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Chapter 12: Navigating the future of taxation and public finance in the age of artificial intelligence and analytics

12.1 Introduction

The 21st century presents a unique set of challenges for policymakers. Among these are the consequences of globalization, rising public debt levels, demographic changes, poverty and inequality, climate change, and the discontent with the political class. These challenges are further complicated by the rapidly shifting technological landscape, which has made Artificial Intelligence (AI) and the use of analytics prominent areas of interest across all forms of private- and public-sector activity. Public finance and the study of taxation balance both theory and practice by examining how governments raise money to fund the activities that the market cannot. There is little doubt that governments will be faced with greater spending needs and limited abilities to raise revenue in the future. Thus, it is possible that some areas of taxation will be of increasing importance, such as value-added taxation, while corporate income tax revenues will be unable to contribute meaningfully to government coffers (Brynjolfsson & McAfee, 2020; Gupta & Gupta, Lee, 2021 & 2023 Johnson).

Understanding and expanding the understanding of the role of taxation is vital in navigating these challenges. Specifically, given the unique challenges posed by AI and analytics, this requires understanding how technology interacts with, and may contribute to, addressing the challenges to taxation and public finance of the 21st century. There has been considerable research and debate concerning the productivity allure of the digital economy, particularly the degree to which these emerging industries are relatively less productive than those in the industrial economy. Much of the attention has focused on whether the new industries are able to augment the productivity of the established industrial economy. Our focus, however, is not on the elusive relationship between taxation and productivity, or even the relationship between the allocation of resources in

the economy and the level of productivity, but rather an analysis of how the revenue-raising functions of taxation may change in a world dominated by AI optimal allocation of tasks (Miller & Bell, 2022; Wang, 2024).

12.1.1. Overview of Taxation Fundamentals

Taxes are the price we pay for civilization, and funding the operations of government is the preeminent role of public finance. In critical areas such as education, health and welfare, security, defense and the courts, and infrastructure, only the government can provide the level of services characteristic of civilization. Government finances that spending with tax revenues collected from individuals and businesses. Taxes fall broadly into two categories: income taxes and consumption taxes. Income taxes are based on taxpayers' incomes and are paid annually based on how much income is received in the prior calendar year. Consumption taxes are also known as sales taxes and are assessed on purchases made throughout the year, and collected at the point of sale. Every civilized nation uses both forms of taxation to redistribute income from wealthy citizens with excess resources to support those in need.

All governments compete with one another for tax revenues, which is why country-specific and local rates of taxation can differ dramatically. Multinational companies are especially sensitive to those tax rates, which is why many of them have moved some of their operations to countries where the corporate tax rate is lower. But taxation cannot and should not only focus on raising revenue, that revenue must be raised in an equitable manner. Higher-income taxpayers should pay taxes at higher overall rates than lower-income taxpayers, and businesses should be taxed on their profits regardless of where those profits are earned. A goal of good tax policy that is not often achieved in practice is to identify and assess federal and state taxes that are unrelated entirely to the ability to pay. These taxes cause distortions that must be considered in evaluating the effect of a tax. For example, employers are likely to hire fewer workers if the tax that they pay on their employees exceeds a more equitable level. And at some levels, the sales tax distorts consumption levels.

12.2. The Evolution of Taxation

Navigating the Future of Taxation and Public Finance in the Age of Artificial Intelligence and Analytics discusses the challenges of the current transition from the industrial society based on minor technological development to the information and AI society heavily affected by the 4th Industrial Revolution, creating the need for a new paradigm. The scope and aim of the current work is to identify concrete areas of tax reform and public finance development with the use of advanced technology with special

attention to economic structural changes and their reflection as revenues of public budgets. This introduction section discusses the challenges and consequences of the ongoing global transition from an industrial society to the emerging addressable paradigm where a new technological, informational, digital, and AI development providing new economic growth is reversed by periodic crises of overproduction with information and data overflow. The first phase of the digital economy, reflected mainly in consumption goods becoming commodities, is related to the crisis of technological development in the first quarter of the twentieth-first century. Market and economic models based on consumption become invalid in the situation of oversaturation with AI technologies covering all economic activities from production to marketing, transportation, treatment, environmental protection. Inflation ceases to be a main indicator of economic stability. There is a new value called Data Value. Resource wars become technological activities, including both the creation of Data, AI, and robotics technologies, and their appropriation. Under these conditions, traditional models of taxation audit and public finance become invalid. They can be just improved with AI without searching for new paradigms. In this section, we try to outline the way towards a new taxation and public finance model.

