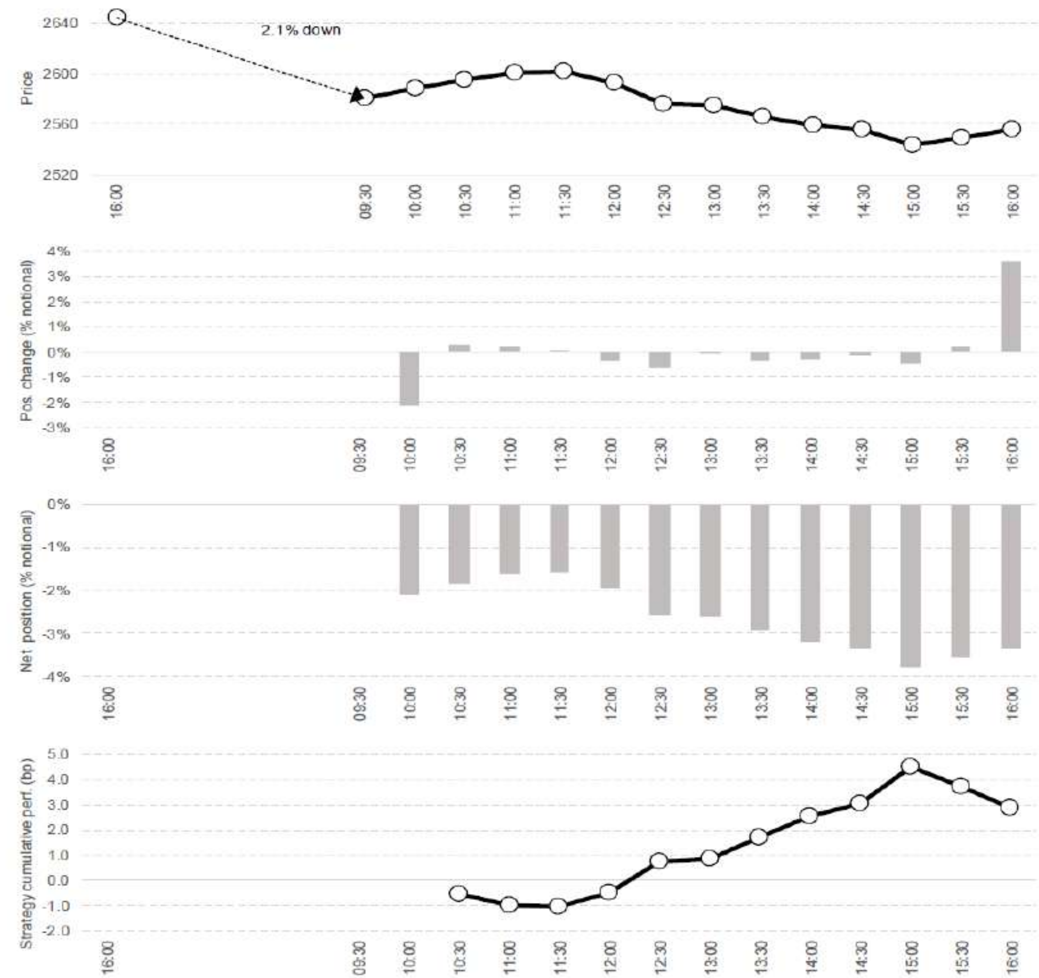
- When negative news appears outside trading hours, markets drop sharply at the open.
- The downtrend tends to persist until the close of the session.
- During the next session, prices tend to revert, with the formation again of a new trend during the day.



Source: SG Cross Asset Research/Cross Asset Quant

THE INTRADAY TREND FOLLOWING STRATEGY IN PRACTICE

The intraday trend following strategy over one day (S&P on 17 December 2018)[3]



Source: SG Cross Asset Research/Cross Asset Quant

Source: SG Cross Asset Research/Cross Asset Quant

FOCUSING ON THE SHORT TERM

- **Following the commoditization of low frequency systematic strategies, intraday strategies are now becoming more accessible to investors.**
- **We introduce a simple trading rule. It aims at capturing intraday trends.**
- **When applying this signal to S&P 500 Mini Futures over a period of 15 + years. The strategy delivers an overall good risk / return profile, with a shape of 0.78 on the period.**

The intraday-trend strategy on the S&P, an attractive return profile

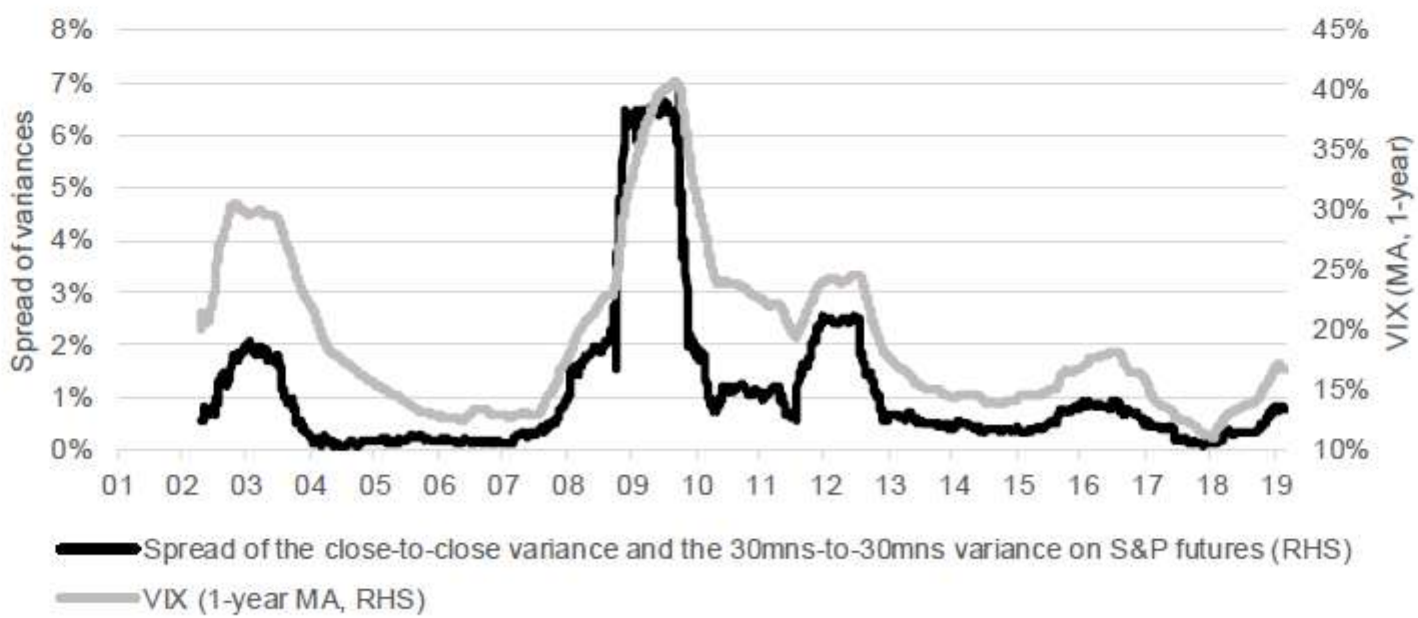
Source: SG Cross Asset Research/Cross Asset Quant, SG Trading, Bloomberg

Source: SG Cross Asset Research/Cross Asset Quant

A DEFENSIVE PROFILE

- **The strategy is long daily variance and short intraday variance**
- **It exhibits a defensive profile**
- **Performance is proportional to overall volatility levels.**

The higher the uncertainty, the better the expected return of the intraday trend strategy



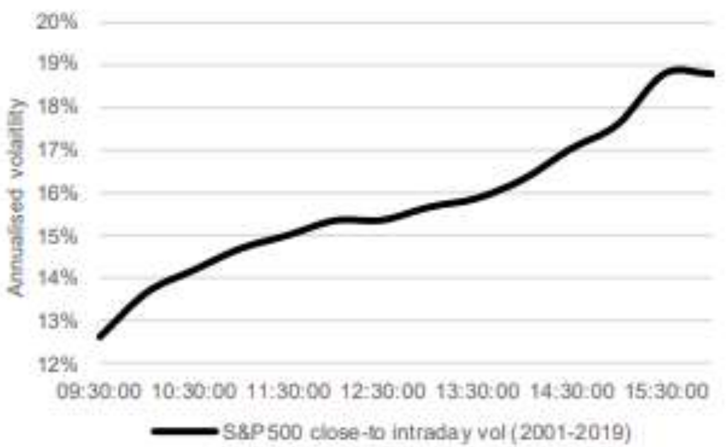
Source: SG Cross Asset Research/Cross Asset Quant, SG Trading, Bloomberg

Source: SG Cross Asset Research/Cross Asset Quant

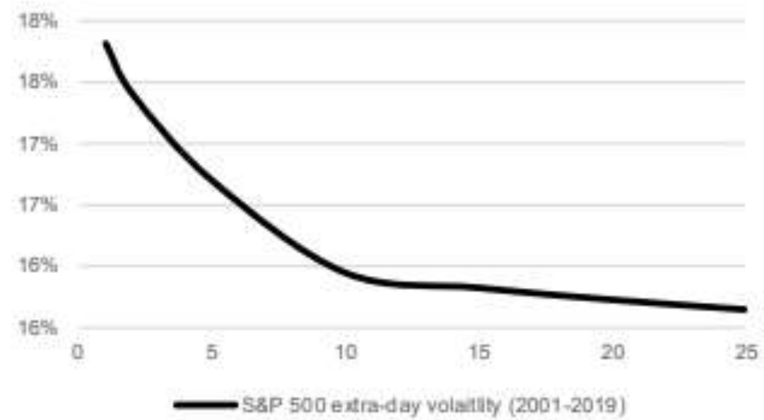
THE INTRADAY TRAVELER

- When prices are trending, realised volatility tends to increase with time.
- When prices revert to the mean, realised volatility decreases as the time span on which returns are measured decreases
- Prices are trend following intra-day and mean reverting extra-day

