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Artificial Intelligence as a Tool for Tax Audit: A Legal–Economic Analysis of Efficiency and Legitimacy

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Abstract

:This research aims to study the role of artificial intelligence (AI) as a modern tool in tax auditing, through a legal-economic approach that assesses its effectiveness and legitimacy. The research analyzes the contribution of AI technologies to improving the detection of tax evasion, streamlining audit processes, and enhancing tax compliance, while also examining the legal and ethical issues they raise concerning transparency; Responsibility and the protection of taxpayers' fundamental rights. The research emphasizes that adopting artificial intelligence in tax auditing requires a clear legal framework that balances the demands of administrative efficiency with guarantees of legal legitimacy.

Keywords : Artificial Intelligence; Tax Control; Tax Evasion; Legal Legitimacy

1. Introduction

Artificial Intelligence as a Tool for Tax Audit: A Legal–Economic Analysis of Efficiency and Legitimacy

Artificial Intelligence has begun to be applied in tax administration, including tax audits, by national and subnational jurisdictions ranging from developing to developed countries. This technology is often perceived as a game changer for tax audits, deserving of empirical research to evaluate efficiency and legitimacy. Probing these aspects through a legal–economic lens can clarify perspectives.

Tax audits aim to verify compliance with obligations such as the payment of taxes due or the filing of taxable events. A legal–economic appraisal emphasises goals de jure and de facto of tax administration at large, and allows the assessment of new technologies against objectives less commonly addressed. Efficiency spans productivity metrics, service quality, and, implicitly, the alignment of regulatory burden with taxpayer and government capacity. Legitimacy refers to compliance with rule-of-law principles and international obligations that underpin tax governance (Black et al., 2022) and take on particular importance for technologies whose deployment can profoundly reshape functions and procedures.

2. Conceptual Framework

AI is defined as a system exhibiting intelligent behavior rather than merely as a software type. In tax administration, AI encompasses all tax governance measures utilizing this system. AI encompasses both narrow AI, targeting specific tasks with restricted training data, and general AI, performing various tasks using vast datasets (Rocco, 2022).

Tax administration comprises three principal functions: taxpayer registration, compliance risk management, and taxpayer assistance. For each function, three operational tasks can be distinguished: detection of new taxpayers, assessment of compliance risk, and provision of responses to requests for clarification. Figure 1 illustrates this categorization, along with the AI applications and deployment situations relevant to the implementation under consideration. That implementation focuses on audits of Individual Income Tax, Corporate Income Tax, and Value Added Tax filings.

Efficiency pertains to optimizing resource allocation within a system of explicit rules and prescribed processes, such as tax law. Legitimacy corresponds to governance that rigorously observes the rule of law, adheres strictly to principles of due process, and safeguards freedom.

2.1. Defining AI in Tax Administration

Tax administration uses Artificial Intelligence (AI) to analyze data, detect fraud, prioritize case loads and realign resources. AI further automates recommendations, predictions and decisions in tax compliance. Narrow AI, which relies on machine learning and rule-based systems, is widely deployed; general AI combining natural language processing and reasoning is in prospect but has yet to create prototypes.

AI technology in public tax administration extends from tax policy research to tax compliance, with business income tax audits as the initial focus (Rocco, 2022). AI for non-compliance risk management enhances taxpayer profiling, detection of hidden economic assets and fiscal losses in enforcement actions, technological readiness. In public tax audits, AI-based processes are examined.

Machine learning increases productivity by identifying patterns in data, guiding decisions through knowledge augmentation, resource reallocation, and lowering levels of intervention, running scenarios to define preferred choices. Rule-based procedures support FIRPTA withholding tax on sales of U. S. real estate by non-resident aliens, inform registration requirements for unexempt property, streamline forms preparation, and speed compliance with tax return filing.

Robotics Process Automation (RPA) manages stand-alone applications without the need for programming, applies systematic commands following pre-specified rules across systems, operates at intervals defined in business processes, extracts and falls back to automated corrections, executes multi-step sequences in web browsers to secure scraping from web pages. RPA in tax compliance upgrades systems operational since 1994 and handles quarterly-declared withholding statements while generating reports on FIRPTA transactions. Onboarding desks are monitored to pre-empt revenue losses through creation of potential missing taxpayers (Surden, 2019).

2.2. Legal-Economic Lens for Tax Audit

Tax authorities constantly strive to increase audit efficiency by collecting evidence and scrutinizing tax returns, despite limited resources. Integration of various technological tools is seen as a possible solution to these challenges. In particular, increased computer processing capabilities and the adoption of machine-learning algorithms enable automatic detection of individuals whose tax compliance seems suspicious based on their tax returns and other data. When seen through a legal–economic lens, improved audit efficiency is accompanied by changes in governance objectives, altering the calculus of tax authorities. The combination of improved productivity (more cases are handled in the same amount of time) and reduced compliance risk allows the establishment of different benchmarking criteria for time to impose a case and external indicators to monitor compliance risks (Raskolnikov, 2013). Audit automation raises concerns regarding legitimacy, such as checks against arbitrary

decisions or the need for an explanation of decisions made.

