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Taxation of Robots

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This brief is intended for use by governments seeking to address new challenges arising from the proliferation of robots. It examines probable economic effects, which could lead to a shrinking of traditional payroll and income tax bases, and discusses the advantages and disadvantages of taxing robots. It also explores possible tax instruments and relevant developments in Asia and the world. The brief argues for well-designed robot taxes that consider the principles of efficiency, equity, stabilization of international capital markets, and administrative feasibility.

Introduction

Robots have emerged that have potential to support and enhance human endeavor. While their development is ongoing, robots are already being increasingly used in factory production and are performing tasks in domestic and office environments previously done by humans, powered in varying degrees by artificial intelligence (AI).

The future role of robots had been foreseen as early as a century ago, such as by the engineer and philosopher Ludwig Wittgenstein (1889–1951) of the University of Cambridge in the United Kingdom (UK). Wittgenstein pondered if machines could think, his conclusion being that machines may not outthink human beings; rather, they could discourage humans from thinking for themselves. Robots have also figured prominently in literature, in particular science fiction (or sci-fi). HAL 9000, a super-computer, outsmarted astronauts in *2001: A Space Odyssey*, a landmark sci-fi novel written by Arthur C. Clarke and published in 1968.

In recent times, Harari (2017) points to human beings becoming more dependent on technology and cites as an example the use of the global positioning system or GPS in vehicles for navigation.

Within the scientific community, there is a hypothesis that humans, having evolved from organisms for millions of years, can, in turn, design, develop, and generate machines that can mimic the way humans think. Eventually, according to this community, such computers are likely to think for themselves and, through AI, take over tasks previously held by humans.

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Robots are likely to lead to a change in the composition of labor through a need for and movement toward more specialized skills.

Lee and Qiufan (2021) provide a list of economic activities that are becoming productive using AI; medical analysis, for example, can enhance human longevity.[1] It is an enthralling, albeit fearsome, vision of the future—a world wherein machines will likely replace humans in productive activities while improving their physical well-being. In such a scenario, humans will be unable to keep pace with the advancement of AI. Harari (2017) refers to it as the "data religion" or "dataism."

While there is a certain amount of inevitability in AI taking over many channels of human activity, the question is whether it should begin to make a fiscal contribution to society. Initial questions arise on the characteristics of robots—can they be considered as a homogeneous commodity or are they heterogeneously scattered in concept and construction, i.e., are they employment-replacing or, with the increase in productivity, are they employment-complementary? Also, how should robots be considered with respect to capital? Do such changes affect the current demand for different factors in production and, therefore, their returns? And could tax policies be used to mitigate any adverse impact of such changes? These questions need to be addressed while recognizing the long-term benefits of AI to human society.

It is in this context that the consideration of taxing robots arises, also because they are likely to replace significant traditional sources of revenue such as white-collar and blue-collar labor. Accordingly, the taxability of robots may be analyzed and designed. Can (or should) robots be treated as a taxable person—either individual or juridical? Should they be covered by income or consumption tax, or both? The exploration of such issues comprises the subject matter of this governance brief.

Background

Before narrowing down the taxation aspects of robots, it should be helpful to examine their probable economic effects.

Economic Effects

The economic effects of robots will include the substitution of labor by "capital," in particular AI. In turn, this could lead to a shrinking of traditional payroll and income tax bases. Robots are also likely to lead to a change in the composition of labor through a need for and movement toward more specialized skills. Further, as specialized labor complementary to AI substitutes other forms of labor, incomes will become increasingly concentrated among higher-skilled, upper-income groups whose more advanced skills will become more in-demand.

As a result, technological advances would risk bringing about income inequality, to the disadvantage of low-skilled workers, including women who can often access only routine, low-paying jobs (Brussevich et al. 2018). The main beneficiaries from the advent of AI will be the owners of AI or capital owners (Berg, Buffie, and Zanna 2018). AI could exacerbate the existing state of inequality, thus issues would arise on the feasibility and design of mitigating measures, including redistributive policies.