Intraday trend following



Extra-day mean reversion

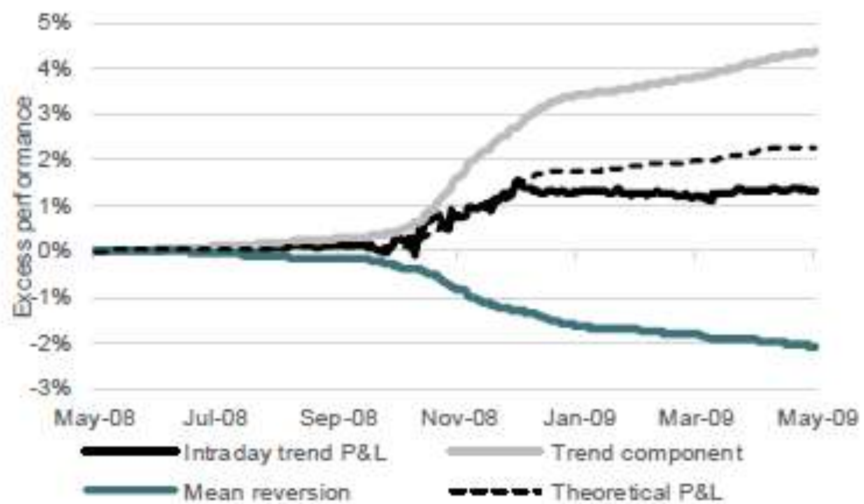


Source: SG Cross Asset Research/Cross Asset Quant, SG Trading, Bloomberg

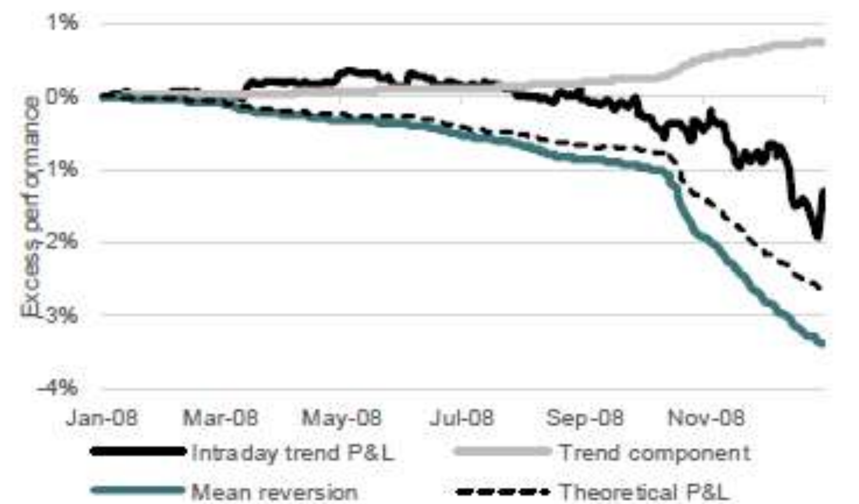
THE KEY DRIVERS OF PERFORMANCE

- **We developed an analytical framework for understanding the performance drivers of the strategy**
- **The performance is driven by three factors.**
- **The first and the second factors benefit from the daily trend and the trend's uncertainty, respectively. They both have a positive impact on the strategy's performance.**
- **The third factor captures the reversion to the mean of intraday prices. It has a negative impact on the performance.**

S&P gains during the GFC from the trend and its volatility



Brent mean reversion offset any trend gains



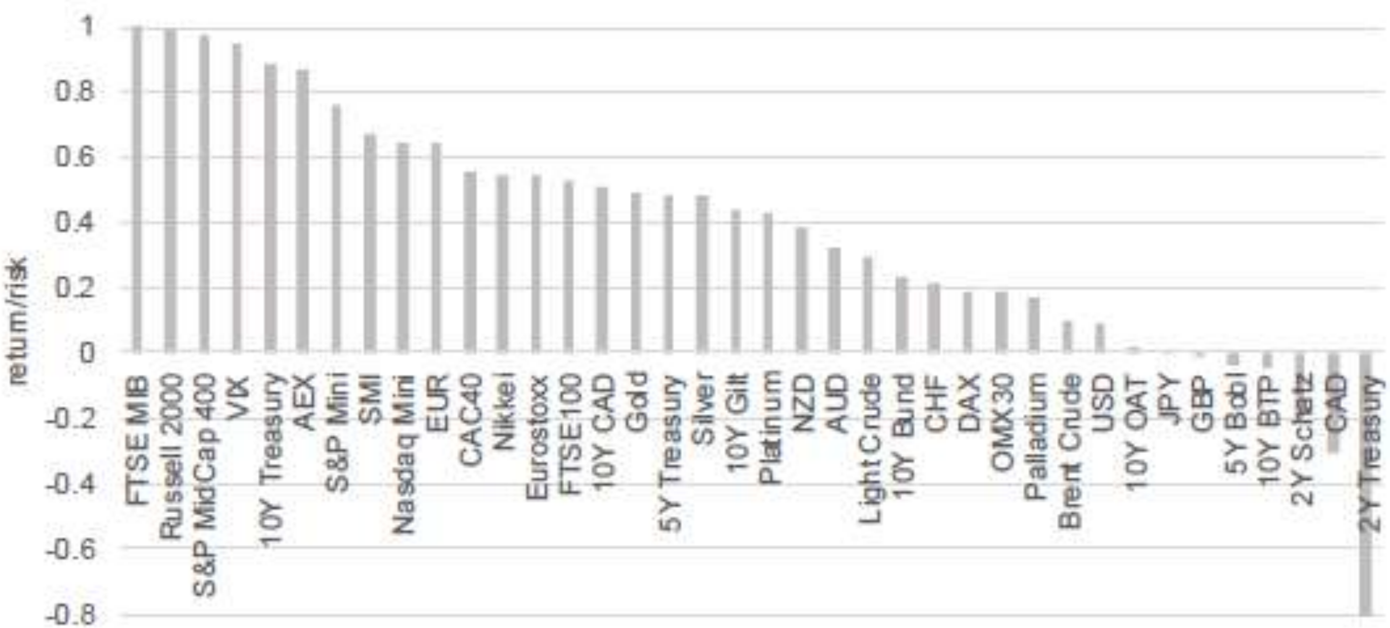
Source: SG Cross Asset Research/Cross Asset Quant

Source: SG Cross Asset Research/Cross Asset Quant

THE PRACTICAL DAY TRADER

- We have applied this same signal to 30+ liquid futures.
- Before taking into account transaction costs, most of them exhibit a strong intraday trend pattern. The most profitable ones remain US equities, VIX and some FX pairs.

Applying the intraday trend following rule across assets (excluding costs)



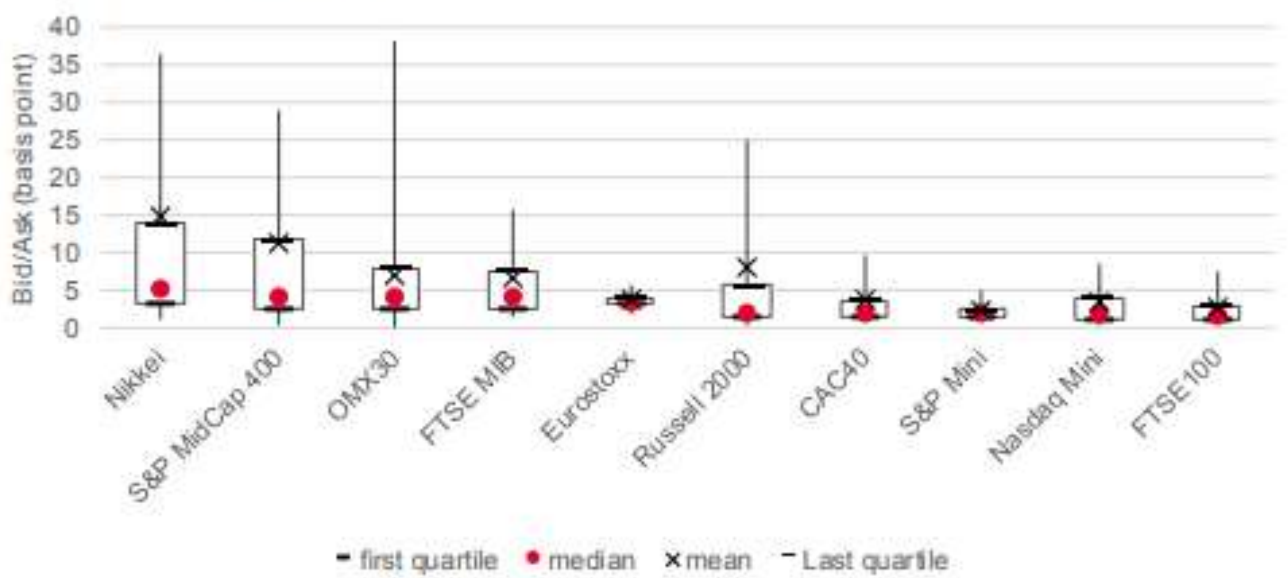
Source: SG Cross Asset Research/Cross Asset Quant, SG Trading, Bloomberg

Source: SG Cross Asset Research/Cross Asset Quant

BEWARE OF TRADING COSTS

- **Trading costs are different across assets**
- **They also change during the trading day. It is generally more expensive to trade the open and the close.**