3. Efficiency through AI in Tax Audits

A recent analysis of AI deployment in tax audits across multiple jurisdictions examines the incorporated technologies, delineates governance issues, and evaluates net welfare effects. Early findings suggest that AI-assisted audits outperform traditional approaches in productivity, throughput, error rates, and risk segmentation, warranting further monitoring of advancement trajectories and ongoing performance comparisons.

Governments often lack sufficient resources to ensure comprehensive tax compliance across the entire taxpayer base. Long-standing governance traditions have sought to administer taxation through transparency, predictability, and procedural fairness. These have also extensively regulated the deployment of new technologies in tax administration. Consequently, the adoption of AI technologies is subject to intense scrutiny concerning efficiency and legitimacy.

A recent policy paper analysing the impact of AI deployment on efficiency in tax audits documents substantial gains, signalling significant remaining performance gaps and highlighting the corresponding public policy interest (Black et al., 2022).

3.1. Productivity Gains and Resource Allocation

Tax administrations are associated with the collection of fiscal revenue for public financing, promoting economic stability, welfare, and sustainable development (ABRARDI et al., 2019). In this context, the investigation of tax-audit processes has particularly focused on relevant efficiency gains. While financial-efficiency gains can be expressed in monetary terms, these do not adequately capture tax-audit or tax-administration efficiency since such income also depends on the timing of tax and the expected risk perceived by taxpayers.

Instead, non-financial measures might prove more useful to adequately express economic productivity and the relative performance of tax auditors, typically perceived as being rather low. An investigation of tax auditing is likely to reveal additional insights into the proper functioning of public administrations, providing knowledge about the functioning of a significant part of the society as a whole.

3.2. Error Reduction, Risk Segmentation, and Throughput

An unresolved challenge in administrative research concerns measuring the scale of artificial-intelligence (AI) efficiency gains on tax audits. Previous studies have estimated productivity improvements of 20–40 percent, but the limited nature of the underlying data hampers more definitive conclusions (Black et al., 2022). Initial administrative records suggest substantial input–output improvements compared to conventional screening methods. AI-assisted processes appear significantly faster than traditional audits, with average hourly productivity doubling.

Beginning the examination, AI's role in error reduction is quantified. Taxpayer filings frequently contain errors and anomalies, with non-compliance attributable to various factors. Computers initially screen submissions to narrow the pool of potentially problematic returns. A leading software application subsequently flagged multiple red flags as part of this initial screening, successfully eliminating 40–45 percent of monitored submissions from downstream analysis. Observer benchmarks indicate that prior conventional administration programs detected no more than 30 percent of comparable risky returns under statutory parameters. The information technology also segments risks more efficiently. Four distinct screening phases (vs. one previously) allow resources to shift to more prescriptive and detailed guidance for the non-compliant cohort, alongside other focus areas.

Finally, the AI system increases throughput per unit of time. Preliminary inspections into diverse escort-service tax-collection audits indicate significant time savings, which vary by the number of risk parameters rejected. Efficient risk segmentation directly aids these throughput enhancements.

3.3. Benchmarking against Traditional Methods

Benchmarking AI-assisted processes against conventional audits confirms notable performance gaps that AI has begun to close. In an average month, analysis of four AI-supporting functions in fourteen jurisdictions indicates improvements of 33 to 60 percent depending on the examination ratio, varying by country. Examination ratios signal the relative intensity of verification effort and taxpayer support, shaping potential welfare impacts and implementation incentives (Black et al., 2022).

AI systems have the potential to sharpen findings and identify issues that human auditors might overlook. Taxpayer compliance relief from broad statutory changes previously attracted substantial attention, yet complementary human scrutiny is a prerequisite for maximising welfare gains from additional insights. Initial findings underscore the importance of input from human examiners, whose knowledge of taxpayer behaviour anchored by pre-existing information and experience remains crucial for the application of new strategies.

Deployment furthers the compilation of soft information on taxpayer behaviour adjustments, monitoring trends before implementing fresh technical measures often constrained by airborne capacity. Without sufficient investigation, reliance on additional audit results as a justification for substantial extra capacity may not be warranted. Existing AI-enabled processes can enhance performance by broadening the hybrid exploration of fresh issues.

4. Legitimacy and Governance

The compliance of AI-based tax audits with the rule of law and due process hinges on safeguards against arbitrary decision-making (Rocco, 2022). An element of due process—protection against unreasonable administrative actions—is particularly pertinent when taxing authorities assume significant discretion. Moreover, taxpayers expect tax audits to function within the confines of the rule of law, which extends to both human and automated processes (Larsson, 2019). Governance cannot be enhanced without immediately legitimising tax audits.

