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THE USE OF ARTIFICIAL INTELLIGENCE IN DETECTING CROSS-BORDER TAX EVASION: REGULATORY GAPS AND CASE-BASED EVIDENCE

Abstract

The evolution of tax laws, increased financial transactions, growing data and higher expectations from taxpayers for government efficiency and transparency are just some of the challenges taxation systems around the world face in the era of advanced technology. The complex tax systems are faced with new dilemmas, which are directly connected to digitalization. To address these challenges, tax authorities have turned toward the use of Artificial Intelligence (AI). In the past five years, we have witnessed the increased use of AI in international tax enforcement. Across the world, governments and tax authorities rely on algorithms to detect cross border tax fraud more than ever before. AI is also used to improve tax compliance and optimize audit targeting. With the vast expansion of economies and complex financial transactions, AI tools offer serious benefits in automatization of tax administration, identification of anomalies and improvement of transparency. However, the use of AI in detecting cross-border financial crimes still remains problematic. Even though the use of AI brings advanced solutions regarding pattern recognition and risk analysis across jurisdictions, it also raises legal, ethical, and procedural challenges for tax authorities. Cross-border tax evasion has long posed a significant challenge to global financial transparency and tax justice. In this context, Artificial Intelligence (AI) can be used as a powerful tool in detecting and combating tax evasion. Yet, while AI holds transformative potential, its use remains underdeveloped, mostly due to the lack of regulatory frameworks. This paper analyses the role of AI in detecting cross-border tax evasion, examines existing regulatory gaps, and analyzes key case-based evidence regarding the use of AI in this domain.

Keywords: tax evasion, artificial intelligence, regulatory gaps

I. Introduction

Cross-border tax evasion has always been a significant threat to global fiscal integrity, and more importantly, it costs governments enormous amounts of money annually. AI technologies have advanced in recent years, particularly in the field of machine learning, anomaly detection and network analysis. This enables tax authorities to uncover hidden patterns in complex international financial data. AI tools are being used to trace offshore shell companies, monitor high-net-worth individuals and inform governments of suspicious transactions across their borders. Close to 75% of tax administrations report that they are using or that they are in the implementation phase for the future use of cutting-edge techniques to exploit data in ways that reduces the need for human intervention. (OECD, 2021). However, while the technology advances rapidly, the needed regulatory framework for its use remains underdeveloped or only partially developed.

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Technological changes have allowed governments and auditing firms to improve tax compliance and reduce evasion, but the challenges regarding regulatory gaps, mostly connected with standardization of jurisdictions, the concerns about explainability, data privacy etc. still remain.

Tax fraud remains a significant challenge for governments worldwide, contributing to an estimated 4% to 15% of the tax gap in various OECD countries (Gaie, 2023). Across Europe, tax authorities are leveraging artificial intelligence to improve fraud detection, enhance compliance, and optimise tax collection (Erastov, Balytska, 2025).

This paper aims to explore how AI is being used in the detection of cross-border tax evasion in practice and which are the existing regulatory gaps.

II. Cross-border tax evasion and the need for artificial intelligence (AI)

To determine how artificial intelligence can impact efforts to tackle tax fraud and tax evasion, we must first explain the phenomenon of cross-border tax evasion. It can be summarized as the practice of holding undeclared financial deposits or assets in foreign jurisdictions (commonly tax havens), beyond domestic legal reporting requirements, to conceal income and evade taxation (Casi, Spengel, Stage, 2020). The use of shell companies, complex transfer pricing strategies, and secrecy jurisdictions are common elements in such schemes. The 2016 Panama Papers and the 2021 Pandora Papers exposed how global elites used intricate corporate structures and offshore accounts to avoid taxation, often facilitated by legal and financial intermediaries (Obermayer & Obermaier, 2016; ICIJ, 2019).

The detection of such activities is very challenging due to the cross-jurisdictional nature of the transactions. Traditional research methods often prove inadequate, as they are limited by human processing capacities, inability to access data in real time and jurisdictional secrecy laws – the most important element of tax havens. In this matter, AI offers a powerful alternative by the use of predictive analytics and detection of anomalies with speed which was previously impossible to imagine.