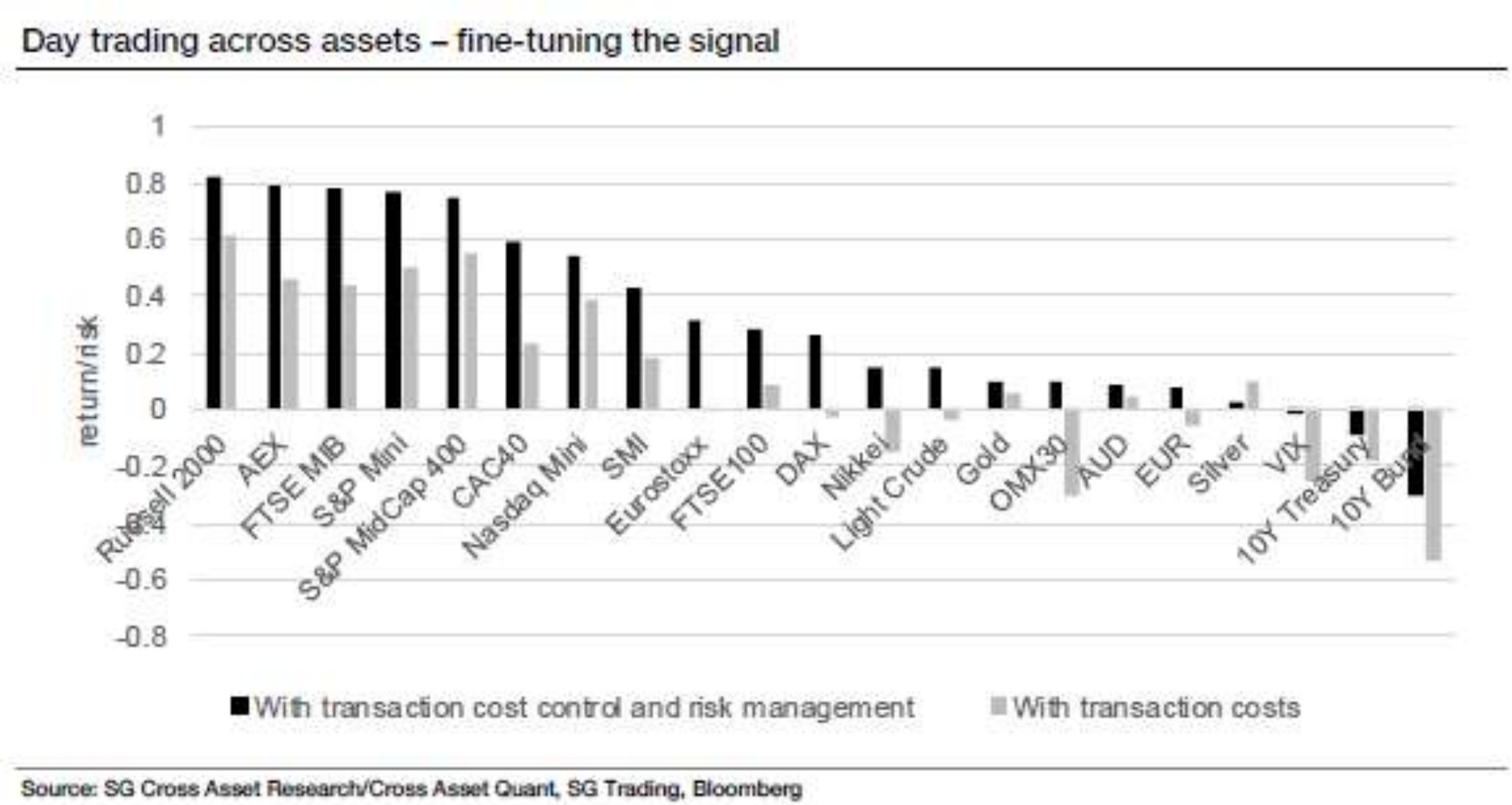
Beware the costs on less liquid markets



Source: SG Cross Asset Research/Cross Asset Quant

THE DEVIL IS IN THE EXECUTION

- **Intraday strategies have a high turnover. They are particularly sensitive to transaction costs.**
- **After taking into account for transaction costs, only US and European equities remain sufficiently profitable.**

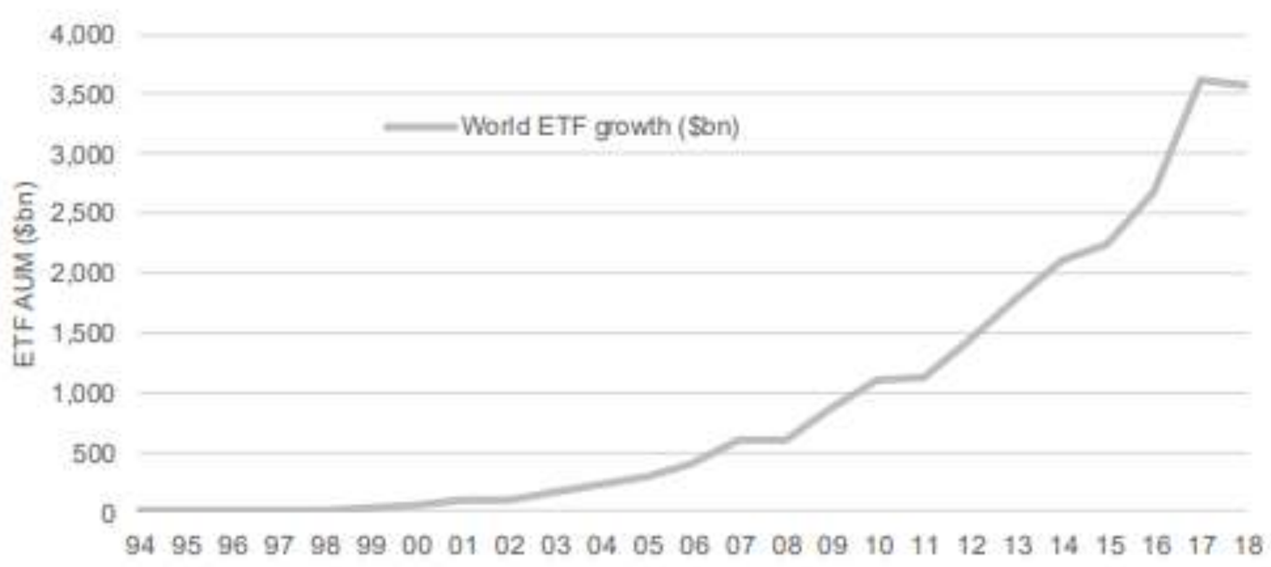


Source: SG Cross Asset Research/Cross Asset Quant

A DETOUR IN THE WORLD OF LEVERAGED ETFS

- **Our assumption is that end of day flow activity has a great impact on intraday trend patterns.**
- **Passive mutual funds, ETF managers and option hedgers are all forced into trading at the end of the day. They create volatility and trends around the close.**
- **We study the case of leveraged ETFs using out ETFs team's database.**

The incredible success story of ETFs

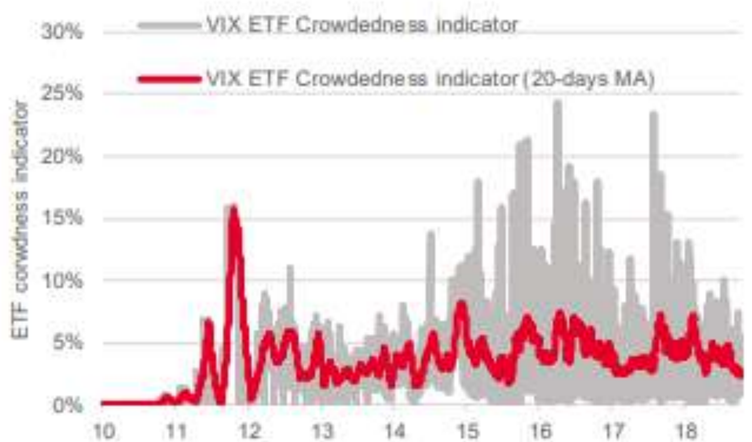


Source: SG Cross Asset Research/ETF

ASSESSING THE IMPACT OF 'NON DELTA-ONE' ETFS

- **We introduce the leveraged ETF impact indicator as the ratio between:**
  - The sum of the "signed" AUM of ETFs related to this future multiplied by the absolute value of the ETF daily return
  - And the end-of-day dollar volume of each futures market.
- **We also introduce the leveraged ETF crowdedness indicator**

Contribution of 'non delta-one' ETFs to VIX futures volumes



Net impact of ETFs on the VIX futures market

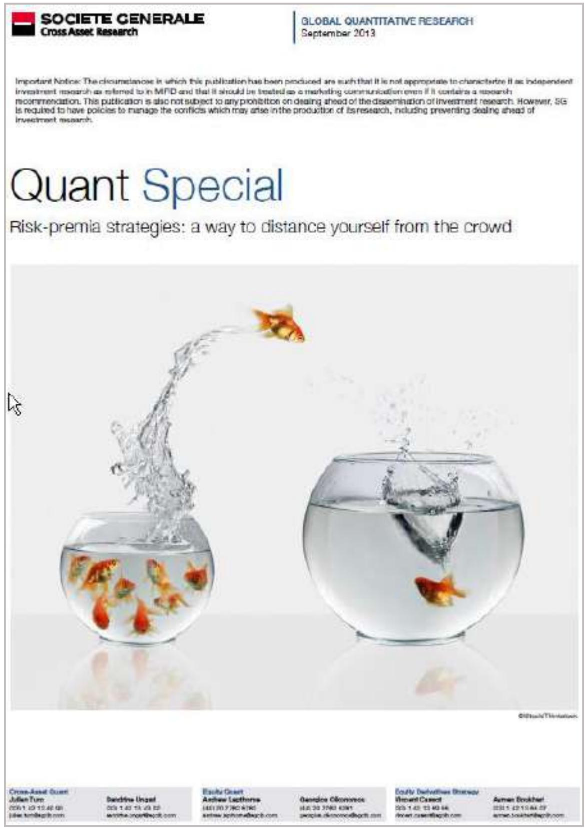
Source: SG Cross Asset Research/Cross Asset Quant

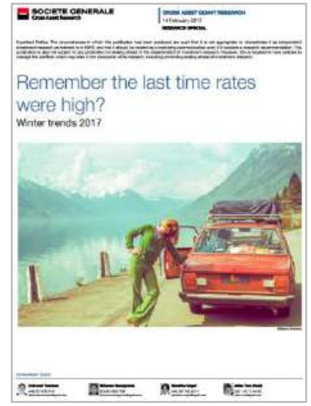
CAN ETF REBALANCING EXPLAIN THE INTRADAY TRADING PATTERN?