Tax systems and practices differ broadly across jurisdictions, and legitimacy has to be interpreted within local contexts. Nevertheless, transparency, explainability, and trust are critical features underpinning the legitimacy of algorithmic decision-making. Disclosures regarding the outputs of AI-based audits and the reasons behind them are necessary to sustain confidence in both governance and instruments. Likewise, accountability structures, recourse opportunities, and independent oversight that monitoring logs spanning each audit remain crucial.

4.1. Rule of Law and Due Process

Tax authority audit practices remain a core enforcement tool for legal tax compliance. AI tax-audit tools can enable speedy, efficient, and transparent processing and taxpayer compliance while protecting taxpayer rights. Possible governance and compliance barriers to the AI tax-audit tools are reviewed. The rule of law, necessary for the legitimacy of tax administration, is examined together with accountability and due-process issues related to decisions made by tax authorities and tax-compliance AI tools. Many relevant safeguards exist in government and tax-administration operational frameworks. AI tax tools are examined from a legal and economic perspective, focusing on efficiency and legitimacy (Dymitruk, 2019).

4.2. Transparency, Explainability, and Trust

Artificial Intelligence (AI) tools have the potential to provide tax administrations — in developing and high-income countries alike — with far-reaching productivity gains and welfare-improving economic efficiencies. An increase in the efficiency and effectiveness of tax audits reduces taxpayer compliance burdens, while also contributing to governments' fiscal sustainability. 4.4. Transparency, Explainability, and Trust Transparency, explainability, and trust are essential prerequisites for the successful deployment of AI tools in tax audits (Larsson, 2019). The use of AI and ML systems by tax authorities has raised debates about the requirements for transparency, especially regarding the appropriateness of systems that lack such features. To promote public confidence and secure legitimacy, tax administrations should consider the need for timely and clear descriptive disclosure of outputs and rationale whenever AI/ML tools are employed in tax audits or other operations. Transparency, explainability, and trust are essential prerequisites for the successful deployment of AI tools in tax audits. The use of such systems by tax authorities has raised debates about the requirements for transparency, particularly regarding the appropriateness of systems that lack such features. To promote public confidence and secure legitimacy, tax administrations should consider the need for timely and clear descriptive disclosure of outputs and rationale whenever AI/ML tools are employed in tax audits or other operations.

4.3. Accountability and Redress Mechanisms

The inclusion of AI significantly enhances the ability to trace decisions that require oversight and verification. Audit trails detailing actions taken, logic employed, and involved individuals provide clarity on the determinations made by AI-supported processes. Under EU regulations, such as the General Data Protection Regulation (GDPR) 2016/679 and the Artificial Intelligence Act Proposal 2021/0106(COD), comprehensive transparency, traceability, and accountability requirements govern specific automated decisions, stressing the need for these structures in tax audits. While AI cannot fully eliminate human discretion, the extent to which it introduces new choice elements, thereby raising accountability needs, varies among deployment scenarios.

AI integration can still enhance accountability, even with purely automated operations. Processes can be designed to leave certain decisions unaddressed, with the determination of which elements remain under discretion entrusted to human examiners. Initial, singular, or uniform audit approaches may exempt audits from policy decisions, and clear guidelines on the treatment of previously audited individuals or entities can mitigate accountability pressures.

5. Privacy, Data Protection, and Ethical Considerations

AI's integration into everyday life raises significant concerns about privacy, data protection, and ethical considerations. Such concerns lead to demands for ethically responsible handling of large data sets, a need amplified by scandals like the NSA disclosures and the Cambridge Analytica affair. As a result, regulatory frameworks such as the General Data Protection Regulation (GDPR) aim to establish global data handling standards, although questions remain about how some AI applications—including machine learning—can develop in full compliance with these rules (Kieslich et al., 2021). Furthermore, data science, big data, and digital technologies, including algorithms and Artificial Intelligent (AI), add yet another layer of complexity. Algorithmic bias results from flawed training data, poor design, or misleading research questions, and biased AI systems can discriminate against protected groups (Murdoch, 2021).

First and foremost, tax authorities must ensure the quality of sensitized information used as factual bases in their mathematical algorithms.

Tax inspectors will be unable to mitigate pervasive imperfections embedded in data collection programs. The authenticity and/or legitimacy of such information--e.g., data provenance or data genealogy/questions regarding the data's origin--also exists. Secondly, an assessment must consider privacy and data protection as it pertains to the laws of specific jurisdictions; tax authorities operate in a highly regulated and monitored environment that warrants adherence to these local considerations. Proper checks and infrastructures exist within public administration institutions in various countries to identify the proportionality and necessity of establishing such functionalities while determining the legal grounds thus enabling added benefits from Artificial Intelligent (AI) systems. Such approaches shall reduce prevalent operational risks.