One issue to be considered is the likelihood of achieving "benign outcomes through broadly shared prosperity from technological progress" (Korinek, Schindler, and Stiglitz 2021). This is pertinent for all economies, including advanced economies and developing member countries (DMCs) of the Asian Development Bank (ADB). Given the minimal likelihood of international sources of resource transfer at present, DMCs may have little option but to deploy resources from domestic taxation measures. Otherwise, much needed socioeconomic expenditure measures for redistribution to the "losers" from AI may remain underfinanced.[2]

Implications for ADB's Developing Member Countries

DMCs will face challenges in order to contend with the advent of AI. There is an ongoing transition from exclusivity of manufacturing-based commodity exports to incorporating AI in various processes such as the modernization of the agriculture and services sectors, among others.

The successful adaptation of AI requires adequate redistribution policies and a

[1] They reassure that, at present, countries are cooperating in AI development due to mutual interests, but there is a difference in their business approaches. The US, for example, is providing platforms on which technology entrepreneurs can improve AI. The People's Republic of China (PRC), on the other hand, is offering "productization," i.e., AI applications with immediate business use.

[2] Targeted expenditure policies including enhanced investment in education or infrastructure can reemploy some of the displaced labor and narrow the digital divide within the population.

commensurate resource base. Resources must come primarily from DMCs in the form of tax revenue. This is the case given that no multilateral discussion has taken place with regard to the transfer of resources from countries that are considered "digital giants" (and their satellite economies that would benefit from AI) to developing countries.

Alonso et al. (2020) argue that advanced economies would benefit more from computerization, a reflection of their higher initial capital stock. The ownership of technology as capital could also lead to rapid development and supply of skilled labor. DMCs are likely to encounter a challenge in the supply of skilled labor in relation to advanced economies. Since technological progress, including AI, is likely to impact lower-skilled labor, it may be expected to drive down wages in DMCs. It is, therefore, possible to speculate that DMCs would become worse off compared with the rest of the world.

As the labor force gets displaced or replaced, and multinational enterprises (MNEs) gain tax incentives within their jurisdictions, DMCs are likely to lose significant portions of their traditional tax bases—including those from individual, corporate, and/or payroll. As argued above, such losses would lead to a worsening of inequality and would encourage DMCs to seriously consider and introduce comprehensive taxation on robots. This could follow the proposed tax on the digital economy that is yet to be introduced after several years of multilateral efforts to implement it. DMCs could take the initiative and opt for available structures of robot taxation, a discussion of which appears in the subsection on *Possibilities of Taxing Robots*.

Pros and Cons of the Taxation of Robots

Frey and Osborne (2013), Ford (2015), and Wadhwa and Salkever (2019) comment that emerging technology would substitute or replace between 50% and 90% of labor employment in the US, while Kovacev (2020) predicts economic dislocation and displacement of labor, in general. A question arises on how these developments would impact payroll or income taxes. While it is premised on the taxation of robots, there is also the need to provide income support for displaced workers.

However, strong arguments also exist in favor of AI being complementary to labor. As per this view: (i) technology would be labor-complementary resulting in rapidly rising household incomes; (ii) higher incomes would lead to considerably higher demand for the consumption of goods and services, including road, rail, and air transport; and (iii) this would lead to a continuous cycle of demand and growth for the technology sector (Atkinson 2019). And, even if labor gets displaced, workers could be absorbed in socially higher-valued sectors that increase the well-being of society but currently have insufficient resource allocation.

It is sometimes overlooked that modern societies are increasingly able to afford leisure activities. This is already evident in much of western Europe and is spreading to countries in East Asia. As larger segments of society are able to afford leisure, there should be less pressure in the longer term to catch up with labor deployment patterns of earlier periods. Instead, the number of working hours per week should decline and more people would be concerned with health-care provision, climate change, and the environment. Such concerns should lead to higher employment opportunities in these sectors.

Thus, with the advent of AI, employment is likely to shift from assembly-line activities to those related to health care and the environment, for example. Health care will be needed as populations live longer, become more aware of healthy living, as well as due to the emergence of pandemics and new viruses; but this sector has traditionally suffered from lack of funds and could use resources from the taxation of robots. In the case of the environment, progress befitting advancing societies would need to be rapidly made. Since challenges such as climate risk are having adverse short-run and long-run ramifications globally, their successful mitigation would need global effort.