Fig 12 . 1 : Artificial Intelligence and Its Transformative Impact on Public Finance and Taxation

12.2.1. Historical Perspectives on Taxation Reforms

No civilization and government can function without the provision of security, defense and a judicial system. The provision of such services with generally hated taxes has been a dilemma for all governments. A simple resolution of the issue is, however, not possible.

According to a simple view of governance, called the public goods approach to public finance, governments are providers of public goods like justice, security and services like infrastructure, health, education etc. The idea is quite simple. When individuals fight for their own interest, some of their activities have effects on others without these effects being compensated. It is the government's task to resolve these situations. Governments smooth the inequalities inherent in the market. However, it is not easy to determine what activities and goods have externalities, the degree of such externalities, and to ensure that the taxes imposed compensate for them.

Yet, states have gone about funding their operations by taxing the incomes and expenditures of their citizens. Compulsory contributions to the finances of the public sector are the price citizens pay for civilized life. Taxation is indispensable and permanent. Fiscal policy carries a load of automatic fluctuations and cyclic policies. Fiscal policy can thus reduce fluctuations. Fiscal policy feeds the negative externalities created by the market. The more the government wants to reduce these, the more the state's apparatus must expand. The size of the government inevitably comes into conflict with the citizen’s preference for minimum government. The opposition forces the government to change its taxing structure.

12.3. Current Trends in Public Finance

Public finance represents a sector of economic policy designed to optimize the resources allocation of both the private and collective sectors. It should guarantee an efficient transition towards development without ruling out sustainable growth. In its dynamic facet, it is unavoidably linked to changes in economic structure, population, technology, and in the institutions that form the general community. In the static aspect, it relates to reviewing the existing vertical and horizontal distributive mechanisms. Europe is increasingly active concerning the worldwide tax policies convergence. The United States impulsed some important initiatives on income taxation and corporate relationships. The European Union advanced towards a common body of rules on several aspects of fiscal coordination. Interest is not only focused on tax policy. Developments regarding the adjustment of the public expenditures volume and allocation also ought to be planned and discussed. This aspect has been lately considered in the liberal international sage, who emphasize the need to restrict this expenditure. Attempts have been made to define rational rules to limit the growth of public expenditures, considered to be the source of inefficiency, its future growth being associated with economic growth and the wellbeing of the market and effective allocators being disfavored. At a more advanced stage of development, the bulk of the expenditure is stated to consist in transfers and involuntary payments, these being more dependent on the expansions and

economic cycles. However, the theory is not settled as to how transfer functions ought to be defined. These mainly refer to the welfare effects.

12.3.1. Examining Contemporary Developments in Fiscal Policy

In recent years, political and economic turbulence in many developed economies — including and especially the United States — has revivified debates about how best to use taxation and government spending to support internal functions, and external relations and aspirations. The role of public finance in addressing crises of various sorts, and in implementing policy responses to those crises, is high on the agenda in the study of public finance. Echoing influential works by earlier scholars, social scientists responding to contemporary crises and considering possible policy responses have called for greater attention to factors including creative destruction and technological change; human capital accumulation and development; violence and social disorder; collective action; internal and international migration; social stability and stratification; the political economy of social contract; and use of policy to support entrepreneurship and to influence the level and distribution of savings — to mention just a few. Such concerns are appropriate for consideration in the study of public finance, and address connections to other aspects of the economy and conditions facing society more generally, especially regarding the future.

The challenges the economy faces in the medium- and long-term raise questions that link public finance to other dimensions of economic activity and policy more strongly than is often the case. The ecological and climate base of the factors that sustain growth; patterns of technology and geography that determine the process of creative destruction; human robots and labor-saving technologies; the mean and distribution of labor income; the level of capitalization and investment, and of consumption; the disparities — and possible conflicts — between those and wavefront sectors that are driving growth rejoining; and the sustainability — the growth criterion for fiscal policy — of public and private saving are mutual linkages all likely to affect relations among taxes, spending, and deficits and the prospects for linking the three to economic growth. In short, tax policy, government spending, and the fiscal balance no longer need to rest on historical inheritance, but can be refashioned and innovated to address a changed economic and social landscape.

12.4. The Role of Artificial Intelligence in Taxation

To conclude this chapter, we will summarize the relevance of intelligent technologies in the different areas of the world of taxation and public finance. It is inescapable that the influence of technology in every aspect of society is increasingly integrated into every

social aspect that we cannot ignore. The task of practitioners, academics, and regulators, among many others, is to keep our disciplines anchored to the new technological era in which we live. Although practically every area of taxation will suffer major changes, the arrival of smart technologies such as machine learning, deep learning, and artificial intelligence will represent a unique inflection point. Whether it be due to the high capacity they have for automatic management of big data demands and the automation of highly complex processes.