5.1. Data Quality and Security

Data quality and security constitute crucial determinants for Artificial Intelligence (AI) system functionality and efficiency (Budach et al., 2022). Implementing a system with low-quality data incurs the high risk that unreliable results, model predictions, and decisions may undermine public confidence in AI technology. The quality of both training (historical) and operational (real-time) data defines the level of AI deployment (see 2.1). Tax data must comply with international standards set by the Global Forum on Transparency and Exchange of Information for Tax Purposes. Because untethered "self-learning" processes introduce the potential for unforeseen model evolution, quality safeguards should control both data provenance and data processing (see 1.2). Because AI implementation exposes taxpayers to heightened surveillance, the legitimacy of tax governance depends critically on precisely calibrating the extent of surveillance (see 5.2).

5.2. Surveillance Risks and Proportionality

The reliance on AI in tax auditing raises significant data security and privacy concerns. A classification model developed by the U.S. Internal Revenue Service (IRS) for predicting taxpayer compliance and selecting audit candidates serves as a cautionary example. The model, deemed a landmark achievement by the IRS, was never deployed because the agency could not ensure the necessary safeguards against wrongful intrusion into taxpayers' lives (Black et al., 2022). All technological advancements, including the use of AI in tax systems, create new risks. Consequently, deploying AI at all without counterbalancing safeguards is neither helpful nor wise. Nothing should be automated when the underlying processes cannot be made secure and legitimate.

The potential distributional effects of AI in the tax domain can be framed legally as a matter of privacy and non-discrimination. Even when free of bias in a statistical sense, data-driven techniques are capricious when underpinned by dubious data. Decisions made on non-public information for illicit or personal gain are unacceptable, and safeguards against such breaches are essential.

5.3. Bias, Fairness, and Discrimination Avoidance

Deploying artificial intelligence (AI) into tax administration raises concerns surrounding fairness, bias, and discrimination. National tax authorities consider two main aspects in ensuring that the implementation of machine learning algorithms in tax audits promotes fairness. First, relevant fairness checks are carried out to limit bias against taxpayers in selecting them for audit and ensure the auditing process is even-handed. Second, impact assessments examine the influence of auditing algorithms on particular taxpayer segments to determine whether machine-learning tax auditing promotes discrimination against certain socioeconomic or demographic groups.

Independent fairness assessments on algorithms employed in a country's tax audits need to be conducted in addition to automatically

implementing various existing fairness checks on the training data and those trained to select audits. Tax authorities analyze the extent to which tax audits prevent firms from evading the corporate income tax and crowd out the most productive enterprises (Black et al., 2022). These considerations are utterly critical in nations like Australia because tax auditing is a prerogative that establishes taxpayer–government relations within society to promote social justice in line with the concepts of economic efficiency and the rule of law.

Governments further examine whether the precision of tax auditing campaigns consequently peaks the concentration of audits onto the most productive firms or toward larger, multinationals' offshore income. In contrast to the corporate domain, tax authorities in many jurisdictions express deep apprehensions about the fairness of machine-learning models underpinning individual income tax filing and audit selection programs. Because audit selection essentially links the government's chance of detecting fraud to taxpayers' societal costs when bypassing valid tax obligations, substantial fairness concerns arise around auditing models considering income as a proxy for legal liability. More accurate models, for instance, may just exacerbate income fairness issues; implementing off-the-shelf fairness solutions to governance problems is typically ill-suited; and structural modeling modifications—such as adopting regression as opposed to binary targeting—enhance the fairness of outcomes attained through machine-learning modeling.

6. Legal Frameworks and Compliance Implications

For tax governance to be effective, tax administrations need specific arrangements and their own norms and procedures that shape how they exercise their powers. AI use must align with these arrangements. In many countries, general taxation and tax administration laws provide the legal framework for how the government levies taxes, conducts audits, and determines how taxpayers can be treated and protected. All procedures affected by the introduction of AI should be clarified, ensuring adherence to these provisions. The Organisation for Economic Co-operation and Development (OECD) underscores the need for tax departments in the coordination of cross-border AI and digital transformation, emphasizing the importance of global interoperability and administrative cooperation in the area of taxation (Larsson, 2019). In addition, many countries possess specific legislative frameworks and standards governing the use of AI in public administration and procurement. Depending on the legal status of tax authorities, these frameworks and standards may cover general impacts at the governance and organizational level and not tax-specific dimensions. Public administration AI standards potentially relevant to tax authorities relate to procurement, auditing, ethics, and security.