Chand, Kostic, and Reis (2020) argue that an education tax would be preferable to a robot tax and revenue from it could be used to train and redeploy workers displaced by robots. Conceptually, that appears to shift the solution from a tax on capital to a tax on labor, and to self-financing by labor as a result of being displaced by robots. It also skirts around the central tenet of AI replacing human activity in an increasing number of channels and whether AI should be the source of revenue for compensation.

As the labor force gets displaced or replaced, and multinationals gain tax incentives, DMCs are likely to lose significant portions of their traditional tax bases.

It is possible to tax robots (i) as a form of consumption of commodity or service, (ii) for the income generated as a factor of production, (iii) to allow depreciation from the income tax base for depletion of value, or (iv) as a combination of all three, which is more likely to occur.

Robots and Taxation

Why Robots Should Be Taxed

Reflecting the emergence of robots, taxation possibilities have emerged and options are being discussed. Those who oppose taxation tend to reason that robots are more efficient and taxing them would reduce overall productivity (White 2018). Further, if robots comprise capital which is characterized by mobility across boundaries, taxation would lead to relocation to lower-taxed jurisdictions. However, this argument should not carry weight for several reasons:

(i) The organic composition of financial capital moving in and out of global economies, against which the international community has earnestly raised the issue of base erosion and profit shifting, is quite different from the capital represented by robots or AI.

(ii) In whatever form the income from capital has been selected to be taxed in a particular tax code, the fact remains that capital income is the same as any other source of income and, therefore, should be taxed as all income. That capital income has turned out to be difficult to tax has not converted that income in form or substance to ownership of a unique property that forbids it from being taxed.

(iii) In the initial phase of robot technology, many countries offer tax incentives for their development; commensurately, there should be little fear of flight as in other forms of capital.

(iv) As the use of robots inevitably increases, raising productivity along with incomes, taxing robots has the potential of generating revenue for government expenditure.

(v) Empirical evidence does not reveal that low capital taxation is necessarily linked to high economic growth. In that case, tax havens would have exhibited high growth but, in reality, act more as conduits rather than destinations of growth. At the same time, areas with relatively high taxation such as the People's Republic of China and India have tended to experience high growth.

Therefore, up to this point in the argument, there is no reason why robots should not be taxed. Shiller (2017), for example, indicates that a modest tax on robots would assist in better mitigating any deleterious effect of this form of transformative technology. Guerreiro et al. (2020) recommend a robot tax using an overlapping generations model with routine and non-routine skilled workers in the labor force. The government's objective is to redistribute income toward displaced routine workers. They find that "automation can destroy many of the jobs held by the older generations and lead to a dramatic rise in income inequality," and conclude that the optimal robot tax is non-zero as long as there are skilled workers in the labor force. There is likely to be a greater need for public sector financing through tax revenue for increasing social benefits and pensions as populations age.

Challenges in Taxing Robots

Nevertheless, challenges are likely to arise in the taxation of robots. At present, robots are inanimate objects with no independent juridical identity. They neither receive a share of profits from their owners nor earn any income (Mitha 2017). Therefore, contemplation of any tax on robots has to proceed on the basis of presumption. Indeed, there are many instances of presumption in both income and consumption taxes.

Reflecting the rapid progression of AI, however, it is not impossible that, in the foreseeable future, advanced AI should be able to accomplish tax structuring just as humans do at present and may sharpen such mechanisms even further (Bogenschneider 2020). As robots and AI undergo further progress, it is anticipated that they might also begin to comprehend the norms of tax compliance and extend tax avoidance to its limits. This could be attained by intensive and continuous search by advanced AI of tax avoidance practices globally and stretching those practices further through their own advancing technology and techniques.