Artificial Intelligence is a fundamental introject of future societal transformations. No transformation in the history of humanity as a whole has taken place without causing abrupt displacements of the labor market. Neither will the Fourth Industrial Revolution, but within this framework, extensive opportunities for growth will also open for the understanding of the human condition and numerous possibilities for implementation. At the moment, considerable progress is taking place using aspects of AI, machine learning, and deep learning in the field of taxation in both compliance and tax administration. Given this focus, we will explore the basic aspects of how AI is penetrating into these two main areas of taxation. Subsequently, we will briefly review the basic aspects of the remaining domains of taxation.

12.4.1. AI in Tax Compliance

While the application of AI in tax compliance seems to be yet in its infancy, it seems that we could be a witness to exponential growth in its application in the not-too-distant future, as a growing catalogue of tax compliance issues come to be understood by software developers as being capable of AI automation, as the process lives from commercial massification. In fact, in some domains, AI evaluators have already shown more than satisfactory results. Generating compliance checklists, basic tax computations, and standard form filling have been successfully deployed. Additionally, setting a dialogue with a cognitive tax assistant, acting as a tailored expert, could make it possible to efficiently answer certain taxpayer questions. Tradition and routine may bias the taxpayer, whose costs and numbers are fundamentally human, to overlook the most effective tool available. Of course, many other tools have been developed based on traditional algorithms. However, traditional algorithm tools are in light of achieving results when standard tax questions are being implemented and used.

International jury and developers of the new generative AI craze apps have warned that the apps are based on a cohort of traditional algorithms, traditional algorithms – generative AI being applied to vast amounts of data conglomerates. Going further, some AI tools have shown less satisfactory results in tax computation and, so to speak, tax advisory or consultancy. Thus, far jurisdictional offices have already warned – and certain of their industry clients consulted – about the uncapped use of generative tax AI

tools for developing compliance document results. Despite the satisfactory quality of the wordings and logics deployed, these types of AI tools would be unable to properly clear compliance work from all digital dust, leaving loopholes open or failing to apply certain special provisions, or neglecting obsolescence rules, in tax codes.

12.4.2. AI in Tax Administration

The tax administration's decision to adopt AI for various production functions has not resulted in the same fanfare as that of taxpayers and advisors; their involvement has been sooner tinged with skepticism, trepidation, and even criticism. Some believe that the use of AI will replace human labor and lose some important parts of its core mission. Humans' taxing motives can be beneficial control mechanisms at the tax administration level. Others wonder whether AI can be sufficiently accurate and capable to be reliable and accepted decision-making tools. These concerns have birthed a desire for many politicians, policymakers, and scholars to reserve critical positions for humans so that they can guide or supervise AI in tax administration.

Empirical data are missing that would give answers to research questions such as whether the acting behavior of tax offices has changed due to the implementation of AI, and if so, how far or whether these changes have led to better or worse results for the taxing subjects or tax offices in general. The first applications that have been developed and implemented often pursued only specific goals and it is difficult to derive sweeping recommendations from there. This definitely applies to targeted fraud cases or the prediction of a missing tax return. The first applications to control fraud in an automated way tended to cherry-pick cases; however, these only softly taxi on the tarmac of the airfield. Predicting missing tax returns might or might not be a helpful pre-selection for the officer responsible for checking compliance, thus possibly speeding up work at risk rather than random selection. Lately, and for new groups of taxpayers, there have been more requests to determine forecast cases automatically or to predict accounts that are at higher risk of significant errors. Again, there is no extensive positive testing that this can help to speed up internal compliance checks.

12.5. Data Analytics in Public Finance

The great increase in the volume of data available to the administration has not yet been translated into a similar effect on the government financial activities; however, in the near future, it is likely that the impact of the large-scale analytical capacity that has emerged recently will spread across the whole of public finance. Public finance systems are built around an abundance of rules, parameters and specifications that are cross-related, with little or no immediacy regarding the flows that are monitored. For this

reason, these sectors have developed a relatively poor algorithmic interaction with automated functional operations based on the increasing computational capacity available in picking up simple rules for simple relations, central to the interaction between input, process, output. Therefore, the development of large-scale analytics is expected in the near future to penetrate even these functions. Hence, potentially all the phases of the life cycle of public finance can be and ought to be radically changed by putting together the algorithms capable of taking into better consideration the specificity of public finance and the tremendous greater availability of data, along with the recently-acquired capacity for inventorying its large variety.