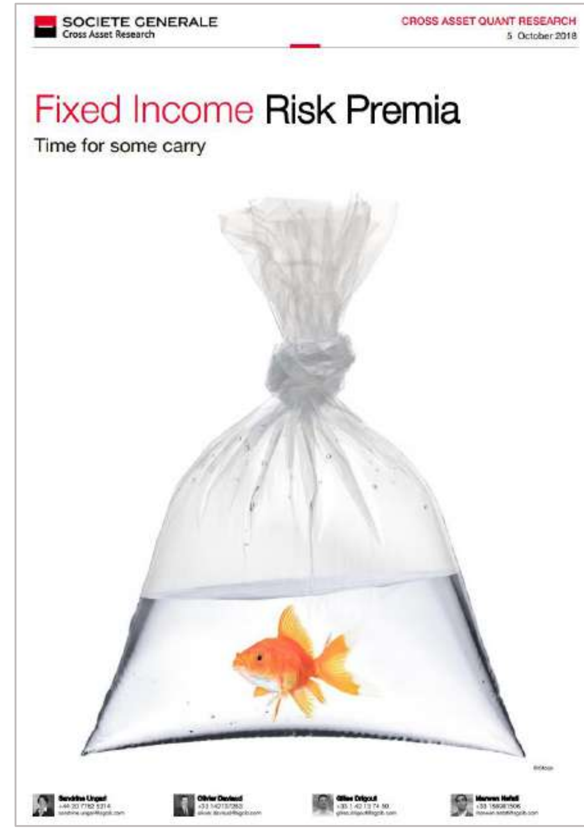
The impact of ETF flows on intraday trend followers

Source: SG Cross Asset Research/Cross Asset Quant, SG Trading, Bloomberg

SG RESEARCH ON SYSTEMATIC STRATEGIES







In preparation :

- Value investing in Fixed Income
- Tail risk hedging

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Cross Asset Research

EXTEL 2018
#5 Overall Research House

Multi-Asset
- Asset Allocation
- Alternative View
- ETF Research
- Technical Analysis

EXTEL 2018
#1 Multi Asset Strategy
#1 Global Strategy

Fixed Income
- Rates & Forex Strategy
- EM Strategy
- Credit Strategy
- Credit Sectors

EUROMONEY FIXED INCOME RESEARCH 2018
#1 Overall Trade Ideas
#3 Fixed Income Research
#3 Credit Research

Cross Asset Research

Economics
- Europe
- UK
- Americas
- Asia

EXTEL 2018
#6 Global Economics

Commodities
- Strategy
- Oil & Products
- Metals
- Agricultural

EnergyRisk Commodity Rankings 2018
#1 Commodity Research
#1 Oil Research

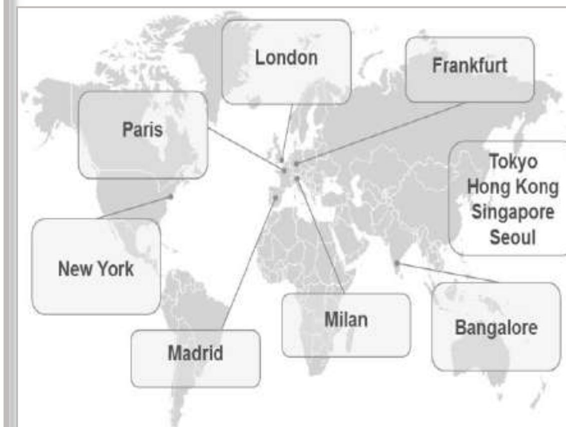
Equity
- Sector Research
- Equity Strategy
- Equity Derivatives
- Thematic and SRI

EXTEL 2018
#7 Equity Sectors Research
9 Sectors in the Top 5
17 Sectors in the Top 10

Quantitative
- Cross Asset Quant
- Equity Quant
- Equity Index

EXTEL 2018
#1 Quantitative/ Database Analysis
#1 Index Analysis

A global footprint



Single names Research

A team of 80+ **equity sector** analysts, with 20 years of experience on average

Strong expertise in all **corporate debt** from IG to HY with highly experienced team members

SG LEADER IN GLOBAL CROSS ASSET RESEARCH

EXTEL IDENTIFYING EXCELLENCE 2018

Macro & Strategy

#1 Multi Asset Research

#1 Global Strategy

#1 Quantitative/Database Analysis

#1 Index Analysis

EUROMONEY FIXED INCOME RESEARCH 2018

Fixed Income

#1 Actionable Trade Ideas

#3 Fixed Income Research

#3 Credit Strategy

#1 Non-Bank Financial Institutions / **#1** TMT /

#1 Autos / **#1** Utilities / **#1** General Industries

EnergyRisk Commodity Rankings 2018

Commodities

#1 Commodity Research

#1 Oil Research

#1 Base Metals Research

#1 Soft Commodities Research

#1 North America & Europe Natural Gas Research

EXTEL IDENTIFYING EXCELLENCE 2018

Equity

#7 Equity Sector Research

9 Sector Research Teams in the **Top 5**

17 Sector Research Teams in the **Top 10**

PANEL: Cutting edge research

Andrea Nardon

Partner, Portfolio Manager, *Sarasin & Partners*

Antoine Jacquier

Researcher, *Alan Turing Institute*

Declan Sheehy

VP of EMEA Asset Owners, *Backstop Solutions*

Greg Winterton

Managing Director, *AlphaWeek*

The Quant Conference

PRESENTATION: Autonomous data testing and signal discovery

Darko Matovski

CEO, *causaLens*

The Quant Conference

PRESENTATION: Your Turnkey Asset Management Solution

The Quant Conference

Juan Colon
Co-Founder and CEO, *Darwinex*

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Darwinex Private LABEL

Turnkey Asset Management

The Quant Conference, November 1st, 2019

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Manual

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ID, Ticker & Fact-sheet

Darwinex diagnostics

Investor Capital

24/5 liquid, trade-able price

Desktop or Mobile 24/5

DARWIN API

DARWIN = Turnkey Asset Management

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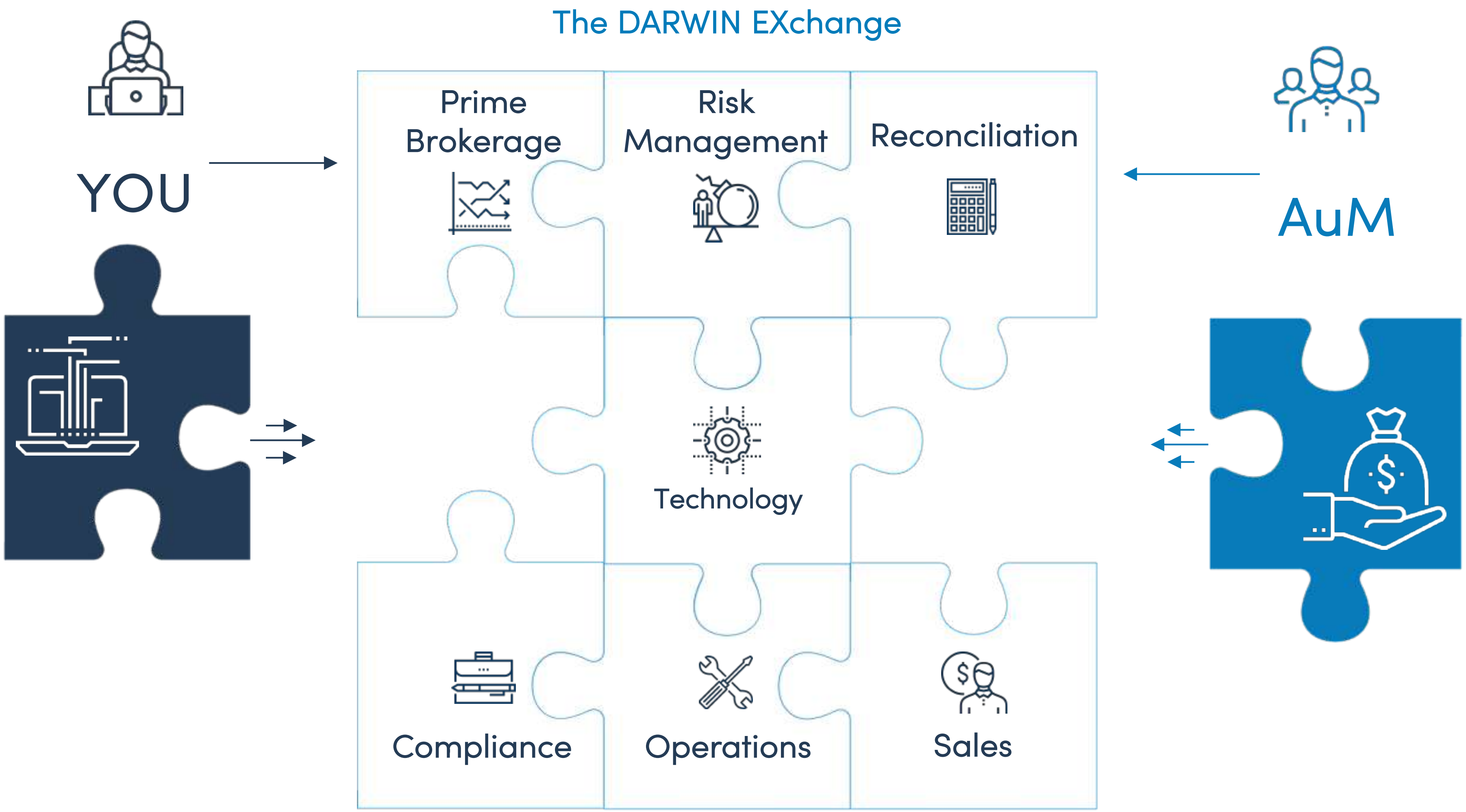

The top Managers ear n well into 6 digit figures

And that’s before we even started selling

Investor AuM breed Alpha,
Which attracts AuM!

