ROBECO QUANTITATIVE INVESTING

Beyond the known path: The potential futures of AI investing

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The Investment Engineers

- AI will reshape investing with new assets, processes and hyper-personalization
- Agentic AI will autonomously manage portfolios with human oversight
- Innovation demands governance and evolving human roles

Artificial intelligence is no longer a far-off idea in finance: it's here, reshaping how investment professionals work every day. From algorithmic trading to robo-advisors, AI is already streamlining analysis and decision-making in asset management. The question now isn't if AI will change the investment industry, but just how far these changes will go. Will we simply see faster and smarter versions of today's tools, or are we on the cusp of something radically different? This long read explores both the known path of linear progress and some more visionary possibilities.

AI has experienced cycles of hype before, with bold predictions that often fell short. So why is this time different? The key lies in the convergence of big data, abundant computing power, and advanced algorithms. This powerful trio forms the engine behind the current wave of AI innovation, not just in finance but across industries. When a single AI model, like GPT-4, can write code, draft research reports, answer client queries, and translate languages, it signals a new frontier.

Beyond the hype, AI is already embedded in daily workflows across investment firms, setting the stage for transformation. Yet, not all technological progress is equal. Some innovations merely make existing processes cheaper, faster, or better, while others fundamentally reshape industries and create entirely new markets or ways of working.

The innovation prism: Cheaper, better, faster… or truly different?

To better understand this distinction and where AI's impact may lie, we turn to the CDE innovation prism[1], a framework proposed by fintech thought leader Huy Nguyen Trieu. The innovation prism categorizes innovations as either C = Cheaper/Better/Faster, D = Different, or E = Enhancing.

Most technological changes start by making existing processes more efficient, in other words, cheaper, better, faster versions of what we already do. In finance, examples would be using AI to automate data gathering or to execute trades more quickly. Many current AI deployments fall into this category: they augment productivity or cut costs but don't fundamentally change the nature of investing.

[1] https://courses.cfte.education/cfte-research-and-reports/cde-innovation-model/

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Blue sky scenarios

However, Nguyen Trieu argues that the version of AI we see today is *different*. It will create entirely new products, services, or markets that didn't exist before. This might mean new ways of investing that break the traditional mold. The biggest changes in investment may not just be faster algorithms or larger datasets, but entirely new ways of investing and organizing financial services.

Assets

AI might expand the very definition of an investable asset or strategy. Today we invest in stocks, bonds, real estate and so forth. Tomorrow, valuable assets might include things like data streams, algorithms, or slices of digital infrastructure that AI systems monetize.

For instance, if "data is the new oil", we could see marketplaces where AI agents trade data with each other, effectively turning datasets and predictive models into asset classes of their own. It's not so far-fetched. Companies already value their data highly, and there are startups tokenizing data rights. AI could accelerate this by consuming and producing data autonomously (imagine an AI that generates profitable trading signals – its 'insights' could be sold as an asset).

While this sounds futuristic, it underlines a key point: AI might change *what* we invest in, not just *how* we invest. Blue-ocean innovation means the emergence of 'value' in areas previously unimagined. Forward-thinking investors will need to broaden their concepts of asset classes beyond traditional categories to include intangible AI-powered assets.

Hyper-personalization

Another transformative shift is the realization of hyper-personalized investing at massive scale. Imagine every investor having access to an 'AI wealth concierge': a highly sophisticated assistant intimately familiar with your financial life, goals, values, career prospects, spending habits, personality, and behavioral quirks. Using this information, it designs and continuously updates a portfolio uniquely tailored to you.

This goes far beyond robo-advisors selecting from a handful of model portfolios based on generic risk questionnaires. It could blend traditional securities with private investments, alternative assets, or even novel AI-driven assets, all optimized for your situation.

Most importantly, hyper-personalization would be affordable and accessible, not a luxury reserved for the ultra-wealthy. If AI reduces advisory costs and operational bottlenecks, even small retail investors could receive services today only available through private banks. Investment firms might shift to becoming platform providers, facilitating millions of bespoke AI-managed portfolios.

Human-AI collaboration going forward

If AI takes over much of the analytical and operational heavy lifting, what becomes of the human investment professional? Historically, technological innovations first reshape industries, then affect the roles of individuals within them. But AI is different in that it can directly replicate human skills and even replace certain roles, not merely speed them up.

