Overview of the Financial investment landscape

This is one in a series of white papers intended to help investors educate themselves on algorithmic funds and investment techniques in order to make the right decisions regarding their assets.

In this paper we set out a taxonomy of the investment landscape, including the fit of major participants and technological changes influencing developments in finance. From this analysis it is evident that professional investors have not utilised these innovations to their full potential.

1.1 An era of explosive innovation

A 'perfect storm' of digital technologies is transforming radically every area of the financial investment industry [Cliff et al, 2011]. Much attention has been drawn to leveraging research in AI, machine learning and Big Data to enable investment decisions made more rapidly and accurately than by human beings. However, technical innovations allowing investors to assess the performance of investments in real time have been less widely explored and place an increasing premium on both transparency and investor control.

1.2 Financial Landscape taxonomy.

Investment funds can be diversely classified, for example by structure, investment strategy, automation level or even regulatory status. We summarise below categories for funds, investors, investment strategies and fees.

1.2.1 Fund Types

Investments are generally bucketed into three major categories: stocks, bonds and cash equivalents and then made accessible via the following:

- **Mutual funds** – a type of financial vehicle made up of a pool of money collected from many investors to invest in securities like stocks, bonds, etc.
- **Equity funds** - a mutual fund that invests principally in stocks, categorised according to geography, company size, and the investment style of the holdings in the portfolio.
- **Index funds** – a portfolio constructed to match or track the components of a financial market index, such as the Standard & Poor's 500 Index (S&P 500).
- **Exchange traded funds** (ETFs) - a type of security that tracks an index, sector, commodity, or other asset, but which can be purchased or sold on a stock exchange the same as a regular stock.

1.2.2 Investor Types

For this review, we group investors depending on their size, knowledge and analytic capability.

- **Institutional Investors** – institutional investors are legal entities that participate in trading in the financial markets. These investors are well served by algorithmic or systematic trading systems.
- **Professional Investors** – by professional investors we mean an investor who possesses the experience, knowledge and expertise to make its own investment decisions and properly assess the risks that it incurs.
- **Retail Investors** - a retail or individual investor is a non-professional investor who buys and sells securities (such as equities) or funds that contain a basket of securities, such as mutual funds and Exchange Traded Funds (ETFs).

1.2.3 Investment Strategies

We group investment strategies on the proportion of the decision making which is based on simple rules, often executed by computer, and how much is made by expert decision makers with clear goals in mind. In reality today, these are not necessarily separate choices. With new AI-based technologies such as machine learning, recommender systems, Natural Language Processing (NLP), and behavioural/predictive analytics, investment strategies can automate and personalise for individual investors, and passive investment funds are starting to offer personal investment services [Galas, 2014, Treleaven, 2013, Nuti, 2011].

- **Active Investment** – each fund has a clear investment focus, managed by fund managers and their investment team or algorithms which make all the decisions of what to buy and sell within a specific fund.
- **Passive Investment** – comprises baskets of securities, largely traded by computer with minimal human intervention by fund managers. Passive managed funds aim to track their chosen market index.
- **Personal investment** - a bespoke personalised investment plan detailing personal finance needs, risk appetite and constraints.

1.2.4 Investment Fund Fees

Active investment fund managers are notorious for their exorbitant and opaque charges [Galas et al, 2022]. In the UK investors inadvertently paid more than £1 billion in fees over a year for funds that manifestly provided poor value for money [Hussain 2020]. Active funds can charge over 2% plus significant 'hidden' fees annually. In contrast, passive funds (such as Vanguard) generally charge significantly less e.g. 0.45% annually. The compounding effects of these costs can be immense.. The challenge is to provide Professional Investors with transparency and control. The true annual cost called the Ongoing Charge Figure (OCF) covers the fund manager's fees and other costs, such as administration, marketing and regulation. However, the OCF typically does not include trading costs: broker commissions, tax on share purchases, bid-offer spreads and so-called load fees.

Example fees include:

- **Investment advisor fees** - annual fee for a financial advisor's services for Assets Under Management (AUM).
- **Investment management charges** – covering administration.

- **Platform fees** - a regular charge (monthly, quarterly, annually) for the account; either a flat fee or percentage of funds.
- **Fund trading costs** – the costs to the fund of buying and selling. For example, paying a broker to place trades and in the UK, paying stamp duty tax on certain types of investments.
- **Performance fees** – a payment to an investment manager for generating positive returns; for example, a percentage of investment profits.
- **Load fees** – various types of commission on trading.
- **Redemption fees** – a charge for transferring to another fund within the same "family of funds"

1.3 Financial Science

The Financial Science research initiative is set up to investigate and optimise an algorithmic investment strategy focused on resilience. In terms of the taxonomy developed above, it applies an algorithmic portfolio using data science techniques to drive long term capital growth.

Professional investors seeking systematic fund management are underserved by current market offerings. There is a lack of transparency for investors who wish to understand the impact of fees and algorithmic performance on the actual returns they will receive on their investments. We strongly believe that the machine learning processes and fee structures should be presented overtly to all stakeholders. We are therefore guided by openness and transparency in the publication of our findings, including clear, accessible performance results, whether positive or negative.

The Financial Science key tenets are commitment to transparency, robust academic publication, continuously evolving machine learning and professional investment management. Its goal is constant improvement of returns through machine learning and data science techniques. In addition, we are innovating in fee structures and applying game and contract theory in the interests of long-term fiduciary value to investors. Automation should achieve better performance than an index fund, at lower cost and with greater transparency than a traditional hedge fund. A target has therefore been set for outperformance over index returns, with greater downside protection and resilience, including in a declining market.

2 References

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