All we’re missing is YOU.
The more Alpha, the more AuM. Repeat ☺

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Everyone competes on our Exchange. Your Private Label is your Turnkey Franchise

darwinex.com

	Exchange	Private Label
What's the point?	From 0 to 1 Million AuM	To the infinite & beyond
What you sell	DARWIN managed account Risk set at 10% monthly VaR by DARWINEX	Managed account, Optional Wrappers: Certificate, UCITS, AifMD YOU set target risk, Darwinex monitors & certifies
What investors pay	Management + Success Fee SET by DARWINEX	Management + Success Fee YOU SET
Who raises AuM?	DARWINEX	YOU Our Cap Intro Eco-system DARWINEX
What's your cost?	Competitive Brokerage (for you & investors) 0 Up-Front 25% of revenues	Competitive Brokerage (you & investors) Limited Up-front (single Thousands) **Variable Platform fee**: **Cap intro fee**: YOU set capacity & fees

Meet our Darwin EXchange

"Everyone's *alpha* for 20% of Everyone's *Profit*" Exchange

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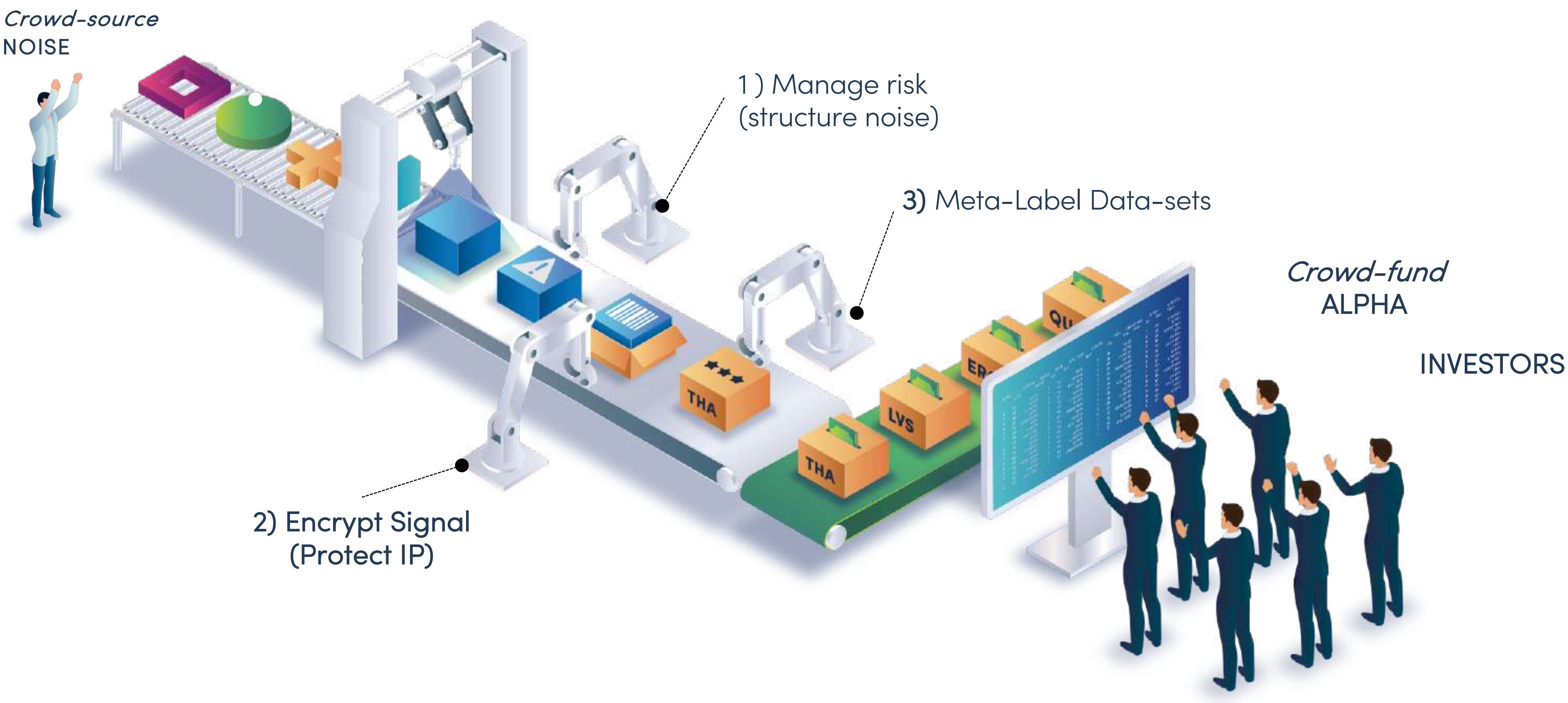

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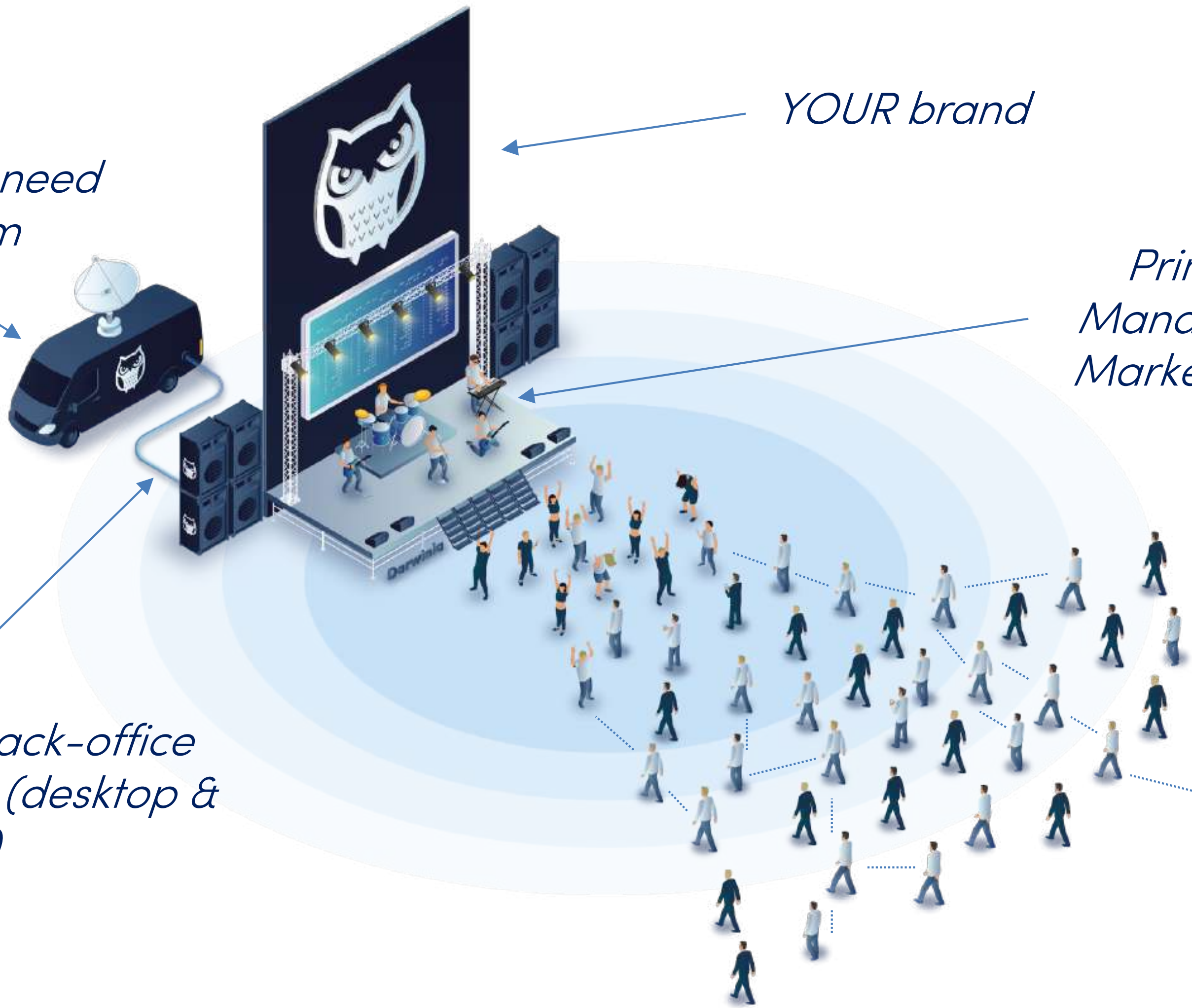
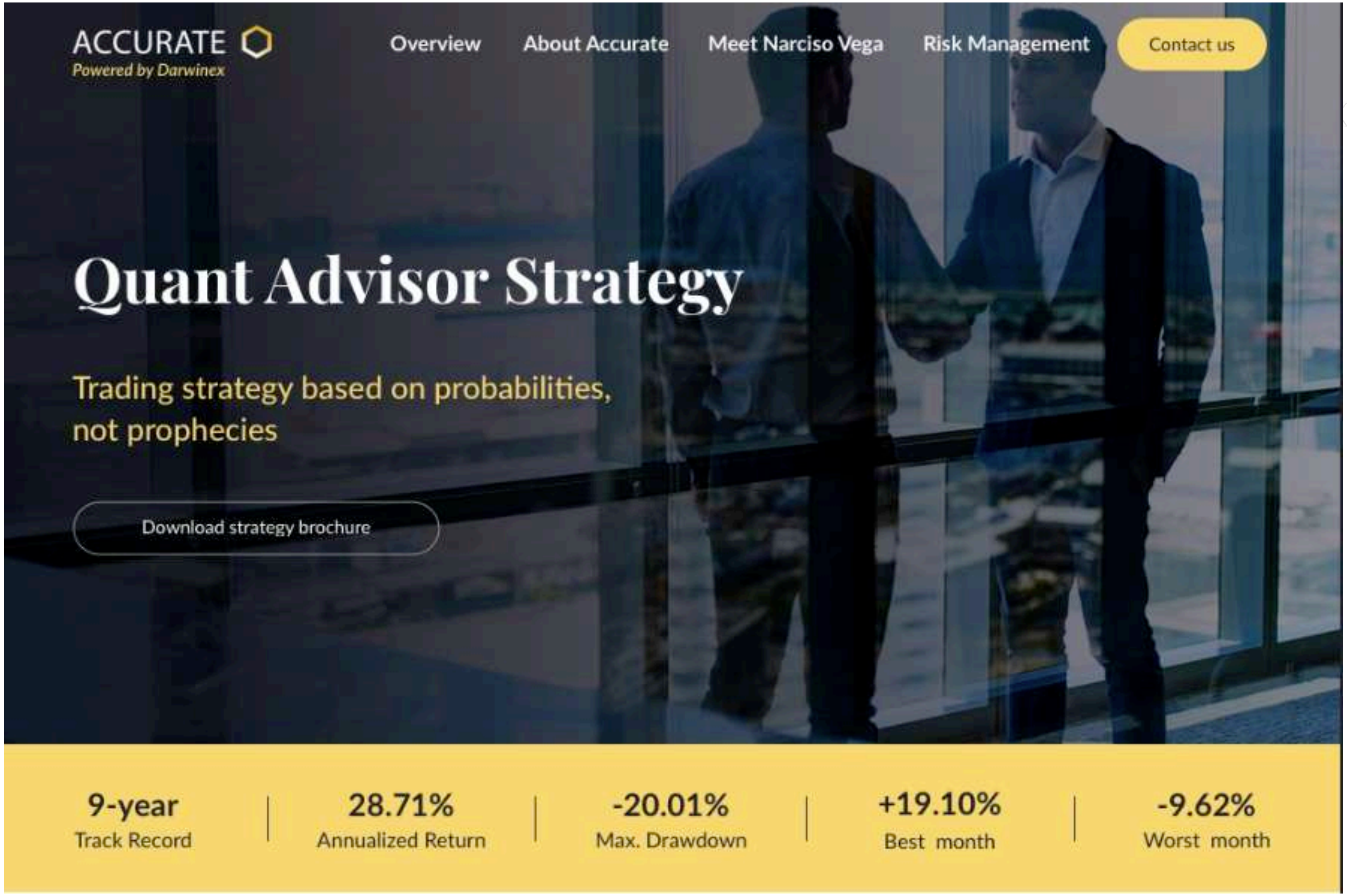


Online Investor back-office system fit for 2020 (desktop & mobile)

Cap intro eco-system to raise your AuM

Meet AccurateQuant

Chicho is a Spanish regulated asset manager



Movement Feedback

This is what fellow aspiring & emerging managers have said over the years

"I really like the Darwinex concept and the way you guys run it!