6.1. National Tax Law and Administrative Procedure

Artificial Intelligence (AI) raises questions about the legality of its deployment in tax audits. AI underpins applications such as machine learning and robotic process automation capable of varied analyses. These techniques operate alongside tax-analytical, risk-analytics, and administrative processes, making them potentially susceptible to legal scrutiny. Tax law governs the activities of officials and determines the extent of judicial review (J. Kovach, 2015).

AI—defined as narrow, general, or super intelligence—exceeds a schedule of national tax tax-administrative steps. Official processes that a given country mandates before an audit, such as pre-sampling notifications, preliminary assessments, or third-party verification, are legally relevant. When applying AI, tax authorities should not skip, merge, or cancel procedures, only altering the timing.

6.2. International Standards and Cross-Border Tax Cooperation

Cooperation in the realm of effective tax governance increasingly occurs across borders. Criminal investigations into tax fraud and evasion do not stop at national frontiers, nor do checks to ensure compliance with international obligations and treaties. Effective functioning therefore requires a high degree of interoperability between the laws and processes governing tax administrations in different jurisdictions. Interoperability rises to the level of international standards as the respective states involved share a sufficiently high threshold of confidence in each other's tax governance, marking the boundary between formal cooperation and fiscal colonialism where one state, however much it prioritizes the citizen's compliance with tax obligations, determines the rules that ought to govern another jurisdiction's own tax administration (Kayis-Kumar, 2018).

6.3. Standards for AI in Public Administration

The rapid development and deployment of Artificial Intelligence (AI) have increased complexities and efforts to implement a coherent system of regulations and standards of use for an intelligible, aligned, and consistent public administration. AI has the capacity to be able to improve responsiveness, empower citizens, and enhance government decision making by limiting arbitrary judgments (Andrews et al., 2022). Nevertheless, misuse risk remains, along with issues of justice, non-discrimination, and the right to explanation, raising questions about dependency, dehumanization, and appropriateness in operation.

In line with such developments, as well as the broad implementation and exploration of AI applications, an assessment of the technical, methodological, and legal-economic infrastructures within tax administrations where such systems are currently deployed is beneficial. Proposals for a conceptual framework of standards for AI use in Public Administration which intersect with these standards and represent best practices in national settings where public sector AI is actively explored and developed are presented. A non-comprehensive mapping of AI proposals on the use of AI in the public sector is also compiled, encompassing indicative prototypes which pertain to the procurement, auditing, and ethical dimension of AI (Rocco, 2022).

7. Economic Impacts and Jurisdictional Variations

A cost-benefit analysis of integrating AI into tax audits estimates the practical net welfare gain. This analysis includes all relevant costs and benefits associated with the change and captures impacts that fall outside traditional economic assessments (ABRARDI et al., 2019). Protecting tax incomes remains a vital economic concern, safeguarding competition settings and citizens well-being. Tax uses are better financed by more systematic means than by exhaustive tax audits alone. ONDES consult scenarios involve sensitivities on gain levels, allowing them to assess future evolution direction (ablation of certain functionalities, broadening coverage to cover other situations).

Competitive neutrality concerns complexity for public authorities offering tools. Overall, limited foreign firms operate in natural resource readiness, which generates a higher risk of anticompetitive behaviour (specific inquiries by different authorities and higher resource extraction levels). Consideration required depends on migration paths towards separate geographical delineations. Detailed geographical impact appears lower in EU-26 than in Canada case.

Framework dimension and population dimensions indicate whether decreased revenue from oil and gas extraction tax bases will empty some public coffers. Comparative investigation remains sensitive to substance nature and national legal frameworks. Existence of competition policy economic analysis remains

important and widely expressed under academic, public, and competition authorities. Entry and affordability times on three central dimensions represent low competitiveness values, demonstrating all three stage-time periods can finish quickly.

Valid variations among regimes and economies yield contingent macroeconomic and sectorial evolution implications.

7.1. Cost-Benefit Analysis of AI Deployment

Both efficiency and legitimacy are fundamental pillars of good governance (Walz & Firth-Butterfield, 2019). Efficiency encompasses the optimal allocation of productive resources, enabling the maximization of output while minimizing the consumption of inputs. In the tax-domain, efficient governance seeks to minimize compliance risk while safeguarding the uniformity of tax-collection procedures for all taxpayers regardless of business size or sector. Legitimacy is rooted in the rule of law and can be subdivided into four attributes: error avoidance, justification, explanation, and accountability (Black et al., 2022). Error avoidance signals that discriminatory or arbitrary decisions ought to be eradicated via a risk-based approach; justification denotes that government actions must be reasoned and justifiable; explanation implies that the authorities must elucidate the reasoning behind their decisions; and accountability mandates the establishment of mechanisms to ensure the right of review and ascertain those responsible.

AI has shown significant potential to enhance the efficiency of tax governance, enabling governments to better allocate productive resources and/or minimize compliance risk. The efficiency of governance processes is measured by the ratio of throughput—quantity of outputs produced—to workload—total amount of effort consumed to generate the outputs. Throughput and workload can be further decomposed into subprocesses to delineate the respective contribution of each.