Still, we argue that human roles will evolve rather than become obsolete. Portfolio managers and analysts are likely to become strategists, educators, and risk overseers, working closely with AI partners. Their focus will shift from number crunching (which AI handles) to providing insight, common sense checks, and nuanced judgment. Client-facing professionals will become storytellers and coaches, translating AI's actions into narratives clients can understand, and helping maintain composure through market ups and downs.

The rise of agentic AI: Finance's autonomous future

Clearly, AI is set to reshape roles within investing, but perhaps even more profoundly, it is transforming *how* investment decisions are made. And we are now witnessing the early stages of this shift – where AI moves beyond merely assisting humans to acting autonomously in the market. This marks a critical turning point with the emergence of agentic AI: intelligent systems that are not just predictive tools, but autonomous agents capable of making independent decisions and taking actions.

If traditional AI functions as an analyst, agentic AI is more like a junior portfolio manager; constantly monitoring markets, generating insights, deciding on strategies, and executing trades, all within parameters defined by human oversight.

To clarify, generative AI (genAI) like ChatGPT is powerful, but fundamentally reactive – it responds to prompts but doesn't *act* on its own. Agentic AI builds on such models (and other AI techniques like reinforcement learning) to create systems that can perceive their environment, learn continuously, and execute goals independently.
Think of an AI that doesn't wait for a human to ask a question, but instead is told, "monitor these 100 stocks and manage this portfolio to maximize Sharpe ratio under these risk limits," and then it autonomously does that job, alerting the human only as needed. It's like having an extremely tireless, quantitatively superhuman team member that never sleeps.

How agentic AI works in practice

Such systems often involve multiple specialized 'sub-task agents' working together under the watchful eye of an 'orchestrator/coordinator agent'. For example, imagine this agentic AI team has been assigned to manage a tech-focused portfolio. One sub-task 'research analyst' agent continuously monitors various information sources, from financial news to macroeconomic data to various alternative data sources such as satellite photos of parking lots, flight logs of private jets, food delivery orders, and geolocation data of cellular phones.

Now, imagine this research analyst agent detects a spike in fast food orders around the headquarters of two tech firms in different cities. It also detects occupied parking lots around the two headquarters and increased geo-located cell phone movements, even during non-business hours. Furthermore, it also detects increased private jet flights between the cities where these firms are located.

Autonomously, the research analyst agent decides to conduct a search and discovers that the industry in which these two firms are operating in is facing macro headwinds, and talks of merger and consolidation have been increasingly mentioned in the financial media. The agent concludes that the staff in these two tech firms are working late at night and visiting each other's headquarters: signs that a possible merger might occur between the two companies.

The research analyst agent reports its findings to the orchestration agent. The latter then informs the portfolio manager (PM) agent and asks it to assess the risk to the portfolio if such a merger were to occur. The PM agent takes this information and analyzes whether the potential effect would be beneficial or detrimental to the portfolio and to what extent the strategy can withstand any possible downsides.

Based on historical merger events and where the two firms are trading today, the PM agent determines that it is better to buy the likely acquired company than to leave the portfolio as is. The PM agent informs the orchestration agent of its decision, which then informs the trader agent and asks it to buy the company in the open market for a certain amount and target price, with minimal price impact.

After the trade, the orchestration agent documents the rationale and the sequence of actions taken in an auditable report for the human investor to examine and review, should it be necessary.

Benefits of agentic AI

What's the benefit of such autonomy? Scale and speed, for one. An AI agent can monitor thousands of information sources simultaneously (news, tweets, satellite data, macro indicators) and react in seconds. It can also run endless scenario simulations to choose an optimal strategy, far beyond what a person could do in a reasonable time.

In essence, agentic AI could unlock a new level of complexity in investment strategies (finding inter-market relationships or micro-opportunities invisible to human cognition) and operate a portfolio with minimal day-to-day human input. This is why some see it as a step toward a form of automated asset manager or even a rudimentary AGI portfolio manager.

However, human oversight remains essential. Humans set high-level objectives, such as investment mandates, risk tolerance, and ESG constraints, while AI handles granular decisions within these guardrails. Humans supervise AI agents and intervene during unexpected events or market crises. Over time, as trust builds, AI may gain more autonomy, but the human role will likely focus on governance, quality control, and strategic guidance.

