Global quantitative asset management
25 years of research and innovation at CFM

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Chairman and Chief Scientist

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CFM Overview

Global reach

WE TRADE LIQUID
INSTRUMENTS
ACROSS GLOBAL
MARKETS INCLUDING
FUTURES
EQUITIES
BONDS
OPTIONS
SPOT & FORWARD FX
CREDIT
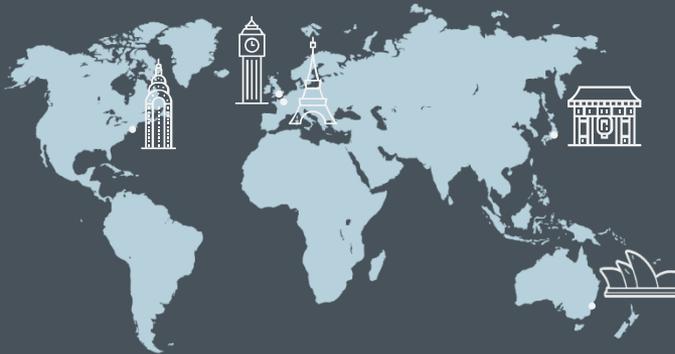
BASED IN PARIS
WITH OFFICES IN **LONDON | NEW YORK | TOKYO | SYDNEY**

Firm

250+ EMPLOYEES

80 PhD

30+ NATIONALITIES

WHO SHARE A CULTURE OF
INNOVATION
COLLABORATION
HUMILITY

Our approach

QUANTITATIVE SYSTEMATIC ASSET MANAGER

History

28 YEARS

FOUNDED **1991**

Trading

US$10 BILLION AUM

α
Alt β

Investment process

RESEARCH AND TECHNOLOGY ENABLE OUR

SCIENTIFIC APPROACH TO FINANCE

Still hiring talented scientists (~ 6 positions/year)

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Quantitative asset management 1980 - 2020

CFM

1980	**The harbingers** Ed Thorpe* ('70), Jim Simons** (Renaissance, '82)
1990	**The pioneers** D.E. Shaw ('88), AHL ('89), Citadel ('90), Prediction Company*** ('91), CFM ('91)…
2000	**The consolidation** Winton ('97), AQR ('98), Two-Sigma ('01)…
2020 →	Convergence with traditional asset management?

**A new crowd of asset managers: mathematicians, physicists, computer scientists –
but only a few economists/finance types**

**Several remarkable successes, much beyond selection bias (while not Ponzi schemes!)
Ed Thorpe: + 20%/year (1980 - 2008)
Renaissance: + 35%/year (1989 - 2011)**

* Blackjack player: 'beat the dealer'
** Code breaker
*** Started beating the roulette at Vegas

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Quantitative asset management: a three step process

1. Signals research

- ► Trend following, mean reversion (absolute/relative)

- ► 100s of other statistical regularities (aka 'anomalies'): seasonalities, over/under reactions, 'risk premia'

- ► Information processing ("Big" Data): fundamental data (earnings, dividends, balance sheet, etc), macro-economic data, other relevant data sources (weather, inventories, etc), text data (news, reports, transcripts), multi-dimensional correlations…

- ► Pricing models (derivatives)

- ► Etc…

Use of public information only, hidden in haystacks of noise – just like humans but in a systematic, disciplined way

Quantitative asset management: a three step process

2. Portfolio construction

Mixing different signals with different time horizons with:

► Strictly controlled risk: exposure to market/sector modes, leverage/diversification limits…

► Transaction/impact costs

A complex, high dimensional mathematical optimisation problem, with uncertain parameters: volatility, correlations, costs… (some advanced tools: HJB, RMT)

A large part, or even <u>all</u> of the 'signal' can be lost at this stage

Quantitative asset management: a three step process

3. Execution and high frequency signals

Once the decision and the amount to trade is known, optimal execution on markets is mandatory to reduce costs and impact

▶ Order splitting and trading schedule

▶ Now or slightly later?

▶ Limit order or market order?

▶ **Customised signals (over seconds to minutes) that trigger orders**
▶ **This must be distinguished from HFT = automated market making**

▶ **Impact is unavoidable but hard to detect, and is the major source of costs**
▶ **Impact is a very interesting scientific question (e.g. the square-root impact law)**
▶ **Cost/impact estimates feedback on step 2 (portfolio construction)**

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Quantitative asset management

Where does performance come from?