For instance, AI models would be able to identify patterns such as sudden increases in loans or changes in beneficial ownership, which may signal possible tax evasion to the authorities. In the process, AI would rely on collected historical data of known tax evasion cases. When integrated with data from the OECD's Common Reporting Standard (CRS) or the EU's DAC6 directive, AI systems can flag suspicious cross-border arrangements for further human investigation (OECD, 2021; European Commission, 2020).

III. AI in cross-border tax evasion: capabilities and methods

AI technologies are transforming how large volumes of transactional and declarative data which is collected by tax authorities is analysed. Machine learning algorithms can analyze vast volumes of financial data with remarkable speed and accuracy, identifying patterns indicative of tax fraud or evasion. Furthermore, AI-powered predictive analytics enable tax authorities to anticipate taxpayer behavior and allocate resources effectively for enforcement purposes (Bajpai, 2024). Natural language processing (NLP) allows tax systems to parse and understand taxpayer inquiries and declarations in natural language, facilitating easier interactions and more accurate data retrieval. Additionally, big data analytics provide the capability to process and analyze vast datasets at unprecedented speeds, offering insights that were previously unattainable due to data volume or complexity (Aladebumoye, 2025). Integrating machine learning algorithms has

remarkably enhanced the ability to detect pattern-based risks, with some systems achieving up to 91% accuracy in predicting emerging risk scenarios (Methuku, 2025). One of the defining features of AI-based risk scoring systems is their ability to assess risk in real time. That means the data is immediately processed through the AI models, in order to generate a risk score, which indicates the likelihood that the transaction is legitimate or fraudulent (Jett, 2024).

For example, regarding the practical application and methods of artificial intelligence in battling tax fraud and tax avoidance, in their 2021 study, Savić et al. present the HUNOD (Hybrid Unsupervised Outlier Detection) system, which is a hybrid unsupervised detection method designed to identify tax evasion risks using Serbian income tax data. By using a combination of algorithms, machine learning and AI techniques that can be explained, the results are 90-98% detected anomalies, which later were internally validated. (Savic et al. 2021)

Another example where AI-assisted systems were used to process data identifying cross-border links and inconsistencies was the Panama Papers case. The Panama Papers refer to eleven million leaked electronic documents that detail financial and attorney-client information for more than two hundred thousand offshore entities. The documents were leaked in April 2016 by an anonymous whistle-blower from the database of Panamanian law firm and corporate service provider Mossack Fonseca (Mukhopadhyay, Ghosh, 2020). ICIJ (International Consortium of Investigative Journalists) and its partners began publishing their explosive Panama Papers disclosures at 2 p.m. U.S. Eastern Time on April 3, 2016. ICIJ, McClatchy, the Miami Herald, German daily Süddeutsche Zeitung and other media partners spent more than a year sifting through 11.5 million leaked files to expose offshore holdings of current and former world leaders and more than 100 other politicians and public officials across the globe. (ICIJ, 2021). AI played a crucial role in structuring and interpreting the leaked data, enabling investigators to extract meaningful patterns from scanned documents, emails, and contracts (Cabra, Kissane, 2016). ICIJ received raw data from Mosack Fonseca leaked dataset, which has been passed over OCR (Optical character recognition) tool to make in readable format (Srivastava, Singh, 2018). To connect the dots and find a link between two transactions and by that, between entities, developers used a graph database (Neo4j) and an Enterprise level graphical network visualization tool (Linkurios) with proximity searching capability (Mukhopadhyay, Ghosh, 2020). This way, hidden relationships and invisible facts were revealed. Neo4J is the world's leading and trending graph database. In the aftermath of the leak, several countries including the UK, Germany, Sweden, France, Spain and others used AI to cross-reference Panama Papers data with domestic tax filings, resulting in hundreds of investigations, and more importantly, millions of dollars recouped (Escudero, Reuter, 2025).