But I have a concern that it may be sold in the future, to someone who tries to change it..."

Emerging Manager, via Intercom

"First I would like to congratulate you and your team on an amazing website and service. Darwinex is Head and Shoulders above competitors"

Investor, to Customer Service

"... the ingenuity of matching emerging managers with capital online, and landing investors with real funds,... it's just clever and a self-sustaining loop kind of thing"

Andrei, via Quora

"... Darwinex looks like a grown-up social trading platform, with good safeguards for investors and an attractive package for ambitious discretionary and algo traders"

Prospective user, via Quora

User A: *"I don't listen to economic "press" it's all designed to draw suckers in"*

User B: *"Agree – the only piece I listen to is Darwinex's Trader Movement Podcast"*

Spontaneous Exchange on Twitter

"Probably the best broker around and Darwinex is setting a new standard for the competition"

Anchorpoint, via MyFXBook

What we bring to YOUR table

darwinex.com

1. 100% FOCUS

- We preserve your band-width
- You tackle the genius bit

2. 0 start-up risk

- Trade with a competitive bróker, on your platform of choice
- 0 up-front expense. 0 fix overhead

3. 0 operational risk

- All costs variable
- Leverage infrastructure proven on thousands of managers and trillions of volume

4. Shortest path to revenues

- From strategy to wrapper in days (managed account) / weeks (wrappers)
- EUR 60 MM AuM (seed + 3rd party AuM)

5. Aligned model

- We NEED you to succeed long term
- We're not here to bill legal fees, charge cap intro retainers, etc.

6. By managers, for YOU

- We ARE in the same shoes as you
- It's as much about the vision, as it is about the money

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PANEL: Current trends in alt data

The Quant Conference

Jared Broad
CEO and Founder, *QuantConnect*

Daniel Mitchell
Co-Founder and CEO, *Hivemind*

Justin Zhen
Co-Founder, *Thinknum*

Yuan Liu
Senior Researcher, *Aspect Capital*

PRESENTATION: Unlocking alternative data

Saeed Amen
Founder, *Cuemacro*

The Quant Conference

PRESENTATION: Alternative data trends in institutional investment

The Quant Conference

Jose Terriquez
Analyst, *Neudata*

Neudata

Alternative data trends in institutional investment

Jose Terriquez, Analyst

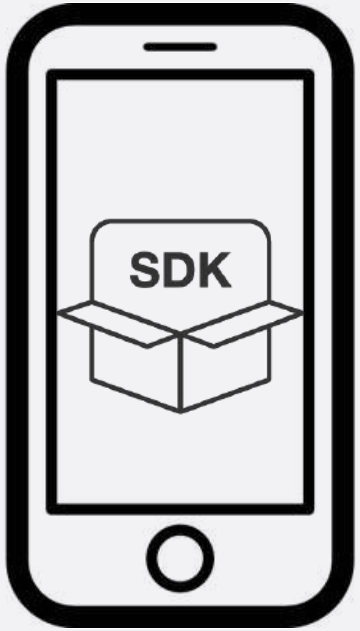
What is alternative data?

Alternative (adj.)
al·ter·na·tive | \ ȯl-ˈtər-nə-tiv

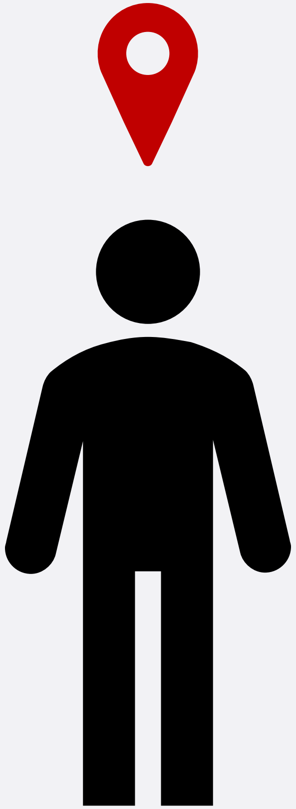
- different from the usual or conventional

What is alternative data?
Dataset types

Alternative data
New sources



SDK installed in a mobile app



SDK captures app users location

Coordinates are mapped to POI

Alt approach to traditional data

Corporate earnings statement

NLP – parse for terminology

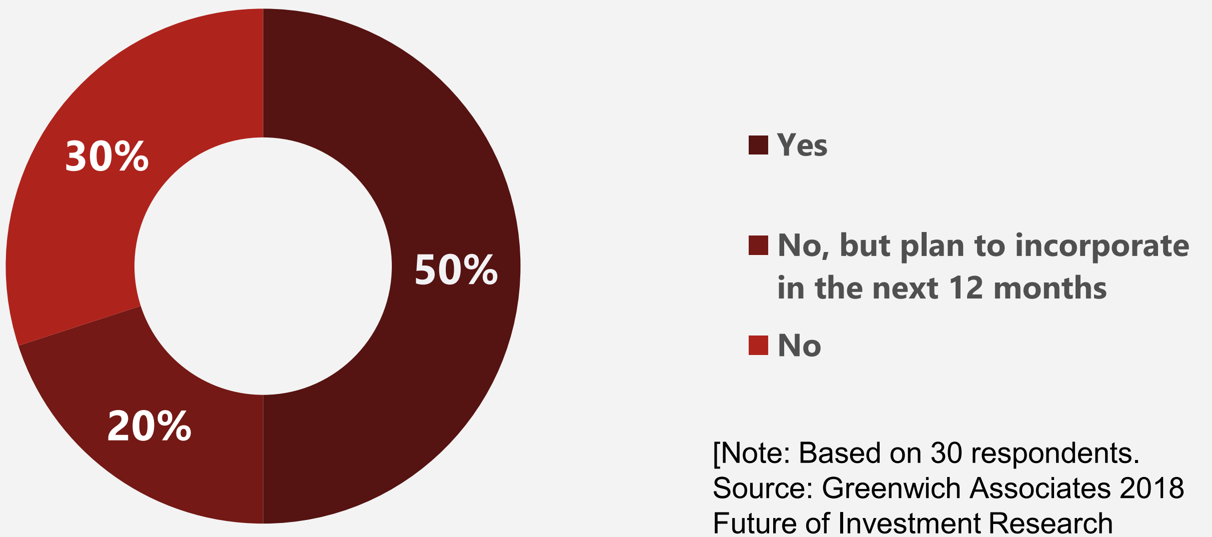
Compare QOQ terminology

Maximise alpha (avg. 22% per year)

[Source: Cohen *et al*, 2019]

What is alternative data?
Is this really a new phenomenon?

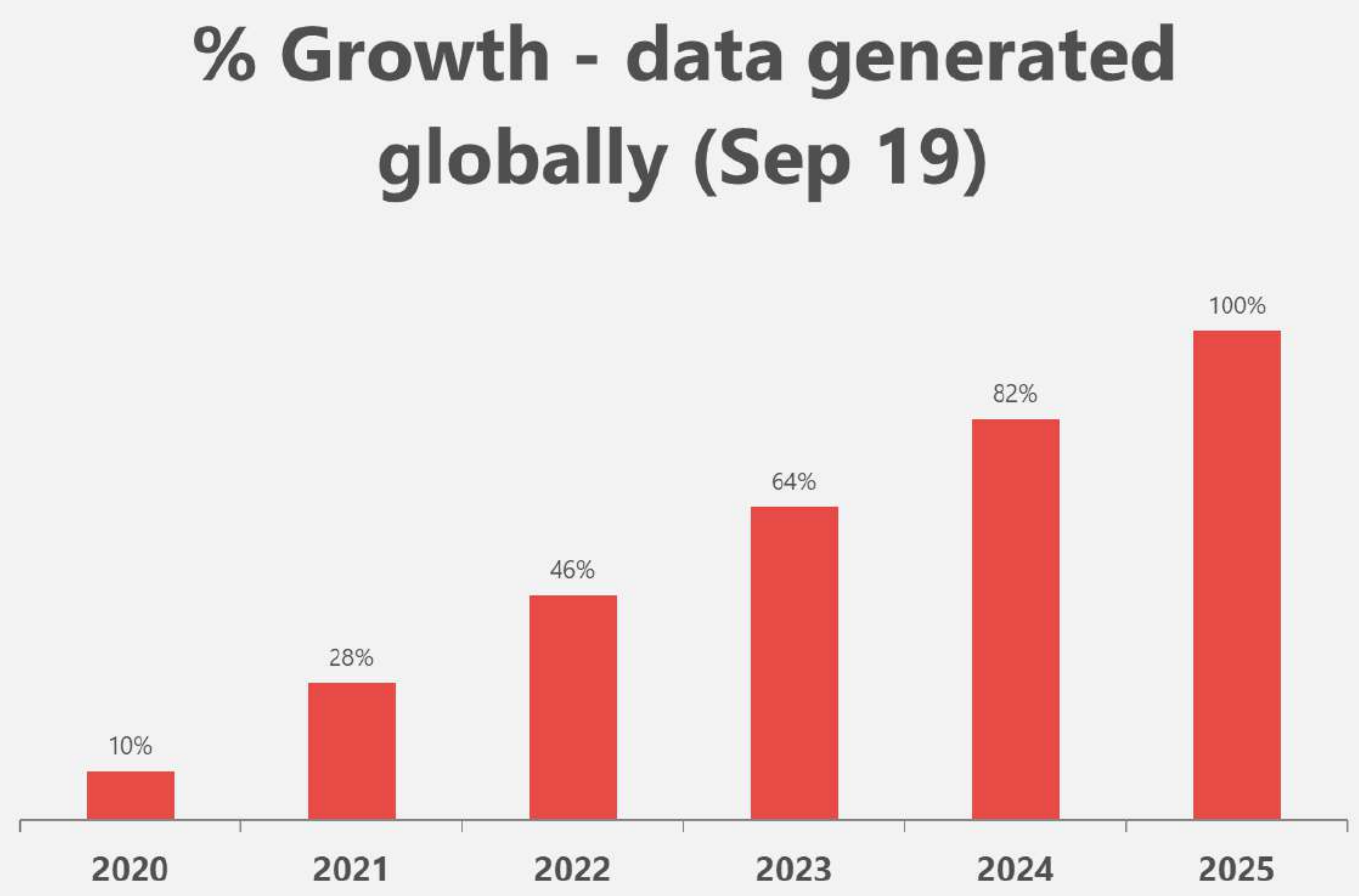
CURRENT IMPLEMENTATION OF ALTERNATIVE DATA



