



## “The Relationship between Foreign Exchange rate prediction using Artificial Intelligence and Audit Effort”

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**Abstract**— this working paper explores how Artificial Intelligence (AI) usage to predict foreign exchange rates has an effect on audit effort in financial firms. The challenge to forecast accurately in the ever-volatile foreign exchange markets necessitates the infusion of AI algorithms, for example, machine learning and neural networks.

By using AI technology in forecasting future foreign exchange rates, accurate predictions are made leading to efficiency. Nevertheless, there are questions about the model's complex nature and transparency which can make audits more complicated thereby increasing compliance costs, regulatory burden as well as risk management requirements. Furthermore, auditors need to consider new factors after integrating AI since they need to learn the underlying algorithms used in its design; assess data integrity during appraisal; and estimate model reliability selection when making decisions.

This working paper emphasizes the necessity of further researching into the subtle effects of AI-driven exchange rate prediction on audit practices such as their influence on planning audits or sampling techniques for a particular year or even generally the approach taken by auditors.

**Keywords**— Artificial Intelligence – Machine Learning- foreign exchange rate prediction- Audit effort.

### ***Introduction-***

The foreign exchange market is a global leading power, and accurately predicting exchange rates can be a game-changer for investors. This will give them intelligent decisions on how to increase their returns effectively and, at the same time, manage the risk involved. On the other hand, with too many incredible numbers of variables that apparently affect the exchange rate, ranging from the economy, politics, social climate and even global incidents of a country (Beeram, 2023).

The fluctuations of the exchange rate have become an important risk factor for the business, operations and financing of international firms. In this working paper we examine whether and how exchange rate prediction using AI affects auditor effort and risk perception audits. (Chang, 2024; Ranasinghe, 2023). Artificial intelligence (AI) approaches have become a global solution to signaling problems. Economists are more confident in the application of soft computing techniques methods in sophisticated economic and financial analysis among (Khan, 2021). With the expansion in the foreign operations in public firms, various studies show that the financial reports and disclosures of these multinational firms are greatly influenced by country-level factors in the foreign countries. The global nature of multinational firms' operations represents a challenge to auditors as it requires additional effort due to the complexity of AI algorithms (Dehghani, 2022; Qi, 2020; Sezer, 2018)

### ***Paper Objective and plan—***

This paper explores the potential of how Artificial Intelligence (AI) usage to predict foreign exchange rates has an effect on audit effort in financial firms.

### ***Analysis of literature reviews —***

#### ***Foreign Exchange rate prediction using Artificial Intelligence***

Foreign Exchange (Forex) markets are among the most liquid globally. Liquidity simply refers to the ease of purchasing and selling without considerable price movement or loss of value in a market characterized by numerous buyers and sellers. Three general types of individuals are constantly needed to be present to maintain market liquidity: Investors seek long-term gain, Arbitrators seek riskless profits as a result of price mismatches due to inefficiencies in the market and Traders (Chang, 2024).

Linear statistical approaches have been widely used in forecasting for decades. Linear models have advantages in implementation and understanding but lack the ability to describe nonlinear interactions found in complicated real-

world problems. Using linear models to solve complex nonlinear forecasting problems is not always effective (Lin, 2024; Dehkordi, 2021; Jin, 2020). The neural network is global for solving a fairly wide class of complex and non-linear problems (Panda, 2022). There are various methods available for forecasting exchange rates, including technical analysis, sentiment analysis, and fundamental analysis. Technical methods of historical time series analysis of interest rate changes are the most popular among traders. An accurate model for prediction is a key option for precise decision (Khan, 2021).

**Supervised Machine learning Model (SVM)** that falls under supervised learning field of expertise. SVM is primarily utilized for classifying data and to assist with regression tasks methods. Since the beginning, SVMs have proven to be superior classification and regression models for n-dimensional data series, especially discrete time series (i.e. stock market data, foreign stock market data, weather forecast data, etc.) that are linearly inseparable. Although SVM classification and SVM regression both operate on different endpoints, they internally follow the same pattern in processing. SVM is mainly used to identify the optimal hyperplane to achieve a better classification of given data values (Beeram, 2023; Prathyusha, 2020).

**Support vector regression (SVR)** is a visually observable predictive model that is used to predict test values from training data when forecasting exchange rate data, the latest data values have a greater influence on the forecasts than the earlier data values. Hence, traditional SVR is unable to explain how time coefficient values would impact the forecasts of value of time (Lin, 2022; Nanthakumaran, 2017)

**Fuzzy SVR (F-SVR)** logic mimics human behavior when decisions are made based on uncertain data. While Boolean logic is based on either 0 or 1, fuzzy increases the dimensions of decision conditions, adding possible decision elements: 0, 0.1, 0.2 ..., 1.

It is a reliable method of demystifying real-world problems with workable solutions. When forecasting time series data, SVR has become a reliable model with confidence deviation, but it suffers slightly in maintaining consistency in accuracy and forecast error rate values. In addition to the sensitivity of SVM with noisy data and contours. The main support vector regression problems that suffer from these limitations are: SVR cannot calculate the priority of variables in the data set predictions, and SVR cannot determine time coefficients with data points. From the analysis of the dataset, we noticed that the currency value forecasting process is mostly based on recent

points rather than past ones. Giving uniform weights to all data points in the training set increases the number of errors in future predictions. To overcome these limitations, we proposed the use of fuzzy functions with SVR, called fuzzy SVR (F-SVR) (Khan, 2024; Beeram, 2023; Khan, 2021; Hao, 2021).