In recent years, we have assisted at the introduction of taxation policies and measures of some rudimentary forms of data analytics. These are steps that, already in the short term, have profoundly modified information at the command of the offices in relation to taxpayer behavior, and have thus enabled the prediction of structurally lasting changes in tax revenues. These steps of improvement seem to be taking place, with guidance, in particular in the United Kingdom, where – among the various initiatives in this direction implemented by the Revenue and Customs – the plan for the introduction of the Making Tax Digital project for businesses, self-employed persons, and landlords is now widely known.

12.5.1. Big Data and Taxation

Tax administrations are not immune to the data revolution; they have been deeply transformed in their functioning and modalities by new technologies which have also affected the way taxpayers do business. We now talk of Big Data for tax administration, or BDT, to refer to the new potential that comes from the development of new techniques, tools, and platforms for the collection, storage, organization, and elaboration of a huge amount of new data coming either from traditional sources or from new nontraditional sources, such as data automatically collected or by data volunteered by taxpayers.

Big Data has opened gigantic opportunities for tax authorities, to fight tax fraud, tax avoidance, and corruption, to minimize the compliance burden, to enhance policy-making, and to re-engineer their organization, work, and processes. BDT is changing the administration of taxation for many reasons: the richness of non-traditional data available; the continual and automatic flow of data that can be exploited in real time, allowing for automatic decision-taking or, at least, automatic warning of the tax authority about deviations; the possibility for tax authorities to put them in relation with traditional data easily and at low costs; the technological advantages that come from combining the Big Data technologies to traditional data sources. The future will tell us to which extent

tax administrations are prepared for these challenges and how they will be able to reengineer their structures, objectives, and activities.

12.5.2. Predictive Analytics for Revenue Forecasting

Predictive models for economic forecasting, particularly revenue forecasting, typically rely heavily on time series or cross-sectional data. By modeling how some economic or financial figure ("the dependent variable") varies with respect to some other figure ("the independent variable"), historical fluctuations can then be extrapolated to forecast the path of the first figure based on expected trends in the second figure. The independent variable is then exogenously defined. In a revenue forecasting example, budget analysts might try to forecast how much revenue will be received from the tax on the last foregone dollar of income ("the dependent variable") by modeling how that interacts with various projected measures of the overall economy, such as GDP ("the independent variable"). In recent years, however, this traditional way of forecasting has been augmented with increasingly sophisticated statistical methods that incorporate more microeconomic data on, for example, employment, wages, and the demographics of taxpayers. Using that data, analysts can build predictive models that forecast, at a more granular level (for example, income and other features of individual taxpayers or households), the set of revenues affected by public policy decisions. From this cache, the broader forecasts (the nationally-aggregated revenue schedules) can then be constructed. This augmented approach is preferred because at this level of granularity the revenue generating activities of taxpayers tend to differ widely in both their nature and elasticities, and considerable "noise" exists in forecast errors derived from less granular models that pool taxpayers into a common analysis.

12.6. Challenges of AI and Analytics in Tax Systems

The transformation of taxation and public finance functions by analytics and artificial intelligence (AI) is emerging rapidly through the digitalization of government – the migration of government services and information from the physical realm to the digital realm. Such change also requires other major innovations, including the construction of an in-house capacity for data analytics, enhanced analytic capability for senior policymakers in all areas of taxation and public finance, that is governance, revenue generation, and expenditure management, and an understanding of what predictive and prescriptive analytics are and how they could, and should not, be applied to taxation and public finance activities. Such developments could make government services more effective and efficient, as well as generating revenue and managing public spending. However, this sort of progress requires developing a digital relationship between

taxpayers or citizens and the state, which raises potential tensions in the form of various privacy and security concerns.

Concerns about the intrusion of government into their private lives are cited by citizens as one of the most significant impediments to the expansion of online services. The government must take every precaution to ensure that the security of taxpayers and public finances is not compromised. There are three types of risks involved: the risk of sensitive private information about taxpayers or citizens being exposed by a third party in the course of using analytics services; the risk of sensitive private information about a taxpayer or citizen being disclosed by government because of questions related to anonymity and confidentiality; and the risk that the results of the analysis lead to unfair or biased government action against specific taxpayers or groups of taxpayers. The first risk is a data security risk. The other two are risks of privacy violations and discrimination.

Fig 12 . 2 : AI and Analytics in Tax Systems

12.6.1. Data Privacy and Security

As tax authorities and governments increasingly adopt Artificial Intelligence and Advanced Analytics techniques to meet their objectives more effectively and efficiently, novel issues have begun to emerge with the application of these technologies. The challenges include, but are not limited to, data privacy and security; bias in AI algorithms; the right to explainability; ethical, algorithmic, and social issues, including theft of Intellectual Property by adversarial AI; and the emergence of a new taxonomy with the increasing reliance of the tax ecosystem on technology.