[Note: Based on 30 respondents. Source: Greenwich Associates 2018 Future of Investment Research Study]

[Source:Greenwich Associates, Q3 2018]

What is alternative data?
Is this really a new phenomenon?



[Source: Data Driven Investor, September 2019]

How do funds typically source this data?

Hypothesis to dataset

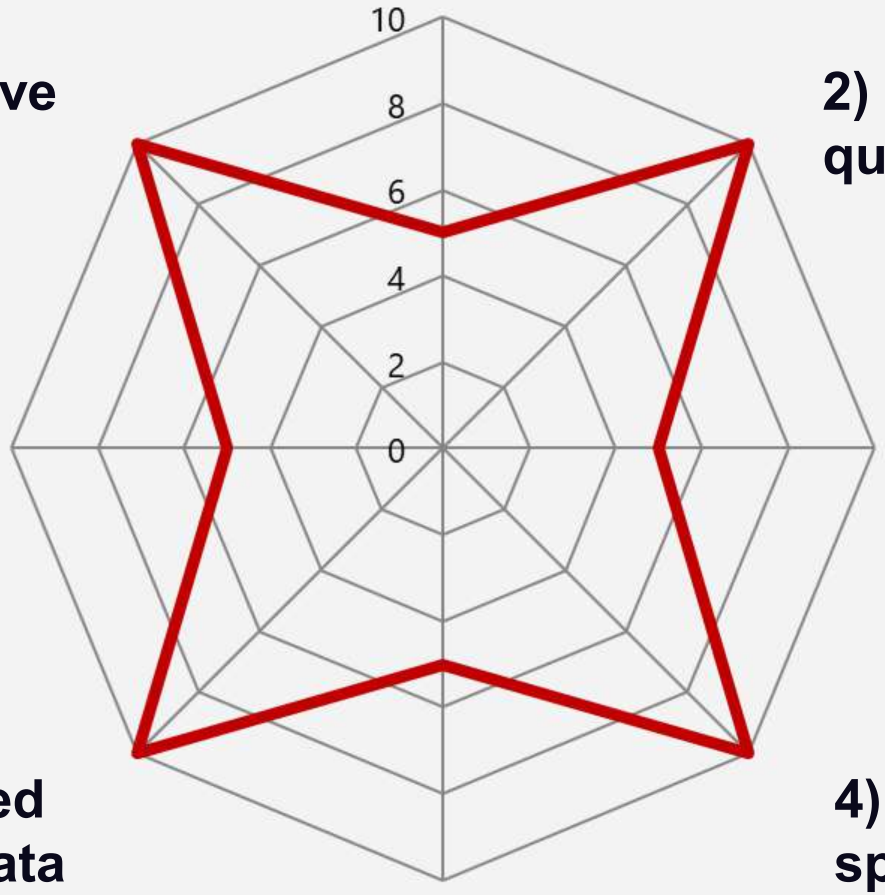
Dataset to hypothesis

Neudata

What do we do?