As such, AI may also progress toward developing or establishing new norms of tax compliance and tax avoidance that may not work in favor of efficient tax administration implementation. Effectively, AI could be shaping tax policy and practices—"tax actuating"—to counter which, superior AI would likely have to be employed by tax administrations themselves. Therefore, only a very carefully structured tax system can bring robots successfully within the tax net. Such realities will pose significant challenges to DMCs as much for their resource costs as for the level of highly skilled professionals needed to run such sophisticated systems. Nevertheless, DMCs cannot afford to stay behind since, in the initial stages at least, there may not be urgent need for such advanced technology to run rudimentary AI systems.

Table: Characteristics of Tax Instruments for Robots

S. No.	Tax Instrument	Neutrality of Labor/Capital Treatment	Design	Revenue Potential
1	Tax based on rate at which robots replace labor	Yes	Achievable but challenging to design	Medium
2	Quasi-income tax on hypothetical robot salary	Yes	Achievable	High
3	Disallowance of tax deductions	Depends on improvement of relative labor/capital treatments	Easy	Medium
4	Similar incentives for robots and labor	Yes	Achievable though irrational	Low
5	Scale back depreciation rates for robots	Depends on improvement of relative labor/capital treatments	Achievable	Medium
6	VAT/GST on robot activities	Yes	Easy	High
7	Levy of selective excise duty	No	Achievable	High, depending on rates

GST = goods and services tax, S. No. = serial number, VAT = value-added tax.
Source: Author's formulation and Bogenschneider (2020).

Possibilities of Taxing Robots

To enable the taxation of robots, a number of elements have to be fulfilled including the definition of the taxable person, freeing the taxable base for expansion as needed, and narrowing down the types of taxes that are most suitable (Oberson 2019). Several possibilities have been discussed regarding taxing robots, essentially comprising a mix of income and consumption taxes:

(i) Impose a tax based on the rate at which an industry, at an individual firm level, replaces labor with robots of any type.
(ii) Construct a quasi-income tax by imputing values to robot incomes that may be derived from the income of labor that robots displace.[3]
(iii) Rather than provide tax incentives for the use of robots, disallow tax deductions for the use of robots.
(iv) Contrarily, neutralize incentives for robot use by providing equivalent incentives for labor use.
(v) Vary depreciation rates to discourage (or encourage) the use of robots and introduce special accounting methods to achieve these objectives.
(vi) Extend a goods and services tax (GST) or value-added tax (VAT) on the 'consumption' of robots by adding the range of robotic activities to the GST or VAT base.
(vii) Levy a selective excise duty on the production and use of robots at a high rate, just as with luxury vehicles, which may be perceived as justifiable if robots enjoy high depreciation rates under the income tax.

It is possible to tax robots (i) as a form of consumption of commodity or service, (ii) for the income generated as a factor of production, (iii) to allow depreciation from the income tax base for depletion of value, or (iv) as a combination of all three, which is more likely to occur. The table elaborates on this list of possibilities using these criteria: (i) the instrument's impact on the neutrality in the use of factors of production, (ii) the ease with which it can be designed, and (iii) their potential revenue effect. Considering all aspects, it appears that options 2, 6, and 7 come out on top, while options 3 and 5 follow. Option 1 would be challenging to design unless the

[3] Make sure not to include the value of the payroll tax imposed on labor since, while labor will receive a return for this tax paid at the time of retirement, robots would not enjoy such benefit.

The design of robot taxation may rest on how it is perceived—whether as labor or capital—though both forms may be contemplated.

authorities are ready to differentiate the rates for each robotic use in industry. Option 4 is irrational since providing more incentives throughout the tax system is tantamount to reducing the corporate tax rate. Further, options 2, 6, and 7 could also be used by DMCs since presumptive taxation (option 2), VAT/GST (option 6), and selective excises (option 7) are already widely prevalent in DMCs.

If one country provides incentives for capital investment including for robots, then investment in robotics will tend to occur to a greater extent compared with other countries. However, again, the speed of movement of such an investment has to be separated from that of the movement of financial capital across international boundaries. Unlike the former, the latter moves instantaneously and could occur merely in response to unstable speculation in international financial markets (Shome 2021).