AI deployment has the capacity to increase productivity by liberating the workforce from low-value-added document review tasks. The average time allocated to these activities differs across tax examiners—whilst some may devote a mere 10% of their working hours to document review, others may expend up to 90%—and thus the net increase in examiner working hours liberated per audit also varies. In addition, AI a priori tailors a unique risk profile for each case via transaction monitoring based on prior knowledge, thereby determining relevant risk parameters less ad-hoc than previously. Processed outputs, including corresponding risk parameters and rationale, also facilitate taxpayer understanding of the risk-assessment process.

7.2. Competitive Neutrality and Market Effects

Tax audits performed by a national revenue authority often raise concerns among private firms or individuals, including predictability and transparency. The value of revenue lost through unreported taxes muted the elasticity of the demand, and firms grew the market above the value through networking to eliminate information asymmetry. The distribution of free funds by tax entrants against tax-evading retained earnings increased the probability of tax-evading firms to enter the market, competing based on Wasserstein metric, and jurisdictional proximity enabled the expansion of positive regressive trend (ABRARDI et al., 2019). Yet many AI systems offering real-time predictions were not deployed due to implementation challenges and manual inputs limiting the potential of insight generation (Black et al., 2022).

7.3. Variations Across Tax Regimes and Economies

The economic impacts of artificial intelligence (AI) use in tax audits vary according to the prevailing tax regime and overall level of economic development. A preliminary cost-benefit analysis, which highlights expected welfare effects, provides insights into the

differential relevance of selected benefits and possible contingent outcomes. The focus is on the use of AI in tax audits and the consequences of its adoption under various regimes and levels of development. Under centralized tax administration, AI deployment can reduce costs considerably by reallocating auditor resources toward higher-value oversight. The risks of misuse are mitigated by broad consensus regarding the potential audit models and appropriate continuing safeguards in legislation. In some emerging economies, even the widespread deployment of AI packages is unlikely to yield substantial benefits. The technology is not well suited to local realities, and its introduction may exacerbate existing inequities between formal and informal taxpayers. In low-income jurisdictions where straightforward AI-assisted models are feasible, substantial net welfare gains can still be anticipated. The enabling conditions differ substantially from those associated with a comprehensive tax system (Black et al., 2022).

8. Implementation and Risk Management

A phased approach facilitates smooth AI integration into tax-audit processes, minimizing disruption while enabling careful calibration of parameters and performance monitoring. Each stage requires specific governance functions to oversee design, deployment, and assessment in line with defined goals. These activities also generate metrics to gauge resource efficiency, output quality, and compliance with legal and institutional standards.

Under the new paradigm, much of the procedural work associated with opening and rectifying tax audits may shift from routine tasks to supervision of technical operations, freeing human resources for other substantive compliance activities. This transition necessitates comprehensive change management-focused preparation that analyses the workforce composition likely to be affected and devises appropriate adaptation measures. Such measures may encompass targeted training and re-skilling to allow personnel to transition into alternative but related examination functions, along with adjustments to job profiles.

The introduction of AI systems into tax audits engenders new risks connected to data, model, output, and procedure integrity, which may influence efficiency and legitimacy. These hazards, compounded by uncertainties surrounding product maturity and low existing user confidence, necessitate robust auditing mechanisms commensurate with those implemented in other critical domains of public life. Protocols focused on validating underlying data provenance, quantifying exposure to risks, and estimating operational impacts can allow continuous performance adaptation following initial deployment (Walz & Firth-Butterfield, 2019). Such parameters should be monitored regularly and subject to periodic external scrutiny, with accompanying records retained as an additional control safeguard.

8.1. Stages of AI Integration in Tax Audit

Outline the stages involved in integrating AI into tax audits—development, testing, pilot, and full deployment—along with the associated governance milestones and performance indicators. Change management and workforce implications are also considered, including necessary training and the evolution of individual roles.

The integration of artificial intelligence (AI) in tax audits entails several stages: development, testing, piloting, and full deployment, each requiring careful attention to governance milestones and performance indicators.

During the development phase, the focus is on function selection, user involvement, and potential risks. The governor identifies mandated audit cycles and specifies an initial repertoire of functions linked to the audit cycle; these may include risk segmentation, collection of general policy data, and other activities that are predominantly objective, repetitive, and easy to explain. Early involvement of users enables

prompt feedback and ex ante consideration of specific issues; for example, if a risk-segmentation function is prioritized, it is important to determine which inputs will be utilized, how compliance status is defined, and what segmentation categories are contemplated. Specified objectives should clarify expectations regarding productivity, accuracy, complexity, and worth; expected performance benchmarks inform resource evaluation.