The protection of privacy is rooted in the recognition that there exists a domain of personal decision-making, an intimate realm of subjective choice so fundamental to an individual's dignity and autonomy that we can draw a veil of confidentiality around it. Privacy entails both the protection of information from being disclosed to third parties, which is known as secrecy or confidentiality, and the right to determine when, how much, and for what purposes information about oneself is disclosed to others. Confidentiality and secrecy protections only apply to the government, while the ability to control the flow of disclosed information applies to the private sector and other entities, both governmental and non-governmental. When individuals know that their actions can be monitored in a constant and comprehensive manner, the possibility for self-determination is diminished. Public attitudes concerning the desirability of tax compliance would seem to dictate that to some degree, individuals need to believe that they can make personal choices free from external scrutiny or undue influence.

12.6.2. Bias in AI Algorithms

Due to the objective data-driven nature of AI, many incorrectly believe that AI can make decisions based on real events without being biased. However, AI algorithms make predictions based on the data these algorithms are trained on, i.e., the data exposes the algorithm to certain characteristics that must be considered in statistical modeling. Hence, if the training dataset is biased and does not reflect the entire population, the predictions made by the model will also be biased. For instance, if the training dataset contains a disproportionate amount of certain ethnicities or sex, the model's predictions may be biased against these groups in the future. Algorithmic bias can occur in a multitude of ways. It can be as obvious as digitally altering someone's photo to strengthen the effect of dramatic features and increase its chance of success in recruiting models, or it can be as subtle as associating model selection with unpaid time or work-off abstaining from their study. The most addressed and tested models are related to facial recognition but are also present in other AI systems utilized today. Models that have been tested, shown to be ineffective, and basically ruled out include models recognizing transgender and women. In addition, AI algorithms are almost always only correct about 60% of the time. And if this number is deemed insufficient for human work, why should we find it enough to enable demotion selection?

12.7. International Perspectives on AI in Taxation

Research on the use of AI in tax and public finance by countries other than the United States is still in its early stages. Most articles focus on benefits. They often take the view that, since AI is available, it will be adopted everywhere; and therefore what really

matters is comparing the level or pace of adoption, rather than assessing the relative benefits and downsides of adopting or delaying adoption. Some discussions highlight AI in the harmonized tax and VAT systems of Spain and through the European Union – respectively sharing borders and belonging to an overall union. Another analysis discusses AI using Nepal as an example, finding that “Adoption of AI is an inevitable decision for tax administrators in order to enhance its collection capacity and improve taxpayers compliance.” It is noted that “Many tax administrations around the world have begun to develop capabilities to deploy AI-based solutions, or are exploring external technology partners to fill the gaps.”

Several authors examine AI in smaller countries. One finds that “Estonia is one of the pioneering countries in public sector automation by using e-solutions, smart procedures and AI.” During the pandemic “Fiscal authorities in … Latvia and Estonia … have been actively exploring AI for tax policy and administrative purposes. In Latvia, the focus has been on developing a predictive analytics capability to understand taxpayer behavior, while Estonia is using its ‘Chatbot’ solution to better engage with taxpayers…” Excessive speed is not what most of us would advocate. The potential of AI in tax policy is in the stage of early investment, yet to be fully fleshed out. Many developing countries are still at a point where, not only are few governments actively using AI in tax policy, but few companies even have the computerized records necessary to allow such reasonably competent use.

12.7.1. Comparative Analysis of Global Practices

Recent research shows that different countries exhibit distinct approaches when it comes to the adoption of AI in tax. We group these approaches into three types: "blockers," "facilitators," and "experimentation." Researchers identified 14 countries as "blockers," including Belgium, Greece, Hungary, Japan, and Sweden. "Blockers" acknowledge the potential of tax compliance AI to disrupt current tax systems, but want to mitigate that risk. Twenty-three countries are "facilitators," such as Australia, Canada, France, Germany, India, Italy, South Korea, the Netherlands, Singapore, and Spain, who actively promote the use of AI tools for automating and streamlining tax compliance processes, but are much less ambitious than the "experimenting" countries. Four countries are classified as "experimenting" with AI in tax: China, Russia, the UK, and the USA. Seen as "experimenting," these four countries are leading the conversation about the potential of AI to change tax compliance services, and conduct research into creating tax compliance AI tools. In contrast to "facilitators," who are invested in specific types of AI that promote greater auditing, they seek to build AI that specializes in automating strategic tasks.