Incidence of the Taxation of Robots

Economists have demonstrated that a tax may be collected from an intended and identifiable base. But, in the ultimate analysis, it may not be borne by that tax base when the reactions to the imposition of that tax by those who are impacted by that tax are taken into account. Rather, the burden may be passed on to unintended tax bases. This is termed the "incidence" of a tax. An example is a tax on the income from capital used in the corporate sector (excluding capital used in the noncorporate sector) on which a tax is imposed, or the corporate income tax. There has been a long-standing debate for 60–70 years on who ultimately bears the burden of this tax even though it is collected in the first instance from corporations. It turns out that the burden may be borne entirely by capital (Harberger 1966); or shared between capital and labor; or shared among capital, labor, and land if the latter is added as a third factor of production used in the corporate real estate or agriculture sectors (Shome 1981). Such outcomes depend on the elasticities of demand for corporate and noncorporate goods, which reflect consumption preferences, and the elasticities of substitution among the three factors of production that reflect the prevailing state of technology.

It is from the latter determinant of incidence—emanating from the possibilities of substitution—that the taxation of robots may be questioned. To what extent will robots substitute the use of labor by pushing out labor to earn more income for itself from which to pay tax? And, therefore, what will be the final outcome for the income condition of labor?

Relatedly, it may be asked whether robots comprise labor or capital for tax purposes. Abbott and Bogenschneider (2018) and Hemel (2020), among others, discuss this in some detail. If a particular robot tends to substitute labor, then it may be perceived as possessing characteristics similar to that of traditional labor. In that case, the robot may be treated as a new form of labor that adds to the pool of labor and a tax may be imposed on robots based on an imputed wage or salary that has to be set on the basis of equivalence.

Even in the current technological milieu, ordinary capital in the form of machinery may be a labor substitute that may call for a different tax regime. If it is a different form of labor, it would be familiar to the prevailing practice of different tax regimes for capital and labor. In other words, the design of robot taxation may rest on how it is perceived—whether as labor or capital—though both forms may be contemplated. Nevertheless, equivalence of tax on robots as capital or labor, though it can be accomplished, may not be straightforward to design. What has to be achieved is a value of the stream of imputed wages that is assigned to robots that could be the basis on which to tax robots. Eventually, AI itself can be assigned to achieve the task of appropriate design (Hemel 2020).

Limits to Spillover Effects

Some caution is necessary against arguments that contest robotic taxation on somewhat novel grounds. For example, robots should not be taxed since that will adversely affect any capital-using sector, including small enterprises. In reality, small enterprises suffer because large MNEs are usually the recipients of relatively beneficial tax treatment that needs to be corrected. There is evidence that this also occurs when large domestic enterprises are the beneficiaries of tax and nontax preferences of governments. Another argument is that MNEs provide large spillover effects that benefit smaller enterprises, if not society as a whole. Therefore, the argument goes that ownership by MNEs, including of robots, should not be taxed just as property should not be taxed, reflecting that the rank of wealth holdings is altered by property tax (Epstein 1986). This presumes that, in effect, property ownership has no link to the ability to pay. Such arguments should be weighed against the desirability of achieving a tax system that is based on a rational structure and therefore acceptable,

functional, and administrable, rather than a system reflecting arguments that tend to reside at a distance from normal considerations.

The slew of deductions offered to international business also reduce any potential bite of corporate taxation. And, where tax deductions are high, the possibility of reinvestment from nondistribution of dividends is also high. Therefore, it is not entirely clear that capital in the form of machinery or robots will migrate that easily, in particular from those jurisdictions that offer high depreciation rates and capital allowances. As AI advances, without carefully designed tax instruments, tax deductions for reinvestment or additional investment are likely to proliferate, safeguarding the place of AI and robots from the vantage position of a country investing in advanced technology. It may also be speculated that even a high rate of capital income tax would not alter the decision as long as reinvestment is associated with high deductions. Actual outcomes would reflect "deep learning" that should reveal economic reactions of MNEs based on actual data and their cash flows across international boundaries. Advanced AI itself is likely to be able to make those predictions in time (Bloom 2020).