Blurring investment styles and expanding impact

One interesting byproduct of agentic AI is that it could blur the lines between quant and fundamental investing. If you have AI agents that can ingest *both* quantitative data *and* unstructured fundamental data (news, earnings calls, etc.), the distinction between a quant strategy and its fundamental counterpart might cease to matter. Indeed, a fundamental PM armed with an AI agent has as much data crunching power as a quant, and a quant armed with AI can incorporate qualitative insights at scale. Everyone ends up using a similar toolkit.

Beyond portfolio management, agentic AI could revolutionize client engagement by producing fully customized reports tailored to each client's preferences and needs, and by handling routine client inquiries 24/7, enhancing the personal touch rather than replacing human relationship managers.

In operations, agentic AI could automate trade reconciliation, compliance monitoring, and other middle- and back-office functions, significantly increasing efficiency and reducing errors.

Organizational transformation and culture

Implementing agentic AI is as much an organizational challenge as a technical one. Some roles like routine data gathering and report preparation may diminish, while new roles like AI model trainers, ethicists, and engineers could emerge. Portfolio managers will need to upskill, gaining fluency in interpreting AI outputs and directing AI assistants.

Firm culture must evolve to foster collaboration between humans and AI, experimentation, and continuous learning. Traditional star portfolio manager models may give way to more collaborative, data-driven teams where insights emerge from both human and machine.

Leadership will play a crucial role in managing risks such as overreliance on opaque models or ethical lapses. Firms that combine human insight with AI capabilities, and cultivate trust and adaptability, will gain a competitive edge.

Risk, governance, and security

Deploying agentic AI requires strong governance frameworks to ensure fiduciary duties are met. Every AI action must be traceable to accountable human supervisors, with oversight committees and dedicated risk managers monitoring behavior. Explainable AI tools will translate AI reasoning into human-understandable terms.

External audits of AI models, akin to financial audits, may become standard to ensure reliability and mitigate bias; especially important as AI trained on historical data may perpetuate flawed assumptions. Cybersecurity, too, is paramount, as AI agents managing trades and funds present new attack vectors. Regulatory transparency and disclosures about AI autonomy and governance will become non-negotiable, potentially including certification systems.

Finally, if AI significantly reduces the need for certain roles, how do we manage that transition responsibly? It could mean reskilling programs to move, say, an operations analyst into a more analytical or client-oriented role, rather than pure job cuts. After all, while AI can do a lot, people still drive the purpose and values of investing.

The beginning of the beginning

Agentic AI represents a new frontier where machines graduate from number-crunchers to autonomous actors in the financial markets. This isn't theoretical – it's nearly here. The potential benefits in performance and efficiency are huge, but it requires a careful balancing act of innovation and governance. The next decade will be a trial of that model. If it works, the investment firm of the future will include AI agents as integral members of the team – not replacing the humans, but changing what we collectively can achieve.

The road forward

AI is transforming the investment landscape along two paths: a linear path of gradual improvements and a more revolutionary path of paradigm shifts. The linear path is already unfolding – we have more data-driven strategies, faster execution, personalized client services, and AI assistants augmenting human decision-makers. These trends are making the industry more efficient, transparent, and inclusive.

At the same time, we must be prepared for the 'different' innovations – the out-of-left-field developments that could redefine how investing works. History teaches us that truly epochal shifts often come from unexpected directions, and for investment professionals, the takeaway is to prepare for both: embrace the current wave of AI tools to stay competitive (learn the tech, adapt your processes, innovate on products), but also cultivate the creativity, agility, and ethical grounding to navigate more radical changes.

It's an exciting time to be in asset management. We are, in a sense, all aboard an accelerating train – one that's following familiar tracks for now, but may soon veer onto new routes. The destination isn't predetermined; it depends on the choices firms and regulators make today. By staying informed, asking the hard questions, and leaning into innovation with eyes open, we can help ensure that AI's great potential is harnessed for the benefit of investors and society.

The story of AI in investments is ultimately a story of us – using our ingenuity to create tools that expand what's possible. And as that story continues to unfold, it's bound to be one of the most important narratives in finance for years to come.

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