Efficient market theory

► All information is instantly included into prices

► Markets are fair and stable (E. Fama: 'bubbles don't exist')

► Active asset management should not exist: only passive exposure to 'Risk Premia' (e.g. the market as a whole)

Not a trifle debate (investment decisions, economic policy models, market regulation/laissez faire…)

"

Market prices are esteemed as if they were oracles. This view grew to dominate much professional thinking in economics, and its implications are dangerous. It is a substantial reason for the economic crisis we have been stuck in for the past five years, for it led authorities in the United States and elsewhere to be complacent about [...] the instability of the global system

Robert Shiller
New York Times, October 2013

Quantitative asset management

Where does the performance come from?

> "
>
> The word 'bubble' drives me nuts, frankly. I don't even know what a bubble means. […] Prices (in 2008) started to decline in advance of when people recognized that it was a recession... That's exactly what you would expect if markets were efficient. E. Fama
>
> "
>
> Professor Fama is the father of the modern efficient-markets theory, which says financial prices efficiently incorporate all available information and are in that sense perfect. In contrast, I have argued that the theory makes little sense, except in fairly trivial ways.
> Of course, prices reflect available information. But they are far from perfect. R. Shiller

Efficient market theory: 30 year of heated debate

Since the 80s*: accumulation of market anomalies and behavioral biases/animal spirits [J.M Keynes, R Shiller, R Thaler, D Kahneman, etc]:

► We make mistakes; information is complex, over-abundant and noisy; we suffer from confirmation/conservatism biases: *over/under reactions*

► We tend to be overconfident and oblivious of our mistakes: *excess trading*

► We are strongly influenced by past patterns (that might repeat): *trends beget trends*

► We are strongly influenced by the behaviour of others (who might have more information): *panic begets panic*

► *Etc….*

► *Theory: Emergent phenomena and ABM (stat mech)*

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Quantitative asset management strengths: basic tenets

Quantitative Asset management thrives on market anomalies/violations of efficient market theory:

► More systematic, faster and more accurate use of 'information'

► Exploiting human biases (trending, over-reaction, excess trading) while removing human biases/errors in the trading process

► Engineering 'Risk Premia' exposures in a controlled way

► Disciplined expectation of performance/drawdowns (Sharpe S $\rightarrow$ Drawdown time S^{-2} !)

► Disciplined risk budgets, known and optimised costs

► Traceable and accountable trading decisions, removing the role of luck and selection biases and allowing objective quality measures

In a nutshell: a disciplined and systematic proxy of human analysis and decision processes.

Quantitative asset management weaknesses and dark corners

Systematic is good until it is bad

► Some strategies rely on the fact that the past will (statistically) repeat. What if the environment suddenly shifts (crises, QE, etc)?

Quantitative managers are 'meta-managers' (of models rather than of assets)

Human decision is pushed one level up (leverage, kill switch...)
► the automatic pilot analogy

Note that markets, in their folly, are in fact surprisingly stable!
► (cf. 'This time is different') – many 'regime shifts' may actually be illusions or can be systematized.

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Skills we value

► **General "PhD" skills**: work independently, formulate problems correctly, read and find literature, intellectual honesty and pertinacity, communicate results (written and oral)

► **Physicists skills**: analytical, orders of magnitude, dimensional analysis and approximations (what's important, what's not), numerics (simulations, etc.), data analysis (graphs, big data, ML, Python) but also intuition (how the comlex world works) rather than "blind models", sense of plausibility, model assumptions and limitations…bridge the gap between theory and empirics…

► **A few tips**:

- Problems are hard, people are smart, and it's hard to do something right from A to Z

- Simple, practical solutions are often better than huge cathedrals

- Things always work better in theory than in practice (overfitting, degradation, impact, data, etc.)

- People cling to what they've learnt and what they know, they look under the lamppost, and mainstream ideas are often wrong. Think outside the box (TOB). If you don't understand, maybe something is fishy. People tend to repeat things without really understanding them, do things just because others do the same.

- TOB is what a PhD should be about