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# Using Gen AI Agents With GAE and VAE to Enhance Resilience of US Markets

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**Abstract** In this study, we explore the application of Generative AI (Gen AI) in enhancing interest rate models utilized in financial risk modeling. We employ advanced Gen AI Large Language Models (LLMs), including OpenAI's ChatGPT-4 and ChatGPT-4 Mini, as well as Google's Gemini versions 2.0 and 1.5, to generate pertinent queries and assess their accuracy. We propose and evaluate a prototype that leverages queries generated by publicly available LLMs to model and fine-tune parameters for Generative Adversarial Networks (GANs) and Variational Autoencoders (VAEs), methodologies that can also be applied to other interest rate models. Our findings demonstrate that ChatGPT (OpenAI) can produce relevant questions and queries that enhance data generated by GANs and VAEs. We implemented our model over a decade (2012–2024) using 10-year U.S. Treasury rates, integrating publicly trained LLM models with Gen AI data tools, and proposed a full stack framework that can be extended to building AI agents. We also presented the GANs and VAEs results using different visualization techniques for better understanding. The accuracy of the LLM-generated queries is evaluated by three independent volunteers with expertise in this area. Our proposed architecture incorporates a Gen AI-based agent to validate current scenario generation and Monte Carlo methods traditionally used in modeling. Additionally, we present backtesting results comparing real and generated data, along with querying and optimizing models, paving the way for future agent-based virtual analysts.