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Front office open to AI promise

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Artificial intelligence (AI) offers real potential for capital markets firms. But how disruptive, and how immediate, will the impact be? By Marwan Tabet, co-head of product management, Murex

AI will transform industries worldwide, and capital markets are no exception.

Investment banks and asset managers are exploring, and gradually adopting, AI. The aim is to drive efficiencies and, at the same time, carefully assess the potential for major disruption.

In this uncertain context, *AI in the front office*, a *Risk.net* survey conducted in partnership with Murex, reveals two distinct dynamics.

The first involves the rapid adoption of generative AI (GenAI), which leverages large language models (LLMs) or process automation tools, and provides immediate efficiency improvements.

The second dynamic reflects the much slower emergence of transformative shifts. AI could challenge fundamental practices in trading, portfolio optimisation and risk management.


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GenAI delivers steady, intuitive near-term productivity enhancements

Machine learning is well established in the financial industry, particularly in areas such as anomaly and fraud detection. In the near term, many of the most practical applications of AI in the industry will continue to focus on operational efficiency, automating routine and human-intensive tasks.

GenAI offers an impressive leap forward for such activities. LLMs can be leveraged to accelerate certain processes – summarising financial filings, legal documents or regulatory updates, for example. Similarly, tasks such as term-sheet processing for extracting and reconciling complex derivatives contracts will probably benefit from AI-driven solutions.

In addition to operational tasks, client-driven and marketing activities have much to gain from AI via tailored content creation. These applications, while incremental rather than transformative, still offer immediate benefits in terms of productivity gains.

Is a paradigm shift ahead?

Projecting profound transformation driven by AI in trading and risk management is a complex task. Current practices are deeply rooted in established frameworks, including quantitative modelling, market standards, regulatory constraints and technological platforms. To assess this and the potential for disruption, the survey focused on two very specific and illustrative examples:

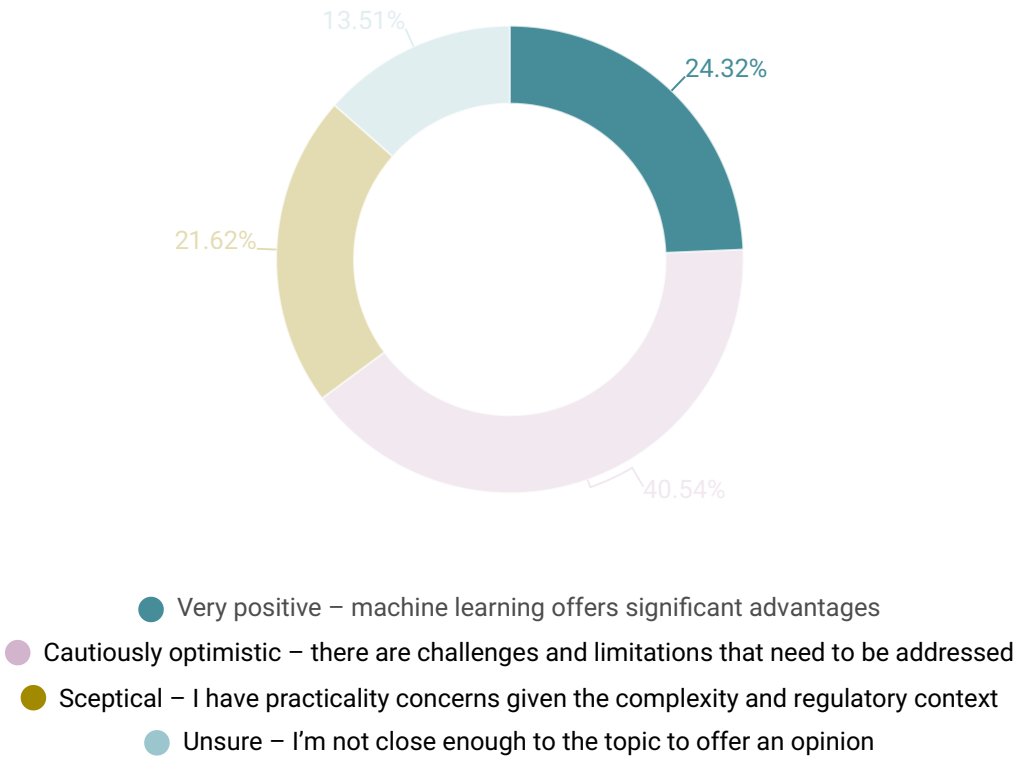
- The use of machine learning techniques to accelerate derivatives pricing and reduce risk system infrastructure cost
- Deep hedging

In the first example, machine learning techniques are used to replicate derivatives pricing models to address the increasing computational demands of risk systems. Over the past decade, the financial industry has witnessed an exponential increase in computational needs driven by factors that include growing quantitative model complexity, the regulatory demands for broad stress-testing and the emergence of central desks dedicated to active management of valuation adjustments.

A well-designed neural network architecture can deliver a high degree of accuracy in replicating pricing models at a staggering speed. It presents an opportunity to use more sophisticated models in contexts demanding a massive number of evaluations. One example is potential future risk modelling in credit risk.

The survey results indicate that front-office teams are exploring the use of such machine learning models. Some 65% of respondents expressed a 'very positive' or 'cautiously optimistic' outlook on the topic.

1. What is your perspective on the use of machine learning techniques to save time and/or costs when running derivatives pricing models?



Source: Murex

A key advantage of this approach is that it relies on established financial models and operates within the same theoretical framework, which makes it easier to gain acceptance and integrate into existing systems. For such models to become mainstream, however, robust and reliable architectures and standard model validation approaches need to be implemented.