### ***Artificial Intelligence and Audit effort***

Auditors have traditionally been burdened with repetitive and labor-intensive responsibilities, limiting their time for strategic and analytical activities. AI's ability to see patterns, process data, and learn offers a new approach to solving this difficulty. AI automates common audit activities, freeing up auditors to focus on complicated analysis and essential decision-making (Odeyemi, 2024). AI-powered automation is very beneficial for data extraction, classification, and reconciliation. AI excels in sorting through large financial records, reconciling transactions, and identifying dataset errors. This not only speeds up the auditing process, but also reduces the risk of human error when managing manual data (Fedyk, 2022).

Automating such typical audit processes has many other benefits than the saving of time. AI helps to focus on value-added activities for the auditor, which resulted in improved audit quality and depth. Auditors will need automation in speeding up regular operations so that they can process vast amounts of data faster than you could have processed manually (Spring, 2022).

Advanced algorithms used in AI provide an auditor with the ability to recognize patterns in complex data running into thousands, which cannot be done through an ordinary examination. In addition, it imparts skills for a more sophisticated understanding of the financial transaction and business process associated with possible risk. Artificial Intelligence will make predictive analytics easier to do, enabling an auditor to forecast trends, weigh possible risks, and proactively comes up with solutions to emerging issues. At this level of proactive stance, an auditor heightens his capacity for strategic insight and recommendations to the organization (Mugebe, 2024; Zhang, 2022).

The application of AI techniques in audit process also facilitates the analysis of unstructured data in the form of text, derived from financial reports, contracts, and even communication records, through the integration with (NLP) natural language processing. Such linguistic analysis will be able to pick up relevant information that is currently hidden in textual formats. AI technologies are further capable of rendering highly complex data sets in dynamic visual representations by using data visualization techniques. It makes the data easy

to understand and also aids in communicating the findings of the audit to stakeholders (Faccia, 2022; Yu, 2020).

***Foreign Exchange rate prediction and Audit effort***

According to the Financial Accounting Standards Board (FASB) Statement, a firm that operates in more than one currency environment must translate its financial results into local currency. In particular, a firm must use a "functional currency approach" in which all of its transactions are first measured in the currency of the primary economic environment in which it operates (the foreign functional currency, which is usually the foreign currency) of the environment in which the foreign subsidiary generates and uses cash and then converts to local currency when the financial statements are consolidated (Chang, 2024; Kim, 2022).

According to Deloitte, (2024), a foreign subsidiary of a multi-firm is exposed to two types of currency risk: transaction risk and translation risk. **Transaction risk** occurs when a foreign subsidiary carries on some of its business activities or transactions in a foreign currency different from its accounting currency. Under the functional currency approach of ASC 830, all business transactions of a foreign subsidiary denominated in a foreign currency must be initially valued at the exchange rate in that functional currency at the time the transaction is recorded in the financial statements. However, for the revaluation of assets and liabilities, the exchange rate valid on the date of such transactions must be used. Consequently, exchange rate fluctuations between the record date and the settlement date result in foreign currency transactions that affect the net result of the exchange rate period. Such profit or loss is ultimately realized as cash (Xu, 2024).

**Translation risk** occurs when the financial statements of its foreign subsidiaries are combined with the financial statements of its parent firm, that is, when the foreign currency-denominated financial statements are converted to local currency. According to ASC 830-30-45-3, assets and liabilities must be translated at the exchange rate at the balance sheet date, while revenues, expenses, gains, losses and accounting rates must be translated at the exchange rate prevailing at each date. The gain or loss resulting from the translation of the financial statements of the foreign subsidiaries into local currency must then be recognized as a cumulative translation (CTA) in other comprehensive income. Because translation adjustments do not translate directly into cash flows (Jingyi, 2023; Kou, 2019).

According to Chang (2024), the effect of currency risk on audit effort is stronger for multinational firms with greater pressure to avoid missing profit targets and whose auditors have greater market concentration, while the effect of currency risk on audit effort is reduced for firms with auditors experienced in auditing currency risk clients whose auditors are busy and whose foreign operations are decentralized. AI leads to reduced manpower requirements and thus lowers audit fees. However, audit firms have to spend money on expensive R&D (hardware, programs, algorithm development). In addition, users believe that the strict communication between the inspector and the client does not come from digital openness. (Difalla, 2024; Lee, 2024).

### **Conclusion**

This working paper considered the possible effect of an exchange rate on auditing efforts. AI is capable of enhancing accuracy in the forecasting of exchange rates. Nonetheless, keep in mind that what is required here is a cautious attitude toward the complex Forex market and limitations tagged with AI models. Although these predictions made by AI have the potential to accelerate the audit process by coming up with more accurate estimates, explainability and transparency go upfront. The auditors will confidently place reliance if they understand the rationale behind the projections generated by AI to ensure their reliability and reduce the risk of bias (Odeyemi, 2024; Chang, 2024).

Future research should aim to further explore a way of using AI together with the already established auditing frameworks in developing a comprehensive approach toward the assessment of risk. In other words, AI can be a promising pathway toward foreign exchange rate prediction, hence reducing the audit effort. However, it is in the responsible implementation that puts transparency and hand-in-hand integration with existing auditing practices as essential elements to the efficacy and reliability of this technology.

### **Future research suggestions:**

- 1) The impact of Artificial intelligence on the relationship between stock price forecasting and audit fees.
- 2) The relationship between foreign exchange rate prediction using fuzzy models and audit quality.
- 3) The impact of forecasting stock price risk on audit procedures.
- 4) The relationship between audit firm technology and assurance on client's artificial intelligence system.

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