Urgency of Robot Taxation

Robot Taxation in Asia

The Republic of Korea has shown the way in using an instrument to increase the burden of taxation on the automation sector through reducing tax credit by 2 percentage points. Silkin (2019) points out that, as the Republic of Korea became the most automated country, unemployment reached a 17-year high, thus prompting the government to take action. Though the change in the tax code provided disincentives for capital investment in technology, the measure could not be seen as a direct or indirect tax on robots. Nevertheless, if the objective was to slow down automation, Kovacev (2020) points out that there is some evidence that the scaling back of tax credit has slowed robot installation in the Republic of Korea for the first time since 2012. However, the Republic of Korea continues to be the most automated economy globally, and robotics and AI continue to mark their presence in important sectors of the economy.

While the Republic of Korea is the only country to have any kind of robot taxation, similar arguments have started to emerge in other Asian countries. In Japan, no robot taxation is introduced, but there have been tax measures supporting the introduction of robots, sensors, and systems necessary in efforts to boost productivity through collaboration and utilization of data.[4] Thailand has also implemented various measures to promote the growth of automation and robotics, as the country was the third-largest market for industrial robots among the members of the Association of Southeast Asian Nations in 2017. The Thailand Board of Investment has offered incentives, including a 3-year corporate income tax exemption on the revenue of an existing project, to promote investment in technology and to improve industry efficiency.[5]

Action from Other Countries

Interest in a robot tax is beginning to emerge in Canada, the European Union (EU), the United Kingdom (UK), and the US. The Green Party in Canada has suggested a robot tax to protect individual workers, and the UK Labour Party has expressed the need for benefits to shift from global corporations that make money out of advanced technology to other individuals. The majority of European leaders agree that the rise of automation should be controlled. The European Parliament has called for an EU-wide legislation to regulate automation, which would include a definitive framework for their development and deployment, and the establishment of liability for their actions.

New York's mayor, Bill de Blasio, has called for an automation policy designed to protect an estimated 36 million jobs that may be made obsolete by technology by 2030 (Silkin 2019).

With time, it is not unlikely that the algorithms of advanced AI may surpass those of the human mind. Thus, it is now time to put effort to get a handle on the robotic sector. Kovacev (2020) points out that this may be a moment of a "highly probable, high impact threat… from AI, robotics and automation" that could cause economic dislocation and displacement of workers with a concomitant deleterious impact on the tax system and revenue from labor-based taxes. A tax on robots should make up for the difference through tax policy whose responsibility lies with policy makers.

As AI advances, without carefully designed tax instruments, tax deductions for reinvestment or additional investment are likely to proliferate.

[4] The Small and Medium Enterprise Agency. https://www.chusho.meti.go.jp/zaimu/zeisei/2014/tyuusyoukigyoutousisokusinzeisei.htm; https://www.chusho.meti.go.jp/keiei/kyoka/kougyoukai.html.

[5] Thailand Board of Investment. 2019. Thailand promotes AI, robotics technology to spur industry 4.0 readiness. Press Release. 21 May. https://www.boi.go.th/upload/content/no76_2562_5ce64eb915fa9.pdf; Thailand Board of Investment. Automation and Robotics. https://www.boi.go.th/index.php?page=business_opportunities_detail&topic_id=117516.

Multilateral or Unilateral Taxation

Efforts at taxing the digital economy perhaps provide an insight into the urgency of taxing robots. Until recently, the international tax community was not able to agree on how to tax the digital economy or on its adequacy, as revealed in prolonged discussions at the Organisation for Economic Co-operation and Development (OECD). The discussions clustered around the so-called Pillar One and Pillar Two of digital economy taxation. Pillar One pertains to the distribution of taxable profits across jurisdictions, while Pillar Two focuses on stipulating an internationally agreed minimum tax. On the taxation of the digital economy, which is related to robot taxation, an OECD report in January 2020 proposed a "unified approach" for negotiating a consensus-based solution to be agreed by mid-2020. This was buttressed by a revised plan of work that replaced the earlier plan of work of May 2019.