From the previous, we come to the conclusion that AI allows detection of suspicious cross-border transactions, which differ from normal financial behavior patterns. This enables tax authorities to identify these anomalies in a timely manner. AI tools offer the possibility of searching through large volumes of structured and unstructured financial data. These models continuously learn from past enforcement data to achieve a higher degree of refinement regarding detection of serious and complex evasion schemes across multiple countries (OECD, 2024). As global tax compliance becomes increasingly digitalized, AI's ability to detect subtle irregularities strengthens the capacity of governments to address transnational financial crime efficiently.

IV. Regulatory gaps in the use of ai in tax evasion detection

It is undeniable that Artificial Intelligence and the tools it provides can be very helpful in detecting international tax evasion and tax enforcement in general, but it also raises serious regulatory problems and concerns.

One major issue and probably a primary regulatory gap is the lack of international standards for how AI should be used in cross-border tax evasion. Different countries use different AI systems, with varying rules for transparency and oversight. Countries also have different legal systems, which means someone flagged by AI in one country could face penalties, while the same behavior might be ignored in another country. These differences cause confusion, reduce trust, and make cooperation between countries harder. International cooperation could manifest as shared standards for the application of tax avoidance AI systems in tax planning, collective investment in AI detection capabilities, and coordinated responses to AI driven avoidance strategies, among others (Alarie, 2023).

Most jurisdictions lack clear rules on the explainability of AI decisions. This is problematic, since individuals and corporations have a legal right to understand and contest decisions made against them. Many advanced machine learning models operate as "black boxes," making it difficult for taxpayers and even regulators to understand how a given decision was made (Raghavendra Rao et al. 2025). The European Union's General Data Protection Regulation (GDPR) provides a "right to explanation," but it remains unclear if and how this regulation shall be applied to AI systems used by tax authorities (EU, 2016). Democratic societies are governed by the rule of law, so any administrative decision must be subject to judicial review and justification. The lack of necessary regulation of this important segment will contribute to lack of transparency and will further reduce accountability of tax authorities.

Another regulatory concern is the risk of cross-border data privacy violations. AI systems require large volumes of personal and financial data, much of which may be sensitive and protected by national laws. Also, the accuracy of AI models is constrained by the fact that tax data is often incomplete, erroneous, or subject to privacy limitations (Raghavendra Rao et al. 2025). For example, the U.S. CLOUD Act allows law enforcement agencies to access data stored abroad, potentially clashing with the EU's strict data protection regime under GDPR (Christakis, 2019).

These are just some of the potential problems tax authorities may encounter in the process of deploying AI in cross-border tax evasion detection. While AI holds significant promise regarding this matter, the necessary regulation remains underdeveloped. Key gaps remain in the field of standardization, transparency, data privacy, and oversight. To bridge these gaps, governments around the world will have to commit to increased coordination and also develop specific legal frameworks that protect taxpayer rights, ensure due process, and promote cooperation between tax authorities. Without such measures, the risks posed by unchecked AI enforcement may ultimately outweigh its benefits in the long term.

V. Conclusion

It is undeniable that the use of Artificial Intelligence (AI) in cross-border tax enforcement is helping governments tackle tax evasion and also changing the course of the process. As shown by the Panama Papers case, AI can help governments and tax authorities uncover hidden wealth by tracing complex illegal networks in a faster, more precise way, since these networks are overloaded with documentation.

However, these advancements come with challenges. The use of AI raises concerns about legal rights, fairness, accountability, and how different countries apply these tools. We have discussed how the lack of clear rules affects how AI decisions are made, how data-sharing across borders can lead to conflict of laws and can cause misuse of personal data and how there are serious loopholes in the protection of taxpayer rights. Without common international standards and regulations, the enforcement of AI in tax law may cause uneven treatment of taxpayers and thus cause a decline in public trust in AI.

The conclusion is that we need strong and coordinated rules on how algorithms work, how data is handled and used, and how taxpayers are protected. International organizations like the OECD, EU, and UN must lead these efforts. If done responsibly, AI can improve global tax systems, but it must be used with fairness, transparency, and cooperation at its core.

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