Tax policy remains a pragmatic effort aimed at solving concrete and immediate problems for which AI can provide a solution. Other countries consider the financial aspects of expanding AI in taxation even further. One idea put forward by many of them is a central and accessible repository of sales data to which all countries could refer to calculate sales tax, import tax, VAT, excise, and corporate profit tax of an organization performing international trade. For many countries, VAT is the second most important source of government revenue after income tax, and forming the requested repository is at the heart of their current activities to optimize VAT collection. The French VAT agency states that it collects 88% of potential rent, while the figure is only 64% in Hungary, whose VAT is 27%.

12.7.2. International Tax Compliance and AI

International tax compliance has always been a specialist area of domestic tax administrations through the use of double-tax treaties with agreements for the exchange of information and coordination assistance across nations. There is little assistance or coordination for the value-added taxes that have become essential in economic life in many jurisdictions through the easy, widespread export of services. A notable area for VAT compliance and enforcement is in the EU where a centralised admin system is being developed. With the immense movements of goods and services via the Internet, many governments will continue to ramp up efforts to ensure that the correct amounts of tax are being collected on the transactions, particularly on e-commerce.

AI and machine learning are enabling tax administrations and other public bodies to implement their compliance mandate with much greater precision. With the availability of massive amounts of data, AI and ML can distill down and use the data to identify areas of risk for non-compliance. The innovation of such tools and services at the disposal of tax administrations as well as other public administrative agencies will not only enhance compliance by identifying high-risk individuals and entities for auditing or investigation but will also make the process more efficient by expanding the number of small- to medium-sized enterprises and other taxpayers audited thereby increasing the overall tax compliance of these small- to medium-sized enterprises and other taxpayers. From a result-oriented perspective, the end result is increased tax revenue which could then be deployed to support the country’s economy and constituents.

12.8. The Future of Tax Policy

Tax policy is always about answers to questions. Should we remove inequities or should we reduce distortion? Should we impose costs on the consumption of road use? Should we tax consumption or tax production or tax net income or tax wealth? Whatever the

answers today concerning the needs of making tax policy we should factor into these three words: Artificial Intelligence and Analytics. We need to think hard about policy implications, practical implications before we adapt tax codes for AI. In a perfect world of International Corporations, where there are no Wettbewerbsnationern, we could slot AI technologies into existing codes and evaluate tax production or corporate income or net income or consumption of corporate exemptions for AI. With the existence of no such world, AI demands adaptation of tax codes. Do we just destroy jobs by taxing reductions in other labor or imposed costs? If AI is a substitute for laborers who care, what can be expected from the finance of tax policy? What is the cost of keeping the INC in there? Could be anything.

The inefficiencies inherent in the use of existing tax caps make costs and taxes estimable. There are other direct estimates of tax code adaptations for payroll or production or corporate income or wealth taxes. The failure of a recent report to estimate new trends in labor supply for AI advancements makes the implications of tax structures on existing codes unevaluable. Something will happen, it's hard to guess the time. Demands for redistributive wealth taxes or imposed costs for services or support prices for production will be with us. Whatever, expert estimates of economic activity and the results will be studied in cryo-cabinets by the next generation as codes to cement the unknown unknowns surrounding tax policy forever.

12.8.1. Adapting Tax Codes for AI

The pace of development of large language models, productivity tools, and robotics is breathtaking. Governments' asking for AI to support (or replace) workers begs the question of how the nation states may adjust tax codes to suit this future. The starting point for tax considerations is that the infrastructure presently exists to task AI directly with tasks and contemplating the original investments to task governments to provide target levels of public goods. The future offers the expectation that massive productivity gains will be realized in globally competing firms which, if incorporated in the parent country, will become eligible for taxing. It is further considered that AI will participate with humans in tasking decisions and eventually participate. Major tax changes will be obtained where using AI bumps up productivity. No detailed rules currently exist to govern sales for merchandising through AI agents. An initial regime might impose sales taxes equal to that borne by competing human enterprises.

If a worker's task is substantially assisted by an AI program, she has an aid. Her employer is attempting to augment the worker's labor productivity. If not as treated, much of the income a firm would be expected to transfer to retain a competitive edge will accrue to the firm as net income. Corporations providing tax losses should be taxed to the level of current net income. Rent seeking by providing generated content might be

subject to income tax, as should flow-on passive investors. Examples abound of how to tax the "money" that AI generates. Regulating the use of AI, compliance issues, consequences of mistakes are not yet on the table.