Reflecting the perceived slow progress in the matter, several countries, meanwhile, took unilateral measures and introduced taxation of the digital economy. An equalization levy or its variations, which countries are using to equalize their own digital economies with the rest of the world, have been viewed by the US as ring-fencing the digital economy. In 2019, the Office of the US Trade Representative (USTR) initiated an investigation into a 3% tax on digital services adopted by France and concluded that this was unreasonable, unfair, and discriminatory toward US commerce and companies such as Google, Facebook, Amazon, and Apple, and proposed retaliatory duties. From 2020, the USTR extended its investigation to Austria, Brazil, the Czech Republic, the EU, India, Indonesia, Italy, Spain, Turkey, and the UK. In January 2021, the USTR found that India, Italy, and Turkey had discriminated against US tech firms.[6]

Meanwhile, work progressed at the OECD and it was expected that Pillar One would propose certain options that would (A) result in a formulaic allocation of profit among members, or (B) assign a fixed remuneration based for the first tranche of baseline distribution and marketing functions that take place in the market jurisdiction, or (C) be applicable where in-country functions exceed the baseline activity compensated under option B. Unlike option A, options B and C would not create any new taxing rights; rather, they would be based on existing profit allocation rules (including a reliance on physical presence). The formula-based approach would be applied only in option A.

If the technical details could be worked out, key policy features of a consensus-based solution to Pillar One was expected to be released in July 2020, with a report by the end of 2020. Instead, the OECD announced a deferral of consensus in the 140-member Inclusive Framework of countries.[7] On 8 October 2021, however, 136 of them officially agreed on certain key parameters to reallocate taxing rights across market jurisdictions.[8]

Under Pillar One, taxing rights on more than $125 billion of profits are expected to be reallocated to market jurisdictions each year. It would be applied from 2023 to MNEs with a global turnover above €20 billion and pre-tax profitability above 10%. A review is to be carried out 7 years after the agreement comes into force. The turnover threshold is to be reduced to €10 billion, contingent on successful implementation during the first phase.

In addition, a minimum corporate income tax has been set at 15% (Pillar Two) that will apply to MNEs over a threshold of €750 million. Pillar Two is estimated to generate around $150 billion in additional global tax revenues annually.[9] However, if the thresholds are high enough for MNEs operating in DMCs to fall below the thresholds, DMCs may not gain much in revenue terms.[10]

The process, however, is not yet completed. The agreement, called the Multilateral Convention, will require all parties to remove their existing taxes on digital services and not introduce any new tax. It

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[6] P. Shome. 2021. *Taxation History, Theory, Law and Administration*. Springer Texts in Business and Economics. Cham: Springer. https://doi.org/10.1007/978-3-030-68214-9.

[7] OECD. 2021. Statement on a Two-Pillar Solution to Address the Tax Challenges Arising from the Digitalisation of the Economy. OECD/G20 Base Erosion and Profit Shifting Project. 8 October. https://www.oecd.org/tax/beps/statement-on-a-two-pillar-solution-to-address-the-tax-challenges-arising-from-the-digitalisation-of-the-economy-october-2021.pdf.

[8] See OECD update of 4 November 2021. https://www.oecd.org/tax/beps/oecd-g20-inclusive-framework-members-joining-statement-on-two-pillar-solution-to-address-tax-challenges-arising-from-digitalisation-october-2021.pdf.

[9] OECD. 2021. International community strikes a ground-breaking tax deal for the digital age. Press release. 8 October. https://www.oecd.org/tax/beps/international-community-strikes-a-ground-breaking-tax-deal-for-the-digital-age.htm.

[10] There is a protective clause that countries will be able to apply an Income Inclusion Rule (IIR) to MNEs headquartered in a country even if they do not meet the threshold. How exactly this clause will operate has to be spelled out.

[11] The Undertaxed Payment Rule will deny deductions or require an equivalent adjustment to the extent the low tax income of a constituent entity is not subject to tax under an IIR.

will be finalized and opened for signature in 2022, and become effective in 2023, with an Undertaxed Payment Rule[11] coming into effect in 2024.