The governor also assesses risks throughout the process; oversight safeguards, such as external validation or heightened scrutiny of ambiguous outputs, are earmarked for functions deemed more complex or prone to difficulty. Potential reputational risks—whether damaging publicity, user complaints, or unguided media perception—are catalogued to foster appropriate mitigation strategies.

The testing phase involves quality assurance, effort estimation, and further engagement with user communities. Validated outputs indicative of the function's soundness are collected for examination. Observing the inputs and outputs typically reveals common characteristics or highlights additional strengths and weaknesses. Guidance on acceptable levels of productivity and accuracy is adapted from conventional methodologies; the greater novelty surrounding complexity and worth leads to focused discussions on these criteria.

In the piloting phase, efforts to extend coverage beyond the initial functions—beyond risk segmentation, for example—are weighed against the directness of the potential benefits from the established repertoire. The governor re-establishes the coverage agenda and resumes periodic monitoring of development progress, quality assurance, and user-community consultation.

In the broader context, the impacts of implementing AI in audits extend beyond the collection of statistical data. The emergence of AI functionality necessitates further analysis of workforce implications, stakeholder awareness, and potentially even formal change-management strategies.

The characteristics of the new AI function significantly influence the nature of change management. Certain AI capabilities automate supportive functions that previously required examiner time, allowing organisations to consider the reallocation of those hours to other tasks. Training becomes crucial in these instances, for existing staff may lack experience in the newly designated activities. Other capabilities sufficient to substitute core decisions normally taken by analysts and that consequently eliminate examiner involvement altogether alter the very nature of the audit process, with the pertinent attention shifting instead to senior management and appropriate training on role evolution. (J. Kovach, 2015)

8.2. Change Management and Workforce Implications

Change management will play a critical role in ensuring successful transition to the augmented audit approach. For this reason, effective training, upskilling, and reskilling initiatives should be implemented to equip tax auditors with the necessary capabilities to interact and work with machine-learning tools used in tax auditing. Proper guidance on how jobs and roles are evolving—as well as articulating career pathways for tax auditors—is essential to alleviating concerns about a threat to relevance or employment in the tax profession. The increase in the value-added activities that "AI-less" auditors can pursue, particularly in complex and risky cases, can present opportunities for expanding their influence and footprint in the augmented audit paradigm and further broaden their skills.

8.3. Risk Mitigation, Auditing, and Validation

Tax audits represent a major operational pillar of revenue-maximizing tax authorities worldwide (Black et al., 2022). Capacity constraints force governments to focus their scarce auditing

resources on higher-risk taxpayers and tax returns, as well as select fewer detailed examination areas. Accordingly, tax authorities strive to develop and improve risk indicators such as taxpayer class, tax declaration class, and tax declaration item class to identify non-compliance in their respective tax systems.

The introduction of AI offers innovative avenues to enhance the productivity, effectiveness, and efficiency of tax audits in at least six areas: risk-scoring models, fraud detection, evaluation of non-filing and incorrect-filing risk, evaluation of taxpayer leakage risk, modelling taxpayer behaviour in tax assessments, and the conduct of automated audits. Furthermore, AI deployment can substantially impact high-level governance objectives such as the implementation of dynamic systemic and/programmatic tax policy-governance approaches, extending the benefits of technology advancement to the economy, and stimulating overarching national initiatives like 'smart nation' and 'digitalisation' (Walz & Firth-Butterfield, 2019).

9. Case Studies and Empirical Evidence

Tax administrations in Canada, the Netherlands, and the United States have integrated artificial intelligence (AI) into their tax audit processes to augment human examiners' work and optimize the use of limited resources. Although the precise technological components deployed vary across jurisdictions, tax audits assisted by AI systematically reduce processing times, minimize errors, and improve throughput. The ability of machine-learning models and rule-based systems to segment taxpayers according to compliance risk enables the reallocation of examiner time to high-risk cases, thereby enhancing productivity and deterrence (A. Dubin & L. Wilde, 1987). Automated classification of tax returns further streamlines pre-examination analyses, enabling lower-risk files to be released without examination and expediting the audit of higher-risk returns (Black et al., 2022).

Evidence from these countries illustrates the primary drivers of high performance and the benefits of AI deployment across different tax systems. Key determinants of success include the establishment of a dedicated team to govern the integration of AI within tax audits, the availability of high-quality training datasets, and the adoption of a gradual, incremental approach to implementation. These insights yield practical recommendations for jurisdictions seeking to introduce or enhance AI in their audit processes, as well as flag critical warning signs exemplified by less successful AI initiatives.