1) Scout alternative datasets

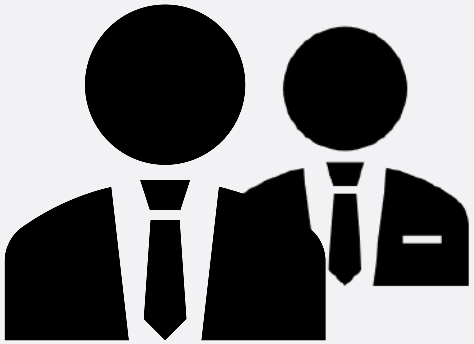
2) Score datasets on quality factors



3) Provide informed commentary on data

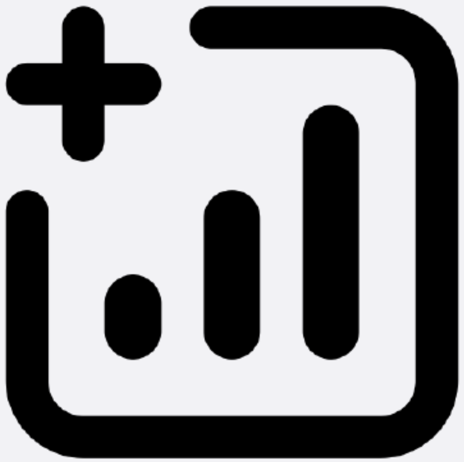
4) Answer use case specific questions

Neudata
Our universe



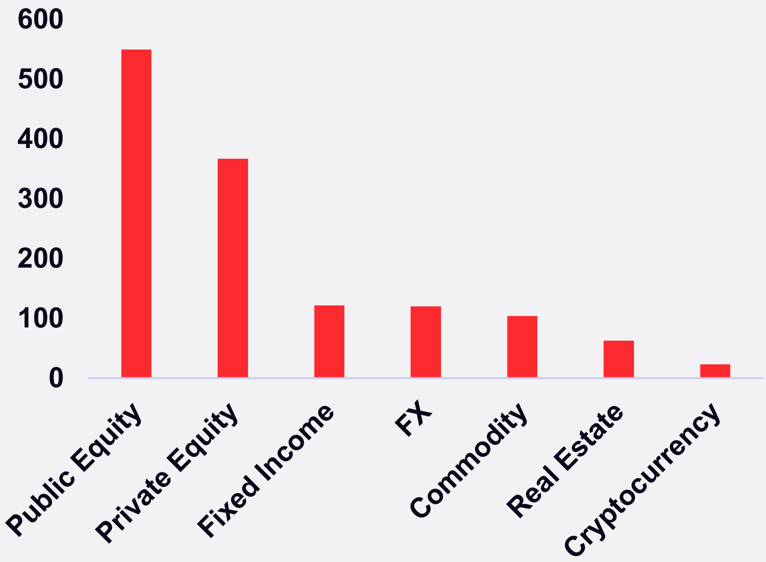
500 asset managers

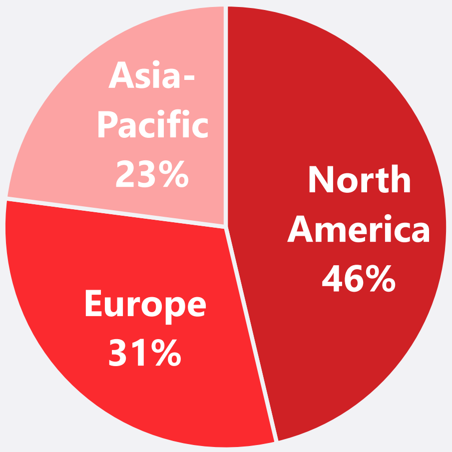
625+ data providers



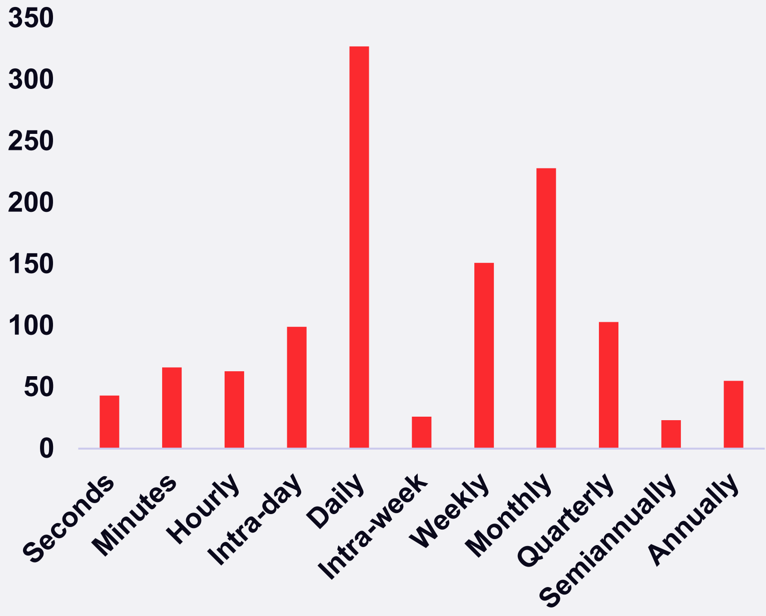
880+ datasets

Data trends





Excludes all other regions & datasets defined by Neudata as global

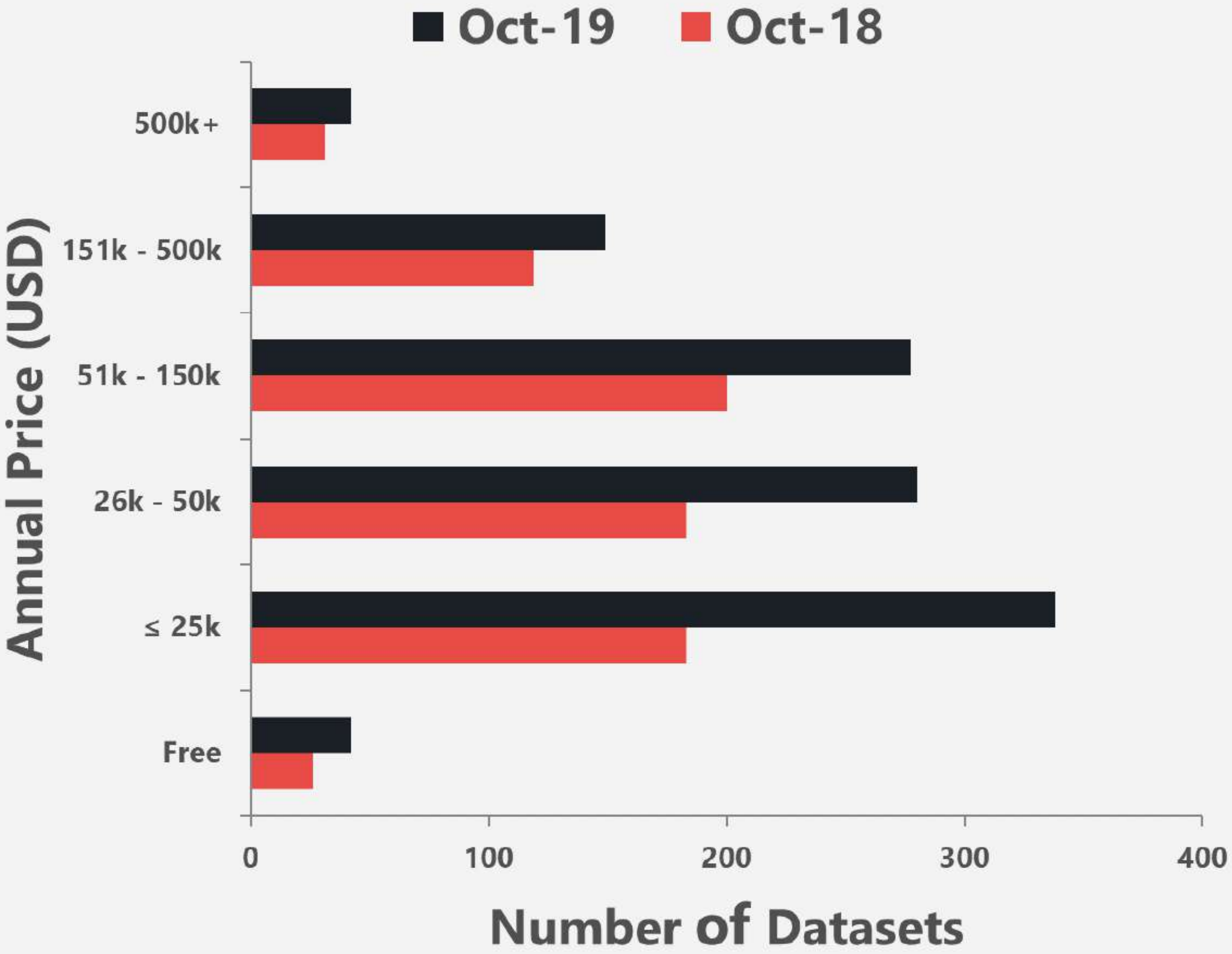


Public equity applicability

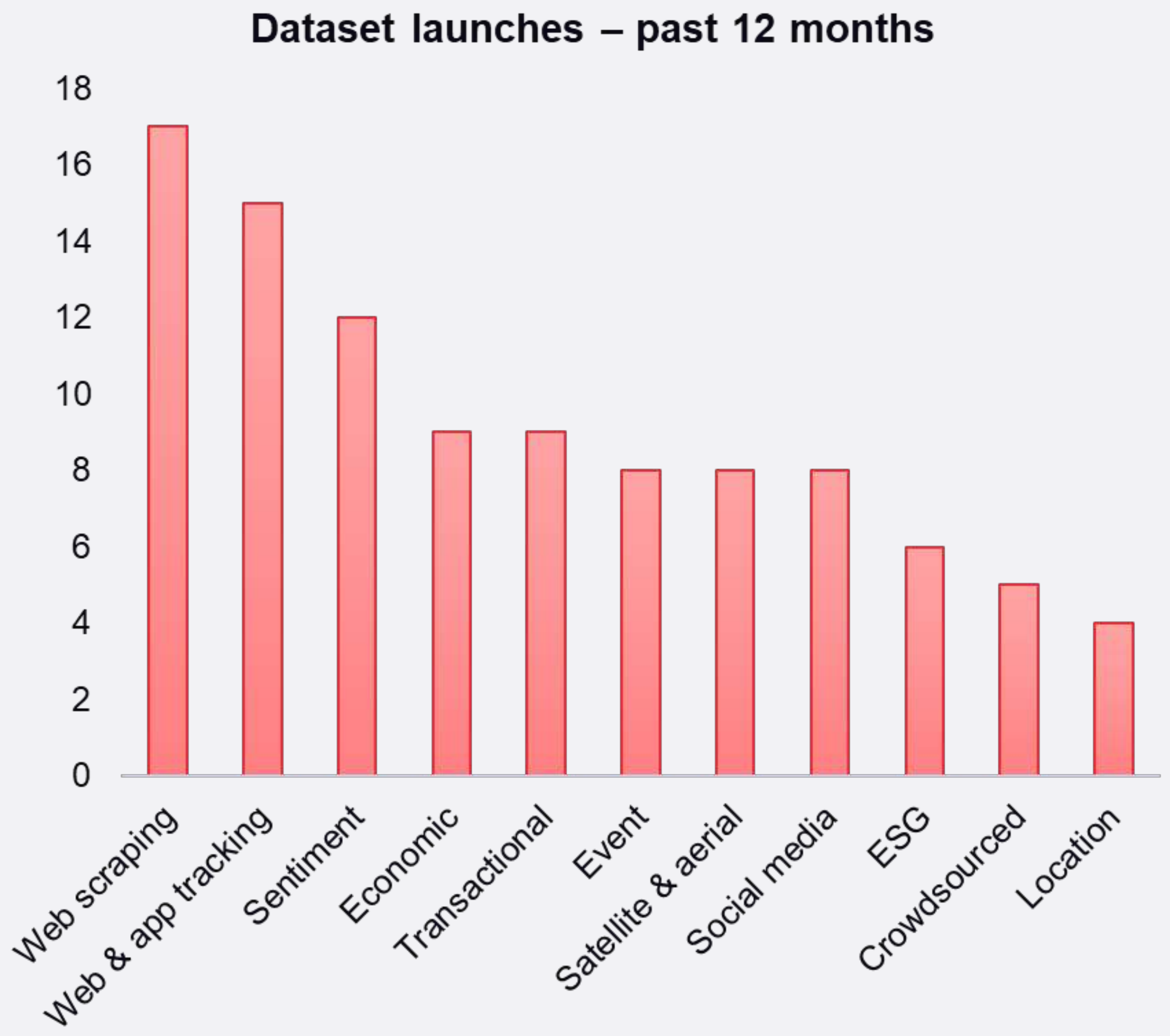
N. American dominance

Daily frequencies

Pricing trends

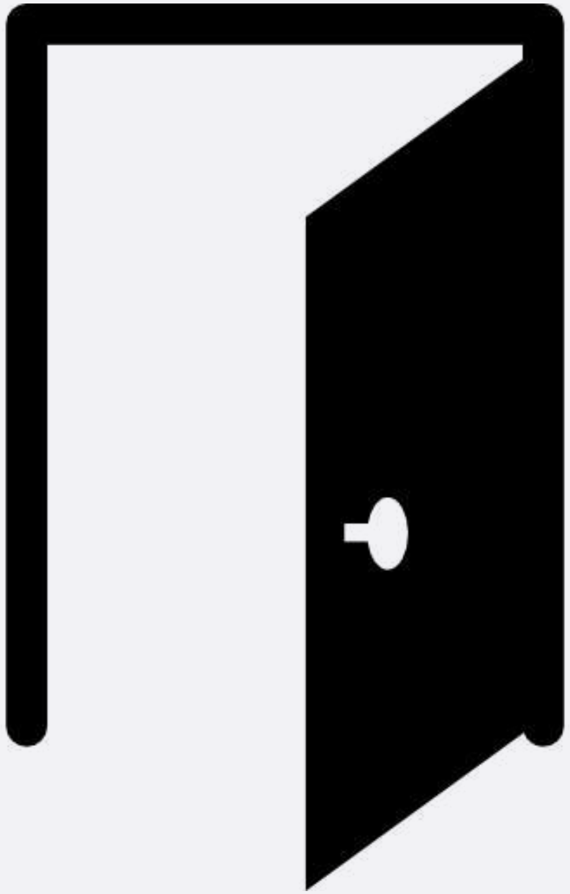


Supply side trends



Supply side trends

- Regulation (Google)
- Legislation (web scraping, open banking)
- “Where one door closes, another one opens”



Trend Recap

01 Datasets that apply to North American public equities are the most popular.

02 Lower price datasets are more common than you may think (and we expect this to remain the case).

03 As the market for data grows, there will be more legislation that will affect the supply of data.

Thank you

For further enquiries please contact
jose@neudata.co

DEBATE: Systematic vs Discretionary

Francesco Filia
CEO and CIO, *Fasanara Capital*

Chris Jones
Chief Executive, *Graham Capital*

Steve Mobbs
Previously Co-Founder and currently Consultant Founder Member, *Oxford Asset Management*

PANEL: Front office of the future. How does technology transform the way AMs and Banks work?

The Quant Conference

Matthew Hampson

Deputy Chief Digital Officer, *Nomura Wholesale Division*

Rob Boardman

CEO, *Virtu Execution Services*

Ashley Lester

Global Head of Multi-Asset Research, *Schroders*

Brice Rosenzweig

Global Head of Data & Innovation Group, *Bank of America Merrill Lynch*

Off the Record Brice Rosenzweig

Closing Remarks

The Quant Conference

Nikita Fadeev

Founder of *The Quant Conference*

Stuart MacDonald

Managing Partner at *Bride Valley Partners*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