In summary, the lesson is that it has taken long drawn-out negotiations with the participation of 140 countries to arrive at a set of relatively simple guidelines for taxing the digital economy globally. The negotiations, together with the long period it is taking to move toward actual implementation, point to the urgency for robot taxation, which also may acquire too many dispersed opinions or diverse country policies.

It is in this light that the taxation of robots should be hastened since otherwise it could become an obstacle to its international taxation. As AI advances, it is not unlikely that interested parties not only would not want to tax the robotic sector but would also weigh down on countries that do so by raising it as an international issue. That would again need to be deliberated and resolved at the level of an international forum such as the OECD. Unfortunately, the outcome of such a process can be foreseen from the experience of the taxation of the digital economy. Therefore, countries should give haste in designing and introducing the taxation of robots within the purview of their tax codes. And DMCs cannot afford to stay behind.

While taking note of the types of taxes that are best suited for robot taxation in the subsection *Possibilities of Taxing Robots*. DMCs may consider seeking technical assistance (TA) from multilateral institutions. There are several channels from which TA may be sought. These include the fiscal departments of these institutions that, apart from their own funds, manage funds placed there by advanced member countries for the provision of a TA. There are also regional TA centers that function under their auspices. In addition, they run training centers in European and Asian locations, including in Singapore, that DMCs can access. They could be requested to introduce familiarity courses on robot taxation at least twice a year. Therefore, there are several channels through which DMCs could proceed briskly with learning, introducing, and implementing robot taxation.

In this context, ADB launched an Asia Pacific Tax Hub which serves as a platform for strategic policy dialogue; knowledge sharing and dissemination; and development coordination among ADB, DMCs, and development partners. Under the Asia Pacific Tax Hub, ADB will proactively use technical assistance support and financial instruments such as policy-based and project lending for its DMCs to enhance domestic resource mobilization efforts through adoption of international best practices and innovative channels.

Earmarking of Tax Revenue

There is argument in favor of earmarking the revenue from a robot tax for distribution purposes, such as for minimum income support. Such proposals are reminiscent of international efforts for a tax on carbon emissions to offset climate change, or a miniscule tax on all financial transactions to be used to eradicate global poverty. In the context of a robot tax, the concern is that since robots are likely to replace low-skilled jobs, therefore its revenue should be used for basic income support. Alternatively, revenue from robot tax could also be used for retraining, reskilling, and developing transferrable skills for displaced workers. In a manner, it would be a quid pro quo of the replacement of labor by capital. In its design, however, earmarking tends to channel and block expenditure into certain categories that may on occasion turn out to be against society's overall preference. Nevertheless, in this case, earmarking would be sensible due to the obvious link between capital and labor.

Conclusion

This governance brief argues in favor of the taxation of robots based on income and consumption, as well as on their characteristics of capital or labor. This is true for advanced economies and DMCs alike. The argument for taxing robots is not merely based on the revenue it can generate, which is an important objective as labor gets replaced and social support becomes inevitable, but also to improve equity in the overall tax structure. Otherwise, the burden of taxation tends to fall heavily on labor income, while capital income escapes taxation to a greater extent through deductions and allowances. Therefore, robot taxation should not suffer from tardiness or arguments motivated by a single-minded empathy for capital ownership. While such arguments should be given due consideration, they should be politely set aside. The taxation of robots needs to be designed according to the principles of taxation, including efficiency, equity, stabilization of international capital markets, and administrative feasibility.

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Merely regulating the robotic sector is insufficient since, in the ultimate analysis, regulation can be circumvented by AI. Instead, a well-designed robot tax may have potential, at least for some time, in shielding labor where it is needed, generating tax revenue, and protecting humans from a subsidiary position given the rapid rise of AI in the not-too-distant future. One issue should not be ignored: that rapid replacement of labor by robots may reduce people's self-worth as such advancements in technology occur at the expense of the labor class. It is for global policy makers to decide whether to move forward without a robot tax or, in recognition of the objectives of protecting labor and managing the relentless advancement of AI, to introduce well-designed taxes on robots.

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