12.8.2. Ethical Considerations in AI Taxation

Ethics can be defined as the collection of values that the individuals of a society adopt to regulate their behavior toward other individuals. And taxes can be understood as the mechanism that societies create to exchange value with those that thrive in it. Hence, the regulation of behavior toward other individuals is the core construct of taxation. Therefore, any asset that intends to influence the regulation of behavior between humans should be subject to tax. Since AI has become a tool that intermediates the interactions between firms and customers, it's hard to react against those companies who evade attributes that connect them with society in which they operate. The sense of violating a preconvened set of behavioral rules linked to some universal values, and the fact of violating or omitting the return to the society in which companies prosper, prohibits individuals from taking action against some global corporations. Those companies should be the ones that give up more value to society in the process of growing and capitalizing. Thus, taxation for AI should be based on establishing ethical AI principles, with ethics as one of the moral values of a society.

Such principles should be the foundation for capitalizing humans in a way that may not be affected by how self-serving businesses behave. Capitalization stems more from AI-related long-term productivity gains than from traditional growth sources such as labor and capital. In this context, the role of the fiscal authorities would not only be to regulate such taxation in a way that ensures the future of society but also to be the promoters of the measures that ensure adherence to such principles. Therefore, the system would work at full capacity for the long-term benefit of society, not only being a distributor of resources failed to adapt but also a guarantee of the failure of those individuals that decide not to participate in the interaction of exchange with the rest of society.

12.9. Public Perception of AI in Taxation

Concerns about negative effects of taxation policy design using AI-stimulated information successes dominated public discussion. Trust in the meritocratic core principles of tax system design such as differentiation, distribution, efficiency and certainty, as well as acceptance of horizontal and vertical equity criterions has been lowered due to the risk of technocratic AI-stimulated decisions. Such tendencies provoke aversion of a loss of power and/or of human being, matter of ethical acceptance of replacing human beings, combined with anxieties regarding the changeover from simple

classical rules to complex algorithms, concerns about the unpredictability of AI, about the equifinality of outputs, about decision bias concerning the algorithm, about manipulating without insight of the process, and about final control authority. As a consequence, public engagement must counteract these fears. Formative engagement based on discourse ethics fosters collective social systems and tax policy visions influencing decision making without the risk of public embarrassment. This can be realized by transforming facts into shared meaning. Domain-specific explanations should entail accounting, but also yield policy relevance, while serving to increase elucidation and eliminating speculation.

Tax systems crucially depend on the trust and cooperation of those who pay, and on the confidentiality of personal data, as well as on experts handling fiscal data. Trust is usually constructed with time-consuming, costly, and multifaceted social processes taking place between private taxpayers and the state, as well as between experts and the state. AI assists time lags by high-pace analysis, as well as secrecy and confidentiality breakage due to centralization of knowledge and decision power. Public engagement strategies must counteract fears of privacy loss, and information closure effects.

12.9.1. Trust in Technology

Tax administrations are increasingly harnessing the potential offered by AI and analytics. Recent advances in generative AI tools may allow for an even greater adoption of these technologies by tax administrations, allowing for improved service delivery, compliance and enforcement activities, and risk assessment, among others. These advances offer new generation tools that have the potential to change the skill sets that tax administrations demand of today and tomorrow. However, for the full potential of generative AI tools to be realised, taxpayers will need to have confidence and trust in these technologies. Trust in AI and technology is anticipated to become a key element for a tax system designed for the future. Security and privacy issues, in particular, will drive taxpayer attitudes. Any risks related to data breaches, or concerns about data privacy, public ire at perceived tech company excesses, as well as non-transparent AI decision-making processes could harm trust in automated services. Ultimately questions about data governance and the ethics involved in employing new technologies to manage tax obligations and taxpayer relationships will loom large. The expansion and deepening of the technology capabilities possessed by tax administrations worldwide raises fundamental questions for the future of indexing and public finance in a rapidly changing environment in which technology plays an increasingly prominent role. How embraced will the use of emerging technologies be by both tax administrations and public opinion – both taxpayers and the taxpaying public? What role does trust in the digitisation processes play? Are the issues around privacy and ethics that surround the use of

technology political rather than economic issues? Given the political pressure that is often exerted on the spending side of public finance, how can the public provide an endorsement in favour of emerging technologies for the collection and allocation of fiscal resources?