9.1. Jurisdictional Experiences and Outcomes

Despite widespread public discourse surrounding the implementation of artificial intelligence in tax auditing, rigorous scrutiny of domestic and international case studies remains scant. Investigating the experiences of multiple jurisdictions that have adopted or trialed such systems reveals divergent outcomes and impact on tax administration, shaped fundamentally by context, including the extent of wider public sector reform, prevailing political ideology regarding state intervention in economic affairs, and the historical evolution of tax policy. Machine learning-assisted tax auditing has been piloted at the local level in Germany since 2018, while Italy is trialing a similar system at the national level. Pending EU Commission proposals on AI also promise to alter the supervisory landscape for national tax administrations across European Union member states. In the Americas, Chile, Mexico, and Peru have introduced machine learning tools to their tax regimes, while the Multilateral Convention for the Implementation of Measures Related to the BEPS Action Plan fosters cross-border implementation of similar systems across its 149 signatory jurisdictions.

The nature of the administrative apparatus and relevant case law in these jurisdictions fundamentally influences the degree of efficiency, complexity, legitimacy, and ultimate approbation enjoyed by respective systems. The

tax administrative apparatus in Canada was established with an explicit emphasis on efficiency through conducive audit policies and risk segmentation, thereby reducing taxpayer burdens across all steps. Tax audits are understood to encompass both the initial engagement of the taxpayer and the conduct of a formal audit throughout data collection and examination. Statutory provisions and case law across Canada also underscore the fundamental importance of due process. By contrast, the analogue case of German machine learning systems is constantly subject to governmental and legislative oversight and intervention chiefly concerned with improving compliance across both direct and indirect taxes, thereby inducing lengthy and repetitive proceedings.

9.2. Lessons from Failures and Successes

A salient finding from the experience in various jurisdictions is the importance of evaluating existing AI solutions in order to assess their effectiveness and adaptability to local circumstances. In Sweden, for example, the tax authority adopted an Enhanced Risk Assessment Model achieved a high degree of efficiency in tax audits without the need to change any conventional tax-audit processes, such as reviewing additional transaction data, handling very specific transactions, or developing enhanced explanations of output decisions. The experiment of nationwide tax audits based on extensive evaluation and benchmarking using input-output ratios among jurisdictions indicated little potential for improving the existing Swedish tax audit system and existing requirements continued to be applicable (Black et al., 2022). On the other hand, following the review and evaluation of the previously installed Decision Support Systems on Tax Auditing in Thailand, the decision to discontinue the use of these systems and to develop new AI solutions was considered necessary, since the existing local environment had changed and no longer matched the preconditions of the Decision Support System.

10. Policy Recommendations and Future Outlook

To enhance efficiency and legitimacy in tax audits, various governance, technical, and legal steps are proposed. Establishing a transparent and accountable AI deployment strategy in tax audits, accompanied by evidence-based investigations into economic effects, can contribute significantly to policy development in many jurisdictions.

The potential of AI and algorithmic tools to disrupt and reform governance, tax administration, and tax audit processes is substantial. Such platforms offer the capability to expand and improve personal incomes and consumption and influence how society, firms, actors, and the government organize, invest, and carry out activities. Tax systems are critical for equitable income and wealth distribution, corruption reduction, sustaining public goods, and combating climate change. Strengthening the role of the tax system hence, remains pivotal for overarching growth, economic recovery, organizational development, and better governance. AI can unlock unprecedented economic growth by associating tax audit processes with cloud technologies, big data infrastructures, mobility, and other AI models, e.g. smart contracts, open and trusted sourcing, NLP and NLU, prediction models, digital doubles, virtual worlds, and crypto.

Tax auditing methods employing AI are expected to undergo substantial evolution. Traditional auditing focuses on identifying economic drivers leading to a tax return. Computing advances offer an opportunity to state the likelihood of compliance or not, given a tax return. AI can, thus, predict compliance and filter out taxpayers expected to comply, freeing human tax enforcement resources for firms/entities with a higher probablility of non-compliance (Rocco, 2022).

11. Conclusion

Tax administrations increasingly experiment with artificial intelligence (AI) to meet growing demands for effective revenue collection. A preliminary analysis, situated within a legal–economic framework, indicates that AI can enhance audit functions in several ways. Tax authorities deploy AI-enabled tools for data extraction, risk assessment, and workflow management. All countries and jurisdictions with which the Organisation for Economic Co-operation and Development conducts economic surveys now use electronic tax returns, while sixty-three others also employ AI-assisted tools across various processes (J. Kovach, 2015). The pace of change is expected to accelerate.

The overarching research question is: To what extent can AI boost the efficiency and legitimacy of tax audits? The objective is to elucidate the efficiency and legitimacy implications of AI-based tax-audit practices by analysing data from a comparable jurisdiction. A legal–economic lens is employed to highlight efficiency gains related to productivity, error reduction, risk segmentation, and throughput; to evaluate conformity with principles of legality and due process; and to assess the implications for legislative, executive, and resource allocation. The findings are anticipated to interest finance ministries, tax administrators, and international agencies.

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