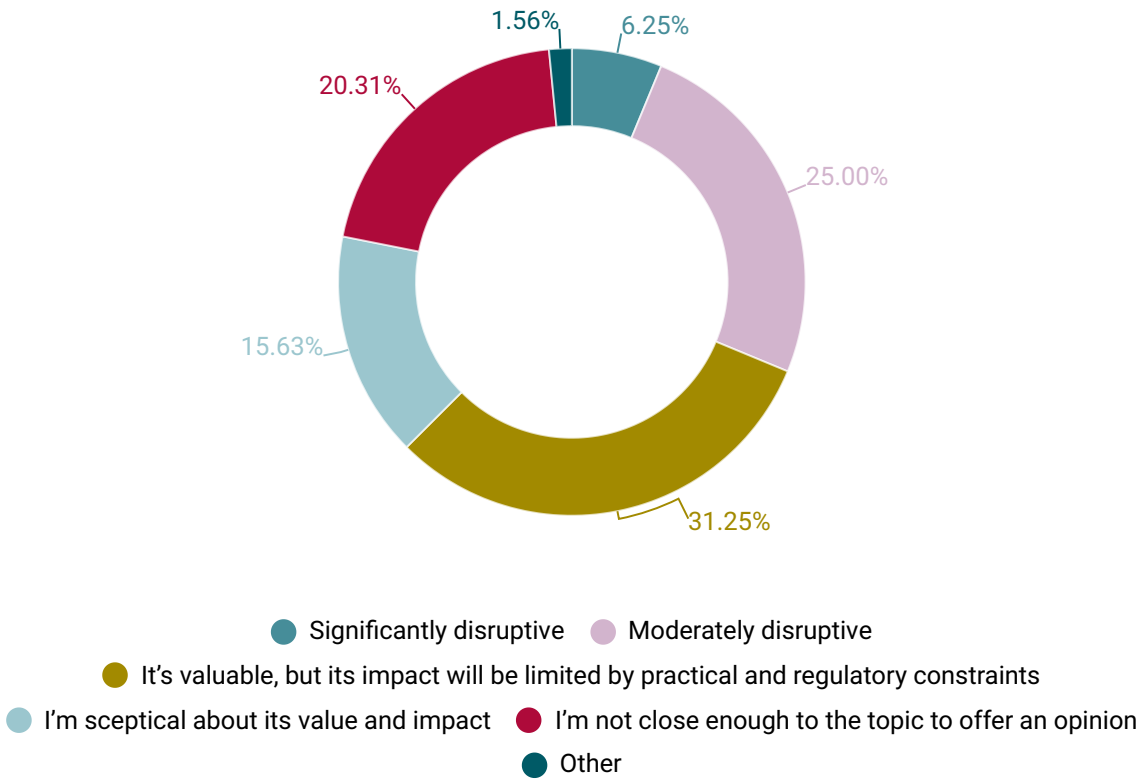
These challenges are addressed in **a white paper, *Derivatives pricing with neural networks***, in which Murex provides a framework for building tailored machine learning architectures. These capture the specifics of financial products and model dynamics, and lead to a high degree of accuracy in model replication.

Deep hedging, meanwhile, was first described by Hans Buehler, Lukas Gonon, Josef Teichmann and Ben Wood in *Deep hedging*, published February 8, 2018. It uses deep learning and reinforcement learning techniques to optimise portfolio hedging. Unlike traditional hedging methods that rely on model-based risk sensitivities – known as Greeks – deep hedging relies on data-driven algorithms to develop hedging strategies.

The approach has proven to be technically robust and could offer fundamental benefits. These include the ability to incorporate market frictions, such as liquidity and transaction costs, and to complement model-driven scenarios with real-world assumptions.

In the survey results, around one-third of respondents perceived deep hedging as ‘significantly’ or ‘moderately’ disruptive. A similar number – some 31% of those surveyed – think that its impact will be limited by practical and regulatory constraints.

2. How disruptive will deep hedging techniques prove for traditional trading and risk management practices?



Source: Murex

The potential of deep hedging in certain trading areas is undeniable. However, its implementation faces several hurdles, broadly categorised as follows:

- **Industry-related challenges:** For several decades, traders, risk managers and other financial professionals have relied on methodologies built on established financial theory and models, ranging from the foundational Black-Scholes framework to the most recent and highly complex quantitative models. Entire organisational systems have been developed around these models, including model validation frameworks, regulatory compliance processes and specialised IT systems. These structures are deeply embedded in the operations of financial institutions, making the transition to AI-driven approaches more than just a technological shift. The transition also presents cultural and structural challenges.
- **Technology hurdles:** The implementation of deep hedging still raises many questions – particularly regarding practicality, in terms of speed and data

required. Real-time hedging demands frequent model recalibration. In the context of deep hedging, this can be challenging because of the computational complexity in the neural networks training process. If they become mainstream, these models are likely to require significant computational resources.

So, do AI-powered hedging models represent a paradigm shift that will deeply impact risk management practices? Or do they simply signal an incremental change? It is still too early to provide an answer. Based on several proofs of concept Murex has conducted in the past few years, the technology is undoubtedly promising. Its full impact will depend on the added value observed by traders in real-life use cases and the ability to integrate this technology into the established fabric of financial markets.

A prudent approach would be to pursue slow, iterative, incremental adoption by focusing first on specific high-value use cases. Good candidates could include instruments where hedging is non-trivial, such as autocallables and other exotic products that require the use of stochastic and local volatility models.

In these cases, deep hedging can serve as a complement to traditional models by assisting traders in decision-making. This measured adoption could provide valuable insights while minimising disruption and gradually building trust for potential larger-scale adoption.

Integrating AI into capital markets is a balance between immediate efficiency gains and transformative changes. Its true impact will depend on the depth of its business value and its integration into established financial frameworks. Realising this potential requires unified effort from financial institutions and technology providers.

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