12.9.2. Public Engagement Strategies

Artificial intelligence, as applied to the conduct of taxation and public finance functions, tends not to be something the general public engages with on a sustained basis. The operations of the tax collection, security, and auditing functions are generally obscure and periods of interaction with them are time limited and limited in scope, fuelling a general belief that it is unimportant to learn too much about their inner workings. It is largely only those who are fearful of retribution or who are receiving the benefit of returns from the system that have any interest in its operations, and even then it is often the accountants and tax advisors doing the work on behalf of taxpayers that are consulted with respect to any perceived inadequacies or delays in the service received. Further, even when the general public are prompted to consider the work that tax authorities do, their primary perspective is that of a service user rather than the overall impact on society. The perception of some countries that are widely considered to have progressed the farthest toward a strategy of taxpayer services over enforcement-based or collection-based approaches is that adherence to the tax laws is very high.

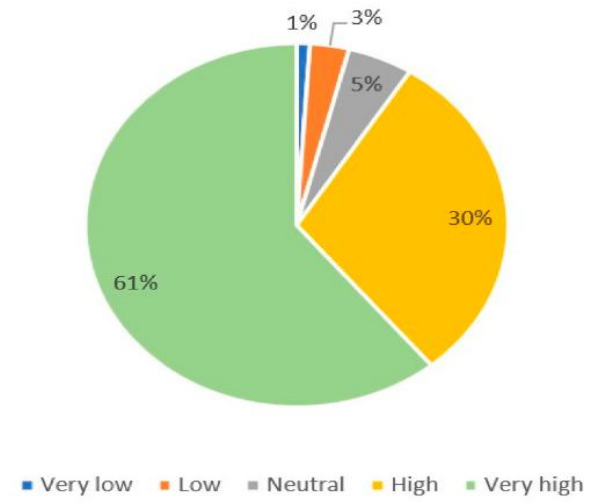

Fig 12 . 3 : Artificial Intelligence and Big Data Analytics in Shaping the Future of Professions

Tax morale, which is defined as the implicit contract between the individual and the state, is achieving increasing attention from politicians and scholars alike. Although it

has often been assumed to result from broad norms of socialization that make tax compliance acceptably high, it is in fact a theory of micro-behaviour. The strategy of communicating with the general public has to be based on behavioral economics-like explanations, drawing on social norms, sunk costs, mental accounting, and other behavioral insights. It is not sufficient to outsource the communication task to tax professionals.

12.10. Conclusion

The recent technological revolution has produced a new and transformational change in the nature of information processing systems using Artificial Intelligence and large data analytic models. It has produced seismic change in the production process of private production firms in the economy. This paper argues that a similar wave of innovation will become apparent in our public sector systems, the tax system and its administration and the public finance system and its administration to ensure public ethics in the design, implementation and consequences of these systems for society well-being. Both the potential negative impacts and potential positive consequences of this AI and innovation wave are made clear in our paper, which are certainly not neutral, for such taxation and public finance processes and the software and data monitoring systems which are used.

Guided by the needed neutrality condition of these public systems for positive and negative impacts on the well-being of the citizen units producing and allocating resources in the market, we stress the needed conceptual and empirical designs needed to inform and audit these systems for possible disruptive effects. We adopt a conceptual and methodological focus in this paper, assisted by empirical results for some countries, of importance but not at the center of the paper's design focus. We end by noting that many of the AI-enabled effects and policies must still be performed by human beings as all citizens must, but without the needed new systems, it will be a difficult task. We emphasize that we remove ourselves from the messy conceptual and empirical debates on the levels and structure of taxation and spending on individual market outcomes and allocations.

12.10.1. Reflections and Future Directions in Taxation

The book concludes that key developments in the rapidly evolving fields of AI, data, and analytics are inexorably heading towards a merging of the spheres of economic and behavioral modeling, decision-making, and consequential tax policy, design, and administration decisions. These technologies are improving, radically lowering the cost, and making widespread use more likely. The developments are also making it less likely that the needed level of scrutiny will be imposed on market and non-market uses of the

technologies over both labor and capital decisions. While dealing with designing social forbiddances against employers and capital use invasion of privacy impediments has been a continual part of societal debate, it is now being amplified and made increasingly urgent with the labor force retrenchment phase that is developing with developments in generative AI.

Consequently, also amplified and made increasingly urgent, are the equity issues associated with trying to prevent exacerbating macroeconomic growth stagnation risks through tax policy and design choices. Designing taxes on economic profits received by AI and tech mandating non-duality functions to ameliorate macroeconomic growth stagnation risks, is an increased urgency area. Taxpayer marginal motivators to work decisions are particularly responsive to the bottom of the net income tax schedule, if rates for imputed income from capital are not raised proportionally at the top, a possible further incentive for capital to try to relocate through low tech, low profitability, straightforward tax avoidance actions. But consistent with these equity concerns, the revenue needs of countries along with compliance costs, both efficiency and equity related, are also problems of current priority, that developing AI and data capabilities could help with.

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